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Access to Housing and Economic Growth in the European Union

Pedro Bação*, Ana Conceição, Marta Simões*****

Abstract: The European Union is facing what some identify as a housing crisis characterized by rising housing prices and rents and a dearth of affordable housing. Beyond its concerning direct effects on household well-being, the housing crisis may also pose long-term risks to macroeconomic performance. Escalating housing prices and rents can result in resource misallocation and shortages of highly skilled labor in key places, as well as increasing inequality, which could ultimately slow growth. An empirical assessment is conducted to examine the relationship between housing affordability pressures – proxied by the share of housing expenditure in household final consumption – and economic growth in the European Union, using data from 21 member states spanning the period from 2000 to 2019. We estimate a growth regression with country and time fixed effects and alternative inference approaches, and include a comprehensive set of control variables selected from prior literature. In this macro panel, inference is sensitive to the covariance estimator; we therefore report Driscoll-Kraay and country-clustered inference and focus on the sign, magnitude, and robustness of the estimated association. Under Driscoll-Kraay inference, a 10% relative increase (e.g., 20% to 22%) in the housing expenditure share is associated with about 0.3 percentage points lower annual real GDP growth (with similar results for real GDP per capita). These findings are consistent with the view that rising housing cost burdens may weigh on growth, but they should not be interpreted as causal effects.

Keywords: Housing Affordability; Economic Growth; European Union.

JEL classification: C33; O18; O47.

* Faculty of Economics, University of Coimbra, CeBER, Coimbra, Portugal; e-mail: *pmab@fe.uc.pt*.
** Faculty of Economics, University of Coimbra, Coimbra, Portugal; e-mail: *2020223672@student.uc.pt*.
*** Faculty of Economics, University of Coimbra, CeBER, Coimbra, Portugal; e-mail: *mcsimoes@fe.uc.pt* (corresponding author).

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1. INTRODUCTION

The European Union is experiencing what has been increasingly recognized as a housing crisis, prompting institutions such as the European Parliament to establish a dedicated committee (the Special Committee on the Housing Crisis in the European Union - https://www.europarl.europa.eu/committees/en/hous/home/) to address the issue. This housing crisis is characterized by rising housing prices and rents and a dearth of affordable housing – see European Parliament (2024) and Kuiper and Carbonell (2024). Between 2015 and 2023, house prices in the EU rose on average by 48%, and rents rose by 18% on average over a similar period (2010-2022), outpacing inflation. According to the OECD (2020), housing expenditures constitute the largest component of household spending, with their relative share increasing over the past two decades. This trend has disproportionately impacted lower-income households, who have experienced a marked rise in the proportion of their income allocated to housing costs.

Given these economic dynamics, the prospect of ample access to housing, which could be broadly defined as the degree to which individuals or households can obtain and maintain adequate, secure, and affordable housing that meets their needs (OECD, 2021), is increasingly jeopardized. In our empirical analysis we focus on housing affordability pressures, proxied by the (log) share of housing expenditure in household final consumption. According to the United Nations Human Settlements Programme (UN-Habitat) 'Access to housing is a precondition for access to employment, education, health, and social services.' (https://unhabitat.org/topic/housing) This statement is used as broad motivation; our empirical proxy captures affordability pressures via the household housing expenditure share rather than "access" in a broader sense. The former in turn have been identified in the literature as key drivers of economic growth – see, e.g., Mankiw *et al.* (1992), Beraldo *et al.* (2009), Bloom *et al.* (2018) and D'Andrea (2022)– namely by increasing labour force and human capital availability, the latter an essential ingredient for final goods production and innovation activities that increase productivity and lead to faster growth (Nelson and Phelps, 1966; Lucas, 1988; Romer, 1990b; Benhabib and Spiegel, 2005). Housing affordability constraints due to excessive house price increases have been shown by Aizenman *et al.* (2019) to sap economic growth due to the associated diversion of investment to the housing sector, reducing funding available for investment by other more productive sectors. The latter is documented by Chakraborty *et al.* (2018) that show that banks operating in robust housing markets exhibit a tendency to increase mortgage lending while concurrently decreasing lending to firms. Anthony (2023) posits that the limited availability of affordable housing is a salient factor in firms' location decisions, driven in part by the need to maintain worker satisfaction. Furthermore, housing-related dissatisfaction is argued to negatively impact firm competitiveness through reduced productivity and increased employee turnover. The former will in turn limit economic growth. Yet another mechanism of transmission refers to inequality. Ioannides and Ngai (2025) argue that housing cost burdens and reduced affordability can drive inequality due to increasing housing costs and concentration of housing capital. According to their review of the literature, research shows that housing demand is income- and price-inelastic, leading lower-income households to spend a growing share of their income on housing, leaving less for other needs and for investment. Also, housing is unevenly distributed in many OECD countries and thus rising property values disproportionately benefit those who already own homes, further increasing inequality.

Although there is no consensus in the literature, the former may impede growth due to reduced physical and human capital accumulation associated with social-political instability, the demand for higher social spending and the consequent need for higher taxation to finance it, which distorts economic decisions namely in terms of labour supply decisions and savings and investment, or imperfect credit markets – see Bagchi and Svejnar (2015), Islam and McGillivray (2020), and Balcilar *et al.* (2021).

Recent empirical research has delved into various issues of access to housing and its implications for economic growth. Aizenman *et al.* (2019) and Asadov *et al.* (2023) investigate the link between house price dynamics and economic growth for 19 countries (both OECD and non-OECD) from the first quarter of 1975 to the third quarter of 2013 in the first case and using quarterly data from 17 OECD countries from 1970 to 2019 in the second case. Aizenman *et al.* (2019) conclude that house prices are linked to economic growth and can either hinder or support growth, depending on the severity of the changes in prices and overall market conditions. In Asadov *et al.* (2023), on the other hand, the main takeaway is that the net contribution of house price return to growth is negligible. Anthony (2023) looks at the influence through housing cost-burdened households focusing on the 100 largest metropolitan statistical areas in the USA and arrives at a statistically significant negative effect on economic growth.

