ESTIMATES OF THE DISEQUILIBRIA IN POLAND's CONSUMER MARKETS (1965-1978)

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February 1981
WP-81-10

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FOREWORD

Understanding the nature and dimensions of the world food problem and the policies available to alleviate it has been the focal point of the IIASA Food and Agriculture Program since it began in 1977.

National food systems are highly interdependent, and yet the major policy options exist at the national level. Therefore, to explore these options, it is necessary both to develop policy models for national economies and to link them together by trade and capital transfers. For greater realism the models in this scheme are being kept descriptive, rather than normative. In the end it is proposed to link models to twenty countries, which together account for nearly 80 per cent of important agricultural attributes such as area, production, population, exports, imports and so on.

In the course of his work on the development of the Polish Agricultural Policy Model, Leon Podkaminer has investigated the disequilibria in Poland's consumer markets. Since an understanding of consumer behavior is critically important in formulating plans and designing policies, that facilitate the realization of plans, this is an important element of the Polish Agricultural Policy Model.

Kirit S. Parikh
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Food and Agriculture Program

PREFACE

One of the aspects of the economic difficulties Poland is experiencing is an acute shortage of consumer goods. Since the per capita consumption of particular goods has been relatively high, the source of trouble arises from the wrong structure of prices that are (administratively) set. The aim of this paper is to evaluate the equilibrium prices for main groups of commodities for the period 1965-1978. Concurrently, the estimates of the quantity-term disequilibria are computed. The analysis are based on the Extended Linear Expenditure Systems for Ireland and Italy adjusted to the historical data for Poland.

ACKNOWLEDGEMENTS

Thanks are due to Desmond McCarthy, Janos Kornai and Kirit Parikh for helpful remarks and to Ms. Bozena Lopuch for computations. The remaining errors can be evenly distributed between the author and a few utility and demand theoreticians referred to in the paper explicitly or implicitly.

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"The question is sometimes asked: Why do we need a theory of choice; why can't we simply take the concepts of demand itself (prices, income measured in money, etc.) as the basic concepts and leave all theory of choice aside? The answer is simple. The theory of choice- and particularly the concept of a utility indicator - is assumed to be independent of the particular organizational form of the market. Even if the goods were distributed to consumers in an entirely different way, not through a market with a budget equation, etc., the utility indicator would in general exist and may, for instance, be used for estimating the behaviour of consumers under specific market forms that may be contemplated in a programming analysis."

Ragnar A. Frisch in "A Complete Scheme for Computing all Direct and Cross Section Demand Elasticities in a Model with Many Sectors", Econometrica, 1959.

1. A PRACTICAL PROBLEM THAT REQUIRES THEORETICAL TOOLS

One of the aspects of the economic difficulties Poland is experiencing is an acute shortage of marketable commodities. Although absolute levels of per capita consumption of particular food items (especially animal produce) and the collections of durables owned by the average household had (until last year) approximated Western European standards, the extent of lines, waiting lists and more or less formalized rationing would suggest that the demand for virtually all commodities is far from satisfied. Although Poland is not the only country affected by the "disequilibrium malady" - since some authors already draw a firm distinction between supply-constrained and demand-constrained economies (Kornai, 1979), the Polish case is definitely a severe and persistent one.

Some thinkers attribute this situation to purely political motives. "One could get rid of the market disequilibrium overnight" - the reasoning often goes - "just by introducing equilibrium prices. But this would" - it is stressed -"provoke popular resentment." This case seems to be well supported by historical events, with attempts at raising prices (of food) failing as a result of widespread protests.

Before the conclusion is reached that there is nothing one can do about the present situation but increase supplies - at any cost (to be covered ultimately by external sources) - it may be worth asking whether the proposed changes in the price structure actually represent a move towards equilibrium or whether,

on the contrary, they imply an even greater extent of disequilibria.

To be able to answer this question, albeit in a crude way, one would have to have a system of demand functions that could be assumed to represent at least "the average Polish consumer's" response to the prices, given the average level of incomes. (Of course, having separate demand systems for households stratified according to professional, demographic and any other relevant criteria, one would only be able to widen and deepen the scope of possible analysis, eliciting all sorts of distributional and welfare effects caused by changing prices.)

Let us put the system of equations in question in the following manner:

$$q_i = f_i(p_1, p_2, \ldots, p_m, y) \qquad i = 1,2,\ldots,m \qquad (1)$$

where q_i is quantity of good "i" demanded under price system $p = (p_1, p_2, \ldots, p_m)$ and y is total expenditure or disposable income. (For the rest of the exposition y and q_i are per capita terms.)

Additionally, (1) has to be "at least locally consistent": for a fairly wide set of commodity bundles $q^0 = (q_1^0, q_2^1, \cdots, q_m^0)$ there should be at least one (ideally exactly one) price vector p^0 that satisfies (1) and the budget constraint:

$$p^0 q^0 = \sum_{i=1}^{m} p_i^0 q_i^0 = y$$

(Any demand system (1) derived via the utility maximization assumption (subject to the budget constraint) yields exactly one price vector ("equilibrium price") for any bundle q for which the utility function is determined. Because empirical demand studies not derived via utility assumption and not even satisfying homogeneity or symmetry conditions can be encountered, it is important to require them to be "at least locally consistent".)

