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Demography as Essential Variable in Real Estate Price Prognosis

Abstract: In publications regarding real estate market analysis, one can find a statement that demography has a crucial impact on the real estate market only over the long term. Such a conclusion usually results in disregarding demography as an independent variable of real estate market analysis conducted to assess the value of property. On the example of the Subcarpathian town of Jarosław, the author indicates that demography should nowadays be particularly taken into account when assessing commercial property value. Demographic changes over the last few years have been so substantial that ignoring them in real estate price prognosis would certainly be a huge mistake. Demography does not only mean quantity; it means quality changes as well. A quickly aging society along with the migration of young people to big cities in search of a job has significantly influenced the changes of a consumer's wallet wealth. Assuming that all other variables describing the real estate market do not impact its value, it can be indicated that demography can be an essential factor that influences statistical reasoning.

Keywords: real estate market, property market, society aging, demography

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1. Introduction

In *The Futurological Congress*, Stanisław Lem wrote that “together with the development of science the future will not become more transparent, but the number of the unknowns will grow.” This statement perfectly fits the description of the surroundings and property market itself. The variables describing it have been discussed in detail in the trade literature. Regarding the interests of a researcher, one can distinguish different variables describing the real estate market and its surroundings. Payback footing of the property market is a key variable for Wheaton [1], Goetzmann [2], Baum [3], and Flavin and Yamashita [4]. In the works of Burns and Mitchell [5] and Haberler [6], business cycles play a key role in long-term prognoses. In developed markets, Crone and Voith [7] suggest taking building indices into account. Bajerowski [8, pp. 73–80] and Begg [9] pay special attention to the volume of natural resources and environment pollution. Gościński [10], Brzeski [11], and Domański [12, pp. 281–284] suggest incorporating political prosperity into a prognosis of the real estate market. Dąbrowski [13] suggests taking “the equation of money circulation and the degree of capital concentration” into account. Grabski [14] suggests incorporating the variability of market surroundings into an analysis. In the long term, Jajuga [15] recommends that one studies the global and local markets at the same time. Nykiel [16] examines the influence of economic emigration on the level of real estate prices. International standards of asset valuers include advised variables that should be integrated into the assessment procedure [17]. In many studies on demography, one can encounter a statement that demography is a crucial independent variable over the long term [18–20]. It is assumed that a long-term perspective means more than 15 years. In the subject literature, more than 200 variables can be found describing the real estate market [13].

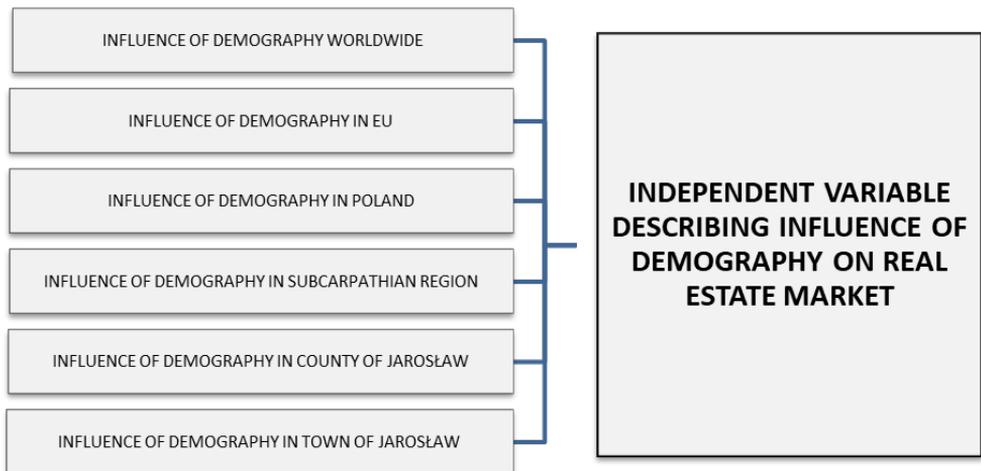


Fig. 1. General principle of influence of demography on real estate market

In this publication (on the basis of conducted research), the authors prove that demography is an independent variable that should be taken into account in real estate price prognosis for up to ten years. According to them, demography should not be considered optionally but obligatory in commercial property assessment. The authors verify the thesis through data relating to Poland and the local real estate market. The general principle of researching the influence of demography on the property market is illustrated below in Figure 1.

