# Impact of Housing Prices on the Standard of Living of the Population in the Provinces of the Republic of Bulgaria

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# Abstract

The rapidly rising housing prices over the past few years in Bulgaria have raised concerns about the situation with the standard of living of large groups of the country's population. Income differentiation and the purchase of housing by foreign citizens or by Bulgarians living abroad creates the illusion that housing provision levels are high and that there is enough housing space for all those in need. Basically, however, a large part of the homes are uninhabitable because they tend to be located in settlements with a declining population or were purchased for the purpose of investment and/or as a measure of protection against inflation. This study establishes the existence of a high negative correlation coefficient between housing prices and the population's standard of living, when measured on the basis of nine objective indicators, united in the form of complex criteria. Two statistical methods were experimented to get to a general estimate of the standard of living based on the selected indicators, and eventually the better one was used. Regression analysis was used to assess the direction, shape and strength of the relationship between the price levels and the standard of living. Conclusions and recommendations were formulated regarding the need to urgently support young and socially weak families with housing from the State or Municipal Housing Stock/available housing so that they might successfully perform their reproductive functions and maintain their standard of living at an acceptable level. What was used for the purposes of this study were comprehensive sets of statistical information by provinces from the National Statistical Institute website and statistical methods applied using the software products SPSS and Excel. The obtained results are useful for Governmental and Local Government Bodies.

**Keywords:** housing price, standard of living, regression, regional analysis.

JEL: R28, R32

# 1. Introduction

Possessing an own home coupled with regions whose standard of living rank at the bottom in the entire European Union are some of the features of life in Bulgaria that do not require a special study to be established and described; yet the impact of house prices

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on standard of living is a relationship worth researching. The reason is notwithstanding the abundance of housing, some of the housing stock appears to be empty, and this is either because those homes were bought merely with investment intentions, i.e., to save the available money from inflation-driven depreciation, or because they are located in regions plagued by underdeveloped economy or inappropriate structure of economic activities, which makes earning a living a great challenge, especially for people with high qualifications in specific fields of knowledge. On the other hand, big cities irresistibly attract young people who have just finished their education with the opportunities to achieve a good standard of living, including many components, and as for housing, it tends to remain a mirage and would mainly be replaced by life at rent. Substantial differences in population's income levels together with living conditions specific for given territorial units would make a sufficient reason for the study of the relationship between prices on residential properties and the standard of living. For this purpose, regional information would be an appropriate choice. The results obtained from this study would be useful in terms of limiting external migration if subsidising housing prices for some particularly sensitive social groups, including young professionals possessing certificates of top ranking majors, who tend to be tempted by the possibility of immediately obtaining high incomes from exercising their profession abroad. One of the challenges in conducting this type of research is the accurate establishment of housing prices, as the actual sale prices differ to some extent from the offer prices, especially when it comes to homes in old buildings, where the estimate of the improvements made to the property and the rate of depreciation would be hard to of the population would acquire housing of

evaluate. Along with that, the influence of a number of factors concerning the state of the environment outside the immediate location of the property are also difficult to assess, i.e., the construction of new transport facilities such as metro stations in Sofia, expressways in the immediate vicinity, increased noise levels and redevelopment, changes in domestic crime rates, the construction or renovation of parks and sports facilities, etc. Another methodological challenge would be the realistic estimate of the standard of living, for which there is no generally accepted methodology, as well as the existence of a personal difference in the structure of consumption for each individual or household, which leads to a different degree of access to basic goods by the different income and age groups of population. All these considerations would give room for the expression of research attitudes and creativity in choosing ways to deal with research challenges.

The main aim of the present study is to determine the direction and strength of the influence of the prices of residential properties on the standard of living of the population over the period 2016-2021 in order to formulate measures to regulate this influence with a view to improving the living conditions of the population.

It is no accident that housing provision levels are not directly involved in the formation of the estimate of the standard of living. Our thesis is that housing prices are inversely related to the level of the standard of living. The reason for this is the hypothesis that low housing prices would raise population's standard of living in two aspects. By paying less per unit of living space, population would have a greater resource for all other real assets and, in addition, a significant part

their own, thus meeting their needs in terms of location and amenities at a much earlier age. There is also the consideration that, to a certain extent, the indicator for housing provision levels would be affected by the presence of housing purchased by foreign citizens as vacation properties or purely for investment purposes or for rental. There are legal entities that would buy or build rental housing, which does not directly affect the actual range of housing amenities available to the country's population, but would affect the value of the estimate of the standard of living if this indicator were included in it.