Now, having (1) that satisfies both conditions, one would be in a position to issue statements on whether the proposed changes in prices really represent a move towards any equilibrium. It is also almost trivial to add that knowing adequate (1) one would be able to contemplate a mathematical programming analysis for pricing and therefore determine optimum equilibrium price vectors.

However, unless (1) were derived via the utility maximization assumption, one would still be unable to use it for predicting the actual level of demands - should the supply (or supplies) of one (or more) of the commodities be inadequate. That is, if, say,

$$s_1 < f_1(p_1, p_2, \cdots, p_m, y)$$

then the value of the excess demand $(s_1 - f_1(p_1, p_2, \cdots, p_m, y))$ tends to be somehow distributed over other commodities. Also, it may in part increase the amount of reported savings. With utility-based demand systems, the prediction does not entail any difficulty, no matter what number of commodities is in short supply. The forecast demands are the (unique) solution to the optimization model:

$$\text{maximize } U(q_1, q_2, \ldots, q_m)$$

$$\text{subject } \sum p_i q_i = y$$

$$\text{and} \quad q_i \leq \bar{q}_i \qquad i = 1,2,\ldots,m$$

where $\bar{q}_i$ are the supplies of the commodities and U(q) is the utility function on which the demand system (1) is based.

It is obvious that the solution of the above optimization model may differ from one which maximizes the utility indicator subject to budget constraints only. If the former is denoted by $q(p,y,\bar{q})$ and the latter by $q^0(p,y)$, then the coordinates of the vector

$$q^0(p,y) - q(p,y,\bar{q}) \tag{2}$$

represent the extent of disequilibria for particular commodities. It is important to observe (see Figure 1) that when total supply is not smaller than total expenditure:

$$\sum p_i \bar{q}_i \geq y$$

then some coordinates in (2) may be negative, some positive and some equal to zero. Hence, under disequilibrium the observed demands for some commodities may be smaller than they should be under equilibrium, while some may be *greater*.

2. SPILLOVERS CAN BE NEITHER OBSERVED NOR IGNORED

A shortage in one commodity is enough to cause spillovers: the observed purchases of other commodities may be additionally increased. The situation worsens when many shortages occur simultaneously.

The fact that knowing the parameters of a demand system (based on the utility assumption) we can determine the final distribution of spillovers - given prices, income and actual supplies - must not blind one to the fact that when we do not know these parameters, it is practically impossible to distinguish between past observed supplies, voluntary demands and spillovers. This, in turn, robs us of the ability to estimate the demand system (1) - whether it is based on utility assumption or not. More specifically, a stochastic counterpart of (1), when complemented by variables for possible spillovers, can be put down in the following manner:

$$q^*_{it} = f_i(a, p_{1t}, p_{2t}, \cdots, p_{mt}, y_t) + \varepsilon_{it} \qquad i = 1,2,\ldots m \tag{3}$$