2. Demographic Situation in Poland

In Poland, any demographic data is thoroughly analyzed by institutions such as the Social Insurance Company⁴ and (particularly) the Central Statistics Office⁵. Only some of the key data and prognoses regarding the dynamics and significance of the changes that have occurred in Poland over the last few years are presented below [21]. The basic data illustrating the ongoing processes that influence the real estate market are natural growth, average life expectancy, the ratio of working and retired people, the actual level of pensions, the cost of Social Insurance Fund⁶, expenditures on sick or maternity leaves, etc. The study presents three charts illustrating the forecasted life expectancy, real number of retirees, and real pension sums as a result of demographic changes.

Figure 2 shows the forecasted average life expectancy in Poland as of 2015.

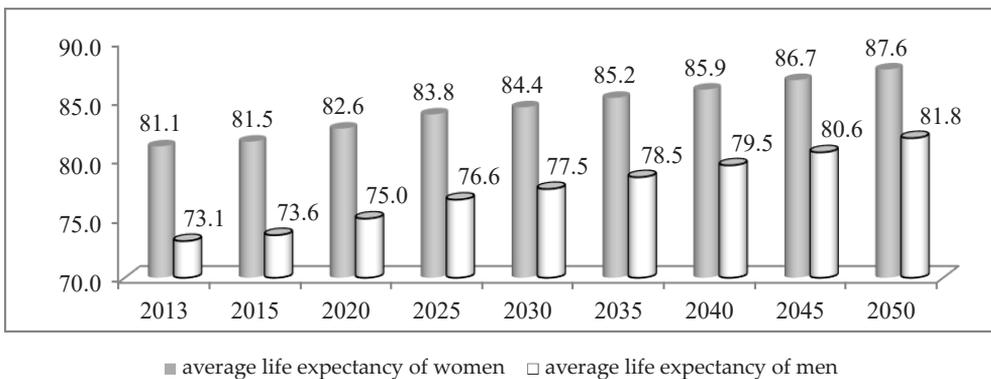


Fig. 2. Prognosis of average life expectancy of women and men in Poland during the years of 2013–2050

Source: authors' own compilation based on ZUS data

⁴ Polish: ZUS (Zakład Ubezpieczeń Społecznych)

⁵ Polish: GUS (Główny Urząd Statystyczny)

⁶ Polish: FUS (Fundusz Ubezpieczeń Społecznych)

Assuming that the inflow of money to ZUS stays at the same level, the prolongation of an average life expectancy will involve a real decrease in pensions, because a greater number of people will have to be catered to with the same pool of money. Analyzing the budget of Poland (or rather its deficit) over the last few years, it is quite hard to assume that ZUS will be granted any money from the government. According to many experts, raising the already high pension contribution would trigger a massive escape into the gray economy and seriously retard the national economy. A very crucial prognostic element is the ratio of insured people paying pension contributions and people receiving pensions (Fig. 3). As a result, the number of working people per one retiree will affect the real pension amount as well as the country's budget. It is assumed that there will be four people working to support one retired person in an ideal model. In a situation when there is only one working person per one retiree, the state budget is seriously burdened with constant expenditures that hinder the country's development, and the real pension sum would be grossly deviated from the expected one.

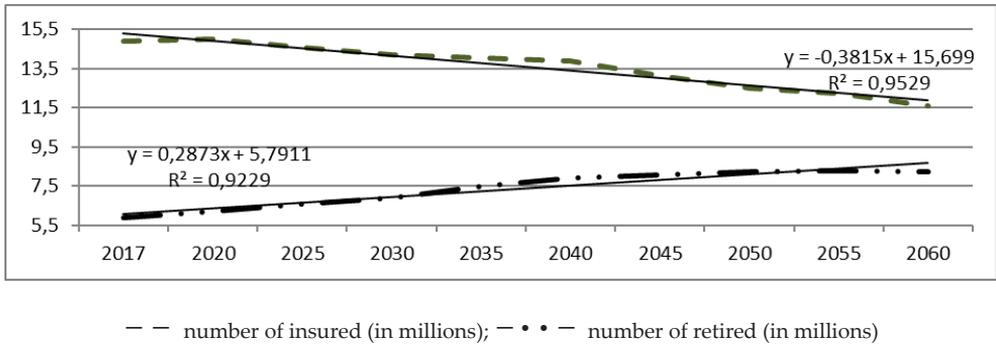


Fig. 3. Prognosis of number of insured and retired people in millions (2017–2060)

