MAREK RĘKLEWSKI

THE IMPACT OF DEMOGRAPHIC CHANGES ON THE LABOUR MARKET IN KUJAWSKO-POMORSKIE VOIVODESHIP

Summary: Better understanding of the changes on the labour market would be impossible without observing demographic processes and their appropriate interpretation. According to the current state of knowledge, demographic changes in Poland and an estimation of their future tendency are expected to play the key role in shaping of the labour market. Adverse demographic changes observed in Poland will result in the increasing reduction of potential labour resources with the aging of these resources.

The aim of this study was to present demographic changes on the labour market in the years 1999-2016 in Kujawsko-pomorskie voivodeship as well as their expected consequences for the current and future situation on the labour market. Basic methods of statistical data analysis were used in the study, namely, the structure analysis and fixed-rate indexes of dynamics. The online resources of the Central Statistical Office, i.e. Demography Base and Local Data Bank provided the main source of demographic data and labour market information. As far as the analysis of labour market data is concerned, the author obtained information from the representative Study of Professional Activity of the Population (Polish: BAEL).

Key words: demography, labour market, professionally active, working-age population.

1. INTRODUCTION

Better understanding of the changes on the labour market would be impossible without observing demographic processes and their appropriate interpretation. According to the current state of knowledge, demographic changes in Poland and an estimation of their future tendency are expected to play the key role in shaping of the labour market. Adverse demographic changes will result in the increasing reduction of potential labour resources with the aging of these resources and with the growing burden of the post-working population for people at the working age [Jóźwiak 2013, p. 19].

The aim of this paper was to present changes on the labour market in the light of demographic changes in Kujawsko-pomorskie voivodeship. For comparative purposes, the data of Kujawsko-pomorskie voivodeship were compared with the data concerning Poland. The scope of the study covered the years 1999-2016. Basic methods of statistical data analysis were used in the study. For the fixed-rate indexes, 1999 was assumed as the base year. The statistics used for the description of both demographic changes and labour market changes were obtained from the Central Statistical Office.

2. CHANGES IN THE POPULATION

In the period between 1999 and 2016, the total population living in Kujawsko-pomorskie voivodeship oscillated between around 2.1 million people (Table 1). In 2016 the total population in Kujawsko-pomorskie voivodeship was 2083.9 k people and was higher by 0.7% (i.e. by 15.1 k people) in comparison with the base year of 1999 = 100, but lower by 0.1% (a drop by 2.3 k people) as compared to the preceding year. In the years 1999-2016, when analysing the changes in absolute terms, the moments of population growth prevailed over declining population. The period of a fall in population in Kujawsko-pomorskie voivodeship was reported in years 2003-2008. The largest decline in the population occurred in 2007 amounting to 2.7 k people.

In the dynamic perspective (where the year 1999 = 100 was assumed as the base), the population decline observed in 2003-2008 was insignificant and was around 0.1%. In the period between 2009 and 2016, in turn, a noticeable upward tendency was reported in the total population of this voivodeship. The number of inhabitants in this voivodeship increased by nearly 164.3 k people at that time. The population growth dynamics ranged between 0.7% and 1.4%. The largest population increase, by 29.8 k people, occurred in 2010.

In Poland during the period between 1999-2016 the highest population level was reported in 2011 – 38.5 million people (an increase by nearly 275.1 k people, i.e. by 0.7% as compared to 1999), whereas the lowest population was reported in 2007 – 38.1 million people, when the population decreased by 147.7 k people (i.e. a 0.4% drop in comparison with 1999).

The percentage of the total population in Kujawsko-pomorskie voivodeship against the total population of Poland was stable in the years 1999-2016 and amounted to ca. 5.4%. As regards the number of citizens in 2016, Kujawsko-pomorskie voivodeship took the 10th place among 16 regions. A similar percentage of population was also observed in such voivodeships as Lubelskie and Podkarpackie voivodeships and amounted to 6.6% and 5.5% respectively. Mazowieckie voivodeship turned out to be the most populous region with the population of 5.4 million people which accounted for about 14.0% of the total population of Poland. The least inhabited voivodeship was Opolskie with 1.0 million people accounting for approx. 2.6% of Poland's total population.

Table 1. The total population in Poland and Kujawsko-pomorskie voivodeship in years 1999-2016

Years	Population in thousands (data as of 31.12.)*					
	Poland	Total growth (k)	Dynamics index (%)	Kujawsko-pomorskie	Total growth (k)	Dynamics index (%)
		1999=100			1999=100	
1999	38263,3	-	100,0	2068,9	-	100,0
2000	38254,0	-9,3	100,0	2067,8	-1,0	99,9
2001	38242,2	-21,1	99,9	2069,7	+0,9	100,0
2002	38218,5	-44,8	99,9	2069,2	+0,3	100,0
2003	38190,6	-72,7	99,8	2068,1	-0,7	100,0
2004	38173,8	-89,5	99,8	2068,3	-0,6	100,0
2005	38157,1	-106,2	99,7	2068,3	-0,6	100,0
2006	38125,5	-137,8	99,6	2066,4	-2,5	99,9
2007	38115,6	-147,7	99,6	2066,1	-2,7	99,9
2008	38135,9	-127,4	99,7	2067,9	-0,9	100,0
2009	38167,3	-96,0	99,7	2069,1	+0,2	100,0
2010	38529,9	+266,6	100,7	2098,7	+29,8	101,4
2011	38538,4	+275,1	100,7	2098,4	+29,5	101,4
2012	38533,3	+270,0	100,7	2096,4	+27,5	101,3
2013	38495,7	+232,4	100,6	2092,6	+23,7	101,1
2014	38478,6	+215,3	100,6	2090,0	+21,1	101,0
2015	38437,2	+173,9	100,5	2086,2	+17,3	100,8
2016	38433,0	+169,7	100,4	2083,9	+15,1	100,7

* The calculation was based on absolute data. Differences in percentages in relation to absolute values, i.e. in case of an increase (+) or a decrease (-) in population and the dynamics index of 100, are the result of rounding off to a decimal fraction.
Source: author's own development based on the data of the Central Statistical Office.

The population of Poland is affected by such demographic factors as changes in natural mobility, international and internal migration if this relates to the regional level[1]. Natural mobility in this case should be identified with the natural population growth calculated as the difference between the number of live births and deaths, while the balance of international migration for permanent residence is established based on the difference between the population inflow (immigration) and the population outflow (emigration) [Holzer 2003, p. 160-163].

[1] *Demographic situation of Poland* (2016), Rządowa Rada Ludnościowa, GUS, Warsaw, p. 38-39.

Then, the so-called actual population growth is determined after consideration of the natural population growth rate and the migration balance versus the total population rate.

