Real estate market reactions to the war in Ukraine in Hungary, Poland and Slovakia - historical data and prognosis

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Abstract. This paper aims to analyse the impact of the war in Ukraine on the real estate markets in three Visegrad Group countries bordering Ukraine – Poland, Hungary and Slovakia – by combining historical data analysis, geopolitical contextualisation and predictive modelling. . Countries neighbouring Ukraine, especially Poland, have taken in millions of people since Russian invasion in February 2022, which has had immediate socio-economic effects, obvious in the housing market. The study is based on an analysis of data from 2005 to 2024, including the number of housing transactions, prices per square metre, the House Price Index (HPI), and the number of refugees. The results indicate a strong and varied impact of the war on housing markets. In Poland, there has been a notable increase in prices and the number of transactions, particularly in Warsaw and Krakow, reflecting heightened demand among refugees. In Slovakia, despite an initial increase in prices in border regions, further growth was hampered by rising interest rates and limited housing supply. The Hungarian market, on the other hand, experienced intense growth earlier (2015–2019), but after 2022, the pace slowed down, partly due to inflation and a decline in the availability of mortgages. Forecast modelling showed that the continuation of the war is limiting the development of the real estate market across the region. The biggest differences in the predicted HPI in 2027 are in Slovakia (20% growth without war factor vs. -3.3% with war factor). Poland is the only country that remains stable in both scenarios. The authors emphasise that the impact of the war should be considered in the context of more profound structural inequalities and local housing policies. The article contributes to the understanding of the mechanisms by which the real estate market responds to migration and geopolitical crises in the Central and Eastern European region.

Keywords. Real estate market, crisis, Russia war in Ukraine, Hungary, Poland, Slovakia, market trends, forecasting, house price index, Visegrad countries

1. Introduction

Russia's invasion of Ukraine began in 2014 and covered the eastern (Donetsk and Luhansk regions) and southern part (the Crimean peninsula) of the country. The repeated invasion of Russia in February 2022 included incursions from the south, east and also north (on the border with Belarus) [1]. This contributed to the fact that close to 6.6 million people have fled Ukraine to neighbouring countries.

The war factor has also contributed to massive displacement within Ukraine towards the west [2]. Residents are naturally concerned that their apartments may be damaged or destroyed due to the ongoing hostilities or targeted military action [3], [4]. This fear impacts the housing market, resulting in lower prices and reduced demand [5], [6]. This is confirmed by data from the Ukrainian real estate platform LUN; the availability of new properties for sale decreased by 18% year-on-year after the invasion in the central regions and by 38% year-on-year in eastern Ukraine [7]. At the same time, the aforementioned internal migration to the western areas of Ukraine is contributing to a 3% increase in the property market [8].

The real estate market in the Visegrad countries (V4) has undergone changes under the influence of various geopolitical, economic, and social factors. One of the most important impulses of the recent period is the ongoing war in Ukraine, which has triggered large-scale migration towards the neighbouring countries. This raises the question of the extent to which this wave of migration affects the demand for temporary and permanent housing, the real estate prices, and the overall housing availability in the V4 countries bordering Ukraine, specifically in Poland, Hungary, and Slovakia.

This paper is divided into seven sections. Each part analysed housing markets in three Visegrad countries (Poland, Slovakia, Hungary) bordering Ukraine, focusing on the regions most affected by the Russian invasion. The introductory section provides information about the property market in Ukraine, second section includes descriptions of housing markets in Poland, Hungary, and Slovakia. The methods section describes the sources of data for the analyses presented in this paper. The results section includes graphs, tables, and commentary on the findings obtained from the analysis. The limitations section provides information on the restrictions of the conducted studies. The conclusions section summarises the findings based on the performed analyses, while the final part includes information on the planned continuation of the research.

2. Literature review of real estate markets in the V4 countries

The issue of housing affordability in the Central European region has been addressed by the study of Matějková and Tichá [9]. Their study focused on the situation in the Czech Republic, Slovakia, Austria, and Poland within the context of recent global crises, including the COVID-19 pandemic, the 2021–2022 energy crisis, and the war in Ukraine. The authors identified that housing affordability is influenced by wage dynamics, housing supply, political interventions, and migration pressure. However, the analysis was limited only to selected cities. To complement this, [10] also demonstrate, using the example of cities in Serbia, that higher prices are observed in cities experiencing faster population growth relative to the housing supply, as well as the impact of inflation, which underscores the potential of real estate as a hedge against inflation. Real estate prices and investment in real estate are also influenced by commodity prices, as confirmed for the countries of the Visegrad region by [11]. These authors emphasise the need to manage risks in the real estate sector in response to economic fluctuations. Napierała and Pawlicz (2025) analysed impact of the Russian-Ukrainian war on hotel performances in neighbouring countries [12].

Housing market booms and busts are more exposed to external shocks in emerging economies than in advanced countries [13]. [14] demonstrates that the war in Ukraine has created escalating financial pressure on European households, exposing the extent of Europe's vulnerability to energy poverty. Analysing the real estate markets in the light of the war in Ukraine resulted in several other papers focusing on various countries in Europe, e.g. in the Czech Republic, Slovakia, and Austria [9], Romania [15], [16], Moldova [17] or Finland [18]. Several papers address the Hungarian housing market in the Central European context, e.g. [19]–[21], pointing to the same external factors as above, affecting all the Central European markets, as well as analysing the specific domestic ones, namely the massive policy intervention in the Hungarian housing market.

The importance of regional differences in the development of real estate prices in Slovakia is confirmed by a study by [22], which indicates that the war in Ukraine, along with inflation and the rise in energy prices, had a profound impact on the real estate market after 2020. The market faced problems related to a labour shortage, increasing prices of construction materials, and a tightening monetary policy, which led to a shift in price trends, especially in the western regions of Slovakia. Housing affordability, vacancy rates, and the effects of government policies on market trends in Slovakia were the most significant factors analysed by [23].

Similar research was done by [20] in Hungary, where the authors identified several factors as the most important underlying reasons for regional differences, among which the most important are the centre-periphery relations, general socio-economic development, and settlement structure (urban vs. rural). Moldicz (2024) noted that due to the high inflation rate in Hungary, real prices in the housing market have been steadily declining since the fourth quarter of 2022 [24]. Hungarian real estate prices in Q3 2022 (after the Russia invasion of Ukraine started) compared to Q3 2021 increased by 21%, while for the same period in the EU it was only 7.4% and in the Euro area, 6.8%, so the increase in real estate prices in this country is affected not only by the conflict but also by its political impact [25].

Some previous research on Poland was also analysed, e.g., the implications of the depopulation of a major city (Łódź) during the period of the Russo-Ukrainian War [26]. This study not only enriches our current knowledge but also has the potential to inform the formulation of urban policies responsive to the housing needs of immigrants. Gluszak and Trojanek are dealing with the growing body of empirical evidence on the impact of mass migration or refugee inflow on housing markets targeted by immigrants [27], while Bartkowiak and Strączkowski's (2023) study focused on the identification of the changes in interests in apartments and in average rents to determine changes in the supply of rental apartments [28]. Łaszek et al. (2024) demonstrated that, in the upcoming period (continuing war in Ukraine), as the newly stimulated demand meets the limited supply from developers, further rapid increases in housing prices are anticipated [29].

3. Methods

This study employs an approach based on historical data analysis and predictive modelling to examine the impact of the war in Ukraine on the real estate markets in the V4 countries bordering Ukraine (Poland, Hungary, and Slovakia). The focus was on analysing quantitative data on, among other things, the number of refugees, the House Price Index (HPI), the number of transactions and prices per square metre of flats in selected border regions and capitals of these countries. Moreover, HPI indicators and monthly HPI changes for four additional countries in Central and Eastern Europe (Lithuania, Latvia, the Czech Republic, and Bulgaria) are also shown. Unfortunately, there is no data available for countries where Ukrainian emigration was higher, such as Belarus, Russia, and Moldova, which could have had a greater impact on the housing market.