In the current situation, there is a 90% probability that the number of retired people will grow alarmingly fast while the number of working people will decrease. With such strong tendencies, we can be sure to observe the crossing of the analyzed curves by the end of the century. Such a state of matters will result in a real decrease in pension sums, which is illustrated by the prognosis shown in Figure 4.

The amount of pension paid by FUS at the end of the 2060s will be a little higher than 20% of the average salary minus the obligatory ZUS contribution. According to the calculations, an average salary in 2060 will nominally amount to over 3000 PLN, but it will actually equal a 600–700 PLN pension in 2017. Pensions will amount to sums that do not allow retired people to cater to their basic needs. Because of this, many of them will probably work until an age much higher than the statutory retirement age.

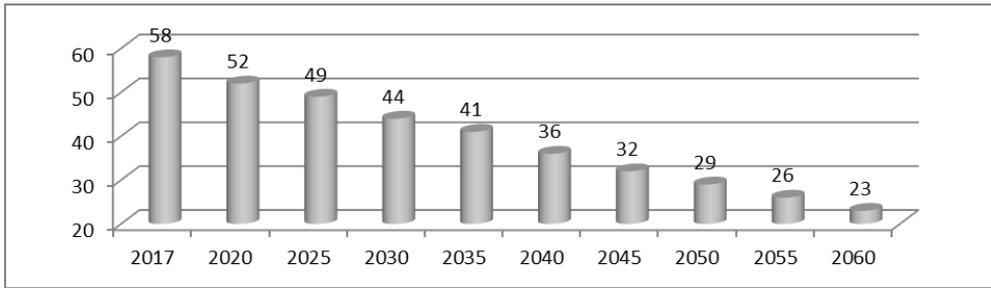


Fig. 4. Prognosis of pension sums paid by FUS during years of 2017–2060 as percentage of average salary less obligatory ZUS contribution

Source: authors' own compilation based on ZUS data (www.zus.pl, access: 13.07.2017)

To expand the analysis, the 'retirement surroundings' of Poland should also be described. The number of immigrants coming to Jarosław from beyond the eastern border has not increased over the last few years. With regards to native inhabitants in highly developed countries, the ratios of working to retired people as well as the rates of demographic decline are expected to lead to much worse scenarios.

To sum up, it can be said that the years to come will bring demographic decrease and a worsening relationship between working and retired people in both Western Europe and Poland. Ultimately, we should assume a real decrease in a pension's purchasing power in the near future. In many countries, the financial situation of retirees will worsen significantly, forcing them to apply for social assistance. Along with age, a gradual change of purchasing priorities will take place [22, 23]. The concept of old age and its phases is qualified in different ways; however, this is crucial due to the decline of elderly expenditures. Two classifications of 'the mature age' are presented below (Tabs. 1, 2).

Table 1. Division of 'mature age' into age ranges

Age range	45–59	60–74	75–89	>90
Age range name	pre-old age	early old age	mature old age	longevity

Source: the author's own compilation based on WHO data [24]

Table 2. Division of 'mature age'

Age range	60–69	70–74	75–84	>85
Age range name	initial old age phase	transition age	advanced old age	senility

Source: authors' own compilation based on Klonowicz [25]

Old age is characterized not only by the slowing down of any activity but also by a significant change in the personal expenditures hierarchy [26, 27]. The elderly are not prone to financial risk, but rather have a strong tendency to ‘save for a rainy day’. People at the old age usually spend less for investments, clothes and food. Together with age, expenditures related to health increase significantly [28].

In a situation when the awareness of quickly melting ZUS funds reaches society, one can assume much stronger tendencies for saving among people at ages above 45. Even now, many publications and conferences clearly convey the following message: *‘If you want to live with dignity at retirement age, diversify your savings’* – the Financial Education Congress (held on March 28, 2017). The accelerated speed of Polish society’s aging is illustrated in Table 3.