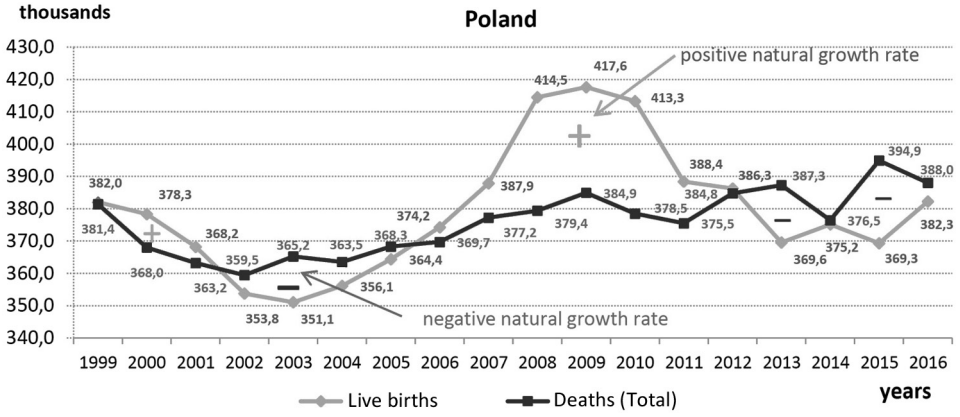
Table 2. The components of the actual population growth in Poland and Kujawsko-pomorskie voivodeship in the years 1999-2016

Years	Poland			Kujawsko-pomorskie		
	actual growth	including		actual growth	including	
		natural growth	migration balance		natural growth	migration balance
	in thousands in people					
1999	-13,4	+0,6	-14,0	+0,9	+1,8	-0,8
2000	-9,3	+10,3	-19,7	+0,7	+1,8	-1,1
2001	-11,8	+5,0	-16,7	+0,5	+1,9	-1,4
2002	-23,7	-5,7	-17,9	-0,4	+1,1	-1,5
2003	-27,9	-14,2	-13,8	-0,5	+0,9	-1,4
2004	-16,8	-7,4	-9,4	-0,4	+0,9	-1,4
2005	-16,8	-3,9	-12,9	-1,0	+1,0	-2,1
2006	-31,6	+4,6	-36,1	-2,1	+1,5	-3,6
2007	-9,8	+10,6	-20,5	-0,9	+1,5	-2,4
2008	+20,2	+35,1	-14,9	+1,5	+3,2	-1,7
2009	+31,5	+32,6	-1,2	+1,3	+2,7	-1,4
2010	+32,7	+34,8	-2,1	+0,5	+2,1	-1,7
2011	+8,6	+12,9	-4,3	-0,3	+1,3	-1,6
2012	-5,1	+1,5	-6,6	-1,7	+0,3	-2,0
2013	-37,6	-17,7	-19,9	-3,3	-0,6	-2,6
2014	-17,1	-1,3	-15,8	-2,8	0,0	-2,8
2015	-41,4	-25,6	-15,8	-4,2	-1,3	-2,8
2016	-4,2	-5,8	+1,5	-2,3	-0,7	-1,6

Source: author's own development based on the data of GUS (Central Statistical Office).

The actual population growth rate in Poland used to be negative in the years 1999-2016 (Table 2). A sudden drop in the migration balance was observed between 2008 and 2011 which was related with an increase in returning migrants caused by an unfavourable situation on global financial markets. Additionally, the same period witnessed the largest dominance of the number of live births over the number of deaths which affected the positive actual population growth (Fig. 1).

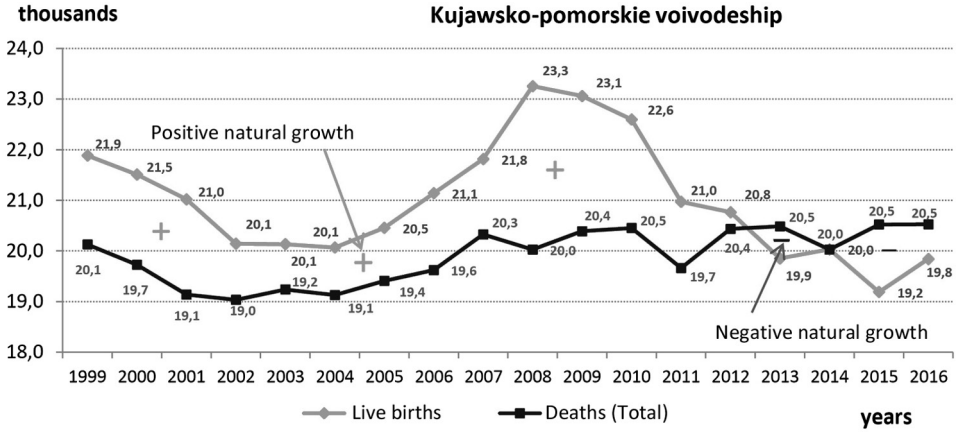
Figure 1. Live births, deaths and the natural population growth rate in Poland between 1999 and 2016



Source: author's own development based on the data of GUS.

In the years 1999-2016 the periods of the negative and positive actual population growth occurred alternately in Kujawsko-pomorskie voivodeship. The natural population growth in Kujawsko-pomorskie region was undeniably positive. The advantage of the number of live-born children over the number of deaths was reported in this voivodeship in the years 1999-2012 and ranged from +0.3 to +3.2 k (Table 2).

Figure 2. Live births, deaths and the natural population growth rate in Kujawsko-pomorskie voivodeship between in the years 1999-2016



Source: author's own development based on the data of GUS.

The negative natural population growth was observed in the years: 2013 (-0.6), 2015 (-1.3) and 2016 (-0.7). Yet, in 2014 the number of deaths equated with the number of live births (Fig. 2). The analysis of the migration balance (international

and internal migration for permanent residence) revealed a clear advantage of the population outflow over the inflow in the voivodeship and a similar situation in the country. The negative migration balance was so significant that the positive natural growth could not compensate for the population decrease affected by the outflow of inhabitants from this region.

Adverse demographic changes in the total population of Poland and Kujawsko-pomorskie voivodeship can be distinguished by the analysis of the population structure by age (Table 3).

The number and structure of population is determined by the potential of labour resources of a given country. As regards Kujawsko-pomorskie voivodeship, the percentage of individuals aged 0-24 decreased from 37.5% in 1999 to 26.5% in 2016. That means a fall in population by approximately 223.8 k people from 776.4 k to 552.7 k. To compare, the percentage of people aged 0-24 in Poland reduced by 4.0 million people from 36.6% to 26.0%.

Table 3. The population structure by age in Poland and Kujawsko-pomorskie voivodeship in 1999 and 2016

Age groups	Population (data as of 31 XII)							
	Poland				Kujawsko-pomorskie			
	1999		2016		1999		2016	
	in thousands	%	in thousands	%	in thousands	%	in thousands	%
0-4	2047,6	5,4	1880,7	4,9	115,9	5,6	98,9	4,7
5-9	2540,5	6,6	2079,2	5,4	143,2	6,9	113,9	5,5
10-14	2993,8	7,8	1813,4	4,7	164,6	8,0	100,6	4,8
15-19	3333,7	8,7	1919,8	5,0	184,9	8,9	108,5	5,2
20-24	3082,3	8,1	2302,0	6,0	167,9	8,1	130,8	6,3
25-29	2683,1	7,0	2760,3	7,2	146,3	7,1	150,1	7,2
30-34	2389,0	6,2	3217,4	8,4	128,8	6,2	172,1	8,3
35-39	2625,6	6,9	3113,2	8,1	141,8	6,9	164,1	7,9
40-44	3165,3	8,3	2831,8	7,4	172,6	8,3	153,3	7,4
44-49	3042,4	8,0	2370,7	6,2	164,4	7,9	129,9	6,2
50-54	2373,7	6,2	2351,4	6,1	131,1	6,3	128,6	6,2
55-59	1619,7	4,2	2737,9	7,1	85,0	4,1	151,3	7,3
60-64	1722,5	4,5	2751,8	7,2	87,8	4,2	149,6	7,2
65-69	1636,3	4,3	2272,9	5,9	82,8	4,0	125,7	6,0
70 i więcej	3007,8	7,9	4030,5	10,5	151,9	7,3	206,6	9,9
Ogółem	38263,3	100,0	38433,0	100,0	2068,9	100,0	2083,9	100,0

