# "Economic growth and housing spending within social protection: Correlation and causal study"

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# ECONOMIC GROWTH AND HOUSING SPENDING WITHIN SOCIAL PROTECTION: CORRELATION AND CAUSAL STUDY

### **Abstract**

The purpose of this study is to ground the causality, its character, and power between economic growth and housing spending within government social protection to strengthen poverty reduction. The study is conducted on a sample of 27 EU countries for 2012–2021 according to the following indicators: government expenditure on housing within social protection, government expenditure on housing development, and GDP per capita growth. Correlation analysis revealed the relationship between the variables. The paper employed time lags with the most significance based on Pearson and Spearman correlation coefficients depending on normal data (Shapiro-Wilk test). The causal analysis determined which of the studied indicators is the cause and consequence of established dependence based on the results of the Granger test. Calculations are made in STATA software. It is confirmed that government expenditure on housing within social protection influences GDP per capita growth in 14 countries (the highest impact is in Greece and Spain) and government expenditure on housing development in 17 countries (the biggest influence is in Romania, the Slovak Republic, Ireland, and Lithuania). It is also emphasized that government expenditure on housing development influences economic growth more significantly and with higher strength than government expenditure on housing within social protection. The obtained results can be useful in further research and government decision-making in social and economic policy, particularly regarding the expediency of increasing government spending for affordable housing and its development according to social protection programs, poverty reduction, and inclusive economic growth.

**Keywords** access, affordability, financial aid, government expenditure, housing, poverty, social protection

JEL Classification H55, O47, R28

### INTRODUCTION

The problem of affordable and social housing has always existed, but in global challenges, such as wars, pandemics, or economic crises, it becomes increasingly acute. Kostenko et al. (2022) grounded the relevance of social resilience during the Covid-19 pandemic. Pakhnenko et al. (2022) distinguished the role and peculiarities of financial aid to communities considering the Covid-19 pandemic. Zhang et al. (2022) emphasized changes in household expenditure and migrants' remittances caused by Covid-19 consequences. Voznyak et al. (2023a, 2023b) paid attention to the migration processes, especially during the war, and accordingly, the increasing necessity of social housing based on survey results that showed a lack of affordable housing in the community (68.6% of responses). Alekseyenko et al. (2021) also substantiated the need for affordable housing for internally displaced persons.

Besides, the urgent need to improve housing affordability for youth and young families is driven by the independence from parental support for financial ability and housing (Kutlák, 2021) and by housing overcrowding, overpopulation, and urbanization (Chen et al., 2022). The health situation is closely connected with housing affordability and conditions (Lyeonov et al., 2021; Ovcharova & Grabowska, 2022; Sheliemina, 2023). Thus, changes in public policy and strategies for post-war and other crises overcoming are significant, particularly in social interactions (Hakobyan et al., 2022; Hakobyan & Khachatryan, 2022). The provision, management, and financing of social and affordable housing is no exception.

To improve the outlined situation, a significant role is assigned to the government, which makes decisions on changes in social, housing, and communal policies, as well as budget policy, revising the structure of budget expenditures, one of the items of which is the financing of housing development, housing construction and subsidizing housing for the poor or unprotected population groups. Therefore, the issue of social protection and housing financial aid for poverty reduction and economic growth is relevant and timely.

### 1. LITERATURE REVIEW

Social protection is positioned as a factor of sustainable development (Tu et al., 2023). Reducing poverty due to social improvement is one of the sustainable development goals for today (Awojobi, 2022; Makole et al., 2022; Salisu, 2022). Thus, Ievdokymov et al. (2020) and Kuzior et al. (2021, 2022) investigated problems of social capital, corporate social responsibility, and transformation to socio-cultural development.

Financial policy aspects for economic growth, economic security, social and sustainable development, competitiveness, macro-stability, financial management, personal finance skills for households, and personal welfare are widely discussed (Kozmenko et al., 2014; Kozmenko & Korneev, 2014; Bilan et al., 2020; Lyulyov et al., 2021; Tiutiunyk et al., 2022; Lyeonov et al., 2022; Antoniuk et al., 2022; Hakhverdyan & Shahinyan, 2022; Maris, 2022; Rosokhata et al., 2022; Stratan et al., 2022).

State budget expenditures were analyzed by Shkolnyk et al. (2021). The study substantiated that social protection, social security, economic activity, and healthcare require significant additional funding. Adewole et al. (2022) described a case of Islamic government finances, accenting the social component too. Vysochyna et al. (2022) studied municipal finance and the urgent problem of its resilience to achieve sustainable economic development.

Marica and Piras (2018) conducted a bibliometric review and investigated some empirical as-

pects of the impact of public spending on economic growth. Poku et al. (2022) analyzed the dependence between public expenditure and economic growth in Ghana based on the data for 1970-2016 and the ARDL econometric estimate. They concluded that government spending is in a positive relationship with economic growth in the short period. At the same time, population growth has a negative relationship with economic growth. Musaba et al. (2013) investigated the impact of public spending on economic growth in the case of Malawi using time series from 1980 to 2007. However, the investigated list of expenses did not include an assessment of expenses for social security in general and financing of social housing in particular.

Li (2018) and Libertun de Duren and Osorio (2020) studied the influence of local budget spending on housing prices and housing deficits. Tahat (2023) grounded the dependence between housing demand and macroeconomic factors. Egan and Bergin (2023) examined the effect of government spending on the housing supply in Ireland and the effects of the government's impact on the real estate market across the economy and by sector. Doling et al. (2013) studied the connection between housing, financing, and economic development. The benefits of financing housing have been found to occur indirectly through improved health, and multiplier effects of conditions of employment and production. A symbiotic relationship between the financing of housing construction and the development of the financial sector was also revealed.

