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AGEING OF THE POLISH POPULATION: STATISTICAL AND DEMOGRAPHIC ASPECTS

The main aim of this paper is to provide a statistical and demographic analysis of the ageing of the population of Poland and of the city of Cracow between 1990–1999. A method for the construction of the population forecast of Poland is also presented. Moreover, the readers will also find a few important thoughts on the problem of old age in Poland in the 21st century. In addition, the paper includes useful references, thus certainly providing inspiration for further research.

1. INTRODUCTION

The on-going ageing of contemporary societies spells serious social, economic and medical problems, which require urgent solutions. The ageing of societies has numerous aspects: biological, social, economic, moral, etc. Contemporary societies face problems relating to broadly understanding medical care and social welfare for the elderly (the terms "elderly people" and "the elderly" mean people of 65 and over). Ageing brings about physical and mental debilitation, which, as a rule, gradually undermines elderly people both mentally and physically, at the same time reducing their professional and earning potential. This, in turn, leads to a deterioration of elderly people's material status.

It is hard to overlook the impact that intensive urbanization and migrations (mainly from rural to urban areas) have on the elderly people's place in the neighbourhood and the family. Influenced by the growth of cities and towns, the growth in their number and the enlargement of urban areas, family life as we know it, is changing. The family offers less and less of a support to the elderly, as it refuses to undertake the chores of their support. Many young people do not care at all about their parents or grandparents, living their own life and being absolutely absorbed by it. The traditional family links have become looser and the authority of elderly family members has weakened.

The young generation increasingly often breaks the mould by living a life entirely of their own, refusing to respect those qualities of life which took many generations to build and refusing to accept existing role models previously passed down from generation to generation.

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2. AGEING OF THE POLISH POPULATION

The growth of the population in any country can be estimated by means of the following exponential function

$$Y_t = \alpha t^{\beta} e^{u_t} \quad \alpha > 0 \quad (t = 1,...,n) \tag{1}$$

where

Y_t – number of people in period t (dependent variable)

t – time variable ($t=1,...,n$) (the explanatory variable)

α, β – parameters, which are unknown

e^{u_t} – a multiplicative disturbance term

$e = 2.71828...$– base of natural logarithms (Euler's constant).

Taking logs of both sides of (1) gives

$$\ln Y_t = \ln a + \beta \ln t + u_t \quad (t = 1,...,n) \tag{2}$$

where u_t is an additive disturbance term representing the difference between the actual level of the logarithm of variable Y_t and its expected level calculated by means of equation (2).

We submit that the second relation is linear in $\ln Y_t$ and t.

Function (1) is used to analyse population growth when the number of people actually grows, but at a decreasing rate.

Population growth can also be estimated on the basis of the following logistic function ("*growth curve*") (see Stanisz 1986)

$$Y_t = \frac{\alpha}{1 + \beta e^{-\gamma t}} \quad (t = 1,...,n) \tag{3}$$

where $\alpha > 0$; $\beta > 1$; $\gamma > 0$ (the α parameter is called the saturation level of the population growth). This lends itself very well to estimating empirical data relating to cases of a monotonous population growth over the long term, where the growth rate drops to zero, which is borne out by the fact that the logistic curve asymptotically approaches the straight line $y = \alpha$, running parallel to the t axis of abscissa.

The α, β, γ parameters of function (3) are estimated by means of the Hotelling, Tintner, Fisher, Bonus or quasi-Newton method (cf. Stanisz 1986, pp. 129-168).

In order to receive a function with qualities similar to the logistic function, but lacking the so-called horizontal asymptote of saturation, Z. Hellwig and J. Siedlecki (1998) modified the logistic function. This modified function was called a logarithmic-logistic function or loglogistical function in short. The function is expressed by means of the following formula:

$$Y_t = \frac{a}{1 + e^{\beta + \gamma t}} \ln t \quad (t = 1, ..., n) \tag{4}$$

where $\alpha > 0$; $\beta > 1$; $\gamma < 0$.

In contrast to equation (3), curve (4) does not have a saturation asymptote. This was the main reason and stimulus for such a modification of the logistic function that would allow a description and forecast of unlimited increase in population growth with a rate of population growth decreasing to zero.

It is a widely known premise that a rising rate of population growth is an equivalent to an increase in the natural growth of population, whilst a declining rate of population growth is an equivalent to a decline in the natural growth of population. Natural growth of population in developing countries tends to be on the increase, whilst in developed countries they tend to fall. If the natural growth of population is positive, the population tends to grow. From the demographic point of view this is a healthy trend. By contrast, a falling rate of population growth represents population shrinkage. Poland - reporting not only a slowing rate of population growth (cf. Table 1) but also an ever faster slow-down in the natural growth of population (cf. Table 6), which is already negative in urban areas (cf. Table 7), indeed so low that it can lead to a degeneration of Poland's demographics and subsequently make Poland a country in which the number of old age pensioners exceeds the number of working people - faces the above second scenario. An inflow of immigrants from countries which are not member states of the European Union, could become a remedy against the ageing of the Polish people. To exemplify the claim, let us recall the case of Germany, which absorbed over 30 million immigrants in the last 40 years. In contrast, 21 million people left the Federal Republic of Germany during the period.

Now let us present the results of estimations of the parameters of the logistic function of the trend representing the increase in population in Poland between 1946 and 1999.

Using the data presented in Table 1, let us estimate parameters α, β and γ of function (3) by means of the *quasi*-Newton method.

The estimated relationship then is

$$\hat{y}_t = \frac{41,845.64}{1 + 0.822 \cdot e^{-0.0455t}}, \quad R^2 = 0.9977. \tag{5}$$

Table 1

Population (in thousands)

Year	As of 31 December			Urban Population as % of Total Population
	Total	Urban Areas	Rural Areas	
1946	23,640	8,043	15,597	34.0
1950	25,035	9,243	15,792	36.9
1960	29,795	14,401	15,394	48.3
1970	32,658	17,088	15,570	52.3
1980	35,735	20,979	14,756	58.7
1991	38,309	23,750	14,559	62.0
1992	38,418	23,701	14,717	61.7
1993	38,505	23,808	14,697	61.8
1994	38,581	23,864	14,717	61.0
1995	38,609	23,876	14,733	61.8
1996	38,639	23,903	14,736	61.9
1997	38,660	23,925	14,735	61.9
1998	38,667	23,923	14,744	61.9
1999	38,654	23,894	14,760	61.8

Source: *Rocznik Statystyczny Rzeczpospolitej Polskiej 2000* (*Yearbook of the Republic of Poland. Year 2000*), Warsaw: GUS, p.95.