and

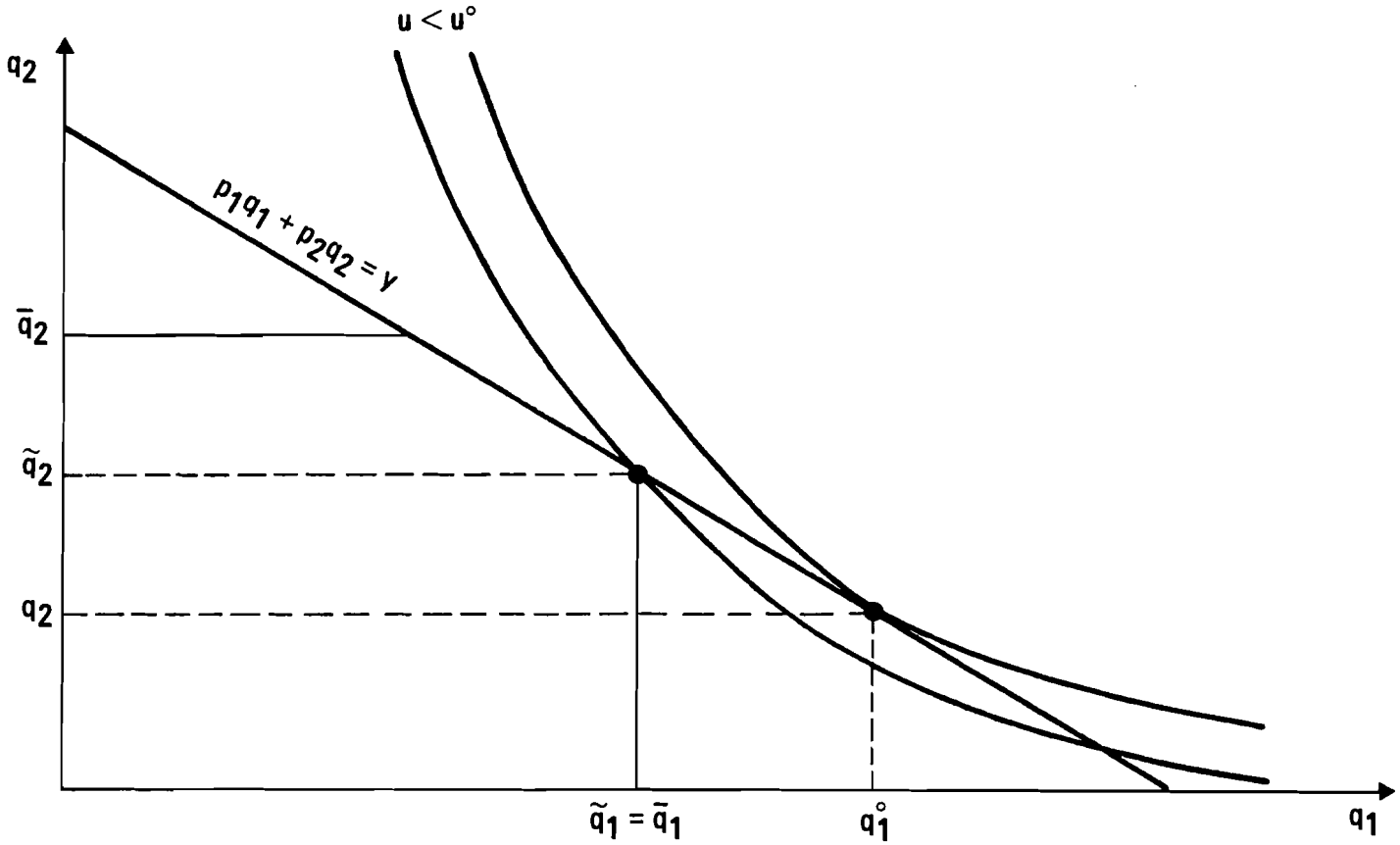
$$p_{it}q^*_{it} = p_{it}q^*_{it} + \sum_j V_{ijt} + \mu_{it} \qquad i = 1,2,\ldots m \tag{4}$$

where

- t numbers observations, say by years;
- q^*_{it} represents the "pure" demand for commodity i (as expressed by equation (1) and under unconstrained supplies of all other commodities);
- q_{it} represents "observed" demand for commodity i (or actual consumption of it);
- V_{ijt} represents the spillover (measured in money) from i to j;
- a is the vector of parameters of (1) - to be estimated;
- ε_{it} is a random factor affecting i;th equation in (1) and
- μ_{it} is a random factor affecting i-th equation in (4).

Both q^*_{it} and V_{ijt} are unobservable. Although the number of the variables V_{ijt} can be reduced by some asymmetry conditions (e.g. requiring that $V_{ijt} = -V_{jit}$), still the system (3)-(4) is incapable of being econometrically estimated.

The moral of this story is that any nontrivial demand system ($m \geq 2$)



$$\tilde{q}_1 = \bar{q}_1 < q_1^\circ \ , \quad \text{yet } q_2^\circ < \tilde{q}_2 < \bar{q}_2$$

Figure 1. Demand under shortage in 2 commodity cases.

estimated solely on the basis of the observed disequilibrium prices, quantities purchased and expenditures cannot be presented justifiably as even an approximate version of the actual system (1). Additionally, it may be noticed that even the "trivial" case poses very considerable (and hardly tractable - without some additional conditions) econometric problems (Ito, 1980).

3. THE USE OF EXTRANEOUS INFORMATION

It is obvious that without some extraneous information on the demand system (1) it is impossible to estimate its parameters. The information required cannot, however, be derived from the data on observed disequilibrium prices, expenditures and quantities, as this cannot generate any more knowledge than is present in (3)-(4). Certainly the knowledge of black market prices might alleviate the specification of the system - provided the work is set in the context of a utility-based demand system. (The Lagrange multipliers in the supply-constrained utility maximization problem would then - in principle - be analytically related to the observed black market prices.) However, since these prices are not reported by official statistics, in practice the advantage of following this approach is dubious.

A more promising method may be to resort to international comparisons. Existing demand studies for many countries that may be safely assumed to enjoy persistent equilibrium in consumers' markets suggest definite patterns of consumer behaviour. Why not identify some of the parameters that are proved to be acceptable while describing the average consumer demand response for a wide range of countries with the ones that may be attributed to the system (1) for Poland, i.e., to the average Polish consumer's behaviour *under* equilibrium?

Upon acceptance of the premise (Houthakker, 1957) that "the discovery of widely applicable generalizations is the principal aim of science" and "that there are meaningful propositions which appear to be valid in nearly all the countries considered, without reference to their climatic or cultural conditions", it is possible, at least in principle, to proceed with the analysis somewhat further.

