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Economic Transition and Poverty: The Case of the Vysehrad Group Countries

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ECONOMIC TRANSITION AND POVERTY:
THE CASE OF THE VISEGRAD COUNTRIES

Abstract

In this research poverty in the Visegrad Group countries is compared. Equivalent income is adopted as an individual welfare measure. Poverty indices are calculated using both absolute and relative poverty lines. Comparability across countries is ensured by using purchasing power parities, estimated within the spatial model of consumer demand. The highest poverty incidence was found in Poland, the lowest in the Czech republic. It appears that inequality is more important in producing poverty than an average welfare. Four variables: unemployment, low education, three children in a household, and female head result in significant risk from poverty in all countries.

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1. Introduction

Economic changes undergoing in the former communist countries affected dramatically their economic situations. All of them faced serious drops in the GDP in the early 1990s followed by recovery, with few exceptions, in succeeding years. Four countries of the so-called the Visegrad Group: the Czech republic, Hungary, Poland and the Slovak republic are considered, along with Slovenia, most advanced in adopting their economies to the European Union standards. They represent also relatively high standards of living, if compared, for example, to some post-Soviet countries. Three of the Visegrad countries reached positive GDP growth rates in 1994 while one of them (Poland) started a recovery already in 1992 (for more details see Milanovic, 1996).

Naturally all those phenomena influenced seriously both income distributions and standards of living in all countries under consideration. Economic changes produced high numbers of both "winners" and "losers". This paper is devoted to the latter ones. Emerging large group of unemployed, higher than average drops in real incomes of some groups (employees of state owned companies and welfare state sector, pensioners), high inflation resulted in large number of people living below acceptable standards. This study tries to answer three principal questions: i/ *How many losers?*, ii/ *Who are the losers?*, and iii/ *How much they lost?* The implementation of these problems is pursued through a calculation of various poverty indices as well as an indication of the most vulnerable groups.

Reaching a comparability of results is possible due to comparability of income data which came from the Luxembourg Income Study (LIS). This huge database contains social and economic data being collected as household surveys in various countries and being available in the form of variable sets which are the same over all included countries. Three data sets utilized in the present study (the Czech and the Slovak republics and Poland) cover 1992 year, while the Hungarian data were available for 1991 only.

Several studies devoted to income distribution in the Visegrad countries (Garner 1995, Ve…ernik, 1995, Andorka et al, 1995, Szulc, 1995 b) which are able to present national pictures of poverty were performed. There are also attempts made to reach an international perspective in poverty evaluations, however most of studies of this type suffer from a non-comparability of poverty lines. The natural way to skip this constraint consists in adopting relative poverty lines. Nevertheless, some authors (Förster, 1995, Milanovic, 1996) present cross-national calculations based on absolute poverty lines and incomes recalculated by means of purchasing power parities (PPPs). The present paper also utilizes PPPs in order to provide international comparability of welfare measures. Unlike those employed in the studies by Förster and Milanovic, the PPPs are bilateral and refer to the country-basis only (here: Poland) which provides the absolute poverty line. This method allows to adopt in comparisons national price structures as well as consumption levels, what appears to be impossible in large, multilateral projects, like those by Förster or Milanovic.

The paper is organized as follows. In Section 2 poverty lines, both absolute and relative, are introduced. Section 3 explains the PPPs calculation and produces some internationally comparable welfare measures. Section 4 is devoted to equivalence scales. In Section 5 the core results for this study, i. e. poverty indices calculated for four countries under consideration, are displayed. Sections 6 indicates the least privileged groups. Section 7 discusses comparability of welfare measures performed recently and for the previous economic system. Section 8 concludes.

2. Individual Poverty Lines

The individual welfare measure in this study is applied in the form of a disposable income divided by a household equivalence scale (hereafter: equivalent income). All households for which equivalent incomes are below a certain threshold are considered poor. The social minimum calculated by the Institute of Labour and Social Studies (ILSS) in Poland is employed as a basis for the calculation of absolute poverty lines, applied to all countries under consideration (after recalculation by means of the PPPs derived in Section 3). It is calculated by the ILSS for four types of household, however in the present study only that attributed to the reference household (single person aged from 30 to 60 years, living in urban area) is utilized[1]. The poverty line is equal to the current, monetary value of the bundle of goods supposed to satisfy the minimum needs at a given time. Therefore, the social minimum is quite generous and is approximately twice higher than the subsistence minimum (also being calculated by the ILSS since 1994) and also than the half mean poverty line (see Tab 1). For a further discussion of the ILSS poverty line see Milanovic (1992), and Panek and Szulc (1991).