Kumar (2021) measured the impact of the housing program, particularly the subsidized housing lottery in Mumbai (India) on the population's welfare. Kunovac and Zilic (2022) investigated the effect of subsidizing housing loans in Croatia. They argued that the subsidy disrupted the normal intra-annual dynamics of housing transactions, and house prices rose immediately after the subsidies were introduced. Molidya and Fanggidae (2020) researched the optimization of state subsidies in the housing sector based on the experience of Kupang during the Covid-19 pandemic.

However, the issue of social protection and housing financial aid by the government is not investigated enough and requires further development. Government housing spending is vital for improving the living conditions of citizens and reducing poverty in general. Funding social and affordable housing from budget expenditures is one of the most widespread sources of strengthening housing affordability. At the same time, financing these items of expenditure occurs along with financing a significant list of other state functions. Therefore, it is appropriate to investigate whether there is a relationship between these expenditures and the country's economic growth.

The purpose of this study is to ground the causality, its character, and power between economic growth and housing spending within government social protection to strengthen poverty reduction.

### 2. METHODS

The causality between housing financial aid according to government social protection and economic growth was determined based on the sample of 27 countries – current members of the European Union (European Union, n.d.).

The period of investigation was 2012–2021, i.e., the last ten years for which Eurostat and the World Bank have published statistical data according to the following indicators:

• GE\_H – government expenditure on housing (in the spending block of social protection) as a percentage of total general government expenditure (Eurostat, 2023);

- GE\_HD government expenditure on housing development (in the spending block of housing and community amenities) as a percentage of total general government expenditure (Eurostat, 2023);
- GDP GDP per capita growth as an annual percentage (World Bank, n.d.).

To confirm or reject the relationships between housing financial aid according to government social protection and economic growth (in particular, between government expenditure on housing in the spending block of social protection and GDP per capita growth and between government expenditure on housing development in the spending block of housing and community amenities and GDP per capita growth) and identify their nature (direction), strength and time lags with its most significance, the study used correlation analysis based on calculating Pearson and Spearman correlation coefficients depending on normal data checked by Shapiro-Wilk test (Shapiro & Wilk, 1965; Shapiro & Francia, 1972; Pearson, 1896; Spearman, 1904).

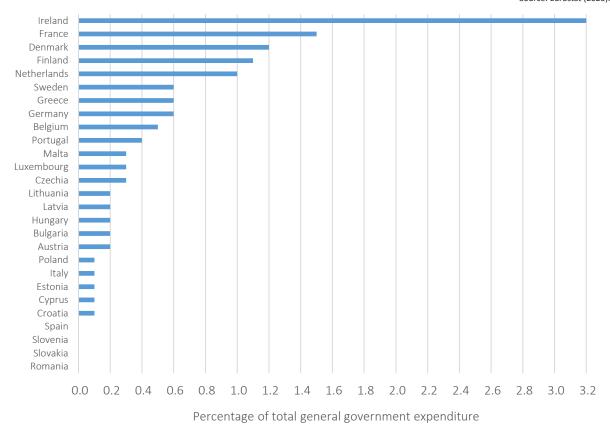
The grounding of which of studied indicators is the cause and which is the consequence in established dependences was conducted based on causal analysis – the Granger test (Granger, 1969). In turn, the methodology of this causal study involved preliminary VAR modeling, after which the Granger test was applied (Rossi & Wang, 2019; Baum et al., 2022; Stata, n.d.). All the above calculations were made in STATA software.

### 3. RESULTS

Government expenditure on housing in the spending block of social protection occupies a small share of the total volume of state expenses. At the same time, they differ significantly within the sample of EU countries (Figure 1).

The highest level of housing financial aid, according to government social protection, is in Ireland, France, Denmark, Finland, and the Netherlands. This share is equal to zero in such EU countries as Romania, the Slovak Republic, Slovenia, and Spain. So, the gap is significant even within the





**Figure 1.** Cross-country analysis of shares of government expenditure on housing in the spending block of social protection in 2021

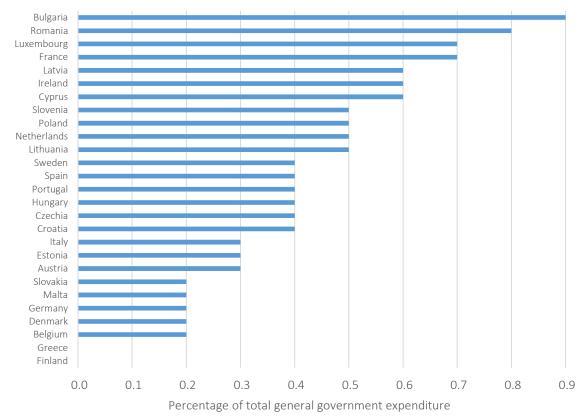
EU. Next, Figure 2 shows the comparative analysis of government expenditure on housing development in the spending block of housing and community amenities.

The leading EU countries on this issue are Bulgaria, Romania, Luxemburg, France, Latvia, Ireland, and the Republic of Cyprus. In Greece and Finland, this item of expenditure is equal to zero. However, in the case of government expenditure on housing development compared with government expenditure on housing as social protection, the gap between countries is not so noticeable and significant. Besides it, some countries, such as Ireland, have a high level of government spending. In turn, Romania is a leader in government expenditure on housing development, but at the end of the list in the case of government expenditure on housing as social protection. The same reverse situation takes place in Finland. This is due to differences in the state social policy, social protection programs, in particular, regarding the financing of social and affordable housing, as well as various mechanisms, tools, forms, methods, and sources of its provision. All above is very important to reduce poverty and housing overcrowding.