This paper explores this link in the context of the housing sector in the EU by analyzing the relationship between housing affordability pressures and economic growth using data for 21 member states observed over the period 2000–2019. Affordability pressures are proxied by the share of housing expenditure in household final consumption. Our contribution is threefold. First, we provide cross-country evidence for EU member states using a nationally aggregated measure that captures the budgetary weight of housing costs and has comparatively broad coverage over time. Second, we explicitly situate the empirical exercise in an EU policy context and account for institutional and housing-policy dimensions by including government effectiveness and public social housing expenditure among the controls. Third, we implement a panel-data growth regression with country and time fixed effects and Driscoll-Kraay standard errors and complement inference with diagnostic testing and robustness checks tailored to the panel's cross-sectional dependence and serial correlation features. Given the small N and T typical of macro panels, inference can be sensitive to the covariance estimator; we therefore benchmark inference across alternative estimators in Table no. A2 (Driscoll–Kraay, country clustering, and a wild cluster bootstrap).

With this study we aim to contribute to the discussion on the macroeconomic implications of the ongoing housing crisis in the EU by providing evidence at the aggregate national economy level and focusing on long-run macroeconomic performance. While the analysis identifies associations rather than causal effects, the evidence may help inform policy discussions on which constraints are most strongly correlated with growth outcomes. As Castañeda *et al.* (2018) explain, setting policy priorities is a challenge for governments due to the need to achieve multiple objectives simultaneously, the complexity of the policy landscape, implementation inefficiencies, and the interrelated nature of policy issues.

The structure of the paper is as follows. Section 2 gives some context and reviews prior empirical studies on the relationship between the housing sector and economic growth. In Section 3, we present our empirical strategy and describe the data used. Section 4 contains the main results regarding the relationship between housing affordability pressures and growth. Section 5 offers concluding remarks and outlines potential avenues for future research.

2. BACKGROUND

Economic growth depends directly on the accumulation of physical and human capital alongside technological progress. While neoclassical models treat technology as exogenous (Solow, 1956; Mankiw *et al.*, 1992), endogenous growth theory posits that growth is driven by the deliberate creation of ideas (Romer, 1990a; Jones, 1995), and capital accumulation (Romer, 1986; Lucas, 1988). In this framework, housing affordability pressures—and, more broadly, constraints on access to adequate housing—may be associated with growth by shaping the availability and allocation of labour, physical capital, and human capital. In what follows we use "access" as broad motivation, but our operational concept is housing affordability pressures, proxied by the housing expenditure share of household final consumption. Regarding labor, home value shocks can trigger wealth effects that reduce labor supply, as shown for the cases of Japan, China and the USA, respectively by Hamaaki and Iwata (2025), Li *et al.* (2020) and Begley and Chan (2018). High costs may also restrict geographical mobility and the efficient matching of talent (Glaeser *et al.*, 2006; Hsieh and Moretti, 2019; Causa and Pichelmann, 2020). This misalignment is particularly acute for low-skilled labor (Ganong and Shoag, 2017) and can lead to increased turnover and diminished productivity among skilled professionals (Hsieh and Moretti, 2019; Anthony, 2023). Furthermore, higher housing-cost burdens can trigger a misallocation of physical capital that can hinder economic growth; overvalued property sectors often divert investment away from more innovative, productive industries (Miao *et al.*, 2015). Finally, because housing is the primary asset for most households, its value directly dictates wealth distribution and income inequality (Causa and Pichelmann, 2020; Dustmann *et al.*, 2021), possibly constituting a barrier to long-term aggregate growth.

In the economics literature, recent studies that have examined how the housing sector influences economic growth include Aizenman *et al.* (2019), Asadov *et al.* (2023) and Anthony (2023).

Exploring the house prices channel, Aizenman *et al.* (2019) investigate how economic growth is influenced by directional changes in house prices, i.e. appreciations vs. depreciations, while Asadov *et al.* (2023) add to the former the analysis of the consequences of house prices volatility for economic stability. The results from Aizenman *et al.* (2019) indicate that excessive increases in house prices lead to overinvestment in the property market, diverting capital away from more productive sectors, while sharp declines can correct this misallocation and stimulate economic growth. The study reached these conclusions based on a sample of 19 countries, including both advanced and emerging economies: some are OECD members, while others are not. The quarterly data covers the period from 1975 to 2013. The authors consider three alternative dependent variables: the real GDP growth rate, the real GDP per capita growth rate, and the growth rate of total factor productivity. Among the explanatory variables, the logarithm of house prices stands out, used to measure the direct impact of fluctuations in the housing market. The model also includes variables related to production factors and controls for macroeconomic factors such as interest rates, inflation, and fiscal policies, ensuring robustness in the estimates. The panel data models are estimated using the Generalised Method of Moments (GMM), which addresses endogeneity and country-specific effects. Asadov *et al.* (2023) focus on the link between house price instability and output, specifically the effect of house price volatility on economic stability, testing also the impact on economic growth, using quarterly data for 17 OECD countries from 1970 to 2019 and

dynamic panel data models estimated using Pooled Mean Group (PMG), Dynamic Fixed Effects (DFE) and Dynamic OLS (DOLS), ensuring robustness and correcting for endogeneity problems. The control variables include private credit (linear and quadratic), private investment growth, public spending, the inflation rate, trade openness and investment volatility. Their findings point to a significant asymmetric impact of house price returns on economic growth, with negative returns exerting twice the effect of positive ones. Additionally, the findings suggest that house price volatility plays a substantial role in contributing to economic instability.

