

CAN OSWALD'S HYPOTHESIS APPLY IN SLOVAKIA? THE LINKS BETWEEN SHARE OF OWNER-OCCUPIED REAL ESTATES AND UNEMPLOYMENT RATES

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Abstract

In the era of economic globalization, the migration of labour force and the dynamic of the labour market are even more in focus, as they are supported by ongoing trends not only in the economy but also in the society as a whole. Andrew Oswald pointed to significant statistical correlation between homeownership and unemployment. His argument is based on the fact, that homeowners are less mobile than those, renting a property. The Slovak real estate market is characterized by a high share of owner-occupied real estate. This share (more than 90 percent) is one of the highest in Europe. The low mobility of the labor force in Slovakia is also related to the structure of the use of the housing stock. As a result of the privatization of the housing stock in apartment buildings by the original tenants, it was necessary to categorize the properties as own apartments in apartment houses and own apartments in family houses. We found a positive correlation between the logarithm of the unemployment rates and share of apartments in family houses and a negative correlation between the logarithm of the unemployment rates and share of apartments in flats in the apartment buildings in the researched period of 2009–2019. We also modelled both dependencies using a linear regression model.

Key words: Oswald's hypothesis, Slovakia, NUTS 4, unemployment, homeownership

JEL Code: D10, E24, R11

Introduction and theoretical background

Oswald (1999) targeted the issue to examine the selected regions in OECD countries. His research came to conclusion if there is a 5% increase in homeownership, the unemployment rate is increasing by 1%. He found a positive correlation between the unemployment rates and the regional homeownership. According to Blanchflower and Oswald (2013), if high homeownership rates are combined with increase in unemployment rates, the policies stimulating homeownership are not always beneficial for the economy.

Flatau et al. (2002) examined the Oswald thesis in the Australian subregions. The research did not detect significant dependence between the homeownership and unemployment. Results Gathergood (2011) warns the attention on negative relationship between income uncertainty and homeownership in the UK in 1996-2000. According to Laamanen (2017), higher prevalence of homeownership is associated with higher aggregate unemployment. On the other hand, studies processing microdata suggest that homeowners have relatively favourable labour market outcomes. The results for Finland fall into the categories of urban, semi-urban and rural. Similarly to Flatau et al. (2002), he did not consider these results as final. Further empirical and theoretical study is needed to understand the mechanism. The ownership of house in most of the countries is encouraged by introducing tax deductible mortgage interest payments. The majority of microeconomic studies conclude that the unemployment durations of homeowners are shorter than renters (Vuuren, 2017). According to his results, the renters in Netherlands between 1989-2000 had an average of 8.7% percent longer unemployment durations than homeowners. Kantor, et al. (2015) introduced a model (Dutch data) in which the property auctions are in correlation with unemployment. According to the authors, the validity of Oswald's thesis may depend on the mortgage market. Tenants receiving rental subsidies have an exit rate of leaving unemployment cca 12%. This shows a lower ratio than in case of tenants not receiving subsidy. This finding is in conflict with the Oswald's thesis. Kantor, et al. (2015). found that homeowners with a mortgage that is equal to the value of the house are about 13 % more likely to leave unemployment compared to outright owners. Guler a Taskin (2018) analyzed the USA data for the time period of 1996-2004. They have found that due to home ownership, the unemployed are less mobile. Palomares-Linares and van Ham (2020) analyzed the microdata at individual level for the last two periods (2001-2011) of population census in Spain. Their findings suggest that the regional level of unemployment has no significant impact on internal migration during the analyzed period. The immobility factor is higher in underdeveloped regions, which means that the people might be „trapped“ in their houses since they cannot afford to move to more developed regions and sell their property. 2011 became an important date regarding the issue. In 2011 it was more evident that homeowners were more likely to remain in regions with high unemployment rate.