Table 3. Proportion of elderly in population structure of Poland

Time frame	1800–1900	1945	1990	2005	2015	2050
Percentage of elderly [%]	>6.3	>8.0	>14.8	>17.1	>24.0	>29.2

Source: authors’ own compilation based on ZUS data (www.zus.pl, access: 13.07.2017)

The prognosis of the number of retired people doubling in 2050 as compared to 1999 might involve huge changes in the country functioning and both the public and personal expense structure.

Summarizing the data regarding the aging societies of Poland and Europe, it can be said that an inflow of people to Jarosław (located in the Subcarpathian region) from Europe and Poland is not to be expected. Until the end of the 20th century, the Subcarpathian area was a relatively ‘young’ voivodeship as compared to other parts of Poland. Due to the small degree of industrialization and the lack of attractive job offers, the tendency for young people to emigrate from the area can be expected in the near future. Within 50 years, the voivodeship may change into a province of old people. Thus, it can be assumed that the demographic situation of Poland and the world will not have a positive impact on the Subcarpathian demography either. On the contrary, considering the emigration of young people to big cities, the exacerbation of the demographic situation cannot be eliminated.

3. Demographic Situation in Jarosław

The demographic situation of the town has changed radically over the last 15 years. In 2004, there were 10,500 college students, 7,000 students attending secondary schools, 3,000 students in lower secondary schools, and 6,000 in primary schools in a town of 40,000 (which was Jarosław’s population at the time). This

meant that students accounted for more than half of Jarosław's citizens, with more than 20% of teenagers and children living in the town. Figure 5 and Table 4 illustrate the demographic situation of Jarosław during the period of 2002–2017.

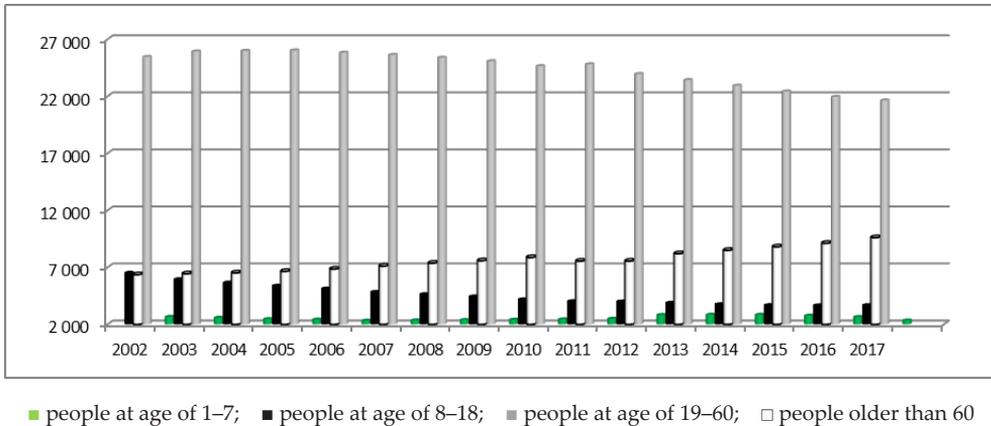


Fig. 5. Demographic changes among age groups in Jarosław (2002–2017)

Table 4. Demographic changes among age groups in Jarosław (2002–2017)

Year	Age groups				total
	people at age of 1-7	people at age of 8-18	people at age of 19-60	people older than 60	
2017–2002	-315	-2844	-3809	3247	-3721

Source: authors' own compilation based on town hall data⁷

During the years of 2002–2017 the following trends were noticed:

- a 11.9% decrease of citizens aged 1–7,
- a substantial (44%) decrease of citizens aged 8–18,
- a 15% decrease of citizens at productive ages,
- a 51% increase of citizens at post-productive ages.