The bundle of goods establishing the social minimum have not been changed, in principle, since 1981. Therefore, it seems to be inadequate to the recent circumstances, especially after the "consumer revolution" which occurred in the beginning of the 1990s. As a result, the normative budget shares, imposed by the ILSS, are considerably different from those observed for households with total expenditures close to the social minimum. For those reasons, the social minimum employed in the present study is updated. The "corrected minimum" is equal, by assumption, to the 1990 social minimum which is supposed to be calculated properly (or, less rigorously, as a point of reference). This is then adjusted by the consumer price indices

[1] As equivalent incomes are comparable between any types of household, they can be referred to the sole poverty line which is calculated for the reference household.

calculated with the use of the actual budget shares of the poor households (i. e. those with expenditures around 1990 social minimum) with the equivalence scale equal to the unity.

Another type of the poverty line employed in this study is based on the relative poverty concept. It is conceived as a certain proportion of an average welfare. Basing on the EUROSTAT idea (see: Barreiros, 1992), the poverty line in this study is set as a half of the mean national welfare (here: equivalent income, although Barreiros utilized expenditures), and supplementary, as 40% and 60% of the mean welfare.

All poverty lines employed in this study are displayed in Table 1. They are to be attached to the reference household (single person aged from 30 to 60 years, living in urban area) while the poverty lines for other types of household may be obtained by multiplying them by appropriate equivalence scales.

Tab.1 Absolute and relative poverty lines (in local currency,per year, per equivalent unit).

COUNTRY	ABSOLUTE POVERTY LINE	RELATIVE POVERTY LINE		
		40%	50%	60%
CZ92	22,436	17,244	21,555	25,866
HUN91	78,364	58,918	73,648	88,377
POL92	14,856th	9,709th	12,136th	14,564th
SLOV92	22,853	14,683	18,354	22,025

For all countries 40% and 50% relative poverty lines are located below the absolute ones (intended to represent the same level of equivalent income for all countries). For the Czech republic and Hungary, which have reached standards of living (precisely, mean equivalent incomes) higher than Poland and Slovakia, the absolute poverty lines are lower also than 60% relative poverty lines.

3. Purchasing Power Parities

3.1 PPPs within the Spatial Consumer Model

PPPs utilized in the present study were estimated by Szulc (1994) for 28 countries using data from the United Nations International Comparisons Project (ICP, see Kravis et al., 1982). They are derived from the generalized expenditure function which does not impose assumption of preferences identity nor similarity across countries. Therefore, PPPs can be re-interpreted as bilateral neoclassical consumer price index numbers. Observations capturing 1980, 1985 and 1990 years include: prices, nominal expenditures on consumption and budget shares for all countries under comparison.

The theoretical model assumes that the following generalized cost function is minimized by the "representative consumer" in the k*th* country (k=1,2,...,K)

$$(P,u,PPP_k) = a_0 + \sum_{i=1}^{n} a_i \ln P_{ik} + \frac{1}{2}\sum_{i=1}^{n}\sum_{j=1}^{n} a_{ij} \ldots$$

$$\ldots P_{jk} + b\,(\ln u) + c\,(\ln u)^2 + \sum_{i=1}^{n} d_i\,(\ln u)\ln \ldots \qquad \textbf{(1)}$$

$$\sum_{i=1}^{n} a_i = 1\ ; \quad \sum_{i=1}^{n} d_i = \sum_{i=1}^{n} a_{ij} = 0 \text{ for } j=1,2,\ldots,n;$$

$$a_{ij} = a_{ji} \text{ for } i,j=1,2,\ldots,n;$$

where:

$P = [p_1, p_2, \ldots, p_n]$ is a country-basis nonnegative price vector;

u is a positive utility level;

A_{kj} is a positive index number comparing prices of the j*th* group of commodities between the k*th* country and country-basis;

$PPP_k = [A_{k1}, A_{k2}, \ldots, A_{km}]$,

P_{ik}, called hereafter generalized price, represents price of the i*th* commodity in the k*th* country. It comes out as the following logarithmic form:

$$\ln P_{ik} = \ln p_i + \sum_{l=1}^{m} e_{il} \ln A_{kl} \tag{2}$$

where e_{il} is an elasticity parameter reflecting influence of price of the l*th* commodity on the i*th* commodity consumption. These parameters are assumed to be the same for all countries, then differences in preferences across countries enter the cost function through the PPP_k only. Generalized cost function defined by (1) assumes affecting consumption patterns by all (not only own) prices. Vector of the k*th* country price index numbers PPP_k is aimed at reflecting differences in price levels and structures between countries and also at expressing country-basis prices in the country own currency. Due to a flexibility of the cost function, the indirect utility function is also flexible in its arguments. Hence, u is able to provide a second order approximation (in terms of Taylor expansion) to the function corresponding to the right-hand side of the following equation:

$$u\,(P,\, PPP_k,\, M_k) = G_k\,[f\,(P,\, PPP_k,\, M_k),\, k] \tag{3}$$

where function f represents a cardinal utility while G_k stands for an ordinal (increasing) transformation. Form of the latter depends on the country but does not affect consumer patterns. One can find therefore the cost function defined by (1) a valuable vehicle for international price comparisons, as an unrealistic assumption of preferences similarity or identity across countries is no longer necessary. Therefore, it is justified to recognize the following ratio:

$$A(P,\, u,\, PPP_k,\, PPP_b) = \frac{C(P,\, u,\, PPP_k)}{C(P,\, u,\, PPP_b)} \tag{4}$$

as a valuable index for bilateral comparisons (between countries k and b).

The estimation of parameters necessary to calculate the index defined by (4) is based on the Hicksian budget shares.

Incorporating Shephard's lemma it is possible to write them in the following manner:

$$= a_i + \sum_{j=1}^{n} a_{ij} (\ln p_i + \sum_{l=1}^{m} e_{il} \ln A_{kl}) + d_i (\ln \quad \textbf{(5)}$$

where w_{ik} denotes the i*th* budget share in the k*th* country.

The PPPs below an aggregation level calculated within the UN's ICP are employed as aggregate price ratios (A_{kl})*PPPs*. The country-basis is Poland. The consumer price indices for 1990, 1985 and 1980 years (the base year is 1984) which substitute prices p_i are from Belgium. The last independent variable in (5), an utility level u_t, is approximated in the model by the ratio of total consumption per capita in national currency divided by UN's PPP. The idea backing this concept is derived from Diewert (1989) who proved that a quantity index number (represented here by real expenditures quotient) might be a second order proxy for utilities ratio. More details on PPPs calculation may be found in (Szulc, 1994, 1996).

The PPPs for four investigated countries are provided in Table 2. Indices are provided for 1992 (obtained as products of 1990 PPPs and national consumer price indices ratios) taking Polish z»oty as a currency-basis. In Szulc (1994, 1996) they were calculated using several methods. That employed in the present paper yields PPPs as results of three bilateral comparisons: between Poland and the Czech and the Slovak republics, and Hungary, separately[2]. Indices are calculated using "quasi-exact" formula (which corresponds to the "quasi-exact" equivalence scales concept presented in succeeding section), i. e. independently from the cost function (1) parameters. This allows to apply actual budget shares of countries under comparison rather than average (over the set of all countries providing

[2]Therefore, they do not pass transitivity axiom, however there is no reasons for demanding this property.

data) ones, unlike in most of multilateral studies. In other words, the present PPPs are characteristic, using Drechsler's (see Diewert, 1986) terminology.

Table 2 PPPs for the Czech and the Slovak republics and Hungary (in Polish z»otys).

CURRENCY		
1 Czech koruna	1 Hungarian forint	1 Slovak koruna
662,15	189,58	650,06

3.2 International Comparisons of Income and Wealth

Using PPPs presented above it is possible to calculate welfare measures which are comparable between countries included in this study. Table 3 presents average equivalent incomes, supplemented by the GNP per capita and average yearly wages (two latter measures utilize PPPs calculated by Havlik, 1994). In some cases considerable differences between the GNP per capita on one side and mean incomes and wages on the other side are revealed. The most important ones appeared for the Czech republic versus Hungary and Poland. The first country reached in 1992 GNP per capita which was by 56% higher than the Polish one and by 17% higher than the Hungarian one (see Ve…ernik, 1995). On the other hand, yearly wages (adjusted by the same PPPs, i. e. those calculated by Havlik) were higher in Hungary and in Poland than those in the Czech republic by 10% and 5%, respectively.

Table 3. Mean equivalent incomes, GNP per capita and wages in Polish z»oty

COUNTRY	MEAN EQUIVALENT INCOME (in thousand z»oty)	GNP PER CAPITA, 1994	YEARLY WAGES, 1992

		(In PPP dollars)[3]	
CZ92	28,634	8201	5442
HUN91	28,074	6988	5988
POL92	24,329	5272	5723
SLOV92	23,988	6887	5660

Source of the GNP and wage information: Ve…ernik, 1995

Mean equivalent incomes: own calculations

4. Equivalence Scales

The general equivalence scale m_k comparing cost of living for two households, k-th and r-th, is defined here after Deaton and Muellbauer (1980)

Definition 1

$$m_k = m(P,u,A_k,A_r) = \frac{C(P,u,A_k)}{C(P,u,A_r)} \qquad \textbf{(6)}$$

where:

$P = [p_1,p_2,...,p_n\ ]$ - vector of prices,

p_i - price of the i-th (i=1,2,...,n) commodity[4],

u - utility level,

$A_t = [A_{1t},A_{2t},...,A_{mt}]$ - vector of demographic attributes of the t-th household (t=k,r),

A_{lt} - l-th demographic characteristics (l=1,2,..,m) of the t-th household (e. g. a number of children),

C - cost (expenditure) function.