As it is evident from the study of scientific literature, determining the relationship between the homeowners and unemployment rate is not easy. There are several determining factors e.g. analysis of micro-data or macro-data, the year of conducting the analysis, rural or urban area the survey took place. We can summarize as the follows: Homeownership can be detected as a key explaining factor of labor force immobility. This can be described as a source

of unemployment. The effect of immobility combined with homeownership is even stronger in the less developed regions. The Oswald's thesis is affected by whether we talk about homeowners or homeowners with mortgage debt, too. Homeowners are less likely to be unemployed in long-term compared to tenants, but after entering employment they have lower wages.

The current state of housing in Slovakia is the result of a comprehensive historical development in an environment of various economic and political conditions. In the contribution to the already mentioned factors, we present a new element - the type owner - occupied real estate. An owner-occupant is a resident of a property who holds the title to that property. In the case of flats, we distinguish whether they are owner-occupied apartments in apartments buildings or owner-occupied apartments in family houses.

1 Research Methodology and Objectives

The aim of this paper is to verify the validity of the Oswald's hypothesis on LAU level (79 districts) in Slovakia. Data about the type of owned property was gained from SOBD in 2011. Data about the level of unemployment was gained from the official data of the Central Office of Labor Affairs and Family in Slovakia. We use the Pearsom correlation coefficient to measure the intensity of the linear dependence (Bruhl, 2017). We modelled the dependence of unemployment rate on the share of own apartments in apartment buildings resp. owned apartments in houses using the linear regression model. According to Pena & Slate (2006), in linear model the relationship between an observable $n \times 1$ response vector \mathbf{Y} and an observable $n \times p$ design matrix \mathbf{X} of predictor variables is the following:

$$\mathbf{Y} = \mathbf{X}\boldsymbol{\beta} + \sigma\boldsymbol{\varepsilon} \quad (1)$$

where $\boldsymbol{\beta}$ is $p \times 1$ vector of unknown coefficients, σ is an unknown scale parameter, and $\boldsymbol{\varepsilon}$ is an $n \times 1$ vector of unobservable error variables.

In this paper we construct two models - model for the dependent variable logarithm of the unemployment rate ($\ln u$) and predictor variable share of owned apartments in apartment building (BD) and model for the dependent variable logarithm of the unemployment rate ($\ln u$) and predictor variable share of owned apartments in family houses (RD). We verified the suitability of the model as a whole, the significance of the coefficients, and the fulfilment of the assumptions (Pena & Slate, 2006) for the use of a linear model. Global statistic G is result for global testing all Gauss Markov assumptions of the linear model (Pena & Slate, 2019). R

statistical programming environment (R Core Team, 2018) and program GeoDa were used for calculations.

2 Results and Discussion

The territory of Slovakia can be characterized with a balanced distribution of population in rural and urban areas. Since towns are in close environment of rural areas, finding employment in bigger settlements does not seem to be a problem. In order to maintain this balance we should make an effort and save rural areas from becoming uninhabited by increasing the measure of urbanization (Konceptcia 2020).

The current trends in housing in Slovakia reflect the historical development. The Act on Flat Ownership and Non-Residential Premises has been in effect since 1993. The main objective was to realize the transfer of property ownership from state ownership to citizens. The privatization of the Housing Fund in Slovakia has ensured that even citizens with lower incomes can have access to the ownership of flats, they can buy them for a fraction of the market price. It is in contrary to the European trend, where this type of living is typical mainly for the middle-class income layer of the society. The development of the housing fund in Slovakia between 1961–2011 is presented in Tab. 1.

