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House prices during the COVID-19 pandemic: the impact of "panic" returnees migrants to New Zealand

Thanh Ngo
Massey University, Palmerston North, New Zealand, and
VNU University of Economics and Business, Hanoi, Vietnam

Hanjun Wu
Massey University, Palmerston North, New Zealand

Kan Tsui
University of Southern Queensland, Toowoomba, Australia, and

Graham Squires and Xueqi Wang
Lincoln University, Lincoln, New Zealand

Abstract

Purpose – This paper aims to investigate the effects of the "panic" returnees who quickly returned back into New Zealand during the COVID-19 pandemic, given that the country was a perceived "safe haven" during that time and thus having some impacts on its national housing market.

Design/methodology/approach – This empirical study combines the autoregressive distributed lag framework and the instrumental variable approach to analyse the causal relationship between "panic" returnees and housing market dynamics in New Zealand during the COVID-19 pandemic.

Findings – The findings reveal that returnees were the major driver of increases in both short- and long-term house prices, although other longstanding factors such as rental prices, mortgage rates and supply constraints on new housing developments are also important. Policy recommendations and housing programmes are accordingly discussed.

Originality/value – To the best of the authors' knowledge, it is the first study on what is termed "panic" returnees. Therefore, it contributes to the understanding of housing market dynamics in the context of international mobility and economic disruptions, in addition to paving the way for targeted policy recommendations and housing programmes to address affordability challenges.

Keywords New Zealand, Housing markets, Aviation, Two-stage analysis, Returnees, COVID-19 pandemic, Autoregressive distributed lag

Paper type Research paper

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1. Introduction

In many countries, rising housing prices and affordability issues have become top priorities in national housing policy (Linneman and Megbolugbe, 1992; Wetzstein, 2017; Squires and Webber, 2019; Squires *et al.*, 2022). Western countries have experienced a housing boom in the past few decades, often linked to population growth (Azam Khan, 2023; Zhao *et al.*, 2023), inward migration (Erol and Unal, 2023; Moallemi and Melser, 2020; Sanchis-Guarner, 2023), improved income levels (Chong, 2020; Cuestas *et al.*, 2023) and lower mortgage rates (Schembri, 2024; Subhanij *et al.*, 2024; Zhao, 2020).

While such issues have been widely examined in the academic literature (Wetzstein, 2017; Subhanij *et al.*, 2024) and the media (Day, 2015; Youqin, 2013), the impact of population movements during crises (e.g. the COVID-19 pandemic) have received less attention (e.g. Ngo *et al.*, 2023; Qian *et al.*, 2021; Zhang *et al.*, 2023). For instance, travel restrictions and border closures during the COVID-19 pandemic and fears of virus transmission led to significant shifts in population movements (Salesi *et al.*, 2022; Seyfi *et al.*, 2023; Cook *et al.*, 2023; Jayasinghe *et al.*, 2024). Contradictory, waves of voluntary or forced people tried to seek safe places to live during the pandemic (Mencutek, 2022) – in New Zealand, a significant number of "panic" expatriates (returnees hereafter) who used to live and work abroad returned to New Zealand to live during the pandemic, as the country was perceived as a "safe haven" (Gauld, 2023). To analyse this phenomenon, we applied an autoregressive distributed lag (ARDL) framework with an instrumental variable (IV) approach to New Zealand's data from January 2017 to December 2021. We found that the influx of "panic" returnees had both short- and long-term effects on housing prices, influenced by factors like rent, mortgage rates and the availability of new homes. These results can inform New Zealand's housing policies and programmes.

This paper makes three key contributions to the growing number of housing related studies. First, it introduces and empirically examines the phenomenon of "panic" returnees – individuals who returned to their home country during the global health crisis – a previously unstudied but highly influential demographic in housing market dynamics. By moving beyond traditional macroeconomic determinants, we incorporate the dual influence of international return migration and house-specific variables, offering a fresh lens on housing price fluctuations. Second, we developed a dynamic economic framework to examine house prices by accounting for both the short- and long-term effects of the housing market's demand and supply dynamics. Third, we rigorously address the endogeneity issue arising from the unplanned and urgent nature of these "panic" return migrations, ensuring robust estimation of the causal relationship between panic returnees and housing affordability pressures. Taken together, these contributions advance the literature on international mobility and economic shocks while providing valuable insights for policymakers aiming to mitigate affordability challenges through responsive housing strategies.

The remainder of the paper is structured as follows. Section 2 reviews the relevant literature on immigration and house prices, COVID-19 and house prices, and house prices in New Zealand during the COVID-19 pandemic. Section 3 describes the methodology and the data. Section 4 reports and discusses the empirical results. Section 5 concludes the study and offers some future directions.

2. Literature review

2.1 Immigration and house prices

Understanding the impact of immigration on house prices has been a significant area of research in many countries, including Australia, New Zealand, the UK and the USA (e.g. Erol and Unal, 2023; Moallemi and Melser, 2020; Sá, 2015; Saiz and Wachter, 2011).

