Guest editorial: Predictability of housing prices in the times of crises: new trends, methodologies, and techniques

1. Introduction

Housing assets serve dual roles as both sources of consumption and investments. Therefore, gaining a comprehensive understanding of housing price (HP) predictability is crucial for making informed investment decisions and for effective asset allocation (Dufitinema, 2021). This importance becomes even more pronounced during periods of global crises, as history has revealed that the housing market can exert significant influence over banking systems, private consumption, mortgage markets, asset portfolios and entire economies (Agarwal and Varshneya, 2022). In recent decades, the world has faced several notable challenges, such as the global financial crisis, the UK's decision to exit the European Union (Brexit), the tragic events of September 11, 2001, the global energy crisis in 2021 and the recent COVID-19 pandemic.

According to the research conducted by Lee and Lee (2018), the global financial crisis, which was initiated by the subprime mortgage crisis in the USA, had an unforeseen impact on housing and financial markets around the world. Meanwhile, the importance of the housing market became abundantly clear as it began to exert a significant impact on various critical areas, including household wealth, the real estate sector, the construction businesses and the stability of the monetary system (Yunus, 2019). This turmoil led to a substantial and unanticipated decline in HPs. The collapse in HPs not only exposed the inherent uncertainty associated with the volatility of house prices but also unveiled how this volatility could extend its reach across different sectors of the economy. Moreover, the abrupt drop in housing values can impact the balance between debt and home equity, eventually raising the risks associated with property ownership. As a result, an increase in HP volatility may lead to a greater likelihood of experiencing losses through mortgage foreclosures and a decrease in home equity (Segnon *et al.*, 2021). This situation emphasises the prominence of delving into the predictability of HPs, as the housing market's fluctuations can significantly affect an individual's investment portfolio.

In contrast, when examining recent crises, particularly the COVID-19 pandemic, it is notable that the pandemic had a pronounced adverse effect on nearly all economic indicators (Yadav, 2023). However, HPs remained largely unaffected. Based on the 2020 Global House Price Index from the International Monetary Fund, it has been observed that among the 60 countries, 23 of them experienced an increase of more than 5% in HPs. Also, a metric that represents housing affordability, i.e. house-price-to-income ratio, reached a greater level that indicates that in these economies, homes were becoming less affordable, as reported by Statista (2022).

Amidst the global health crisis caused by the COVID-19 pandemic, HPs exhibit a behaviour distinct from prior recessions. It has been expected that property values would decline during crises, but in this case, they surge at remarkable rates. This unexpected trend raises concerns about housing affordability and accessibility. Despite the backdrop of a pandemic, HPs have increased at their fastest rate, which in turn fosters a crisis of housing

affordability. Consequently, it becomes crucial to investigate this unexpected development within the housing sector.

To address the prevailing concern, this special issue has been crafted to explore the predictability of HPs during challenging periods. This involves a range of crises, including, but not limited to, the global financial crisis, Brexit (the UK's exit from the European Union), the 2021 global energy crisis, the attacks of 9/11 and the recent pandemic of COVID-19. The special issue is planned in a way that emphasises the research methodologies and techniques to gain deeper insights into these phenomena.

2. Special issue themes

For the special issue, we invited contributions that investigate various topics, including but not limited to HP trends in the COVID-19 pandemic, volatility in housing returns, real estate investment decisions during crises, using real estate as a hedge against market volatility, contrasting COVID-19 housing effects with past recessions, real estate market transformations amid the pandemic, emerging housing market trends, community and government actions for affordable housing, tackling post-COVID-19 housing challenges and enhancing housing affordability through price predictability.

After announcing the call for papers for the special issue, we received submissions across various subjects. However, we ultimately accepted 12 papers for inclusion in this special issue. All papers cover a diverse array of themes, effectively encapsulating the central theme of "Predictability of HPs in the times of crises: new trends, methodologies, and techniques."