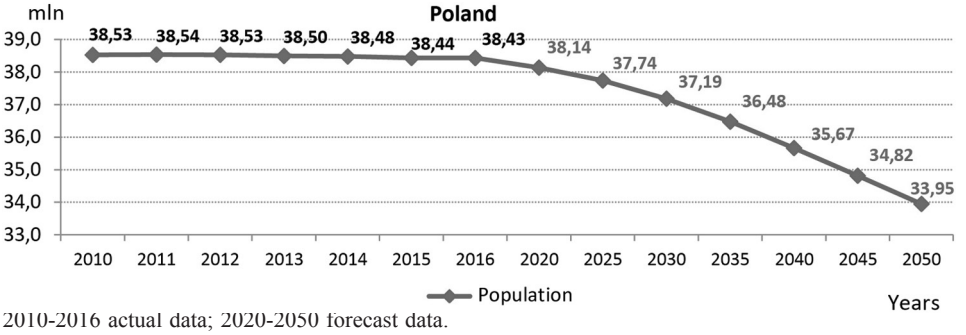
Source: author's own development based on the data of GUS.

Older people aged 55 years and over at the end of their professional career and retired people in this region were reported to have a larger share in total population, that is, from 19.7% to 30.4%. This increase was 225.7 k people (i.e. from 407.5 k to 633.2 k). In Poland, this age group recorded a rise in population (by 3.8 million people) from 20.9% to 30.7%.

The observed population changes both in Poland and Kujawsko-pomorskie voivodeship are associated with, inter alia, the effect of a decline in the intensity of births and the increasing life expectancy, which is expected to have a growing impact on the labour market in the perspective of the years to come.

It is estimated that the population of Poland in 2050 in comparison with 2016 may be lower by ca. 4.5 million (i.e. a drop by 11.7%) and can amount to nearly 34 million people (Fig. 3).

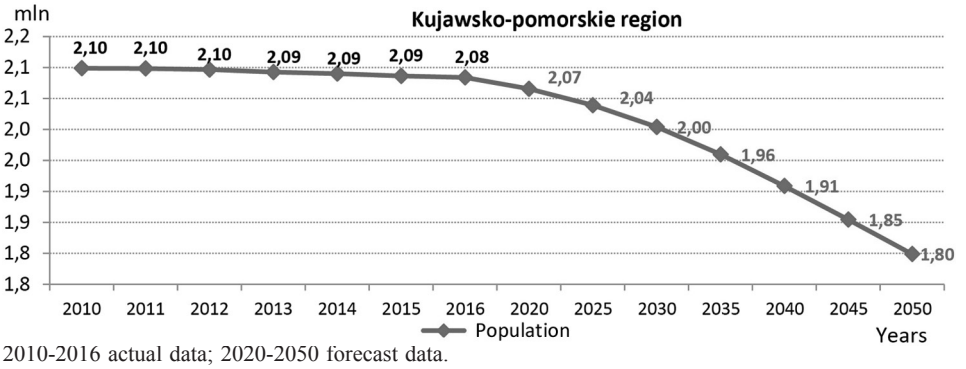
Figure 3. The population of Poland in the years 2010-2050



2010-2016 actual data; 2020-2050 forecast data.
Source: author's own development based on the data of GUS.

As for the population of Kujawsko-pomorskie voivodeship, it is expected to go decline by approximately 270.0 k people (a decrease by 13.0%) from 2.08 million to 1.8 million people (Fig. 4).

Figure 4. The total population in Kujawsko-pomorskie voivodeship in the years 2010-2050



2010-2016 actual data; 2020-2050 forecast data.
Source: author's own development based on the data of GUS.

When analysing change tendencies in the population according to economic age groups, a decrease in the working-age population can be observed in the light of demographic forecast (Table 4). In Poland, the population of people aged 18-59/64 may decline by nearly 4.8 million people, namely, from 23.8 million in 2016 to 19.0 million in 2050 (a decline by 19.9%). Then, the percentage of the working-age population versus total population is expected to reduce from 61.8% to 56.1% (Fig. 5). A significant increase is anticipated in the post-working population (60+/65+). The number of post-working people in Poland is estimated to rise by approximately 2.2 million people in 2050 (by 27.9%). The percentage of post-working population is expected to increase from 20.2% to 29.3%. Similar change tendencies in the proportion of particular economic groups may also appear in the voivodeship.

Table 4. The population by economic age groups in Poland and Kujawsko-pomorskie voivodeship in the years 2016-2050

Item	2016[a]	2020	2025	2030	2035	2040	2045	2050
Poland (thousands of people)								
Pre-working age (0-17 years)	6895,9	6732,9	6500,5	5931,4	5567,9	5262,2	5078,8	4963,4
Working age (18-59/64 years) out of which:	23767,6	23820,1	23092,6	22894,7	22569,2	22005,2	20669,0	19047,7
Mobile (18-44 years)	15021,9	14219,2	12941,7	11761,6	10725,5	10041,1	9656,8	9331,1
Non-mobile (45-59/65 years)	8745,7	9600,8	10150,9	11133,2	11843,8	11964,1	11012,2	9716,7
Post-working age (60+/65+)	7769,5	7584,9	8148,3	8358,9	8339,6	8400,8	9069,6	9939,5
Total	38433,0	38137,8	37741,5	37185,1	36476,8	35668,2	34817,4	33950,6
Kujawsko-pomorskie (thousands of people)								
Pre-working age (0-17 years)	376,5	365,2	349,6	318,4	299,5	282,2	270,0	260,9
Working age (18-59/64 years) out of which:	1295,8	1296,7	1252,1	1235,6	1211,3	1174,7	1099,7	1010,4
Mobile (18-44 years)	815,7	771,3	702,9	637,6	578,6	536,5	511,5	491,1

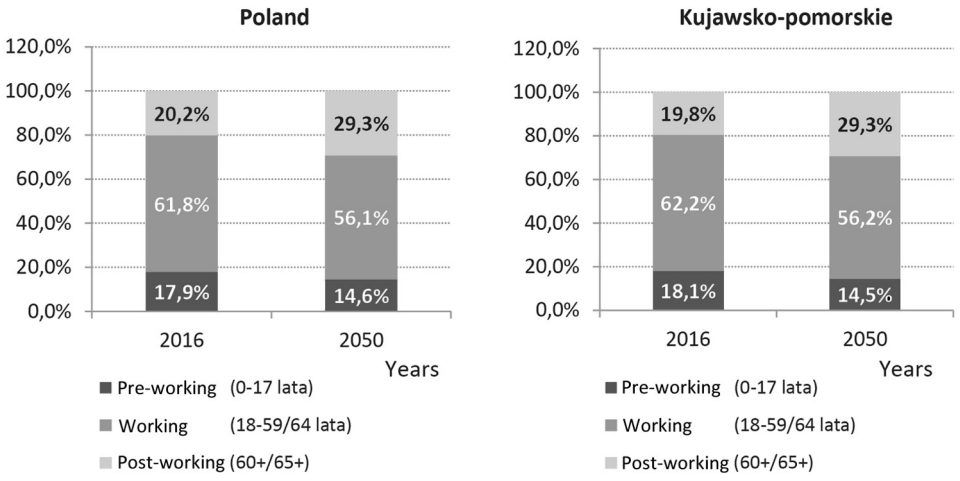
cd. Table 4.

