
Primary Housing Market in the Context of Wages and Creditworthiness in Selected Cities in Poland in the Years 2006-2019

Submitted 31/03/21, 1st revision 30/04/21, 2nd revision 23/05/21, accepted 30/06/21

Sebastian Kokot¹

Abstract:

Purpose: The paper presents the evolution of average unit prices of apartments in selected primary local markets in Poland in 2006-2019. The period covers the end of the price increase phase, their correction, and then stabilization and another upward phase. A characteristic feature of the study is that prices of apartments were presented not only in nominal terms, but also in several real term approaches.

Design/Methodology/Approach: The research was conducted using publicly available data on residential prices in selected cities. Prices were adjusted in a traditional way, i.e. by means of inflation indices, but also through the perspective of salary growth and creditworthiness. The results were presented graphically by means of charts.

Findings: It turns out that the above approach to the evolution of housing prices may lead to conclusions that are quite different from the stereotypical ones concerning the assessment of the housing market situation, its forecasts, as well as the assessment of threats and consequences of relations among prices viewed in varying ways. In particular, it has been shown that the observed tendencies do not seem favorable, since they lead to the perception of an apartment as an exceptionally expensive good, which, unfortunately, will not become apparent until turbulence of interest rates and income hit the market.

Practical Implications: The results of the research can be applied to forecasts of housing market trends and are particularly useful to developers, banks, realtors, potential apartment buyers as well as the government bodies responsible for housing policy.

Originality/Value: Similar research has not yet been conducted in the local housing markets in Poland. The conclusions from the study can provide an important signal regarding the direction of changes on the housing market.

Keywords: Real estate market, real housing prices, Poland.

JEL classification: G10, R31.

Paper Type: Research Paper.

Acknowledgements: The project is financed within the framework of the program of the Minister of Science and Higher Education under the name "Regional Excellence Initiative" in the years 2019 - 2022; project number 001/RID/2018/19; the amount of financing PLN 10,684,000.00.

¹University of Szczecin, Institute of Economics and Finance, Szczecin, Poland;
sebastian.kokot@usz.edu.pl;

1. Introduction

Housing is a specific good that performs a fundamental function in people's lives. Different countries have developed different models of satisfying housing needs. Consequently, these models use different proportions of owned dwellings to be rented in an institutionalized or market-oriented manner. In Poland, the political and economic breakthrough which took place in the early 1990s resulted in the government's withdrawal from the role of the entity responsible for the "supply" of housing for the society, pushing this role onto the market as the best mechanism regulating the demand and supply of the majority of goods and services produced in the economy. It took another decade or so for private companies, whose business is to conceptualize, promote, and execute housing projects, to emerge and establish in the market (Kokot, 2019). Thus, housing prices began to have a market character and be derived from the costs of land, labor and equipment, construction materials, and other fixed and variable costs of running a real estate development company and its profit margin. While the elements mentioned above are as a rule the elements that constitute the external conditions of the developer's operation, the profit margin is the component of the apartment price that, being entirely at the developer's discretion, is shaped according to the current market situation, in line with the market demand for apartments. In extreme cases, profit margins can reach 40%, although generally, profit margins between 11 and 19 percent are considered satisfactory. Nevertheless, in volatile market conditions, the developer's profit margin has a significant impact on the final prices of apartments.

In economic reality, we observe significant variation in property prices across local markets (Lai and Order, 2017; Black, Fraser, and Hoesli, 2006). Considering a group or even just a few of the country's biggest cities, significant disparities between the average unit prices are visible. This problem concerns all segments of the real estate market practically. The very nature of the real estate market permits to watch its phenomena from different perspectives, highlighting diverse aspects of the market activity, such as the subjective, objective, economic, legal, geographical, institutional, economic, social, technical, technological (Ball, Lizieri, and MacGregor, 1998; Kucharska-Stasiak, 2006; Stachura, 2007; Wiśniewska, 2011). Due to the socio-economic importance of the residential real estate segment, it is in the housing market that this problem assumes particular significance. The prices of real estate traded on this market result from the interplay of multiple factors of economic and social nature. The typical, permanent factors of real estate prices, and the apartment prices, in particular, include household income, population growth, employment, and interest rates (Hwang and Quigley, 2006).

The real estate market has many unique features (Kucharska-Stasiak, 2005; Kucharska-Stasiak, 2006; Ludwiczak, 2017; Nawrocka, 2020). From the point of view of the problem in question, what is important is the local character of the real estate market. Consequently, real estate prices quoted in the market vary depending on the location. Therefore, we should not treat the real estate market as a uniform

area or analyze it separately in, e.g., a single town or city, and then generalize the conclusions to be true for all the phenomena occurring in the market. Depending on the type and scope of analyses, it seems appropriate to conduct them simultaneously for several local markets, primarily if they serve as a basis for general conclusions. It should also be noted that the residential market, especially the primary one, is susceptible to business cycles and other fluctuations that affect it with different frequencies and intensity and cause, among others, periodical fluctuations in the number of dwellings completed (Baffoe-Bonnie, 1998; Agnello, Castro, and Sousa 2019).

The demand for housing stock is generated primarily by households needing dwellings to meet their living needs. Therefore, it may seem that the number of housing units in the country should correspond to the number of households. In reality, especially in developed economies, the demand for housing stock is higher as it is further influenced by external migration, internal migration, tourist and professional rentals, student rentals, and residential stock. Among other factors, which seem to be of lesser importance, we should mention dwellings used for professional needs (offices, studios, etc.), dwellings purchased "for the future," dwellings in the process of renovation (statistically, always some part of the resource is unoccupied due to renovation works carried out), vacant, unoccupied dwellings in the process of offering them for sale, etc., (Kokot, 2019). The statistical housing deficit is understood as the difference between the existing housing stock and the number of households that ceased to exist in Poland at the beginning of the 21st century. Since then, nearly 2.5 million dwellings have been completed and found buyers on the market.