3. Papers in the special issue

In the paper titled "*Housing market shifts favouring transit-oriented development in emerging economies: the link between metro rails and housing price dynamics in Delhi*" (Agnihotri and Paul, 2023), the scholars have directed their attention to comprehending how the spatiotemporal metro rail connectivity in Delhi, India, has influenced HPs over time. The scholars primarily aim to study the annual price changes of apartments near Delhi's metro stations from 2010 to 2019. Beyond this, the research also inspects the influence of metro station presence and surrounding spatial developments on HPs.

The authors use cross-tabulation analysis and chi-square values to assess how the housing market in Delhi responds to various locational variables associated with the mass public transportation system. The analysis divulges a significant overvaluation of the housing market near Delhi's metro stations, particularly up to the year 2013. However, at the beginning of 2014, HPs underwent a readjustment after experiencing overvaluation. This study emphasises the significance of location-related factors, particularly the presence of metro rail systems, in influencing the rise in HPs in the city. It further establishes a connection between yearly HP fluctuations and the presence of metro rails, considering different timeframes (short, medium and long term) and the distance from metro stations. These findings highlight the impact of transportation infrastructure on housing market dynamics and emphasise the need to consider location-related variables in understanding HP changes in the city.

The paper titled "*Real estate investment decisions in COVID-19 crisis: the effect of perception and behavioral biases*" by Ali *et al.* (2023) explains how investors' perceptions and behavioural biases influence decisions regarding real estate investment during the pandemic of COVID-19 in Pakistan. The perception of asset further includes: perceived asset price, perceived asset quality and perceived asset value. Conversely, behavioural biases involve: herding, disposition effect, risk aversion and overconfidence. Following the analysis, the results specify that factors such as herding behaviour, overconfidence and

perceived asset value play a substantial role in shaping investment decisions. Conversely, it is important to mention that risk aversion and the disposition effect do not appear to have a significant impact in this scenario. During the crisis of COVID-19, perceived asset value emerged as a key predictor of real estate investment decisions.

The paper by Gude (2023), "*A multi-level modeling approach for predicting real-estate dynamics*," introduces a multilevel algorithm to gain insights into housing market trends and assess the role of house permit data in enhancing the predictive capabilities of the model. The results uncover a statistically significant association between housing permits and house prices. This research is beneficial for various stakeholders, including government entities, construction companies, real estate investors and real estate buyers. Notably, the study's originality lies in its departure from conventional algorithms and models, as it addresses critical limitations by incorporating novel house constructions, inventory and monthly sales data in the market of real estate, with a specific focus on the USA. This innovative approach leverages existing socioeconomic indicators, monthly real estate information, permits and data of the population to enhance the prediction of house prices and inventory.

The paper titled "*The effects of housing price on the mortgage debt in Malaysia: new evidence from FMOLS method*" by Hammad Ahmad Khan (2023) explains how HPs influence mortgage debt. The scholar specifically targets the Malaysian economy and takes into consideration the influence of structural breaks linked to the global financial crisis (GFC). By using cointegration tests and the fully modified ordinary least squares method, the study suggests that HPs and mortgage debt appear to have a moderate positive association in the realm of the Malaysian economy. Remarkably, the GFC's effect is positive but lacks statistical significance, potentially because of the confidence and optimistic expectations of households in the housing market of Malaysia. The research holds noteworthy relevance for the banking sector and policymakers, supporting them in forecasting how households might behave in terms of borrowing during economic crises.

The paper "*Time-varying connectedness between global economic policy uncertainty and regional real estate markets: evidence from TVP-VAR extended joint connectedness approach*" by Zou *et al.* (2023) probes into a vital aspect of global economics and real estate. As the title implies, this paper identifies how uncertainty concerning global economic policy affects the real estate markets of different regions. To achieve this objective, the scholars contemplate the timeframe from April 2007 to August 2022. The Asia Pacific, North America, Latin America, Africa and Europe are the targeted regions of the scholars in the present study. Furthermore, the analysis has been carried out by considering the emerging approach, i.e. time-varying parameter vector autoregression. The results demonstrate Africa and North America as shock transmitters, implying that these regions are perceived as relatively secure investment markets during periods of uncertainty. What sets this study apart is its focus on the ever-evolving dynamics of this connection across multiple regions. Moreover, the utilisation of standard and poor daily real estate investment trust (REIT) indices enhances the credibility of its findings.