Certainly, there is still a great need for caution. First of all, the research should be restricted to rather aggregated-level studies. Then, it should be noted that the reported empirical demand studies do exhibit some differences. The estimated parameters vary somewhat from country to country. Also, they depend on the specific functional form of the equations adopted, the details of assumed stochastic structure and the estimation procedure applied. Needless to say, the statistical quality of the findings is not the same. In effect, the conclusions to be derived with respect to Poland cannot be expected to be independent of the particular foreign demand system accepted. However, if some of these conclusions demonstrate some degree of consistency, one maybe justified in issuing pretty definite qualifications and recommendations with respect to the Polish situation.

4. APPLICATION OF THE EXTENDED LINEAR EXPENDITURE SYSTEMS (ELES) WITH ITALY AND IRELAND AS REFERENCE COUNTRIES

The sample of cross-country comparative studies of consumer demand patterns, from which the final reference demand systems for Poland have been selected, is made up of Goldberger and Gamaletsos 1970, Gamaletsos 1973 and Lluch, Powell and Williams 1977. Italy and Ireland, European countries which resemble Poland with respect to many historical and cultural traditions and represent similar levels of overall economic development have been focused on. Additionally, the durables and housing per average household in all three countries are not dissimilar.

Statistical significance of the reported estimates and their theoretical plausibility prejudged the choice of the Extended Linear Expenditure Systems presented in Lluch et al (1977).

To ensure the comparability with average Polish data, the systems were aggregated* to the four-commodity list containing "food" (including alcohol and tobacco), "clothing" (including footwear), "rent" (including heating and durables, but without automobiles) and "rest" (health, education, leisure, culture, etc.). This aggregation allows getting a general picture - which need not be consistent with subjective feelings about price levels and availability of particular sub-commodities. Thus, for instance, the fact that within "food" goods there are those which are considered both in short supply and too highly priced (better cuts of meat) or abundant yet underpriced (cereals, milk, potatoes), or, abundant and overpriced (alcohol), has to be disregarded. (The same applies to other commodity groups.)

The utility function underlying ELES is given by the well known Stone-Geary-Rubin-Klein formula:

$$u(q_1,q_2,\cdots,q_m) = \sum_{i=1}^{m}\beta_i \ln(q_i - c_i)$$

where c_i is interpreted as "committed" or "subsistence" consumption of good i.

There is one unpleasant thing about any demand system presupposing the existence of subsistence levels c_i's. Since an economist has to work with aggregate commodities, sometimes as nebulous as "food" or "services", c_i's can seldom be measured in physical quantities. Instead, one has to work with "abstract" c_i's representing the monetary values of the subsistence consumption in the prices of some given year. While the unpleasantness reported does not affect the usage of any demand system for the country to which it refers, it certainly creates problems in the cross-country comparisons: there is a need for the use of currency conversion rates. While this may be more or less safely done with respect to the comparable *equilibrium* economies, one might wonder how to convert c_i's expressed in 1970 Lira and Irish Pounds into subsistence consumptions of the basic commodities expressed in Polish Zlotys of some given year.

Inevitably, some additional assumptions have to be adopted.

1. Besides the "average" consumer, in each of the countries under consideration there is a "marginal subsistence" consumer whose income approximates the total subsistence level.
2. The volumes of consumption q_i's (in Poland) are always bigger than the corresponding subsistence levels c_i's. In effect, neither prices nor supplies nor budget interfere with the attainment of all of the c_i's. In particular, no *spillover* between the subsistence consumptions could have occurred.†

*The ELES for Italy is not excellent on theoretical grounds, yet the aggregation adopted restores its quality.

†This is already required by the very formulation of the utility function underlying ELES. It should be observed that the application of the procedure proposed would seem risky with respect to the countries where it is the "marginal" consumer who may be assumed to have a budget covering subsistence levels, while the "average" one may be assumed to be struggling for survival and therefore forced to make choices between subsistence levels (of, say, intakes of protein and calories). With respect to the three countries in question, no such problem has existed since the middle ages (although it has been present during times of wars and famines even quite recently).

Now, if one defined the subsistence consumers in all three countries (retired hippies?) and their average yearly allowances as $w^{pol}, w^{irl}, w^{ita}$, one would postulate the conversion rates for total committed expenditures to follow the identities:

$$\frac{w^{pol}}{\sum_i c_i^{pol}} = \frac{w^{irl}}{\sum_i c_i^{irl}} = \frac{w^{ita}}{\sum_i c_i^{ita}} \qquad (*)$$

This line of reasoning has not been rigorously followed in that the author has chosen the average wage in the lowest-paid sector of the economy instead. (Agriculture appears to be the most deprived sector in all three countries.) At these levels of income the ratios (*) for Ireland and Italy are not the same. This has been allowed for while calculating two sets of c_i's for Poland:

$$\frac{c_i^1}{\sum_i c_i^1} = \frac{c_i^{irl}}{\sum_i c_i^{irl}}$$

where

$$\sum_i c_i^1 = \frac{w^{pol}}{w^{irl}} \cdot \sum_i c_i^{irl}$$

and

$$\frac{c_i^2}{\sum_i c_i^2} = \frac{c_i^{ita}}{\sum_i c_i^{ita}}$$

where

$$\sum_i c_i^2 = \frac{w^{pol}}{w^{ita}} \cdot \sum_i c_i^{ita}$$

Admitting finally that there is some amount of possible bias in the method adopted, alternative conversion rates have also been used in separate runs to test the sensitivity of the estimates. In sensitivity runs 1 one has

$$c_i^{1,1} = 1.5c_i^1$$

$$c_i^{2,1} = 1.5c_i^2$$

while in sensitivity runs 2 one has

$$c_i^{1,2} = 0.5c_i^1$$

$$c_i^{2,2} = 0.5c_i^2$$

Table 1, given below, gives the estimates for the parameters of the two basic reference demand systems for Poland, determined on the basis of hitherto presented considerations.