Accetturo *et al.* (2014) stated that immigration increased housing demand but also affected amenities and the perceived desirability of neighbourhoods. The relationship between immigration and house prices can vary according to the geographical and area size, with smaller local housing markets potentially experiencing price increases resulting from heightened demand or decreases caused by local resident emigration (e.g. Mussa *et al.*, 2017; Sá, 2015; Saiz and Wachter, 2011).

Sanchis-Guarner (2023) explored why immigration pushed up house prices, arguing that the inflow of foreign-born populations intensified spatial competition for housing, initially driving prices up. According to Sanchis-Guarner (2023), the overall impact of immigration on house prices results from increased demand by immigrants, additional changes in demand from the relocated population, and changes in housing conditions. On the other hand, Chong (2020) found that house prices in New Zealand correlated with immigrants' income levels and their ability to adapt. The effects of immigration on house prices also vary regionally. In some areas, immigration has a smaller effect if the incumbent residents prefer not to live near immigrants (Larkin *et al.*, 2019). Other factors affecting the impacts of immigration on house prices include immigrants' choices around housing, household size and the number of households per housing unit (e.g. Braakmann, 2019; Pavlov and Somerville, 2020; Wu *et al.*, 2018).

While much existing research focuses primarily on general immigration effects, recent theoretical developments highlight specific factors underlying migration-driven housing dynamics, particularly return migration. Crisis-induced migration theory posits that economic or political shocks compel migrants to return to perceived stable environments, significantly affecting local housing demand and prices upon their return (Cerutti *et al.*, 2017; Lindley, 2014). Behavioural economics also provides valuable insights, specifically through concepts like safe haven investment behaviour, suggesting return migrants gravitate towards stable real estate assets in response to economic uncertainties (Montezuma and McGarrigle, 2019; Rogers and Dufty-Jones, 2015). In addition, housing supply constraints under uncertainty highlight how inflexible housing supply exacerbates market volatility during sudden migration influxes, intensifying housing price movements (Hilber and Vermeulen, 2016).

Empirical analyses of migration and housing markets commonly face challenges related to endogeneity, particularly simultaneity bias, requiring sophisticated methodological approaches such as IV or generalised method of moments (GMM). For instance, Saiz (2007) uses geographic and historical instruments to isolate exogenous migration flows, whereas Akbari and Aydede (2012) use 2SLS estimations to account for causality between migration flows and housing markets. These approaches underscore the importance of rigorous econometric methods to accurately identify causal relationships between migration and housing dynamics.

Moreover, a significant body of studies have focused on international migration's effect on metropolitan areas, indicating an ambiguous impact on house prices (Erol and Unal, 2023). Whereas some studies predicted that the price would fall following immigration waves, others foresaw price rises (e.g. Sá, 2015; Sanchis-Guarner, 2023; Yiu, 2021). Generally, many studies have attributed the rise in housing prices resulting from immigration to population growth and higher demand, which has been validated in countries such as Australia (Erol and Unal, 2023; Moallemi and Melser, 2020), Canada (Akbari and Aydede, 2012; Pavlov and Somerville, 2020), some European countries (e.g. Degen and Fischer, 2017; Sanchis-Guarner, 2023; Tumen, 2016), the USA (e.g. Ottaviano and Peri, 2012; Saiz, 2007; Sharpe, 2019) and (of particular interest here) New Zealand (e.g. Greenaway-McGrevy and Haworth, 2020; Hyslop *et al.*, 2019).

Furthermore, some studies have found negative impacts of immigration on house prices, particularly in smaller areas (e.g. Hatton and Tani, 2005; Sá, 2015; Saiz and Wachter, 2011). The primary explanation for these negative impacts is the mobility response of the native incumbent population. Specifically, incumbents tend to move away from areas experiencing high immigration, and those who leave are often at the higher end of the wage distribution. This emigration generates a negative effect on housing demand, leading to lower house prices. Sá (2015) further explained that the negative effect of immigration on house prices is more pronounced in areas where immigrants have lower education levels. In addition, Saiz and Wachter's (2011) argued that natives prefer to live with individuals of the same ethnic group and a higher socioeconomic status.

2.2 COVID-19 and house prices

The COVID-19 pandemic, declared in March 2020, significantly affected asset prices worldwide (Qian *et al.*, 2021; Zhang *et al.*, 2023). Studies have investigated the short-term effects of COVID-19 on the housing market, noting that house prices fell in many regions and countries that were heavily affected by the pandemic, especially the economies that lacked diversification or relied on industries requiring face-to-face interactions (e.g. Ling *et al.*, 2020; Wang, 2021; Yilmazkuday, 2023). In the USA, housing market trends during the first six months of the pandemic showed an initial slowdown in price growth, followed by a sharp increase caused by reduced listings, increased online property views and the higher sensitivity of housing demand to mortgage rates (Zhao, 2020).