The increase of 3,247 citizens aged 60 or above together with the simultaneous decrease of 6,653 citizens aged between 8 and 60 translates to a substantial decline in money on the local market. In order to assess the decrease rate, it has been assumed that people at the ages of 19 to 60 spend one 'consumption unit' in shops. For people within the age groups of 1–7, 8–18, and older than 60, the coefficients of spending have been determined as 0.5, 0.6, and 0.8, respectively. Assuming that these amounts of money stay at the same level over the next few years, the amount of money spent

⁷ Polish: UM (Urząd Miejski)

in shops in 2017 was 18% less than in 2002. The assumption of the same amount of money on the local market is based on the local tax office data⁸. The VAT taxation base did not really change over the years of 2002–2015: this amounted to 2.33 billion PLN in 2002 and 2.32 billion PLN in 2015. Interviews with exchange office owners have shown that a significant income decrease over the recent years has been noted, which proves the statement about the smaller sums of money being spent on investments by people working abroad. Thus, it can be stated with a great probability that ‘the cake to be shared’ has been nominally the same among local tradesmen for a few years. If we consider the diminishing turnover caused by ‘age group displacement,’ inflation, the growth of an average and minimum salary over the last several years, and the maintenance of the same taxation base means a real turnover decline and a considerably lower profitability.

4. Final Conclusions

The conducted research has shown that a real estate market analysis performed for the purpose of real estate valuation definitely has to take into account demography as a crucial explanatory variable.

In the case of commercial premises, one has to take into consideration the real decline of money triggered by demographic changes at rates of 1.0–1.5% per year. In the case of housing real estate, demographic changes will have a strong influence on demand-supply relationships as well as on changes in the purchasing preferences of potential buyers. The future will bring an increasing demand for flats and houses adjusted to the needs of the elderly.

All of the research was conducted on the basis of data from ZUS, GUS, US, EUROSTAT, and UM. In addition, the author has verified the number of town citizens given by GUS and UM (registration of residence) against the declarations connected to rubbish recycling – the so-called ‘waste declarations.’ Each household declares a number of tenants and pays a fee on this basis – a kind of tax on potentially disposed rubbish. The ‘waste tax’ is then paid according to the actual place instead of the registered place of residence. After comparing the number of registered people with the number of those who submitted ‘waste declarations,’ it has been discovered that there are about 10,000 fewer people living in Jarosław than are registered at the town hall. Because the real number of residents has amounted to about 28,500 for a few years based on ‘waste declarations,’ this figure should be taken as more reliable. Thus, the number of people within the age ranges of 1 to ‘maturity age’ (19)⁹ and older than 60 seem to be reliable as well. It can be said with great certainty that the ‘missing’ 10,000 citizens fit the 19–60 age group. Providing detailed information would require expensive and extensive research that is far beyond the

⁸ Polish: US (Urząd Skarbowy)

⁹ Students in Poland take a so-called ‘exam of maturity’ at the end of secondary school

scope of this article. All final conclusions regarding the real number of town citizens 'reinforce' the inference about the necessity of incorporating demography into a real estate market analysis conducted for market value assessment. 'Waste declarations' allow us to assume that, in reality, the demographic situation is changing much more rapidly and significantly than what is shown by the official statistics.

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Demografia jako istotna zmienna niezależna w prognozie cen nieruchomości

Streszczenie: W publikacjach na temat analizy rynku nieruchomości można znaleźć stwierdzenie, że demografia ma istotny wpływ na rynek nieruchomości tylko w dłuższej perspektywie czasowej. Stwierdzenie takie zazwyczaj powoduje pomijanie demografii, jako zmiennej niezależnej w analizie rynku nieruchomości wykonywanej na potrzeby szacowania rynkowej wartości nieruchomości. Autorzy na przykładzie miasta Jarosław położonego na Podkarpaciu wykazują, że obecnie demografia powinna być uwzględniana w sposób szczególny przy wycenie nieruchomości komercyjnych handlowych. Zmiany demograficzne w ostatnich latach są na tyle istotne, że błędem byłoby pomijanie ich w prognozach cen nieruchomości. Analiza demograficzna powinna uwzględniać nie tylko zmiany ilościowe, ale również jakościowe. Szybkie starzenie się społeczeństwa połączone z migracją młodych ludzi w poszukiwaniu pracy do dużych ośrodków znacząco wpływa na zmiany zasobności portfela konsumenckiego. Przy założeniu, że żadne inne zmienne opisujące rynek nieruchomości nie wpływają na jego wartość, można wykazać, że prognozy demograficzne mogą być bardzo istotnym czynnikiem wpływającym na wnioskowanie statystyczne.

Słowa

kluczowe: rynek nieruchomości, starzenie się społeczeństw, demografia