Taking into account the given differences in the priorities of state financing of social housing – either within the limits of social protection (housing subsidies, etc.) or within the limits of the development of housing construction, it is vital to investigate the causal relationships between housing financial aid according to government social protection and economic growth to strengthen householders welfare and poverty reduction.

Firstly, the input data of government expenditure on housing in the spending block of social protection (GE\_H) (Eurostat, 2023) and government expenditure on housing development in the spending block of housing and community amenities (GE\_HD) (Eurostat, 2023) for 27 EU countries in 2012–2021 were checked for normality using Shapiro-Wilk test via STATA software (Table 1).





**Figure 2.** Cross-country analysis of shares of government expenditure on housing development in the spending block of housing and community amenities in 2021

Table 1. Normal data testing based on the Shapiro-Wilk methodology

Source: Shapiro and Wilk (1965), Shapiro and Francia (1972).

	GE_H				GE_HD					
Country name	Obs	W	V	z	Prob>z	Obs	W	V	z	Prob>z
Austria	10	n.d.	n.d.	n.d.	n.d.	10	0.88	1.89	1.17	0.1212
Belgium	10	0.85	2.36	1.62	0.0529	10	0.82	2.78	1.96	0.0253*
Bulgaria	10	0.78	3.46	2.44	0.0073*	10	0.86	2.20	1.47	0.0706
Croatia	10	0.85	2.36	1.62	0.0530	10	0.85	2.34	1.59	0.0554
The Republic of Cyprus	10	0.77	3.62	2.54	0.0055*	10	0.75	3.90	2.72	0.0033*
The Czech Republic	10	0.84	2.45	1.69	0.0455*	10	0.87	2.03	1.31	0.0957
Denmark	10	0.88	1.89	1.17	0.1212	10	0.91	1.45	0.66	0.2538
Estonia	10	n.d.	n.d.	n.d.	n.d.	10	0.89	1.77	1.04	0.1503
Finland	10	0.97	0.42	-1.36	0.9129	10	0.89	1.72	0.98	0.1641
France	10	0.99	0.22	-2.29	0.9889	10	0.99	0.16	-2.69	0.9964
Germany	10	0.88	1.89	1.17	0.1208	10	0.83	2.67	1.88	0.0304*
Greece	10	0.90	1.61	0.86	0.1959	10	n.d.	n.d.	n.d.	n.d.
Hungary	10	0.86	2.16	1.43	0.0762	10	0.60	6.16	3.87	0.0001*
Ireland	10	0.86	2.19	1.46	0.0722	10	0.99	0.11	-3.15	0.9992
Italy	10	n.d.	n.d.	n.d.	n.d.	10	0.77	3.62	2.54	0.0055*
Latvia	10	0.97	0.43	-1.34	0.9098	10	0.96	0.57	-0.93	0.8233
Lithuania	10	0.83	2.67	1.88	0.0304*	10	0.76	3.74	2.62	0.0044*
Luxembourg	10	0.99	0.08	-3.45	0.9997	10	0.88	1.86	1.13	0.1291
Malta	10	0.82	2.82	1.99	0.0233*	10	0.95	0.74	-0.50	0.6896
The Netherlands	10	0.95	0.82	-0.33	0.6291	10	0.94	0.95	-0.09	0.5366
Poland	10	0.77	3.62	2.54	0.0055*	10	0.93	1.13	0.21	0.4158
Portugal	10	0.60	6.16	3.87	0.0001*	10	0.94	0.97	-0.06	0.5242

**Table 1 (cont.).** Normal data testing based on the Shapiro-Wilk methodology

		GE_H				GE_HD				
Country name	Obs	W	V	z	Prob>z	Obs	W	٧	Z	Prob>z
Romania	10	n.d.	n.d.	n.d.	n.d.	10	0.99	0.08	-3.53	0.9998
The Slovak Republic	10	n.d.	n.d.	n.d.	n.d.	10	0.99	0.17	-2.62	0.9957
Slovenia	10	0.97	0.42	-1.38	0.9155	10	0.97	0.53	-1.03	0.8488
Spain	10	0.88	1.89	1.17	0.1212	10	0.99	0.22	-2.29	0.9889
Sweden	10	0.60	6.16	3.87	0.0001*	10	0.88	1.89	1.17	0.1212

*Note:* n.d. – the input data are unchanged during the studied period or are equal to zero; \* – the data are not subject to the law of normal distribution.

If Prob > z is less than 0.5, the data are not subject to the law of normal distribution. It is important for choosing a method of correction analysis at the next research stage: – Pearson method is applied when the data are normal (Prob > z is equal or more than 0.5); – Spearman method is applied when the data are not normal (Prob > z is less than 0.5).

Secondly, correlation analysis was conducted to confirm or reject the existence of a relationship between housing financial aid according to government social protection and economic growth for each country from the sample and to identify the nature of the relationship (direct or reversed) and strength (low, middle, or high). Time lags were also applied to determine when the relationship has the highest significance level. For these calculations, STATA instruments were used (Table 2).

The dependence between government expenditure on housing in the spending block of social protection and GDP per capita growth was confirmed in 22 from 27 EU countries. It is positive in 14 countries, mostly with middle strength (the high strength is in Greece and Spain) and negative in 8 countries, mostly with middle strength. The time lag is from 0 to 3 years (mostly 1 year or without time lag).

The relationship between government expenditure on housing development in the spending block of housing and community amenities and GDP per capita growth exists in 26 of 27 countries from the sample. It is positive in 17 countries with high and middle strength (high – in 8 and middle – in 9 countries) and negative in 9 countries with high and middle strength (high – in 4 and middle – in 5 countries). The time lag is from 0 to 3 years (mostly 1-2 years).