Although Aizenman *et al.* (2019) and Asadov *et al.* (2023) focus on house prices, there is a direct connection with the impact of housing affordability on economic growth. High house prices can raise housing cost burdens and weaken affordability by increasing the financial pressure on households. In this context, another recent study by Anthony (2023) analyses 100 U.S. metropolitan statistical areas (MSAs) for the years 2000, 2010, and 2015 to assess the impact of housing affordability on regional economic growth. Using multiple panel data regressions, the author estimates the relationship between the proportion of cost-burdened households and the change in real GDP per capita. Control variables include unemployment rates, population density, and each region's initial real GDP per capita. The results show that an increase in the proportion of cost-burdened households has a negative and significant effect on economic growth in metropolitan areas, with renters being the most affected.

While the link between the housing sector and macroeconomic performance is well-established in the previous studies, our work occupies a distinct niche. Rather than focusing on house price dynamics, as in Aizenman *et al.* (2019) and Asadov *et al.* (2023), we shift attention to household budget constraints within the European Union. This EU-specific focus contrasts with the OECD and emerging-economy samples used in those studies, which may obscure institutional and structural particularities of the EU, and it moves beyond the regional U.S. perspective of Anthony (2023) by offering a cross-country analysis. By employing the 'Housing Expenditure Share of Final Consumption' we bridge the gap between the broad, price-based approaches of Aizenman *et al.* (2016) and Asadov *et al.* (2023), which, while informative, do not fully capture the financial burden on households' consumption and quality of life, and the localized, burden-focused analysis of Anthony (2023).

The focus on EU member states is a timely one as, regardless of the country, prices for housing and energy have been rising relative to household consumption, with roughly 22% of household consumption dedicated to housing and over 20% of renters living in overcrowded units, 2022 numbers, while other market segments experienced "under-occupation" (large homes with few inhabitants), as discussed in Egner and Krapp (2025). According to the European Commission European Commission (2025), between 2013 and 2024 house prices across the EU increased 60%, faster than household income, rents grew on average 20%, with new rents growing significantly more, while residential building permits decreased 20% since 2021 and unoccupied dwellings increased by 20%. A housing crisis has thus been unfolding across the EU, but housing provision is not an EU-level task; it is managed at the national level. However, a common European approach to solving these issues is being attempted. Recent EU-specific housing policy initiatives include the European Affordable Housing Plan, launched late 2025 and announced by the European Commission as 'Europe's response to the housing crisis'. The plan is structured around four primary objectives: boosting housing supply; mobilizing investment; enabling immediate support while driving reforms; and protecting the most affected. To achieve these goals, the EU has introduced several specific

mechanisms, including reprogramming Cohesion funds for investments in social, affordable and sustainable housing, with additional support from the Social Climate Fund. Other examples include a new housing simplification package to reduce administrative burden, accelerate permitting and renovation and improve cost efficiency; revising State aid rules to enable faster and simpler public support for social and affordable housing; encourage reforms in areas such as spatial planning, social housing, and taxation, reducing complexity and enhancing housing supply. In any case, as discussed by Egner and Krapp (2025) based on the experience of twelve EU member states plus Norway and the UK, and by Hochstenbach (2025) for the case of Netherlands, national differences regarding the housing sector remain a fundamental issue that should not be forgotten when analyzing the policy implications of our findings for the average EU member state, which should additionally be framed through the lens of national specificities. For instance, countries differ in how their populations are distributed across tenures (owner-occupation vs. private rental vs. social rental). This distribution dictates who suffers most, with cost overburden and overcrowding more prevalent among renters than owners.

3. EMPIRICAL STRATEGY AND DATA

To investigate the link between housing affordability pressures and economic growth in the EU we use data for 21 member states: Austria, Belgium, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden. Regarding the period under consideration, since economic growth is shaped by a broad set of determinants beyond housing affordability pressures, including physical and human capital, labor, trade, or institutions (more details below), the limited availability of consistent and comparable data across all relevant indicators has constrained the feasible period of investigation. In particular, the human capital indicator is available only up to 2019, while financial development measures extend only to 2021. As a result, the empirical analysis focuses on the period 2000–2019, which maximizes the overlap of relevant variables, and additionally avoids the noise and volatility due to the COVID-19 pandemic that hit the world economy in 2020. This choice is also consistent with the studies more closely related to our work, Aizenman *et al.* (2019), Asadov *et al.* (2023) and Anthony (2023). The panel is balanced.

The baseline empirical model is given by equation (1), which serves as a conceptual reference point:

$$d\_logGDP_{it} = \alpha + \lambda logGDP_{it-1} + \beta\, logHousing_{it} + \theta X_{it} + \vartheta_i + \tau_t + \varepsilon_{it} \quad (1)$$

where d_logGDP_{it} is our measure of economic growth, $logGDP_{it-1}$ is the log of initial output, $logHousing_{it}$ is the log of our indicator of housing affordability pressures (higher values indicating a larger housing expenditure share and hence stronger cost pressures), X_{it} is a vector of control variables, ϑ_i represents the individual country effects, τ_t represents time effects, ε_{it} is the error term, i represents the country and t represents the year. The coefficient β captures the association between housing affordability pressures and growth, conditional on controls and fixed effects.

Following Aizenman *et al.* (2019) and Asadov *et al.* (2023), we measure economic growth, our dependent variable, as the log difference of real GDP (or real GDP per capita in the

sensitivity analysis). Our explanatory variable of interest is housing expenditure as a share of final consumption expenditure of households from the OECD Affordable Housing Database. This indicator was chosen for its broader temporal coverage. Other possible indicators, such as households' housing cost burden (mortgage and rent cost) as a share of disposable income, were not used due to limited data availability. The proportion of housing expenditure in household final consumption offers valuable insight into the significance of housing-related costs within overall household spending. It facilitates comparisons across different consumption categories, countries, and time periods. According to OECD (2024), this indicator encompasses expenses related to actual and imputed rentals for housing and the maintenance and repair of housing (including materials and services), as well as essential utilities and services such as water supply, waste collection, sanitation, and communal services like elevator maintenance, cleaning, and security. This comprehensive measure captures both direct and indirect housing costs, providing a fuller understanding of housing's financial burden on households. We interpret this measure primarily as a proxy for housing affordability pressures (a higher share indicates that housing costs take a larger slice of the consumption basket). The variable *logHousing* is therefore expected to present a negative association with economic growth, because stronger cost pressures may restrict geographical mobility and the efficient allocation of labor and human capital, redirect investment toward the real estate sector and away from more productive activities, and increase inequality, as discussed above.

