The Assessment of Development Potential for Voivodship Capital Cities in the Aspect of Local Housing Markets

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Abstract

The purpose of this research is to try to identify development potential for Polish voivodship capital cities in the area of the housing market, with particular consideration of the number of apartments/flats delivered. The Shift Share Analysis (SSA) method has been used to identify development potential of the analyzed cities. The space-time analysis of flats delivered has been carried out in three market aspects regarding flats planned for sale or rent, flats built individually, and other flats (including: condominiums, council flats, company flats and social housing).

Keywords: housing market, apartments/flats delivered, development potential, the shift-share analysis, regional development

JEL: R1, R3

Introduction

The number of flats delivered, as one of the building process components,[1] shows the state and condition of the housing market. The analysis of dynamics in changes regarding the number of flats delivered will allow specification of the current development potential for building processes performed in the analyzed cities on the one hand, and on the other it will demonstrate the condition of these regional economies, as well as the entire nation of Poland. The knowledge of development potential in the area of housing will make it possible to adapt the strategies of housing developers' operations to current phenomena observed in the construction market. As regards sustainable development, this knowledge will allow adaptation of the strategies of municipal government operations for the implementation of present investment programmes, in particular those connected with building investments. Moreover, it should be emphasized that due to considerable involvement of financial capital in housing stock development, the knowledge of housing market development potential will also allow assessment of financial condition of the economy both in macro and micro scale, and for individual households.

This research to identify development potential in the housing sector was carried out in two stages. During the first stage, the analysis covered the evolution in time of the number of flats delivered throughout Poland and in regions (voivodship capitals). It involved demonstration of the structure of flats delivered, divided into individual stock, flats for sale or rent, and other housing

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1. According to the Central Statistical Office of Poland (Polish acronym: GUS) research methodology, the building process components are defined as: the number of building permits issued, the number of flats, construction of which has been started, the number of flats delivered, and the value of sales in the building sector. The issues concerning real property evaluation and parameterisation of its determinants can be found for example in the studies by Foryś (2011), Kucharska-Stasik (2006), Śliwiński (2000).

types — condominiums, council flats, company flats and social housing. In the second stage, while examining the space-time changes in the number of flats delivered, the growth rate for flats delivered weighed by regions and sectors was calculated, as well as the so-called total, structural and geographical effect for the analyzed cities. These effects make it possible to parameterize development potential in the area of flats delivered, as well as to examine competitiveness and evaluate structural changes. Total, structural and geographical effects of changes were calculated using the shift-share analysis. The shift-share analysis was introduced in the studies on regional growth by Dunn (1960) and used in subsequent studies — e.g., by Batóg and Batóg (2013), Kundsen (2000), Malik (2011, 115–125), Mach (2014), or Suchecki (2010, 162–201).

1 Research guidelines

Structural and spatial analyses of development potential have been carried out using the shift-share analysis. The completed analysis has covered the evolution of a quantified variable marked TX_1,, representing absolute increments or rates of change for variable X_1, which represents the number of flats delivered. Three dimensions (sectors) were distinguished in the examined variable: flats built individually, flats for sale or rent, and other flats (condominiums, council flats, social housing, and company flats). Multidimensional statistical data was gathered for the examined variable, which made it possible to develop a contingency chart with matrix elements $\{x_{ri}\}$, where x_{ri} are the values of the aggregate variable X for the r-th voivodship capital and the i-th sector (that's intended use of a flat delivered). The time interval of the analyzed data covers the years 2008–2017. The data was collected using the Local Data Bank website of Central Statistical Office of Poland.[2] In order to eliminate the effect of diversification in the size of regions, weight variables were taken into account in the calculations and analyses. For the analyzed variable, an individual growth rate (equation 1) and two aggregate measures were calculated — average growth rates in the rth region (equation 2) and total in the whole country (equation 3):

$$(1) \qquad tx_{ri} = \frac{x^*_{ri} - x_{ri}}{x_{ri}},$$

$$(2) \qquad tx_{r.} = \frac{\displaystyle\sum_{i=1}^{S}(x^*_{ri} - x_{ri})}{\displaystyle\sum_{i=1}^{S} x_{ri}},$$

$$(3) \qquad ttx_{r..} = \frac{\displaystyle\sum_{r=1}^{R}\sum_{i=1}^{S}(x^*_{ri} - x_{ri})}{\displaystyle\sum_{r=1}^{R}\sum_{i=1}^{S} x_{ri}},$$

where:

x_{ri} — observations of the analyzed variable X in the r-th region and in the i-th cross-sectional group, in the initial period, and

x^*_{ri} — observations of the analyzed variable X in the r-th region and in the i-th cross-sectional group, in the end period.