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[3] Calculated by Havlik (1994).

[4] In empirical applications it is substituted by a price index number.

Scales utilized in the present study are based on Diewert's (1976) translog cost function estimated with the use of the Polish data. The demographic attributes are incorporated into the cost function C following demographically flexible Almost Ideal Demand System proposed by Deaton and Muellbauer (1980), for which Diewert's function is a special case (with a linear term reflecting the interaction between prices and utility).

The parameters necessary for a computation of the equivalence scales are obtained, like in the case of the PPPs, through an estimation of Hicksian budget shares derived from Shephard's lemma and coming out in the form[5]

$$= a_i + \sum_{l=1}^{m} a_{ij} \, (\ln p_j + \sum_{l=1}^{m} m_{il} \ln A_{lt}) + d_i \ln \qquad \textbf{(7)}$$

(i = 1,2,...,n) where m_{il} stands for a demographic elasticity of consumption. The vector of demographic attributes A_t includes: family size, number of children below 10, number of children from 10 to 15, and age of household head (16 - 29, 30 - 60, over 60).

Given the results of the estimation, general equivalence scales are calculated using eqn (9) which is based on the theorem (by Szulc 1992 a, b) on "quasi-exact" equivalence scales

Theorem

If:

The r-th and k-th households minimize their translog cost functions,

then

$$\ln \frac{C(P,u,A_k)}{C(P,u,A_r)} = \frac{1}{2} \sum_{l=1}^{m} \sum_{i=1}^{n} \left[m_{il}(w_{ik} + w_{ir}) \right] \ln \frac{A}{A} \qquad \textbf{(8)}$$

where

---

[5] Like in the estimation of eqn 5, the utility level which appears in eqn 7 is approximated by the equivalent expenditure. This meets Diewert's (1989) idea of "exact and superlative welfare change (here: utilities ratio) indicator".

u_* - geometric mean of $\underline{r}$-th and $\underline{k}$-th household utilities,

w_{it} - $\underline{i}$-th budget share of the $\underline{t}$-th household.

The left-hand side of (8) represents the general equivalence scale defined by (6). The right-hand side can be calculated using w_{it}, A_{lt} and m_{il} (i=1,2,...,n ; l=1,2,...,m) only. This relaxes the impact of stochastic disturbances in the estimation of parameters a_i, a_{ij}, and $\underline{d}_i$, (i, j = 1, 2, ... ,n). The next advantage of "quasi-exact" scales consists in possibility of attaching individual scale to each household, given its budget shares.

To apply "quasi-exact" equivalence scales to remaining countries individual budget shares would be necessary. As they are not available through the LIS database, the estimation of equivalence scales is based on two parameters only. The class of scales of such a type has been employed, for example, by Duclos and Mercader (1993) by means of the following equation:

$$E = (N_A + S_C)^S \qquad \textbf{(9)}$$

where E is an equivalence scale, N_A and N_C stand for number of adults and number of children, respectively. S_C (cost of children as a proportion of adults cost) and S are parameters to be estimated. Given "quasi-exact" equivalence scales calculated for Poland by Szulc (1995c) the following estimates are obtained:

Parameter	Estimate	t-statistic
S_C	.850407	228.139
S	.723448	897.738

R-squared = .975569

Using S_C and S, the equivalence scales are calculated for the Czech and the Slovak republics and for Hungary. The results are displayed in Table 4 which presents the scales for selected types of household. They are, by definition, identical across countries for the same types of households. However, demographic differences between countries result in different average equivalence scales. The highest one was calculated for Poland (2.15 what is, approximately, an equivalent of almost 3 adults) while the lowest for the Czech republic (1.92).

Table 4. Household equivalence scales

No of adults	No of children	Scale
1	0	1
2	0	1.65
3	0	2.21
4	0	2.73
2	1	2.13
2	2	2.58
Country average		
CZ92		1.92
HUN91		2.04
POL91		2.15
SLOV92		2.07

5. Poverty Indices: Theory and Empirical Results

Poverty indices employed in this research have been chosen to provide a possible comprehensive assessment of the various aspects of poverty by means of a minimum set of formulas. This study focuses on: 1/ poverty incidence, 2/ poverty depth, and 3/ relative poverty and inequality.