Item	2016[a]	2020	2025	2030	2035	2040	2045	2050
Non-mobile (45-59/65 years)	480,1	525,5	549,2	597,9	632,7	638,2	588,1	519,3
Post-working age (60+/65+)	411,7	403,5	437,3	450,0	448,9	451,8	484,8	527,7
Total	2083,9	2065,4	2039,0	2003,9	1959,7	1908,8	1854,5	1799,0

a – actual data originated from the Bank of Local Data obtained from GUS.
Source: The population forecast for the years *2014-2050*, GUS, Warsaw 2014, p. 148; Demography Base.

In Kujawsko-pomorskie voivodeship, the working population is going to decrease by nearly 285.4 k people from the level of 1.3 million to 1.1 million (a 22% decline). The percentage of this age group is expected to drop from 62.2% to 56.2%. The post-working population of this region, in turn, is intended to go up by 116 k from 411.7 k in 2016 to 527.7 k people in 2050 (a 28.2% decrease). It is estimated that the percentage of the working-age population may rise from 19.8% to 29.3%. A point of concern is that in addition to the decline in the working population the percentage of the pre-working age population (0-17 years) is expected to decrease as well. This percentage is estimated to reduce from 17.9% to 14.6% in Poland and from 18.1% to 14.5% in the region.

Figure 5. The percentage of the pre-working, working and post-working population in Poland and Kujawsko-pomorskie voivodeship in 2016 and 2050



Source: author's own development based on the data of GUS.

The percentage of the mobile-age group (18-44 years) and non-mobile age group (45-59/65 years) in comparison with the total population in 2016 in the voivodeship amounted respectively to: 39.1% and 23.0% (in Poland: 39.1% and

22.8%). The percentage of the non-mobile population in the region and in Poland is expected to increase by 2040 according to the demographic forecast. This increase means that labour resources will gradually grow older.

Negative consequences of demographic processes in the population structure can be presented using the demographic dependency ratios (Table 5). The post-working population per 100 people at the working age in the voivodeship in 2016 was 32 people (33 people in Poland), whereas in 2050, this ratio may oscillate at the level of 52 individuals. Such a situation is an optimistic scenario considering the fact that demographic dependency ratios were determined with regard to Pension Law extending the retirement age to 67 years for men and to 65 years for women in force since 01.01.2013.

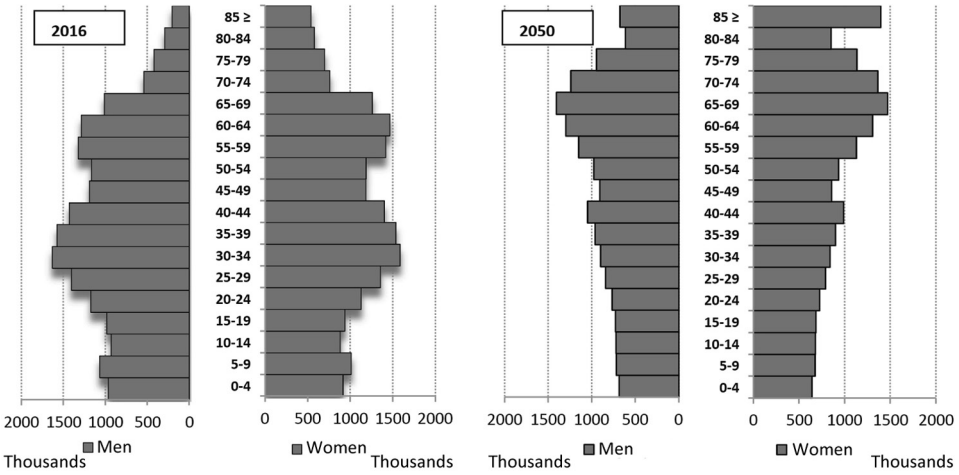
Table 5. Dependency ratio in Poland and Kujawsko-pomorskie voivodeship in the years 2016-2050

Item	2016[a]	2020	2025	2030	2035	2040	2045	2050
Poland								
Non-working population per 100 people at the working-age	62	60[b]/67[c]	63/72	62/73	62/76	62/83	68/93	78/105
Pre-working population per 100 people at the working-age	29	28/30	28/30	26/28	25/27	24/27	25/28	26/30
Post-working population per 100 people at the working-age	33	32/38	35/43	3745	37/49	38/56	44/65	52/75
Kujawsko-pomorskie								
Non-working population per 100 people at the working-age	61	59	63	62	62	62	68	78
Pre-working population per 100 people at the working-age	29	28	28	26	25	24	24	26
Post-working population per 100 people at the working-age	32	31	35	36	37	38	44	52

a – actual data obtained from the Local Data Bank GUS.
b – estimate data according to Pension Law valid since 31.12.2012.
c – estimate data according to Pension Law valid since 01.01.2013.
Source: *Population forecast for the years 2014-2050*, GUS, Warsaw 2014, p. 150.

A decrease in the number of births plays a significant role in the development of the population structure by age and gender. When analysing the population pyramid it can be observed that the pyramid shape both for Poland (Fig 6) and

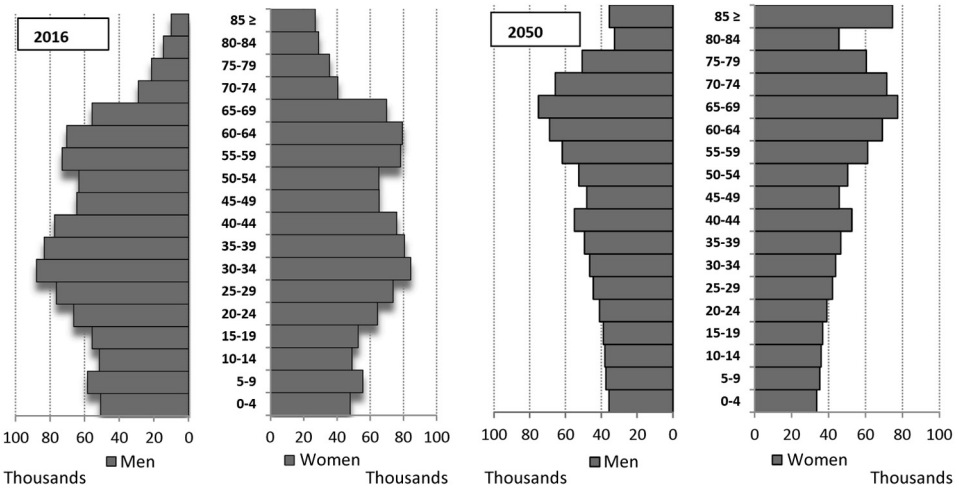
Figure 6. Population pyramid by age and gender in Poland in 2016 and 2050.