## 2. Discussion of the relevant literature

In the scientific literature, there are a number of different definitions of the concept of "standard of living", which stems from its complex and interdisciplinary nature. For example, using a scientifically based theoretical formulation. Barreiro-Gen examines the "standard of living" through the lens of three directions, namely: 1) standard of living, defined as the utility of life (according to the modern variant of this approach, utility is equated with the fulfilment of desires); 2) a standard of living considered as economic security or "luxury"; and 3) a standard of living considered as a type of freedom. (Barreiro-Gen, 2019) Looking at the first direction, we cannot fail to note that in the different stages of his/her life, each person has different desires and needs, as a result of which the standard of living can vary both from person to person and from settlement to settlement. Delving deeper into the second direction, it would not be an exaggeration to claim that the degree of economic security or "luxury" are too relative concepts, since economic satisfaction can vary widely and, under the same living circumstances, be Impact of Housing Prices on the Standard of Living of the Population in the Provinces of the Republic of Bulgaria

different. Of interest in this context would be the notion of "decent living standard", in the concept of which some authors include the living circumstances that are essential to people, i.e., they would be seen as a "basic minimum". (Rao et al., 2018). According to the authors, a "decent standard of living" would include some basic welfare requirements such as food, clean air, education costs and mobility. In our opinion, these requirements should include the possibility of living in quality residential properties (Yovkova et al.) and receiving modern medical treatment. The third direction (standard of living, considered a type of freedom), in our opinion, would rather gravitate around the essence of the concept of "guality of life", referring to an individual's degree of satisfaction with his/her living conditions. Seen through the eyes of the economist, however, freedom is not so much a subjective estimate, but is an opportunity to fulfil the full set of dreams, desires and abilities of a significant part of the population, which would be directly dependent on that population's financial position and on the social system of the country he lives in. Typically, emigrants from developing countries are very impressed by the social benefits in the developed Member States of the European Union, but these are benefits that the population actually pays or has paid, accumulating national wealth and productive assets capable of generating a sufficiently high gross domestic product per capita for a long period of time.

CFI (Corporate Finance Institute) uses the term "standard of living" to describe the level of income, necessities, luxuries and other goods and services that are generally readily available to a certain segment of the population, as CFI assesses the amount of real assets that are produced and sold in a specific

geographic area—such as a community, province, state, or country. (CFI, 2020) Part of the abovementioned understandings are represented in the definition of the concept given by P. Angelova, who defines the category "standard of living" as "the quantity, quality and structure of real assets and services that the population and the individual have at their disposal to satisfy their needs, as well as the conditions under which humans reproduce as biological and social beings". (Petrov, 2007, p. 6 [in Bulgarian]) According to L. Rashkova, the standard of living of the population is "the availability, quantity and quality of goods and services and their distribution among the population of a given country, the set of socioeconomic indicators that reveal the degree and level of satisfaction of the population's vital needs through quantitative measures". (Rashkova, L. (2021, p. 510 [in Bulgarian]). Bv emphasising this purelv financial conceptualisation embedded in the views of the mentioned authors, R. Easterlin describes the change to a more inclusive definition of the standard of living, which also covers aspects of human development, such as the average life expectancy and education (Esterlin, 2000). Taking into account the mentioned definitions, in our opinion, the "standard of living" can be defined as the level of supplies to society as a whole and of individuals plus households of goods and services that should be provided both by the economy's public sector and private sector combined with the levels of people's access to these real assets and services (Stoencheva, 2022, p. 16-17 [in Bulgarian]).

An essential issue in the estimate of the standard of living is the choice of appropriate indicators. At the dawn of the process of studying the "standard of living" taken as a category, the gross domestic product

(GDP), and the gross domestic product per capita, respectively, was the only indicator representing the level of the studied concept (Esterlin, 2000, p. 8). According to various authors and international organisations, GDP per capita fails to reflect a number of important aspects of human well-being, and some notable differences are indicated in the ranking of countries based on this indicator in comparison with some other possible indicators of well-being, such as life expectancy and education. Many of these opponents fear that if policymakers focus on GDP per capita, they will be unduly biased toward economic growth as a policy goal rather than striving for balanced human development. In this regard, the human development index (HDI) is widely applied as a product for reporting social indicators after 1990 as an integral indicator, which is calculated on the basis of statistical data on the main socio-economic processes. This index contains three main components, namely: life expectancy, education and gross domestic product per capita (Human Development Report, 2023). R. Esterlin tries to find another approach to expand the concept of standard of living, which would also be influenced by what people themselves report about their sources of well-being. The author heavily relies on a survey conducted in the early 1960s in 12 countries by asking open-ended questions about what people want from life. It turns out from the results of this survey that the respondents place the greatest importance on the financial circumstances, especially the standard of living (60-95%), followed by family (27-76%), health (4-48%), values/character (9-42%), employment/work (8-42%), social (1-14%), international factor (0-15%), status quo in the society (0-11%), political factors (0-15%). Without attempting to combine the indicators

of the different dimensions of the standard of living into an overall measure, he offers the following: lifestyle; life expectancy, health and reputation; family circumstances; school enrolment and literacy, political democracy (Easterlin, 2000, p. 8-24).