In New Zealand, Ngo *et al.* (2023) looked at the New Zealand market and found the positive impact of COVID-19 on house prices, suggesting that the pandemic contributed to the increased prices of New Zealand houses, which was driven by acute demand and increased monetary supply. Yiu (2023) also provided an explanation for the rising house price in New Zealand, namely the sharp increase in construction and material costs, which were largely caused by the disruptions in the global supply chains. Moreover, Yiu (2021) suggested that the synchronized increases in house prices in many countries after the outbreak of COVID-19 indicated that it was likely to be caused by a common shock rather than individual local issues.

However, the number of confirmed COVID-19 cases for a country or city has been shown to reduce house prices. Qian *et al.* (2021) found that housing prices decreased by 2.47% with confirmed COVID-19 cases, and its negative impact persisted for three months and grew over time. Similarly, Ling *et al.* (2020) reported that a one standard deviation increase in daily local COVID-19 cases depressed real estate investment trusts' returns by 0.23% the following day in the USA, showing particularly greater negative effects in regions with higher infection levels and worse medical treatment conditions.

2.3 House prices in New Zealand during the COVID-19 pandemic

New Zealand's early border closure in March 2020 only allowed New Zealand returnees (New Zealand citizens and permanent residents) to migrate back to New Zealand, and this migration policy lasted for a total of 38 months until July 2022 (Huang *et al.*, 2024). Despite limited airline capacity being available during this period, Statistics New Zealand (2020) reported a significant increase in the number of returnees migrating back to New Zealand during the COVID-19 period compared with the usual levels, putting pressure on the housing market (Albsoul *et al.*, 2023; Ngo *et al.*, 2023). According to Quotable Value NZ, average housing prices rose by 29.6% from 2020 to 2022 (QV, 2022). The Ministry of Housing and Urban Development (2020) acknowledged the challenges posed by the COVID-19 pandemic and outlined the need to address the systemic barriers contributing to the housing shortage

within New Zealand, including construction costs, infrastructure funding, land use regulations, rising migration and population growth.

Studies on New Zealand's housing market trends during the pandemic suggested that returning New Zealanders heightened housing demand, thus contributing to rising house prices (Ngo *et al.*, 2023). Albsoul *et al.* (2023) reinforced this claim, stating that the increase in the number of returnees to New Zealand exacerbated the supply–demand imbalance of the housing market and drove higher house prices caused by delays in replenishing the housing stocks across New Zealand's regions and cities. Moreover, Gauld (2023) proposed that inflated housing prices following the COVID-19 pandemic was driven by returning New Zealand citizens and permanent residents seeking to secure a "base" or "safe living place" in their home country during the global shock event. Notice that this study, however, does not analyse the "aftermath effect", i.e. whether the returnees stabilized in which city/region and participate in the property market therein, but focuses on their participations at the national level; we also believe that no country have such "aftermath" data.

However, the short- and long-term effects of COVID-19 on New Zealand's housing market, particularly regarding the returnees due to COVID-19's effects, remain limited and are under-researched. The combination of New Zealand's border shutdown policy, allowing only returnees to return and migrate back to New Zealand to live, and the significant changes in housing prices during the COVID-19 period make New Zealand an ideal case study for investigating the impact of those "panic returnees" on housing prices.

3. Methodology

3.1 Autoregressive distributed lag

This study examined the changes in house prices (i.e. *HPI*) under changes in the number of returnees migrating back to New Zealand (i.e. *RETURNEES*), among other factors, over time. Because we aimed to examine both the short- and long-term impacts of *RETURNEES* on *HPI*, the ARDL approach is more appropriate than other traditional time series approaches (Pesaran and Shin, 1999; Pesaran *et al.*, 1999). Specifically, ARDL is a statistical approach to examine the relationship between time series variables by using both autoregressive terms (lagged values of the dependent variable) and distributed terms (lagged values of the independent variables). In this sense, ARDL is useful to determine whether a stable long-run relationship exists between the dependent variable and its determinants (Nkoro and Uko, 2016). Other benefits of the ARDL approach include the ability to handle endogeneity via the inclusion of lagged variables, the flexibility with small samples via its robustness concerning serial correlation and heteroskedasticity, and the ability to analyse causality via bounds testing (e.g. Chudik *et al.*, 2016; Pesaran, 2015; Sharif *et al.*, 2020). Note that ARDL is popularly used in examining housing markets (Akça, 2023; Bangura and Lee, 2023; Akpolat, 2024). Consequently, this study followed Javed *et al.* (2023), Ngo and Tsui (2024) and Raza *et al.* (2024) in constructing our baseline model of modelling demand (M-D) as specified in equation (1):

$$\begin{aligned} \text{M}-\text{D}: HPI_t = {} & \alpha_0 + \alpha_1 HPI_{t-i} + \alpha_2 RETURNEES_{t-i} + \alpha_3 RENT_{t-i} \\ & + \alpha_4 RATES_{t-i} + \alpha_{5j} Z_{jt} + \varepsilon \end{aligned} \tag{1}$$

where *HPI* represents the national housing price index in the monthly period *t* (*t* ranges from January 2017 to December 2021), *RETURNEES* represents the number of returnees migrating back to New Zealand in period *t*, *RENT* measures the national rental price index in period *t*, *RATES* represents the one-year mortgage rate, *Z* is a set of fixed-effect control variables [1], *i* represents the optimal lag length of the variable to be determined by the Schwarz criterion, *j* represents the number of control variables, and ε is the statistical noise.

