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THE HIGH COST OF EATING: CAUSES OF INTERNATIONAL DIFFERENCES IN CONSUMER FOOD PRICES

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Prices of food vary greatly among the developed countries, and some countries' food prices have been consistently far above the OECD average. The main explanation for food price difference is the extent of protection of agricultural products at the farm level. A second important influence is the level of VAT on food. A third is deviations of aggregate country price levels from the levels that would be predicted from their *per capita* incomes, presumably because of omitted characteristics of the countries' economies, such as, possibly, inefficient or monopolistic service sectors. In addition, there are occasional episodes of high or low price levels due to temporary factors affecting exchange rates.

The degree of protection of agricultural products is treated both as an exogenous factor and as an endogenous one. In the latter case, it is explained by climatic conditions and, presumably, the political influence of the agricultural sector or a general desire to retain an agricultural sector despite poor growing conditions.

INTRODUCTION

Although farm products are tradable goods, and a substantial part of the world's trade, prices of food to consumers vary widely across countries. Even among the more developed OECD countries, the highest retail food price level in 1990, for Finland, was more than twice the lowest, for New Zealand, and 60 percent above the average for the EC countries. Moreover, these price disparities have persisted over long periods.

Surprisingly little is known empirically about what accounts for wide and persistent price disparities between countries. Such price differences call into question the empirical validity of the idea of purchasing power parity. They raise issues that are important to an understanding of real income differences between countries and are also relevant to evaluations of policy. To the extent that high prices are the result of, e.g. import protection and weak domestic competition, they may represent a largely hidden cost of anti-competitive policies.

Several possible explanations come to mind for the high food price levels in some countries. One is that these are countries with relatively high *per capita*

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incomes, and price levels in general have been shown to be positively correlated with income levels (See, for example, Kravis and Lipsey, 1983 and 1987, and the reports on the UN International Comparison Program cited there). Another is that the climate is relatively poor for agricultural activity in the countries with high food prices, and the levels of protection required to protect domestic agriculture in countries with no comparative advantage in agriculture may be high. A third is that rates of taxation, and particularly taxes on food, could be higher than in other countries. A fourth is that food at the retail level may include a large service component and services may be high in price in these countries, either because of their high income levels (Kravis and Lipsey, 1983; Bhagwati, 1984) or for other reasons, such as lack of competition in protected markets.

In this paper we explore the determinants of food price levels among the OECD countries, using as a basis the international price data collected as part of the UN International Comparison Program (ICP). We have confined our attention to the OECD countries so as to have a group of fairly similar economies. In particular, we wanted to avoid the problems in food price measurement presented by large subsistence agriculture sectors. We have relied mainly on the food price data prepared by the OECD from basic data collected as part of the ICP.

The Aggregate Price Level

Although our main interest in this study is in the factors determining food price levels, we begin with an analysis of general, or GDP, price levels on the theory that some of the variance in food prices may reflect these broader influences. We think of the factors determining the general price level as falling into two classes: what we call long-term, or structural influences, and short-term ones. Structural factors are those that change only slowly, such as the country's real *per capita* income, its level of taxation, the resource base, the share of services in output, the country's openness to trade, and the level of protection of domestic production. Short-term factors might be fluctuations in exchange rates or in monetary or fiscal policy. In this paper we examine only long-term influences on the general price level; short-term influences, to the extent they can be disentangled from the structural ones, appear mainly as changes in the price level residuals for individual countries.

Analyses of differences in general price levels (Kravis and Lipsey, 1983 and 1987; Bergstrand, 1991; Clague, 1985, 1986; Kleiman, 1993) have generally found that price levels are positively correlated with *per capita* real income across countries or with factors associated with high *per capita* income such as large endowments of land and minerals and large stocks of capital (Falvey and Gemmell, 1991). Other variables that have been suggested, such as the share of tradables in total output or the degree of openness of the economy, have not revealed as consistent a relationship. We have, therefore, begun with *per capita* income, but we have added two other policy variables, each of which takes several alternative forms. One is the indirect tax burden, on the assumption that these taxes—mainly VAT—are passed on to domestic consumers but not to foreign consumers, and are not simply offset by exchange rate levels or changes. The second is the degree of protection given to domestic agriculture, on the assumption that any

one country's protection affects domestic prices but not, to any large extent, world prices. Ideally we would have preferred a measure of each country's overall degree of protection, of which agricultural protection is only a part.