The individual welfare measures are aggregated by Jorgenson (1990) social welfare function (SWF). To obtain comparability between units, individual utilities are replaced here by equivalent incomes). Employing this SWF it is possible to calculate a representative income, which is a form of money metric measure of social welfare. The representative income, ., for Jorgenson SWF takes a form of an average welfare, minus an inequality measure

$$>(X) = \frac{\sum_{i=1}^{K} x_i}{\sum_{i=1}^{K} m_i} - (\left[\frac{\sum_{i=1}^{K} m_i \left| \frac{x_i}{m_i} - \frac{\sum_{i=1}^{K} x_i}{\sum_{i=1}^{K} m_i} \right|^{-D}}{\sum_{i=1}^{K} m_i} \right]^{-1/D} \qquad \textbf{(10)}$$

where:

K - number of households

x_i, m_i - nominal income and equivalence scale, respectively, of the <u>i</u> - th household (i = 1, 2, ... , K),

$X = [x_1, x_2, ..., x_K]$,

(- function ensuring satisfaction of the Pareto principle by the SWF,

D - parameter representing social aversion to inequality.

The most popular poverty measure is the head count ratio (hereafter: H), defined as a proportion of households or persons below a poverty threshold (here: the absolute poverty line and three relative poverty lines). In this study it is supplemented by an evaluation of an average, relative welfare shortfall experienced by the poor. For the aggregator function defined by (10) this measure takes a form of the aggregate Dalton (1920) index

$$D = \frac{z - >(X_p)}{z} \qquad \textbf{(11)}$$

where

z - poverty line,

$X_p = [x_1, x_2, ... , x_q]$ - vector of incomes of the poor,

q - number of the poor.

Finally, Gini inequality indices for countries as a whole are calculated. All results are collected in Table 5.

The lowest absolute poverty incidence is found for the Czech republic. This result might be guessed from the welfare comparisons displayed in Table 3, matched with the inequality measures (the last column in Table 5) The average equivalent income is the

Table 5. Poverty and inequality indices for the Visegrad countries

COUNTRY	H	H_*	HR_{40}	HR_{50}	HR_{60}	DALTON	GINI
CZ92	0.027	0.026	0.008	0.021	0.080	0.200	0.201
HU91	0.137	0.136	0.056	0.108	0.203	0.320	0.291
PL92	0.203	0.259	0.060	0.120	0.203	0.268	0.291
SV92	0.082	0.078	0.009	0.024	0.062	0.156	0.183

H - head count ratio for households, absolute poverty line
H_* head count ratio for persons, absolute poverty line
H_{40} - head count ratio for households, relative 40% poverty line
H_{50} - head count ratio for households, relative 50% poverty line
H_{60} - head count ratio for households, relative 60% poverty line

highest in this country (28,634,000 PPP z»otys) while inequality is the second lowest, after Slovakia. Comparing absolute poverty incidence for Slovakia (the lowest average welfare along with the lowest inequality) and Hungary (both high welfare and inequality) also support the hypothesis that inequality plays more important role in producing poverty in the Visegrad countries. The highest poverty incidence experienced by Poland is therefore not striking, given high inequality accompanied by the second lowest average welfare. On the other hand, one might be surprised by a magnitude of a difference between head count ratios calculated for Poland (0.203) and for the Czech republic (0.027), given not so high difference between mean incomes (see Table 3).

Comparing absolute poverty incidence calculated for households and for persons one can find that only for Poland the latter ones are higher than the previous. It means that only in this country large families are (slightly) more frequently poor than average ones.

Relative poverty indices usually are considered a type of inequality measures (although they do not hold some certain properties which should be passed by inequality indices in a strict sense). The empirical results confirm that view, as they are the lowest for countries characterized by the smallest inequality (the Czech and the Slovak republics). Naturally, this is not a formal "proof" for the above mentioned "theorem".

Dalton index tells how poor are households below the absolute poverty line. It takes the highest values for Hungary and for Poland and much lower for the Czech and Slovak republics. As claimed by Szulc (1995a), there is a certain, positive association between Dalton index values and inequality.

6. Groups at Risk from Poverty

This section is aimed at indicating the least privileged socio-economic groups. The analysis covers both risk of being poor (subsection 6.1) as well as poverty depth (subsection 6.2), resulting from belonging to the given demographic or socio-economic group. In both cases identical sets of explanatory dummy variables are employed. In analysis of risk from poverty, the response variable in the probit estimation variable is a dummy indicating being poor. In analysis of poverty depth, the dependent variable is calculated as an absolute poverty gap, i.e. difference between the (absolute) poverty line and actual welfare (equivalent income). The estimation in this case is performed over the set of households below the poverty line.