Table 2. Pearson/Spearman correlation calculations

Source: Pearson (1896), Spearman (1904).

	Betwee	en GE_H and GDP	Between GE_HD and GDP		
Country name	Coefficient	Time lag when it is the most significant	Coefficient	Time lag when it is the most significant	
Austria	n.d.	n.d.	-0.5	2	
Belgium	0.4	0	0.4	1	
Bulgaria	0.4	2	0.3	0	
Croatia	0.4	2	0.5	1	
The Republic of Cyprus	0.4	0	0.6	1	
The Czech Republic	-0.5	3	0.2	0	
Denmark	0.2	1	-0.4	1	
Estonia	n.d.	n.d.	-0.5	1	
Finland	0.4	0	0.3	2	
France	-0.6	3	0.4	3	
Germany	0.2	1	-0.5	0	
Greece	0.7	2	n.d.	n.d.	
Hungary	-0.3	0	-0.2	3	
Ireland	-0.1	1	0.8	3	
Italy	n.d.	n.d.	0.6	0	
Latvia	0.4	0	-0.5	2	
Lithuania	-0.4	1	0.7	1	

Table 2 (cont.). Pearson/Spearman correlation calculations

	Betwee	en GE_H and GDP	Between GE_HD and GDP		
Country name	Coefficient	Time lag when it is the most significant	Coefficient	Time lag when it is the most significant	
Luxembourg	0.2	0	0.3	0	
Malta	-0.4	1	0.6	3	
The Netherlands	0.4	0	0.4	3	
Poland	-0.5	3	-0.4	1	
Portugal	0.2	1	-0.4	2	
Romania	n.d.	n.d.	0.7	2	
The Slovak Republic	n.d.	n.d.	0.8	2	
Slovenia	-0.2	2	-0.3	0	
Spain	0.7	1	0.4	2	
Sweden	0.4	1	0.3	3	

*Note:* n.d. – the input data are unchanged during the studied period or are equal to zero.

The causal study was made to find which of the above indicators (result and factor) is the cause and which is the consequence. For this purpose, the Granger causality test and the Vector Autoregression (VAR)

were applied using STATA software. It contributes to determining which variable is a determining factor for another one or, in other words, identifying the direction of the causality link (Table 3).

Table 3. Granger test for causality

Source: Granger (1969), Rossi and Wang (2019).

	Prob > chi2							
Country name	GE_H is a cause of GDP	GDP is a cause of GE_H	GE_HD is a cause of GDP	GDP is a cause of GE_HD				
Austria	n.d.	n.d.	0.000	0.002				
Belgium	0.032	0.000	0.000	0.000				
Bulgaria	0.000	0.000	0.036	0.000				
Croatia	0.085*	0.000	0.000	0.000				
The Republic of Cyprus	0.060*	0.000	0.258*	0.000				
Γhe Czech Republic	0.000	0.236*	0.000	0.000				
Denmark	0.464*	0.000	0.504*	0.000				
Estonia	n.d.	n.d.	0.260*	0.147*				
Finland	0.367*	0.000	0.056*	0.000				
France	0.000	0.036	0.000	0.000				
Germany	0.000	0.232*	0.000	0.223*				
Greece	0.000	0.300*	n.d.	n.d.				
Hungary	0.005	0.595*	-	_				
reland	0.000	0.000	0.000	0.000				
taly	n.d.	n.d.	0.376*	0.000				
_atvia	0.000	0.421*	0.000	0.157*				
ithuania	0.000	0.000	0.000	0.001				
Luxembourg	0.080*	0.477*	0.701*	0.007				
Malta	0.419*	0.000	0.412*	0.000				
Γhe Netherlands	0.000	0.000	0.000	0.000				
Poland	-	-	0.177*	0.000				
Portugal	-	-	0.000	0.001				
Romania	n.d.	n.d.	0.002	0.098*				
The Slovak Republic	n.d.	n.d.	0.008	0.554*				
Slovenia	0.000	0.000	0.000	0.000				
Spain	0.000	0.000	0.000	0.196*				
Sweden	0.000	0.064*	0.000	0.260*				

*Note:* n.d. – the input data are unchanged during the studied period or are equal to zero; \* – the investigated factor is not the cause of the resulting indicator; "–" – causality has not been established.

For example, for the first pair of variables (the 1st column), if the p-value is less or equal to 0.05, the hypothesis that GE\_H is a cause of GDP is confirmed. If the p-value is more than 0.05, the investigated factor is not the cause of the resulting indicator, and causality was not established. Therefore, the direction of causality is from GE\_H (government expenditure on housing in the spending block of social protection) to GDP (GDP per capita growth). The same rule was used to estimate the results presented in the other three columns for two pairs of investigated indicators. In some countries, there is causality in both directions; it is a bidirectional causality. Table 4 shows the generalized and visualized results of the casual study.