As for the vector of control variables (X), again following Aizenman *et al.* (2019) and Asadov *et al.* (2023), we control for the initial level of output, proxied by $logGDP_{it-1}$, as initially poorer countries are expected to grow faster and converge to the output levels of initially richer countries (Solow, 1956) and so λ should be negative. We also control for the availability of capital and labor, captured, respectively, by gross fixed capital formation as a percentage of GDP (*inv*), a human capital index that reflects both average years of education and returns to education (*logHC*) and the log of the unemployment rate (*logUnemp*). These variables control for the availability (or lack of) of inputs, physical and human capital and labour, with the influence of the first two expected to be positive and of the third to be negative. Similar to Aizenman *et al.* (2019) we also control for inflation (*infl*), measured by the annual growth rate of the consumer price index (CPI); trade openness (*logOpen*), defined as the ratio of the exports plus imports to GDP; government consumption as a percentage of GDP (*logGovc*); and financial development (*logFD*) measured using the financial development index of the International Monetary Fund (IMF), an index that captures the depth, access, and efficiency of the financial institutions and financial markets in different countries. Other control variables from the literature that we include are the quality of institutions, measured using the World Bank index of government effectiveness (*gef*), and social expenditure on housing as a percentage of GDP (*logSEHous*). Table no. 1 contains details on the variables used and respective sources. Table no. 2 contains summary statistics.

Table no. 1 – Variables and sources

Variable	Description	Source
d_logGDP	Difference of the log of real GDP, PPP (constant 2021 international $).	World Bank
d_logGDPpc	Difference of the log of real GDP per capita, PPP (constant 2021 international $).	World Bank
Housing	Share of housing expenditure in household final consumption.	OECD Affordable Housing Database

Variable	Description	Source
inv	Gross fixed capital formation as a percentage of GDP.	World Bank
Open	Sum of exports and imports as a percentage of GDP.	World Bank
SEHous	Public social expenditure on housing as a percentage of GDP.	OECD Social Expenditure Database (SOCX)
gef	Government effectiveness index that captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Ranges from approximately -2.5 to 2.5	World Bank
HC	Human capital index, based on years of schooling and returns to education. Ranges from approximately 1 (no formal education) to 4.5, although it has no strict upper or lower bound in theory.	Penn World Table 10.1
infl	Growth rate of the consumer price index (%).	World Bank
Unemp	Unemployment as a percentage of total labour force.	World Bank
Govc	General government final consumption expenditure as a percentage of GDP.	World Bank
FD	Financial development index that captures the depth, access, and efficiency of the financial institutions and financial markets. Ranges from approximately 0 to 1.	International Monetary Fund (IMF)

Table no. 2 – Summary statistics

Variable	Mean	Std. Dev.	Min.	Max.
d_logGDP	0.021	0.034	-0.175	0.121
d_logGDPpc	0.019	0.035	-0.158	0.130
logGDP	26.706	1.345	24.108	29.293
logGDPpc	10.684	0.411	9.550	11.853
logHousing	3.082	0.183	2.494	3.497
inv	22.240	3.848	10.687	36.800
logUnemp	2.062	0.471	0.591	3.321
infl	2.277	2.068	-1.736	15.402
logOpen	4.615	0.442	3.816	5.946
logGovc	3.006	0.130	2.669	3.330
logFD	-0.635	0.424	-1.889	-0.104
logSEHous	2.262	1.650	-2.303	4.494
logHC	1.160	0.104	0.802	1.348
gef	1.205	0.551	0.099	2.347

4. FINDINGS

We start by applying cross-sectional dependence tests to the series used, after which we proceed to testing for stationarity. We next carry out the estimation of the selected model.

4.1. Cross sectional dependence and stationarity analysis

Before estimating the baseline empirical model given by equation (1), a diagnostic test was carried out to see if the series show cross-sectional dependence (CSD). CSD occurs when shocks or events that affect one country tend to influence the other countries. As our sample contains only EU member states, this dependence is particularly likely due to the economic,

financial and institutional integration between these countries. The presence of CSD can bias estimates and influence the validity of statistical tests, making it necessary to use robust methodologies to correct this problem.

Table no. 3 contains the results of the Pesaran (2021) test, which assesses the average correlation between the residuals of different countries to test for the existence of CSD. The variable *logHC* was excluded from the test due to its near-linear behavior. The null hypothesis assumes cross-sectional independence; when this hypothesis is rejected, it indicates the presence of cross-sectional dependence (CSD). In such cases, it becomes necessary to either include variables in the model that capture the impact of common shocks across countries – such as time effects – or to apply estimation methods that account for this dependence. As shown in Table no. 3, the variables *logGDP, logGDPpc, infl, logOpen, inv, logUnemp, logGovc, logFD*, and *logHousing* all reject the null hypothesis at a p-value of 0, indicating significant cross-sectional dependence.

Table no. 3 – Pesaran (2004) **Test Results for Cross-Sectional Dependence (CSD)**

Variable	Statistic	p-value
logGDP	48.18	0.000
logGDPpc	43.84	0.000
logHousing	23.52	0.000
inv	22.53	0.000
logUnemp	17.91	0.000
infl	40.19	0.000
logOpen	51.67	0.000
logGovc	15.71	0.000
logFD	25.36	0.000
logSEHous	-0.83	0.404
gef	1.48	0.139

Notes: the null hypothesis is that of cross-sectional independence.