The structural and geographical equivalence was calculated as the final result of the completed analyses. This relation characterizes geographical diversification of the surplus in the average regional growth rate compared to the national growth, and it is shown as the component of two effects: structural and geographical. In the article, the principles of computational engineering proposed by Suchacki (2010, 162–168) were used in computations. Moreover, the following assumption was made in the research: the discussed area in Pomorskie Voivodship would be analyzed as the Tri-City metropolitan area including three cities together: Gdansk, Gdynia and Sopot. Also,

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taking into account the specific character of the Śląskie Voivodship, this area was quantified as the Silesian Metropolis, taking into account overall the number of flats delivered in the following cities: Bytom, Chorzow, Dabrowa Gornicza, Gliwice, Jaworzno, Katowice, Myslowice, Ruda Slaska, Sosnowiec, Tychy, and Zabrze.

2 The framework analysis of evolution in the number of flats delivered

Preliminary analysis of the number of flats delivered was carried out and three aspects were elaborated. The first contained a structural analysis of flats delivered for all of Poland. Figure 1 shows the structure of flats delivered in Poland considering: flats planned for sale or rent, flats built by individual investors, and flats built as condominiums, company flats, council flats, and social housing. The obtained structural analyses allow us to observe that in the years 2005–2017 housing stock built for sale or rent was the prevailing type in Poland. It should be also noted that this type of housing was growing over the analyzed years, since in 2005 these flats constituted 60% of the total, to reach 84% in 2017 (increase of 24 percentage points). The second group of flats delivered are those built by individual investors. In 2017, this stock represented 12% of the overall number of flats delivered. It should be emphasized that the share of individual flats dropped by 6 percentage points over the analyzed years. From the social point of view, it's alarming that in the discussed period the other types of flats (condominiums, company flats, council flats, and social housing) faced a drop in the market share from 22% in 2005 down to 4% in 2017. As regards availability of the so-called other flats, it seems necessary to initiate a discussion on the availability of flats for those households which do not have financial capacity to purchase flats at market prices.

The second analyzed aspect in the framework analysis of flats delivered showed the evolution of their number depending on their intended use. The quantity of stock delivered intended for sale or rent in the years 2005–2017 increased from 23 450 to 61 857, giving an annual average increase in the number of flats delivered of 2 253 flats. Moreover, it should be noted that in spite of the decreasing share of flats delivered by individual investors in the overall structure (fig. 1), this stock was increasing every year by 143 flats on average. There were 8 790 individual flats delivered in 2017.
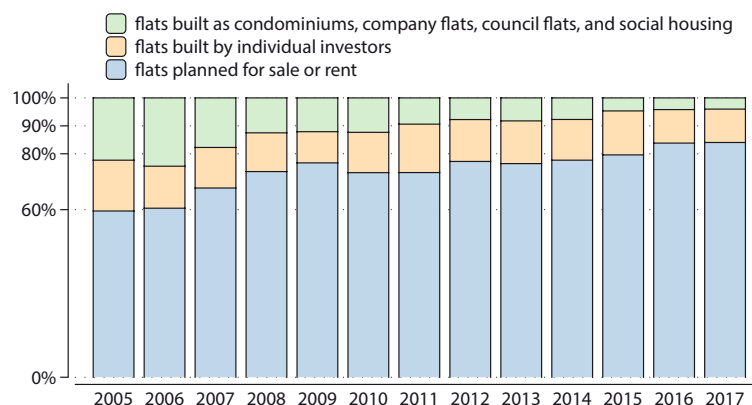

Fig. 1. The structure of flats delivered in Poland in the years 2005–2020

The third stage of analyses presents the structure of flats delivered for individual voivodship capital cities, as seen in 2017 (tab. 2). This analysis is intended to show in detail the discussed types of intended stock use (individual, planned for sale or rent, other) in the analyzed local housing markets. Regional analysis of the structure of the discussed variable is expected to show the specific character of the local housing market, indirectly representing the implemented strategies of investors, households and municipal governments. From a structural point of view, the majority of flats delivered planned for sale or rent are located in cities: the Tri-City, Krakow, Olsztyn, and Wroclaw (the share of this stock in the overall number of flats exceeds 90%). Considering flats built individually, the leaders are: the city of Opole (38%) and the Silesian Metropolis (33%). As regards flats delivered in the category "other," the relatively largest number were delivered in the

