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Guest paper

Macroeconomic determinants of housing affordability in the European Union: panel evidence from the house price-to-income ratio

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Annotation. Housing affordability has become an increasingly important socio-economic issue across the European Union, as housing prices have grown faster than household incomes in many countries. This study investigates the macroeconomic determinants of housing affordability using the house price-to-income ratio as the main indicator. The empirical analysis is based on panel data for EU member states covering the period 2000–2024 and combines macroeconomic indicators from Eurostat, including GDP per capita, purchasing power parity indicators, and GDP price level indices. Panel econometric models with country- and time-fixed effects are used to estimate the relationship between macroeconomic variables and housing affordability dynamics. In addition, cluster analysis is applied to identify groups of countries with similar housing affordability trajectories. The results indicate that macroeconomic factors play a significant role in shaping housing affordability in EU countries. Higher price levels are associated with higher house price-to-income ratios, while income growth partially mitigates affordability pressures. Cluster analysis reveals substantial heterogeneity between European housing markets, highlighting different housing market regimes across EU member states.

Keywords: housing affordability, house price-to-income ratio, housing markets, panel data analysis, European Union.

JEL classification: R21, R31, C23, E32.

Introduction

Housing affordability has become one of the most widely discussed socio-economic challenges in advanced economies. In many countries, prices of residential properties have increased substantially faster than household income, raising concerns about housing accessibility, social inequality, and financial stability. The house price-to-income ratio (HPIR) is widely used as a key indicator of housing affordability because it captures the relationship between housing prices and household purchasing power. When housing prices grow more rapidly than income, the HPIR rises, indicating increasing pressure on household budgets and declining affordability.

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The growing gap between housing prices and household income has attracted increasing attention in economic research. Early studies highlighted the relationship between the dynamics of the housing market and macroeconomic conditions. For example, Case and Shiller demonstrated that housing markets may exhibit speculative price dynamics similar to those observed in financial asset markets, where expectations about future price growth influence demand and housing price cycles (Case, Shiller, 2003). Other researchers highlighted the importance of structural factors in housing markets. Glaeser *et al*. argued that housing supply restrictions, planning regulations, and limited land availability can significantly amplify housing price increases when housing demand increases (Glaeser *et al*., 2008).

Another strand of literature focusses on the interaction between housing markets and macroeconomic cycles. Muellbauer and Murphy showed that housing prices are closely linked to economic growth, credit conditions, and financial market developments, suggesting that housing affordability problems may emerge when rapid credit expansion fuels housing demand (Muellbauer, Murphy, 2008). At the same time, several studies highlight the importance of institutional and regulatory factors in shaping housing affordability. For example, Hilber and Vermeulen found that planning restrictions and regulatory constraints significantly affect housing supply elasticity, and therefore long-term housing price developments (Hilber, Vermeulen, 2016).

More recent research highlights that housing affordability trends differ significantly between countries. Dewilde shows that housing affordability for low-income households has deteriorated in several Western European countries, reflecting structural differences in housing markets and welfare regimes (Dewilde, 2018). These findings suggest that the dynamics of housing affordability are shaped not only by macroeconomic conditions but also by institutional factors and structures of the housing market.

Recent empirical studies increasingly apply panel econometric techniques to analyse housing affordability dynamics across countries. For example, Arnerić *et al*. (2024) employ panel data methods to examine the drivers of housing affordability across member states of the European Union, highlighting the importance of macroeconomic conditions and demographic trends. Similarly, Lee *et al*. (2022) show that income growth, demographic change, and housing supply constraints jointly influence housing affordability outcomes in advanced economies. Biljanovska and Chen (2023) constructed a cross-country dataset of housing affordability indicators and demonstrated that affordability pressures have intensified in many developed economies over the past decade. Despite these contributions, empirical studies that jointly analyse macroeconomic determinants of housing affordability in EU countries using panel econometric models remain relatively limited.

Despite the growing literature on housing markets, relatively few studies analyse the determinants of housing affordability in countries of the European Union using panel econometric methods. Most existing studies focus either on housing price dynamics or on housing affordability within individual countries. As a result, empirical evidence on the macroeconomic determinants of housing affordability in the EU remains relatively limited.

Therefore, the purpose of this study is to investigate the macroeconomic determinants of housing affordability in the European Union using panel data for the period 2000–2024. The analysis focusses on the relationship between the HPIR and key macroeconomic indicators, including GDP per capita, purchasing power parity indicators, and price level indices. In addition to panel regression analysis, the study applies cluster analysis to identify groups of countries with similar housing affordability dynamics.

The HPIR is used as the main indicator because it captures the relationship between housing market developments and household purchasing power in a comparable way across countries. While panel regression analysis allows the identification of macroeconomic factors associated with changes in housing affordability, cluster analysis provides additional information on structural differences between housing markets. By grouping countries according to the dynamics of housing affordability, the cluster approach helps identify different housing market regimes within the European Union.

Empirical results indicate that macroeconomic factors play a significant role in shaping housing affordability in EU countries. Economic growth, cross-country price level differences, and purchasing power disparities significantly influence the HPIR. The results also reveal substantial heterogeneity between European housing markets, highlighting the importance of structural differences between countries.

By providing new empirical evidence on the macroeconomic drivers of housing affordability in EU member states, this study contributes to the literature on housing economics and offers policy insights to improve housing affordability and housing market stability in Europe.

This study contributes to the literature on housing affordability in several ways. First, it provides a comprehensive cross-country analysis of housing affordability dynamics across member states of the European Union using a long panel dataset covering the period 2000–2020. Second, the analysis combines panel econometric models with cluster analysis to identify different housing market regimes in European countries. Third, the study distinguishes between long-term affordability levels and short-term housing market dynamics, allowing a more nuanced understanding of the macroeconomic determinants of the HPIR. By integrating these approaches, the study offers new empirical evidence on the macroeconomic drivers of housing affordability and provides policy-relevant insights to improve housing market stability in Europe.