We experimented with two variants of the taxation variable. One is the reported standard rate of VAT or corresponding sales taxes. The second is the overall ratio to GDP, for all levels of government combined, of indirect taxes on goods and services.[1] We have some preference for the latter measure because it is consistent across countries, to the extent that the OECD can achieve such consistency. It covers provincial and state, as well as local governments. The standard VAT rate, on the other hand, covers different proportions of national output in different countries, because there are different treatments of food, production inputs, services, and "luxury" goods in the various national tax regimes.

Of the available measures of agricultural protection, we have used in the equations here the net producer subsidy equivalent (NPSE). The NPSE is a measure of the protection given by governments to their domestic farmers. The gross PSE is the difference between domestic and world prices, to which the net PSE adds explicit subsidies to farmers and subtracts "excess" input costs, such as inflated costs of feed, which could be thought of as a negative subsidy to farmers, or a tax on them. The gross PSE is a measure of protection for farmers imposed at borders, assuming in effect that prices at the farm level would be equal in all countries if there were no protection, and the net PSE adds devices imposed internally.[2]

It might appear tautological to use international differences in prices to explain international differences in prices, but it is not. The farm prices that enter the calculation of the NPSE are a small part of the consumer prices we are attempting to explain. In Sweden, for example, the price to the farmer was, on average, 40 percent of the final consumer price of protected food products, with manufacturing, distribution, retail and indirect taxes accounting for the rest. However, it was only 24 percent of the value of total food consumption, since not all foods were protected.

We have fitted the equations to three-year averages of the dependent and independent variables in order to reduce the effects of transient disturbances on the coefficients. The indirect tax measure we prefer, indirect tax receipts at all levels of government combined as a percent of GDP, is used in Table 1.

More than half the variance across countries in GDP price levels is explained by these equations in every period. The coefficients for GDP *per capita* and the protection measure are always statistically significant. The *per capita* income coefficient is the most uniform over time, but the net PSE coefficient also varies over a range of only about 50 percent (highest as percent of lowest). The protection coefficient is surprisingly high, considering that the PSE applies only to agricultural products that form a fairly small part of final consumption. The size of the

[1]Clague (1993) also used this variable while Kleiman (1993) used the ratio of central government total and indirect taxes to GDP.

[2]The CSE is a measure of the subsidy to consumers in which the PSE, a negative subsidy for consumers, is offset to some, usually small, degree by measures that reduce the prices paid by consumers. We report here only results based on the PSE measure because it is available for a longer period than the CSE and because the measures show very little difference. The reasons for using the NPSE are discussed in Lipsey and Swedenborg (1993).

TABLE 1

EQUATIONS RELATING GDP PRICE LEVELS TO *PER CAPITA* GDP,[a] INDIRECT TAXES,[b] AND NET PSE[c]

	No. of Obs.	Constant Term	Coefficients			$\bar{R}^2$
			RGDPC[a]	INDT[b]	NPSE[c]	
1979–81	22	9.54	0.533	2.76	0.520	0.636
		(0.61)	(4.24)	(3.53)	(2.72)	
1982–84	22	4.90	0.598	1.57	0.452	0.522
		(0.26)	(4.18)	(1.78)	(2.08)	
1985–87	22	−2.01	0.591	1.15	0.619	0.682
		(0.13)	(5.04)	(1.61)	(3.65)	
1988–90	22	9.14	0.553	1.38	0.605	0.585
		(0.44)	(3.65)	(1.46)	(3.52)	

Note: Figures in parentheses are absolute values of *t* statistics.
[a]Real *per capita* GDP, with OECD average equal to 100.
[b]Indirect taxes on goods and services as a percentage of GDP.
[c]Net market support payments as a percentage of market value of products.

coefficient suggests that it may be a proxy for a much wider range of import protection and, perhaps, internal barriers to competition.