It is noteworthy that some of these characteristics are complex qualitative signs for which an adequate measure should be sought. While life expectancy (actual and expected) is precisely measurable, lifestyle and political democracy are subjective, calling into question the accuracy of estimates and the comparability of results across countries and regions. In this regard, some authors also believe that subjective assessments are not accurate enough, therefore they propose disposable income as a determining indicator of the standard of living (Atkinson et al., 2010). According to the authors, this indicator can be successfully used as a comparative dimension characterising the living conditions, since income measures are convenient and independent of subjective evaluation. A thorough and detailed system of indicators for assessing the standard of living has been developed at the Centre for Economic Conditions and Forecasts at the Ministry of Economy of the Russian Federation. It contains 7 sections covering 39 indicators: (Ekonomika, 2014 [in Russian])

- I. Summarising indicators: cost of living index; gross national product (consumption fund, personal consumption fund) per capita.
- II. Population's income: population's real total income; population's real disposable income; population's total income; population's personal income; population's real personal disposable income; population's monetary income; employees' average income and average salary/ wage; monetary income of the population;

Impact of Housing Prices on the Standard of Living of the Population in the Provinces of the Republic of Bulgaria

average real salary/wage; average amount of pension, benefits, scholarships.

- III. Population's consumption and expenses: population's total volume of consumption of real assets and services; population's monetary expenditure; population's consumer spending; population's consumption of basic food products; purchasing power of the average salary/ wage; purchasing power of the average pension.
- IV. Population's monetary savings
- V. Accumulated property and housing: value of accumulated residential (personal) property; presence and characteristics of durable goods in population's property; population's housing conditions.
- VI. Social differentiation of the population: distribution of the population according to the size of the average total income per capita (average per household); consumption of basic food products, non-food products and services by the population with different levels of average total income per capita (household average); the structure of consumer spending of population with different levels of per capita income (average household); the dynamics of the price of the actual and standard consumer baskets of different segments of population; income concentration index (Gini coefficient); decile coefficients of differentiation of income and consumption of population; the ratio of average values of income and consumption within the limits of the top and bottom deciles: the share of quintile (decile) groups of population (households) by the level of income per capita (average per household) in the total income of society.
- VII.Low-income population strata: subsistence (poverty line); minimum user budget;

minimum wage/salary; minimum pension; purchasing power of the minimum wage/ salary; the purchasing power of the minimum pension; poverty ratio (level); lack of income; areas of poverty; social portrait of poverty.

From the presented system of indicators for assessing the standard of living, it is clear that the object of in-depth research are population's income and expenses, which undoubtedly determine changes in population's well-being. Evaluating macroeconomic indicators, in our opinion, GDP should also be included in the specified classification as a general indicator of the state of the national economy and an indicator of a primary nature compared to other macro determinants (Grzega, 2018).

Analysis of the living standard of the population based on different indicators is also done by different institutions. For example, the Central Bureau of Statistics of Nepal measures living standards by including several variables in the analysis related to housing, access to facilities, literacy and education and health services. In Mexico, indicators related to employment, leisure, reproductive health, crime, etc. are included (Cited in: Barreiro-Gen, 2019). In Bulgaria, the standard of living is the subject of several studies that have been conducted by the World Bank, based on a survey covering indicators such as: consumption, income, savings, service costs, etc., united in four thematic blocks (Living Standards Measurement Survey (LSMS) (Scott, K at all., 2005). In one of the studies, an estimate was made of the changes in living conditions in the period before and after the accession of our country to the European Union (EU). A dedicated report, based on comprehensive statistical data, contained an estimate of the changes in the standard of living and the quantitative level of deprivation and the benefits of poverty reduction and the overall improvement of well-being in various segments of the Bulgarian population (World Bank Group, 2009). As of today, however, there is no, or at least no known, unified system of indicators for assessing the standard of living, which could be used in a territorial aspect. In this regard, taking into account the scientific achievements presented above, the standard of living in Bulgaria's provinces will be evaluated as a complex estimate of objective indicators reflecting the following thematic areas:

- Financial well-being in general they measure population's well-being and are the basis of the satisfaction of the primary biological needs of food, shelter and clothing and the ability to satisfy the needs, desires and needs of fulfilment of trips, raising the level of education, recreation, entertainment, etc. The following indicators are included:
  - Gross domestic product per capita in BGN;
  - Average annual income per person of household in BGN;
  - Average annual gross wage/salary of those employed under an employment relationship and under employment contracts with the State Administration in BGN.
- II. Labour market. A major source of population's income is labour employment. Notwithstanding what area labour is exerted, labour impacts positively personality development, rationalisation of what life is, shaping responsibility and motivation to develop a number of different capabilities, competences and goals. The following indicators are included:

- Average annual unemployment rate of the population aged 15 and over, %
- Average annual employment rate of the population aged 15–64, %
- Average annual economic activity rate of the population aged 15–64, %
- III. Education. The degree of development of the educational system is the basis for the success and prosperity of the society. A highly educated population is the main engine for the development and rise of any country. Thematic area includes the indicators:
  - Number of college and university students per one thousand inhabitants;
  - Relative share of population aged 25– 64 with BA/MA degrees, in %;
  - Education system leavers as a % of all students.

No matter how blurred the boundaries between the concepts of "standard of living" and "life quality" are, in our opinion, the latter would produce a broader meaning, which would include the evaluative nature in terms of any individual's degree of satisfaction with the security levels, with the standards of operation shown by the justice system, the efficiency demonstrated by the healthcare system, the quality of education system, political stability, freedom of speech, etc. As an element of the standard of living, the number of doctors or hospital beds per thousand could be high, but the absence of modern equipment and up-to-date medicines coupled with the low remuneration of medical work in remote areas could lead to ineffective health prevention and high morbidity and mortality levels, with the total of these entailing dissatisfaction.