By combining panel econometric analysis with a comparative cluster-based examination of housing affordability trajectories across EU member states, this study provides new empirical insights into the macroeconomic factors associated with housing affordability dynamics and highlights structural differences between European housing markets.

1. Review of the Literature

The determinants of housing affordability have received increasing attention in the economic literature, particularly following the rapid growth of housing prices observed in many advanced economies during the last two decades. Housing affordability is commonly analysed through the relationship between housing prices and household income, often measured using the HPIR. When housing prices grow faster than income, housing becomes less accessible to households, creating affordability pressures and potential social and macroeconomic risks.

An important strand of research focusses on the macroeconomic drivers of the dynamics of housing prices. Early empirical work emphasised the relationship between economic growth, income levels, and housing demand. Case and Shiller demonstrated that housing markets can exhibit speculative dynamics like financial asset markets, where expectations about future price appreciation contribute to housing price fluctuations and market cycles (Case, Shiller, 2003). Subsequent studies highlighted the importance of macroeconomic cycles and financial conditions in shaping housing market developments. For example, Muellbauer and Murphy argued that housing markets are strongly influenced by income growth, credit availability, and financial market conditions, which together determine the strength of

housing demand (Muellbauer, Murphy, 2008). Rys and Rys (2025) explored the relationship between income growth and housing prices in the seven largest cities in Poland Researchers analyse the consequence of financial support by the government in response to the recent energy crisis and the resilience of households (Burlinson *et al*., 2024). Kuang *et al*. (2026) studied how macroprudential policy changes affect consumer expectations of the housing market and perceptions of housing affordability. Sá (2025) found that foreign investment increases house prices and therefore influences housing affordability.

A second strand of literature emphasises the role of housing supply constraints in determining housing price dynamics. In markets where housing supply is highly regulated or subject to land use restrictions, increases in demand can lead to substantial increases in housing prices. Glaeser *et al*. argue that supply restrictions represent a key structural determinant of housing prices, particularly in urban areas where land availability is limited (Glaeser *et al*., 2008). The dispersion in house prices across regions and relative housing affordability were analysed by Pionnier and Schuffels (2024). Empirical research by Hilber and Vermeulen further demonstrates that regulatory constraints significantly affect housing supply elasticity and therefore influence long-term housing price developments (Hilber & Vermeulen, 2016). Similarly, Saiz shows that geographical and regulatory constraints can strongly limit housing supply responses, amplifying housing price increases in high-demand regions (Saiz, 2010). Recent empirical work also applies panel data methods to analyse socio-economic and demographic drivers of housing affordability across EU member states (Arnerić *et al*., 2024).

More recent research has increasingly focussed on housing affordability as a socio-economic challenge rather than solely a housing market phenomenon. Dewilde shows that housing affordability has deteriorated significantly for low-income households in several Western European countries due to rising housing costs and stagnant income growth (Dewilde, 2018). Balz (2025) examines housing affordability in Germany from 2017 to 2023, considering rising real estate prices. Chirita *et al*. (2026) explore the socioeconomic implications of affordability issues, emphasising their links to inequality and financial vulnerability. Hromada (2024) highlights a strong correlation between regional economic vitality and property prices. Ioannides and Ngai (2025) investigate the impact of unequal endowments on housing. Lim *et al*. (2025) explore the effects of government financial assistance to relieve cost-of-living and housing affordability pressures. The differences in housing affordability between countries are also related to variations in housing policy, welfare systems, and institutional housing frameworks.

Recent studies further highlight the growing importance of affordable housing in advanced economies. For example, Lee *et al*. (2022) found that macroeconomic factors such as income growth and demographic changes significantly influence housing affordability dynamics in developed economies. Similarly, Molloy *et al*. (2022) show that housing supply constraints and rising construction costs play an important role in driving housing price increases. Alshubiri and Al Ani (2024) emphasises that housing affordability indicators are closely related to broader patterns of economic sustainability and urban development.

Other recent studies highlight the growing divergence of housing affordability trends between countries. Biljanovska and Chen (2023) develop a cross-country housing affordability dataset and show that affordability pressures have intensified in many advanced economies over the past decade. Reichle *et al*. (2023) demonstrate that new economic phenomena, such as short-term rental platforms, may further contribute to increases in housing prices in urban areas. Similarly, Nasrabadi *et al*. (2024) show that research on housing inequality and affordability has expanded significantly over the past decade, reflecting growing concerns about housing accessibility and social inequality.

Despite the growing body of literature on housing markets and affordability, relatively few studies analyse the determinants of housing affordability in countries of the European Union using panel econometric methods. Most existing research focusses either on housing price dynamics or on housing affordability within individual countries. As a result, empirical evidence on the macroeconomic determinants of housing affordability in the European Union remains relatively limited.

This study contributes to the literature by providing a comprehensive panel data analysis of housing affordability dynamics in EU member states. By combining macroeconomic indicators with cluster analysis of housing market regimes, the study provides new insights into the structural determinants of housing affordability in European housing markets.

The reviewed literature highlights several important determinants of housing affordability, including macroeconomic conditions, housing supply constraints, and institutional characteristics of housing systems. However, previous studies often focus on individual countries or on housing price dynamics rather than on housing affordability indicators themselves. In addition, only a limited number of studies combine macroeconomic panel econometric analysis with structural comparisons of housing market regimes across countries. Therefore, the present study extends the existing literature by analysing the macroeconomic determinants of the HPIR across EU member states and by complementing panel regression analysis with cluster analysis that identifies different housing market regimes.

2. Data and Methodology

This section describes the data sources, variables, and empirical methods used to analyse the dynamics of housing affordability in the European Union. The analysis is based on panel data for EU member states covering the period 2000–2024. Macroeconomic indicators were obtained from the Eurostat database, including GDP per capita indices, purchasing power parity indicators, and GDP price level indices. Empirical analysis combines panel econometric models and cluster analysis to examine both the determinants and structural patterns of housing affordability in European housing markets.