In short, the baseline model [equation (1)] examines the dynamic relationship between *HPI* and the demand side of the housing market, for which we hypothesise that an increase in the number of returnees (because of the COVID-19 pandemic) has a positive effect on house prices (i.e. $\alpha_2 > 0$).

Whereas equation (1) examines house prices across a long-run equilibrium stage, its error correction model (ECM) can estimate the short-run deviation from equilibrium, as shown in equation (2):

$$\begin{aligned} \mathrm{M-D-ECM}: \Delta HPI_t = {} & \beta_0 + \varnothing HPI_{t-1} \\ & + (\theta_1 RETURNEES_{t-1} + \theta_2 RENT_{t-1} + \theta_3 RATES_{t-1}) \\ & + \left[\sum_{i=1}^{a} \beta_{1i} \Delta HPI_{t-i} + \sum_{i=1}^{b} \beta_{2j} \Delta RETURNEES_{t-i} \right. \\ & \left. + \sum_{i=1}^{c} \beta_{3i} \Delta RENT_{t-i} + \sum_{i=1}^{d} \beta_{4i} \Delta RATES_{t-i} \right] + \beta_{5j} Z_{jt} + \varepsilon \end{aligned} \quad (2)$$

where Δ denotes the first differencing operator, $\varnothing$ denotes the speed of adjustment (expected to be statistically negative because the ECM will push house prices back to equilibrium), θ represents the vector of the short-run coefficients, β represents the vector of the long-run coefficients, and *a*, *b*, *c* and *d* are the optimal lag lengths of the variables to be defined by the ARDL model.

As discussed in Andrews (2010), Chow and Niu (2015) and Ngo *et al.* (2023), the equilibrium in the housing market is also dependent on the supply side (e.g. the number of newly built houses). Consequently, we extended the baseline models [equations (1) and (2)], both in terms of the short- and long-run relationships, to also incorporate housing supply in equation (3) for modelling both housing demand and supply (M-D-S). Accordingly, the corresponding ECM model of M-D-S-ECM for modelling the demand and supply of the housing market is presented in equation (4):

$$\begin{aligned} \mathrm{M-D-S}: HPI_t = {} & \alpha_0 + \alpha_1 HPI_{t-i} + \alpha_2 RETURNEES_{t-i} + \alpha_3 RENT_{t-i} + \alpha_4 RATES_{t-i} \\ & + \alpha_5 NEWBUILT_{t-i} + \alpha_{6j} Z_{jt} + \varepsilon \end{aligned} \quad (3)$$

$$\begin{aligned} \mathrm{M-D-S-ECM}: \Delta HPI_t = {} & \beta_0 + \varnothing HPI_{t-1} + (\theta_1 RETURNEES_{t-1} + \theta_2 RENT_{t-1} \\ & + \theta_3 RATES_{t-1} + \theta_4 NEWBUILT_{t-1}) \\ & + \left[\sum_{i=1}^{a} \beta_{1i} \Delta HPI_{t-i} + \sum_{i=1}^{b} \beta_{2j} \Delta RETURNEES_{t-i} + \sum_{i=1}^{c} \beta_{3i} \Delta RENT_{t-i} \right. \\ & \left. + \sum_{i=1}^{d} \beta_{4i} \Delta RATES_{t-i} + \sum_{i=1}^{e} \beta_{5i} \Delta NEWBUILT_{t-i} \right] + \beta_{6j} Z_{jt} + \varepsilon \end{aligned} \quad (4)$$

where *NEWBUILT* represents the total number of new building consents for residential houses issued in period *t*, including new builds and renovations.

3.2 The endogeneity issue: the IV ARDL approach

As discussed in Section 2.1, even before the COVID-19 pandemic, there was a proportion of returnees within the total number of migrants to New Zealand (Statistics New Zealand, 2020). However, most of them returned temporarily (e.g. to visit relatives and relatives and then leave the country). Thus, they did not significantly impact New Zealand's housing markets. During the COVID-19 pandemic, the panic around the world became different: returnees returned to settle down in New Zealand and wanted to rent or buy a house/property to live in. However, the number of returnees who could successfully return to New Zealand during the COVID-19 period mainly depended on the limited seat capacity available from the repatriation mission flights (Ngo *et al.*, 2023) and the arrival caps of hotel quarantine spaces available for returnees during this period (Gauld, 2023).