A well-developed transport system at hand will be insufficient to gain satisfaction provided this system is not maintained and updated to meet the increased traffic and the needs of Impact of Housing Prices on the Standard of Living of the Population in the Provinces of the Republic of Bulgaria

modern means of transport. In this vein, a high standard of living can be accepted as a prerequisite for achieving a good life quality. It would be worth noting that for the purposes of defining what financial security is there is a quantitative measure: it is satisfying at least basic human needs. There is no reliable measure of people's dreams and their needs for creative expression. Such people's dreams would usually be measured using surveys by means of appraisal by points and attributes, the varieties of which are located on loose statistical scales, with the latter making them subjective. The development of communications would contribute to the fact that many people compare their lives with the world's best examples or even with that of idealised movie characters, which causes them to strive to achieve the unattainable and feel dissatisfied and even depressed despite living in the conditions of high standard of living.

## 3. Explanation of the methodology

For a complex estimate of the standard of living according to the proposed 9 objective indicators in the three thematic areas, two equivalent methodologies were used. The first methodology used is the vector optimisation methodology (Zhekova, 1993, p.3-4 [in Bulgarian]). To this end, each area is considered as a multidimensional vector in space. The values of the indicators for the individual areas are normalised using the arithmetic mean and the standard deviation, and from the obtained normalised values. a hypothetical standard vector is formed, which features the best values for each of the indicators. For some indicators, this is the highest value (for example, gross domestic product per capita, average annual employment rate of the population aged

15–64, etc.), for others, the lowest values are the best (for example, average annual unemployment rate of the population aged 15 and over who have left the education system as a % of all learners). All territorial units are individually compared to this hypothetical reference unit and the distance from it on all indicators is summed to obtain a summary score. It is possible to normalise the obtained values a second time to reduce their variation within the limits of zero to one.

An application algorithm includes the following sequence of actions:

- Selection of appropriate indicators having a quantitative dimension. *De facto*, there is no maximum number of indicators used to work with the methodology. Their units of measurement may also be different.
- Calculation of the standardised deviations of the values of the indicators for the individual territorial units from the average value for the considered population:

$$p_{in} = \frac{x_{in} - \overline{x}_n}{S_n},\tag{1}$$

where:

i = 1, ..., k is the number of the territorial unit;

n = 1, ..., m - is the number of the indicator.

$$\overline{x}_n = \frac{\sum_{i=1}^{k} x_{in}}{k} \tag{2}$$

$$s_n = \sqrt{\frac{\sum_{i=1}^{k} \left(x_{in} - \overline{x}_n\right)^2}{k - 1}}$$
(3)

where:

 $x_{in}$  is the individual value of the *n*-th indicator for the *i*-th territorial unit;

 $\overline{x}_n$  – the mean value of the *n*-th indicator for all compared territorial units;

 $s_n$  – the standard deviations for the *n*-th indicator.

- Identifying the co-ordinates of the reference territorial unit A<sub>0</sub> (p<sub>01</sub>, p<sub>02</sub>, ..., p<sub>0m</sub>) based on standardised deviations.
- 4. The total distance of each territorial unit, represented as a point in *m*-dimensional space, to the reference territorial unit  $A_0$  is calculated.

$$c_{i0} = \sqrt{\sum_{n=1}^{m} (p_{in} - p_{0n})^2}$$
(4)

This is the deviation of the normalised individual values of the indicators from the best for the studied aggregate.

5. A summary multidimensional indicator is calculated for each province using its distance to the province  $A_{0}$ :

$$b_i = 1 - \frac{c_{i0}}{c_0} \tag{5}$$

$$\mathcal{C}_0 = \overline{\mathcal{C}}_0 + t^* S_0 \tag{6}$$

$$\bar{c}_{0} = \frac{\sum_{i=1}^{k} c_{i0}}{k}$$
(7)

$$s_{0} = \sqrt{\frac{\sum_{i=1}^{k} (c_{i0} - \bar{c}_{0})^{2}}{k}}$$
(8)

where:

k

 $\overline{c}_0$  is the average distance of a compared province to the benchmark province;

 $S_{0}$  -is the standard deviation from the average distance;

t – the confidence factor corresponding to the probability that the multidimensional indicator would vary between zero and one.

In this case, the algorithm was used up to the fourth stage, which is enough to draw the necessary conclusions. The total distance thus calculated can be used as an

indicator to compare the provinces according to a complex criterion, i.e., by all indicators considered. The way of interpretation differs from that where the algorithm is used in its finished form. The smaller the value of the total distance to the adopted benchmark, the higher the corresponding area will be in the ranking.

It is also worth noting that the proposed methodology for the complex estimate of the standard of living gives equal weight to all the indicators included in it, since there are methodologies that apply weight coefficients that can change the weight of the indicators.