2.1 Data

Empirical analysis uses an annual balanced panel for the 27 member states covering the period 2000–2024. The data set was constructed from harmonised Eurostat tables into a single long-format panel suitable for econometric analysis. The dependent variable is the standardised HPIR (2015=100), which captures the relative evolution of housing prices compared to income and serves as a direct indicator of housing affordability pressure. *Table 1* presents descriptive statistics of the variables.

Four macroeconomic explanatory variables were created from the research tables. First, GDP per capita – GDP_PC_INDEX_Q4 (index 2015=100, end-of-period Q4 values) proxy income and broad real convergence. Second, the GDP price-level indices (PLI_GDP) capture cross-country differences in general price levels and cost structures. Third, the GDP indices of purchasing power parities (PPP_GDP) reflect the relative purchasing power of households across countries. Fourth, the annual average rate of change of the HPIR provides a growth-based measure for the dynamics of the short-run housing market.

The final panel contains 675 country-year observations before lag and first differencing. After data transformations are used in the dynamic and growth specifications, the number of observations varies by model. All series were kept at an annual frequency to ensure full comparability across uploaded datasets and to match the econometric design intended for EViews.

Table 1. Descriptive statistics of the variables

	HPIR_INDEX	HPIR_GROWTH_PCT	PLI_GDP	PPP_GDP	GDP_PC_INDEX_Q4
Mean	107.6672	0.528549	90.36798	9.553713	104.7298
Median	104.2000	0.350000	89.60000	1.073645	103.5435
Maximum	263.1400	51.50000	141.7000	279.9300	167.3360
Minimum	55.87000	-31.90000	34.50000	0.343302	50.10500
Std. Dev.	20.17454	7.484899	25.50569	36.53316	16.83353
Skewness	1.857952	1.103524	-0.005903	5.094924	0.360634
Kurtosis	12.17514	11.12590	1.925481	28.72789	4.551479
Jarque-Bera	2588.601	1872.974	30.50414	20228.76	77.32990
Probability	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	68261.03	335.1000	57293.30	6057.054	66398.69
Sum Sq. Dev.	257638.7	35463.01	411792.0	844847.4	179371.9
Observations	634	634	634	634	634

Source: own data.

All data used in the analysis are publicly available from the Eurostat database and can be accessed through the Eurostat online data portal.

2.2 Variables and Transformations

To improve interpretability and reduce scale sensitivity, the baseline levels models use logarithmic transformations of the HPIR, GDP per capita, GDP price level indices, and purchasing power parities. Therefore, the panel workbook includes ln_hpir_index, ln_gdp_pc_index_q4, ln_pli_gdp, and ln_ppp_gdp. Lagged values of the dependent and explanatory variables were generated to estimate delayed macroeconomic effects, while first differences were created for growth specifications.

Furthermore, four regime indicators were defined to capture the main macrofinancial phases in European housing markets: the pre-crisis boom (2000–2007), the global financial crisis adjustment (2008–2012), the post-crisis recovery (2013–2019) and the post-COVID period (2020–2024). These period markers allow for direct testing of structural shifts in housing affordability dynamics.

2.3 Variables and Transformations

The main empirical specification is a two-way fixed effects model with country and year effects:

$$\ln(HPIR_{it}) = \alpha + \beta_1 \ln(GDPpc_{it}) + \beta_2 \ln(PLI_{it}) + \mu_i + \lambda_t + \varepsilon_{it} \quad (1)$$

where $HPIR_{it}$ denotes the HPIR in country i and year t, $GDPpc_{it}$ is GDP per capita, PLI_{it} is the GDP price level index, μ_i captures unobserved country heterogeneity, λ_t controls for common time shocks, and ε_{it} is the idiosyncratic error term.

In addition to the baseline specification, two alternative models are estimated. The first replaces the GDP price level index with purchasing power parity indicators in order to capture differences in household purchasing power across countries.

$$\ln(HPIR_{it}) = \alpha + \beta_1 \ln(GDPpc_{it}) + \beta_2 \ln(PPP_{it}) + \mu_i + \lambda_t + \varepsilon_{it} \quad (2)$$

The second specification examines short-term housing affordability dynamics using the annual rate of change of the HPIR as the dependent variable.

$$\Delta HPIR_{it} = \alpha + \beta_1 \Delta GDPpc_{it} + \beta_2 \Delta PLI_{it} + \mu_i + \lambda_t + \varepsilon_{it} \quad (3)$$

These alternative specifications allow us to distinguish between long-term affordability levels and short-term housing market dynamics.

An alternative levels model replaces the price-level index with purchasing power parities. A growth model is also estimated with the annual rate of change in the HPIR as the dependent variable and the first differences of GDP per capita and the price-level index as short-run regressors. This combination allows the analysis to distinguish long-term affordability levels from short-term acceleration of the housing market.

2.4 Cluster Analysis

Because EU housing markets are structurally heterogeneous, a country clustering stage was added before interpretation. The countries were clustered on the basis of their HPIR trajectories. A three-cluster solution was retained because it provides a more informative interpretation of housing market regimes than the purely mechanical two-cluster optimum. The three groups were labelled mature high-price-level, catch-up mixed-cycle, and high-volatility convergence markets.

In the final panel file, cluster dummies and interaction terms between clusters and macroeconomic variables were generated. This allows direct testing of whether the elasticity of housing affordability differs between housing market regimes.

2.5 Estimation Strategy and Robustness

The empirical strategy progresses in six steps. First, the pooled OLS models are estimated as a reference. Second, two-way fixed-effects models are estimated using country and year dummies. Third, alternative specifications replace GDP price level indices with purchasing power parities. Fourth, lagged models are estimated to account for the delayed transmission from macroeconomic conditions to affordability. Fifth, separate regressions are run for the major sub-periods. Sixth, cluster interaction models are used to test heterogeneity in coefficients.

Model selection between fixed and random effects was performed using the Hausman test after estimating comparable fixed-effects and random-effects panel models.