However, compared to other countries, the indicators illustrating the degree of housing needs satisfaction in Poland are not good (Surówka, Wyrobek, and Surówka, 2020). In recent years we have also observed a record increase in the prices of dwellings. Most of the apartments find buyers already at the early stage of their construction. The constantly growing stock of apartments naturally provokes questions about how many more apartments the Polish real estate market can absorb and why residential prices are rising?

Attempts to answer questions about the absorptive capacity of the housing market and the impact of selected socio-economic factors on housing prices have been made in separate publications (Kokot, 2019; 2020). Studies revealing the links between housing price dynamics and economic growth have also been conducted about selected local markets (e.g., Wolniak et al., 2020), as well as geographical (Tomal, 2019) and international approaches (Dąbrowski *et al.*, 2020). A related research trend focuses on the state housing policy and its impact on the efficiency of meeting housing needs (Omelchuk, 2018). Other publications attempt to explain the mechanisms governing the housing price dynamics (Bełej and Kulesza, 2015; Żelazowski, 2017). This paper points out the disproportions appearing between the nominal and real prices of apartments on the primary market. The prices were made

realistic in three ways, taking inflation, average wages, and average creditworthiness as the basis. While it is evident that such disproportions in prices of apartments occur naturally, the value of the presented research lies in pointing out their scale and in an attempt to identify the resulting threats. Previously, related research was published into the so-called income accessibility of apartments in selected cities in Poland and Europe (Kokot, 2018).

2. Research Methodology

The following source data were used for the study:

1. About average unit prices of apartments in 17 Polish cities published cyclically by the National Bank of Poland. Data for Q4 of particular years were used.
2. About the annual rates of increase in the prices of consumer goods and services (inflation) published by the Central Statistical Office.
3. About average gross wages, i.e. before advance payments for personal income tax and contributions to compulsory social security (retirement pension, disability and sickness insurance schemes) paid by the insured employee, in business entities with more than 9 employees in the considered cities.
4. About average interest rates for new and renegotiated PLN real estate loans - the so-called real interest rate, as of December of each year by the NBP (Polish central bank).

The aspects selected for the study indicated that it was legitimate to transform the source data accordingly, in particular:

- gross wages were converted to net wages using an averaged ratio of 0.73,
- To calculate the creditworthiness an online calculator was used, available at total.money.pl.

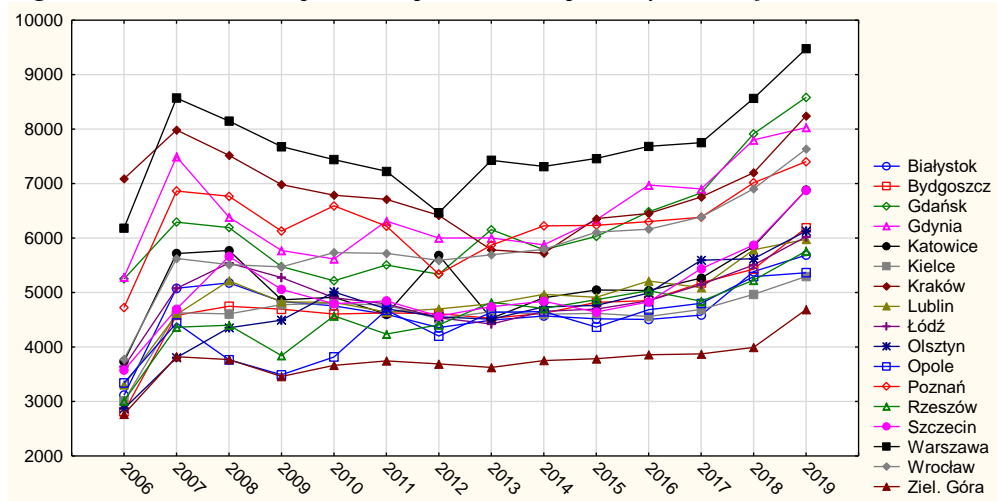
Some specific issues regarding how the calculations were made are presented when discussing the various stages of the study. The results obtained were shown using line and bar graphs as well as a box plot.

2.1 Housing Prices in Nominal Terms

The starting point for the analysis of housing prices in real terms is priced in nominal terms. Unit prices of apartments on the primary market in selected cities in Poland in the years 2006-2019 are shown in Figure 1. In 2007-2008, we saw a surge in prices in all cities, more or less emphatically referred to as a speculative bubble (Żelazowski, 2007; Dąbek, 2008; Masiukiewicz, 2013). Admittedly, the presented data cover the period from the end of 2006, but available sources indicate the formation of a clear upward trend as early as 2005 (Nykiel, 2007). The years 2009-2011 were a period of price correction, and since 2012 we observed first a slow, then accelerating upward price dynamics. Then, starting from 2017 (in some cities since

2018), the rate of price growth seemed already high enough to be compared to that observed in 2006-2008. Individual cities differed in terms of both the price level itself and its dynamics considered examined in detail. However, it can be pointed out that, generally, in 2017-2018, housing prices started to exceed their hitherto record levels from 2008. It can also be seen that the most expensive markets, i.e., Warsaw, Kraków, Gdynia, Gdańsk, Poznań, proved to be the most susceptible to the price tumble. Compared to 2006, 2019 apartment prices were higher in all cities, ranging from 16% in Kraków to 120% in Bydgoszcz. On the other hand, price increases in 2019 compared to the top price level before the price slump ranged from 5% in Warsaw to 36% in Gdańsk.

Figure 1. Nominal unit apartment prices in the primary market from 2006 to 2019.