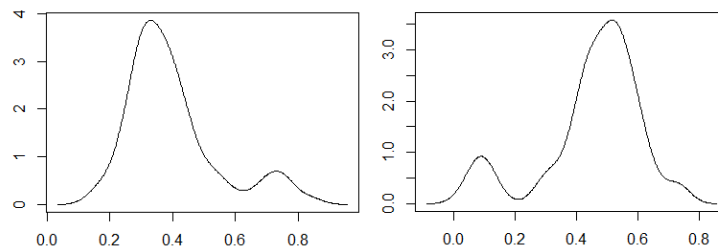
Tab. 1: Permanently occupied flats by type between 1961–2011

	1961	1970	1980	1991	2001	2011
Apartments in apartment buildings	192899	340961	587406	806388	845494	856147
Share in %	19.61	29.64	41.54	49.84	50.76	49.37
Apartments in houses	790589	809187	826526	811440	820042	877993
Share in %	80.39	70.36	58.46	50.16	49.24	50.63

Source: Own processing based on data of Statistical Office of Slovakia

Currently, according to available statistics, 90% of flats can be found in personal ownership, which is one of the highest shares in the EU. In Slovakia, almost half of the owned apartments are in family houses and the rest can be found in apartment buildings. 90 percent of dwellings are privately owned. The districts with a low share of owned flats in apartment buildings have a high share of apartments in houses and vice versa.

Fig. 1: The function of density for the share of owned apartments in apartment buildings and owned apartments in family houses for 79 districts in Slovakia



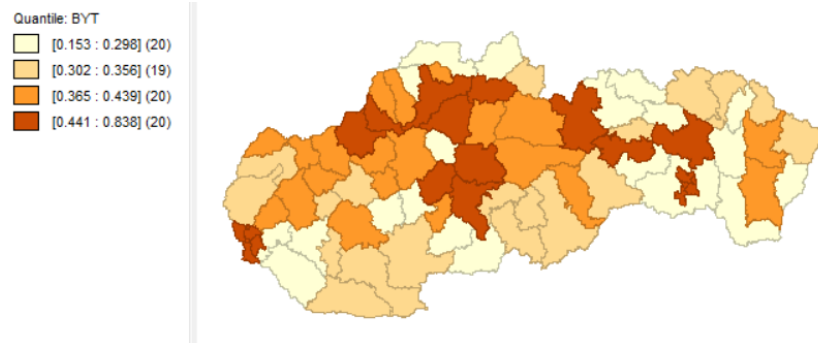
Source: Own processing of data of Statistical Office in Slovakia

The highest ratio of owned apartments in apartment buildings is in the districts of Trenčín, Banská Bystrica, Košice I – IV, Bratislava I-V, resp. the districts with industrial plants - Žiar nad Hronom, Ilava, Martin, Zvolen, Poprad. The lowest number of them can be found in the south of eastern Slovakia and the northern part of the country. These are the districts of Sobrance, Košice – neighbourhood, Námestovo, Zlaté Moravce, Bytča, Vranov nad Topľou, Trebišov, Turčianske Teplice, Veľký Krtíš.

The lowest share (below 30%) of owned apartments in houses is in the districts of Bratislava V, Košice III, Bratislava II, Košice II, Bratislava I, Bratislava IV, Košice I, Košice IV, Bratislava III, Banská Bystrica and Zvolen. The highest ratio of owned apartments in houses can be found in rural districts of Senec, Senica, Galanta, Dunajská Streda. In eastern Slovakia, these are the districts of Sobrance (73.7 percent), Košice – surroundings (71.6), Vranov nad Topľou (60.3), Veľký Krtíš (59.4), Trebišov (59.0), Sabinov(59.0), Gelnica (55.7), which belong to the least developed districts. The least developed districts are characterized with lack of workplaces, cannot sell properties, there is nobody to have demand for buying a property or financing the change of moving to find a job (similar results Palomares-Linares and van Ham (2020) and Valletta (2013)).