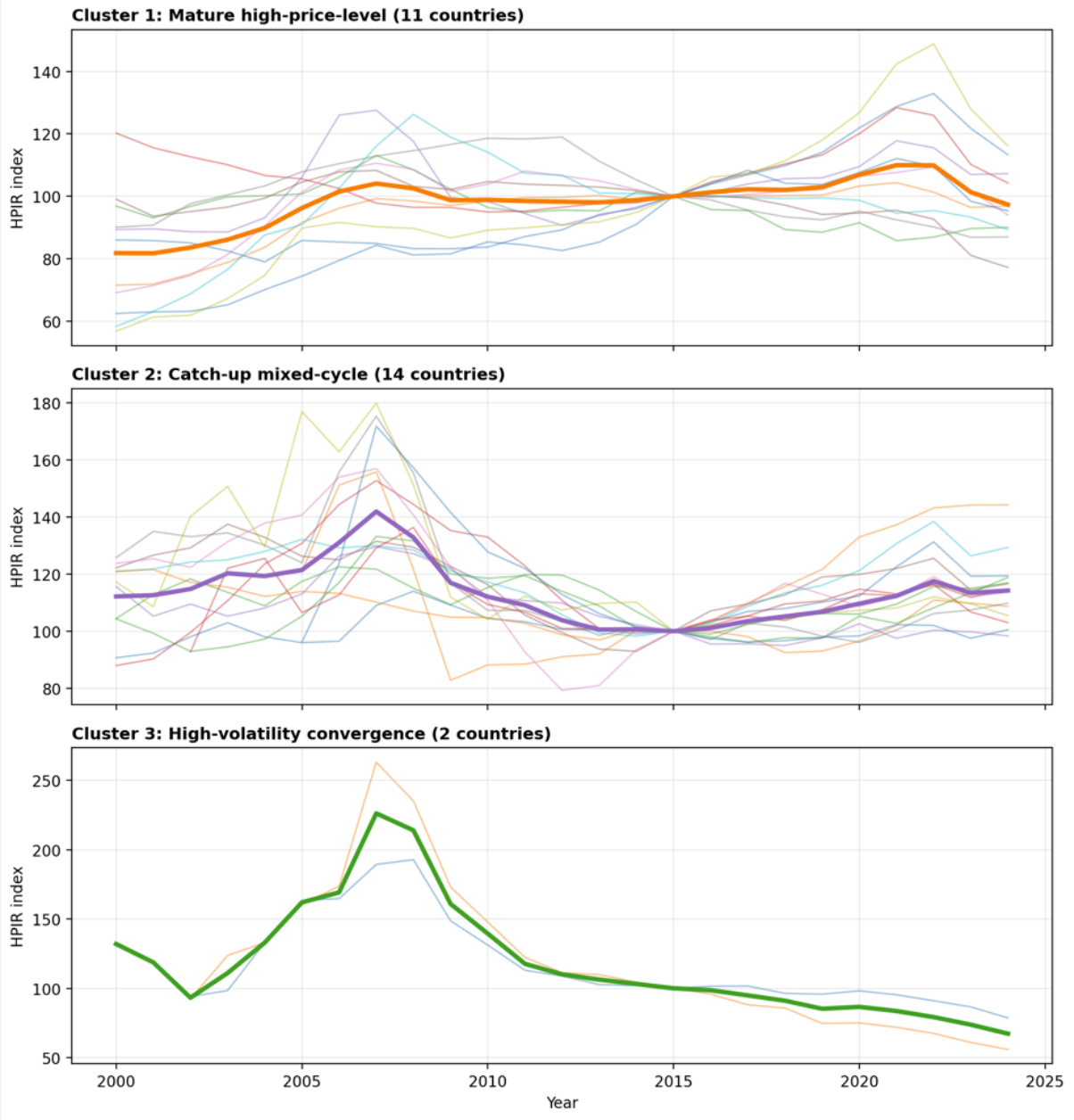
3. Results

The presentation of empirical results begins with the cluster analysis in order to il-lustrate the structural heterogeneity of housing affordability trajectories across EU member states, before discussing the econometric estimation results.

3.1 Descriptive Patterns and Cluster Structure

The descriptive statistics presented in *Table 1* reveal substantial heterogeneity in housing affordability in all EU member states. The mean value of the HPIR index is 107.7, with a relatively high standard deviation of 20.17, indicating considerable variation in affordability conditions. The maximum value of the index (263.1) suggests that in some country-year observations, housing prices grew more than twice as fast as household income relative to the base year.

Figure 1 illustrates the median trajectories of the HPIR for these clusters. To better understand these differences, a clustering procedure was applied to group countries according to their housing affordability trajectories.