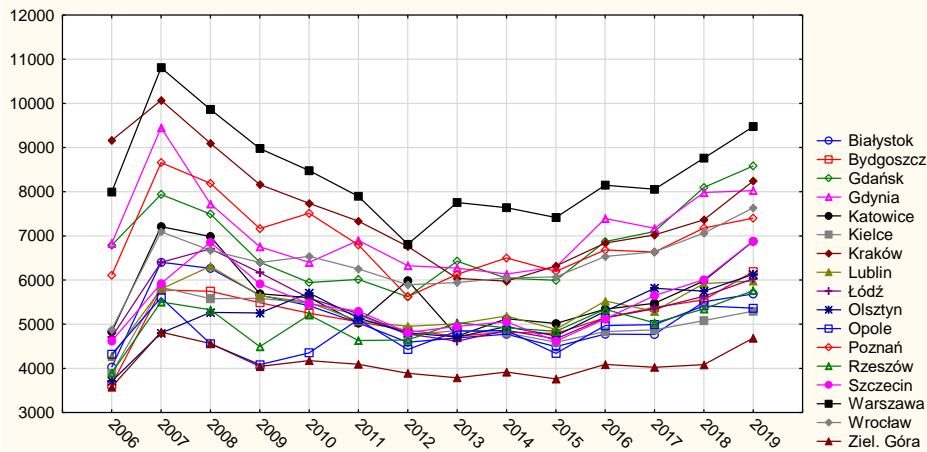
Source: Own study based on NBP data.

2.2 Real Housing Prices - An Inflation-Based Approach

The analysis of prices over a long period raises the problem of their being realistic. Even if the annual inflation is relatively low, covering several years or even decades distorts the analyzed prices. Hence, in the next stage of the research, unit nominal prices were recalculated with inflation indices bringing historical prices to the last year covered by the analysis, i.e., 2019. The results are shown in Figure 2. We can see that inference based on nominal prices may be illusory, as, in real terms, few cities reached the pre-crisis price level. These include, Bydgoszcz, Gdańsk, Olsztyn, Rzeszów, Szczecin and Wrocław, with the maximum recorded increase amounting to 8%. In the remaining cities, at the end of 2019, the apartment prices on the primary market were relatively lower than before the crisis - the most significant decrease was recorded in Kraków, where it amounted to 18%. In several of the cities under study, accurate residential prices stayed above their 2006 level throughout the price adjustments. In Krakow, Gdańsk, Gdynia, Warsaw, Opole, and Poznań - the prices dropped below that level in other cities. The most significant price decline

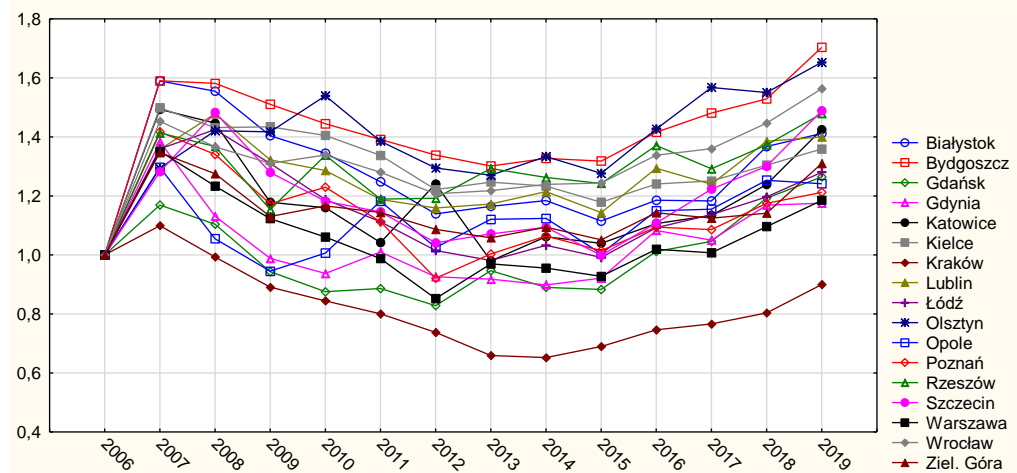
approached in this way was seen in Krakow, wherein a record year 2014 it amounted to 35%. Krakow is also the only city wherein 2019 apartment prices still failed to reach the 2006 level, as shown in Figure 3 that illustrates absolute apartment price indices, with 2006 being the reference year.

Figure 2. Unit apartment prices on the primary market from 2006 to 2019, recalculated using inflation rates for 2019.



Source: Own study based on NBP and GUS (Central Statistical Office) data.

Figure 3. Indices of inflation-adjusted housing prices in the primary market from 2006 to 2019 (2006=1).



Source: Own study based on NBP and GUS data.

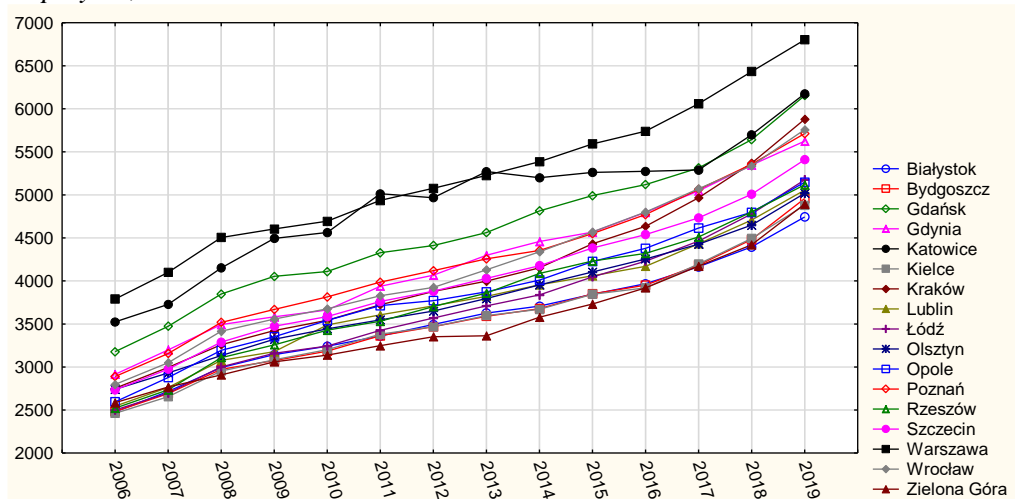
2.3 Real Housing Prices – An Income-Based Approach

Inflation reflects the increase in nominal prices of an adequately constructed basket of goods and services. Housing prices are one of the elements of this basket. From

the point of view of a potential apartment buyer, changes in the relationship between housing prices and the buyer's income are more important than changes in prices themselves, even allowing for inflationary effects. Hence, in the next stage of the research, the housing price dynamics were assessed through the lens of income. In the period in question, when, to remind you, the dynamic growth of apartment prices was followed by a price correction phase and then by another phase of their growth, we observed a clear, systematic, and significant increase of average wages in the economy in all the cities under consideration, as illustrated by Figure 4 showing average gross monthly wages in units with more than nine employees. Over the whole analyzed period, the salary rises ranged from 75% in Katowice to 106% in Wrocław.