The subsistence levels c_i's are expressed in thousands of Zlotys per capita per year (1971 price levels). m are the estimated propensities to consume out of total disposable monetary income. Thus, it is assumed that under equilibrium, total expenditure y and total disposable monetary income Y satisfy the equation

$$y = mY + (1 - m)\sum_{j=1}^{4} p_j c_j$$

Therefore, the estimate of the voluntary saving is $(1 - m)(Y - \sum_{j=1}^{4} p_j c_j)$

Table 1. The parameters of the basic reference demand systems for Poland

	Ireland		Italy	
Commodity (i)	β	c	β	c
Food (1)	0.315	2.925	0.402	2.4
Clothing (2)	0.134	0.436	0.087	0.52
Rent (3)	0.222	0.907	0.24	0.56
Rest (4)	0.329	0.931	0.271	1.12
Propensity to consume m	0.846		0.790	

5. ARITHMETICS OF THE REFERENCE ELES's WHEN APPLIED TO POLAND

Two types of equations are used:

1) The equations for the determination of supplies that would have equilibrated the markets while leaving all prices and income (i.e. monetary endowment) unchanged;
2) The equations for the determination of prices that would have equilibrated the markets while leaving the consumption and income unchanged.

The *former* are given by the following general formula:

$$q_{i,t}^{k,j} = c_i^{k,j} + \frac{\beta_i^k}{p_{i,t}} m^k (Y_t - \sum_{s=1}^{4} c_s^{k,j} p_{s,t}) \qquad (5)$$

k = 1 (Ireland), 2 (Italy)

j = 0,1,2 (basic, increased and decreased levels of total subsistence expenditure)

i = 1,2,3,4 (commodities)

t = date (years)

$p_{i,t}$ is therefore actual (reported) price index of commodity i of year t, expressed in current prices (base year = 1971).

Y_t is total per capita per year monetary endowment observed in year t. (This is assumed to equal total actual expenditure plus savings, as identified with bank deposits).

$q_{i,t}^{k,j}$'s are therefore the vectors of supplies that would have equilibrated all the markets (and left the consumer with no involuntary savings or debts) estimated on the basis of the respective demand system (k,j).

The *latter* are given by the following general formula:

$$p_{i,t}^{k,j} = m^k Y_t \frac{\beta_i^k}{q_{i,t} - c_i^{k,j}} \cdot \frac{1}{1 + \sum_{s=1}^{4} \frac{\beta_s^k c_s^{k,j}}{q_{s,t} - c_s^{k,j}} m^k}$$

where all the symbolds, with the exception of $q_{i,t}$ and $p_{i,t}^{k,j}$ have the same meaning as before. Now:

$q_{i,t}$ is the actual (observed) consumption of commodity i in year t (expressed in 1971 prices);

$p_{i,t}^{k,j}$'s are the vectors of prices that would have equilibrated all the markets (and left the consumer with no involuntary savings or debts) estimated on the basis of the respective demand system (k,j).

6. ESTIMATED ACTUAL SHORTAGES (AND SURPLUSES) OF COMMODITIES FOR HISTORICAL DATA FOR 1965-1978

Table 2. gives information on $p_{i,t}$, q_i, $Y_{i,t}$ and $Y_{i,t}$ for the period under consideration.

Table 2. Historical Data for Poland

	Food		Clothing		Rent		Rest		Total	Observ.	Monetary
Year	q	p	q	p	q	p	q	p	expend.	savings	endowment
1965	7.33	0.92	1.59	1.00	1.28	0.98	1.94	0.84	11.22	1.33	12.55
1966	7.80	0.92	1.85	1.00	1.22	1.01	3.08	0.93	13.12	1.64	14.76
1967	8.06	0.93	1.93	1.00	1.34	0.99	3.29	0.95	13.89	1.97	15.86
1968	8.26	0.97	2.08	1.00	1.54	0.98	3.47	0.96	14.90	2.27	17.17
1969	8.52	0.97	2.20	1.00	1.60	0.98	3.68	0.97	15.57	2.67	18.24
1970	8.91	0.97	2.32	1.00	1.69	0.99	3.85	1.00	16.49	2.99	19.47
1971	9.05	1.00	2.33	1.00	1.95	1.00	2.62	1.00	15.45	3.42	19.37
1972	9.43	1.01	2.54	1.00	2.21	1.00	2.98	0.98	17.19	4.20	21.39
1973	10.18	1.01	2.90	1.00	2.45	1.00	3.38	1.00	19.01	5.20	24.21
1974	10.48	1.01	3.21	1.01	2.85	1.01	3.65	1.04	20.50	6.39	26.89
1975	11.28	1.12	3.17	1.20	2.85	1.25	3.17	1.31	24.15	7.39	31.54
1976	12.18	1.20	3.27	1.26	3.02	1.29	3.58	1.35	27.44	8.03	35.47
1977	12.64	1.26	3.22	1.34	3.67	1.36	3.38	1.70	30.98	8.74	39.72
1978	12.63	1.43	3.01	1.46	3.42	1.43	3.48	1.77	33.51	9.52	43.03