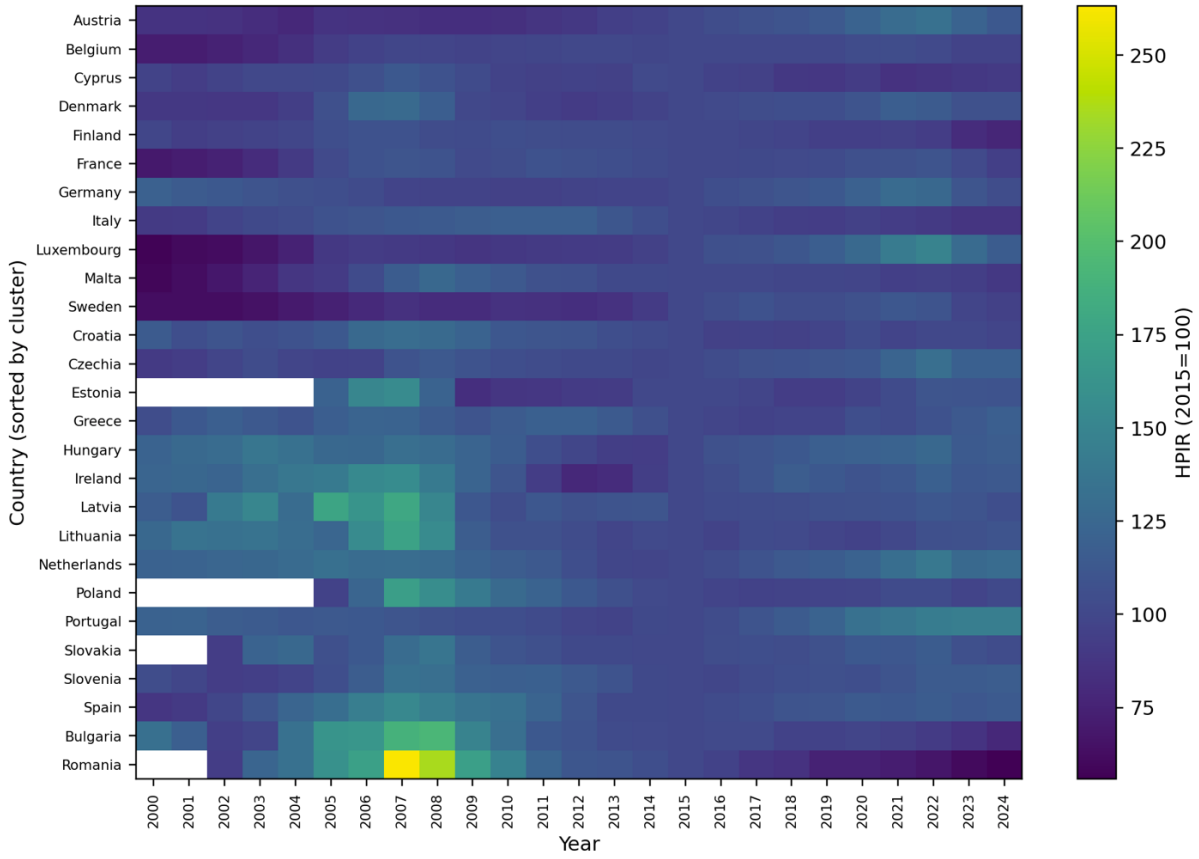
Source: own data.

Figure 1. **Trajectories of the HPIR by Country Cluster**

The clustering algorithm identifies three distinct housing market regimes. The first group, labelled Mature high-price-level markets, includes countries with persistently high housing prices relative to income, such as Austria, Belgium, Denmark, France, and Sweden. The second cluster, Catch-up mixed-cycle markets, consists mainly of Central and Southern European economies where housing prices increased rapidly during certain periods, but also experienced strong corrections. The third cluster, the high-

volatility convergence markets, includes Bulgaria and Romania, where the dynamics of housing affordability exhibit particularly strong fluctuations.

Mature housing markets maintain relatively stable but elevated affordability pressures throughout the sample period. On the contrary, catch-up economies exhibit more pronounced cyclical dynamics, particularly after the global financial crisis. The high-volatility group shows strong convergence patterns combined with higher volatility, reflecting the structural transformation of housing markets in these economies.



Source: own data.

Figure 2. **Heatmap of the HPIR Trajectories by Country and Year**

Figure 2 complements this evidence by presenting a heatmap of the trajectories of the HPIRs between countries and years. The figure highlights both regional persistence and significant temporal variation in housing affordability. In particular, affordability pressures intensified in several countries after 2013, coinciding with the period of low interest rates and renewed expansion of the housing market in Europe.

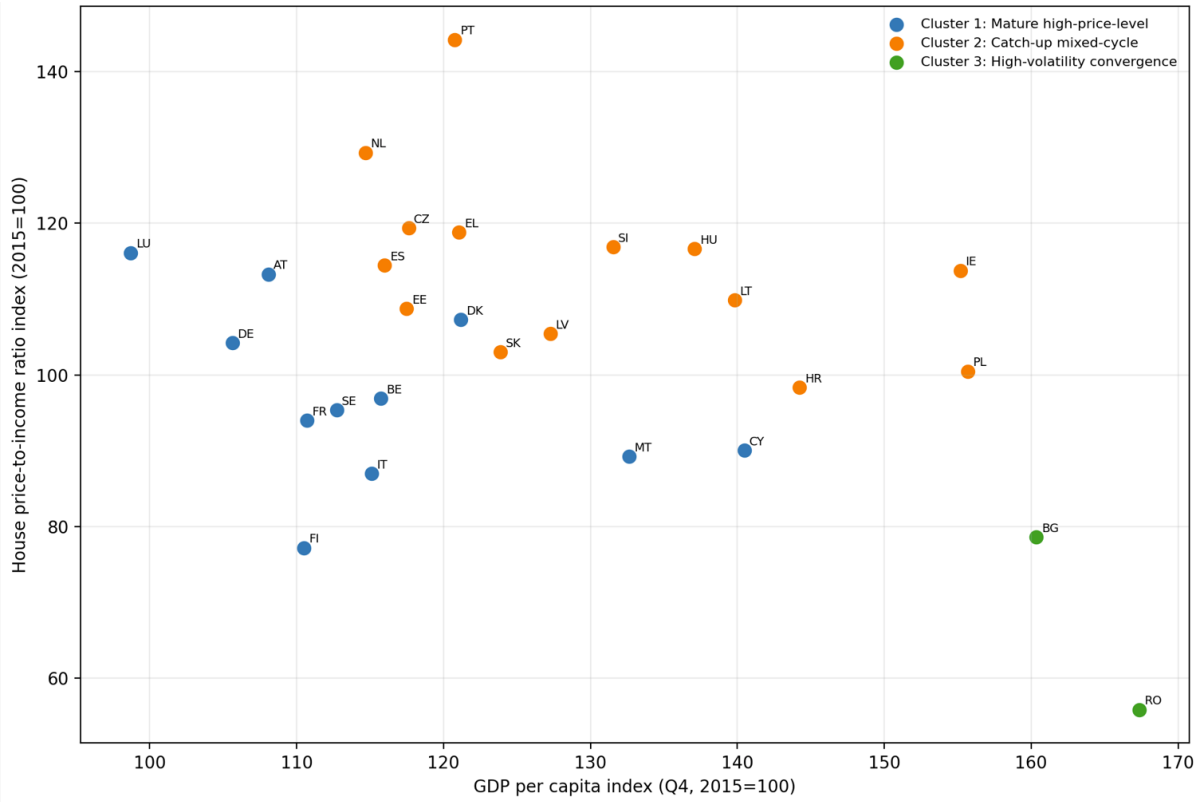
3.2 Baseline Panel Regression Results

The main empirical results are obtained using two-way fixed effects panel models that control for both country-specific and time-specific effects. This specification allows for isolation of the impact of macroeconomic variables on housing affordability while accounting for unobserved heterogeneity between countries and common macroeconomic shocks.