The coefficient for the indirect tax rate varies widely, declines in size over time and is significantly only in the earlier years. It is always a positive influence on price levels.[3]

A disturbing feature of the indirect tax rate coefficients is that they also seem too high; it is difficult to see why they should not be close to 1.0, as they would be if they were added on to all internal prices, but had no offsetting effects on export prices or exchange rates [PL = Pretax PL × (1 + INDT)]. The high levels point to a relation to some missing influence on prices that is correlated with indirect tax levels, possibly the extent to which indirect taxes were levied on services.

Our concern that the high coefficients for the indirect tax rate were really reflecting other factors correlated with those tax rates suggested an experiment. We assumed that the VATs, the main component of the indirect tax rate, were passed on directly to consumers and that we could therefore remove their true effect on prices by dividing each country's price level by 1 + % VAT, where % VAT is the ratio of the VAT payment to the value net of VAT. In effect we were assuming that the coefficients for the VAT rate in the equations should be set at one.

The results of these calculations were similar to those of Table 1. In the last two periods, the degree of explanation was higher than for the equations based on total indirect taxes. The coefficients of the remaining variables, *per capita* income and protection, were consistently significant, not very different in size from those in the other set of equations, and more consistent from period to period.

In sum, we find that we can explain most of country differences in GDP price levels within the OECD quite well. The main influence, as has been found for

[3]Kleiman (1993) reports that the impact of indirect taxes fell entirely on the tradables sector of the price level.

broader ranges of countries, is real *per capita* income. In addition, indirect taxes appear to affect the price level, as we might expect since the price level is measured inclusive of indirect taxes.

The degree of protection of farm products was also consistently significant in equations for the general price level, to such an extent as to raise the question of whether it was a cause or an effect of these price levels.

Food Price Levels

The countries with high overall price levels were almost 25 percent more expensive than the OECD average over the whole period from 1979 to 1990 (Table 2). Since the GDP price level includes a large service component, usually thought of as the main source of price level differences among countries, the food price levels might be expected to vary less across countries. In fact, food price levels in the same seven countries were, on average, more than 40 percent above the average of the OECD countries. The seven countries with the highest GDP price levels were also the seven most expensive countries for eating. Since food consumption accounted for a small part of GDP, there must have been some common influences affecting food prices and other prices. The food price levels in the EC 6, despite the price-raising effects of the common agricultural policy (CAP), were just about average among the OECD countries. At the other end of the food price distribution, the lowest price country, aside from the low income ones, was New Zealand, at 24 to 34 percent below the OECD average.

TABLE 2

GDP and Food Price Levels of Seven High Price OECD Countries
Average of Four Periods, 1979–90
(OECD Average = 100)

	GDP	Food
Denmark	119	124
Finland	120	144
Iceland	126	146
Japan	116	148
Norway	136	142
Sweden	123	142
Switzerland	121	138
Average	123	141

Source: Lipsey and Swedenborg (1993), Appendix Table 2.

In theory, CAP means that the EC countries have the same degree of agricultural protection. That should imply that agricultural prices at the producer level should be the same. In practice, however, the degree of protection varies also within the EC. However, the dispersion of consumer food prices within the EC countries is so wide (from Portugal's 73 to Denmark's 129) that it could not mainly reflect such differences in agricultural protection but must involve differences arising in the nontradable sector (wholesale and retail), including differences in VAT.

Whatever the determinants of food prices, one clear characteristic of the levels is their relative stability. Of the 24 countries for which we have price level data, seven were always above average and nine always below; only eight switched positions at any time. For most countries, the food price level must reflect very permanent features of an economy or of its policies toward food industries.