**Table 4.** Determination of unidirectional or bidirectional causality based on Granger test results

Country name	Causality between GE_H and GDP	Causality between GE_HD and GDP
Austria	-	$GE\_HD \leftrightarrow GDP$
Belgium	$GE\_H \leftrightarrow GDP$	$GE\_HD \leftrightarrow GDP$
Bulgaria	$GE\_H \leftrightarrow GDP$	$GE\_HD \leftrightarrow GDP$
Croatia	$GE\_H \leftarrow GDP$	$GE\_HD \leftrightarrow GDP$
The Republic of Cyprus	GE_H ← GDP	GE_HD ← GDP
The Czech Republic	$GE\_H \rightarrow GDP$	$GE\_HD \leftrightarrow GDP$
Denmark	$GE\_H \leftarrow GDP$	GE_HD ← GDP
Estonia	-	-
Finland	$GE\_H \leftarrow GDP$	GE_HD ← GDP
France	$GE\_H \leftrightarrow GDP$	$GE\_HD \leftrightarrow GDP$
Germany	$GE_H \rightarrow GDP$	$GE\_HD \rightarrow GDP$
Greece	$GE_H \rightarrow GDP$	-
Hungary	$GE_H \rightarrow GDP$	-
Ireland	$GE\_H \leftrightarrow GDP$	$GE\_HD \leftrightarrow GDP$
Italy	_	GE_HD ← GDP
Latvia	$GE_H \rightarrow GDP$	GE_HD → GDP
Lithuania	$GE\_H \leftrightarrow GDP$	$GE\_HD \leftrightarrow GDP$
Luxembourg	-	GE_HD ← GDP
Malta	$GE\_H \leftarrow GDP$	GE_HD ← GDP
The Netherlands	$GE_H \leftrightarrow GDP$	$GE\_HD \leftrightarrow GDP$
Poland	-	GE_HD ← GDP
Portugal	-	$GE\_HD \leftrightarrow GDP$
Romania	-	$GE\_HD \rightarrow GDP$
The Slovak Republic	-	GE_HD → GDP
Slovenia	$GE\_H \leftrightarrow GDP$	$GE\_HD \leftrightarrow GDP$
Spain	$GE\_H \leftrightarrow GDP$	$GE\_HD \rightarrow GDP$
Sweden	$GE_H \rightarrow GDP$	GE_HD → GDP

*Note: "-"* – causality is not confirmed or cannot be established at a given time interval in a specific country.

Therefore, government expenditure on housing in the spending block of social protection is a cause of GDP per capita growth in 6 EU countries. The reverse causality (GDP per capita growth is a cause of government expenditure on housing as social protection) takes place in 5 countries. Besides, there is bidirectional causality in 8 countries. In the end, government expenditure on housing in the spending block of social protection influences GDP per capita growth in 14 EU countries.

In turn, government expenditure on housing development in the spending block of housing and community amenities is a cause of GDP per capita growth in 6 EU countries. The reverse unidirectional causality (GDP per capita growth is a cause of government expenditure on housing development in the spending block of housing and community amenities) exists in 7 countries. In addition, there is bidirectional causality in 11 countries. So, government expenditure on housing development in the spending block of housing and community amenities influences GDP per capita growth in 17 EU countries.

# 4. DISCUSSION

Ianchuk et al. (2021) confirmed a hypothesis about the impact of owners' number of housing with loans on economic growth and the number of tenants, rent social (free) housing, or housing with reduced prices on economic growth. The conclusion showed that government should pay more attention to affordable lending housing strategies over programs to reduce rental housing. However, this study examines completely different mechanisms of financing social housing and their impact on economic growth: government expenditure on housing development and government expenditure on housing in the spending block of social protection.

Chugunov and Nasibova (2021) also studied the issue of government financing of social protection on the evidence of European countries. They concluded the influence on indicators of socio-economic development, paying attention to the inconsistency in the amount of financing social protection expenditures. At the same time, the subject of their study was social payments and contribu-

tions, the structure of social protection, not including the issue of financing social housing and related problems.

Hasnul (2015) checked the hypothesis about the influence of government spending on economic growth using the evidence of Malaysia for 45 years (1970–2014). The study classified government spending in which development and housing sector expenditures cause lower economic growth. But research is based on the case of Malaysia, so in other countries, the results can be different.

Sriningsih et al. (2023) also analyzed the causality of government spending in Indonesia and its impact on economic growth. Among the different expenses, attention was paid to state expenses on housing and public facilities, for which a positive connection with economic growth was confirmed.

But the study made conclusions based on the evidence only of one country. In contrast, this analysis is based on a sample of 27 EU countries.

This study has some limitations. Firstly, it has a limited sample of the study countries – EU members. Secondly, the research period is limited too – the last ten years, for which the investigated indicators were published. Therefore, in further studies, it is advisable to expand the sample of countries, paying attention to developing countries, where the problem of poverty, lack of healthy living conditions, and housing overcrowding is even more acute. Accordingly, the increase of state expenditures under various budget items on social and affordable housing can significantly impact economic growth more than in developed countries.

# CONCLUSION

This study grounded the causality, character, and power between economic growth and housing spending within government social protection to strengthen poverty reduction. Correlation analysis confirmed the relationship between government expenditure on housing as social protection and GDP per capita growth in 22 from 27 EU countries, including 14 countries with positive dependence, mostly middle strength and 1-year lag (or without time lag). In turn, the interconnection between government expenditure on housing development in the spending block of housing and community amenities and GDP per capita growth was determined in 26 from 27 sample countries, which involve 17 ones with positive direction, high (8 countries) and middle (9 countries) strength and 1–2-year lag. Using the results of Granger causality testing, government expenditure on housing as social protection influences GDP per capita growth in 14 EU countries, and government expenditure on housing development in the spending block of housing and community amenities is a cause of GDP per capita growth in 17 EU countries. Greece and Spain have the highest impact of government expenditure on housing as social protection on GDP per capita growth. The most significant influence of government expenditure on housing development on economic growth is in Romania, the Slovak Republic, Ireland, and Lithuania.