The following dummy variables are employed:

AGE30 - head's age below 30 years

AGE60 - head's age over 60 years

SINPAR - families with one adult and at least one child

EDULO - primary or lower education of the head

FARM - farmer household

RURAL - rural residence

FEM - female head

UNEMP - household of unemployed

CHI3 - family with 2 adults and 3 children

CHI4 - family with 2 adults and at least 4 children

The choice of variables is natural rather than based on formal criterion. All above mentioned variables have been examined in numerous studies (for example, Barreiros, 1992, Szulc, 1995a) and frequently happened to be positive determinants of low incomes. To ensure comparability of classifications, which differ between countries, households are defined as farmer ones simply if a farm self-employment income is greater than a half of disposable income. Households of unemployed are defined in an analogous way, using unemployment compensations.

6.1 Analysis of risk from poverty

The results of the estimation are reported in Tables 6-9. Estimated parameters may be interpreted as indicators of risk from poverty. Positive sign means that belonging to the respective group results in higher than average risk from poverty. For example, an estimate equal to 1.898 obtained for households of unemployed (variable "UNEMP") in the Czech republic may be interpreted that they face risk from poverty much higher than average households. On the other hand, -0.467 obtained for large households (variable "NPER6") means risk lower than average. However, one should be aware that the later estimate is non-significant at 0.05 level (appropriate t-statistic is below 1.96; see the last columns in tables). Table 10 displays both significance and signs of estimates of risk from poverty. As one can see, significance of different socio-economic attributes varies significantly between countries.

Table 6. Estimates of risk from poverty: Czech Republic

Variable	Estimate	t-stats
INTERCPT	-2.351881	-57.74463
CHI3	0.54254	5.4213
CHI4	0.72652	1.86315
NPER6	-0.467133	-1.595531
AGH30	0.64675	11.1086
AGH60	-0.129105	-2.087226
FARM	0.61644	2.25039
UNEMP	1.8984	7.72398
SINPAR	0.85684	10.281
FEM	0.28287	4.86827
EDULO	0.48084	9.04718
RURAL	0.02738	0.53953

Table 7. Estimates of risk from poverty: Hungary

Variable	Estimate	t-stats
INTERCPT	-1.834418	-23.98308
CHI3	0.38467	2.05385
CHI4	0.39043	1.07487
NPER6	0.38736	2.19166
AGH30	0.44584	3.51632
AGH60	0.20825	2.37095
FARM	0.00862	0.01353
UNEMP	1.17624	3.99686
SINPAR	0.16613	0.85947
FEM	0.33423	3.74403
EDULO	0.68014	8.23498
RURAL	0.23046	2.93832

Table 8. Estimates of risk from poverty: Poland

Variable	Estimate	t-stats
INTERCPT	-1.474951	-41.52451
CHI3	0.72638	10.0931
CHI4	0.95774	6.62659
NPER6	0.24039	2.2436
AGH30	0.108	1.50676
AGH60	0.03655	0.7743
FARM	-0.009216	-0.122788
UNEMP	1.85182	6.72731
SINPAR	0.14422	1.2422
FEM	0.24746	5.19144
EDULO	0.45563	10.683
RURAL	0.57703	13.9614

Table 9. Estimates of risk from poverty: Slovakia

Variable	Estimate	t-stats
INTERCPT	-1.935434	-64.1701
CHI3	0.42611	7.08266
CHI4	1.10379	8.00736
NPER6	-0.40299	-3.502217
AGH30	0.57357	12.3595
AGH60	-0.16848	-4.118106
FARM	0.00022	0.0007
UNEMP	2.38057	11.2526
SINPAR	0.63688	8.67235
FEM	0.29162	7.7133
EDULO	0.62332	16.9497
RURAL	0.16969	5.32417

Table 10. Significance and signs of estimates of risk from poverty

Variable	Country			
	CZ92	HU91	POL92	SLOV92
CHI3	+	+	+	+
CHI4	! +	! +	+	+
NPER6	! -	+	+	-
AGH30	+	+	! +	+
AGH60	-	+	! +	-
FARM	+	! +	-	! +
UNEMP	+	+	+	+
SINPAR	+	! +	! +	+
FEM	+	+	+	+
EDULO	+	+	+	+
RURAL	! +	+	+	+

! non-significance at 0.05 level

\+ positive estimate

\- negative estimate

Four factors: unemployment, low education of a household head, three children in a household, and female head are positive and significant for all investigated countries. For the first variable the estimates reach the highest values (from 1.176 for Hungary to 2.381 for Slovakia), for the last one the lowest (from 0.247 for Poland to 0.334 for Hungary). It may be found surprising that risk estimated for households with at least four children is non-significant (although positive and values are higher than those estimated for households with three children) for the Czech republic and Hungary. Rural residence yields positive, significant risk from poverty in three countries (excluding the Czech republic, for which positive estimate is non-significant). The lowest risk from poverty is faced by households headed by persons over 60. Positive, significant risk from poverty is found only for Hungary.