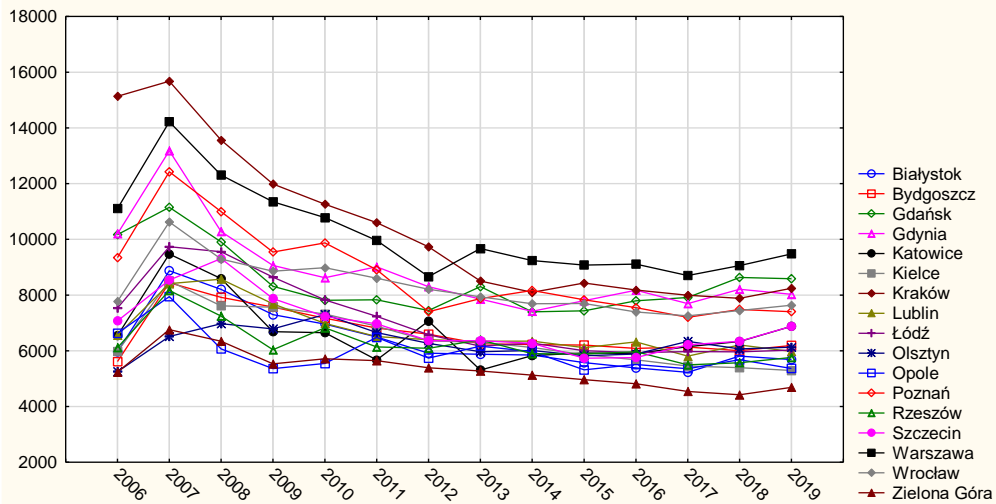
In connection with the presented dynamics of residential prices, such dynamics of wages are reflected in the actual availability of dwellings, as shown in Charts 5 and 6. In figure 5, unit prices of apartments are converted to wage indices for 2019. The data presented therein show what the apartment prices would be about wages in particular years if those wages were the same as in 2019. As seen in this approach, after a steep increase in prices in 2006, they gradually decreased over the next few years, and most cities relatively stabilized around 2013. Also, in most cities, prices of apartments in the primary market converted to wage indices did not even reach the level from 2006. The exceptions were Bydgoszcz (10%), Katowice (5) and Olsztyn (17%). The most significant drops were recorded in Gdynia and Poznań (21%). Moreover, in none of the cities measured in such a way, the prices of apartments reach their maximum levels, which, depending on the city, fell in 2007 or 2008. In this respect, Kraków has the most catching up to do (47%) compared to Olsztyn, with the smallest gap (16%).

Figure 4. Average monthly gross wages and salaries in entities with more than 9 employees, 2006-2019.



Source: Own elaboration based on GUS data.

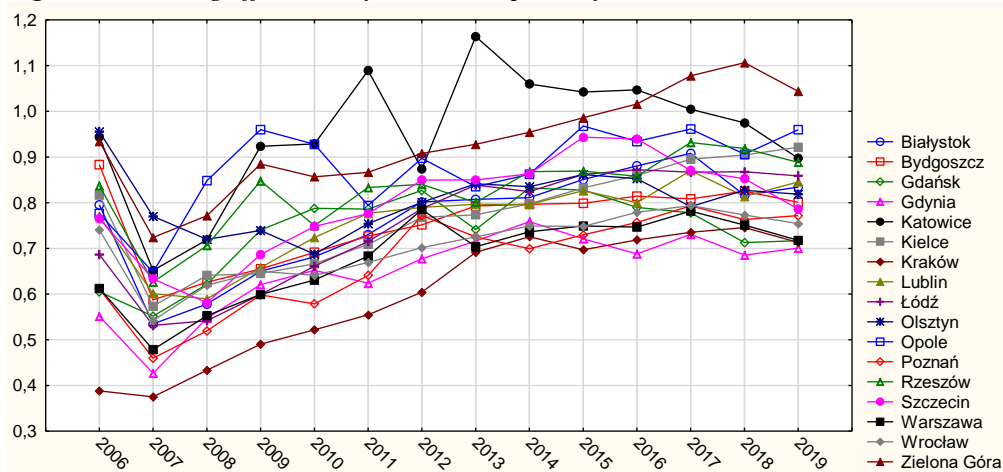
Figure 5. Unit prices of homes in the primary market from 2006-2019, converted to wage indices for 2019.



Source: Own study based on NBP and GUS data.

In Figure 6, the considered phenomenon is shown as quotients of average wages to average unit prices of apartments. The index constructed in this manner is sometimes referred to in the literature as the housing affordability index and states directly how many square meters of an apartment may be purchased for an average salary. This study aimed not to provide factual information but to compare the phenomenon over time and between the cities under study; gross wages were again used to calculate the indices. The obtained results show that although the differences in the index value in particular cities were significant, with fluctuations as high as twofold, the dynamics of the index were similar. After a sharp decline in 2007, there was a phase of systematic growth, continuing until around 2013. Afterward, the index no longer showed such a clear trend and its fluctuations over time were much smaller. The most significant deviations from this rule were seen in Katowice.