The non-linear trend function (5) allows a good approximation of the empirical curve of increase in population in Poland during the period under analysis (cf. Figure 1), which indeed increases but does so at a decreasing rate (the rate decreases to zero). The resultant R^2 coefficient of determination stands at 0.9977, which implies that the growth of Poland's population is explained by the estimated trend function (5) in 99.8%.

Table 2 shows the 1999 structure of Poland's population by age classes. Each age class was assigned the number of people on 31 December 1999.

An analysis of the structure of the population by age classes is made easier with a diagram called "the population pyramid". Figure 2 shows a population pyramid built on the basis of data from Table 2.

Building the population pyramid on the basis of Table 2 data, the author did not mark the observed empirical number, but the average density of frequency computed on the basis of the following formula
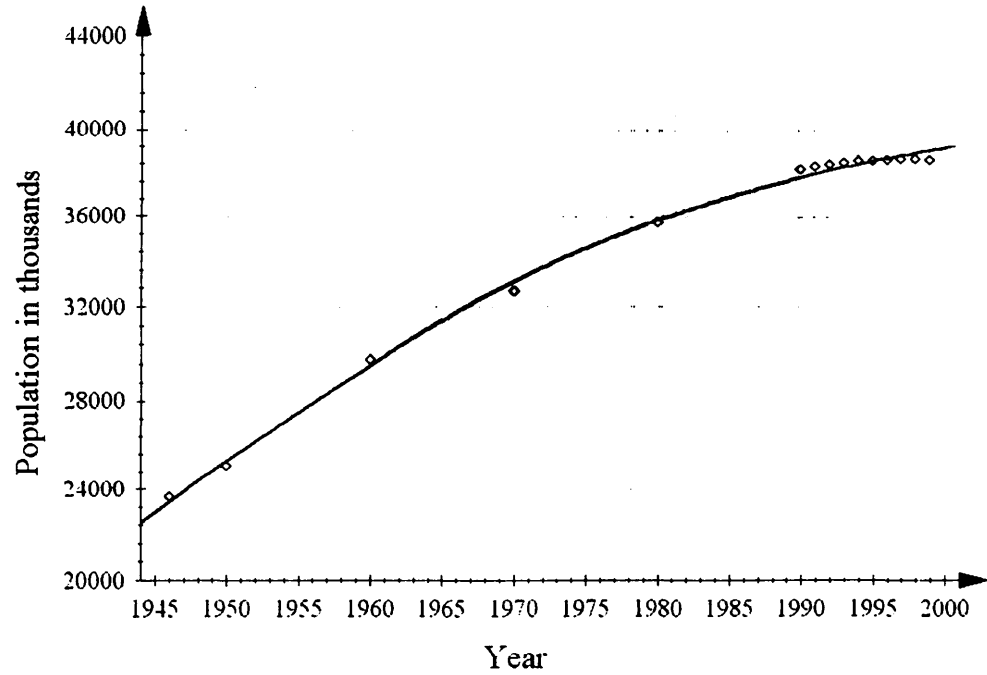
$$f_i' = \frac{f_i}{h_i} \quad (i = 1,...,k) \tag{6}$$

where

f_i – is the frequency in each class

h_i – is the width of the class

h – is the width of the class used as a unit of measurement.

$$\hat{y}_t = \frac{41,845.64}{1 + 0.822 \cdot e^{-0.0455 \cdot t}}, \quad R^2 = 0.9977$$

Figure 1. Total Polish Population, 1946-1999

Table 2
Population by Sex and Age (in thousands). As of 1 December 1999

Age class	Total	Males	Females
POLAND	38,653.6	18,783.5	19,870.1
0 –2	1,179.6	606.7	572.9
3 – 6	1,808.5	927.7	880.8
7 - 14	4,569.5	2,340.1	2,229.4
15 - 19	3,365.7	1,715.8	1,649.9
20 - 24	3,168.5	1,612.6	1,555.9
25 - 29	2,758.3	1,403.6	1,354.7
30 - 34	2,418.4	1,231.5	1,186.9
35 - 39	2,674.9	1,348.2	1,326.7
40 - 44	3,214.5	1,606.7	1,607.8
45 - 49	3,084.7	1,519.8	1,564.9
50 - 54	2,394.7	1,158.6	1,236.1
55 - 59	1,623.5	759.5	864.0
60 - 64	1,729.1	776.5	952.6
65 - 69	1,635.1	701.0	934.1
70 - 74	1,359.6	528.1	831.5
75 - 79	923.1	323.1	600.0
80 and more	745.9	224.0	521.9

Source: *Rocznik Statystyczny Rzeczpospolitej Polskiej 2000 (Yearbook of the Republic of Poland. Year 2000)*, Warsaw: GUS, p. 96, own calculations.

The width of the age class with the most frequent occurrence in the distribution (i.e. a five-year age class) was used as a unit of measurement. We will receive the following density of frequencies for males and females.

$$f_{1,M}' = 1011.2, \; f_{2,M}' = 1159.6, \; f_{3,M}' = 1462.6, \; f_{1,K}' = 954.8,$$
$$f_{2,K}' = 1101.0, \quad f_{3,K}' = 1393.4.$$

We should also observe that the last age class is an aggregate. In this analysis, it is the 80 and 80+ age class. Since it would be advisable to make the number of people belonging to the last age class comparable to that of an other age class, let us assume that this age class lives to be 100. Consequently, the last age class should be entered as the 80-99 age class. Following this assumption, we will receive the following density of frequencies $f_{17,M}' = 56.0$ and $f_{17,K}' = 130.5$.