Source: Polish Statistical Yearbooks 1972, 1976, 1979

By applying formula (5) to the historical data one obtains the estimates of the *systems* of supplies that would have equilibrated all the markets, all other factors remaining unchanged.

To facilitate the reception of the data, the estimates of the *disequilibria* actually occurring in particular years (measured as differences between estimated equilibrium supplies and volumes actually consumed) are reported. Table 3 reports on the estimates of shortages (positive) and surpluses (negative) for the basic demand systems described in Table 1.

By the application of the formula (6) to the historical data one obtains the estimates of the *system* of prices that would have equilibrated all the markets, all other factors unchanged. Table 4 reports these estimates (together with the actual prices) for the basic demand systems described in Table 1. Additionally, the "true" price indexes (Laspayers, base year = 1971) corresponding to the estimated prices are given, and also the corresponding index implied by the official data.

Before the findings presented in Tables 3 and 4 are commented on, a brief account of the results of the sensitivity runs 1 and 2 will be given.

Table 3. Extents of Disequilibria, Quantity Terms (1971 Prices)

	Food		Clothing		Rent		Rest		Vol. Savings		Observ.
Year	Irel.	Ita.	Irel.	Ita.	Irel.	Ita.	Irel.	Ita.	Irel.	Ita.	savings
1965	-2.16	-2.05	-0.27	-0.50	1.11	0.89	1.56	1.30	0.74	1.17	1.33
1966	-2.02	-1.80	-0.30	-0.61	1.52	1.30	0.80	0.44	1.08	1.63	1.64
1967	-2.00	-1.74	-0.27	-0.62	1.63	1.41	0.84	0.42	1.24	1.87	1.97
1968	-2.00	-1.70	-0.27	-0.70	1.74	1.53	0.90	0.49	1.45	2.14	2.27
1969	-1.97	-1.61	-0.27	-0.73	1.89	1.68	1.04	0.48	1.61	2.36	2.67
1970	-2.04	-1.61	-0.26	-0.77	1.94	1.73	1.08	0.47	1.80	2.62	2.99
1971	-2.35	-1.96	-0.29	-0.79	1.62	1.41	2.25	1.66	1.78	2.60	3.42
1972	-2.23	-1.75	-0.27	-0.87	1.74	1.53	2.55	1.81	2.10	3.03	4.20
1973	-2.25	-1.62	-0.31	-1.03	2.02	1.82	2.83	1.93	2.53	3.62	5.20
1974	-1.85	-1.10	-0.35	-1.18	2.08	1.88	3.07	2.04	2.95	4.18	6.39
1975	-2.31	-1.49	-0.33	-1.16	1.87	1.66	3.15	2.21	3.66	5.20	7.39
1976	-2.82	-1.92	-0.23	-1.13	2.10	1.90	3.35	2.27	4.27	5.98	8.03
1977	-2.81	-1.84	-0.02	-0.99	1.74	1.54	2.89	1.94	4.92	6.88	8.74
1978	-3.15	-2.22	0.16	-0.79	2.19	1.92	3.00	2.00	5.43	7.57	9.52

Table 4. The Extents of Disequilibria, Price Terms (1971 Prices)

												Price Index		
	Food			Clothing			Rent			Rest			True		Reported
Year	Irel.	Ita.	Act.	Irel.	Ita.	Act.	Ire.	Ita.	Act.	Irel.	Ita.	Act.	Irel.	Ita.	
1965	0.39	0.49	0.92	0.64	0.49	1.00	3.27	2.03	0.98	1.79	2.01	0.84	0.93	0.91	0.92
1966	0.43	0.60	0.92	0.64	0.53	1.00	4.76	2.92	1.01	1.03	1.11	0.93	1.00	0.93	0.94
1967	0.49	0.63	0.93	0.72	0.55	1.00	4.00	2.71	0.99	1.11	1.11	0.95	0.97	0.93	0.95
1968	0.55	0.66	0.97	0.76	0.55	1.00	3.29	2.44	0.96	1.22	1.15	0.96	0.95	0.93	0.97
1969	0.58	0.70	0.97	0.78	0.56	1.00	3.28	2.48	0.96	1.22	1.38	0.97	0.96	0.94	0.97
1970	0.59	0.72	0.97	0.80	0.56	1.00	3.19	2.48	0.99	1.27	1.16	1.00	0.97	0.96	0.98
1971	0.57	0.67	1.00	0.79	0.54	1.00	2.37	1.93	1.00	2.17	2.02	1.00	1.00	1.00	1.00
1972	0.63	0.73	1.01	0.82	0.55	1.00	2.20	1.86	1.00	2.07	1.87	0.98	1.00	1.00	1.00
1973	0.66	0.77	1.01	0.83	0.55	1.00	2.19	1.90	1.00	2.05	1.80	1.00	1.01	1.01	1.00
1974	0.73	0.85	1.01	0.84	0.55	1.01	1.99	1.76	1.01	2.11	1.82	1.04	1.04	1.04	1.01
1975	0.76	0.89	1.12	0.99	0.65	1.20	2.32	2.07	1.25	2.98	2.61	1.31	1.24	1.25	1.18
1976	0.80	0.93	1.20	1.11	0.72	1.26	2.46	2.22	1.29	2.93	2.52	1.35	1.28	1.28	1.24
1977	0.86	1.00	1.26	1.27	0.82	1.34	2.13	1.97	1.36	3.57	3.06	1.7	1.40	1.40	1.35
1978	0.93	1.09	1.43	1.49	0.96	1.46	2.53	2.32	1.43	3.70	3.18	1.77	1.53	1.52	1.49