TABLE 3

EQUATIONS RELATING FOOD PRICE LEVEL[a] TO *PER CAPITA* INCOME, FOOD VAT RATES, AND NET PSE[b]
FOUR PERIODS, 1979–90

Period	No. of Obs.	Constant	RGDPC	FVAT	NPSE	$\bar{R}^2$
1979–81	21	46.16	0.24	1.43	0.80	0.76
		(3.72)	(2.14)	(3.90)	(4.61)	
1982–84	22	25.39	0.34	0.92	0.96	0.77
		(2.25)	(3.12)	(2.71)	(5.47)	
1985–87	22	−1.55	0.36	1.08	1.28	0.80
		(0.11)	(2.85)	(2.67)	(6.46)	
1988–90	22	10.68	0.35	1.51	1.15	0.78
		(0.71)	(2.39)	(3.40)	(6.15)	

[a]OECD weighted average = 100. Food price levels are extrapolated from 1990 OECD price level estimate by food price indexes.
[b]Market support divided by market value for 11 agricultural products.

Table 3 shows the results of an attempt to explain national food price levels by *per capita* incomes, food VATs, and the level of protection. The degree of explanation is considerably higher than for the GDP price level: from 75 to 80 percent of the food price variance is explained by these variables. All the coefficients are statistically significant, with the expected signs. The coefficients for the food VAT range from 0.92 to 1.51, with two of them considerably above the 1.0 we would expect. The coefficients for the agricultural protection variable are also high, especially in the period after 1985.

A coefficient of one for the net PSE implies that a reduction of one percentage point in the rate of agricultural protection in the average OECD country would lead to a one percent reduction in consumer food prices, far more than could be explained by multiplying the fall in agricultural prices by the share of agriculture in final food product prices. Part of the reason, presumably, is that protecting the farmer also usually means protecting later stages in the links between farmer and consumers. A country that protects farmers by raising farm prices far above world levels must also protect its processed food industries unless they are totally insulated by transportation or spoilage costs. Otherwise imports of processed foods from countries with low farm prices would undercut local producers. Thus, a high PSE on farm products (often actually applied to semi-finished products), may also bring with it high protection for food processing. There are often, in addition, non-tariff barriers to trade in processed foods. This helps explain how segments of the food industry in Sweden, for example, can display costs that are twice as high as those of potential competitors in the EC countries (Bolin and Swedenborg, (ed.) 1992). A recent paper by Fölster and Peltzman (1995) shows that price regulation and protection have, indeed, led to high costs in Swedish manufacturing, especially in the food industry.

Since the high food price countries are the same as the high price countries for all of GDP, and since the food industry is too small for policies specific to it to account for much of the GDP price level, we want to introduce a variable to reflect the effect of policies that move overall price levels away from purchasing power parity. These would include macroeconomic policies that, in the short run, move exchange rates away from long-run equilibrium levels. They would also include more long-run policies, such as wage compression, that affect the cost structure, and therefore move the overall price level away from purchasing power parity. Our proxy for this effect is the deviation of the general (GDP) price level from its "expected" level, as defined by the structural equations discussed earlier. The results based on these equations are shown in Table 4.

TABLE 4

EQUATIONS RELATING FOOD PRICE LEVELS INCLUDING FOOD VAT[a] TO *PER CAPITA* GDP, FOOD VAT, NET PSE, AND DEVIATION OF GDP PRICE LEVEL FROM EXPECTED VALUE (FPL = F(RGDPC, FVAT, NPSE, PLDEV)

	No. of Obs.	Constant Term	Coefficients				$\bar{R}^2$
			RGDPC	FVAT	NPSE	PLDEV	
1979–81	21	40.27	0.29	1.18	0.85	0.59	0.83
		(3.81)	(3.05)	(3.70)	(5.78)	(2.88)	
1982–84	22	25.42	0.34	0.91	0.96	0.56	0.88
		(3.18)	(4.38)	(3.77)	(7.79)	(4.35)	
1985–87	22	−1.27	0.36	0.76	1.32	0.9	0.92
		(0.14)	(4.51)	(2.84)	(10.38)	(5.18)	
1988–90	22	11.19	0.35	0.67	1.24	1.04	0.94
		(1.43)	(4.70)	(2.60)	(12.67)	(7.08)	

[a]OECD = 100. PLDEV = Difference between the country price level and the expected price level derived from the equations of Table 1.