In 1999, the structure of Poland's population by age classes, like in most European countries, continued to reflect the results of both world wars. Their most immediate consequence was a reduction in the number of population of the generation which living during both periods, suffered the dire consequences of military operations and occupation. Wars also result in demographic lows and highs, due to oscillations in the number of births. Figure 2 clearly points to a high birth rate in the 1950's.
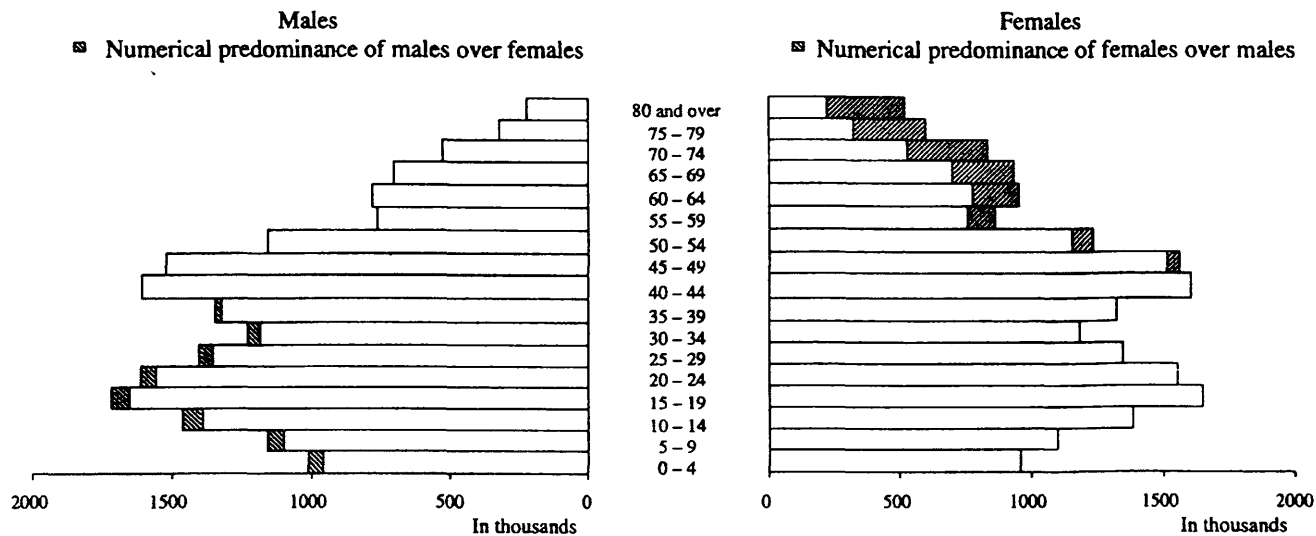
Males

◨ Numerical predominance of males over females

Females

◨ Numerical predominance of females over males

	80 and over
	75 – 79
	70 – 74
	65 – 69
	60 – 64
	55 – 59
	50 – 54
	45 – 49
	40 – 44
	35 – 39
	30 – 34
	25 – 29
	20 – 24
	15 – 19
	10 – 14
	5 – 9
	0 – 4

2000   1500   1000   500   0

In thousands

0   500   1000   1500   2000

In thousands

Figure 2. Population in Poland by Sex and Age, 31 December 1999. Average density of frequency.

The population pyramid also reflects the consequences of other events of a catastrophic character, e.g. of epidemics, and the impact of domestic and foreign migrations. If such disturbances had not happened, then the population pyramid (cf. Figure 2) would have a regular shape moulded by the scale of births and deaths. The impact of migration is clearly visible in the structure of sex and age in urban areas, particularly in metropolitan areas.

As already mentioned, demographic processes are universal in character and occur in any developed country, including Poland. Despite the fact that Poland ranks among countries which demographics-wise are old, the speed of ageing of the Polish population is relatively lower than that of highly developed countries.

Table 3

Old People in Poland (in %)

Year	Age Class		
	60 and more	65 and more	80 and more
1980	13.21	10.04	1.46
1985	13.95	9.44	1.75
1990	15.00	10.17	2.04
1995	15.87	11.22	2.10
1999	16.64	12.07	1.93

Source: Halicka, M (1999, p. 142). *Rocznik Statystyczny Rzeczpospolitej Polskiej 2000)*, Warsaw: GUS, p. 96.

Table 3 indicates that the ageing of the Polish people is a dynamic process. Changes in the percentage of people aged 65 and more, which stood at 10.04 in 1980 and declined to 9.44 only to return to 12.1 fourteen years later, are the biggest eye-catcher.

It should be noted that the increased mortality rate in the 65+ age class was aggravated by the socio-political and economic crisis of the 1980's, which, more likely than not, contributed to the higher mortality rate in this age class.

A demographic analysis often necessitates calculation of the life expectancy of 60-year olds (e_{60}). The indicator represents an average number of years that a 60-year old is likely to live for, assuming a fixed mortality rate during the period for which life tables were compiled. Thus, the length of life of the 60-year olds is an indicator of the length of life in the old age class. The e_0 indicator, on the other hand, represents the average number of years a newly-born baby is likely to live for under conditions of present-day population mortality. Table 4 shows both indicators of life expectancy, which synthesize the factors that influence the mortality rate of the population under analysis.

Table 4

Life Expectancy in Poland by Sex and Age between 1990 and 1999

Year	Life Expectancy			
	e_0 (at Birth)		e_{60}	
	Males	Females	Males	Females
1990	66.5	75.5	15.3	20.0
1995	67.6	78.4	15.8	20.5
1998	68.9	77.3	16.4	21.0
1999	68.8	77.5	16.3	21.1

Source: *Rocznik Statystyczny Rzeczpospolitej Polskiej 2000*, Warsaw: GUS, 109.

The data shown in Table 4 indicate that the present life expectancy in Poland has increased considerably compared to the 1950's. Indicators of life expectancy are varied in terms of sex and rural vs. urban population (cf. Table 5). Due to the excessive death rate of men, women enjoy a definitive numerical superiority over elderly men. The high death rate of Polish men manifests itself, amongst others, in the differing life expectancy for men and women.

Table 5

Life Expectancy in Poland in 1999

Specification	Life Expectancy			
	e_0 (at Birth)		e_{60}	
	Males	Females	Males	Females
Urban Area	69.1	77.3	16.4	21.0
Rural Area	68.4	77.8	16.2	21.3

Source: *Rocznik Statystyczny Rzeczpospolitej Polskiej 2000*, Warsaw: GUS, p. 109.

Tables 6, 7 and 8 present data which typify the total natural growth of population, as well as the urban and rural natural growth of population. Table 6 indicates that the 1981-1999 period saw a declining rate of natural growth of population, which could be an expression of a preference for the easy and comfortable life and of a fall in the number of births as well as of women's preference for a career rather than bringing up children. Urban areas even experienced a negative natural growth of population. 1998 saw a natural growth of population of − 5,000, compared to −15,000 in 1999 (see Table 7).