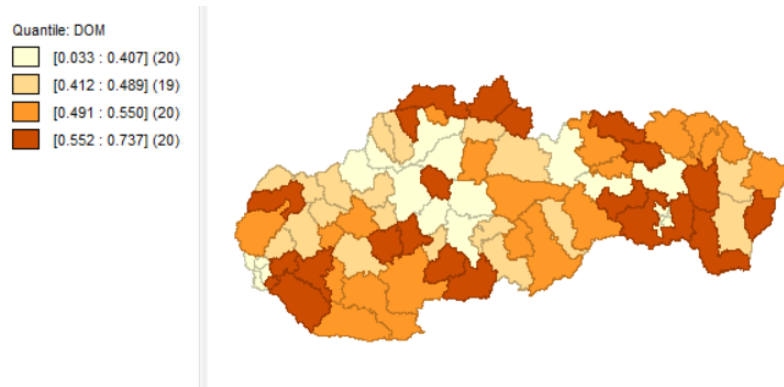
The highest share of properties in the ownership of municipalities, cooperatives and other forms of ownership are in the district of Košice I (20.5), Banská Štiavnica (17.6), Lučenec (16.9), Bánovce nad Bebravou (15.8), Stropkov (15.1), Partizánske (15.0), Kežmarok (15.0) and Bratislava I (1.0). The lowest share (below 7%) of properties owned by municipalities, cooperatives and other forms of ownership can be found in the district of Senec, Námestovo, Kysucké Nové Mesto, Malacky, Dolný Kubín, Košice – neighbourhood, Bratislava IV.

Fig. 2: Spatial distribution of the ratio of owned apartments in apartment buildings (SOBD, 2011)



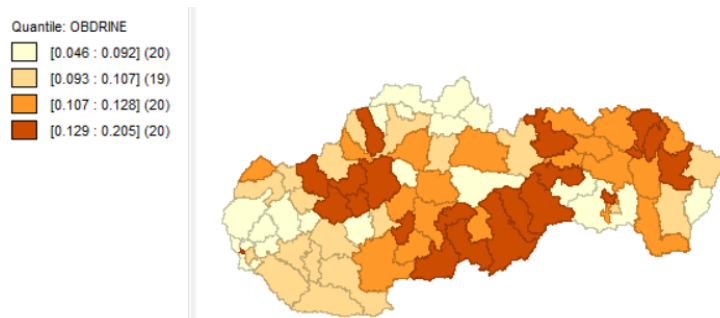
Source: Own processing of data of Statistical Office of Slovakia

Fig. 3: Spatial distribution of the share of owned apartments in family houses (SOBD, 2011)



Source: Own processing based on data of Statistical Office in Slovakia

Fig. 4: Spatial distribution of the share of the properties in the ownership of municipalities, cooperatives and other forms of ownership (SOBD, 2011)



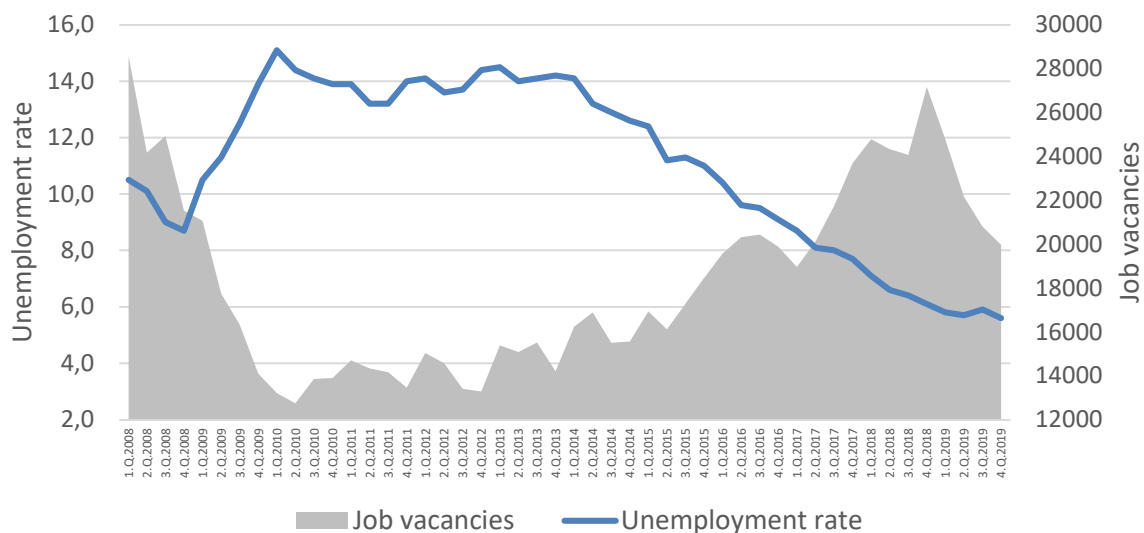
Source: Own processing based on data of Statistical Office in Slovakia