The analyses carried out in this part of the study lead to the conclusion that, from the point of view of the population's income expressed in terms of average wages, housing prices in the period under study did not grow as quickly as it may be expected taking into account the inflation alone. Even in 2019, they were lower than in the peak phase in 2007-2008. The average wage could buy more square meters than in the reference period.

Figure 6. Housing affordability indices on primary market between 2006 and 2019.

Source: Own study based on NBP and GUS data.

2.4 Real House Prices – A Creditworthiness-Based Approach

The dynamics of home prices on the primary market is yet another matter when we evaluate the prices from creditworthiness. Such an approach is justified because, by various estimates, from 1/3 to even 2/3 of sales on the housing market are financed with mortgage credit. In this analysis, the leading concept is creditworthiness, understood as the maximum amount of money obtained in the form of credit for the purchase of an apartment. In addition to the potential buyer's income, the creditworthiness is also determined by the mortgage interest rate. As it varies over time, it is one of the factors that influence, through creditworthiness in conjunction with housing prices and buyers' income, the ability to purchase a dwelling and the size of the dwelling that can be purchased. Chart 7 illustrates average interest rates for new housing loans in PLN each year according to the National Bank of Poland.

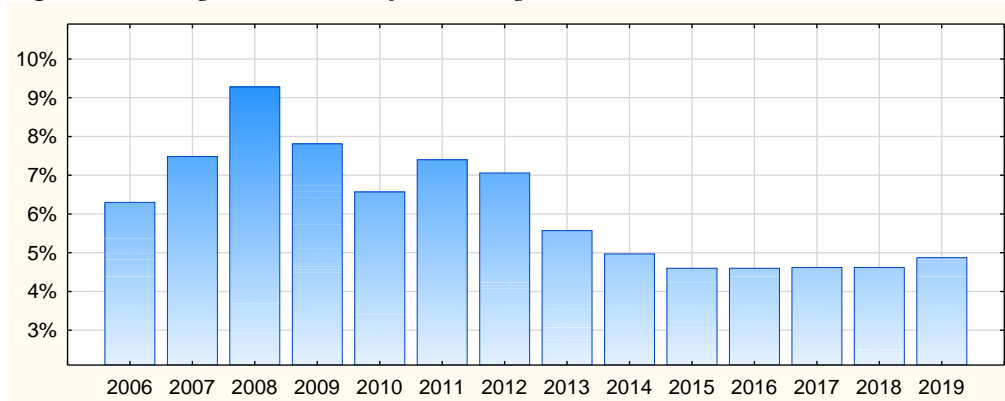
As it is clear from Figure 7, loan interest rates fluctuated considerably during the period under study. The highest interest rates, at 9.28%, were recorded in 2008, whereas the lowest rates (4.60%, i.e., twice as low) were in 2015 and 2016. The chart shows the average interest rates, which means that banks offered loans that were either cheaper or more expensive than that. Using this data, in figure 8, the average creditworthiness between 2006 and 2019 is shown as calculated with the online calculator available at total.money.pl. The following assumptions were made:

- number of members in the household - 2,
- both household members' incomes were equal to the average wage in the city,
- gross wages were converted to net income using an averaged factor of 0.73,
- loan duration - 25 years,

- annual interest and capital repayments on the loan were equal over the lifetime of the loan,
- no other credit or credit card debt,
- no other fixed obligations.

Although the above assumptions occur very rarely in practice, they were adopted due to the relative nature of the conclusions drawn from the analysis. The point was not to determine the actual creditworthiness of a given person but to ensure comparability of results, and in particular, the possibility of capturing changes in creditworthiness.

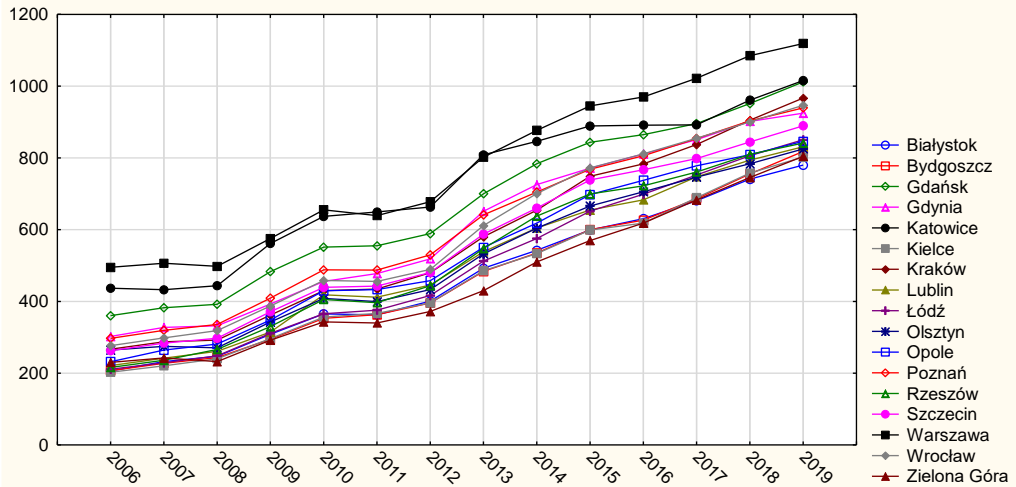
Figure 7. Average interest rates for housing loans in PLN.



Source: Own study based on NBP data.