Comparing the economic growth of these two indicators of financing social and affordable housing from government spending, it is noted that government expenditure on housing development influences GDP per capita growth more significantly and with a higher level of power than government expenditure on housing as social protection. Therefore, to strengthen economic growth, improve the well-being of households and overcome poverty, it is more appropriate for the governments of EU countries to invest in the development of the housing stock and housing construction than to pay housing subsidies within the framework of social protection programs. The obtained results can be useful in further research and government decision-making in social and economic policy, in particular, regarding the expediency of increasing government spending for affordable housing and its development according to social protection programs, poverty reduction, and inclusive economic growth.

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### REFERENCES

- Adewole, J. A., Omotayo, V. A., & Ojewande, A. A. (2022). Islamic cooperative societies and the efficiency of financial intermediation in Ife East Local Government, Osun State, Nigeria. Financial Markets, Institutions and Risks, 6(2), 5-15. https://doi. org/10.21272/fmir.6(2).5-15.2022
- Alekseyenko, L., Tulai, O., Petrushenko, Y., Kuznietsov, A., & Derkash, J. (2021). Affordable housing for internally displaced persons: The priorities for investment and development in Ukraine. *Investment Management and Financial Innovations*, 18(1), 101-113. https://doi.org/10.21511/imfi.18(1).2021.09
- Antoniuk, D. S., Vakaliuk, T. A., Didkivskyi, V. V., Vizghalov, O. Y., Oliinyk, O. V., & Yanchuk, V. M. (2022). Using a business simulator with elements of machine learning to develop personal finance management skills. CEUR Workshop Proceedings, 3083, 59-70. Retrieved from https://ceur-ws. org/Vol-3083/paper131.pdf

- Awojobi, O. N. (2022). Cash transfer programmes for reducing poverty and vulnerabilities:
   Effects on children's health in Sub-Saharan Africa and Latin America.
   SocioEconomic Challenges, 6(1),
   5-23. https://doi.org/10.21272/sec.6(1).5-23.2022
- Baum, C. F., Hurn, S., & Otero, J. (2022). Testing for time-varying Granger causality. *The Stata Journal*, 22(2), 355-378. https://doi. org/10.1177/1536867X221106403
- Bilan, Y., Tiutiunyk, I., Lyeonov, S., & Vasylieva, T. (2020). Shadow economy and economic development: A panel cointegration and causality analysis. *International Journal of Economic Policy in Emerging Economies*, 13(2), 173-193. https://doi.org/10.1504/ IJEPEE.2020.107929
- 7. Chen, Q., Chi, Q., Chen, Y., Lyulyov, O., & Pimonenko, T. (2022). Does population aging impact China's economic growth? International Journal of Environmental Research and Public

- Health, 19(19), 12171. https://doi. org/10.3390/ijerph191912171
- Chugunov, I., & Nasibova, O. (2021). Public funding of social protection: Impact on social indicators in Eurozone countries. *Investment Management* and Financial Innovations, 18(2), 181-192. https://doi.org/10.21511/ imfi.18(2).2021.15
- Doling, J., Vandenberg, P., &
  Tolentino, J. (2013). Housing and
  housing finance A review of the
  links to economic development and
  poverty reduction (ADB Economics Working Paper Series No.
  362). Asian Development Bank.
  Retrieved from https://www.adb.
  org/sites/default/files/publication/30348/ewp-362.pdf
- Egan, P., & Bergin, A. (2023).
   The impact of government spending on Ireland's housing and residential market Targeted vs economy-wide stimulus. *Journal of Policy Modeling*. https://doi.org/10.1016/j.jpolmod.2023.05.005

- 11. European Union. (n.d.). *EU* country profiles. Retrieved from https://european-union.europa.eu/principles-countries-history/country-profiles\_en
- 12. Eurostat. (2023). Housing development, percentage of total (GF0601). General government expenditure by function (COFOG). Retrieved April 28, 2023, from https://ec.europa.eu/eurostat/databrowser/view/gov\_10a\_exp/default/table?lang=en
- 13. Granger, C. W. J. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica*, *37*(3), 424-438. https://doi.org/10.2307/1912791
- Hakhverdyan, D., & Shahinyan, M. (2022). Competitiveness, innovation and productivity of the country. Marketing and Management of Innovations, 1, 108-123. https://doi.org/10.21272/mmi.2022.1-08
- 15. Hakobyan, N., & Khachatryan, A. (2022). Post-war anomie in the field of management leadership and anomie overcoming models. *Business Ethics and Leadership*, 6(2), 94-102. https://doi.org/10.21272/bel.6(2).94-102.2022
- Hakobyan, N., Dabaghyan, A., & Khachatryan, A. (2022). Strategies of post-war anomie's overcoming in the fields of social interactions and business. *Business Ethics and Leadership*, 6(3), 105-112. https:// doi.org/10.21272/bel.6(3).105-112.2022
- Hasnul, A. G. (2015). The effects of government expenditure on economic growth: The case of Malaysia (MPRA Paper No. 71254). University Library of Munich, Germany. Retrieved from https://mpra. ub.uni-muenchen.de/71254/1/ MPRA\_paper\_71254.pdf
- Ianchuk, S., Garafonova, O., Panimash, Yu., & Pawliszczy, D. (2021). Marketing, management, and financial providing of affordable housing. *Marketing* and Management of Innovations, 2, 213-230. http://doi.org/10.21272/ mmi.2021.2-18
- 19. Ievdokymov, V., Lehenchuk, S., Zakharov, D., Andrusiv, U., Us-