Table 6

Natural Growth of Population (in thousands)

Year	Live Births	Deaths	Natural Growth of Population
1946 – 1998	33,196	16,168	+ 17,028
1946 – 1950	3,497	1,337	+ 2,160
1951 – 1960	7,623	2,640	+ 4,983
1961 – 1970	5,576	2,419	+ 3,157
1971 – 1980	6,382	3,016	+ 3,360
1981 – 1990	6,415	3,655	+ 2,760
1991 – 1998	3,703	3,102	+ 602
1998	395	275	+ 20
1999	382	381	+ 1

Source: *Rocznik Statystyczny Rzeczpospolitej Polskiej 1999*, Warsaw: GUS, p. 95. *Rocznik Statystyczny Rzeczpospolitej Polskiej 2000*, Warsaw: GUS, p. 94.

Table 7

Natural Growth of Population in Urban Areas (in thousands)

Year	Live Births	Deaths	Natural Growth of Population
1946 - 1998	15,469	8,045	+ 7,424
1946 - 1950	1,180	436	+ 744
1951 - 1960	3,160	1,056	+ 2,104
1961 - 1970	2,390	1,127	+ 1,263
1971 - 1980	3,257	1,577	+ 1,680
1981 - 1990	3,505	2,045	+ 1,451
1991 - 1998	1,977	1,795	+ 82
1998	214	219	- 5
1999	208	223	- 15

Source: *Rocznik Statystyczny Rzeczpospolitej Polskiej 1999*, Warsaw: GUS, p. 95. *Rocznik Statystyczny Rzeczpospolitej Polskiej 2000*, Warsaw: GUS, p. 94.

This phenomenon demands further analysis, but one can say even now that if the trend continues, the threat of negative natural growth of population which may lead to a shrinkage of the country's population is fast becoming the most serious problem facing Poland. The looming threat of this projected catastrophe is surprisingly strong. Promotion of a pro-family policy is the order of the day.

For comparison, one should present some statistics regarding Polish population of working age (in Poland age 18–64 for men and 18–59 for women) and post-working age between 1990 and 1999. Table 9 shows that the number of Poles at post-working age grew from 4,903,000 in 1990 to 5,616,000 in 1999, i.e. by 713,000.

Forecasts indicate a continued increase in the number of people of post-working age, up to 9 112 000 people in 2030 (see Table 4, column 10). Coefficient of demographic load is a measure of population ageing. It shows the number of people at the post-working age as a percentage of people at the working age. Forecasts for 2000-2030 indicate that the proportion of elderly people will grow until it will almost double in 2030. The elderly, though, will be entitled to health care and social benefits.

Table 8

Natural Growth of Population in Rural Areas (in thousands)

Year	Live Births	Deaths	Natural Growth of Population
1946 - 1998	17,727	8,123	+ 9,604
1946 - 1950	2,317	901	+ 1,416
1951 - 1960	4,463	1,584	+ 2,879
1961 - 1970	3,186	1,292	+ 1,894
1971 - 1980	3,125	1,439	+ 1,686
1981 - 1990	2,910	1,601	+ 1,309
1991 - 1998	1,726	1,306	+ 420
1998	181	156	+ 29
1999	174	158	+ 16

Source: *Rocznik Statystyczny Rzeczpospolitej Polskiej 1999*, Warsaw: GUS, p. 96. *Rocznik Statystyczny Rzeczpospolitej Polskiej 2000*, Warsaw: GUS, p. 95.

Table 9

Population at Working Age and Post-working Age (in thousands). As of 31 December

Year	Population in Working Age	Population in Post-Working Age	Population in Post-Working Age as a Percentage of all People in Working Age
1990	21,962	4,903	22.3
1995	22,647	5,317	23.5
1997	23,014	5,480	23.8
1998	23,226	5,552	23.9
1999	23,424	5,616	24.0

Source: *Rocznik Statystyczny Rzeczpospolitej Polskiej 1999*, Warsaw: GUS, 98. *Rocznik Statystyczny Rzeczpospolitej Polskiej 2000*, Warsaw: GUS, 97, own calculations.

Table 10

Population at Working Age and at Post-working Age. Population Projection

Year	Total	Population at Working Age	Population at Post-Working Age	Population at Post-Working Age as a Percentage of All People at Working Age
2000	38,649	23,665	5,680	24.0
2005	38,634	24,819	5,830	23.5
2010	38,788	25,076	6,271	25.0
2015	39,005	24,277	7,213	29.7
2020	39,003	23,075	8,215	35.6
2025	38,657	22,271	8,855	39.8
2030	38,025	22,015	9,112	41.4

Source: *Rocznik Statystyczny Rzeczpospolitej Polskiej 2000*, Warsaw: GUS, 109, own calculations.

## 3. ELDERLY PEOPLE IN THE CRACOW AGGLOMERATION

The number of people living in the City of Cracow between 1990-1999 (by sex and age) is presented in Table 11 and in Figure 2. The period under analysis covered the years 1990-1999 and was long enough to reveal a long-term trend, if there was one. A linear function was used to capture the growth trend reflecting the declining population growth. The author used the ordinary least square method for the estimation as it allowed the best fitting of the trend to empirical data.

The estimated trend line was

$$\hat{y}_t = 751.440 - 1.318 \cdot t, R^2 = 0.8421, \qquad (7)$$

where t stands for a time variable, and R^2 is the coefficient of determination, that is a measure used to describe how well the trend line fits the observed data. The value of $R^2 = 0.8421$ indicates that the estimated trend line fits the observations quite well. This is shown graphically in Figure 3.