6.2 Socio-economic Determinants of Poverty Gaps

The analysis presented above is oriented on poverty incidence, therefore the dependent variable is of 0/1 type. Analysis of poverty depth may be carried out by means of the ordinary least squares estimation. The dependent variable is defined in the form of individual, absolute poverty gap, d, which may be specified as:

$$d_i \text{ ' } z \;\&\; y_i \qquad \textbf{(12)}$$

(i = 1, 2, ... ,K).

The independent variables are the same as in the probit regression presented in Section 6.1. The results of estimation, pursued for households below the social minimum, are reported below. Interpretation of the estimates is similar to the probit estimates: negative value may be interpreted as lower than average poverty gap caused solely by belonging to a given group and *vice versa*. The higher value of estimate, the higher poverty depth due to belonging to a given group. Results are displayed in Tables 11-14.

Table 15, like Table 10, summarizes results of estimation of poverty depth determinants. The conclusions are usually different from those which might be drawn from probit analysis of risk from poverty. The number of non-significant variables is much higher and none of them is significant for all countries. Moreover, many of estimates are negative. Only low education of head and a farmer occupance yield estimates which are positive for all countries. Estimates for households headed by persons over 60 are negative for all countries, and only that for Poland it is non-significant. Given these results and those on risk from poverty, one can conclude that old persons usually have relatively low but equallydistributed incomes. The opposite phenomenon may be found for farmer households which face relatively low risk from poverty but poor farmers are usually more poor than average households below the poverty line.

Table 11. Determinants of poverty gaps: Czech Republic

Variable	Estimate	t-stats
INTERCEPT	6.801700	9.845
CHI3	4.750181	.137
CHI4	-7.189515	-.202
NPER6	-5.867941	-.211
AGH30	10.644963	2.379
AGH60	-14.90140	-2.769
SINPAR	5.826268	1.034
EDULO	4.216853	1.026
UNEMP	43.170138	4.244
RURAL	-1.882661	-.444
FEM	-3.114950	-.657

R Square: 0.14225

Table 12. Determinants of poverty gaps: Hungary

Variable	Estimate	t-stats
INTERCEPT	25697.18860	7.291
CHI3	349.149345	.028
CHI4	-1174.62062	-.107
NPER6	-5087.41063	-.819
AGH30	4753.435739	.998

AGH60	-9069.98903	-2.620
FARM	21185.94525	.873
UNEMP	-2958.30292	-.385
SINPAR	372.780451	.054
FEM	-5472.75410	-1.609
EDULO	5627.202726	1.587
RURAL	1459.190009	.468

R Square: 0.06858

Table 13. Determinants of poverty gaps: Poland

Variable	Estimate	t-stats
INTERCEPT	2145.7894	14.149
CHI3	-133.4947	-.362
CHI4	1217.7974	3.346
NPER6	99.559351	.334
AGH30	-20.28326	-.076
AGH60	-370.1982	-1.750
FARM	1313.0375	5.288
UNEMP	3320.7816	10.144
SINPAR	-146.6423	-.301
FEM	226.46369	1.056
EDULO	573.02402	3.567
RURAL	1308.4636	8.367

R Square: 0.19467

Table 14. Determinants of poverty gaps: Slovakia

Variable	Estimate	t-stats
Constant	39.412684	17.862
CHI3	.102197	.011

CHI4	-13.40453	-1.450
NPER6	5.878157	.710
AGH30	9.322024	3.325
AGH60	-16.96702	-6.021
FARM	47.580016	2.256
UNEMP	41.972399	7.172
SINPAR	6.949693	1.699
FEM	-3.980041	-1.540
EDULO	3.022383	1.276
RURAL	-1.780358	-.846

R Square: 0.11765

Table 15 Significance and signs of estimates poverty gap determinants

Variable	Country			
	CZ92	HU91	POL92	SLOV92
CHI3	! +	! +	! -	! +
CHI4	! -	! -	+	! -
NPER6	! -	! -	! +	! +
AGH30	+	! +	! -	+
AGH60	-	-	! -	-
FARM	+	! +	+	+
UNEMP	+	! -	! +	+
SINPAR	! +	! +	! -	! +
FEM	! -	! -	+	! -
EDULO	! +	! +	+	! +
RURAL	! -	! +	+	! -