There are other ways of normalising heterogeneous quantities and subsequent joint processing. It is of interest whether the method of normalisation of the same indicators would affect the final result. If this comparison were made, it would become clear to what extent the obtained results are identical and whether the final results could be influenced intentionally or unintentionally by the choice of methodology. Given this context, a second methodology was also used (Tsanov, V. 2018 [in Bulgarian]). In the case of this second methodology, each feature of a selected indicator for a specific province should be divided by the maximum for the same indicator for all provinces and multiplied by 100 to turn into a %. In this case, the indicators forming the standard of living should be grouped in headings and the summarising thereof should be carried out in two stages. The first thing to do: by the arithmetic unweighted mean within each individual heading and then the values for the individual headings should be averaged again using the arithmetic unweighted mean. The main formulas, presenting in an analytical form the normalisation via the cited methodology, would have the following form:

Impact of Housing Prices on the Standard of Living of the Population in the Provinces of the Republic of Bulgaria

$$H_{ij} = \frac{I_{ij}}{\max(I_{ij})} *100$$
(9)
Where:

 $H_{ii}$  - is the standardised estimate of the i-th indicator for j-th administrative province;

 $I_{ij}$  - is the value of the i-th indicator for j–th administrative province;

 $\max I_{v}$  is the maximum value of the i-th indicator for all administrative provinces

i = 1.....n (number of indicators)

j = 1.....28 (number of administrative provinces)

This variant of the normalisation formula is applied when the relationship between the indicator and the standard of living is directly proportional. When the relationship is inversely proportional, the formula takes the following form:

$$H_{ij} = \frac{\max(I_{ij}) - I_{ij}}{\max(I_{ij})} *100$$
 (10)

The obtained summary characteristics for each of the administrative provinces could be used for comparison between them as the most favourable in the ranking would be the highest value. In our view, it should be borne in mind that as proposed the methodology cited by averaging the normalised values by headings and then averaging the values for the headings using the unweighted arithmetic mean would only be appropriate if the number of indicators in each of the headings were the same. In such a case, however, there would be no need to average by headings, and the normalised values for all indicators can be directly averaged for each of the objects to be compared. With a different number of indicators in the individual headings, the averaging of the obtained average normalised values by headings should be carried out inserting the average weighted arithmetic value, using the number of indicators in the respective

heading as weight. This requirement stems from one of the properties of the arithmetic mean, namely that "If the statistical series is divided into parts, the arithmetic mean for the whole series can be calculated as the average of the averages of its separate parts. When calculating the overall average for the entire statistical series, the group averages are averaged, using the number of units in the individual groups as weights" (Stoenchev, N., 2013, p.96 [in Bulgarian]). In our opinion, the use of the unweighted arithmetic mean to average the averages of individual headings, provided that the headings involve a different number of indicators, would lead to an artificial under-weighting of those headings that have a greater number of indicators.

In order to get an idea of the change in the ranking of the provinces by standard of living at the beginning and at the end of the reference period, Spearman's Rank correlation coefficient was used. It will be used to compare the rankings of the provinces by standard of living at the beginning to the end of the reference period. In this case, the transformation of the complexity ratings into ranks represents a shift from a strong to a weak statistical scale (from an interval to a ranking scale) which is a kind of loss of accuracy, but on the other hand in this way in some cases minimum differences in the complex ratings would lead to a tangible difference in the ranks, which would allow the changes to be more clearly delineated. Spearman's Rank correlation coefficient has the following analogous analytical form:

$$R_{s} = 1 - \frac{6\sum d^{2}}{N(N^{2} - 1)}$$
(11)

 $R_s$  - is Spearman's Rank correlation coefficient, whose value may vary within the range -1 to +1;

*d* - difference between the rank value of each of the areas by standard of living in 2016 and 2021;

N - number of units within the aggregate (28 in this case).

Bivariate regression was used to examine the impact of housing prices on living standards (Stoenchev, N., 2013, p.191–200 [in Bulgarian]).

## 4. Data use and sources

Official data from the National Statistical Institute and the Institute of Market Economy were used: "Regional profiles: development indicators. Territorial comparison is at district level. In Bulgaria, the provinces are the lowest level of regionalisation recognised by Eurostat and demonstrate compactly and reliably the diversity of socio-economic and demographic processes depending upon the ethnic composition of the population, the prevailing economic activities, the degree of urbanisation and geographical features. The research covers the period 2016–2021.

#### 5. Description of the results

Table 1 shows the results of the ranking of the provinces according to complex criteria obtained with the indicators selected for the purpose.