Source: author's own development based on the data of GUS.

for Kujawsko-pomorskie voivodeship (Fig. 7) is becoming similar to the so-called regressive structure [Kurkiewicz 2010, p. 112-113] – the shape of the upturned triangle (getting narrower at the bottom – fewer young people and much wider at the top – more elderly people).

Figure 7. Population pyramid by age and gender in Kujawsko-pomorskie voivodeship in 2016 and 2050



Source: author's own development based on the data of GUS.

3. CHANGE TENDENCIES IN THE NUMBER OF BIRTHS AND WOMEN'S FERTILITY

In the years 1999-2016 the number of births in Kujawsko-pomorskie voivodeship ranged between 19.2 and 23.2 k (Table 6). In this region there were ca. 19.8 k births in 2016 which was less by 2.0 k as compared to 1999 (a decrease by 9.9%). The percentage of live births in this voivodeship in 2016 accounted for 5.2% of total live births in Poland. In the same year nearly 382.3 k babies were born in Poland which was more by 0.3 k than in 1999 (a 0.1% increase) and by 12.9 k more as compared to the preceding year (a 3.5% increase). The number of births in Poland at the end of 2017 was more likely to reach or even exceed 400 k children. This may be affected by the "Family 500+" programme implemented by the Ministry of Family, Labour and Social Policy. For comparative purposes, during the last baby boom in Poland which took place in the first half of the 1980s, the number of births amounted to 723.6 k births at the culmination point[2]. In Poland, in turn, only 351.1 k babies were born in 2003 which was the lowest result in the post-war time.

In Kujawsko-pomorskie voivodeship, the period of 1999-2016 brought many years of a decline in births (as compared to the base year 1999 = 100). The highest falling dynamics was reported in 2015 amounting to 12.3% (a decrease by 2.7 k from 21.9 k to 19.2 k). A three-year period of birth rate increase was observed in the years 1999-2016 (2008-2010). During that time, the largest number of children, that is nearly 23.3 k, were born in 2008. The dynamics of the birth number increase oscillated from 3.3% to 6.3% (0.7-1.4 k).

Table 6. Live births in Poland and Kujawsko-pomorskie voivodeship in the years 1999-2016

Years	Live births in thousands					
	Poland	Absolute increase (in thousands)	Dynamics rate (%)	Kujawsko-pomorskie	Absolute increase (in thousands)	Dynamics rate (%)
		1999=100			1999=100	
1999	382,0	-	100,0	21,9	-	100,0
2000	378,3	-3,7	99,0	21,5	-0,4	98,3
2001	368,2	-13,8	96,4	21,0	-0,9	96,0
2002	353,8	-28,2	92,6	20,1	-1,7	92,0
2003	351,1	-30,9	91,9	20,1	-1,8	92,0
2004	356,1	-25,9	93,2	20,1	-1,8	91,7
2005	364,4	-17,6	95,4	20,5	-1,4	93,5
2006	374,2	-7,8	98,0	21,1	-0,7	96,6
2007	387,9	5,9	101,5	21,8	-0,1	99,7

[2] *Basic information on demographic development in Poland until 2014*, GUS, Warsaw 2015, p. 4.

cd. Table 6.

Years	Live births in thousands					
	Poland	Absolute increase (in thousands)	Dynamics rate (%)	Kujawsko-pomorskie	Absolute increase (in thousands)	Dynamics rate (%)
		1999=100			1999=100	
2008	414,5	32,5	108,5	23,3	+1,4	106,3
2009	417,6	35,6	109,3	23,1	+1,2	105,4
2010	413,3	31,3	108,2	22,6	+0,7	103,3
2011	388,4	6,4	101,7	21,0	-0,9	95,8
2012	386,3	4,3	101,1	20,8	-1,1	94,9
2013	369,6	-12,4	96,7	19,9	-2,0	90,7
2014	375,2	-6,8	98,2	20,0	-1,9	91,5
2015	369,3	-12,7	96,7	19,2	-2,7	87,7
2016	382,3	0,3	100,1	19,8	-2,0	90,7

Source: author's own development based on the data of GUS.

Demography versus synthetic measures of population reproduction includes the Total Fertility Rate (TFR) which is the sum of all partial fertility ratios for subsequent reproductive age groups; it defines the number of children born by one woman during the entire reproductive period [Holzer 2003, p. 180-182].

The fertility rate in Poland since 1989 (2.078) was below 2.1 per one woman aged between 15-49 years, namely, below the level of simple succession of generations. Interestingly enough, this adverse trend has been continuing until this day. From the point of view of population reproduction, given the current female mortality according to the tables of life expectancy at a given moment, the theoretical fertility rate ranging between 2.1 and 2.15 (that is at least two children per 1 woman) is considered to be an optimal situation. Considering Poland's current demographic situation, reaching such a level in the following years is actually impossible. During the last baby boom of the 1980s, the fertility rate was 2.416 which was twice higher than the lowest fertility rate in 2003 which oscillated at the level of 1.2 child (a decrease by as much as 49.4%).

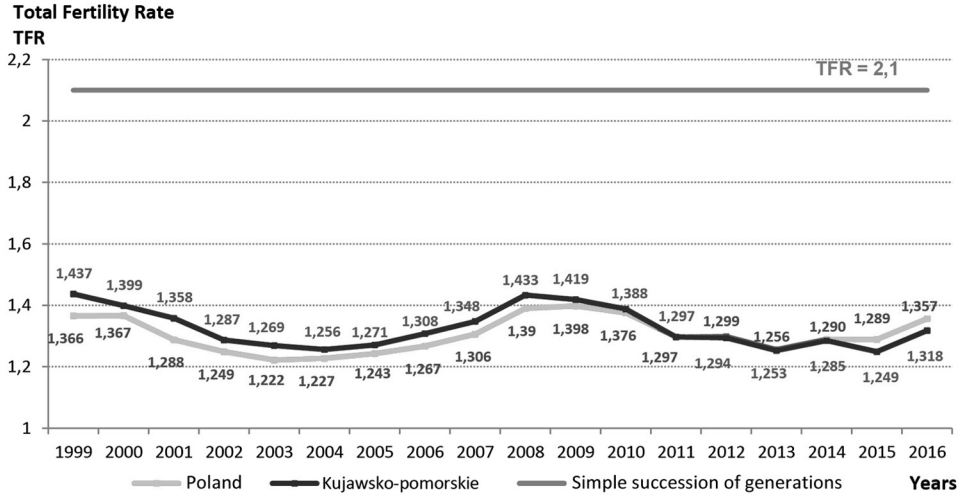
In Kujawsko-pomorskie voivodeship the fertility rate was law in the years 1999-2016 and ranged from 1.249 (in 2012) to 1.437 (in 1999) which was considerably under 2.1 child (Table 7). This means that respectively 1249 and 1437 born children were per 100 women at the reproductive age. Fertility rates recorded in the analysed period were lower in comparison with 1999. A reduced fertility rate among mothers ranged between -0.04 and -0.188. The study of changes in the dynamic approach revealed a decrease in fertility rates oscillating at the level of 0.3-13.1%. Figure 8 displays fertility rates in Poland and the voivodeship.