The data came from publicly available sources such as Eurostat [30], [31], national central banks [32]–[35], UNHCR [36] and information portals, as well as the LUN real estate platform (in the context of Ukraine) [8]. The analysis included both national and regional data, particularly from regions bordering Ukraine, where the greatest impact of migration was

expected. The data set covered the period from 2005 to 2024 and included 80 quarterly observations for each country. The year 2015 was taken as the reference point (HPI value = 100). The data was visualised in charts, clearly marking the moment of Russia's invasion of Ukraine (February 2022) to show the housing market's reaction to this event.
For a part of the data (Figures 14 and 15), a 4th degree polynomial trend function was adopted according to the formula:

$$y_i = a_4 x_i^4 + a_3 x_i^3 + a_2 x_i^2 + a_1 x_i^1 + a_0 \quad (1)$$

Where y_t is the predicted value at sample t_i, a_1 to a_4 are the polynomial coefficients, and t_i is the independent variable (sample number). This formula uses regression by using the least squares method:

$$S = \sum_{i=1}^{n} (y_i - \hat{y}_i)^2 = \sum_{i=1}^{n} \left(y_i - a_4 x_i^4 + a_3 x_i^3 + a_2 x_i^2 + a_1 x_i^1 + a_0\right)^2 \quad (2)$$

In addition, HPI forecasting modelling was carried out until 2030 in two scenarios: one assuming the continuation of the war and one assuming its end. These forecasts were designed to evaluate the potential directions of the housing market in relation to the geopolitical situation. The analysis was conducted separately for each country, focusing on regional differences in the number of transactions and property prices, as well as on changes over time. This approach enabled the assessment of the impact of migration and geopolitical tensions on housing markets in a territorial context and the identification of regions particularly vulnerable to change. An automated exponential triple smoothing (ETS) method was used to analyse future trends, which adjusts to seasonality and trends based on the following model:

$$\hat{Y}_t = \alpha Y_{t-1} + (1 - \alpha)\hat{Y}_{t-1} \quad (3)$$

Y_t is the forecasted value at time t, t is a period number (1, 2, 3, …), and α is the smoothing factor ($0 < \alpha < 1$). This method was used because it employs triple exponential smoothing, which separates the level, trend, and seasonality of the time series data. By minimising the mean square error (MSE), it generates forecasts for subsequent periods, considering trends and seasonality effects.

4. Results

4.1. Central Europe

Using the above methods, the number of refugees to countries neighbouring Ukraine between 24 February 2022 and 13 March 2022 is shown in Figure 1. It is clear that Poland received the largest number of people, more than 1.7 million, in the first three weeks of the war. At the same time, most refugees were concentrated in temporary accommodation. For example, in Ukraine, such shelters were schools, kindergartens, student dormitories and other sports facilities.

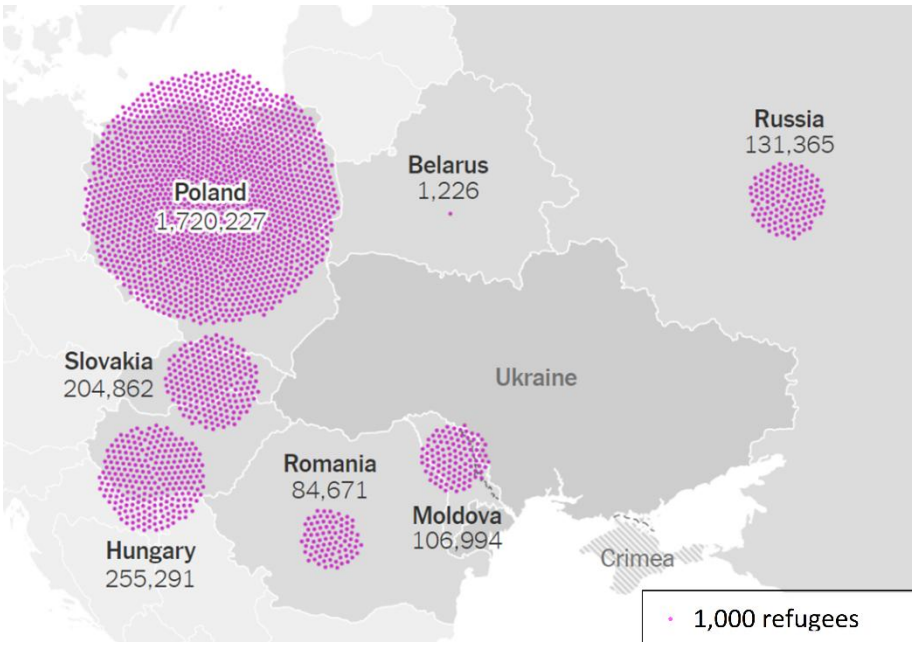

Figure 1. Number of refugees to countries neighbouring Ukraine between 24 February 2022 and 13 March 2022 (for Romania, data as of 8 March 2022). [37], [38].

Table 1 shows refugee border crossings into neighbouring countries (Bentley, 2022) for the period 24 February 2022 – 24 May 2022. We see that Poland remains the leader in refugee border crossings with over 3.5 million people. At the same time, the number of people crossing the border is almost one million for Romania and Russia. In the case of Russia, people were already within the occupation zone, beyond the line of hostilities. For them, it was often the safest way to escape the hostilities across the Russian border. Romania, with its long-shared border with Ukraine, was more of a transit country for refugees. Hungary and Slovakia have a combined total of over 1 million refugees; however, it is essential to note that these figures only represent the number of refugees who have crossed the borders. The overwhelming majority of them left Hungary at its western border to Austria and beyond. According to UNICEF data, the current estimate is 61,000 UA refugees in the country (~10% of the initial arrivals), plus approximately 20.000 immigrants.

Table 1. Refugee border crossings into neighbouring countries [39]

Country	# of Border Crossings (as of May 24, 2022)
Poland	3,505,890
Romania	961,270
Russia	919,934
Hungary	644,474
Moldova	471,223
Slovakia	442,316
Belarus	27,308

To further confirm the above data, Figure 2 shows the number of beneficiaries from Ukraine of temporary protection per thousand persons. It is clearly seen in the case of Hungary that the majority of Ukrainian immigrants have left the country by the end of 2022. The peak for Poland from April to October 2022 is clearly evident. As well as a steady growth curve of 12 to 23 per cent between 2022-04 and 2025-04.

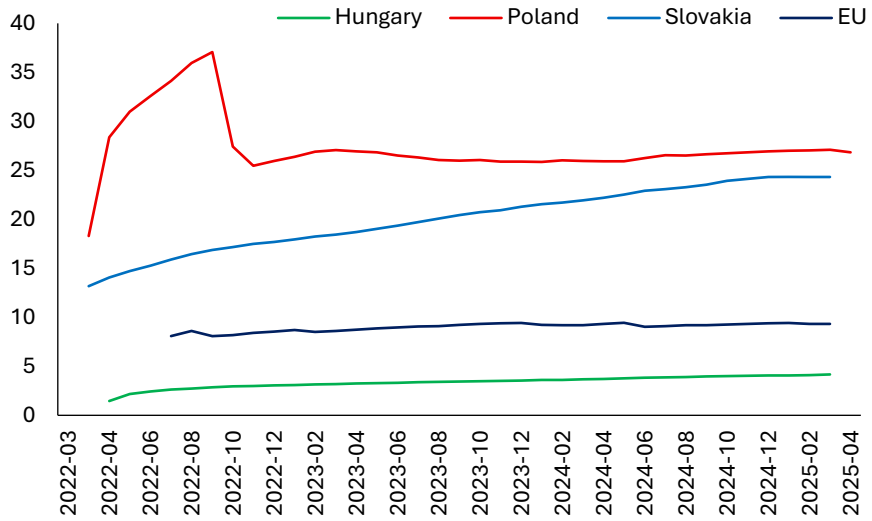

Figure 2. Beneficiaries from Ukraine of temporary protection - per thousand persons [40].

Let's take a closer look at the HPI (House Price Index) for the V4 countries bordering Ukraine and the EU average over the past 20 years, where 2015 is set as 100, serving as a reference year (Figure 3). The dataset covers the period from 2005 to 2024, comprising 80 records for each country. The war period is highlighted in yellow, while the Russian attack is indicated by a black line. It is clear that the HPI for Poland is increasing sharply, which is related to the large number of migrants from Ukraine, as shown in the previous section.

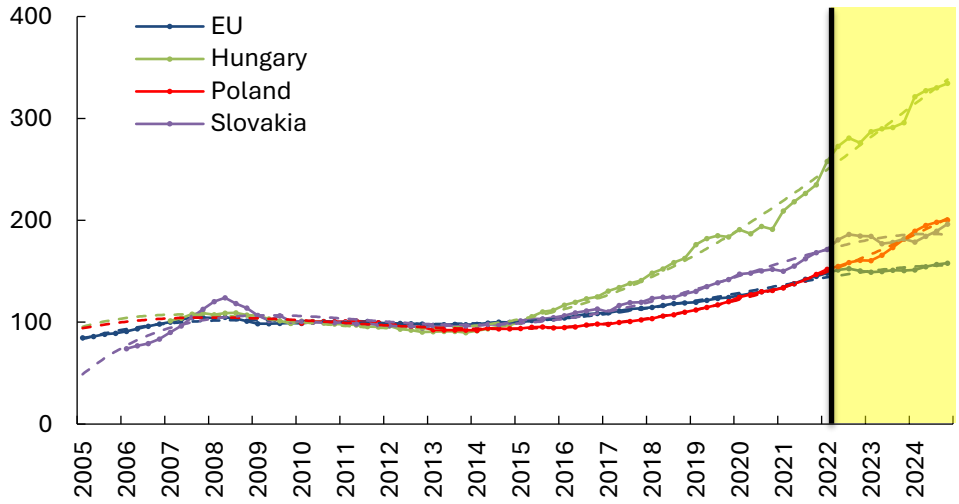

Figure 3. House Price Index (2015 = 100) - quarterly data for Visegrad countries bordering Ukraine [30].