The addition of the PL deviation has little effect on the coefficients of the other variables, as compared with those of Table 3, but the explanatory power of the equations is increased. The coefficient for the general price level deviation is always positive and significant; thus the macroeconomic or exchange rate or structural influences on the general price level, not specific to the food sector, are a significant influence on absolute food price levels.

Food Prices Relative to General Price Levels

Another way of addressing the macroeconomic or exchange rate influences on food price levels is to compare food prices to general (GDP) price levels. This procedure is an alternative to the use of the price level deviations as a way of removing the effect of influences that affect price levels in general, such as exchange rates or monetary and fiscal policy. It assumes, in effect, that the effect of these general influences is multiplicative; a 10 percent "overvaluation" of the currency produces a 10 percent higher food price than would exist otherwise. Since both food prices and GDP price levels were consistently and positively related to *per capita* real income (Tables 1 and 3), but the coefficients in the food price equations were much smaller, we expect a negative coefficient on *per capita* income in

explaining relative food prices. If there is any effect of taxation, it should be from the differential between the VAT for food and that for products in general.

Equations explaining relative food price levels are given in Table 5. *Per capita* GDP was a consistently negative and significant influence and the agricultural protection level a consistently positive influence. The coefficient for relative VAT was always positive but never statistically significant. The coefficients for agricultural protection levels are somewhat smaller than those in the absolute food price level equations (Tables 3 and 4). One way of describing the difference is that the equations of Table 5 assume that agricultural protection affects only food prices, but not the aggregate price level. The food price level equations allow for the possibility that agricultural protection, or other types of protection that come with it, could also influence the aggregate price level, and the coefficients for protection in those equations incorporate both effects (on PL and on FPL/PL). On the whole, we prefer the absolute food price level equations and use them to describe our main results.

TABLE 5

EQUATIONS RELATING RELATIVE FOOD PRICE LEVELS[a] TO *PER CAPITA* GDP, RELATIVE FOOD VAT,[b] AND NET PSE

	No. of Obs.	Constant Term	Coefficients			$\bar{R}^2$
			RGDPC	RVAT	Net PSE	
1979–81	21	102.9	−0.238	6.67	0.407	0.262
		(2.41)	(1.97)	(0.13)	(2.04)	
1982–84	22	80.2	−0.289	36.24	0.506	0.302
		(1.96)	(2.23)	(0.75)	(2.22)	
1985–87	22	51.1	−0.294	56.63	0.621	0.559
		(1.27)	(2.83)	(1.11)	(3.37)	
1988–90	22	49.61	−0.235	54.54	0.534	0.629
		(1.71)	(2.75)	(1.59)	(4.99)	

[a][Food price level (OECD = 100) ÷ GDP price level (OECD = 100)] × 100.
[b](Food VAT + 100) ÷ (Standard VAT + 100).

Treating Protection as Endogenous

It is possible that we should not be treating the protection level as exogenous, because it partly depends on price and income levels. If, for example, each country wished to maintain 5 percent of its population in agriculture, regardless of cost, the required level of protection would depend on the country's climate and its general price and cost level. If the country wished not only to maintain the numbers in agriculture but also to provide a national average level of income to farmers, the required level of protection would also reflect the country's *per capita* income. Thus, the protection level might reflect other factors that affected both protection levels and food prices or an influence of the other independent variables on the protection levels.