Table 7. Fertility rates of women in Poland and Kujawsko-pomorskie voivodeship in the years 1999-2016

Years	Fertility rate of women					
	Poland	Absolute increase (in thousands)	Dynamics rate (%)	Kujawsko-pomorskie	Absolute increase (in thousands)	Dynamics rate (%)
		1999=100			1999=100	
1999	1,336	-	100,0	1,437	-	100,0
2000	1,367	0,031	102,3	1,399	-0,038	97,4
2001	1,288	-0,048	96,4	1,358	-0,079	94,5
2002	1,249	-0,087	93,5	1,287	-0,15	89,6
2003	1,222	-0,114	91,5	1,269	-0,168	88,3
2004	1,227	-0,109	91,8	1,256	-0,181	87,4
2005	1,243	-0,093	93,0	1,271	-0,166	88,4
2006	1,267	-0,069	94,8	1,308	-0,129	91,0
2007	1,306	-0,030	97,8	1,348	-0,089	93,8
2008	1,390	0,054	104,0	1,433	-0,004	99,7
2009	1,398	0,062	104,6	1,419	-0,018	98,7
2010	1,376	0,040	103,0	1,388	-0,049	96,6
2011	1,297	-0,039	97,1	1,297	-0,14	90,3
2012	1,299	-0,037	97,2	1,294	-0,143	90,0
2013	1,256	-0,080	94,0	1,253	-0,184	87,2
2014	1,290	-0,046	96,6	1,285	-0,152	89,4
2015	1,289	-0,047	96,5	1,249	-0,188	86,9
2016	1,357	0,021	101,6	1,318	-0,119	91,7

Source: author's own development based on the data of GUS.

Figure 8. Theoretical fertility rate in Poland and Kujawsko-pomorskie voivodeship in the years 1999-2016



Source: author's own development based on the data of GUS.

According to demographic forecasts for years 2014-2050, based on the analysis of demographic trends and the socio-economic circumstances of Poland, the total fertility rate in Poland and Kujawsko-pomorskie voivodeship is expected to grow on a regular basis. The fertility rate in 2050 both in Poland and Kujawsko-pomorskie region is expected to be approx. 1.5 child per 1 woman at the reproductive age (Table 8).

The increasing tendency of fertility rates is a positive phenomenon, but the values are still lower than the optimal level of 2.1-2.15. Besides, an increased fertility rate will not lead to a higher number of births due to unfavourable changes in the number and structure of women at the procreation age[3]. The number of women at the procreation age in Poland is estimated to decline from 9.1 million in 2016 to even 5.8 million in 2050 (in the region respectively from 497.2 k to 306.7 k). In turn, the number of births in 2050 as compared to 2016 may fall in Poland by more than 120 k and in the voivodeship by 6.4 k children.

Table 8. Live births and fertility rate in Poland and region in years 2016-2050

Item	2016[a]	2020	2025	2030	2035	2040	2045	2050
Live births (thousands of people)								
Poland	382,3	339,3	310,8	284, 9	274,1	273,5	268,9	254,7
Kujawsko-pomorskie	19,8	18,4	17,0	15,7	14,9	14,7	14,2	13,4
Total Fertility Rate								
Poland	1,357	1,316	1,384	1,428	1,461	1,485	1,504	1,521
Kujawsko-pomorskie	1,318	1,330	1,400	1,440	1,470	1,490	1,510	1,520

a – actual data originated from the Bank of Local Data obtained from GUS.
Source: The population forecast for years *2014-2050*, GUS, Warsaw 2014, p. 56, 103, 157; Demography Base.

4. CHANGES ON THE LABOUR MARKET

Demographic conditions are increasingly influencing the labour market in Poland. Demographic changes have an impact on the population structure according to age and gender. This is especially important due to the fact that each change in the population structure directly affects the size of labour resources. Workforce resources – labour supply – means professionally active population at the working age, i.e. the employed and the unemployed. The working-age population, namely, the population able to work, is often referred to as the potential labour supply (potential labour resources), whereas professionally active people separated from potential labour supply are often referred to as the actual labour supply (real labour resources) [Góra, Sztanderska 2006, p.33; Kryńska 2006,

[3] *Population forecast for the years 2014-2050*, GUS, Warsaw 2014, p. 156.

p.11]. Data concerning professionally active people, used in this study, have been obtained from the representative Labour Force Survey (LFS).

The number of professionally active people aged 15 years and over in Kujawsko-pomorskie voivodeship in years 1999-2016 ranged between 0.8 and 1.0 million people (in Poland 16.9 – 17.4 million people) (Table 7). A similar situation can be observed with regard to potential labour resources, that is, the number of professionally active people at the working age (Table 8). The smallest number of professionally active people was reported in 2008 while the largest one was in 2002. This number in Kujawsko-pomorskie voivodeship during the investigated period oscillated between 0.8-1.0 million people (in Poland it was 16.4-16.9 million people). The percentage of professionally active individuals at the working age in Kujawsko-pomorskie region as compared to the total working-age population which was professionally active in Poland ranged from 5.0% to 5.9%.

Table 7. Professionally active population aged 15 years and over in Poland and Kujawsko-pomorskie voivodeship in years 1999-2016

Years	Population in thousands					
	Poland	Absolute increase (in thousands)	Dynamics rate (%)	Kujawsko-pomorskie	Absolute increase (in thousands)	Dynamics rate (%)
		1999=100			1999=100	
1999	17 148			971		
2000	17 311	163	101,0	999	28	102,9
2001	17 376	228	101,3	1 008	37	103,8
2002	17 213	65	100,4	1 009	38	103,9
2003	16 946	-202	98,8	992	21	102,2
2004	17 025	-123	99,3	982	11	101,1
2005	17 161	13	100,1	924	-47	95,2
2006	16 938	-210	98,8	867	-104	89,3
2007	16 859	-289	98,3	835	-136	86,0
2008	17 011	-137	99,2	806	-165	83,0
2009	17 279	131	100,8	925	-46	95,3
2010	17 123	-25	99,9	871	-100	89,7
2011	17 221	73	100,4	856	-115	88,2
2012	17 340	192	101,1	898	-73	92,5
2013	17 361	213	101,2	869	-102	89,5
2014	17 428	280	101,6	874	-97	90,0
2015	17 388	240	101,4	915	-56	94,2
2016	17 260	112	100,7	920	-51	94,7

Source: author's own development based on the data of GUS.