As of July 2020, the New Zealand Government and Air New Zealand, the national flag carrier, agreed to manage incoming bookings for returnees aligned with the capacity for managed isolation or quarantine (MIQ) (New Zealand Government, 2020). This system could only accommodate 6000 people at 28 MIQ facilities across New Zealand. As of September 2021, more than 230,000 New Zealanders (e.g. about 58% of registered MIQ users) could not secure their places in the MIQ system for their return to New Zealand (Aljazeera, 2021). Therefore, the variable of *RETURNEES* should be considered as an endogenous variable, considering the number of returnees was limited by airline seat capacity to New Zealand (*AVIATION*), and the availability of managed isolation/quarantine space (*MIQ*).

Consider the supply and demand ECM model (i.e. M-D-S-ECM) in equation (4). Phillips (1988) recognized that when the explanatory variables are endogenous, the asymptotic distribution of the ECM estimator is not free of nuisance parameters, and the corresponding *t*-statistics do not have a standard normal distribution asymptotically. Inder (1993) also showed that the IV approach can be used and extended to the ECM model and that this provides an asymptotic distribution free of nuisance parameters. Therefore, we established the IV-ARDL model with a two-stage IV approach (e.g. Ngo *et al.*, 2022; Soyk *et al.*, 2021; Tsui *et al.*, 2017). In the first stage of the IV-ARDL model, equation (3) was modified so that the endogenous variable of *RETURNEES* is regressed against *AVIATION* and *MIQ*, alongside other exogenous variables in equation (5):

$$RETURNEES_t = \delta_0 + \delta_1 HPI_{t-1} + \delta_2 RENT_t + \delta_3 RATES_t + \delta_4 NEWBUILT_t + \delta_5 AVIATION_t + \delta_6 MIQ_t + \delta_{7j} Z_{jt} + \varepsilon \quad (5)$$

The predicted value of *RETURNEES* derived from equation (5), $\widehat{RETURNEES}$, from the first-stage estimation was then used in the model of M-IV (modelling IV) in equation (6) during the second-stage estimation, which aimed to capture the consistent long-run impacts of the returnees to New Zealand on the housing market. Accordingly, the model of M-I-VEC is presented in equation (7). In this sense, we corrected the values of *RETURNEES* by accounting for its influencers (i.e. *AVIATION* and *MIQ*):

$$\text{M}-\text{IV}: HPI_t = \alpha_0 + \alpha_1 HPI_{t-i} + \alpha_2 \widehat{RETURNEES}_{t-i} + \alpha_3 RENT_{t-i} + \alpha_4 RATES_{t-i} + \alpha_5 NEWBUILT_{t-i} + \alpha_{6j} Z_{jt} + \varepsilon \quad (6)$$

$$\mathrm{M-IV-ECM}: \Delta HPI_t = \beta_0 + \varnothing HPI_{t-1} + \left(\theta_1 \widehat{RETURNEES}_{t-1} + \theta_2 RENT_{t-1} + \theta_3 RATES_{t-1} + \theta_4 NEWBUILT_{t-1}\right) + \left[\sum_{i=1}^{a} \beta_{1i} \Delta HPI_{t-i} + \sum_{i=1}^{b} \beta_{2j} \Delta \widehat{RETURNEES}_{t-i} + \sum_{i=1}^{c} \beta_{3i} \Delta RENT_{t-i} + \sum_{i=1}^{d} \beta_{4i} \Delta RATES_{t-i} + \sum_{i=1}^{e} \beta_{5i} \Delta NEWBUILT_{t-i}\right] + \beta_{6j} X_{jt} + \varepsilon \quad (7)$$

where $\widehat{RETURNEES}$ denotes the predicted value of the dependent variable estimated by equation (5).

4. Empirical results

4.1 Data and their validity

Our main dependent variable, *HPI*, was extracted from the Real Estate Institute of New Zealand (2022). For other demand- and supply-side variables of interest, we sourced the data from Statistics New Zealand (2022). The descriptive statistics of these key variables are reported in Table 1. Note that the logarithmic values of large-scale variables (i.e. *HPI*, *RETURNEES*, *RENT* and *NEWBUILT*) have been used in our estimations instead of their original values. Post-COVID-19 pandemic refers to dates from January 2020, when the initial outbreak started to have a significant impact on the global population.

Before proceeding to the ARDL estimations, we performed tests of unit roots and endogeneity (regarding the variable of *RETURNEES*, as discussed in the previous section) of the variables of interest. Note that ARDL can deal with I(0) and I(1), but not I(2) variables (Katrakilidis and Trachanas, 2012; Li and Cheung, 2017; Mehta *et al.*, 2023). Appendix 1 shows that all the variables of interest are free from I(2), and thus they are suitable for the ARDL estimations. In addition, Appendix 2 reports that the key variable of *RETURNEES* is

Table 1. Descriptive statistics of the variables (january 2017−december 2021)

	Pre-COVID-19			Post-COVID-19			All samples		
Time series variables	Obs.	Mean	SD	Obs.	Mean	SD	Obs.	Mean	SD
HPI	36	2710.25	86.10	24	3502.75	468.86	60	3027.25	493.34
RETURNEES	36	10112.47	2062.38	24	4337.21	2716.08	60	7802.37	3679.62
RENT	36	1446.89	49.53	24	1557.25	43.59	60	1491.03	71.89
RATES	36	4.19	0.36	24	2.72	0.42	60	3.60	0.82
NEWBUILT	36	5179.28	768.73	24	6133.67	1015.67	60	5561.03	987.43