The paper titled "*Predictability of Belgian residential real estate rents using tree-based ML models and IML techniques*" by Lenaers *et al.* (2023) pursues a dual objective. First, it demonstrates the superior predictive performance of machine learning (ML) models that use intricate tree-based algorithms, commonly known as "black box models," when compared to traditional linear regression models for predicting rental prices in Belgian residential properties. Second, it introduces the innovative application of interpretable machine learning (IML) techniques to analyse the tree-based models and gain insights into the factors influencing predictions of rent. The findings confirm the superiority of tree-based models

and reveal key predictors, such as liveable surface area, asking price, number of bedrooms, cadastral income, proximity to points of interest and number of bathrooms. This research breaks new ground in real estate economics by emphasising rental price prediction and the utilisation of IML techniques, and it pioneers the use of SHapley Additive exPlanations (SHAP) plots to extract insights about rental determinants.

The paper titled "*Quantile connectedness among real estate investment trusts during COVID-19: evidence from the extreme tails of distributions*" by Tong *et al.* (2023) undertakes a vital exploration of the interconnectedness of REITs in the challenging environment of the COVID-19 pandemic. This study seeks to understand the nexus between 12 REITs. To achieve this, Tong *et al.* (2023) consider three specific time frames: the full period, the peak of the COVID-19 crisis and the recovery phase, using a unique quantile vector autoregressive (VAR) approach. The findings of this study accentuate the sensitivity of REIT markets to the COVID-19 pandemic, revealing substantial connectedness among the REITs during each of the examined periods. The study identifies the USA and The Netherlands as the primary sources of shock transmission. These economies stand out as comparatively stable options for forecasting the performance of other REIT markets. Conversely, Hong Kong and Japan are portrayed as less attractive REIT markets, being more susceptible to external shocks.

Another paper of the special issue titled "*Comparing simple and complex regression models in forecasting HP: case study from Kenya*" by Okuta *et al.* (2023) focuses on forecasting HPs in Kenya, aiming to address the housing market's imbalance between supply and demand. It uses both simple and complex regression models and compares their performance in projecting HPs. The findings indicate that complex models, particularly the VAR model, outperform simple models in forecasting HPs, highlighting the sensitivity of the housing market to economic indicators. Granger causality tests reveal the significant impact of certain macroeconomic indicators on HP changes, including gross domestic product, exchange rates, private capital inflows, interest rates and household income.

In the special issue, the paper titled "*Dynamic effects of geopolitical risks and infectious diseases on real estate markets*" by Yuni *et al.* (2023) delves into the dynamic impact of geopolitical risks (GPR) and infectious diseases on both global and regional house price indexes. The study uses a quantile regression approach to capture asymmetric effects, especially in varying market conditions. The research findings shed light on the diverse influence of GPR and infectious diseases on different regional real estate markets. Interestingly, during bullish market phases, geopolitical threats appear to have more pronounced effects than infectious diseases, particularly in the European, Asia-Pacific and North American regions. Nevertheless, the African real estate market appears less susceptible to GPR effects. Furthermore, infectious diseases increase real estate investment losses during bearish market conditions, extending into normal market periods in certain regions.

Another paper published in this special issue titled "*Australian housing markets, the COVID-19 pandemic and black swan events*" by Wong *et al.* (2023) probes into an in-depth exploration of how lending liquidity influences HPs, particularly during black swan events such as the 2007–2008 GFC and the pandemic of COVID-19.

The main goal of this research is to assess the impact of lending liquidity on Australian house prices during unforeseen financial crises. The research's timeframe encompasses data from 2004 to 2021, using easily accessible macroeconomic and financial data from authoritative sources such as the Central Bank of the Nation and the Australian Bureau of Statistics. The authors select an autoregressive distributed lag model to accommodate the complex nature of the data. The scholars reveal that despite the challenges posed by the pandemic of COVID-19, the Australian housing market exhibited remarkable resilience,

concluding in an unprecedented surge in the house price index prior to the end of 2021. Based on their analysis, the researchers posit a positive connection between HPs and variables such as population growth, housing finance and the value of residential property construction. These findings shed light on the limited impact of traditional drivers, such as economic activity, unemployment rates, income levels and stock prices.