- atenko, O., & Kovalenko, L. (2020). Social capital measurement based on "The value explorer" method. *Management Science Letters*, 10(6), 1161-1168. https://doi.org/10.5267/j.msl.2019.12.002
- Kostenko, A., Kozyntseva, T.,
   Opanasiuk, V., Kubatko, O., &
   Kupenko, O. (2022). Social resilience management of Ukrainian
   territorial communities during the
   Covid-19 pandemic. *Problems and Perspectives in Management*, 20(3),
   1-11. https://doi.org/10.21511/
   ppm.20(3).2022.01
- Kozmenko, S. M., Korneyev, M. V., & Makedon, V. V. (2014). Financialisation of economy and its influence on the indicators of countries' socioeconomic development. Actual Problems of Economics, 161(11), 290-298. (In Ukrainian). Retrieved from https://essuir.sumdu.edu.ua/ handle/123456789/53113
- Kozmenko, S., & Korneev, M. (2014). Periodization of financialization process of economics: Domestic and foreign contexts. *Economic Annals-XXI*, 144(9-10), 73-76. Retrieved from http://ea21journal.world/index.php/ea-v144-18/
- 23. Kumar, T. (2021). The housing quality, income, and human capital effects of subsidized homes in urban India. *Journal of Development Economics*, 153, 102738. https://doi.org/10.1016/j.jdeveco.2021.102738
- 24. Kunovac, D., & Zilic, I. (2022). The effect of housing loan subsidies on affordability: Evidence from Croatia. *Journal of Housing Economics*, *55*, 101808. https://doi.org/10.1016/j.jhe.2021.101808
- Kutlák, J. (2021). Individualism and self-reliance of Generations Y and Z and their impact on working environment: An empirical study across 5 European countries. Problems and Perspectives in Management, 19(1), 39-52. https://doi.org/10.21511/ppm.19(1).2021.04
- Kuzior, A., Grebski, W., Kwilinski, A., Krawczyk, D., & Grebski, M. E. (2022). Revitalization of postindustrial facilities in economic and socio-cultural perspectives –

- A comparative study between Poland and the USA. *Sustainability*, 14(17), 11011. https://doi.org/10.3390/su141711011
- Kuzior, A., Ober, J., & Karwot, J. (2021). Stakeholder expectation of corporate social responsibility practices: A case study of Pwik Rybnik, Poland. *Energies*, 14(11), 3337. https://doi.org/10.3390/en14113337
- 28. Li, S. (2018). Study on the impact of local public expenditure on housing price An empirical analysis based on provincial panel data. *Modern Economy*, 9(2), 247-262. https://doi.org/10.4236/me.2018.92016
- 29. Libertun de Duren, N., & Osorio, R. (2020). The effect of public expenditure on the housing deficit in Peru at the municipal level. *Housing Policy Debate*, 30(5), 718-740. https://doi.org/10.1080/10511482.2020.1739107
- Lyeonov, S., Bilan, S., Yarovenko, H., Ostasz, G., & Kolotilina, O. (2021). Country's health profile: Social, economic, behavioral and healthcare determinants. *Economics & Sociology*, 14(3), 322-340. https://doi.org/10.14254/2071-789X.2021/14-3/17
- Lyeonov, S., Tiutiunyk, I., Vasekova, M., Dziubenko, O., & Samchyk, M. (2022). Tax, investment, institutional and social channels of economic shadowing: Challenges for macro-financial stability and good governance. *Public and Municipal Finance*, 11(1), 128-141. https://doi.org/10.21511/pmf.11(1).2022.11
- 32. Lyulyov, O., Lyeonov, S., Tiutiunyk, I., & Podgórska, J. (2021). The impact of tax gap on macroeconomic stability: Assessment using panel VEC approach. *Journal of International Studies*, 14(1), 139-152. https://doi.org/10.14254/2071-8330.2021/14-1/10
- 33. Makole, K. R., Ntshangase, B. A., Maringa, M. S., & Msosa, S. K. (2022). Can a basic income grant improve the quality of life for the poor in South Africa: An analytical review. *Business Ethics and Leadership*, 6(3), 57-67. https://doi.org/10.21272/bel.6(3).57-67.2022

- 34. Marica, S., & Piras, R. (2018). The relationship between government spending and growth: A survey. *Rivista Internazionale Di Scienze Sociali*, 126(2), 123-152. Retrieved from https://www.jstor.org/stable/26538304
- Maris, M. (2022). Management of competitiveness in the EU Member States: The main strengths and weaknesses. *Marketing and Management of Innovations*, 2, 110-120. https://doi.org/10.21272/ mmi.2022.2-10
- 36. Molidya, A., & Fanggidae, R. E. (2020). Government subsidy optimization in the property sector (housing) in the middle of the COVID-19 pandemic. Proceedings of the 5th International Conference on Tourism, Economics, Accounting, Management and Social Science (TEAMS 2020). Advances in Economics, Business and Management Research (pp. 440-447). Retrieved from https://www.atlantis-press.com/article/125948494.pdf
- 37. Musaba, E. C., Chilonda, P., & Matchaya, G. (2013). Impact of government sectoral expenditure on economic growth in Malawi, 1980–2007. *Journal of Economics and Sustainable Development, 4*(2), 71-78. Retrieved from https://core.ac.uk/download/pdf/234645824.pdf
- 38. Ovcharova, N., & Grabowska, M. (2022). Implementation of public-private partnership in the healthcare management system. Health Economics and Management Review, 3(1), 86-95. https://doi.org/10.21272/hem.2022.1-09
- 39. Pakhnenko, O., Brychko, M., & Shalda, A. (2022). Financial support of communities during the Covid-19 pandemic. *Financial Markets, Institutions and Risks*, 6(3), 83-92. https://doi.org/10.21272/fmir.6(3).83-92.2022
- Pearson, K. (1896). Mathematical contributions to the theory of evolution III. Regression, heredity, and panmixia. *Philosophical Transactions of the Royal Society of London, Series A, 187,* 253-318. https://doi.org/10.1098/rsta.1896.0007
- 41. Poku, K., Opoku, E., & Ennin, P. A. (2022). The influence