One of the current problems in Slovakia is rental housing. Experts estimate that about 2,7% of the apartments are currently owned by municipalities and the state. In other EU countries this ratio is higher, rental housing accounts for 62%. The public rental sector accounts

for almost a fifth of the Housing Fund. This means that rental housing in Slovakia is limited. Determining the scope of the Housing Fund and further indicators from available sources is very difficult (Konceptcia 2015). This is also the reason why we did not examine the dependence of unemployment and the share of rental flats.

If we would like to characterize the spatial distribution of unemployment by districts during the researched period, we can conclude that moving in direction to the eastern part of the country, increasing rate of unemployment can be detected. The unemployment rate in south and central Slovakia was high as well during the researched period. Fig. 5 presents the development of unemployment rate and the number of vacant workplaces in Slovakia.

Fig. 5: Development of unemployment rate and the number of vacant workplaces in Slovakia (2008-2019)

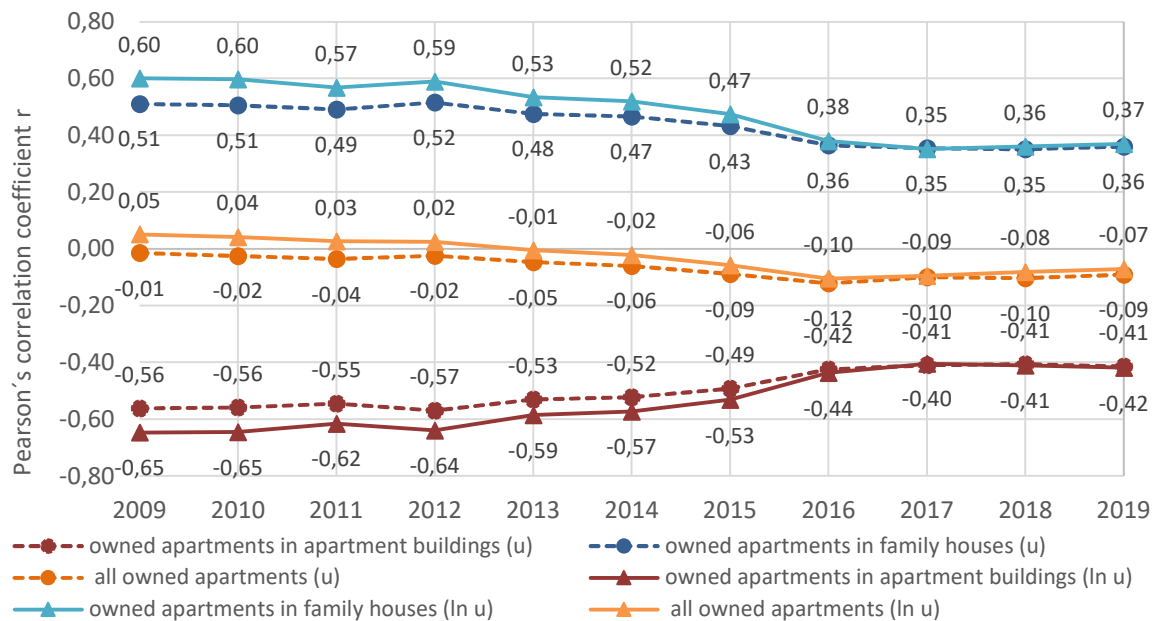


Source: Own processing based on data of Statistical Office in Slovakia

There has been an increase in vacant workplaces since 2015 and the unemployment rate had been falling. The intensity of the dependence of logarithm of the unemployment rate on the share of owned apartments in apartment houses measured by Pearson correlation coefficient has also decreased. Similar tendency can be detected in the case of the regression coefficient (in absolute value). Apartments in apartment buildings are sold easier than the apartments in houses. Most of the people after 2015 show less willingness to change their residence – less motivation to migrate in order to find job. The explanation might be the structural unemployment. It means that they do not have the adequate qualification that results in lack of motivation to change the place of residence. A hypothesis (later will be addressed by our research) that structural unemployment started to appear significantly in 2015 can be applied.