Note(s): *HPI*, the housing price index (December 2003 = 1000); *RETURNEES*, the number of people with New Zealand citizenship or permanent residency who migrated back to the country (in persons); *RENT*, the rental price index (November 2006 = 1000); *RATES*, one-year mortgage rates (%); *NEWBUILT*, the number of building consents issued for residential houses (both new builds and renovations); N, the number of observations; SD, standard deviation

Source(s): Authors' own creation

indeed endogenous and that the two IV variables of *AVIATION* and *MIQ* are sufficient for applying the IV analysis. Therefore, in this study, the IV-ARDL approach was more appropriate than the traditional ARDL model (Inder, 1993; Arize, 2017).

4.2 Empirical results of the ARDL estimations

Since we are interested in both the short- and long-term effects of the number of returnees on New Zealand's housing prices, we first report the results of our base model of M-D ECM in Column (2) of Table 2. The results for the other models (MD, MDS and MIV) are not reported here but will be made available upon request. Note that the yearly and regional fixed-effect variables were included in all estimations to control for the heterogeneity issues.

Table 2. ARDL Results

Variable	Model M-D-ECM (2)		Model M-D-S-ECM (3)	
(1)	Coefficient	Standard error	Coefficient	Standard error
Speed-of-adjustment				
ø	−0.145***	0.050	−0.169***	0.049
Short-run effects				
HPI_{t-1}	1.180***	0.140	0.831***	0.049
HPI_{t-2}	−0.662***	0.222		
HPI_{t-3}	0.613***	0.212		
HPI_{t-3}	−0.276**	0.131		
$RETURNEES_t$	0.011***	0.003	0.008***	0.003
$RENT_t$	0.170	0.126	0.244*	0.139
$RENT_{t-1}$			0.184	0.153
$RENT_{t-2}$			−0.288*	0.163
$RENT_{t-3}$			−0.245	0.149
$RENT_t$	0.045***	0.013	0.031**	0.012
$RENT_{t-1}$	−0.060***	0.014	−0.041***	0.014
$NEWBUILT_t$			0.021**	0.009
$NEWBUILT_{t-1}$			−0.010	0.009
$NEWBUILT_{t-2}$			0.002	0.008
$NEWBUILT_{t-3}$			0.027***	0.008
$NEWBUILT_{t-4}$			0.021**	0.008
Long-run effects				
RETURNEES	0.074**	0.034	0.046**	0.021
RENT	1.176	0.702	−0.624	0.994
RATES	−0.103**	0.050	−0.060	0.037
NEWBUILT			0.357***	0.126
INTERCEPT	−0.140	0.751	1.560	0.927
Control variables				
COVID-19	0.026**	0.010	0.028***	0.010
CHCH	−0.008	0.009	−0.008	0.008
Model statistics				
R^2	0.726		0.717	
F-statistic	1419.06		1348.20	
Log-likelihood	200.30		203.33	

Note(s): *, **, and *** indicate the significance levels of 10, 5, and 1%, respectively
Source(s): Authors' own creation

If we only considered the demand side of New Zealand's housing market, we found evidence that the increased number of New Zealand returnees played a significant role in boosting housing prices. Specifically, it is suggested that a 1% short-term increase in *RETURNEES* could lead to a 0.011% increase in *HPI*; this relationship was significant at the 1% level. Other statistically significant factors, including the lagged values of *HPI* (up to four lags) and *RATES* (up to one lag) were reported, which significantly contributed to the short-term variations in housing prices in New Zealand.

To be specific, the combined coefficients for the lagged values of *HPI* and *RATES* were 0.855 and −0.015, respectively, suggesting that the present value of *HPI* is strongly and positively influenced by its values in previous periods, but is weakly and negatively impacted by the past values of *RATES*. Such findings align with studies such as Ngo *et al.* (2023), which argued that New Zealand's house prices are temporally correlated; and other studies (e.g. McGibany and Nourzad, 2004; Balli *et al.*, 2019; Damen and Schildermans, 2022) have provided evidence that high mortgage rates in the previous periods tend to decrease housing prices in the current period. More importantly, our findings confirmed the increasing trend of housing prices in New Zealand over the sampled period of January 2017–December 2021.

New Zealand's housing market during the COVID-19 pandemic experienced unprecedented dynamics driven by a unique combination of factors. The New Zealand government's border closure policy and the very limited international flights led to a surge in returnees returning to New Zealand, seeking a safe place to live during the global health crisis (Ngo *et al.*, 2023). This influx of returnees significantly boosted demand for housing within New Zealand as they sought both temporary and permanent accommodation, contributing to a rapid increase in housing prices (Ngo *et al.*, 2023). At the same time, the Reserve Bank of New Zealand's decision to lower the official cash rate to stimulate the economy as a response to the outbreak resulted in historically low mortgage rates (New Zealand Parliament, 2021). This monetary policy made borrowing more affordable, encouraging more buyers to enter the housing market and existing homeowners to refinance or invest in additional properties. Investors seeking better returns amidst economic uncertainty also increased their activity, further driving up housing prices. These surges were reflected by the housing price index, which saw unprecedented acceleration over 2020 and 2021 (Dominick, 2022).