- of government expenditure on economic growth in Ghana: An Ardl approach. *Cogent Economics* & Finance, 10(1), 2160036. https:// doi.org/10.1080/23322039.2022.2 160036
- Rosokhata, A., Jasnikowski, A., Kropyva, V., & Deryzemlia, M. (2022). Financial market trends as a part of regional development: Manifestations of behavioral reactions and impulses. Financial Markets, Institutions and Risks, 6(2), 112-121. https://doi.org/10.21272/ fmir.6(2).112-121.2022
- 43. Rossi, B., & Wang, Y. (2019). Vector autoregressive-based Granger causality test in the presence of instabilities. *The Stata Journal*, 19(4), 883-899. https://doi.org/10.1177/1536867X19893631
- Salisu, P. O. (2022). Unemployment, poverty and governance questions in Nigeria: Human capital development and partnership approach options. SocioEconomic Challenges, 6(2), 127-137. https://doi.org/10.21272/sec.6(2).127-137.2022
- 45. Shapiro, S. S., & Francia, R. S. (1972). An approximate analysis of variance test for normality. *Journal of the American Statistical Association*, 67(337), 215-216. https://doi.org/10.1080/01621459. 1972.10481232
- 46. Shapiro, S. S., & Wilk, M. B. (1965). An analysis of variance test for normality (complete samples). *Biometrika*, 52(3/4), 591-611. https://doi.org/10.2307/2333709
- 47. Sheliemina, N. (2023). Interrelationship between indexes of the population medical care quality and macroeconomic efficiency. *Health Economics and Management Review, 4*(1), 47-59. https://doi.org/10.21272/hem.2023.1-05
- Shkolnyk, I., Ladyka, Y., Orlov, V., Aldiwani, K., & Kozmenko, Y. (2021). Balancing state budget expenditures: A case of Ukraine using the simplex method. *Public* and Municipal Finance, 10(1), 34-46. https://doi.org/10.21511/ pmf.10(1).2021.04
- 49. Spearman, C. E. (1904). The proof and measurement of as-

- sociation between two things. *The American Journal of Psychology, 15*(1), 72-101. https://doi.org/10.2307/1412159
- Sriningsih, S., Suriadi, I., & Fatimah, S. (2023). Government expenditure according to functions and economic growth in Indonesia. *East Asian Journal of Multidisciplinary Research* (*EAJMR*), 2(5), 1933-1956. https://doi.org/10.55927/eajmr.v2i5.3957
- 51. Stata. (n.d.). Pairwise Granger causality tests after var or svar.

  Retrieved from https://www.stata.
  com/manuals/tsvargranger.pdf
- 52. Stratan, A., Gutium, T., & Şavga, L. (2022). Effects of the non-observed economy on economic security in the Republic of Moldova. Proceedings of the 2nd International conference Interdisciplinarity and Cooperation in Cross-Border Research. Chisinau, Moldova. Retrieved from http://www.across-journal.com/index.php/across/article/view/123
- 53. Tahat, I. (2023). The sensitivities of Jordan housing demand to macroeconomic factors: Demand supply analysis model application. *SocioEconomic Challenges*, 7(1), 65-74. https://doi.org/10.21272/sec.7(1).65-74.2023
- Tiutiunyk, I. V., Zolkover, A. O., Lyeonov, S. V., & Ryabushka, L. B. (2022). The impact of economic shadowing on social development: Challenges for macroeconomic stability. *Naukovyi Visnyk Natsion-alnoho Hirnychoho Universytetu*, 1, 183-191. https://doi.org/10.33271/ nvngu/2022-1/183
- Tu, Y., Kubatko, O., Piven, V., Kovalov, B., & Kharchenko, M. (2023). Promotion of sustainable development in the EU: Social and economic drivers. *Sustain-ability*, 15(9), 7503. https://doi. org/10.3390/su15097503
- Vasilyeva, T. A., Leonov, S. V., & Lunyakov, O. V. (2013). Analysis of internal and external imbalances in the financial sector of Ukraine's economy. Actual Problems of Economics, 150(12), 176-184. Retrieved from https:// essuir.sumdu.edu.ua/handle/123456789/50836

- 57. Voznyak, H., Mulska, O., Druhov, O., Patytska, K., & Sorokovyi, D. (2023a). Adaptation of internally displaced persons in host communities under conditions of war in Ukraine: The role of local governments. *Problems and Perspectives in Management*, 21(2), 323-335. https://doi.org/10.21511/ppm.21(2).2023.32
- 58. Voznyak, H., Mulska, O., Druhov, O., Patytska, K., & Tymechko, I. (2023b). Internal migration dur-
- ing the war in Ukraine: Recent challenges and problems. *Problems and Perspectives in Management, 21*(1), 312-325. https://doi.org/10.21511/ppm.21(1).2023.27
- 59. Vysochyna, A., Molotok, I., Babenko, V., Merezhko, V., Holynska, O., & Rud, I. (2022). Impact of municipal financial resilience on sustainable economic development: Case of Ukraine. Review of Economics and Finance, 20, 662-
- 668. https://doi.org/10.55365/1923. X2022.20.77
- World Bank. (n.d.). GDP per capita growth (annual %). Retrieved from https://data.worldbank.org/ indicator/NY.GDP.PCAP.KD.ZG
- 61. Zhang, L., Chen, Y., Lyulyov, O., & Pimonenko, T. (2022). Forecasting the effect of migrants' remittances on household expenditure: COV-ID-19 impact. *Sustainability*, *14*(7), 4361. https://doi.org/10.3390/su14074361