Where:

Impact of Housing Prices on the Standard of Living of the Population in the Provinces of the Republic of Bulgaria

## Table 1. Ranking of provinces by distance to the benchmark for the assessment of standard of living in 2016 and 2021

		2016	2021			
Provinces	Total distance toRankreference point(complex criteria)		Total distance to reference point (complex criteria)	Rank	Rank change	
Sofia (City)	1	2.375	1.431	1	0	
Varna	2	6.428	428 6.766		0	
Gabrovo	3	7.354	8.021	5	+2	
Stara Zagora	4	8.043	8.008	4	0	
V, Tarnovo	5	8.357	8.142	6	+1	
Plovdiv	6	8.420	8.167	7	+1	
Ruse	7	8.448	7.959	3	-4	
Sofia	8	8.707	8.663	8	0	
Yambol	9	8.917	9.376	14	+5	
Burgas	10	9.010	8.765	9	-1	
Smolyan	11	9.093	9.428	15	+4	
Pleven	12	9.244	9.331	13	+1	
Blagoevgrad	13	9.307	9.280	12	-1	
Shumen	14	9.341	9.003	10	-4	
Pernik	15	9.392	10.044	19	+4	
Kyustendil	16	9.688	9.508	16	0	
Haskovo	17	10.136	10.320	22	+5	
Razgrad	18	10.414	10.288	21	+3	
Dobrich	19	10.484	10.201	20	+1	
Vratsa	20	10.553	9.540	17	-3	
Lovech	21	10.668	9.618	18	-3	
Kardzhali	22	10.769	9.033	11	-11	
Pazardzhik	23	10.806	10.467	23	0	
Sliven	24	11.009	10.661	24	0	
Vidin	25	11.059	11.180	27	+2	
Targovishte	26	11.513	10.844	25	-1	
Montana	27	11.570	11.898	28	+1	
Silistra	28	12.086	11.095	26	-2	

The calculations were performed by the authors on the basis of data from Regional Profiles: Development Indicators and the National Statistical Institute

According to the direction of the change in the ranks of the areas by standard of living, based on the calculated complex criteria, three groups can be distinguished:

**First group:** Provinces that are keeping their positions in this ranking: These are Sofia (Capital City), Varna, Stara Zagora, Sofia, Kyustendil, Pazardzhik and Sliven.

**Second group:** Provinces that have improved their positions in this ranking: Ruse, Burgas, Blagoevgrad, Shumen, Vratsa, Lovech, Kardzhali, Targovishte, Silistra.

**Third group:** Provinces that have deteriorated their ranking position by moving to a lower position: Gabrovo, Veliko Tarnovo, Plovdiv, Yambol, Smolyan, Pleven, Pernik, Haskovo, Razgrad, Dobrich, Vidin, Montana.

Sofia (Capital City) and Varna occupied the leading positions for both years presented. The most significant improvement in the position was achieved by: Kardzhali, Ruse and Shumen, followed by Vratsa and Lovech. The most significant lag in the position is observed in the provinces: Yambol and Haskovo, followed by Smolyan and Pernik. It is worth noting that the lower ranking of some areas does not necessarily mean that the standard of living has decreased. This is a comparative estimate and may indicate progress in other provinces while stagnating those mentioned as lagging behind.

The value we calculated for the rank correlation coefficient using Spearman's rank correlation coefficient is 0.923, which indicates a significant degree of concordance of ranks in the ranking of complex criteria of living standards in 2016 and 2021. The reason is the low dynamics in the macroeconomic indicators used to form the estimate of the standard of living according to complex criteria, the stable legal basis during this period and the short period between the two measurements. What may be argued would be that the differences in population's standard of living by administrative provinces in Bulgaria in recent years have been relatively uniform.

The ranking of the provinces by average normalised value of the same indicators by the method of comparison of the actual value with the maximum value of the indicator for 2016 and for 2021 are shown in table 2.

 Table 2. Arrangement of the provinces by the size of the rank obtained on the basis

 of the average normalised values for 2016 and 2021 according to the methodology for comparing

 the real value with the maximum value in %

Provinces		2016	2021			
/Ranking by average value of normalised indicators in % for 2016/	Rank	Average normalised values in %	Average normalised values in %	Rank	Rank change	
Sofia (City)	1	91,946	94,926	1	0	
Varna	2	69,113	73,156	2	0	
Gabrovo	3	66,022	64,273	5	+2	
V. Tarnovo	4	65,696	69,381	3	-1	
Ruse	5	59,070	63,395	7	+2	
Plovdiv	6	58,929	66,151	4	-2	
Blagoevgrad	7	58,377	59,993	10	+3	

Impact of Housing Prices on the Standard of Living of the Population in the Provinces of the Republic of Bulgaria

#### Articles

Provinces		2016	2021		
/Ranking by average value of normalised indicators in % for 2016/	Rank	Average normalised values in %	Average normalised values in %	Rank	Rank change
Smolyan	8	57,600	58,341	13	+5
Stara Zagora	9	57,599	63,689	6	-3
Sofia	10	57,417	63,015	8	-2
Pernik	11	55,108	53,937	18	+7
Yambol	12	55,000	55,533	15	+3
Burgas	13	54,543	58,731	11	-2
Pleven	14	53,892	54,011	17	+3
Shumen	15	53,891	57,120	14	-1
Kardzhali	16	53,517	60,915	9	-7
Kyustendil	17	51,954	58,514	12	-5
Haskovo	18	49,803	53,917	19	+1
Lovech	19	47,260	54,341	16	-3
Razgrad	20	46,585	49,033	21	+1
Pazardzhik	21	45,367	47,844	23	+2
Vratsa	22	45,104	52,275	20	-2
Targovishte	23	45,044	46,223	25	+2
Dobrich	24	44,813	48,645	22	-2
Montana	25	44,195	39,592	28	+3
Sliven	26	43,789	46,396	24	-2
Vidin	27	42,722	43,659	26	-1
Silistra	28	40,890	42,826	27	-1

The average normalised values in % was calculated by the authors on the basis of data from Regional Profiles: Development Indicators and the National Statistical Institute

Several groups of areas are outlined according to the nature of the changes in the ranking by standard of living according to the second method:

The first group consists of the provinces that have maintained their ranking in both studied years: such provinces are the leaders in the ranking, i.e., Sofia (Capital City) and Varna.