Flats planned for sale or rent

$y = 2\,252{,}70\,t + 23\,563$
$R^2 = 0{,}627$

Flats built by individual investors

$y = 142{,}87\,t + 6\,450$
$R^2 = 0{,}545$

Flats built as condominiums, company flats, council flats, and social housing

$y = -625{,}40\,t + 9\,899$
$R^2 = 0{,}874$

Flats total number

$y = 1\,770{,}16\,t + 39\,912$
$R^2 = 0{,}463$

Fig. 2. Evolution of the number of flats delivered depending on their intended use in Poland in the years 2005–2017

Tab. 1. Results of the estimation of the linear trend of different types of flats delivered in the years 2005–2017

Type of flat	Constant	Time (t)	R^2	Adjusted-R^2
Flats planned for sale or rent	23 563,3***	2 252,7**	0,627	0,593
Flats built by individual investors . . .	6 449,8***	142,9**	0,545	0,504
Flats built as condominiums, company flats, council flats, and social housing	9 898,7***	−625,4***	0,874	0,863
Flats total number	39 911,8***	1 770,2*	0,462	0,414

Note: [In the journal European practice of number notation is followed — for example, 36 333,33 (European style) = 36 333.33 (Canadian style) = 36,333.33 (US and British style). — Ed.]

* $p < 0{,}05$; ** $p < 0{,}01$; *** $p < 0{,}001$

Tab. 2. The structure of flats delivered divided into the analyzed sectors — voivodship capitals, year 2017 (in %)

	Individual	Planned for sale or rent	Other
Tricity	5	91	4
Kraków	8	91	1
Olsztyn	10	90	0
Wrocław	3	90	7
Warszawa	10	87	2
Poznań	10	87	2
Białystok	11	87	2
Zielona Góra	14	86	0
Szczecin	15	82	3
Lublin	19	73	7
Łódź	27	70	3
Kielce	27	66	7
Rzeszów	23	64	13
Bydgoszcz	19	64	17
Opole	38	60	2
Silesian Metropolis	33	58	8

cities of Bydgoszcz and Rzeszów (17% and 13%, respectively). It should also be pointed out that in their structure of flats delivered, the cities of Olsztyn and Zielona Gora have no such stock as condominiums, council flats, company flats, or social housing.

3 The shift-share analysis as a tool measuring potential of voivodship capital cities in a regional, structural and geographical aspect

The process of assessment and description of development potential in regional, structural and geographical aspects has been carried out using the shift-share analysis method. The data used in the analysis is based on information from the years 2008–2017. The beginning of this interval was chosen due to the start of the global economic crisis in the housing market in 2008. The end of the analyzed period was determined by the availability of statistical data in databases of the Central Statistical Office of Poland. In the first place, development potential was analyzed for the whole defined interval—the changes in potentials: regional, structural and geographical, were calculated for the whole period 2008–2017. Then, other studies were carried out for time windows in the following periods: 2008–2011, 2011–2014, 2014–2017 in order to elaborate on the performed analyses. Additional time/research windows were established in order to analyze development potentials in the space-time aspect. The analysis allowed us to determine and evaluate the change in dynamics. For each completed shift share analysis, calculations and interpretations were performed regarding: growth rate for development potentials of voivodship capitals weighed by regions, growth rate for development potentials of voivodship capitals weighed by sectors, the structural and geographical equivalence and its components.

Table 3 presents growth rate weighed regionally, calculated for the years 2008–2017. Comparison of regional growth rate for individual voivodship capital cities to average national growth reaching 27,3% shows seven cities having their ranking position better than the national average, whereas, the definitely largest rate of changes has been observed for the cities of Rzeszów and Opole. Moreover, it should be emphasized that in Rzeszów this high growth rate was achieved owing to flats delivered planned for sale or rent (164,7%). The worst situation as regards the rate of changes weighed regionally can be observed in the cities of Olsztyn, Kielce and Bydgoszcz. In these cities

Tab. 3. Growth rate weighed regionally (2008–2017)—the number of flats delivered (in %)