Table 8. Professionally active population at the working age in Poland and Kujawsko-pomorskie voivodeship in years 1999-2016

Years	Population in thousands					
	Poland	Absolute increase (in thousands)	Dynamics rate (%)	Kujawsko-pomorskie	Absolute increase (in thousands)	Dynamics rate (%)
		1999=100			1999=100	
1999	16 546	-	-	951	-	-
2000	16 709	163	101,0	980	29	103,0
2001	16 802	256	101,5	984	33	103,5
2002	16 704	158	101,0	989	38	104,0
2003	16 466	-80	99,5	976	25	102,6
2004	16 550	4	100,0	965	14	101,5
2005	16 700	154	100,9	911	-40	95,8
2006	16 523	-23	99,9	855	-96	89,9
2007	16 458	-88	99,5	823	-128	86,5
2008	16 616	70	100,4	795	-156	83,6
2009	16 875	329	102,0	911	-40	95,8
2010	16 691	145	100,9	856	-95	90,0
2011	16 767	221	101,3	841	-110	88,4
2012	16 873	327	102,0	881	-70	92,6
2013	16 883	337	102,0	851	-100	89,5
2014	16 911	365	102,2	852	-99	89,6
2015	16 833	287	101,7	894	-57	94,0
2016	16 659	113	100,7	893	-58	93,9

Source: author's own development based on the data of GUS.

In years 2005-2016 there was a considerable decrease in the professionally active population at the working age in Kujawsko-pomorskie voivodeship as compared to 1999. The dynamics of this fall during that period ranged within the variability area of 4.2-16.4% (i.e. 40-156 k people).

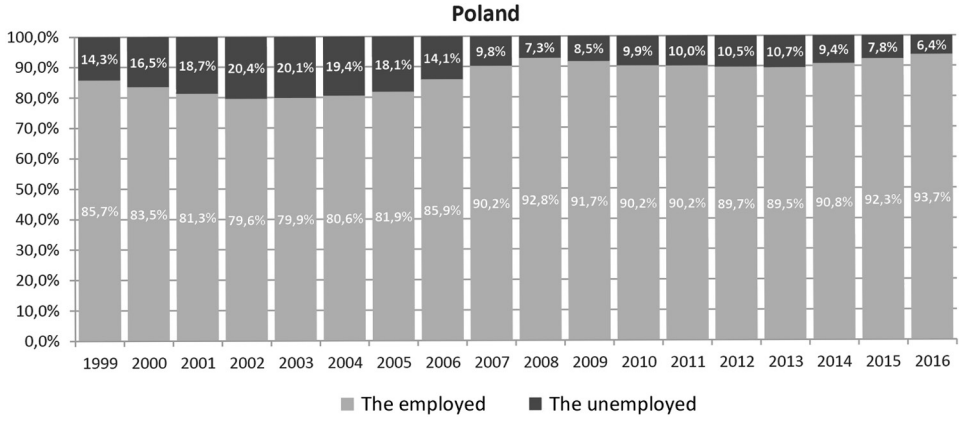
The employed population at the working age in Kujawsko-pomorskie region in years 1999-2016 oscillated from 0.7 to 0.8 million people (Table 9). The percentage of the employed compared to the professionally active population systematically grew from 77.6% in 2004 to 92.5% in 2016 (in Poland from 79.6% in 2002 to 93.7% in 2016).

Table 9. Professionally active, employed and unemployed population at the working age in Poland and Kujawsko-pomorskie voivodeship in years 1999-2016

Years	Poland			Kujawsko-pomorskie		
	Professionally active	Employed	Unemployed	Professionally active	Employed	Unemployed
	in thousands					
1999	16 546	14 185	2 361	951	808	143
2000	16 709	13 958	2 751	980	803	176
2001	16 802	13 656	3 145	984	784	200
2002	16 704	13 295	3 410	989	773	217
2003	16 466	13 154	3 312	976	760	216
2004	16 550	13 336	3 214	965	749	216
2005	16 700	13 670	3 030	911	728	183
2006	16 523	14 191	2 332	855	716	139
2007	16 458	14 849	1 609	823	730	94
2008	16 616	15 416	1 200	795	722	73
2009	16 875	15 472	1 404	911	816	96
2010	16 691	15 053	1 638	856	764	92
2011	16 767	15 118	1 649	841	748	94
2012	16 873	15 136	1 737	881	775	106
2013	16 883	15 106	1 778	851	744	107
2014	16 911	15 357	1 553	852	760	92
2015	16 833	15 542	1 291	894	822	72
2016	16 659	15 608	1 051	893	826	67

Source: author's own development based on the data of GUS.

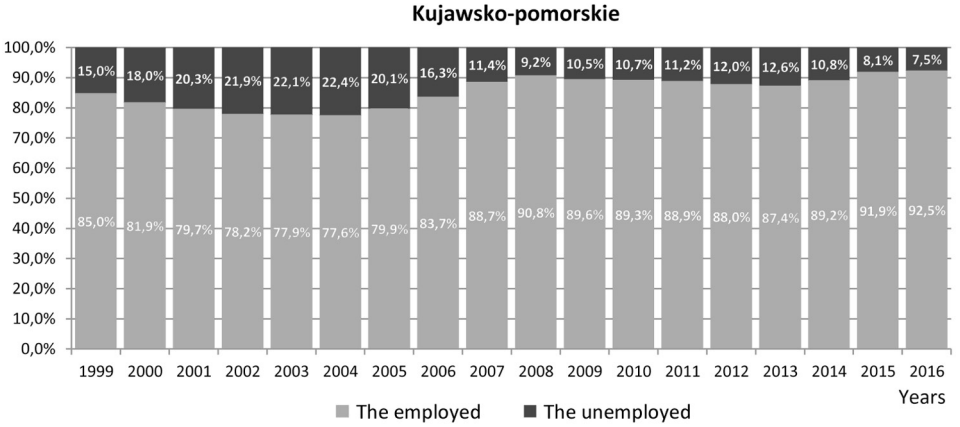
Figure 9. The percentage of the employed and unemployed population versus the professionally active people at the working age in Poland in years 1999-2016



Source: author's own development based on the data of GUS.

In Kujawsko-pomorskie voivodeship the percentage of the unemployed versus professionally active people at the working age in years 1999-2016 tended to drop gradually (Fig. 10). In 2016 this ratio reached a record low level of 7.5% (to compare, the figure was over 22% in 2004). In Poland the ratio dropped from 20.4% in 2003 to 6.4% in 2016 (Fig. 9). The unemployed population in Poland decreased twice from 2.4 million to 1.1 million people (in the region it was from 143 k to 67 k people). The Polish job market is increasingly using available labour resources especially the people who are able to take up a job.

Figure 10. The percentage of the employed and unemployed population versus the professionally active people at the working age in Kujawsko-pomorskie region in years 1999-2016



Source: author's own development based on the data of GUS.

The degree of the utilization of labour resources are defined by the economic activity ratio which comprises the percentage of professionally active people versus the total population aged 15 years and over (or 18 years and over)[4]. The coefficient of professional activity for individuals aged 15 years and over and at the working age was used in this paper (Table 10). The economic activity rate at the age of 15-59/64 in Kujawsko-pomorskie voivodeship in 2016 was 73.6% (in Poland it was 75.2%) and increased by 2.6 percentage points as compared to 1999. It is estimated that the working population will have grown at a slower pace than the unemployment rate will have fallen by the year 2019 and is not expected to change despite this level of the economic activity rate (56.2%)[5]. This means that the proportions between the working population and professionally inactive people will not change. A similar situation may appear in the voivodeship.