The idea that the level of protection may itself be determined by country characteristics, rather than being purely a policy choice, can be tested by asking whether we can explain the protection level. Table 6 gives an answer to that question, indicating that the protection level can be explained at least partly by

TABLE 6

ESTIMATION OF NPSE FROM VARIABLES REPRESENTING THE COST OF AGRICULTURAL PROTECTION
(NPSE = F(LANDC, COLD))

	1979–81	1982–84	1985–87	1988–90
Constant	45.30	44.73	57.83	56.54
	(13.69)	(13.56)	(18.96)	(15.07)
LANDC[a]	−12.56	−10.85	−13.08	−14.32
	(3.38)	(2.93)	(3.75)	(3.34)
COLD[b]	−1.11	−1.11	−1.45	−1.67
	(2.23)	(2.25)	(3.16)	(2.96)
$\bar{R}^2$	0.367	0.315	0.471	0.419
Residuals for Six High-Price Countries				
Denmark	−3.66	−4.62	−1.33	−7.84
Finland	7.35	9.84	5.42	9.55
Japan	19.67	24.40	22.66	20.07
Norway	22.10	23.13	14.76	15.13
Sweden	−2.95	−6.73	0.76	−4.25
Switzerland	19.80	24.20	23.06	18.95

[a]LANDC = Hectares of Arable Land *per capita*.
[b]COLD = Average temperature in coldest month.

factors determining the cost of agricultural production, even though our indicators of these factors are very crude: the average temperature in the coldest month, and the amount of arable land *per capita*. (The addition of GDP *per capita* did not improve the explanation. That is an indication that high income *per se* does not require high support levels to bring farm incomes up to parity with nonfarm income or that countries do not strive for such parity. Use of average annual temperatures or the average for the hottest month produced poorer fits.)[4] The worse the conditions for agriculture, the higher the protection. In effect, there seems to be something like an inelastic demand for the retention of agriculture; the higher the price of retention, the greater the agricultural subsidies.

These equations explained the protection levels for Denmark and Sweden quite well, but not those for Japan, Norway, and Switzerland, which are extreme. In the latter three countries, the protection levels were substantially higher than predicted from these variables. These countries may have had stronger farm lobbies, a stronger public demand for the promotion of farming, or other cost factors (mountainous terrain?) that we did not include.

The equations for the protection level can be used as the first stage in a two-stage least squares estimation of food price levels, in which the estimated net PSE enters in place of the actual NPSE in the second stage. The second-stage equations for the food price level are shown in Table 7.

Treating the degree of protection of farm products as endogenous has a strong effect on the coefficients of the protection variable, reducing them by between a third and a half in most cases. They still seem high, given the low ratio of farm prices to final food prices, but at least none is above one. We may have removed

[4]These are all questionable proxies for the cost of maintaining farm population. Another possibility would be some measure of the length of the growing season, but that is not a clear concept either. For one thing, it must vary from one crop to another.

TABLE 7

SECOND-STAGE EQUATIONS EXPLAINING FOOD PRICES
(FPL = F(RGDPC, FVAT, $\widehat{NPSE}$, PLDEV))

	1979–91	1982–84	1985–87	1988–90
Constant	51.99	36.37	14.31	21.39
	(4.60)	(4.60)	(1.84)	(2.63)
RGDPC	0.310	0.371	0.435	0.459
	(2.79)	(4.61)	(5.79)	(5.71)
FVAT	1.45	1.13	1.13	1.21
	(4.10)	(4.57)	(4.68)	(4.51)
$\widehat{NPSE}$	0.455	0.545	0.817	0.733
	(4.62)	(7.27)	(11.14)	(11.69)
PLDEV	0.465	0.407	0.824	0.868
	(1.99)	(2.98)	(5.05)	(5.53)
$\bar{R}^2$	0.779	0.872	0.927	0.931
Residuals for Six High-Price Countries				
Denmark	7.16	2.16	3.55	−1.20
Finland	10.25	8.50	5.75	−4.14
Japan	9.61	10.61	12.32	16.66
Norway	−21.41	−15.42	−14.19	−5.42
Sweden	0.01	6.86	6.03	5.33
Switzerland	3.29	1.06	−3.64	−3.21

some spurious protection effects but we may also, because our first stage equation was so crude, have removed some genuine effects of agricultural protection. Aside from that difference, most of the coefficients were not very different from those of Table 4. The *per capita* income coefficients are a little higher here and those for the price level deviation a little lower, and there is a smaller range of coefficients from one period to another. On the whole, these estimates confirm the earlier findings, and add to our confidence in them.