	Growth rate weighted regionally			Average growth rate
	tx_{r1}	tx_{r2}	tx_{r3}	$tx_{r.}$
Rzeszów	29,1	164,7	−10,7	183,1
Opole	55,1	127,1	−32,8	149,4
Zielona Góra	−12,3	123,1	−15,0	95,8
Wrocław	−3,0	73,9	−3,7	67,3
Kraków	2,9	65,4	−1,5	66,8
Szczecin	8,4	48,6	−17,7	39,2
Białystok	−7,4	48,5	−11,9	29,2
Silesian Metropolis	9,4	20,5	−3,1	26,8
Lublin	12,6	18,8	−7,7	23,7
Poznań	−10,2	33,1	−1,2	21,7
Tricity	−4,3	27,1	−3,4	19,4
Warszawa	2,7	12,6	−8,5	6,7
Łódź	8,5	9,6	−12,9	5,1
Bydgoszcz	9,4	9,9	−24,6	−5,3
Kielce	0,4	−25,1	4,0	−20,7
Olsztyn	−28,1	4,9	−22,9	−46,2

Note: tx_{r1}—flats delivered, individual investor; tx_{r2}—flats delivered, for sale or rent; tx_{r3}—flats delivered, other stock (company flats, council flats, social housing, condominiums)

the rate of changes dropped by −46,2%, −20,7%, and −5,3%, respectively, which constitutes a drop of −73,5%, −48,0%, and −32,6% under the average growth rate in Poland. On the other hand, as regards intended use of flats delivered, it can be seen that the best situation is for flats delivered built for sale or rent (negative rate of changes reaching −25,1% was only observed in Kielce).

Table 4 presents synthetic results for an average growth rate weighed by sectors. The first line in the table shows the results for an absolute average rate of changes observed in the analyzed sectors — in flats delivered built by individual investors, in flats delivered planned for sale or rent, and in other flats. The largest average absolute drop appears in the third sector, while the most favorable situation is in case of flats intended for sale or rent. The second line of results demonstrates the sector determinant of changes — the rate of changes in individual sectors corrected by an average rate of changes in Poland.

Tab. 4. Growth rate weighed by sectors (2008–2017) — the number of flats delivered (in %)

	tx_{r1}	tx_{r2}	tx_{r3}
Average growth rate $tx_{.i}$	10,0	45,0	−59,0
Sectoral growth factor	−17,7	18,0	−86,4

Note: tx_{r1} — flats delivered, individual investor; tx_{r2} — flats delivered, for sale or rent; tx_{r3} — flats delivered, other stock (company flats, council flats, social housing, condominiums)

Table 5 presents calculations concerning the regional, structural and geographical development potential regarding the number of flats delivered. The largest drop of potential in the country can be seen in the city of Olsztyn. First of all, this drop should be correlated with disadvantageous internal changes connected with competitiveness, as compared to other cities (drop by −55,9%). It should be noted that a drop by −17,8% was observed also for structural effects. While analyzing the city characterized by the largest development potential regarding the discussed aspect, it is obvious that Rzeszów has reached its leading position due to advantageous changes in the area of competitiveness (199,1%) (tab. 4).

Fig. 5. The shift-share analysis: building permits issued (in %)

	Development potential		
	Regional	Structural	Geographical
Rzeszów	155,85	−43,25	199,10
Opole	122,13	−35,62	157,75
Zielona Góra	68,52	−12,02	80,54
Wrocław	40,02	−0,28	40,30
Kraków	39,54	10,47	29,07
Szczecin	11,98	−9,26	21,24
Białystok	1,90	−4,41	6,31
Silesian Metropolis	−0,48	−7,79	7,31
Lublin	−3,58	−3,27	−0,31
Poznań	−5,55	5,78	−11,32
Tricity	−7,89	6,07	−13,96
Warszawa	−20,53	3,44	−23,97
Łódź	−22,13	−6,09	−16,05
Bydgoszcz	−32,55	−27,24	−5,32
Kielce	−47,97	8,75	−56,72
Olsztyn	−73,42	−17,83	−55,59

Another stage in the analysis was to check the dynamics of changes in average growth rate of potentials weighed by regions for three partial intervals, for the years 2008–2011, 2011–2014, and 2014–2017. Table 6 contains results of these calculations. Stable growth of development potentials

regarding the number of flats delivered has been observed in two cities only, in Rzeszów and Białystok. Stable means positive in each of the analyzed partial intervals whereas continuous contraction of development potential in the aspect of the number of housing stock delivered has been observed in Olsztyn.