The fixed-effects model explains a substantial share of the variation in housing affordability across EU countries, indicating that macroeconomic factors provide meaningful explanatory power for cross-country differences in the HPIR.

In the baseline specification, including GDP per capita and the GDP price level index, the estimated coefficient for ln(GDP per capita) is equal to 0.507 ($p < 0.001$), while the coefficient for ln (PLI) is equal to 0.262 ($p = 0.029$). These results indicate a statistically significant association between macroeconomic conditions and housing affordability dynamics across EU member states.

Figure 3 illustrates the cross-sectional relationship between housing affordability and GDP per capita in 2024. Although richer countries often exhibit higher housing prices in absolute terms, the relationship between income and affordability pressures becomes more complex once country-specific structural factors are taken into account.



Source: own data.

Figure 3. **House Affordability vs. GDP per capita, 2024**

The negative coefficient for GDP per capita implies that higher income levels are associated with lower housing affordability pressures once country-specific characteristics and common macroeconomic shocks are taken into account. In other words, improvements in household income partially offset increases in housing prices, thereby moderating the growth of the HPIR. This finding is consistent with the interpretation that income convergence in the European Union may help mitigate housing affordability pressures in some economies.

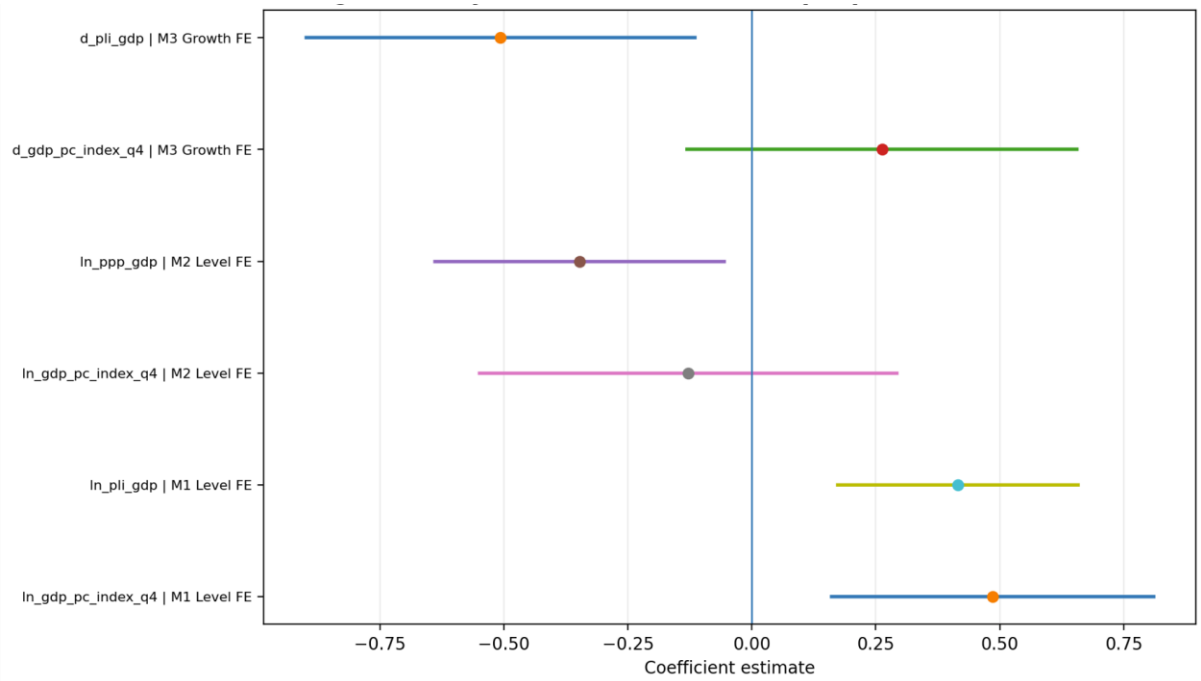
The positive coefficient for the GDP price level index indicates that countries with higher overall price levels tend to exhibit higher HPIRs. This result suggests that housing affordability is closely related to

broader cost-of-living structures. In economies where the general price level is higher, housing prices also tend to be relatively higher compared to household income.

3.3 Alternative Specification Using Purchasing Power Parity

To test the robustness of the baseline results, an alternative specification replaces the GDP price level index with purchasing power parity purchasing power parity. In this model, the coefficient for ln(GDP per capita) is equal to 0.347 ($p < 0.001$), while the coefficient for ln purchasing power parity is equal to 0.129 ($p = 0.233$).

The GDP coefficient remains negative and statistically significant, confirming the robustness of the income effect identified in the baseline model. However, the purchasing power parity variable is not statistically significant at conventional levels. This result suggests that the GDP price level index provides a more informative measure of cross-country price differences to explain the dynamics of housing affordability in the current data set.



Source: created by the authors.

Figure 4. **Key Coefficients from Example Panel Models (95% CI)**

Figure 4 summarises the estimated coefficients and their confidence intervals across the alternative panel model specifications. The *Figure 4* shows that the estimated effects of macroeconomic variables remain relatively stable between different model specifications.