Figure 4 illustrates the quarterly changes in the real estate price index for the Czech Republic, Latvia, Lithuania, and Bulgaria between 2005 and 2025, with 2015 as the base year (2015 = 100). All countries experienced strong price growth before the 2008 financial crisis, followed by a sharp decline. Since around 2014, a renewed upward trend has emerged, which has been particularly dynamic since 2020. The steepest growth rate after 2020 is observed in Lithuania, while Bulgaria shows the mildest growth. The period 2022–2025, marked in yellow, covers forecasts indicating further, albeit varied, price increases in all countries since the outbreak of the war. Overall, the data show that the real estate market in the region has re-entered a phase of strong price expansion after a period of stabilisation.

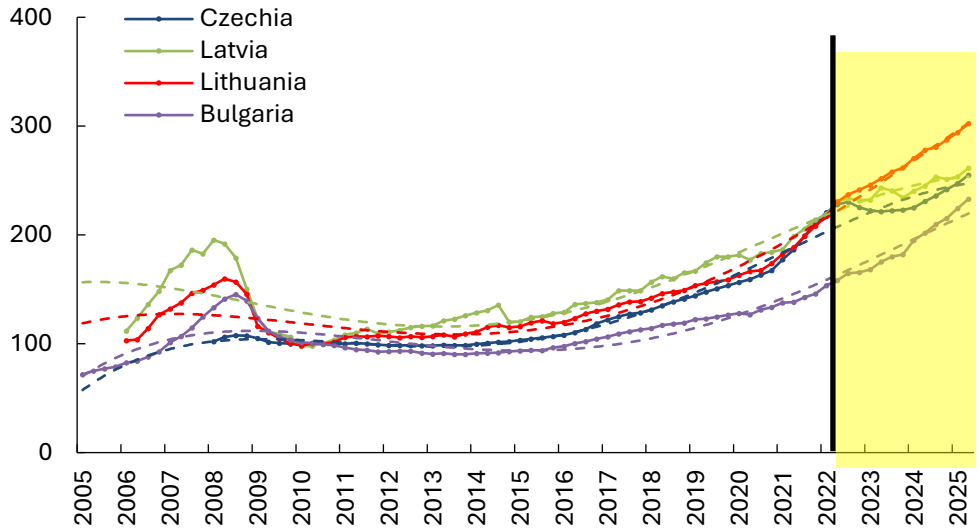

Figure 4. House price index (2015 = 100) - quarterly data for Czechia, Lithuania, Latvia and Bulgaria [30].

Since 2011, HPI trends have been quite similar, except for the change in Hungary, which has peaked from 2015 to 2020 (Figure 5). The vertical black line marks again the start of Russia's invasion in 2022, after which, there is a clear drop of 15-20 points for all curves, which is obviously caused by the war and the movement of refugees from Ukraine to these countries. It could also be seen that the fastest response by the market happened in Poland, while it was delayed in other countries. This is not only due to the actual number of displaced persons, but also to the expectation that the war would contribute to an even more noteworthy resettlement of Ukrainians to Poland, as one of the closest countries in Europe.

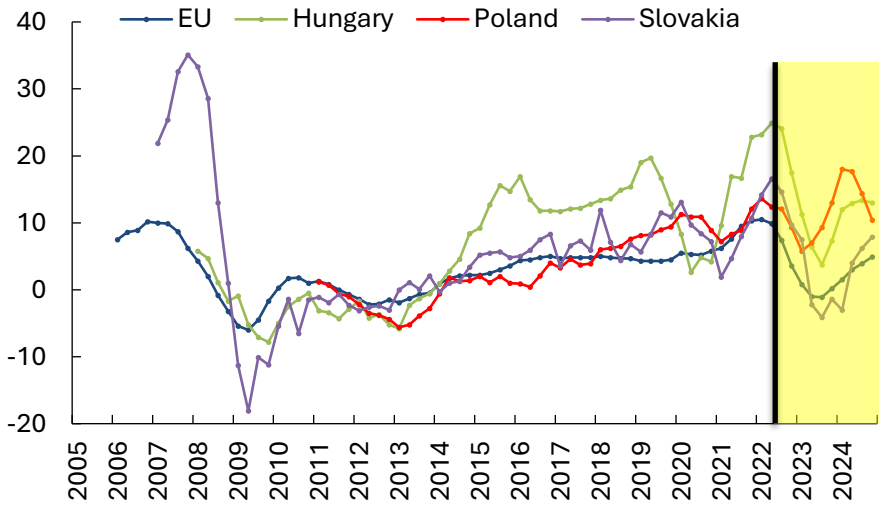

Figure 5. Percentage annual change in HPI in the EU, Hungary, Poland and Slovakia from 2005 to 2025 [30].

Figure 6 shows the annual percentage changes in the house price index (HPI) in the Czech Republic, Lithuania, Latvia, and Bulgaria between 2005 and 2025. There are clear fluctuations in price dynamics, especially during the 2008–2009 financial crisis, when the growth rate fell sharply and turned negative in some countries. After 2010, price changes stabilised and remained at a moderate positive level between 2015 and 2020. During and after the pandemic (2020–2022), the growth rate accelerated again, as indicated by a short-term increase in the curves. Data for 2023–2025 (area marked in yellow) indicate a continued, yet more sustainable,

pace of price growth. Overall, the data reveal the cyclical nature of the housing market, characterised by sharp declines during the crisis and moderate stabilisation in recent years.

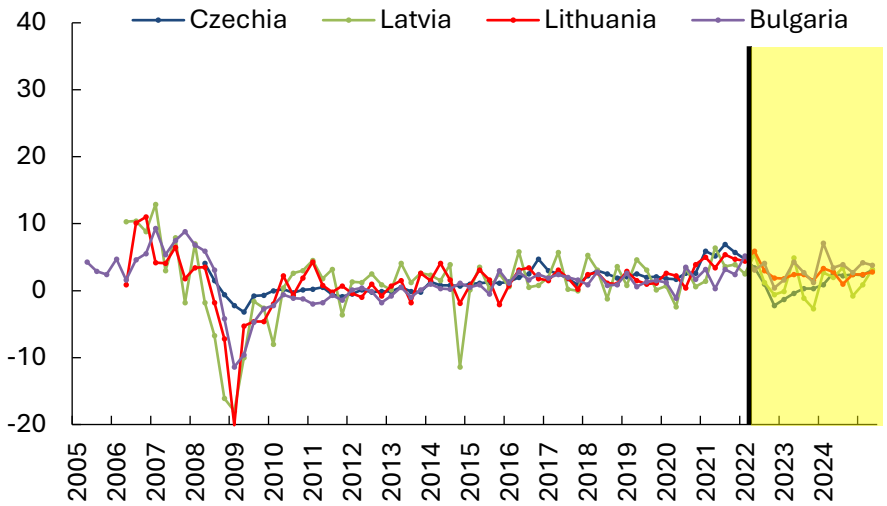

Figure 6. Percentage annual change in HPI in Czechia, Lithuania, Latvia and Bulgaria from 2005 to 2025 [30].

Analysing the year-on-year evolution of the HPI for EU, Poland, Hungary and Slovakia (Figure 7), one can point to 2022 as the key year, after which there were declines in EU, Hungary and Slovakia, but not in Poland. This confirms that demand for housing in Poland remained high in 2023, probably because of the number of migrants from Ukraine.