The last stage of the research involved presentation of the values of structural and geographical effects in order to show specific changes in development potentials of the number of flats delivered. In table 7, while looking at the values of calculated effects, it is possible to analyze changes in potentials regarding improvement or deterioration of competitiveness in the discussed aspect, at the same time taking into account structural changes.

Tab. 6. Average growth rate in the country weighed by regions for partial periods (in %)

	2008/2011	2011/2014	2014/2017	2008/2017
Rzeszów	70	5	58	183
Opole	66	−24	37	149
Zielona Góra	−27	51	76	96
Wrocław	−29	58	49	67
Kraków	−27	51	49	67
Szczecin	−6	−22	90	39
Białystok	9	1	17	29
Silesian Metropolis	−21	25	29	27
Lublin	−32	−11	103	24
Poznań	−25	45	12	22
Tricity	−13	−11	54	19
Warszawa	−51	60	36	7
Łódź	−36	15	44	5
Bydgoszcz	−43	42	17	−5
Kielce	14	57	−56	−21
Olsztyn	−39	−9	−3	−46

Tab. 7. The structural and geographical effects in individual voivodship capital cities for the three analyzed time windows (in %)

	2008/2011		2011/2014		2014/2017	
	Structural	Geographical	Structural	Geographical	Structural	Geographical
Wrocław	−1,41	2,52	2,08	25,96	1,20	8,45
Bydgoszcz	−5,70	−6,95	−4,21	15,69	3,99	−26,47
Lublin	−1,09	−0,78	−7,56	−33,10	−7,35	71,27
Zielona Góra	4,24	−0,71	−10,03	31,24	1,88	35,03
Łódź	0,37	−6,60	−6,32	−8,93	−0,13	4,60
Kraków	0,98	2,45	2,05	19,21	6,02	3,14
Warszawa	−0,79	−19,95	1,35	28,45	0,90	−4,41
Opole	0,37	95,77	2,30	−56,34	−22,58	20,40
Rzeszów	−1,87	102,50	−4,76	−20,01	−23,40	41,64
Białystok	1,18	37,67	2,51	−31,19	2,64	−24,90
Tricity	0,11	17,12	3,80	−44,94	3,38	11,28
Silesian Metropolis	3,23	5,85	−10,20	4,95	−3,53	−7,23
Kielce	3,19	41,02	−4,64	31,69	−33,53	−61,61
Olsztyn	1,66	−10,68	2,52	−41,44	2,49	−44,84
Poznań	3,09	2,20	2,54	12,30	5,75	−33,40
Szczecin	−2,00	26,60	1,16	−53,52	0,21	49,95

In the years 2008–2011, directly after the outburst of the economic crisis, the largest drop in potential as regards competitiveness was observed in Warszawa (−19,95%) and Olsztyn (−10,68), whereas competitiveness increased most in the city of Rzeszów (102,50%). In the period 2011–2014 competitiveness of the examined area increased most in Kielce and Zielona Gora (by 31,69% and 31,24%, respectively), while the largest drop in competitiveness was observed in Opole and Szczecin (−56,34% and −53,52%).

Summary

In an attempt to evaluate development potential of voivodship capital cities in the aspect of local housing markets, the analysis covered the evolution of the number of flats delivered. Undoubtedly, information on this value and the dynamics of its changes will provide an outline of current condition of housing market and the situation in other markets directly or indirectly connected with the housing market. The intended use of flats being delivered has been taken into account while elaborating on the analyses of the number of flats delivered and impact on housing market development. From the social point of view and considering the strategies of housing market development in individual regions, it is crucial to know the occupancy of individual flat types in the general number of flats delivered. From a social or even economic perspective of less wealthy households, it is an unacceptable situation in the aspect of social equality when there are no flats being delivered in the social housing category in the local housing market. On the other hand, delivery of an inadequate number of flats of social stock will probably have a negative impact on developers' activities based on free market economy principles. Considering the above, the analyses carried out for the purposes of this article (allowing determination of development potentials for individual voivodship capitals with simultaneous synthetic description of their dynamics and particular consideration of two aspects: geographical and structural) may boost the discussion on the development of local housing markets and their form as regards the type of housing stock being delivered.

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