The values of the Person correlation coefficient are significant for the unemployment rate (u), the logarithm of unemployment rate ($\ln u$) for both types of dwellings - owned apartments in apartment buildings and owned apartments in family houses in all evaluated years. However, they have a different sign. A consequence of housing policy, more precisely, the massive privatization at the end of the last century is that more than 50% of the owned apartments are in apartment buildings. The dependence between all owned apartments and unemployment rate (u), the logarithm of unemployment rate ($\ln u$) is not statistically significant. These facts led us to the construction of two models - separately for owned apartments in apartment buildings and separately for owned apartments in family houses. As the assumptions for the linear model in the case of unemployment rate (u) are not met, we present the results only for the logarithm of unemployment rate ($\ln u$).

Fig. 6: Pearson correlation coefficient between the unemployment rate (u), logarithm of unemployment rate ($\ln u$) and the share of owned apartments in the period of 2009–2019



Source: Own processing based on data of Statistical Office in Slovakia

Examine the dependence of the logarithm of the unemployment rate ($\ln u$) on the share of own apartments in family houses resp. apartment buildings. Two models are presented based on the evaluated years 2009, 2015, 2019.

Tab. 2: Linear model for logarithm of the unemployment rate and owned apartments in apartment buildings

Year		Estimate	Std.Error	p value	F stat	p value	R ²	Pearson r
2009	Intercept	3.4693	0.1369	<2e-16	55.45	1.18e-10	0.4186	-0.6470
	BD	-2.4121	0.3240	1.18e-10				
2015	Intercept	2.9731	0.1254	< 2e-16	30.42	4.484e-07	0.2832	-0.5322
	BD	-1.637	0.2969	4.48e-07				
2019	Intercept	2.1521	0.1652	< 2e-16	16.41	0.0001	0.1757	-0.4192
	BD	-1.583	0.3910	0.0001				

Source: Own processing of data based on data of Statistical Office of Slovakia

Tab. 3: Global validation of linear model assumptions – logarithm of the unemployment rate and owned apartments in apartment buildings

Year		Global stat	Skewness	Kurtosis	Link Function	Heteroskedasticity
2009	Test statistics	6.3160	1.9930	0.3534	0.6136	3.3559
	p value	0.1767	0.1580	0.5521	0.4334	0.0669
2015	Test statistics	2.8306	0.2018	1.6390	0.5572	0.4326
	p value	0.5866	0.6533	0.2005	0.4554	0.5107
2019	Test statistics	3.5150	0.0089	1.7875	1.7174	0.0012
	p value	0.4756	0.9250	0.1812	0.1900	0.9717

Source: Own processing based on data of Statistical Office of Slovakia

Tab. 4: Linear model for logarithm of the unemployment rate and owned apartments in family houses