The second group consists of the provinces that have improved their positions in the ranking of the provinces Kyustendil

in this ranking: Veliko Tarnovo, Plovdiv, Stara Zagora, Sofia, Burgas, Shumen, Kardzhali, Kyustendil, Lovech, Vratsa, Dobrich, Sliven, Vidin, Silistra.

The third group consists of the provinces that have deteriorated their positions in this ranking: Gabrovo, Ruse, Blagoevgrad, Smolyan, Pernik, Yambol, Pleven, Haskovo, Razgrad, Pazardzhik, Targovishte, Montana.

The most significant is the improvement

and Kardzhali, followed by Stara Zagora and Lovech. The most significant is the lag in the ranking of the provinces: Pernik and Smolyan, followed by Blagoevgrad, Yambol, Pleven and Montana.

The summarised estimate of the grades of the changes in the ranks of the provinces by standard of living during the reference period using Spearman's rank correlation coefficient is 0.932. It indicates that there are very little overall changes in ranks over the reference period. This coefficient turns out to be slightly higher than calculations for the same indicators using the methodology of the complex criteria represented by the distance from the benchmark vector, which yielded 0.923. The two coefficients have the same sign. It can be argued that the second methodology for normalising the empirical values of the used indicators by comparison with the maximum value is less sensitive when reflecting the changes that occurred during the reference period. This conclusion offers us grounds to prefer the estimate of living standards by complex criteria to examine the relationship with housing prices.

As for the rank occupied in the ranking of the provinces by standard of living and the change of these ranks for the reference period, there are some differences in the results yielded between the two methodologies, which could serve as a reason to recommend sustainability when using one of the two methodologies.

Given the aim of this study, what attracts our interest *inter alia* are the prices of properties. The dynamics of prices over the period 2016–2021 is shown in table 3.

Table 3.	Growth	rate	in %	of	residential	property	prices	in the	e regions	of	the	country	/
					for the per	riod 2015	-2021						

		-				2015=100
Province	2016	2017	2018	2019	2020	2021
Blagoevgrad	1.8	7.3	18.0	26.3	30.3	32.1
Burgas	2.9	9.4	13.1	12.4	13.5	21.1
Varna	7.4	17.8	26.5	35.1	35.6	43.4
V. Tarnovo	1.5	6.8	15.6	21.7	30.5	41.0
Vidin	2.9	2.3	6.1	8.4	8.5	17.8
Vratsa	6.2	12.3	18.9	26.8	36.7	45.0
Gabrovo	-0.1	1.8	2.8	5.7	7.8	13.6
Kardzhali	3.1	3.7	6.4	9.0	12.1	13.6
Kyustendil	-3.5	-0.6	-2.4	-2.3	-0.4	3.8
Lovech	-1.7	-2.2	3.9	9.0	14.0	18.3
Montana	-8.2	-2.9	4.8	6.5	8.9	10.0
Pazardzhik	-0.3	3.9	7.7	8.4	9.9	15.0
Pernik	7.9	13.6	18.9	22.2	23.8	31.0
Pleven	5.5	16.7	23.6	31.6	40.0	54.0
Plovdiv	7.5	15.8	29.6	42.5	47.3	58.6
Razgrad	5.8	11.5	16.6	22.3	25.4	33.1

Impact of Housing Prices on the Standard of Living of the Population in the Provinces of the Republic of Bulgaria

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Province	2016	2017	2018	2019	2020	2021
Ruse	2.5	16.3	26.2	31.7	36.9	46.7
Silistra	-3.7	-2.5	-2.8	-4.3	-5.4	-3.7
Sliven	-0.3	6.6	11.7	16.3	22.7	30.3
Smolyan	-2.3	-3.2	-4.0	-2.8	-0.9	0.9
Sofia (City)	11.1	23.1	31.3	41.2	50.9	67.7
Sofia	3.5	7.6	14.9	17.2	19.2	27.8
Stara Zagora	8.5	17.4	24.9	32.3	39.8	49.6
Dobrich	0.9	3.8	3.9	7.7	8.8	13.2
Targovishte	1.4	3.4	6.5	10.7	16.0	21.2
Haskovo	3.3	10.0	16.1	19.2	23.5	28.7
Shumen	5.3	12.5	20.8	25.2	34.3	44.5
Yambol	7.5	13.5	21.3	27.5	32.6	41.4

The indicators were calculated by the authors on the basis of data from the National Statistical Institute