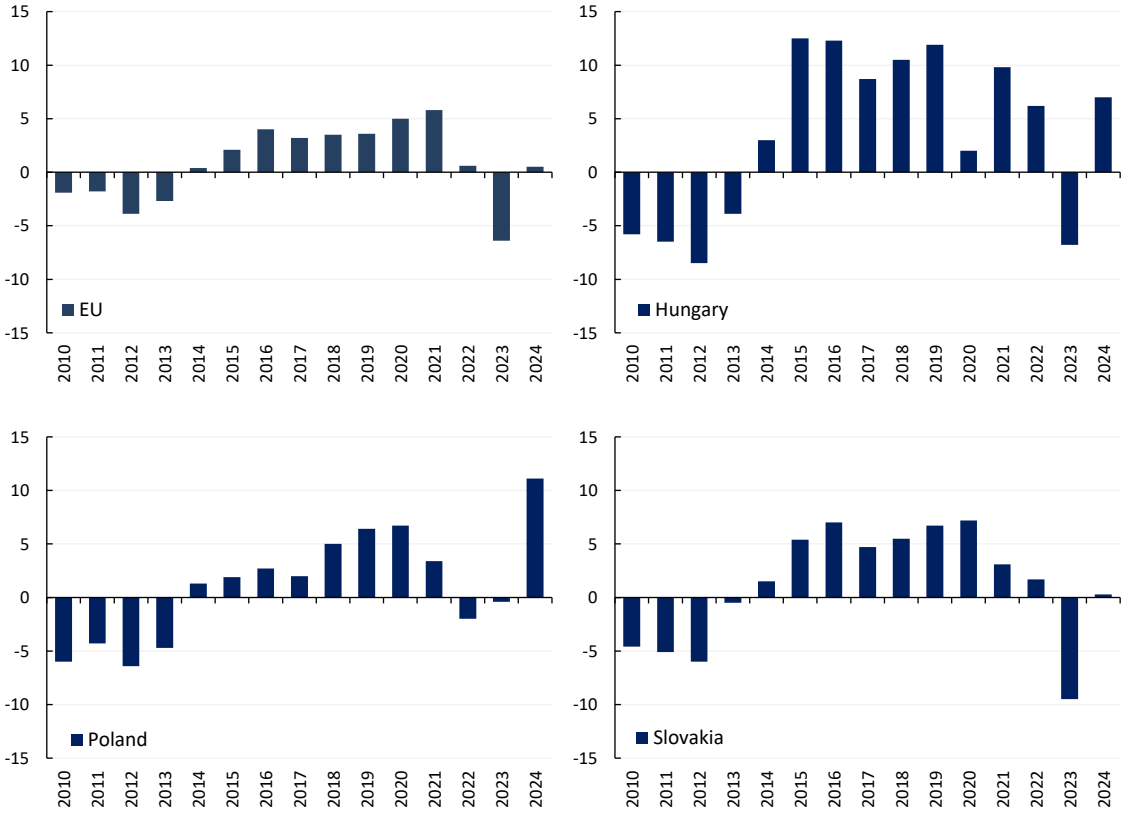

Figure 7. Annual change of HPI in EU, Hungary, Poland and Slovakia from 2010 to 2024 [30].

Sections 4.2-4.4 provide more detailed data on the territorial units that border Ukraine directly, as well as the capital cities and central provinces, which are the subject of this analysis (Figure 8, Table 2):

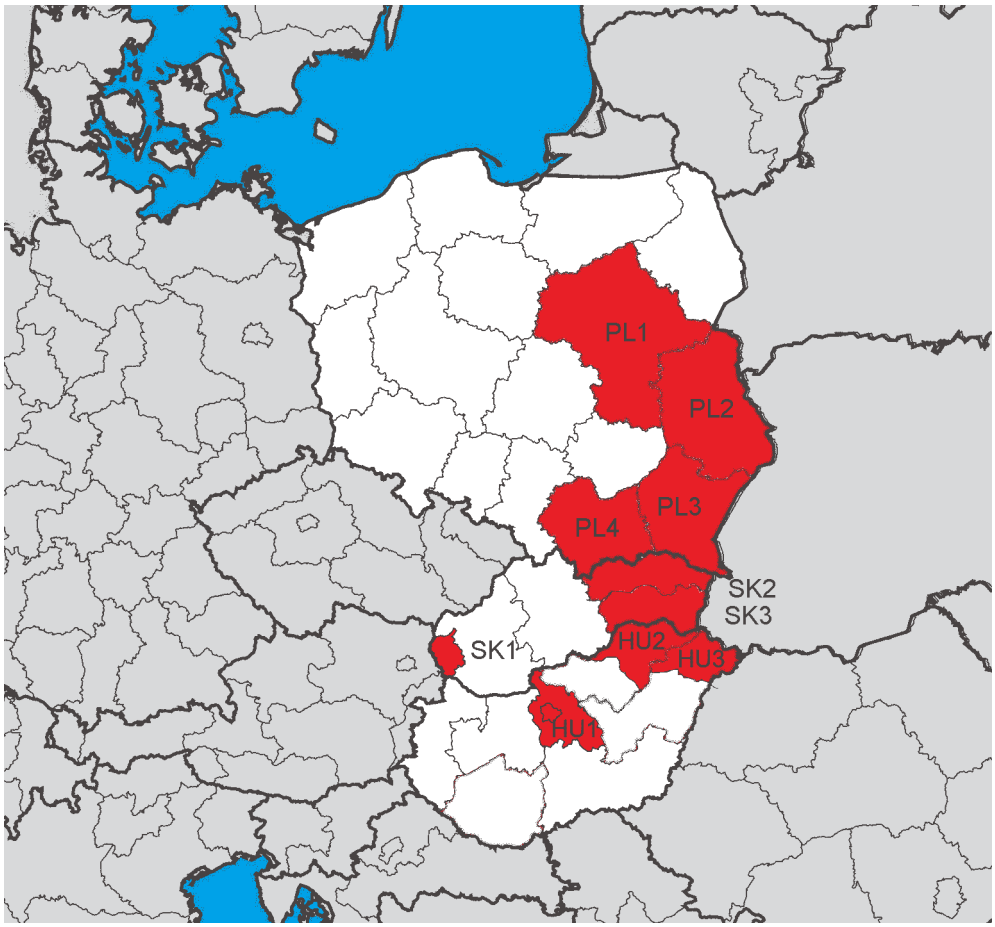

Figure 8. Regions in Poland, Slovakia and Hungary are bordered by Ukraine directly, as well as the capital cities with central provinces [41].

Table 2. Regions analysed in sections 3.2-3.4.

Country	Region	Central city	Description
Poland	Mazowieckie	Warszawa	PL1
	Lubelskie	Lublin	PL2
	Podkarpackie	Rzeszow	PL3
	Malopolskie*	Krakow	PL4
Slovakia**	Bratislavský	Bratislava	SK1
	Prešovský	Prešov	SK2
	Košický	Košice	SK3
Hungary	C. Pest	Budapest	HU1
	C. Borsod-Abaúj-Zemplén	Miskolc	HU2
	C. Szabolcs-Szatmár-Bereg	Nyíregyháza	HU3

**Małopolska does not border Ukraine directly, but as one of the main refugee destinations (second only to Mazowieckie), it was included in the analysis. ** For Slovakia, data covers only regions, not their seats*

4.2. Poland

Figures 9 and 10 show the quarterly changes in the number of flats sold and the average prices per square metre of real estate in four provinces of Poland (Masovian, Lublin, Subcarpathian,

and Lesser Poland) and their capitals (Warsaw, Lublin, Rzeszów, and Krakow). Figure 9 shows that the number of residential transactions fluctuates noteworthy, with a notable increase in the first half of 2022, following the outbreak of war in Ukraine. In particular, increases are noticeable in Warsaw and Krakow, which may indicate increased demand from refugees and internal migrants.

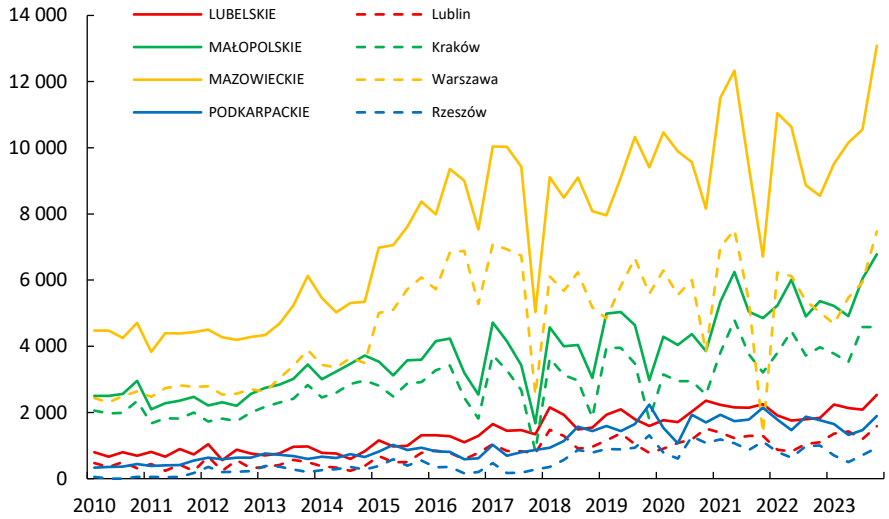

Figure 9. Quarterly number of residential properties sold in market transactions in four Polish provinces (solid line) and their seats (dashed lines) [42]

Figure 10 shows that prices per square metre have risen steadily in all regions analysed, with the highest values being achieved in provincial capitals, especially in Warsaw and Krakow. This increase accelerated after 2022, which may be directly related to demand pressure caused by the influx of people from Ukraine. These data confirm the thesis that war migration has a bigger impact on regional real estate markets in Poland.