There is a clear trend indicating that the population of Cracow is declining by an average of 1,318 people per year. This points to a sharp decline of the population of Cracow, which, based on an extrapolation of the trend, can take place around 2015.
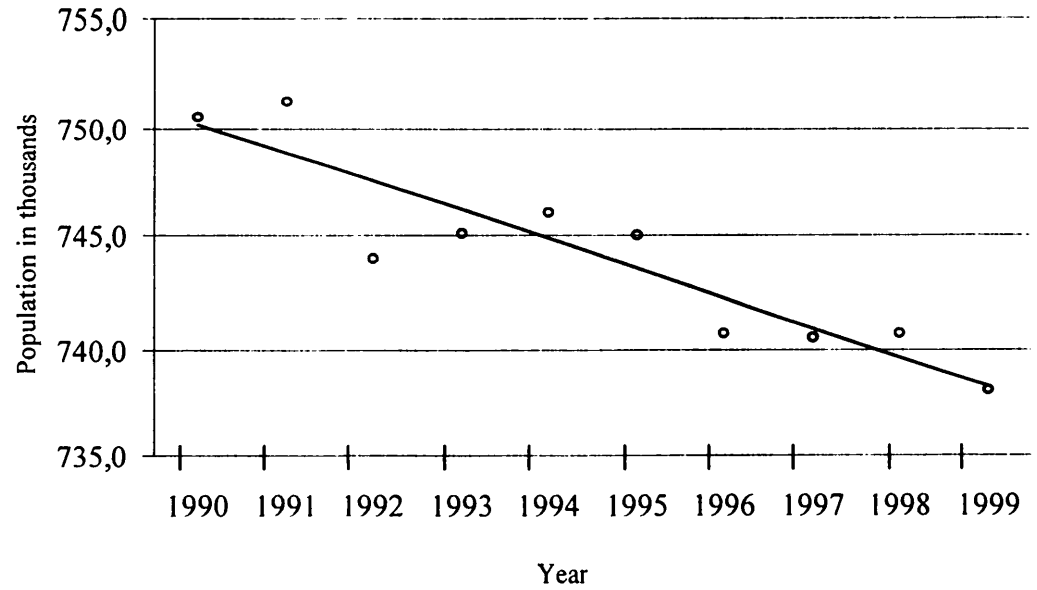
$$\hat{y}_t = 751{,}440 - 1{,}318 \cdot t, \quad R^2 = 0{,}8421$$

Figure 3. Total Population in Cracow, 1990–1999

Table 11

Total Population by Sex (in thousands) in the City of Cracow between 1990-1999. As of 31 December

Year	Total	Males	Females
1990	750.5	358.0	392.5
1991	751.3	358.5	392.8
1992	744.0	351.0	393.0
1993	745.1	351.5	393.6
1994	746.0	351.1	394.9
1995	745.0	350.4	394.6
1996	740.7	347.4	393.3
1997	740.5	347.7	392.8
1998	740.7	347.6	393.1
1999	738.1	346.4	391.7

Source: *Roczniki Statystyczne Województwa Krakowskiego za lata 1991-1998 (Statistical Yearbooks of the Cracow Province 1991-1998)*, Wojewódzki Urząd Statystyczny w Krakowie; *Ludność w Województwie Małopolskim w 1999* r.; *Rocznik Statystyczny Województwa Małopolskiego 2000 (Statistical Yearbook of the Malopolska Province, Year 2000)*, Urząd Statystyczny w Krakowie.

Table 12

Population by Sex and Age (in thousands) in the City of Cracow in 1999. As of 31 December

Age Class	Total	Males	Females
CRACOW	738.1	346.4	391.7
0 -4	30.2	15.4	14.8
5 - 9	36.7	18.9	17.9
10 - 14	46.3	23.9	22.4
15 - 19	58.9	29.6	29.3
20 - 24	72.8	36.4	36.4
25 - 29	52.5	25.7	26.8
30 - 34	44.3	22.0	22.3
35 - 39	48.0	22.9	25.1
40 - 44	60.8	28.5	32.3
45 - 49	62.3	28.7	33.6
50 - 54	52.2	23.9	28.3
55 - 59	36.9	17.1	19.8
60 - 64	37.0	16.2	20.8
65 - 69	36.1	15.2	20.9
70 - 74	28.5	11.3	17.2
75 - 79	19.1	6.7	12.4
80 - 84	7.9	2.3	5.6
85 and more	7.6	1.9	5.7

Source:; *Ludność w Województwie Małopolskim w 1999* r. Kraków: Urząd Statystyczny w Krakowie, May 2000, p. 60.
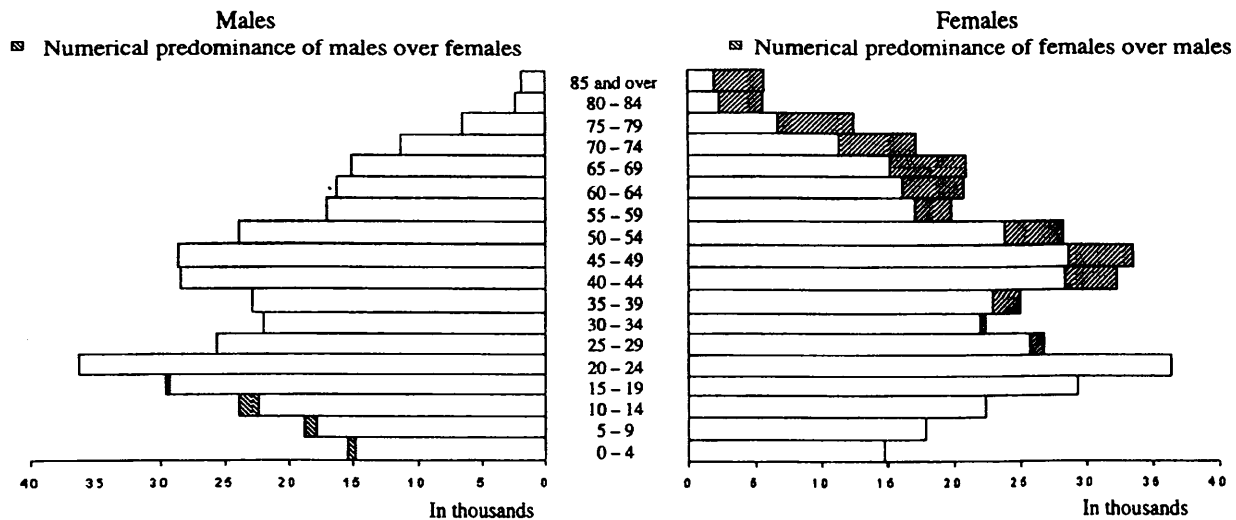
Males

☒ Numerical predominance of males over females

Females

☒ Numerical predominance of females over males

	85 and over
	80 – 84
	75 – 79
	70 – 74
	65 – 69
	60 – 64
	55 – 59
	50 – 54
	45 – 49
	40 – 44
	35 – 39
	30 – 34
	25 – 29
	20 – 24
	15 – 19
	10 – 14
	5 – 9
	0 – 4

40   35   30   25   20   15   10   5   0

In thousands

0   5   10   15   20   25   30   35   40

In thousands

Figure 4. Population in Cracov by Sex and Age, 31 December 1999.

The number of people (by sex and age) living in Cracow in 1999 is presented in Table 12 and Figure 4. Looking at the data shown in Table 12, one can observe that there is an increasing number of elderly people, which is an unmistakable sign of an ageing population. This is caused, amongst others, by a declining fertility rate.