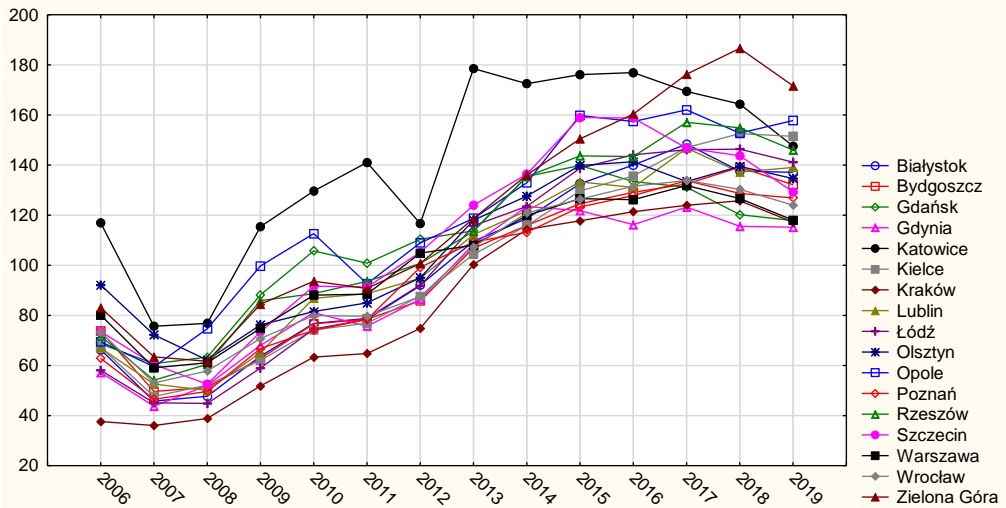
While analyzing the average creditworthiness throughout the whole period in question, it can be seen that it grew dynamically. It slowed down slightly only in 2010-2011. The relatively lowest increase in nominal creditworthiness was observed in Warsaw, where it amounted to 126% due to the high level of wages in the city reported as early as in the base year and, consequently, to their lower relative growth. The most notable increase in creditworthiness was seen at 303% in Łódź. As a result of lower interest rates on loans, in 2019, the general creditworthiness increases were even more significant than the average salary growth over the same period. This means that, in absolute terms and given the situation on the real estate loan market, housing is more affordable than one might expect, having taken into consideration just the price-to-income ratio. This can also be seen in figure 9, which shows the number of square meters one can purchase with available credit. It turns out that, given creditworthiness with the same input assumptions, in all the cities, the residents could afford considerably larger apartments than in 2006. The highest increase - by 143% - was recorded in Łódź. The creditworthiness growth exceeding 100% was also seen in Białystok, Gdynia, Kielce, Kraków, Lublin, Łódź, Opole, Poznań, Rzeszów and Zielona Góra. Increased creditworthiness (by 26%) had the weakest effect on purchasing capacity in Katowice.

Figure 8. Average creditworthiness from 2006 to 2019



Source: Own study on the basis of NBP and GUS data with the use of the creditworthiness calculator from total.money.pl.

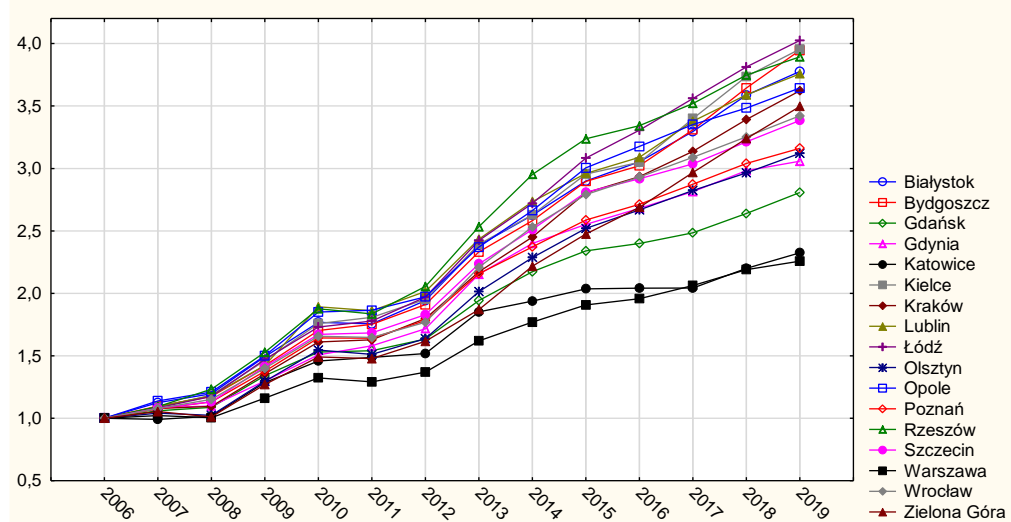
Figure 9. The number of square meters of floor area that could be purchased for the amount corresponding to the average creditworthiness between 2006 and 2019.



Source: Own study on the basis of NBP and GUS data with the use of the creditworthiness calculator from total.money.pl.

The fact how large the increase in creditworthiness was is illustrated even more clearly in the figure 10 which shows debt-to-income ratios calculated under the assumption that the year 2006=1. The majority of cities saw increases more than three times higher. Smaller increases were recorded only in the case of Gdańsk, Katowice and Warsaw.

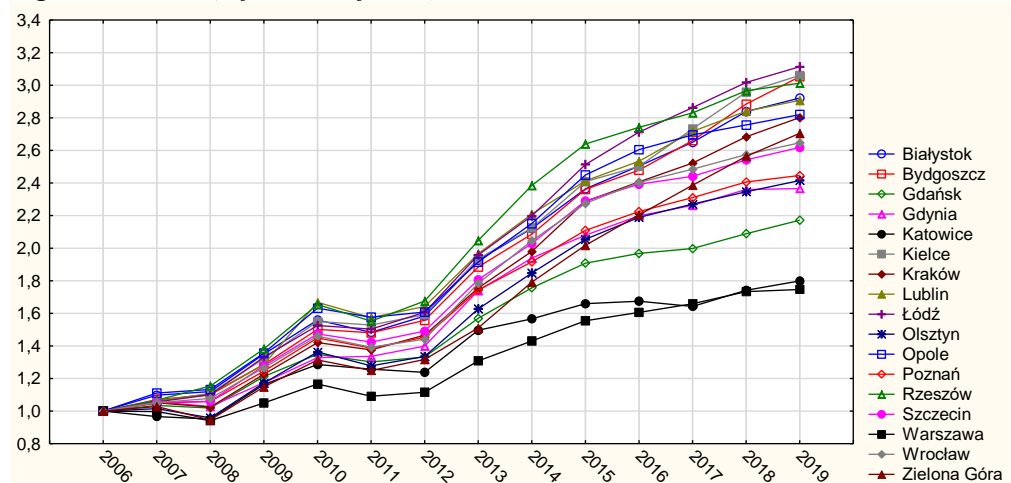
Figure 10. Nominal debt-to-income ratios, 2006=1.