After confirming cross-sectional dependence (CSD) in most variables, we assess whether the series are stationary using the Pesaran (2007) Cross-sectionally Augmented IPS (CIPS) test, reported in Table no. 4 (with and without a deterministic trend). The results suggest that several macro series are I(1) in this sample – notably *logGDP*, *logOpen*, *logGovc*, *logSEHous*, and *gef* – so we work with first differences for these variables in the baseline specification. The results for *logHousing* are mixed across trend and lag choices, which motivates the robustness specifications that use both *logHousing* and *d_logHousing* as the housing affordability pressure regressor. Finally, the *logFD* series yields mixed outcomes across trend specifications, so we difference it for robustness.

Table no. 4 – Pesaran (2007) **Second-Generation Unit Root Test - CIPS**

		Test without trend		Test with trend	
Variable	**Lags**	**Zt-bar (No Trend)**	**P-Value**	**Zt-bar (Trend)**	**P-Value**
logGDP	0	1.419	0.922	2.084	0.981
logGDP	1	-1.985	0.024	-0.615	0.269
logGDPpc	0	1.538	0.938	4.075	1.000
logGDPpc	1	-0.937	0.175	1.066	0.857
logHousing	0	-1.154	0.124	1.715	0.957
logHousing	1	-2.758	0.003	-0.487	0.313
inv	0	-1.687	0.046	-0.222	0.412

		Test without trend		Test with trend	
inv	1	-2.301	0.011	-1.685	0.046
logUnemp	0	3.034	0.999	1.107	0.866
logUnemp	1	-2.419	0.008	-0.219	0.413
infl	0	-5.238	0.000	-3.380	0.000
infl	1	-3.883	0.000	-2.111	0.017
logOpen	0	0.290	0.614	2.597	0.995
logOpen	1	0.233	0.592	2.284	0.989
logGovc	0	0.263	0.604	2.544	0.995
logGovc	1	-0.228	0.410	2.274	0.989
logFD	0	-1.775	0.038	-2.809	0.002
logFD	1	-0.953	0.170	-2.727	0.003
logSEHous	0	2.102	0.982	3.230	0.999
logSEHous	1	1.277	0.899	3.378	1.000
gef	0	-5.898	0.000	-6.856	0.000
gef	1	0.733	0.768	-0.307	0.379

Notes: the null hypothesis assumes that the variable has a unit root (non-stationary).

In light of these results, the variables *logOpen*, *logGovc*, *logSEHous*, *logGDP*, and *gef* were differenced, as the CIPS test indicated that they are non-stationary in most cases. Table no. 5 presents the results of Pesaran (2007) Cross-sectionally Augmented IPS (CIPS) second-generation unit root test for these differenced variables, as well as for *logHousing* and *logFD*. When differenced and tested without a trend, all variables reject the null hypothesis, indicating stationarity. This transformation ensures that the estimated coefficients are not affected by spurious relationships and supports the statistical validity of the model. Furthermore, due to the divergence in unit root test results for the *logFD* variable – with the null hypothesis accepted without a trend and rejected with a trend – we opted to difference the variable to enhance the robustness of the results and avoid potential issues related to higher-order integration. The stationarity of the *logHousing* variable also yielded ambiguous outcomes. Given this uncertainty, alternative model specifications will be tested, including versions both with and without differencing *logHousing*, to evaluate the robustness of our findings.

Table no. 5 – CIPS Unit Root Test - First Differences

Variable	Lags	Test without trend Zt-bar (No Trend)	P-Value	Test with trend Zt-bar (Trend)	P-Value
d_logGDP	0	-4.45	0.000	-2.308	0.010
d_logGDP	1	-3.063	0.001	-0.746	0.228
d_logGDPpc	0	-3.755	0.000	-2.227	0.013
d_logGDPpc	1	-2.452	0.007	-0.931	0.176
d_logOpen	0	-5.076	0.000	-3.470	0.000
d_logOpen	1	-2.434	0.007	-1.198	0.115
d_logGovc	0	-6.662	0.000	-6.068	0.000
d_logGovc	1	-2.373	0.009	-1.723	0.042
d_logFD	0	-12.567	0.000	-10.489	0.000
d_logFD	1	-7.856	0.000	-6.011	0.000
d_logHousing	0	-7.43	0.000	-6.425	0.000
d_logHousing	1	-2.539	0.006	-1.395	0.081
d_logSEHous	0	-7.451	0.000	-5.889	0.000
d_logSEHous	1	-1.551	0.060	-0.086	0.466
d_gef	0	-15.673	0.000	-13.617	0.000
d_gef	1	-6.098	0.000	-3.492	0.000

Notes: the null hypothesis assumes that the variable has a unit root (non-stationary).

Finally, equation (1) is operationalized as a dynamic panel model with fixed effects, incorporating differenced non-stationary variables, lagged variables, and time controls through annual dummy variables. The inclusion of the lagged dependent variable (d_logGDP_{it-1}) captures the persistence of economic growth, reflecting the notion that past growth influences current performance. This dynamic specification is standard in empirical growth regressions and helps capture adjustment processes in growth rates over time see, e.g., Caselli *et al.* (1996); Bond *et al.* (2001). The required transformations are applied to equation (1), resulting in the regression presented in equation (2):

$$d\_logGDP_{it} = \alpha + \lambda logGDP_{it-1} + \gamma d\_logGDP_{it-1} + \beta\, logHousing_{it-1} + \theta X_{it-1} + \vartheta_i + \tau_t + \varepsilon_{it} \qquad (2)$$

Equation (2) is the final estimated specification used for the main results reported below. The vector X_{it-1} contains the following variables lagged one period: the investment rate (*inv_1*), the logarithm of the unemployment rate (*logUnemp_1*), the inflation rate (*infl_1*), the first difference of the logarithm of the openness variable (*d_logOpen_1*), the first difference of the logarithm of public consumption (*d_logGovc_1*), the first difference of the logarithm of the financial development index (*d_logFD_1*), the logarithm of the human capital index (*logHC_1*), the first difference of government effectiveness (*d_gef_1*), and the first difference of the logarithm of public social housing expenditure (*d_logSEHous_1*).