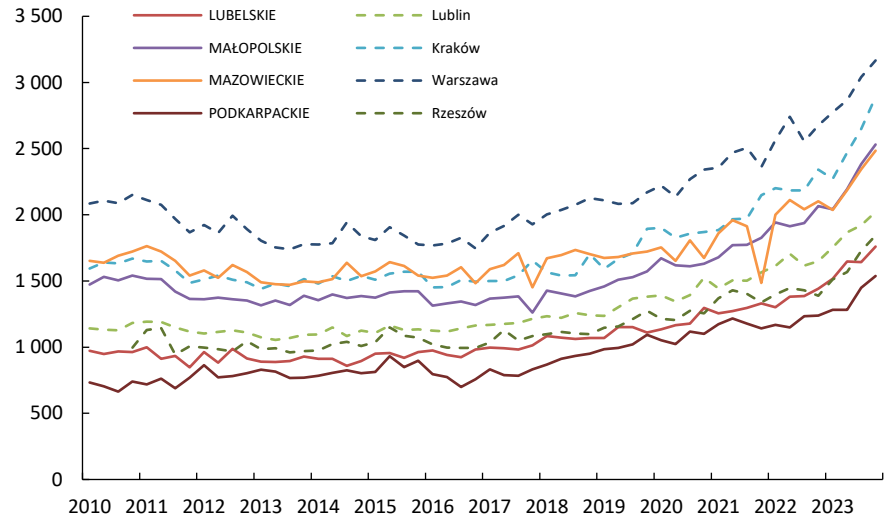

Figure 10. Average price of euros per 1 m^2 of residential premises sold in market transactions (quarterly data) in four Polish provinces (solid line) and their seats (dashed lines) [42].

It is worth noting that the differences between provincial capitals and other parts of the regions are visible not only in price levels but also in the dynamics of change. Provincial capitals are characterised by noteworthy faster growth in property values and prices, which can be explained

by greater availability of infrastructure, services and employment, which attract both refugees and local buyers. For example, Warsaw and Krakow not only have the highest prices, but also a stable level of transactions, which suggests high demand even in conditions of rising purchase costs.

In contrast, in border regions such as Podkarpackie and Lubelskie, there is a noticeable growth in activity on the housing market, albeit from a lower starting point. This may indicate the growing importance of these areas as first points of contact for people fleeing the war, who eventually decide to settle in Poland. The changes observed in the real estate market indicate the need for a differentiated housing policy that considers both migration pressure and regional development inequalities.

4.3. Hungary

Hungarian housing prices rose notable in the analysed period. In the last one and a half decade this increase was more than 2.5-fold, which is among the highest in the EU according to Eurostat [30]. The increase wasn't linear; the steepest growth happened between 2015 and 2019 and in the last 1.5 years, while in the 2010-2015 period, the market declined, and in the early 2020s, a small correction took place (Figure 11).

The housing market of Hungary had been hit hard by the impacts of the global financial crisis of 2008-2009, with property values dropping during the crisis. Demand for housing remained weak due to increased unemployment, limited wage growth, and restricted access to credit. Banks were cautious in their lending practices, especially after the fallout from widespread foreign-currency-denominated lending in the 2000s. Many Hungarians (76% of all housing loans had been foreign currency-based) had taken out mortgages denominated in foreign currency, especially in Swiss francs, before the crisis, attracted by lower interest rates. However, when the Hungarian forint (HUF) depreciated sharply against other currencies, monthly repayments became unaffordable for many households [43].

The housing market reached its bottom in 2013, from where a marked shift occurred around 2014. On one hand, it was a consequence of the starting economic recovery and improving employment, thanks to which the housing market gained momentum. GDP growth accelerated, wages began to rise, and consumer confidence started to return. A key turning point came in 2015, when the Hungarian government launched the so-called CSOK program (Family Housing Support Programme), which offered direct subsidies, favourable mortgage terms and decreased VAT for construction materials and services to families with children. The aim was to stimulate homebuilding and improve demographic trends by encouraging childbirth, but as a side effect, it also increased inflation and rising housing prices [20].

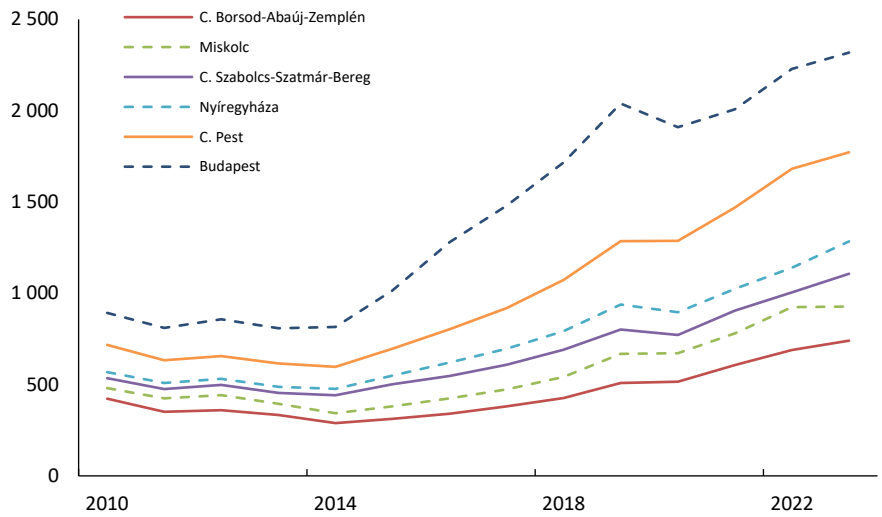

Figure 11. Average price euro per 1 m^2 of residential premises sold in market transactions in Hungarian counties (solid line) and their seats (dashed lines) [44].

These policies boosted demand, especially for new homes. As interest rates remained low across Europe, borrowing became more affordable, further incentivizing home purchases. A housing construction boom began, particularly in cities and suburban areas. Meanwhile, investors increasingly viewed real estate as a safe and profitable asset. Add to this the traditional high rate of homeownership and a struggle to reach it, which also contributed to the increased demand and consequently to the rising prices, particularly in Budapest [19].

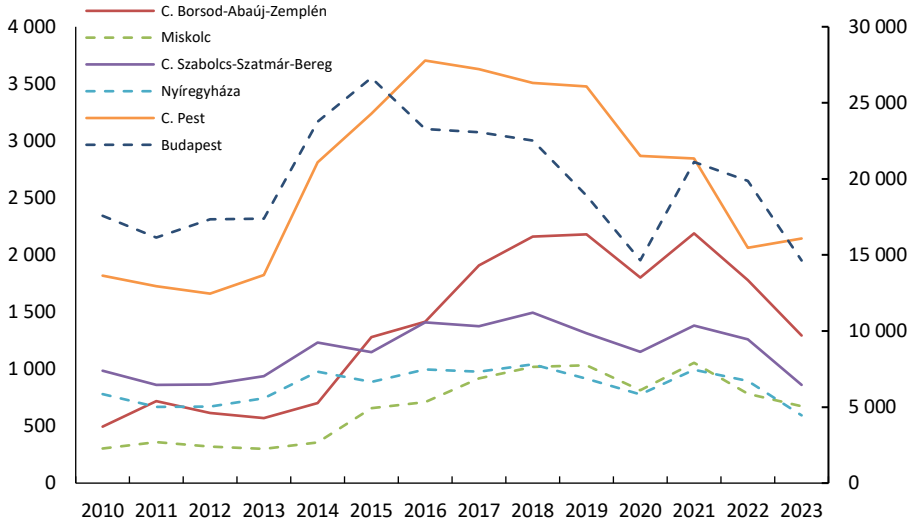

Figure 12. Number of residential properties sold in market transactions in Hungarian counties (solid line) and their seats (dashed lines), right axis is for Budapest and its region (C. Pest) [44].

By 2019, the Hungarian housing market was booming. New developments surged, and demand remained high. The COVID-19 pandemic in 2020 temporarily disrupted this upward trend. Initially, market activity slowed, with restrictions on mobility and economic uncertainty affecting both buyers and sellers. However, unlike in some other countries, there was no notable drop in prices. After a brief dip in transactions, the market recovered quickly by the end of 2020, however regionally differently (Figure 12). As a new phenomenon the housing market of the capital and Pest county was hit harder by the health crisis than the countryside [45], which, on the other hand is connected to one of the pandemic's longer-lasting effects: the shift in

housing preferences. With more people working remotely, suburban and rural properties became more desirable, while demand for small urban apartments declined slightly. This led to a geographic redistribution of demand. To support economic recovery, the government and central bank introduced additional housing incentives in 2021 combining sustainable and housing goals. Despite the ongoing health crisis, housing prices continued to rise steadily throughout 2021 and 2022, although at a slightly slower pace than before [33].

By 2023, new challenges emerged for Hungary's housing market. Rising global inflation and energy prices forced the Hungarian National Bank to raise interest rates to curb inflation. As mortgage rates increased, affordability declined. Many prospective buyers either postponed purchases or were priced out of the market entirely. Consequently, the rate of housing price growth slowed, particularly in major urban centres like Budapest. Some segments of the market saw stagnation, while others experienced mild corrections. At the same time, construction costs rose, and developers faced shrinking profit margins, leading to a slowdown in new housing starts. Government policy remained a crucial influence during this time. Adjustments to CSOK and the introduction of new support mechanisms were used to try to sustain market stability, though the effectiveness of these measures varied [34].