3.4 Short-Term Dynamics of Housing Affordability

In addition to the levels models, a growth specification was estimated using the annual rate of change in the HPIR as the dependent variable. This model captures the dynamics of the short-term housing market rather than long-term affordability levels.

The results indicate that a one-unit increase in the annual change in GDP per capita is associated with a 0.416 increase in the annual growth of the HPIR ($p < 0.001$). Similarly, a one-unit increase in the annual change in the price level index leads to a 0.486 increase in HPIR growth ($p < 0.001$).

These results suggest that the dynamics of short-term housing affordability are strongly influenced by macroeconomic growth and price developments. Rapid income growth may stimulate housing demand, while increases in general price levels may also contribute to housing price growth.

At the same time, the estimated coefficients for the crisis and post-crisis regime indicators are negative, indicating that housing affordability growth was weaker during the adjustment and recovery periods compared with the pre-crisis housing boom.

3.5 Sub-Period Analysis

The sub-period regressions reveal that the relationship between macroeconomic variables and housing affordability changed over time. During the pre-crisis period (2000–2007), the estimated effects of GDP per capita and the price level index are relatively weak, reflecting the broad expansion of credit and housing market boom that characterised this period.

On the contrary, during the crisis period (2008–2012), the coefficient of the price level index becomes strongly positive and statistically significant. This suggests that relative price structures played an important role in the adjustment of housing markets after the global financial crisis.

During the recovery period (2013–2019), the effect of the price level remains positive and statistically significant, while the GDP coefficient weakens. In the most recent period (2020–2024), estimates become less stable, which is not surprising given the simultaneous effects of pandemic shocks, inflationary pressures, and monetary policy normalisation.

Table 2. Sub-period fixed effects estimates for the level specification

Period	N	GDP coef.	GDP p	PLI coef.		PLI p
2000–2007	202	0.091	0.566	0.372		0.191
2008–2012	135	-0.122	0.519	1.168		0.001
2013–2019	189	-0.162	0.576	0.533		0.040
2020–2024	135	0.122	0.531	0.140		0.440

Source: own data.

In general, these results highlight the importance of considering structural breaks and macroeconomic regime changes when analysing housing affordability dynamics over long time horizons. *Table 2* presents the sub-period fixed effects estimates for the level specification.

4. Discussion and Policy Implications

The empirical results of this study highlight the important role of macroeconomic factors in shaping housing affordability dynamics in member states of the European Union. Panel regression estimates indicate that GDP per capita and the GDP price level index are statistically significant determinants of the HPIR. These results confirm that housing affordability is closely related to broader macroeconomic conditions rather than being determined solely by factors specific to the housing market.

The positive relationship between the price level index and the HPIR suggests that housing affordability pressures tend to be stronger in economies with higher overall price levels. This finding is consistent with

previous research that indicates that housing markets tend to reflect broader cost-of-living structures and economic development patterns (Hilber, Vermeulen, 2016). In high-price economies, housing prices tend to grow faster than household incomes, contributing to increasing affordability pressures.

At the same time, the negative coefficient for GDP per capita in fixed-effects models suggests that income growth may partially mitigate housing affordability pressures. Higher income levels improve household purchasing power and can offset increases in housing prices to some extent. This result is consistent with the literature that emphasises the role of income growth in shaping housing demand and housing market dynamics (Muellbauer, Murphy, 2008).

Cluster analysis reveals significant heterogeneity in housing affordability dynamics in EU member states. Mature housing markets with relatively high price levels show persistent affordability pressures, while several Central and Southern European economies exhibit stronger cyclical patterns. On the contrary, emerging housing markets display higher volatility but also signs of gradual convergence towards broader European housing price structures. These findings support the view that the dynamics of housing affordability are influenced by structural differences in housing systems, including institutional frameworks, housing supply conditions, and mortgage market structures.

The results also highlight the importance of changes in the macroeconomic regime. During the pre-crisis period, the dynamics of housing affordability were strongly influenced by rapid credit expansion and booms in the housing market. On the contrary, the global financial crisis significantly altered the conditions of the housing market in Europe. The post-crisis recovery period was characterised by renewed housing price growth in many countries, partly driven by low interest rates and increasing demand for urban housing.

These findings are consistent with a broader strand of literature emphasising the macrofinancial nature of housing market dynamics. Housing affordability pressures often arise not only from housing market-specific factors, but also from wider macroeconomic conditions, including income convergence, price level differences, and macroeconomic cycles. Therefore, housing affordability should be analysed within a broader macroeconomic framework that considers both housing market structures and general economic developments.

From a policy perspective, the results suggest that improving housing affordability requires a combination of housing market policies and broader macroeconomic measures. Empirical results suggest that housing affordability pressures are closely associated with macroeconomic conditions and general price level structures. In countries with persistently high price levels, the pressures for housing affordability tend to be stronger. Therefore, policies aimed at improving housing affordability should consider both housing market measures and broader macroeconomic conditions. For example, policies that facilitate the expansion of housing supply in high-demand regions may help moderate the growth of housing prices, while policies supporting sustainable income growth can improve household purchasing power.

Furthermore, policies that support income growth and economic convergence within the European Union can also contribute to improving housing affordability. Higher household incomes can partially offset rising housing prices and reduce affordability pressures. At the same time, careful monitoring of housing market developments is necessary to identify potential housing bubbles and macroeconomic risks.

In general, the findings indicate that housing affordability is shaped by a complex interaction between macroeconomic conditions and structural characteristics of the housing market. Effective housing policies should, therefore, adopt a comprehensive approach that considers both housing supply conditions and broader economic developments.

5. Limitations and Future Research

This study focusses primarily on macroeconomic indicators and national data to analyse housing affordability dynamics in member states of the European Union. Although this approach allows for identifying broad macroeconomic patterns, it may not fully capture important regional differences within countries, particularly in large urban housing markets, where housing price dynamics often differ substantially from national averages.