The results displayed in table 3 show a visible increment in the residential property prices in most provinces over the reference period. Overall positive growth was observed in twenty of the twenty-eight provinces. The most significant is the increase in prices in the City of Sofia, by 67.7%, and the province of Plovdiv where it came to 58.6%. In our opinion, the reason for obtaining such values is the high demand in the specific territorial communities, dictated by the opportunities for employment and professional fulfilment, the opportunities for training and upgrading of qualifications, etc. In one of the provinces, a downward trend in prices could be observed throughout the reference period, namely in the province of Silistra, where prices decreased by 3.7% compared to the benchmark year of 2015. A decrease in the prices of residential properties during almost the entire reference period was also present in the province of Smolyan. Only 2021 saw a slight increase of less than 1%.

Figures 1 and 2 show the comprehensive estimate of the country's provinces by

standard of living, expressed by the distance to the benchmark, and the levels of residential property prices in 2016 and 2021.

For both years presented, average residential property prices appear to be far different by province than the standard of living estimates.

What is noted is that in provinces featuring a high standard of living (a short distance to the benchmark), the average prices of the residential area are high. The reason is the inverse relationship between the distance to the benchmark and the standard of living. That would mean that higher prices correspond to a higher standard of living. Correlation analysis and bivariate regression were used for the quantitative analysis of the relationship between the price level of the floor space and population's standard of living.

For 2016, the obtained correlation coefficient, the regression coefficient before the dependent variable and the coefficient of determination are small, which means that the scatter of the empirical points is large and the linear model cannot give promising results.





Figure 1. Ranking of the country's provinces by standard of living and the levels of residential property prices in 2016



Figure 2. Ranking of the country's provinces by standard of living and the levels of residential property prices in 2021.

It turns out that the only year when the correlation coefficient was high was 2021.

The linear correlation coefficient calculated between the studied quantities using the built-in Pearson function in Excel

was (-0.856). The high value of the coefficient indicates the presence of a strong relationship between the studied variables. The negative value of the coefficient was obtained as a result of the inverse relationship between

the numerical values of the distance to the benchmark and the standard of living. In this case, it could be claimed that the relationship is bidirectional rather than causal. High incomes and high living standards tend to stimulate the construction of modern housing using quality materials, which would boost their prices. Another reason for boosting the prices of properties' floor space would be the increased demand for housing both for purchase and renting properties out, because the regions with higher standard of living tend to attract migrants from the regions with lower living standards. The price scale-up would also be impacted by the scarcity of sufficient lands with very good location plus property market customers such as Bulgarian migrant workers living abroad and some international investors. The point is that all values are averaged, which suggests that in regions featuring a high standard of living, not the Impact of Housing Prices on the Standard of Living of the Population in the Provinces of the Republic of Bulgaria

entire population enjoys prosperity, and high housing prices also have to be dealt with by students from other settlements who would need to rent properties along with young professionals whose incomes would be out of keeping with the high renting standards yet plus disadvantaged people who do not have a chance to buy their own home at market prices.

Such negative consequences for the bulk of society would yield some positive consequences for another part of society, which constitutes the minority thereof. Developers and rental property owners are reaping profits, attracting foreign investment from people who want to protect their money.

Figure 3 shows a scatter plot diagram between the average prices per square metre of living space and the standard of living according to complex criteria in 2021





The presented linear regression model was selected as a result of a comparison of the results when using different types of functions: linear, exponential, logarithmic, power, and polynomial of the second degree. The functions were compared according to the magnitude of the coefficient of determination  $R^2$ . A slightly higher value of the coefficient of determination equal to 0.738 was obtained by using a second-degree polynomial, but this minimal difference does not justify the over-complexity of the model. The model visually presents the form of the revealed interrelationship between the studied values. The location of the cloud reflecting the empirical observations in the graphical field and the slope of the linear model confirm and successfully illustrate the conclusions drawn on the basis of the correlation coefficient.

## 6. Conclusion

The studies carried out by us afford us grounds to claim that, in an actual aspect, there is a clearly expressed positive high housing prices/population's standard of living correlation. This correlation is highly likely to be bidirectional. High purchasing power would drive the construction of luxury new homes; demand for new homes tends to be high, which is also driving price growth. A group of people engaged in construction and renting are raising their standard of living by taking advantage of high housing prices. Clearly, house prices can be used as a way to get an idea of the standard of living in a territory. However, there are quite a few people in the big cities that would live suffering a shortage of living space and would need some support.

The market economy will not allow any direct administrative intervention by the State in the residential property market, but there are also non-market social mechanisms to protect particularly vulnerable social groups of the population, including young families who are relied on to perform reproductive functions and young professionals with B.A. and M.A. degrees, for whose training public funds have invested substantial monies, and their emigration to more developed countries should be prevented by the existence of more attractive living circumstances.

In terms of the mechanism for monitoring the housing prices/standard of living: this mechanism is supposed to be sustainable in time to open ground to make relative comparisons. This would mean a constant set of standard-of-living related indicators coupled with an adopted methodology of summarising thereof and the correct application of such methodology.

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