7. SENSITIVITY RUNS

The results of the additional Runs 1 and 2 justify the proposition that the estimates of the extents of the past market disequilibria in Poland do not virtually depend on the levels of the conversion rates for total subsistence expenditure. This is exemplified by the contents of Table 5 given below.

The "critical" commodity "food" appears -in view of the results contained in Tables 3, 4 and 5 - to be *overpriced (or oversupplied)* as compared with the two considered equilibrium situations. Since this may contradict somone's beliefs, it is worth performing yet another sensitivity analysis. This time the focus is on the possibility of the pure demand for "food" (free from possible spillovers) being greater than recorded supplies. The analysis assumes utterly implausible

Table 5. Equilibrium and actual prices for food depending on run (assumption about conversion rate for total subsistence level) and the reference system

		Equilibrium					
		"Irish" System			"Italian" System		
Year	Actual	Run 0	Run 1	Run 2	Run 0	Run 1	Run 2
1965	0.92	0.39	-1.16*	0.45	0.49	0.34	0.53
1966	0.92	0.43	-6.29*	0.50	0.60	0.56	0.61
1967	0.93	0.49	-0.051*	0.53	0.63	0.61	0.63
1968	0.97	0.55	0.80	0.56	0.68	0.68	0.67
1969	0.97	0.58	0.46	0.58	0.70	0.71	0.69
1970	0.97	0.59	0.51	0.60	0.72	0.73	0.71
1971	1.00	0.57	0.54	0.47	0.67	0.64	0.68
1972	1.01	0.63	0.62	0.62	0.73	0.72	0.73
1973	1.01	0.66	0.67	0.65	0.77	0.77	0.77
1974	1.01	0.73	0.75	0.70	0.85	0.86	0.83
1975	1.12	0.76	0.77	0.76	0.89	0.87	0.89
1976	1.20	0.80	0.80	0.79	0.93	0.92	0.93
1977	1.26	0.86	0.87	0.85	1.00	0.98	1.00
1978	1.43	0.93	0.94	0.92	1.09	1.07	1.09

*It is "illegal" to execute Run 1 for 1965, 1966 and 1977 with respect to the "Irish" system: its subsistence expenditure for "rent" (c_4) equals 1.35 while the actual expenditures $q_{3,1965}$, $q_{3,1966}$, and $q_{3,1967}$ are respectively 1.28, 1.22 and 1.34.

parameters for the supposed Polish ELES, by which the "pure" demand for food (not allowing for possible spillovers from other commodities) would be the greatest. Since this is given by the following expression:

$$q_1 = c_1 + \frac{\beta_1}{p_1} m(Y - \sum_{j=1}^{4} p_j c_j) \ ,$$

it is obvious that the lower c_2,c_3 and c_4, the greater q_1.

By setting $c_2 = c_3 = c_4 = 0$, it is supposed that the average Polish consumer does not have any positive minimum levels for consumption of any nonfood commodity. Then, since the greater m and β_1, the greater q_1, let us suppose that of the two pairs of the reported β_1's and m,s, the larger ones are taken. Thus, m = 0.846 (the Irish propensity for total expenditure out of disposable income) and $\beta_1 = 0.4$ (the Italian marginal budget share of food) are assumed.* Now, within the range of data for the period under study, the maximum "pure" demand for food would - in any given year t - be given by the following equation:

$$q_{1t} = c_1 + \frac{0.4}{p_{1t}} 0.846(Y_t - P_{1t}c_1) \qquad (7)$$

Let c_1 be as high as 3.6. This is measured in thousands of Zlotys per capita (children included) per year in 1971 prices spent on food. (In physical terms this is

*The Irish propensity to consume is second highest and the Italian marginal expenditure share of food is the highest for the countries reported in Lluch (developing countries excluded). It is also worth noting that - in effect - q_1 is the greater the greater the product $\beta_1 m$. The product assumed here is highest of all $\beta_1 m$'s reported for any developed country (by at least some 30%). It is second highest of all countries reported, "inferior" only to that of Korea (and "superior" to those of Thailand, Taiwan and Jamaica).

equivalent to a diet consisting of 40 kg of meat, 25 kg of sugar, and practically unlimited amounts of milk, cereals, vegetables and, in addition, 2 litres of vodka.)