By contrast, Table 13 contains information about the ageing of the Cracovians. We can spot a rising number of people belonging to the age group at the bottom of the population pyramid. The 80+ age group is stable (see Table 13, column 4).

One should also note the median age of Cracovians (see Table 14). The median age of Cracow's inhabitants points to a steady increase (cf. Figure 5). To capture the trend reflecting the increase in the median age, a linear function was used.

The estimated trend function then is

$$\hat{y}_t = 33.889 + 0.359 \cdot t, R^2 = 0.9401. \tag{8}$$

The trend indicates that absolute increase in the median age during the period in question rose by an average of 0.36 years. The coefficient of determination is $R^2 = 0.9401$. This means that 94.0% of the variation of Y_t can be attributed to the variation of the fitted values of Y_t, i.e. to $\hat{y}_t$. This is shown graphically in Figure 5.

We should also acknowledge the fact that, whilst in 1990 half of Cracow's inhabitants were less than 33.7 years old, in 1999 the median age was 37.3. Based on an extrapolation of the trend, in 2010 the median age will stand at 41.4.

Table 15 shows natural growth of population in Cracow between 1990 and 1999. The increase is presented in terms of the balance of births and deaths. The population of Cracow during the period in question fell (cf. Table 11) due, amongst other things, to a low natural growth of population. This negative natural growth of population commenced in 1992 and significantly contributed to a decline in population growth. The decline is so big (−1,235 people in 1999) that it threatens a demographic catastrophe.
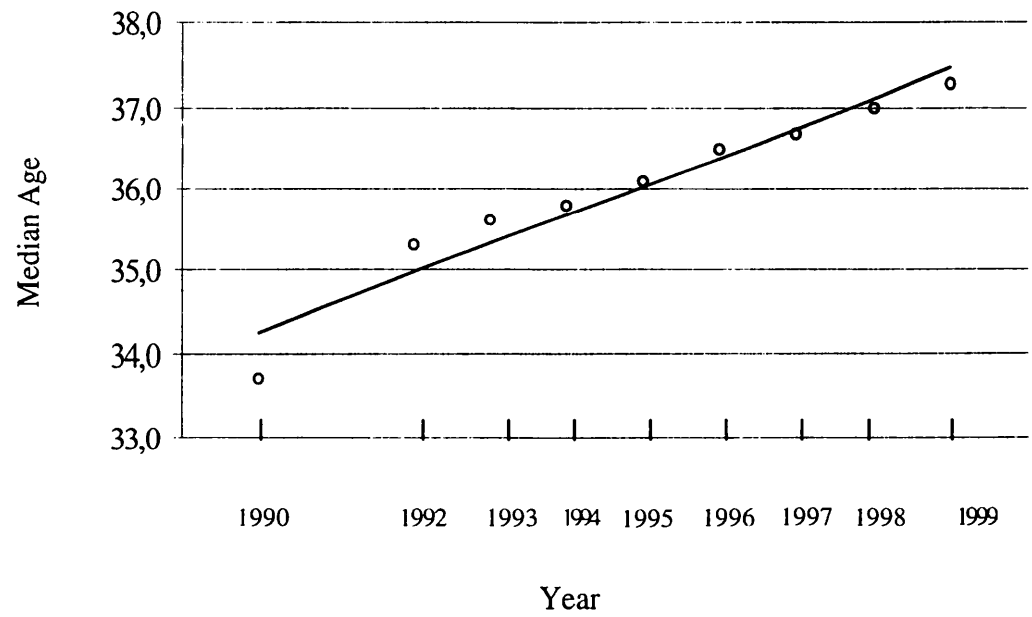
$$\hat{y}_t = 33{,}889 + 0{,}359 \cdot t, \quad R^2 = 0{,}9401$$

Figure 5. Population in Cracow. Median Age Trend, 1990 - 1999

Table 13
Elderly People in the City of Cracow (in %)

Year	People Aged [a]		
	60 and more	65 and more	80 and more
1990	15.5	10.4	2.1
1992	16.4	10.9	2.2
1993	16.7	11.3	2.2
1994	16.9	11.6	2.3
1995	17.3	12.0	2.2
1996	17.7	12.5	2.2
1997	17.9	12.8	2.1
1998	18.2	13.1	2.2
1999	18.4	13.4	2.1

[a] no data was available for 1991.
Source: Own calculations.

The author also researched population growth at working age and post-working age in Cracow between 1990 and 1999. An increase was noted in the post-working age (see Table 16). On the whole, we are looking at an intensive process of population ageing, a process that is bound to have serious demographic, economic and social consequences. Direct demographic consequences include an intensive rise in the number of deaths and a fall in the number of births (see Table 15). Economic consequences are bound with the need to ensure decent standards of living for the elderly. Society must also ensure proper health care and social welfare for those who are past their full professional life.

Table 14
Median Age of the Inhabitants of Cracow Between 1990-1999[a]

Year	1990	1992	1993	1994	1995	1996	1997	1998	1999
Median Age of the Inhabitants of Cracow	33.7	35.3	35.6	35.8	36.1	36.5	36.7	37.0	37.3

[a] no data were available for 1991.
Source: Own calculations.

Table 15
Natural Growth of Population in Cracow, 1990-1999 (absolute numbers)

Year	Live Births[a]	Deaths	Natural Growth of Population
1990	7,837	7,152	+685
1991	7,910	7,505	+405
1992	7,263	7,501	-238
1993	7,103	7,327	-224
1994	6,913	7,315	-402
1995	6,258	7,277	-1,019
1996	6,274	7,171	-897
1997	6,040	7,310	-1,270
1999	5,840	7,075	-1,235

[a]No data were available for 1998.

Source: *Roczniki Statystyczne Województwa Krakowskiego za lata 1991-1998)*, Wojewódzki Urząd Statystyczny w Krakowie; *Ludność w Województwie Małopolskim w 1999 r.; Rocznik Statystyczny Województwa Małopolskiego 2000*, Urząd Statystyczny w Krakowie.

Table 16
Cracow's Population in Productive Years and Post-productive Years (in thousands)

Year	Population at Working Age	Population at Post-Working Age	Population at Post-Working Age as a Percentage of all People at Working Age
1990	463.8	99.3	21.4
1993	461.3	106.6	23.1
1994	454.4	118.4	26.1
1995	466.0	111.4	23.9
1996	463.3	114.7	24.7
1997	467.4	116.1	24.8
1998	-	118.2	-
1999	470.8	120.0	25.5

[a]No data were available for 1998.