It is also reported that the speed of adjustment was statistically significant and negative, suggesting that it should take New Zealand's housing market about seven months (i.e. = 1/0.145) to revert to its long-run equilibrium, given a short-term shock (in our case, the COVID-19 pandemic and the surge of returnees to New Zealand) in the market. Note that the seven months correction out of 60 consecutive months sample size is reasonable, compared to a 3 quarters correction in China (Yii *et al.*, 2022), a 18 months in South Africa (Tita and Opperman, 2022), or even a 23 months in Turkey (Alhodiry *et al.*, 2021). As such, *RETURNEES* and *RATES* were reported to have significantly impacted the long-term *HPI*, both at the 5% levels of significance, though *RENT* did not. Following the literature (McGibany and Nourzad, 2004; Coskun *et al.*, 2020; Bangura and Lee, 2022), we may argue that the fundamental factors (in our M-D ECM model for housing demand and mortgage rates) are still important determinants that affect New Zealand's housing market.

To reveal profound insights into the New Zealand housing market's dynamics, particularly during the COVID-19 pandemic, we further extended our estimation to include the supply side of New Zealand's housing market, i.e. the M-D-S-ECM model, Column (3) of Table 2. We found that in the short term, the additional variable of *NEWBUILT* significantly and positively contributed to housing prices for up to four lags of *NEWBUILT*. Overall, it influenced *HPI* with a combined coefficient of 0.060. This positive relationship

suggests that although increasing the housing supply through new constructions should theoretically moderate increases in house prices by meeting housing demand within New Zealand, the actual market dynamics have initially led to a price surge. This counterintuitive effect can be explained by several factors. For example, building capacity constraints within New Zealand's construction industry have historically limited the housing supply in New Zealand (Brunton, 2021). Second, the COVID-19 pandemic exacerbated this issue, further disrupting construction activities within New Zealand and increasing labour costs. Third, supply chain issues led to shortages of building materials; subsequently, construction costs and housing prices increased (Mirhosseini *et al.*, 2024). As a result, the consented houses faced challenges in being built on schedule and within budget, and thus housing supply within New Zealand was unable to meet the surge in demand promptly, particularly with more returnees during the COVID-19 period, ultimately leading to a continued rise in housing prices.

Consequently, New Zealand's housing market saw a rapid increase in housing prices as high housing demand, attractive borrowing conditions and a shortage of housing created a perfect storm in the overall housing price index (Malpezzi, 2023; Yiu, 2021). This period highlighted the intricate interplay among economic policies, a global shock event (i.e. the COVID-19 pandemic) and market conditions, which profoundly impacted the affordability and availability of housing in New Zealand. Importantly, the disrupted air transport during the COVID-19 pandemic boosted the number of returnees, thus inflating house prices. This also underscores the broader economic ramifications of the COVID-19 pandemic on New Zealand's housing market. In addition, Column (3) of Table 2 reports that *RETURNEES* continuously had a significant positive impact on *HPI*, strengthening our main research hypothesis that returnees to New Zealand played an important role in its housing market during the COVID-19 pandemic. Logically, returnees would normally bring back savings or capital from abroad, which enhances their purchasing power for buying their houses. This further fuelled housing demand and contributed to rising housing prices within New Zealand.

Table 3 reports the Granger causality test results for the short-run impacts of the independent variables on house prices. It further confirmed that there are significant causal relationships between RETURNEES, RATES and NEWBUILT on HPI. The constraint test result for ECM (i.e. ø) is also statistically and positively significant at 1%, suggesting that all variables are jointly the cause of housing price inflation in the New Zealand market.

4.3 Robustness check: IV-ARDL results

As previously discussed and tested in Section 4.1, the IV-ARDL approach is appropriate for examining the effects of *AVIATION* and *MIQ* on the number of returnees to New Zealand during the COVID-19 period. Table 4 reports the relevant IV-ARDL results. It should be noted that the two IVs of *AVIATION* and *MIQ* are statistically significant and positively

Table 3. Granger causality tests based on ECM

Causality periods	Short run				Long run
Dependent variable	*RETURNEES*	*RENT*	*RATES*	*NEWBUILT*	ø
HPI	15.239***	2.559	8.356**	7.827**	34.454***

Note(s): ** and *** indicate that the significance levels of 5 and 1%, respectively
Source(s): Authors' own creation

Table 4. IV-ARDL Results for housing demand and supply with the IV approach (M-IV-ECM)