Now, having assumed the parameters of the equation for the "pure" demand for food that transform the average Polish consumer into an insatiable food devourer, it is possible to run equation (7) for any year studied.

Having done this, it is learned that *the "pure" demand for food, possible spillovers disregarded, has always been lower than the consumption reported.* (It is quite possible that actual prices for food have been higher than the reported ones. This would mean even greater surplus of food under respective equilibria. Thus, even if at the same time the actual consumption has been smaller than reported, the overall impact of the biased statistical data may probably be neglected.)

8. FIRST CONCLUSIONS

Has there been a *real* shortage of food in Poland? Were the attempts at raising prices of food an economic necessity?

The contents of Tables 3 and 4 may be summarized in just three statements:

1. Despite the fact that the parameters of both demand systems are not very similar, the results yielded by them, although not identical, are amazingly consistent. All folkloristic differences between the "average" Italians and Irishmen, as well as the difference in the price structures observed in the two countries (and hence specific structures of purchases) do *not* lead to any substantial disagreement while diagnosing what is"wrong" with the "average" Pole.
2. At given prices the pure demand for food has always been *lower* than supplies by, at least, the equivalent of some 1.5-2.5 thousand (1971) Zlotys per capita per year. The actual consumption of food has, therefore, - to some extent - been the result of spillovers from the undersupplied commodities "rent" and "rest".* Thus, it was possible to enjoy market equilibria at lower consumption of food and at the reported prices. This, however, would have required definite increases in the supplies of the "rent" and "rest" commodities (at the reported prices).
3. At given supplies, the price for food has been *too high* by at least 15 percent. Thus, it was possible to enjoy market equilibria with the actual suplies of food being sold at much *lower* prices. This, however, would have required definite increases in the prices of the "rent" and "rest" commodities (without reducing their supply).

9. POLICY AND RESEARCH RECOMMENDATIONS

The price reforms that were (unsuccessfully) introduced in 1970, 1976 and 1980 provided for substantial increases in the prices of food (with some compensatory decreases in the prices of nonfood products and/or some compensatory increases in incomes). In view of the analysis presented one has every reason to believe that these reforms - if aimed at restoring market equilibria - would have been counterproductive.† So the policy of creeping increases in the price of food

*Thus, at given supplies and prices one has had to observe the queues for food, although it is housing and various services which are *really* lacking.

†Since the prices received by producers of agricultural products have very little, if anything, to do with consumer prices - as the state is both the monopolist buyer and seller of the bulk of all products, the motive for the changes in prices should not be believed to reside in the

that has been followed since 1973 must be qualified.

A fair appraisal of the reasons that have lead to the application of the market policy that could not succeed should allow for the fact that since Oscar Lange's (1961) frivolous and unjust "critique" of the concept of utility, economic research, especially if concerned with practical matters, has had virtually nothing to do with any such "futility". "Econometrical" estimates of what should have had to suit the average Polish consumer, derived from the studies that ignore the natural theoretical background contained in the theory of choice, and instead adhere to all sorts of ideas about the predominance of the "institutional" factors in shaping the consumer needs, may have played a role in shaping what has not suited the consumer at all.

The reluctance, which has been repeatedly signalled, of the "average Polish consumer" to accept the proposed price changes might suggest that he is really a more "rational man" than some tend to believe: the changes, if accepted, would have resulted in an even greater degree of disequilibrium.

The counterproposals formulated spontaneously by the population do *not* require increased supplies of food. (What is asked with respect to food is the restoration of the market equilibrium for food - and this could not have been done by raising its price, while compensating with rising incomes.)* Instead, they are concerned with the increase in the supplies of housing, education, health services, leisure and cultural goods! This natural experiment in revealing social preferences does, therefore, corroborate the analytical results presented.

To reach specific policy recommendations concerning the nearest future, one would have to use the data on actual supplies of particular goods that the government intends to sell to the population. (Also, the analysis should allow for the possibly beneficial effects of some changes in the structure and size of the foreign trade in specific consumer goods.) Additionally, research concerned with the cross-country comparisons of the household expenditure patterns, distinguishing between various consumer groups, is still needed. This would enable the determination of the best price and - if need be - rationing policy, while taking into account possible distributional effects.

Certainly, the specification of the recommended policies concerning the aggregate commodities ("food", etc.) should be complemented by the specification of corresponding guidelines for more specific consumer goods. This, once again, necessitates additional studies. A study with respect to specific foodstuffs is expected to be completed soon (Podkaminer, forthcoming).

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attempts at inducing bigger supplies of agricultural goods.

*Currently, with a catastrophic fall in agricultural production, which some attribute mainly to a series of unprecedented weather shocks (that have realy happened), there may be a real shortage of food.

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