While the equations of Table 7 tell us that the independent variables included explain most of the variation across countries in food price levels, and the residuals show how much remains unexplained, neither shows us the explanation for any single country's food price level. The price level might be high in one country simply because *per capita* income is high, and in another country because there is a high tax on food, and in a third country because agricultural products are heavily protected, and in a fourth country because the exchange rate, and therefore the general (GDP) price level, is out of line with that of similar countries. For any particular country in any period, we can describe the contribution of each factor to the deviation of the food price level from the OECD average by substituting the country values into the equation for all the OECD countries, explaining some part of the price level and leaving some as an unexplained residual.

The residuals from the second stage equations show that for at least some high-price countries the price level can be explained by protection, food VAT rates, *per capita* income, and the degree to which the value of the currency deviates from the value that would be predicted from purchasing power parity and the *per capita* income. However, part of the high food price in Japan remains consistently unexplained and these factors consistently more than explain Norway's price level.

TABLE 8

CONTRIBUTION OF EACH FACTOR TO DIFFERENCE BETWEEN COUNTRY FOOD PRICE LEVEL AND OECD AVERAGE 2SLS EQUATIONS WITH PRICE LEVEL DEVIATION SIX HIGH-PRICE COUNTRIES

FPL = F(RGDPC, FVAT, $\widehat{NPSE}$, PLDEV)

	1979–81	1982–84	1985–87	1988–90
Denmark	*31.79*	*11.42*	*22.24*	*29.24*
RGDPC	−0.33	0.78	1.73	−0.57
FVAT	18.73	14.38	13.58	13.45
$\widehat{NPSE}$	−2.58	−5.29	−5.55	−3.92
PLDEV	0.90	−0.71	5.19	11.17
Residual	15.07	2.26	7.30	9.10
Finland	*35.40*	*35.35*	*46.51*	*57.52*
RGDPC	−3.16	−1.91	−2.53	−1.40
FVAT	12.93	13.66	14.76	14.86
$\widehat{NPSE}$	10.67	15.19	20.43	26.85
PLDEV	−3.41	0.09	4.48	10.90
Residual	18.37	8.33	9.36	6.31
Japan	*30.49*	*32.87*	*59.79*	*70.01*
RGDPC	−3.21	−1.97	−1.74	0.31
FVAT	−7.37	−5.96	−6.76	−5.91
$\widehat{NPSE}$	20.78	27.28	37.01	32.67
PLDEV	2.46	2.95	15.36	15.87
Residual	17.83	10.58	15.92	27.05
Norway	*34.50*	*37.08*	*41.50*	*53.84*
RGDPC	−2.18	−1.24	0.40	−2.54
FVAT	21.63	16.64	15.84	15.87
$\widehat{NPSE}$	25.81	30.07	33.87	33.30
PLDEV	2.47	7.14	2.00	2.12
Residual	−13.23	−15.51	−10.60	5.09
Sweden	*45.00*	*27.98*	*40.98*	*53.58*
RGDPC	0.99	1.81	1.60	0.25
FVAT	25.28	19.81	19.75	20.06
$\widehat{NPSE}$	0.71	−2.68	4.82	4.58
PLDEV	10.18	2.54	5.07	13.02
Residual	7.84	6.50	9.75	15.68
Switzerland	*32.88*	*31.41*	*40.57*	*47.54*
RGDPC	9.41	10.74	11.32	10.84
FVAT	−7.37	−5.96	−6.76	−8.33
$\widehat{NPSE}$	21.78	28.19	40.69	37.76
PLDEV	−2.49	−2.68	−4.68	0.04
Residual	11.56	1.12	0.00	7.23