Including both the initial output level ($logGDP_{it-1}$) and lagged growth (d_logGDP_{it-1}) serves distinct purposes. The former captures conditional convergence—initially poorer countries are expected to grow faster conditional on fundamentals—while the latter captures short-run persistence in growth rates that may arise from propagation mechanisms and gradual adjustment (e.g., Caselli *et al.*, 1996; Bond *et al.*, 2001).

This specification can also be interpreted in error-correction terms. Starting from a simple dynamic level equation in which output depends on its own lag and lagged covariates, differencing yields a growth equation that includes the lagged level of output (capturing adjustment toward a conditional steady state) alongside lagged growth (capturing short-run dynamics), as in panel ARDL/error-correction models (e.g., Pesaran *et al.*, 1999). To reduce concerns about simultaneity, all regressors are lagged one period; nevertheless, reverse causality between growth and housing affordability pressures remains a potential limitation, and the results should be interpreted as associations rather than causal effects. In the Annex, Table no. A1 therefore reports a dynamic-panel GMM *transparency* exercise (not an identification strategy) using restricted and collapsed internal instruments to limit instrument proliferation following standard practice (Arellano and Bond, 1991; Blundell and Bond, 1998). Given the well-known fragility of dynamic GMM in small-N macro panels with persistent regressors, we do not rely on GMM for inference and treat it only as a robustness check alongside the main FE+DK results.

An additional measurement-related channel is worth noting: because the housing variable is an expenditure *share* of household consumption, it can increase mechanically if non-housing consumption falls (e.g., during downturns) even with unchanged housing costs. This feature reinforces the interpretation of the baseline results as associations.

We first estimated equation (2) using fixed effects to consider the possibility of omitted variable bias due to unobserved events and to control for time-invariant unobserved heterogeneity at the country level, which is particularly important in our context given persistent structural differences across countries. After estimating equation (2) with fixed effects, the Pesaran (2021)

CSD test was applied again to check whether the model adequately captures potential interdependencies among countries in the sample. Contrary to the findings for the individual variables, the results shown in Table no. 6 indicate a p-value of 0.2834, suggesting no statistically significant evidence of cross-sectional dependence between countries. Having addressed stationarity and CSD, the next step was to examine autocorrelation. Table no. 7 presents the Wooldridge test for panel data, described in Wooldridge (2002), which tests for the presence of first-order autocorrelation in the model's residuals. The null hypothesis assumes no autocorrelation. However, with a p-value of 0.000, the test strongly rejects the null hypothesis at conventional significance levels, indicating the presence of autocorrelation. To account for this issue, robust estimation methods are required. One appropriate approach is the Driscoll and Kraay (1998) estimator, which adjusts the error variance-covariance matrix and is robust to heteroscedasticity and serial correlation, and can also accommodate general forms of cross-sectional dependence. While the residual cross-sectional dependence test for the baseline FE model does not reject at conventional levels (Table no. 6), cross-sectional dependence is a pervasive concern in macro panels and such tests may have limited power in small panels. With T = 20 and N = 21, neither Driscoll-Kraay nor country clustering has perfect small-sample justification, as they rely on different asymptotic arguments. We therefore report Driscoll-Kraay inference as a robustness benchmark, alongside country-clustered inference in the Annex (Table no. A2).

Table no. 6 – Cross-Sectional Dependence Test (Pesaran, 2021) applied to equation (2) estimated with FE

	Value
Pesaran test for cross-sectional independence	-1.073
p-value	0.2834
Average absolute off-diagonal values	0.272

Notes: the null hypothesis corresponds to cross-sectional independence.

Table no. 7 – First-Order Autocorrelation Test (Wooldridge) applied to equation (2) estimated with FE

	Value
F-Test (1, 20)	41.789
p-value	0.0000

Notes: the null hypothesis corresponds to no autocorrelation.

4.2. Estimation results

Table no. 8 presents the results of the estimation of equation (2) with fixed effects (FE) and with Driscoll-Kraay (DK) corrected standard errors. Because the Driscoll-Kraay correction affects the estimated variance-covariance matrix, the FE point estimates in columns (1) and (2) are identical; what changes is inference via the standard errors (and associated p-values).

The results in Table no. 8 show that the variable *logHousing_1* is negative but not statistically significant at conventional levels under one-way country-clustered inference; under Driscoll-Kraay inference it is statistically significant at the 5% level (Table no. A2). Among the other explanatory variables, all except human capital (*logHC_1*), have the expected signs. The estimated coefficients for inflation and unemployment are negative as expected and positive for the other explanatory variables, but statistical significance is low

and varies across regressions for the same explanatory variable. Notably, the coefficient for *logGDP_1*, which tests the convergence hypothesis, confirms that countries with lower initial GDP tend to experience faster growth. Additionally, the positive and statistically significant coefficient of *d_logGDP_1* confirms persistence in economic growth, meaning that past growth positively influences current growth. Inference is sensitive to the standard-error estimator in this macro panel; we therefore report both Driscoll-Kraay and country-clustered inference and focus on the sign, magnitude, and robustness of the estimated association. In terms of magnitude, the DK point estimate implies that a 10% relative increase (e.g., 20% to 22%) in the housing expenditure share is associated with roughly 0.3 percentage points lower annual real GDP growth, suggesting a modest economic magnitude. Table no. A2 also reports wild cluster bootstrap p-values for the clustered specification as a conservative small-sample benchmark. Even modest annual growth differentials can cumulate over time; we note this only to aid interpretation and not as a prediction. The signs of the remaining explanatory variables remain basically unchanged.