Source: Own calculations.

4. THE PROBLEM OF AGEING OF THE POLISH PEOPLE IN THE 21ST CENTURY

The fall in women's fertility rate and the extension of life expectancy are two factors which are behind the ageing of populations. In the USA, and in Western Europe, until the middle of the 20th century, the rise in the proportion of elderly people in the total population was occasioned by a fall in female

fertility. It was later substituted by a rise in life expectancy as the main factor of population ageing.

The number of elderly population in Poland is growing in proportion to the overall number of people (cf. Table 3). Demographic forecasts show a faster growth of the percentage of late old age people, which will entail an increase in the number of very old and incapacitated people who demand constant domestic or institutional care. It is worth mentioning that the question may arise whether contemporary welfare systems offered by the State may be supplanted in the future, to a sufficient extent, with communal care or charitable assistance. The swelling of this population demands a different approach to the problem of old age. The attitude to old age and elderly people will not change out of its own accord. What is needed is action. A resolute effort must be made to alter the social policy paradigm, and it must be followed by acceptance for the family as a value in itself. Moreover, old age and the approach to problems experienced by elderly people should be reconsidered. The elderly should not be dictated to by the social security system, but much rather have a right to speak for themselves and decide about their own fate. What is needed, therefore, is a remaking of the entire society and a fundamental change in human values and attitudes. Elderly people must not be treated as just another burden: weak, hapless, handicapped and socially redundant. Indeed, work should start immediately on eliminating the mistakes inherent in policies towards elderly people. They should be involved in social and cultural life as partners. They should be made important, needed and useful. They deserve not only respect but also to have their needs and desires listened to. They deserve kindness, and where necessary, support and help in time of need.

It must also be stated that neither the socialist welfare system, nor its present democratic counterpart, fully takes into account the interests of elderly people. Their problems catch the eye when a debate on the review of pensions or disability benefits comes due, and politicians usually recall them around election time, when votes are to be won or lost. Elderly people are often encouraged to use the public transport system and to do shopping outside the rush hour. Holiday companies offer them trips out of season. Elderly people see mainly their age peers. Poland, in very much the same manner as highly industrialized countries, has developed various forms of assistance to the elderly, such as old people's houses, pensioners' houses and centres where they can live their old lives in peace and quiet. But is this not a blueprint for ghettoizing elderly people?

We should add here that both in Poland and in Europe, society shows excessive interest in youth, youthful enthusiasm, fitness and opportunities for

the asking. The contemporary civilization yearns for permanent youth, and is at the same time obsessed with a fear of old age and death. The desire for immortality accompanied by the awareness of the inevitability of ageing and death have captured people's imagination from the beginning of time. Cicero, author of "Cato The Older on Ageing" dating back to the first century BC wrote, "When I am thinking about old age, I see four reasons why we are used to treating old age as an unhappy period of life: it takes us away from a life of activities, weakens us physically, deprives us of all sensual pleasures and death is nigh." A veil of silence is drawn on the issue, which becomes a taboo that is not even to be mentioned. One can notice a growing trend in the society to marginalize the elderly, coupled with an escapism on the part of the young who cut out thinking of their own - inevitable - old age, whilst many of the elderly have profound and tested expertise, a well of professional skills and experience of life which could be tapped into by the young generation, society and the family.

For the elderly, staying within and being part of the family is what they want. Strong family ties give them the strength and a willingness to live on, helping them cope with the unpleasant side of ageing. Thus, family is what they need, but the family needs them as much too.

Whether mandatory retirement at an age determined by the lawmaker is good for the elderly, is yet another problematic issue. Retirement leads to a loss of the working environment and the ties that the environment inevitably carries with it. Employees must be better prepared, psychologically, to come to grips with their retirement and leave the milieu smoothly and piecemeal.

A growth in the number of elderly people, who are permanently incapacitated and entirely dependent on social welfare, will have a wide range of consequences relating to the choice of the most appropriate model of medical care. The natural, heightened predisposition of the elderly to suffer from ailments and injuries, coupled with an increase in the sheer number of elderly people leads to a high demand for medical care, and treatment of certain conditions (cancer, osteoporosis, senility, Alzheimer's' and other forms of senile dementia, coronary and heart-related conditions caused by arteriosclerosis, protracted mobility problems, rehabilitation of patients suffering from protracted conditions, long-term companionship for physically and mentally debilitated elderly people and terminal care patients etc). Experts estimate that in societies advanced in terms of age, at least half of the patients seeking doctors' help will be over 65. There is also a strong correlation between patients' age and the duration of their hospital stay, which can partly be attributed to doctors' qualms about discharging elderly patients too early as

at home they could find themselves wanting care and assistance from the family (cf. Szukalski 1998, p. 51). Today's families seeking comfort and acting on the strength of so-called objective conditions (e.g. small flat, problems in ensuring adequate care for elderly family members) will ever more often sail clear of caring for the elderly. This is going to be an increasingly common problem given the systematically declining number of family members, the increase in voluntary childlessness and the related demographic transformation of reproductive models (sometimes referred to as the second demographic transformation which has been taking place in European countries since the beginning of the nineteen seventies; the process started in Northern and Western Europe) (see Kurkiewicz 1998). This is a new challenge facing the social policy of the State responsible for ensuring adequate organization of health care and social services.

Loneliness is a big, if not the biggest, problem of today's civilization. The State may be expected to solve the problems of lonely people, give them flats, decent pensions and medical care, but there is one thing which cannot be arranged: plain human warmth and kindness. Maybe we are not aware of the fact that loneliness strikes harder and in a more mischievous a manner than poverty.

To recap, one must state that the number of single elderly people who are permanently incapacitated is increasing and is coupled by falling birth rates, breaking up of marriages, destabilization of the family, increased professional activity of women and weakening ties between generations. The future elderly will of course be better educated and more open to their realities than today's ones. Their mental skills will surpass those of their contemporary peers. Future pensioners will significantly differ from their contemporary counterparts.

In Western Europe, the economic status of elderly people is high. The elderly are a group of well-off older people. On the other hand, even Western countries have elderly people who are poor or entirely incapacitated and demand constant help or care. Yet the problems are most pressing in the former socialist countries where the poverty of people in the post-productive years is truly abject. In Poland we have experienced the serious impact of the political and economic transformation on the health and social status of elderly people (cf. Pędzich 1999, p. 132).