As of mid-2025, Hungary's housing market is stabilizing. While price growth has levelled off, there is no sign of a major crash. Demand remains healthy in certain regions, especially where employment and infrastructure development are strong. However, affordability continues to be a major concern, particularly for first-time buyers and young families [32].

The analysed territorial units have very different socio-economic characteristics which clearly affect their housing markets as well. Pest County and Budapest within are the most developed central places in the country. The capital (a primate city) is the home of 17,5% of the country's population; combined with Pest county, this share rises to one third; they produce almost half of the nation's economic output. On the other hand, while the two eastern counties are large (2nd and 3rd in population), they are at the bottom third of the counties according to GDP/capita and 2nd and 3rd in unemployment, providing far fewer economic opportunities and are seen in the country as peripheries.

The housing markets of their seats (Miskolc and Nyíregyháza) move together with other regional centres in the country (which follows national trends), however, Miskolc is among the least dynamic in post-crisis recovery [46]. On the other hand, the Budapest housing market clearly stands out from the national average, with noteworthy higher price growth. Pest County is also among the more dynamic units in the housing market, primarily due to its proximity to Budapest.

4.4. Slovakia

According to data from the National Bank of Slovakia [35], average real estate prices in Slovakia began to rise more from 2020 (by 11.9% compared to 2019), despite the Covid-19 pandemic (Figure 13). Demand remained strong, primarily due to low mortgage interest rates and a limited supply of new residential developments. Many individuals sought larger spaces and considered real estate as a form of secure capital investment. Strong demand has also been supported by the cultural preference of Slovaks for homeownership, which is conditioned by historical developments. The homeownership rate has long stood at approximately 90% [47], while rental housing is not perceived as a preferred or stable form of living, and therefore the

rental housing market remains underdeveloped. Moreover, social rental housing represents only 2.5% of the total housing stock (European Commission, 2025). It should be noted, however, that the data available in Slovakia do not fully correspond to those obtained for the areas of Poland and Hungary, i.e. there is no data for the capitals of the Slovak regions.

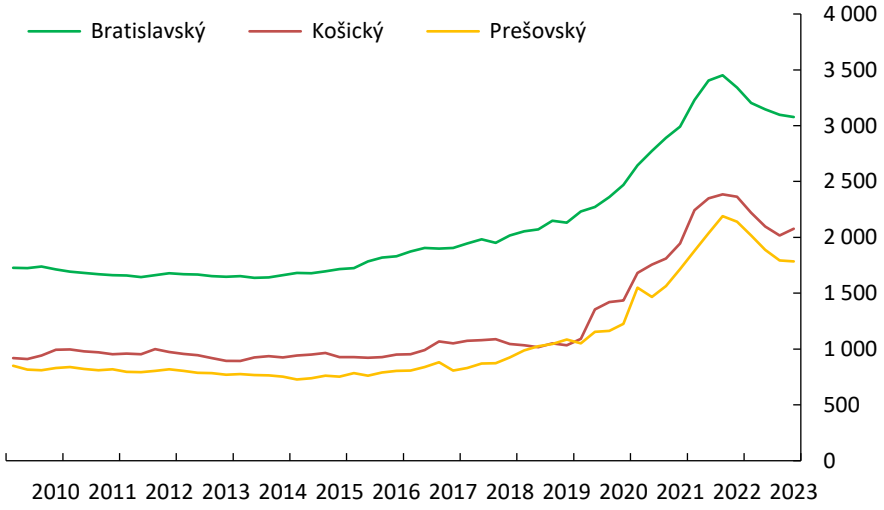

Figure 13. Average price of euros per 1 m^2 of residential premises sold in market transactions in the three observed Slovakian regions [35].

Low interest rates, inflation expectations, and strong housing demand drove the market upwards in 2021, when the annual average price reached €2,176/m², making it a record year with an annual increase of 23.5%. In 2022, real estate prices reached their historical peak (annual average of €2,639/m²). This peak was caused by a combination of persistently low interest rates in the first half of the year, strong investment demand, and a growing imbalance between supply and demand, including reactions to the outbreak of the war conflict and the migration of Ukrainian citizens. As a neighbouring country and a member of both the EU and NATO, Slovakia became part of the so-called "safe haven effect" within the Central European region.
In the second half of 2022 and throughout 2023, there was a notable price correction (annual average of €2,480/m²). In response to the sharp rise in inflation, the European Central Bank began increasing interest rates, which led to a substantial rise in mortgage costs and a decline in housing affordability. Demand cooled rapidly, and prices dropped by approximately 6% compared to 2022.
The development of real estate prices in the analysed regions generally followed the national trend, while simultaneously revealing regional differences that point to diverse market dynamics across various parts of Slovakia [35].
In the Bratislava Self-Governing Region, price growth was the most pronounced – in 2022, prices reached their peak at €3,357/m², while in 2023, the average price decreased to €3,131/m².
In the Košice Self-Governing Region, prices rose dynamically until the beginning of 2023 but then recorded a decline (-6.1% in Q1 2023). Paradoxically, however, by the end of 2023, it was the only region to experience a slight price recovery (+3%), which may indicate a specific resilience of the local market. The Prešov Self-Governing Region followed a similar trajectory to that of Košice, with an increase in 2022 followed by a sharp price decline in 2023.
From the perspective of the impact of the war in Ukraine, the Bratislava Self-Governing Region represents a safe and stable location for the relocation of Ukrainian citizens, as well as for

property investments by local residents situated further from the border with Ukraine. The Košice and Prešov self-governing regions are more often preferred by individuals intending to return to Ukraine or by refugees wishing to remain as close as possible to their homes.
The identified regional differences in the development of real estate prices indicate an uneven dynamic of the property market across different parts of Slovakia. While the Bratislava Self-Governing Region has maintained its status as the most robust and attractive region for both investment and living, the eastern Slovak regions (Košice and Prešov) have demonstrated greater volatility and sensitivity to external shocks, such as the war in Ukraine and the tightening of monetary policy. This differentiation is not coincidental but is linked to long-observed spatial inequalities.
As shown by the study of [9], the Bratislava Region constitutes a distinct development cluster characterised by a high concentration of tertiary-educated population, a strong presence of foreign direct investment, and important innovation potential. In contrast, the eastern Slovak regions are perceived as peripheral areas with a higher proportion of structurally dependent employment, an ageing population, and the presence of spatially excluded communities, all of which weaken their economic and market resilience. [48] also highlight the long-term stability of these spatial disparities, which extend into sectors such as housing and limit the capacity of certain regions to respond flexibly to migratory developments.
In light of these findings, the development of real estate prices should be understood not only as a result of market forces but also as a reflection of deeply rooted demographic, economic, and spatial inequalities that notable influence the resilience and adaptability of regional real estate markets in Slovakia.

4.5. Future prognosis modelling

Based on the analysed data, future prognosis modelling could be done. Figures 14 and 15, respectively, illustrate two future forecast modelling scenarios: one that includes the effects of the war (starting from 2025) and the other that excludes these effects (starting from 2022). Annual deflated HPI (navy blue) for period 2006-2024 (all accessible data) was used to forecast changes (red) in the ‘war factor included’ scenario for 2025-2027, and the same HPI data was used, but for the period of 2006-2021 (last data used is from before the 2022 invasion), to forecast changes in the ‘war factor excluded’ scenario for 2022-2027. The modelling shows that the V4 countries bordering Ukraine will be more affected than the EU as a whole. The forecast of the ‘war factor included’ scenario is less stable.