Table no. 8 – Response of the growth rate of real GDP to housing affordability pressures

Variable	(1) FE (clustered)	(2) FE (DK/SCC)	(3) FE (clustered)	(4) FE (DK/SCC)
logHousing_1	-0.029	-0.029**		
	(0.018)	(0.013)		
d_logHousing_1			-0.014	-0.014
			(0.043)	(0.039)
inv_1	0.000	0.000	0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
logUnemp_1	-0.008	-0.008	-0.006	-0.006
	(0.007)	(0.005)	(0.008)	(0.005)
infl_1	-0.005***	-0.005	-0.004***	-0.004
	(0.001)	(0.003)	(0.001)	(0.003)
d_logOpen_1	0.042	0.042	0.039	0.039
	(0.044)	(0.040)	(0.045)	(0.041)
d_logGovc_1	-0.106*	-0.106	-0.100*	-0.100
	(0.051)	(0.097)	(0.051)	(0.099)
d_logFD_1	0.028*	0.028	0.031*	0.031
	(0.016)	(0.032)	(0.016)	(0.033)
d_gef_1	0.004	0.004	0.004	0.004
	(0.004)	(0.003)	(0.004)	(0.003)
d_logSEHous_1	0.008	0.008	0.008	0.008
	(0.006)	(0.006)	(0.005)	(0.006)
logHC_1	-0.046	-0.046	-0.053	-0.053
	(0.107)	(0.052)	(0.108)	(0.054)
logGDP_1	-0.077**	-0.077**	-0.079**	-0.079**
	(0.033)	(0.029)	(0.033)	(0.030)
d_logGDP_1	0.411***	0.411***	0.423***	0.423***
	(0.071)	(0.091)	(0.072)	(0.092)
Constant	2.215**	2.215**	2.183**	2.183**
	(0.827)	(0.775)	(0.845)	(0.786)
R2	0.737	0.7292	0.735	0.7348
Observations	378	378	378	378

Notes: country and time fixed effects. Standard errors in parentheses. Columns (1) and (3) report one-way country-clustered (Arellano-style) standard errors; columns (2) and (4) report Driscoll–Kraay (SCC) standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

As an additional sensitivity check, Table no. A3 reports leave-one-country-out re-estimations of the DK specification. The coefficient on *logHousing_1* remains negative in all 21 runs for both real GDP growth and real GDP per capita growth, indicating that the result is not driven by any single country.

Since the results of the stationarity test for *logHousing* were ambiguous, Table no. 8 also contains an alternative specification considering the first difference of housing affordability pressures, *d_logHousing*, instead of the variable in levels. The coefficient on *d_logHousing_1* remains negative but is not statistically significant, which is consistent with the interpretation that short-run changes in housing expenditure shares are noisy and may not map cleanly into short-run growth fluctuations in this setting.

To check the robustness of our results, we use as alternative measure of economic growth the difference of the log of real GDP per capita and replicate the estimations carried out before. Table no. 9 contains these results obtained with the FE and the DK estimators and considering the explanatory variables of interest, housing affordability pressures, either in levels or first differences. Using this alternative measure of economic growth, our core findings remain consistent: an increase in the housing expenditure share is negatively associated with economic growth. As before, statistical significance depends on the inference method: the coefficient is significant under Driscoll-Kraay but not under country-clustered inference when housing affordability pressures are measured in log-levels (see Table no. A2). For the remaining control variables, the results remain basically unchanged, maintaining the sign of the respective estimated coefficient, while statistical significance improves in some cases such as for government effectiveness.

Table no. 9 – Response of the growth rate of real GDP per capita to housing affordability pressures

Variable	(1) FE (clustered)	(2) FE (DK/SCC)	(3) FE (clustered)	(4) FE (DK/SCC)
logHousing_1	-0.028	-0.028*		
	(0.020)	(0.013)		
d_logHousing_1			-0.010	-0.010
			(0.046)	(0.035)
inv_1	0.000	0.000	0.000	0.000
	(0.001)	(0.000)	(0.001)	(0.000)
logUnemp_1	-0.009	-0.009	-0.007	-0.007
	(0.008)	(0.005)	(0.008)	(0.006)
infl_1	-0.005***	-0.005	-0.004***	-0.004
	(0.001)	(0.003)	(0.001)	(0.003)
d_logOpen_1	0.040	0.040	0.038	0.038
	(0.043)	(0.041)	(0.044)	(0.043)
d_logGovc_1	-0.111*	-0.111	-0.105*	-0.105
	(0.054)	(0.099)	(0.054)	(0.101)
d_logFD_1	0.019	0.019	0.022	0.022
	(0.018)	(0.034)	(0.019)	(0.034)
d_gef_1	0.007*	0.007	0.007*	0.007*
	(0.004)	(0.003)	(0.004)	(0.003)
d_logSEHous_1	0.008	0.008	0.008	0.008
	(0.006)	(0.007)	(0.005)	(0.007)
logHC_1	-0.106	-0.106*	-0.114*	-0.114*
	(0.062)	(0.056)	(0.061)	(0.059)
logGDP_1	-0.070**	-0.070***	-0.071**	-0.071***
	(0.027)	(0.020)	(0.028)	(0.021)
d_logGDP_1	0.393***	0.393***	0.403***	0.403***

Variable	(1) FE (clustered)	(2) FE (DK/SCC)	(3) FE (clustered)	(4) FE (DK/SCC)
	(0.066)	(0.090)	(0.065)	(0.092)
Constant	0.998***	0.998***	0.927***	0.927***
	(0.246)	(0.252)	(0.281)	(0.249)
R^2	0.740	0.7402	0.738	0.7383
Observations	378	378	378	378

Notes: country and time fixed effects. Standard errors in parentheses. Columns (1) and (3) report one-way country-clustered (Arellano-style) standard errors; columns (2) and (4) report Driscoll–Kraay (SCC) standard errors. ***, **, and * indicate statistical significance at 1%, 5%, and 10%, respectively.