Demographic forecasts for the 21st century must take stock of these factors, because even if old age is a time of helplessness and poverty (for lack of sufficient material resources), of rejection and neglect, it is still a fact of life waiting round the corner for all of us. If the younger generation repudiates family tradition which took generations upon generations to develop and severs

generation ties, whilst the State fails to strengthen and expand palliative medicine, high standard of health care for the elderly, chronically ill or those demanding protracted care, then social acceptance and legalization of euthanasia, the easy death, the dignified death, death on request, is very likely. Our civilization governed, as it is, entirely by economic considerations is bound eventually to choose this cheapest ultimate solution.

Even if it is hard to believe, on 28 November 2000 the Lower House of the Dutch Parliament passed an act which violates human dignity and legalized euthanasia and doctor's assistance in committing suicide. The enactment in the Upper House was but a formality. On 1 January 2001 Holland became the first country in the world in which euthanasia for elderly people and terminally ill patients is legal, and where killing "on request" is no longer deemed a crime. The enactment of the law permitting euthanasia is a breach of the Convention on Human Rights and Basic Freedoms of the Council of Europe, dated 4 November 1950. Article 2 thereof states "Nobody can be deliberately deprived of his life." Tacit approval for this crime is noticeable in other countries, notably in Switzerland, the UK, Belgium and Scandinavia. At the turn of the new century, the ghosts of the two 20th century aberrations, namely nazism and Soviet-style totalitarianism, representing racial and class hatred are back. Regardless of the guise under which the word euthanasia is sold to a society ("*Sterbeerleichterung*", "*Sterbehilfe*") one cannot overlook the fact that it is an assisted suicide of a patient and murder by a physician.

Euthanasia was used in ancient times on the handicapped, who were treated ruthlessly. In ancient Greece the idea was advocated by the Spartans, pushing off handicapped or debilitated children into the sea from the cliffs. Even Plato upheld the view. In his treatise on the State he requested that the "best" children were handed over to the State, and the weak abandoned or killed.

24 centuries before Christ, Hippocrates (460-377) refused to accept euthanasia by declaring "I will never administer a lethal drug if I am asked for one, and I will never advise it". Euthanasia is often described as a "dignified death", but clearly there is no dignity in suicide and murder (cf. H.P. Dunn's 1997 work on the issue, pp. 84-91). In Poland, Article 31 of *Code of Medical Practice* enacted by the Third National Convention of Physicians on 14 December 1993 in Warsaw states: "the physician must not use euthanasia" (cf. *Code of Medical Practice*, 1994).

There is a moral duty to straighten the facts regarding euthanasia and remain vigilant, lest this contempt for a man, for the weakest and non-productive social class coupled with extreme selfishness, spawned by hedonism fuelled by rampant consumption, strikes Poland.

REFERENCES

Bulska, B. (2000). Sytuacja ludzi starszych w Warszawie w okresie międzywojennym i obecnie, (*Situation of Elderly People in Warsaw Between the World Wars and Now*), *Wiadomości Statystyczne* 6, pp. 63-75.

Bulska, B.M. (2000). Warszawa u schyłku XIX i na progu XXI wieku w dokumentacji statystycznej. (*End of the Nineteenth Century and Beginning of the Twentieth Century Warsaw in Statistical Documentation*). Warszawa: Polskie Towarzystwo Statystyczne Oddział Warszawski.

Dunn, H.P. (1999). Etyka dla lekarzy, pielęgniarek i pacjentów (*Ethics for Physicians, Nurses and Patients*). Tarnów: Biblos.

Halicka, M. (1999) Podeszły wiek społeczeństwa: Aspekty demograficzne (*Ageing Society: Demographic Aspects*), *Ethos* 47, pp. 138-148.

Hellwig, Z., Siedlecki, J. (1989). Krzywa logistyczna, jej własności i wykorzystanie w prognozowaniu rozwoju procesów społeczno-gospodarczych. (*The Logistic Curve, Its Characteristics and Use in Forecasting of the Development Social Economic Processes*). *Prace Naukoznawcze i Prognostyczne*, 4, pp. 55-70.

Holzer, J. (1994). Demografia. (*Demography*) 4th ed. Warszawa: PWE.

Kaczmarek, M, Szwed, A. (1999). Natura i osobliwości starzenia się (*Nature and Peculiarities of Ageing*), *Forum Akademickie* 12, pp. 48-50.

Kodeks etyki lekarskiej. (1994). (*Code of Ethics for Physicians*). Warszawa Oficyna Wydawnicza Naczelnej Izby Lekarskiej.

Kurkiewicz, J. (1992). Podstawowe metody analizy demograficznej. (*Basic Methods of Demographic Analysis*). Warszawa, Wydawnictwo Naukowe PWN.

Kurkiewicz, J. (1998). Modele przemian płodności w wybranych krajach europejskich w świetle drugiego przejścia demograficznego. (*Models of Change in Fertility in Selected European Countries in the Light of the Second Demographic Transformation*), Akademia Ekonomiczna w Krakowie. *Zeszyty Naukowe. Seria Specjalna: Monografie* 131, Kraków.

Kwiecień, W. (1975). Sytuacja ekonomiczno-społeczna ludzi starszych w Polsce (1950-1972). (*Economic and Social Situation of Elderly People in Poland (1950 – 1972)*), *Annales Universitatis Mariae Curie-Skłodowska Lublin-Polonia*, vol. IX, 3, Sectio H, pp. 29-52,

Mynarski, S. (1999). Czy grozi nam ujemny przyrost naturalny, (*Are We Threatened by Negative Population Growth*), *Wiadomości Statystyczne* 1, pp. 40-43.

Ochocki, A. (1999). Starzenie się ludności Polski, (*Ageing of the Poland's Population*), *Ethos* 47, pp. 149-153.

Pędzich, W. (1999). Starzy ludzie w perspektywie XXI wieku, (*Old People in the 21 Century*) *Ethos* 47, pp. 129-137.

Pietkiewicz B. (2000). Wyklęte słowo eutanazja (*Euthanasia: a Word Lying Under a Curse*), *Polityka* 46 (2271), pp. 3-9.

Stanisz, T. (1986). Funkcje jednej zmiennej w badaniach ekonomicznych, (*Functions of a Single Variable in Economic Research*). Warszawa: Państwowe Wydawnictwo Naukowe.

Szukalski, P. (1998). Proces starzenia się społeczeństw Europy: spojrzenie perspektywiczne, (*The Process of Ageing of European Societies. A Look into the Future*). *Gerontologia Polska* 6 (2), pp. 51-55.