Another limitation concerns the set of explanatory variables included in the empirical models. Although the analysis incorporates key macroeconomic indicators such as GDP per capita, purchasing power parity, and price level indices, other important factors may also influence housing affordability. Mortgage interest rates, housing supply constraints, demographic changes, and institutional characteristics of housing systems can play an important role in shaping housing affordability outcomes.

Therefore, future research could extend the analysis by incorporating regional housing market data and additional variables reflecting housing supply conditions, credit market developments, and demographic trends. Such extensions would allow for a more detailed understanding of the dynamics of housing affordability and the structural differences between European housing markets.

Conclusions and Recommendations

Housing affordability has become an increasingly important socio-economic issue across the European Union. The rapid growth in housing prices relative to household income has raised concerns about housing accessibility, social inequality, and the long-term stability of housing markets. Therefore, understanding the macroeconomic determinants of housing affordability is essential for designing effective housing policies and improving the functioning of housing markets.

The purpose of this study was to examine the macroeconomic determinants of housing affordability in the European Union using panel data analysis for the period 2000–2024. The analysis focussed on the relationship between the HPIR and key macroeconomic indicators, including GDP per capita, purchasing power parity indicators, and price level indices. Additionally, a cluster analysis was applied to identify groups of countries with similar housing affordability trajectories.

Empirical results demonstrate that macroeconomic factors play an important role in shaping housing affordability dynamics in EU member states. The results of the panel regression indicate that GDP per capita and price level indices are statistically significant determinants of the HPIR. Higher price levels are associated with increased housing affordability pressures, whereas higher income levels partially mitigate these effects by improving household purchasing power. These findings confirm the importance of macroeconomic conditions in determining housing affordability outcomes.

Cluster analysis also reveals substantial heterogeneity in the dynamics of housing affordability in European housing markets. Three main groups of countries were identified, representing different housing market regimes. Mature housing markets with relatively high price levels exhibit persistent affordability pressures, while several Central and Southern European countries exhibit stronger cyclical

dynamics. On the contrary, some emerging housing markets show greater volatility combined with gradual convergence towards European housing price structures.

The analysis of short-term dynamics indicates that housing affordability growth is strongly influenced by macroeconomic fluctuations. Periods of rapid economic growth and rising price levels tend to coincide with increases in the HPIR. Sub-period analysis also highlights the importance of macroeconomic regime changes, particularly during the global financial crisis and the subsequent recovery period.

From a policy perspective, the results suggest that housing affordability cannot be addressed solely through housing market policies. Broader macroeconomic conditions, including income growth, inflation dynamics, and price level structures, play an important role in shaping housing affordability outcomes. Therefore, policies aimed at improving housing affordability should combine housing supply measures with broader macroeconomic and structural policies.

In particular, increasing housing supply remains a key policy instrument for improving housing affordability in many European countries. Reducing regulatory barriers, improving urban planning procedures, and encouraging new housing construction can help moderate housing price growth in high-demand areas. At the same time, policies supporting income growth and economic convergence within the European Union can also contribute to improving housing affordability.

Despite providing new empirical evidence on the dynamics of housing affordability in EU member states, this study has several limitations. The analysis focusses primarily on macroeconomic indicators and national data, which may not fully capture the dynamics of the regional housing market. Housing affordability often varies significantly between regions and cities within individual countries. Therefore, future research could extend the analysis by incorporating regional housing market data and additional variables such as mortgage interest rates, housing supply indicators, and demographic factors.

Further research could also explore the role of institutional and policy differences between housing systems in shaping housing affordability outcomes. Comparative studies of housing policy frameworks can provide additional information on the structural determinants of housing affordability in different European housing regimes.

In general, this study contributes to the growing literature on housing affordability by providing new empirical evidence on the macroeconomic determinants of housing affordability in the European Union. By combining panel econometric analysis with cluster analysis of housing market regimes, the study highlights the complex interaction between macroeconomic conditions and structural characteristics of the housing market. These findings provide useful information for policy makers looking to address housing affordability challenges and promote sustainable development of the housing market in Europe.

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MAKROEKONOMINIAI BŪSTO ĮPERKAMUMO VEIKSNIAI EUROPOS SĄJUNGOJE: BŪSTO KAINOS IR PAJAMŲ SANTYKIO TYRIMAS

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Santrauka. Būsto įperkamumas tampa vis svarbesniu socialiniu ir ekonominiu klausimu visoje Europos Sąjungoje, nes daugelyje šalių būsto kainos augo sparčiau nei namų ūkių pajamos. Tyrime analizuojami makroekonominiai būsto įperkamumo veiksniai, o būsto kainos ir pajamų santykis pasitelkiamas kaip pagrindinis vertinimo rodiklis. Empirinė analizė pagrįsta ES valstybių narių paneliniais duomenimis, apimančiais 2000–2024 m. laikotarpį. Ji apima ir „Eurostato“ makroekonominius rodiklius, įskaitant BVP vienam gyventojui, perkamosios galios pariteto rodiklius ir BVP kainų lygio indeksus. Makroekonominių kintamųjų ir būsto įperkamumo dinamikos ryšiui vertinti naudojami paneliniai ekonometriniai modeliai su šalies ir laiko poveikio duomenimis. Be to, klasterinė analizė taikoma siekiant nustatyti šalių grupes, pasižyminčias panašiomis būsto įperkamumo trajektorijomis. Rezultatai rodo, kad makroekonominiai veiksniai yra reikšmingi formuojant būsto įperkamumą ES šalyse. Didesnis kainų lygis yra susijęs su didesniu būsto kainos ir pajamų santykiu, o pajamų augimas iš dalies gerina būsto įperkamumą. Klasterinė analizė atskleidžia didelį Europos būsto rinkų nevienalytiškumą, išryškindama skirtingus būsto rinkos režimus įvairiose ES valstybėse narėse.

Reikšminiai žodžiai: būsto įperkamumas; būsto kainos ir pajamų santykis; būsto rinkos; panelinių duomenų analizė; Europos Sąjunga.