The paper "*Deterministic and probabilistic analysis of Ukrainian residential property market evolution in turbulent 2019–2022 years*" by Yakubovsky *et al.* (2023) makes a substantial contribution to the understanding of real estate market dynamics amid crises, i.e. COVID-19 pandemic and ongoing military actions in the Ukraine. For this reason, the authors consider the data from 2019 to 2022. Despite the challenges posed by the pandemic and the war, the Ukrainian residential property market exhibited notable growth. The authors emphasise that the impact of these factors varies depending on the specific regions and types of properties. The outcomes unveil the core determinants of market evolution, highlighting cost-sensitive factors, including the overall area, floor level, geographical location and conditions of the houses.

The special issue includes a paper titled "*Have housing value indicators changed during COVID? Housing value prediction based on unemployment, construction spending, and housing consumer price index*" (Zhang and Yang, 2023). This research is driven by the concept that the pandemic may have altered the predictive power of traditional housing indicators. The study by Zhang and Yang (2023) centers its attention on the home value index within the USA, exploring its connections with three essential indicators: the housing consumer price index (HCPI), the national unemployment rate and private residential construction spending (PRCS).

After the analysis, it has been found that the COVID-19 pandemic had a notable impact on traditional housing indicators, such as unemployment, which has historically been a key factor in assessing housing values. However, the study introduces a novel indicator, PRCS, which demonstrated a strong and consistent relationship with housing values even throughout the pandemic. Notably, HCPI emerged as a more influential indicator for housing values compared to the commonly used All-Item consumer price index.

4. A way forward

The 12 papers in this special issue have expanded our understanding of the complex factors that affect HPs during times of crisis. As we think about these valuable contributions, it is clear that they not only significantly contribute to the present literature but also lay the foundation for a promising future of research in this field. In the following section, we present a roadmap for what lies ahead and highlight potential avenues that scholars can explore in upcoming years.

This special issue has provided several insights from various corners of the globe; hence, future studies can conduct a comparative analysis to explore similarities and differences in HP dynamics during crises across different countries. Investigating the impact of global events on local housing markets and comparing responses can offer valuable lessons for policymakers and investors. Another promising avenue for future inquiry involves a deeper examination of the sociocultural and psychological factors that influence housing investment decisions. Therefore, forthcoming studies can consider the following fields: sociology, psychology and urban planning to offer valuable understandings regarding the behavioural dynamics that drive housing market prices during crises. Moreover, the application of cutting-edge methodologies, particularly in the realm of ML and predictive modelling, can open avenues for scholars. Future research might explore the development of more precise and detailed predictive models by taking advantage of the progress in artificial

intelligence and big data. It will enable stakeholders to make more informed decisions in a rapidly changing housing landscape.

In addition to these recommendations, future research should also consider the long-term implications of housing market dynamics during crises. Studies could investigate the lasting impacts on homeowners, the financial sector and broader economic stability. Furthermore, examining the potential of emerging technologies, such as blockchain and smart contracts, can be a promising avenue to explore how these technologies affect HP dynamics and investment strategies in crises.

5. Concluding statement

We are grateful to the editors-in-chief for entrusting us with curating this special issue and to the reviewers for their valuable contributions. We sincerely thank all the contributors, both those whose work has been published and those who submitted their research.

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References

Agarwal, S. and Varshneya, S. (2022), "Financial crisis and the US mortgage markets-a review", *Handbook of Real Estate and Macroeconomics*, Edward Elgar Publishing, pp. 240-268.

Agnihotri, V. and Paul, S.K. (2023), "Housing market shifts favouring transit-oriented development in emerging economies: the link between metro rails and housing price dynamics in Delhi", *International Journal of Housing Markets and Analysis*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1108/IJHMA-04-2023-0050.