[4] *Methodological principles of the labour market and wages and salaries statistics*, GUS, Warsaw 2008, p. 21.

[5] http://www.polska2041.pl/spoleczenstwo/news-slabo-z-aktywnoscia-zawodowa-polakow,nId, 2419501.

Table 10. Economic activity rates in Poland and Kujawsko-pomorskie voivodeship in years 1999-2016

Years	Economic activity rate							
	Poland				Kujawsko-pomorskie			
	15 years and over		15-59/64		15 years and over		15-59/64	
	%	Growth 1999=100 (percentage points)	%	Growth 1999=100 (percentage points)	%	Growth 1999=100 (percentage points)	%	Growth 1999=100 (percentage points)
1999	56,7	-0,1	72,1	-	56,0	0,1	71,0	-
2000	56,6	-0,4	72,0	-0,1	56,1	0,6	70,9	-0,1
2001	56,3	-1,3	71,7	-0,4	56,6	-0,6	71,8	0,8
2002	55,4	-2,0	70,5	-1,6	55,4	-0,4	71,2	0,2
2003	54,7	-2,0	69,8	-2,3	55,6	0,3	70,5	-0,5
2004	54,7	-1,8	69,6	-2,5	56,3	-0,3	70,5	-0,5
2005	54,9	-2,7	69,8	-2,3	55,7	-3,2	69,6	-1,4
2006	54,0	-3,0	69,2	-2,9	52,8	-4,4	67,2	-3,8
2007	53,7	-2,5	69,1	-3,0	51,6	-3,6	67,0	-4,0
2008	54,2	-1,8	69,9	-2,2	52,4	-1,2	67,6	-3,4
2009	54,9	-1,4	70,9	-1,2	54,8	-1,7	69,9	-1,1
2010	55,3	-1,2	71,6	-0,5	54,3	-1,8	69,8	-1,2
2011	55,5	-0,8	72,1	0,0	54,2	0,3	70,8	-0,2
2012	55,9	-0,8	72,9	0,8	56,3	-0,2	72,7	1,7
2013	55,9	-0,5	73,5	1,4	55,8	-0,7	72,9	1,9
2014	56,2	-0,5	74,3	2,2	55,3	-0,9	73,1	2,1
2015	56,2	-0,5	74,5	2,4	55,1	-0,9	72,6	1,6
2016	56,2	-0,1	75,2	3,1	55,1	0,1	73,6	2,6

Source: author's own development based on the data of GUS.

5. SUMMARY

Demographic changes in Poland, especially the low fertility rate and increasing life expectancy have an impact on the decline in the working population, i.e. in potential labour resources. In 2016, life expectancy in Poland was 73.6 years for men and 81.6 for women, and in the voivodeship it was respectively 73.5 years and 81.3 years. As estimated by the Central Statistical Office, life expectancy in Poland in 2050 will be 82.1 years for men and 87.5 years for women, while in Kujawsko-pomorskie region it is estimated to grow to 81.9 years for men and 87.2 years for women.

The analysis of the population age structure has revealed that reduced numbers of people are entering the labour market and are not able to satisfy

the growing demand of employers for employees; yet, more numerous and longer living generations are retiring. Potential labour resources in Poland are also limited by restoring the retirement age of 60 for women and 65 for men which will additionally deplete this population group due to a shorter period of professional activity.

The labour market in Poland is struggling with a large shortage of workers and such a situation is expected to get worse. Analysts predict that a faster pay rise offered by employers may be a positive effect for employees. On the other hand, labour resources shortages will be compensated by the inflow of economic immigrants from the countries of Eastern Europe, particularly from Ukraine[6].

BIBLIOGRAPHY

- Góra M., Sztanderska U., 2006, *Wprowadzenie do analizy lokalnego rynku pracy*, Ministerstwo Pracy i Polityki Społecznej Departament Analiz Ekonomicznych i Prognoz, Warszawa, p. 33.
- Holzer J. Z., 2003, *Demografia*, PWE, Warszawa.
- http://www.polska2041.pl/spoleczenstwo/news-slabo-z-aktywnoscia-zawodowa-polakow,nId,2419501.
- Jóźwiak J., 2013, *Demograficzne uwarunkowania rynku pracy w Polsce*, [w:] Kiełkowska M. (ed.), Rynek pracy wobec zmian demograficznych. Zeszyty demograficzne, nr 1, Warszawa, p. 19.
- Kryńska E., 2006, *Zasoby pracy w Polsce – Stan obecny i perspektywy*, Instytut Pracy i Spraw Socjalnych, Warszawa, p. 11.
- Kurkiewicz J. (ed.), 2010, *Procesy demograficzne i metody ich analizy*, Wydawnictwo Ekonomiczne w Krakowie, Kraków, p. 112-113.
- *Podstawowe informacje o rozwoju demograficznym Polski do 2014 roku*, 2015, GUS, Warszawa, p. 4.
- *Prognoza ludności na lata 2014-2050*, 2014, GUS, Warszawa, p. 156.
- *Sytuacja demograficzna Polski*, 2016, Rządowa Rada Ludnościowa, GUS, Warszawa, p. 38-39.
- *Zasady metodyczne statystyki rynku pracy i wynagrodzeń*, 2008, GUS, Warszawa, p. 21.

WPŁYW ZMIAN DEMOGRAFICZNYCH NA RYNEK PRACY W WOJEWÓDZTWIE KUJAWSKO-POMORSKIM

Streszczenie: Zrozumienie zachodzących zmian na rynku pracy nie jest możliwe bez obserwacji procesów demograficznych i ich właściwej interpretacji. Według dotychczasowego stanu wiedzy przemiany demograficzne w Polsce, a także przewidywany ich przyszły kierunek będą coraz bardziej wpływać na kształtowanie się rynku pracy. Niekorzystne uwarunkowania

[6] http://www.polska2041.pl/spoleczenstwo/news-slabo-z-aktywnoscia-zawodowa-polakow,nId,2419501.

demograficzne obserwowane w Polsce coraz silniej przyczyniają się do zmniejszenia potencjalnych zasobów pracy przy jednoczesnym starzeniu się tych zasobów.

Celem opracowania jest przedstawienie zachodzących zmian demograficznych w latach 1999-2016 w województwie kujawsko-pomorskim i także ich przewidywanych konsekwencji, dla bieżącej i przyszłej sytuacji na rynku pracy. W pracy zastosowano podstawowe metody analizy danych statystycznych tj. analiza struktury, indeksy dynamiki o podstawie stałej. Głównym źródłem danych demograficznych i rynku pracy były internetowe zasoby Głównego Urzędu Statystycznego tzn. Baza Demografia i Bank Danych Lokalnych. W przypadku analizy danych z zakresu rynku pracy posłużono się informacjami pochodzącymi z reprezentacyjnego Badania Aktywności Ekonomicznej Ludności (BAEL).

Słowa kluczowe: demografia, rynek pracy, aktywni zawodowo, ludność w wieku produkcyjnym.

Dr Marek Ręklewski
Urząd Statystyczny w Bydgoszczy
ul Konarskiego 1-3, 85-001 Bydgoszcz
e-mail: m.reklewski@stat.gov.pl
orcid.org/0000-0001-6036-3370