Source: Own study on the basis of NBP and GUS data with the use of the creditworthiness calculator from total.money.pl.

Considerable increases in creditworthiness were present even when its nominal amounts were adjusted by inflation indices or even by housing price indices, which is well illustrated by the adequately adjusted debt-to-income ratios in Figures 11 and 12. For obvious reasons, they are lower than debt-to-income ratios expressed in nominal terms, but even after adjustment by income ratios for all the cities (excluding Olsztyn), they have been increasing since 2010.

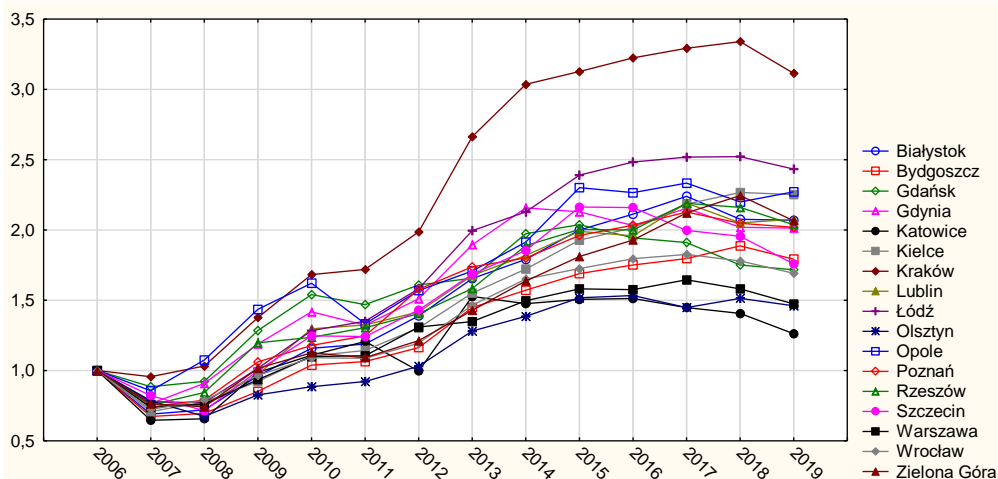
Figure 11. Real (inflation-adjusted) debt-to-income ratios 2006=1.



Source: Own study on the basis of NBP and GUS data with the use of the creditworthiness calculator from total.money.pl.

In all approaches to debt-to-income ratios, it is interesting that the range of their values expands over time, which indicates how differently the component variables affecting creditworthiness in this approach were changing in particular cities. Apart from interest rates on loans, these variables were primarily housing prices and average wages.

Figure 12. Real (adjusted with housing price increase indices) debt-to-income ratios, 2006=1.



Source: Own study on the basis of NBP and GUS data with the use of the creditworthiness calculator from total.money.pl.

3. Discussion of Results and Conclusions

The presented research results seemingly give reasons for optimism. Although prices of apartments on the Polish primary market are growing and in nominal terms, they have exceeded the record levels of 2007-2008, in real terms, apartments are still cheaper than in that period. However, a more detailed analysis of the results raises the question of whether the observed trends do not lead to adverse relationships between the prices of housing and other goods. The fact that apartments are relatively cheaper in real terms results first and foremost from the high dynamics of the population's income in the period under analysis, combined with a drop in interest rates on housing loans.

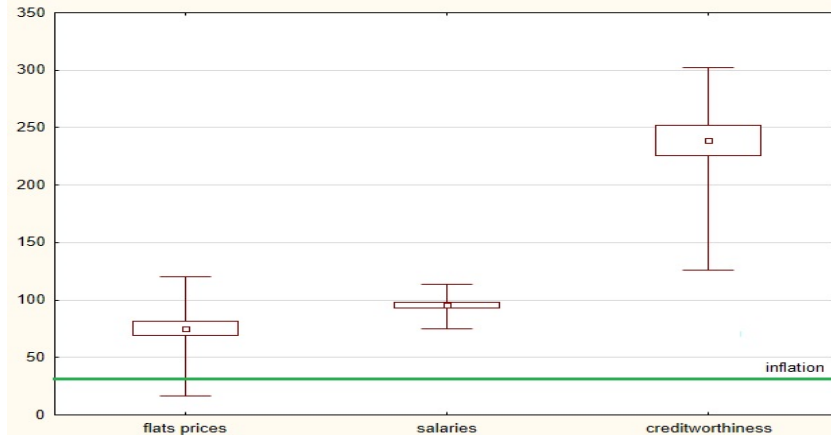
These factors generate demand for housing, much of which is based on investment and speculation rather than satisfying housing needs. It might even be said that the investment and speculative demand are pushing out the demand related to satisfying housing needs in a strict sense. Apartments, whose prices are growing systematically even though for an average potential buyer they are relatively cheaper than several years ago, may at a certain point become very expensive when interest rates rise.

Also, the housing may become less affordable for buyers whose income dynamics are lower than the dynamics of the average income.

Prices of apartments are growing faster than prices of other consumer goods and services, yet taking into account income and creditworthiness is still more accessible. Such a tendency does not seem beneficial, as it leads to making housing a costly good, the effect of which, unfortunately, will not be revealed until later in a situation of market turbulence in interest rates and incomes. However, homeownership is a good of fundamental importance for the development of society as it is essential to build a sense of security and stability. A change in the proportion of housing prices to the prices of staples may trigger undesirable situations on the real estate market manifested by many vacancies accompanied by high housing prices.