When we analyze the deviations of country price levels from OECD averages in each period we find that in the great majority of the cases, especially after 1979–81, most of the difference between each high price country's food price level and the OECD average is explained by these variables (Table 8). However, the sources of the high price levels differ among the countries. In all the Nordic countries, a high food VAT is an important factor, the most important one in Denmark and Sweden. In Japan, and especially in Switzerland, the high protection level is the main factor, and in Finland and Norway, high food VATs and high protection share the responsibility for high food prices, with protection gaining in importance over time. Currency "overvaluation" in the sense of exchange rates

higher than those expected on the basis of general price levels and real *per capita* income, was consistently important only for Japan, but sporadically a substantial cause of high food prices in other countries. These include Sweden in 1979–81, and Denmark, Finland, and Sweden in 1988–90. The apparent overvaluation of both Finland's and Sweden's currencies was confirmed by their drastic devaluations in the early 1990s. Switzerland was the only country in which a high *per capita* income played an important role in the high food price level.

Conclusions

There have been wide differences among the OECD countries in the levels of food prices paid by consumers, and these food price levels have have tended to be persistent, at least over the 1980s. Denmark, Finland, Iceland, Japan, Norway, Sweden, and Switzerland, almost always have had high food prices.

The major elements determining food price levels are the level of protection of agricultural products and the VAT rate on food, both policy instruments that governments have the power to change. A third element is the exchange rate or general price level, presumably at least partly a product of macroeconomic policy, but not necessarily subject to ready alteration. The degree to which the exchange rate or general price level departs from what we call its "structural" level was particularly important for Japan in recent years, and occasionally for other countries.

The responsibility for high food prices was distributed differently from one country to another. The level of the food VAT was consistently the most important influence in Denmark and Sweden. In Finland, Japan, Norway, and Switzerland the agricultural protection level outweighed the food VAT, although the high food VAT also played a major role in Finland. High general price levels relative to what we would expect from "structural" variables, presumably some reflection of these countries' macroeconomic policy, were a major factor for Japanese food price levels throughout 1985–90, and for Danish and Swedish prices for 1979–81 and 1988–90.

It should be stressed that these comparisons of country food price levels with the OECD average understate the effects of protection, or of removing protection altogether, since the OECD average to which we compare the high-price countries is heavily weighted by countries with quite high protection levels. A reversion to U.S. protection levels, still well above those of Australia and New Zealand, might be a better measure of these possibilities. It would suggest the possibility of much larger reductions in consumer food prices and a larger share of responsibility for high food prices attributable to protection levels.

In addition to these policy variables we would have wished to include at least two other characteristics of the countries, but lacked the necessary data. One is the degree of competition in the domestic manufacturing, wholesale, and retail sectors and the possibly related degree of efficiency in these sectors, and the other is the distribution of income or the dispersion of wages across skill levels or industries. There is evidence that competitive pressures in both manufacturing and retailing are weak in Sweden as a result of regulation and cartelization. We

suspect that this is also true of some of the other high-price countries, but we do not have systematic information.

The basis for including the distribution of income or the dispersion of wages is that retailing, especially food retailing, is a relatively low-skill industry, and an industry that can make use of part-time workers, mothers who wish to work only during school hours, or students who wish to work only outside school hours. In a country in which skill and wage differentials are large, or employers offering convenient hours can pay low wages, retailing should enjoy low labor costs. Where wage differentials are small, as in the Scandinavian countries, the retailing industry would gain little by employing low-skill or part-time workers. Therefore, the higher the degree of wage dispersion or wage differentiation in the economy, the lower retail margins, and therefore retail prices should be.

High food prices to consumers may reflect both of these characteristics of the distribution sector in addition to the farm protection, taxation, exchange rate, and *per capita* income variables analyzed here.

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