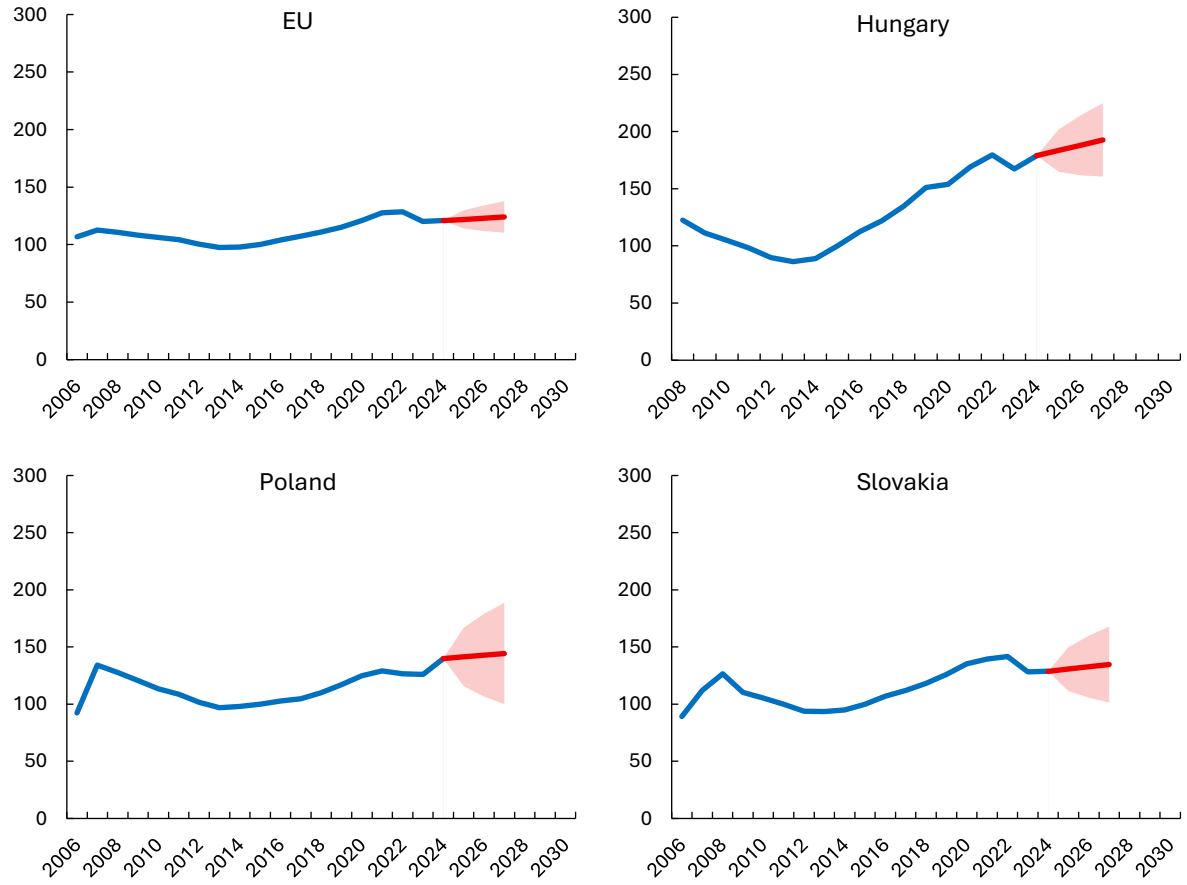

Figure 14. ‘The war factor included’ future prognosis modelling. Annual deflated HPI (navy blue) 2006-2024 with forecast (red) for 2025-2027 [30].

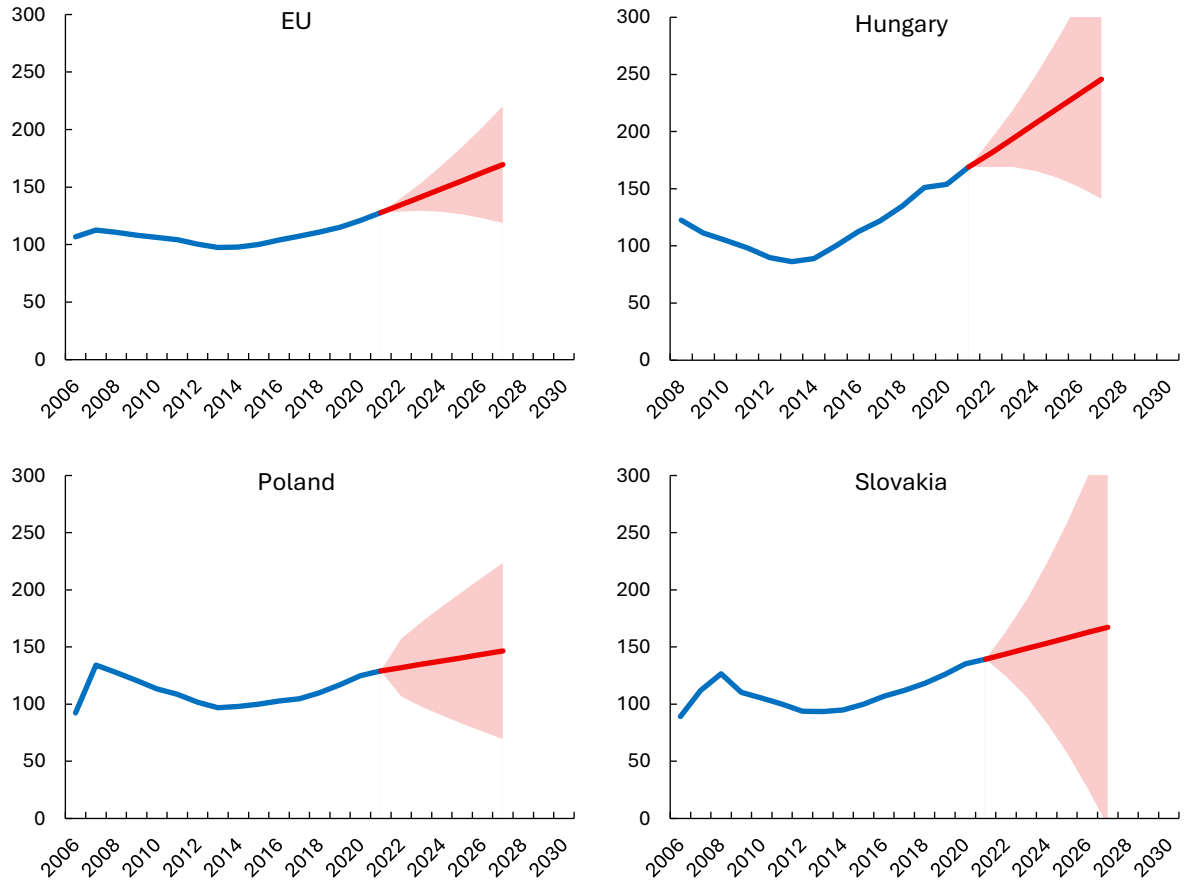

Figure 15. 'The war factor excluded' future prognosis modelling. Annual deflated HPI (navy blue) 2006-2021 with forecast (red) for 2022-2027 [30].

Table 3 presents the forecasts for the annual House Price Index (HPI) considering inflation for 2027 in the two scenarios. The data covers four entities: the European Union, Hungary, Poland and Slovakia. In the 'war factor excluded' scenario, all countries and the EU show higher HPI growth. For example, the projected growth for Hungary without war is 45.3%, while with war, it is 13.9%. Poland is the only country to exhibit similar values in both scenarios: 11.8% (including the war factor) and 13.6% (excluding the war factor). The war has a negative impact on all three markets through inflation, uncertainty, and other factors, but it has a noteworthy positive effect only on the Polish market, due to a large-scale influx of Ukrainian migrants, according to the forecasts. In the case of Slovakia, the 'war factor included' scenario indicates a 3.3% decline in property prices, while in the case of the 'war factor excluded' scenario, a 20% increase is predicted.

Table 3. Percentage forecast of the annual deflated HPI in 2027

	war factor included (2006-2024)	war factor excluded (2006-2021)
EU	-2.9%	32.7%
Hungary	13.9%	45.3%
Poland	11.8%	13.6%
Slovakia	-3.3%	20.0%

The European Union as a whole sees a 2.9% decline in the HPI in the 'war factor included' scenario, with a 32.7% increase in the 'war factor excluded'. These results suggest that armed conflict has a notable impact on the stability and development of real estate markets. A particularly negative impact is noticeable in Slovakia and across the EU. The table clearly shows that the war in Ukraine acts as a factor inhibiting the growth of property values in the region.

5. Conclusions

These results indicate that after the outbreak of the Russian war in Ukraine, the V4 countries that share a common border with Ukraine: Poland, Hungary and Slovakia, experienced a pronounced adjustment in their housing market, consistent with a large influx of people fleeing the war from Ukraine in the first weeks and months. Compared to the overall reaction of the housing market in Europe and these V4 countries, the results indicate that these border economies may have been more strongly affected by war-related migration, as the House Price Index increased noteworthy, which is especially evident in the reaction of the real estate market in Poland. However, this association should be interpreted with caution, as other drivers of housing price growth (such as monetary policy, inflation or post-pandemic demand shifts) could have played a concurrent role.

The findings presented in this study highlight a spatial differentiation in the development of the residential real estate market across the analysed countries, during a period of marked geopolitical and economic turbulence. The war in Ukraine and the associated wave of migration served as an external impulse that coincided with observed price developments, particularly in border regions and in more stable investment locations. However, the country-level data for Slovakia do not permit a detailed analysis of within-country regional disparities. Nevertheless, price dynamics across the analysed countries are shaped not only by these short-term shocks but also by long-standing spatial, demographic, and institutional disparities.

6. Limitations

When interpreting the results of this study, it is essential to consider that the development of residential property prices is the result of a complex interplay of multiple factors – economic, geopolitical, demographic, and institutional. Although our analysis primarily focused on identifying the potential impact of the war in Ukraine and related migration on real estate markets in the V4 countries, these factors cannot be assessed in isolation. Migration flows triggered by the war are likely to be influenced by considerations of housing costs (Baláž et al., 2023; Vidal and Huinink, 2019). Conversely, the arrival of new residents can amplify demand pressures and contribute to the dynamics of housing prices in receiving regions.