Year		Estimate	Std.Error	p value	F stat	p value	R ²	Pearson r
2009	Intercept	1.5833	0.1493	< 2e-16	43.46	4.86e-09	0.3608	0.6006
	RD	2.045	0.3103	4.86e-09				
2015	Intercept	1.7179	0.1356	< 2e-16	22.4	9.86e-06	0.2254	0.4748
	RD	1.333	0.2818	9.86e-06				
2019	Intercept	0.9458	0.1759	1.82e-07	12.13	0.00082	0.1361	0.3689
	RD	1.273	0.3655	0.00082				

Source: Own processing based on data of Statistical Office in Slovakia

Tab. 5: Global validation of linear model assumptions – logarithm of the unemployment rate and owned apartments in family houses

Year		Global stat	Skewness	Kurtosis	Link Function	Heteroskedasticity
2009	Test statistics	7.9409	1.4334	0.4795	2.9308	3.0972
	p value	0.0938	0.2312	0.4887	0.0869	0.0784
2015	Test statistics	2.3198	0.0068	1.6728	0.1654	1.3485
	p value	0.6772	0.9343	0.1959	0.6842	0.2455
2019	Test statistics	2.1994	0.2233	1.6303	0.2464	0.0993
	p value	0.6991	0.6365	0.2017	0.6196	0.7526

Source: own processing based on data of Statistical Office in Slovakia

On annual basis our data satisfy the assumptions of a linear model for dependence of the logarithm on the unemployment rate on the share of the owned apartments in apartment buildings and the share of own apartments in family houses (Tab. 3 and Tab. 5). P values are higher than the level of significance (0,05), and thus we accept the fulfilment of individual assumptions as well as the complex hypothesis regarding the fulfilment of linear model assumptions. Tab. 2 and Tab. 4 show that the coefficients in the regression model are statistically significant ($\alpha = 0.05$) for each year. The values of the coefficient of determination R^2 are acceptable. The results in Tab. 2 reflect that the Oswald's hypothesis of dependence of the unemployment rate on the share of flats in apartment buildings does not apply. The higher the share owned flats in the apartment buildings, the lower the logarithm of the unemployment rate and therefore also of the unemployment rate is. Those living in owned flats in apartment buildings show more willingness to migrate for work. The sale of owned flats in the apartment buildings is faster and therefore less expensive than the sale of family houses.

The results in Tab.4 show that the Oswald's hypothesis on dependence of unemployment rate on the share of owned flats in family houses applies. The higher the share of owned apartments in family houses, the higher the unemployment rate (more precisely the logarithm of the unemployment rate) is. Those living in owned apartments in family houses show no willingness to migrate in order to find work. The reason is usually a longer sales time and the associated higher costs. These costs can be unacceptably high for some groups of the population. Thus, they remain in their family homes and are unable to change residence due to employment.

Conclusion

The presented analysis is explaining the mobility resp. immobility of the citizens for work in terms of apartments ownership. Unemployment in context of various factors is common. Examining share of owned flats and unemployment is not a common combination of variables that would be of interest of a wide scope of professionals.

Owner-occupied housing currently represents the dominant form of housing in the Slovak Republic (more than 90 percent of all dwellings). As a result of the privatization of flats in the 1990s, almost all flats in apartment buildings became the property of former tenants. We found a positive correlation between the logarithm of the unemployment rates and share of ownership of apartments in family houses in the researched period of 2009–2019. If people from regions with high unemployment own a family house, it has a low price and sells for quite a long time. Their ability to move for work is thus limited. On the contrary, there is a negative

correlation between the logarithm of the unemployment rates and share of the ownership of apartments in apartment buildings in the researched period. The sale of apartments in apartment buildings is faster and transaction costs are lower. People living in flats in apartment buildings are thus more mobile. We have identified year 2015 as an exceptional year for both types of owned apartments. In connection with the decline in unemployment from this year and the growth in the number of job vacancies, we hypothesize that this is a year when structural unemployment is beginning to manifest itself more intensively.

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