5. CONCLUSION

Building on the literature concerning the relationship between housing and economic growth, we study how housing affordability pressures relate to economic growth in the European Union. We use a panel dataset that includes 21 member states spanning from 2000 to 2019. Applying fixed effects and Driscoll-Kraay corrected standard errors, we account for lagged economic growth, initial output and the housing expenditure share of final consumption expenditure of households, our proxy for housing affordability pressures, along with a comprehensive set of control variables. We find that stronger housing affordability pressures are associated with lower real GDP growth. Using the growth rate of real GDP per capita as our dependent variable yields a consistent pattern. Taken together, these findings improve our understanding of the potential macroeconomic correlates of housing cost burdens. While affordability pressures may affect growth through labor allocation and mobility, capital allocation, and inequality channels, the evidence in this paper is observational and consistent with these mechanisms but does not establish them causally.

While the analysis does not deal directly with policy issues, the results are consistent with the view that policies that alleviate housing cost burdens may be supportive of growth in the EU context. Even though our measure shows only a moderately negative association with growth and should not be interpreted as identifying causal effects, such policies could, if effective, matter for living standards over time. Different types of policies could mitigate elevated housing cost burdens and reduced affordability and, consistent with the negative association we estimate, could coincide with more favorable growth outcomes in the EU context, as discussed by Monroy *et al.* (2020). One such housing policy instrument to stimulate supply in the owner-occupied housing market could be the introduction or increase of a tax on vacant urban land providing incentives for more efficient use of well-located urban land. Redesigning property taxes could also incentivize more efficient land use towards higher-density housing development. Reducing the administrative burden, accelerating permitting and renovation, and improving cost efficiency could also stimulate supply. The European Strategy for Housing Construction will promote advanced construction materials and methods, such as offsite and modular construction, and digitalization to increase resource efficiency and reduce building costs (European Commission, 2025). As an alternative to expanding the owner-occupied market segment, which can result in over-consumption of housing space, governments may boost the rental market by defining clear, balanced and stable tenant–landlord regulations. Housing allowances and rent-subsidy vouchers can improve housing affordability for low-income groups, as well as developing affordable housing programs. Because housing sectors vary significantly by country, national policies

must be customized to address local specificities, as argued by Egner and Krapp (2025) and Hochstenbach (2025).

While the estimated negative association is stable across specifications within our EU sample, the sign and implied magnitude of the housing coefficient are robust, the statistical significance is sensitive to the inference method (Table no. A2). We recognize that the unique institutional and economic characteristics of the European Union, sharing a common market and harmonized regulations across multiple policy domains, suggest that generalizations to non-member countries should be made with caution. Future studies could broaden the scope and examine the relationship between housing affordability pressures and economic growth in a wider sample of countries, offering a more comprehensive understanding of the consequences of the housing sector for long run aggregate economic dynamics. Additionally, future research should explore the channels of transmission from housing affordability pressures to economic growth, i.e. whether it affects the availability of physical and human capital, productivity and inequality.

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ORCID

Pedro Bação https://orcid.org/0000-0002-3340-1068
Ana Conceição http://orcid.org/0009-0009-5436-4989
Marta Simões https://orcid.org/0000-0003-1046-2551

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ANNEX

This Annex provides dataset-preserving robustness exercises that address endogeneity and sensitivity concerns raised by the referees, without changing the sample or the operational concept (housing affordability pressures proxied by the housing expenditure share).

First, in response to referee requests for an IV/GMM-type exercise, Table no. A1 reports a parsimonious dynamic-panel GMM *transparency* check in levels using the GMM-DIF (Arellano-Bond) and GMM-SYS (Blundell-Bond) estimators, with collapsed instruments and restricted lag ranges to limit instrument proliferation. Because dynamic-panel GMM in small-N macro panels with persistent regressors is known to be delicate, we report this exercise to document fragility and to reinforce a cautious, associational interpretation; it is not treated as an identification strategy or a pillar of our conclusions.

Table no. A1 – Dynamic-panel GMM robustness (endogeneity check)

Estimator	Coef. on logHousing	p-value	# instr.	AR(2) p-value	Sargan p-value	N
GMM-DIF	-0.099	0.200	26	0.018	0.701	378
GMM-SYS	-0.146	0.251	29	0.013	0.381	399

Notes: the dependent variable is logGDP. Regressors are logHousing, inv, logUnemp, infl, and logHC, plus time dummies. For GMM-style instruments we use lags 3–4 of logGDP and logHousing (collapsed); for the system specification we additionally use GMMlevel instruments with lag 1.

The diagnostics reported in Table no. A1 underscore that standard internal-instrument approaches are fragile in this setting, so we do not rely on GMM for inference. We also do not search over instrument choices to obtain more favorable diagnostics; instead we present Table no. A1 for transparency and focus on FE-based associations, with robust inference benchmarked under alternative standard-error estimators.

Second, to provide low-cost sensitivity evidence focused on inference and influence, Table no. A2 reports alternative inference benchmarks for the baseline *logHousing_1* coefficient (country-clustered vs. Driscoll–Kraay), and Table no. A3 reports leave-one-country-out sensitivity summaries for the DK specification.

Table no. A2 – Alternative inference benchmarks for the logHousing coefficient (baseline specification)

Dependent variable	DK (SCC) coef.	DK SE	DK p-value	Cluster (country) coef.	Cluster (country) SE	Cluster (country) p-value	Wild cluster bootstrap p-value
d_logGDP	-0.029	0.013	0.034	-0.029	0.018	0.122	0.140
d_logGDPpc	-0.028	0.013	0.050	-0.028	0.020	0.184	0.253

Notes: DK uses Driscoll–Kraay (SCC) standard errors and Cluster(country) uses one-way country-clustered standard errors. The wild-cluster column reports a wild cluster bootstrap-t p-value (Rademacher weights, 9999 replications) as a small-sample robustness check for the clustered specification.

Table no. A3 – Leave-one-country-out sensitivity (DK specification)

Dependent variable	# runs	# negative	Min coef.	Median coef.	Max coef.
d_logGDP	21	21	-0.039	-0.030	-0.018
d_logGDPpc	21	21	-0.039	-0.028	-0.017

Notes: each run re-estimates the baseline DK model excluding one country at a time and records the coefficient on logHousing_1.