! non-significance at 0.05 level

\+ positive estimate

\- negative estimate

7. Some Remarks on Interpretation of Results

Poverty statistics based on the corrected social minimum is, in general, not very pessimistic. The highest poverty rate has been found for Poland, however it should not be regarded extremely high, given true that the poverty line represents a social minimum rather than a subsistence minimum. Poverty rates obtained for the Czech and the Slovak republics are very low, and the same may be said when relative lines are employed. These results do not confirm popular believes on large poverty expansion in the 1990s in the post-communism economies[6]. Even in Poland higher poverty rates, basing on approximately the same social minimum, were calculated for some years during the 1980s (see Szulc, 1995 a and Milanovic, 1992). Moreover, there are several reasons to believe that the poor in the 1990s is better of than the poor in the 1980s with the same poverty depth. They are briefly described below.

The "consumer revolution" which occured in most of countries of the former communist system improved significantly quality of commodities purchased by households, like food, clothing and footwear, household appliances, electronics, cosmetics etc. (see also Garner, 1995). This results in non-comparability of prices paid for nominally "the same" products recently and in the previous period. Unfortunately, changes in quality which could be quantified by the hedonic regression should be performed separately for each single commodity, what make this type of regression non-eligible in studies like this one.

Liberalization of the consumer market obviously improved a comfort of shopping. For example, it has been estimated by Leven (1991) that between July 1989 and July 1990, the amount of time lost in lines decreased in Poland from 2.4 to 0.7 hours per day for women and from 1.9 to 0.66 for men. On the other hand, changes in other countries covered by this study probably were

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[6]Studies on the Czech, the Slovak (Garner, 1995), and the Polish (Szulc, 1995) economies confirm decrease in income (and expenditure) inequality at the beginning of the 1990s.

not so substantial, as shortages were less painful than those observed in Poland.

Changes in availability of consumer goods also affected positively rationality of purchases. It is well known that quantity constraints do not allow a household to reach the neoclassical optimum. Collier (1989) estimated influence of quantity constraints on welfare levels in Eastern Germany in the 1980s. Employing the utility function estimated with the use of the Western Germany data he evaluated consumer lost in the Eastern Germany equal to 13% of the optimal utility level.

One more point, of statistical character, should be added here. In the central market economies, prices reported by statistical officies were frequently lower than the actual ones, i. e. those paid in fact by consumer. This constitutes one more reason for assuming that real cost of living during the transition period increased to less extent than the "official" consumer price indices indicated. One should also take into consideration bargain sales, which are new in post-communist economies and are rarely captured by the official price statistics.

8. Concluding Remarks

International comparisons of income distributions presented in this paper allow to distinguish two groups of the Visegrad countries. The Czech republic and Hungary may be considered "rich" states, with average, individual incomes by 15-20% higher than those in Poland and Slovakia. There are also two groups of countries, as far as inequality of incomes is concerned. The Czech and the Slovak republics are characterized by low inequality while Poland and Hungary are countries of relatively high inequality of equivalent incomes. Due to the above findings it was not surprising to find the highest poverty incidence for Poland and the lowest for the Czech republic.

The analysis of poverty have not confirmed popular beliefs on the large expansion of poverty in the Visegrad countries after starting economic transition. The highest poverty incidence, i. e. that calculated for Poland is even lower than in some years during 1980s. In terms of relative poverty, results also can not be considered very pessimistic, as calculated indices are lower than those in many European Union countries (see Barreiros, 1992). Naturally, those poverty lines represent much lower standards of living than the EU average.

Estimations made over sets of socio-economic and demographic variables allowed to indicate groups of the highest risk from poverty. In all investigated countries four types of household face high, statistically significant risk from poverty: unemployed, low educated persons, households with three children, and households with female heads. Analysis of socio-economic or demographic determinants of poverty depth did not allow to indicate groups affected by higher poverty gaps in all countries under consideration.

There are reasons which allow to suppose that individual poverty in the 1990s is less oppressive than that occuring in the 1980s. The same real expenditure or income in the 1990s gives the consumer higher utility than in the 1980s. This is an effect of improving quality and availability of consumer goods which results in more rational and less time-consuming budgeting. On the other hand, new calculations made for Poland are less optimistic and claim increasing number of poor (Szulc, 1995 b). The same might happen to other countries of the Visegrad Group, in spite of GDP growth experienced by all of them. Milanovic (1996) study claimed sharp inequality increase in 1993/1994 in most of the post-communist economies.

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