As [49] point out, even in the case of inflation, which is often regarded as a key determinant of real estate prices, correlation alone is insufficient to build a statistically robust predictive model. Previous research by Vasabi et al. (2025) and Kuethe and Pede (2011) has explicitly addressed the prediction of housing prices, highlighting that reliable forecasting is crucial for territorial planning, real estate investment decisions, and the formulation of economic policy. Similarly, our study works with data that do reflect the development of prices over time and across space; however, their predictive capacity is limited by the fact that, due to data unavailability, other

variables were not explicitly included – such as construction rates, supply-side characteristics, housing-related fiscal policies, or the structural characteristics of regions. The results should therefore be regarded as a partial contribution to the broader discussion on the factors influencing housing affordability and price formation in the countries under review.

Considering the abovementioned limitations, our study provides an answer to the question of how the most important housing market indicators (HPI, number of transactions, and prices in €/m²) have changed in Poland, Hungary, and Slovakia during and after the escalation in February 2022. It is done by indicating the dynamics, direction, and territorial differences of changes (border regions vs. metropolitan areas). Secondly, the findings of our study indicate where the observed changes were more visible (e.g. large urban markets compared to border regions), which is supportive of a territorial interpretation of market responses to the war. Thirdly, the scenario projections indicate how the medium-term changes of the HPI could differ in the with/without war scenarios, which points to the sensitivity of the forecast to the historical data.

In addition, it should be noted that article does not reveal the answer to the main research question: how much each of war-induced migration, modifications in monetary policy, inflation, and national housing policies separately affect the observed changes in terms of house price and number transactions. The lack of sufficient information and control variables—such as supply—limits the possibilities for revealing how much each of these variables separately affects the observed phenomenon. Therefore, it is recommended that the article be considered as a structured contribution that organizes the co-variance and timing of the observed phenomenon in relation to the three V4 countries.

7. Policy Recommendations

Based on the analysis of the literature on the subject, our own research, and the forecasts presented, it is not possible to establish a cause-and-effect relationship between the war in Ukraine and the increase in real estate prices with certainty. This relationship is too complex to be reduced to such an unequivocal statement, as described in the limitations section. However, it is certain that Russia's invasion of Ukraine has affected migration (refugees) and capital transfers. Both of these factors have had an impact on housing prices, which is reflected in their fluctuations. Based on this research, Table 4 has been prepared, presenting the main findings and recommendations.

Table 4. Key Findings and Policy Recommendations for Poland, Hungary, and Slovakia

Country	Summary of key findings	Policy Recommendations
Poland	▪ After 2022, a strong increase in transactions and prices, especially in Warsaw and Kraków. ▪ Migration from Ukraine boosted demand, particularly in regional capitals. ▪ Border regions show increased housing activity, though from a low base. ▪ Poland is the only country where the “war factor” has a ‘positive’ impact on housing price forecasts (higher HPI).	▪ Increase housing supply in large cities (regulatory and planning facilitation). ▪ Develop infrastructure and housing stock in border voivodeships. ▪ Integrate migration trends into long-term housing policy (transport, urban planning, integration). ▪ Expand data systems, especially for the rental market.

Hungary	▪ Strong price growth in 2014–2019 driven by CSOK and strong economic conditions. ▪ COVID-19 temporarily slowed the market, but the rebound was quick—especially outside Budapest. ▪ Since 2023, growth has slowed due to high interest rates and inflation. ▪ Strong regional disparities: Budapest and Pest are the most dynamic, while the east remains structurally weaker.	▪ Reform CSOK to support housing supply more effectively rather than primarily boosting demand. ▪ Regional equalisation measures for eastern counties (infrastructure, rental housing). ▪ Temporary mechanisms to ease high credit costs for young families. ▪ Support development of the long-term rental market (tax incentives, institutional instruments).
Slovakia	▪ Strong price growth in 2020–2022, partially driven by migration from Ukraine and low interest rates. ▪ In 2023, there was a notable correction (-6%) due to rising borrowing costs. ▪ Large regional disparities: stable market in Bratislava vs. higher sensitivity in Košice and Prešov. ▪ The "war factor" reduces forecasted prices, whereas without the war, strong growth would be expected.	▪ Expand social housing (currently only 2.5% of the stock). ▪ Programs increasing access to housing for the middle class (credit relief, rental support). ▪ Regional development policies strengthening eastern Slovakia (infrastructure, labour market). ▪ Create a monitoring system for migration impacts on the housing market.

Based on the national recommendations in Table 3, several fields were identified and compared with the good practices recommended by the OECD.

Table 5 highlights that the effectiveness of housing policies in individual countries is closely aligned with the established evidence presented by the OECD [50], [51]. The last column ("Why it works") demonstrates that reforms targeting increased supply, particularly by enhancing planning and expanding the number of social housing or affordable rental housing, are effective because they directly address the structural shortages that drive price increases. Policies that guard against excessive subsidies on the demand side work because they prevent overheating in markets where supply is limited.

Table 5. Comparison of National Recommendations (Poland, Hungary, Slovakia) with OECD Good Practices

Recommendation	Good Practice (OECD)	Why it works
Increasing housing supply in large cities (planning simplification)	Streamlining planning procedures + active land release (land-use reform). OECD recommends accelerating permitting and reducing planning fragmentation.	Reduces construction time and costs → faster supply growth and stabilisation of prices.
Supply-support programmes (social housing, rental housing)	Development and financing of social housing and publicly supported rental supply (PRS) — widely implemented across EU countries and recommended by OECD.	Increases access for low- and middle-income households; improves market mobility.
Caution with strong demand-side instruments (e.g., mortgage subsidies)	The OECD recommends prioritising supply-side instruments and conditioning subsidies with mechanisms that stabilise demand.	Demand-side subsidies without new supply can lead to fuel price increases and overheating.
Support for the rental market and institutional investors	Targeted investments in social housing and mixed public-private financing models. EU promotes stable rental sectors.	Provides secure housing for vulnerable groups and reduces pressure on private markets.
Regional policy (infrastructure + labour market)	Integrated territorial strategies (European Semester, regional funds): linking housing with labour market and infrastructure development.	Ensures that housing investment aligns with economic opportunities → greater policy effectiveness.
Data systems and market monitoring (including the rental market)	OECD promotes developing transaction registers, rental data systems, affordability indicators, and interoperable public data.	Better data → evidence-based policy, earlier detection of bubbles and supply shortages.
Integrating migration with housing policy	OECD integration practices: emergency shelters + structured transition to regular rental housing; support for employment and social services.	Helps refugees move smoothly into stable housing; reduces pressure on local markets.
Limiting the fiscal risks of interventions	OECD recommends full cost assessments and exits mechanisms for housing programs.	Protects public finances from long-term liabilities in volatile market conditions.

Overall, strengthening the rental sector, including institutional and social rental models, improves mobility and housing security, reducing pressure on real estate markets. Integrating housing with regional development, infrastructure, and labour markets is effective because it aligns housing availability with economic opportunities. Finally, robust data systems and monitoring improve policy-making by providing early signals of imbalances and ensuring that interventions remain targeted and financially sustainable. All of this will not only work well in the current situation – migration pressure (related to the war on the border of the host countries) – but also when that pressure subsides.

8. Future research

Although the analysis was carried out on the basis of differentiated data on the development of real estate prices in the regions, there was a lack of micro-data on household incomes, housing preferences, or real estate investors' behaviour. This kind of information could be used to better explain the differences in regions and the demand-related characteristics. Therefore, it can be

concluded that in the future, it is necessary to extend the analysis by incorporating qualitative information and developing more advanced models that consider a larger number of variables. In this context, it is becoming increasingly important to observe the qualitative aspects of housing and urbanisation. As noted by Máška et al. (2025), in a situation of geopolitical uncertainty, high levels of inflation, and demographic problems, the notable of sustainable and socially inclusive real estate projects is rising. This kind of solution can support the stability of the real estate market in the face of external disturbances. In strategic planning, it is necessary to consider not only the economic aspects of development, but also the environmental and social aspects of development, from the point of view of either public policy or investors' interests.
In particular, attention should be paid:

- Regional analysis within individual countries – it is worth developing research on data at the regional or city level to study local price differences and the effect of migration.
- Analysis of various factors influencing the market – future research should focus on studying the coexistence of various factors influencing real estate prices, namely monetary policy, inflation, changes in demand due to the pandemic, and, at the same time, the arrival of migrants (including war refugees).
- Analysis of the long-term effects (including regional effects) of war migration – research could study the effect of the arrival of refugees from Ukraine on the housing market in the medium and long term, including the demand for housing and real estate prices.
- Qualitative and microeconomic research – interviews with households, investors, and local authorities can help understand the behaviour and strategies of market participants that are not apparent from macroeconomic data.

International and interregional comparisons – it would be interesting to compare the influence of war migration on the real estate markets in border and inland countries, as well as different regions of Europe and the world, in order to understand the price mechanisms and the markets' resilience.