A summary of the conducted research is presented in figure 13, where the percentage increments of average, minimum, and maximum values of housing prices, income, and creditworthiness in the considered cities in 2019 are compared with those in 2006. Income growth compensated for housing price increases. However, creditworthiness grew much higher over that time.

Figure 13. Average values and ranges of percentage changes in housing prices, average wages, and creditworthiness in cities in 2019 versus 2006.



Source: Own compilation based on NBP and GUS data with the use of the creditworthiness calculator from total.money.pl.

Due to data availability, the study covered the timeframe between 2006 and 2019, although the study itself was conducted in early 2021. Hence, the conclusions about the turbulence in the housing market during the pandemic period cannot be drawn from the presented data. Nevertheless, given the scarce data, it is highly justified to expect further increases in house prices and incomes and predicts significant increases in creditworthiness brought about by sharp cuts in interest rates. It is,

therefore, to be expected that in 2020 the phenomena in question will become even more evident.

References:

- Agnello, L., Castro, V., Sousa, R.M. 2019. The Housing Cycle: What Role for Mortgage Market Development and Housing Finance? *Journal of Real Estate Finance and Economics*, 61, 607-670.
- Baffoe-Bonnie, J. 1998. The Dynamic Impact of Macroeconomic Aggregates on Housing Prices and Stock of Houses: A National and Regional Analysis. *Journal of Real Estate Finance and Economics*, 17(2), 179-197.
- Ball, M., Lizieri, C., MacGregor, B.D. 1998. *The economics of commercial property markets*. Routledge, London.
- Belej, M., Kulesza, S. 2015. The Dynamics of Time Series of Real Estate Prices. *Real Estate Management and Valuation*, 23(4), 35-43.
- Black, A., Fraser, P. Hoesli, M. 2006. House Prices, Fundamental and Bubbles. *Journal of Business Finance and Accounting*, 33(9-10), 1535-1555.
- Dąbek, K. 2008. Zjawisko bańki cenowej na rynku nieruchomości w Polsce. *Świat Nieruchomości*, 4(66), 4-9.
- Dąbrowski, I., Mach, Ł., Mikołajczyk, Ł., Kuświk, A. 2020. Correlation of Economic Development of Countries with the Potential of their Housing Real Estate Markets: A Case Study in the European Union. *European Research Studies Journal*, 23(1), 660-678.
- Hwang, M., Quigley, J.M. 2006. Economic Fundamentals in Local Housing Markets: Evidence from U.S. Metropolitan Regions. *Journal of Regional Science*, 46, 425-453.
- Kokot, S. 2019. Próba oszacowania chłonności rynku mieszkań w Polsce w perspektywie 20 lat. *Mikroekonometria w teorii i praktyce gospodarki nieruchomościami (Difin)*, 23-44.
- Kokot, S. 2020. Socio-Economic Factors as a Criterion for the Classification of Housing Markets in Selected Cities in Poland. *Real Estate Management and Valuation*, Vol. 28, No. 3, 77-90.
- Kokot, S. 2018. Dostępność dochodowa mieszkań w wybranych miastach Polski i Europy. Czy mieszkania w Brukseli rzeczywiście są droższe niż w Warszawie? *Rzeczoznawca Majątkowy*, 2(98), 32-38.
- Kucharska-Stasiak, E. 2005. Podstawy funkcjonowania rynku nieruchomości. Ujęcie teoretyczne. *Acta Universitatis Lodziensis. Folia Oeconomica*, 187, 10-15.
- Kucharska-Stasiak, E. 2006. *Nieruchomość w gospodarce rynkowej*. Wydawnictwo Naukowe PWN.
- Lai, R.N., Van Order, R. 2017. U.S. House Prices over the Last 30 Years: Bubbles, Regime Shifts and Market. Efficiency. *Real Estate Economics*, 45, 259-300.
- Ludwiczak, A. 2017. Jaki nie jest rynek nieruchomości – problemy dla badaczy. *Finanse, Rynki Finansowe, Ubezpieczenia*, 1(85), 351-361.
- Nawrocka, E. 2020. *Metody badania dynamiki cen nieruchomości w Polsce dla potrzeb wyceny*. Wydawnictwo Uniwersytetu Gdańskiego.
- Nykiel, L. 2007. *Rynek mieszkaniowy i budownictwo mieszkaniowe. Analiza za 2006 rok*. PKO BP, Departament rynku mieszkaniowego.
- Omelchuk, V.O. 2018. Effectiveness of the Housing Policy: A Comparative Analysis. *European Research Studies Journal*, 21(1), 383-392.

- Stachura, E. 2007. Marketing na rynku nieruchomości. Polskie Wydawnictwo Ekonomiczne, Warszawa.
- Surówka, K., Wyrobek, J., Surówka, M. 2020. The Condition of Polish Housing Against the Background of Selected European Countries. *European Research Studies Journal*, 23(2), 469-482.
- Tomal, M. 2019. The Impact of Macro Factors on Apartment Prices in Polish Counties: a Two-Stage Quantile Spatial Regression Approach. *Real Estate Management and Valuation*, 27(4), 01-14.
- Wiśniewska, M.A. 2011. Inwestowanie w nieruchomości na rynkach międzynarodowych. Wydawnictwo Naukowe PWN, Warszawa.
- Wolniak, R., Olkiewicz, M., Szymczewska, M., Olkiewicz, A. 2020. The Functioning of the Real Estate Market: Dynamics of Price Formation and the Sale of Apartments. *European Research Studies Journal*, 23(2), 281-307.
- Żelazowski, K. 2007. mZjawisko bańki cenowej w kontekście zmian na polskim rynku mieszkaniowym. *Studia i Materiały Towarzystwa Naukowego Nieruchomości*, 1-2, 139-148.
- Żelazowski, K. 2017. Housing Market Cycles in the Context of Business Cycles. *Real Estate Management and Valuation*, 25(3), 5-14.