Ali, M., Choi-Meng, L., Aw, E.C.-X., Puah, C.-H. and Barut, A. (2023), "Real estate investment decisions in COVID-19 crisis: the effect of perception and behavioral biases", *International Journal of Housing Markets and Analysis*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1108/IJHMA-12-2022-0173.

Dufitinema, J. (2021), "Stochastic volatility forecasting of the finnish housing market", *Applied Economics*, Vol. 53 No. 1, pp. 98-114.

Gude, V. (2023), "A multi-level modeling approach for predicting real-estate dynamics", *International Journal of Housing Markets and Analysis*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1108/IJHMA-02-2023-0024.

Hammad Ahmad Khan, H. (2023), "The effects of housing price on the mortgage debt in Malaysia: new evidence from FMOLS method", *International Journal of Housing Markets and Analysis*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1108/IJHMA-11-2022-0167.

Lee, H.S. and Lee, W.S. (2018), "Housing market volatility connectedness among G7 countries", *Applied Economics Letters*, Vol. 25 No. 3, pp. 146-151.

Lenaers, I., Boudt, K. and De Moor, L. (2023), "Predictability of Belgian residential real estate rents using tree-based ML models and IML techniques", *International Journal of Housing Markets and Analysis*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1108/IJHMA-11-2022-0172.

Okuta, F.O., Kivaa, T., Kieti, R. and Okaka, J.O. (2023), "Comparing simple and complex regression models in forecasting housing price: case study from Kenya", *International Journal of Housing Markets and Analysis*, doi: 10.1108/IJHMA-02-2023-0027. Vol. ahead-of-print No. ahead-of-print.

Segnon, M., Gupta, R., Lesame, K. and Wohar, M.E. (2021), "High-frequency volatility forecasting of US housing markets", *The Journal of Real Estate Finance and Economics*, Vol. 62 No. 2, pp. 283-317.

Statista (2022), available at: www.statista.com/statistics/237529/price-to-income-ratio-of-housing-worldwide/

Tong, H., Khaskheli, A. and Masood, A. (2023), "Quantile connectedness among real estate investment trusts during COVID-19: evidence from the extreme tails of distributions", *International Journal of Housing Markets and Analysis*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1108/IJHMA-11-2022-0166.

Wong, W.W., Mintah, K., Wong, P.Y. and Baako, K. (2023), "Australian housing markets, the COVID-19 pandemic and black swan events", *International Journal of Housing Markets and Analysis*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1108/IJHMA-04-2023-0045.

Yadav, D.K. (2023), "Impact of the COVID-19 pandemic on macroeconomic indicators: a comparative study of developed and developing countries", In *The Impact of the Covid-19 Pandemic on People and Their Lives*, Routledge India, pp. 207-229.

Yakubovsky, V., Bychkov, O. and Zhuk, K. (2023), "Deterministic and probabilistic analysis of Ukrainian residential property market evolution in turbulent 2019-2022 years", *International Journal of Housing Markets and Analysis*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1108/IJHMA-02-2023-0032.

Yuni, D.N., Enwo-Irem, IN. and Urom, C. (2023), "Dynamic effects of geopolitical risks and infectious diseases on real estate markets", *International Journal of Housing Markets and Analysis*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1108/IJHMA-09-2022-0130.

Yunus, N. (2019), "Dynamic linkages among US real estate sectors before and after the housing crisis", *The Journal of Real Estate Finance and Economics*, Vol. 58 No. 2, pp. 264-289.

Zhang, X. and Yang, E. (2023), "Have housing value indicators changed during COVID? Housing value prediction based on unemployment, construction spending, and housing consumer price index", *International Journal of Housing Markets and Analysis*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1108/IJHMA-01-2023-0015.

Zou, H., Ahmed, M., Tariq, Q. and Khan, K.A. (2023), "Time-varying connectedness between global economic policy uncertainty and regional real estate markets: evidence from TVP-VAR extended joint connectedness approach", *International Journal of Housing Markets and Analysis*, Vol. ahead-of-print No. ahead-of-print, doi: 10.1108/IJHMA-12-2022-0176.