Variable	Coefficients	Standard error
Speed of adjustment		
ø	−0.083***	0.027
Short-run effects		
$\widehat{RETURNEES}_t$	0.006*	0.004
$RENT_t$	0.233	0.151
$RENT_{t-1}$	0.397**	0.147
$RATES_t$	0.029**	0.013
$NEWBUILT_t$	0.021**	0.009
$NEWBUILT_{t-1}$	−0.046***	0.013
$NEWBUILT_{t-2}$	−0.047***	0.011
$NEWBUILT_{t-3}$	−0.021**	0.009
Long-run effects		
$\widehat{RETURNEES}$	0.078*	0.045
RENT	−0.718	1.003
RATES	−0.182**	0.081
NEWBUILT	0.537**	0.208
INTERCEPT	0.714*	0.417
Control variables		
COVID-19	0.013*	0.007
CHCH	−0.007	0.009
First-stage regression: RETURNEES *as the dependent variable*		
AVIATION	0.537***	0.072
MIQ	0.061***	0.017
Model statistics		
R^2	0.717	
F-statistic	1348.20	
Log-likelihood	203.33	

Note(s): $\widehat{RETURNEES}$ is the predicted value of RETURNEES derived from the first-stage regression. *, **, and *** indicate that the explanatory variable is significant at the 10, 5, and 1% levels, respectively
Source(s): Authors' own creation

associated with *RETURNEEs* at the 1% significance level during the first-stage estimation using equation (5), confirming our arguments in Section 3.2 above, namely that the limited airline seat capacity and the managed isolation or quarantine capacity during the COVID-19 pandemic had a significant effect on the number of returnees to New Zealand.

In particular, the airline seat capacity was a critical factor influencing the number of returnees to New Zealand during 2020 and 2021. An increase in the number of airline seats and the expedited management of these flights during New Zealand's international border lockdown period (i.e. March to June 2020) provided essential air service options for New Zealand's citizens and permanent residents returning to New Zealand. It is evident that airlines rapidly adapted their capacity to the changing circumstances as allowed, with increased flight frequencies and capacities to cater to the surging demand from citizens and residents from abroad returning home in a panic amid the global health crisis. The MIQ facilities during this period also played a crucial role by ensuring the accommodation and isolation of an increasing number of returnees under New Zealand's public health protocols, thus minimizing the risk of COVID-19 spreading.

Overall, we observed a weaker positive impact of *RETURNEES* on *HPI* in the short term (with a coefficient of 0.0006) but a stronger relationship between the two in the long term (with a coefficient of 0.078), compared with the results of the traditional ARDL (as in Table 2). We could argue that while the airline seat capacities and MIQ facilities available for returnees to New Zealand temporarily mitigated the impacts of returnees on New Zealand's housing market during the early stage of the pandemic, this mediation effect would be eased out over time (Ngo *et al.*, 2023; Wooliscroft *et al.*, 2022). Initially, the restricted air transport and MIQ capacity helped manage the sudden influx of returnees to New Zealand without causing immediate significant pressure on New Zealand's housing market. However, as the flow of returnees stabilised and continued over a more extended period, the cumulative housing demand by returnees who had settled in New Zealand exerted more substantial pressure on the housing market.

Regarding the long-run effect, the surge of New Zealand citizens and permanent residents that returned to the country still played an important role in the demand side of New Zealand's housing market and thus positively increased house prices in New Zealand. This finding aligns with the theoretical expectations that an increase in the population's size leads to higher demand for housing, which subsequently drives up prices (e.g. Gong and Yao, 2022; Makinde, 2014; Wang *et al.*, 2017). Again, the long-term relationship between *RETURNEES* and *HPI* underscores the necessity for strategic planning by policy makers and the housing sector in New Zealand to accommodate and manage future population movements and their implications for the housing market.

5. Conclusions

The context of this research is set spatially in the perceived "safe haven" of New Zealand and temporally during the COVID-19 pandemic from January 2017 to December 2021, with significant border restrictions and temporal effects affecting resident returnees from March 2020. We found that one factor contributing significantly to the escalating house prices during this time and space was, inter alia, immigration-related demand both in the short and long term. These contributions were evidently caused by factors beyond demand-led changes in the migrant population. We also revealed simultaneous drivers of house prices such as rental prices, interest rates and the supply-side effects of proposed new housing additions. New Zealand, as a case study, demonstrates a useful unique condition, where domestic resident "panic returnees" during the COVID-19 pandemic were, in part, stimulating demand. These findings should be taken with caution, given the uniqueness and the unknown period when some financial constraints were loosened by the banking system (borrowing relief, lowering interest rates) and employment was protected (furloughing) in anticipation of concerns about economic growth.

The work here confirms the increasing trend of housing prices in New Zealand between January 2017 and December 2021. Importantly, it suggests that a 1% short-term increase in returnees could lead to a 0.011% increase in house prices. Moreover, we found that the combined lagged values of house prices and interest rates were 0.855 and −0.015, respectively, suggesting that the present value of house prices is strongly and positively influenced by its past values, but weakly and negatively impacted by the past values of interest rates. Moreover, and more in the long term, we revealed the positive effect of returnees and interest rates on house prices.

For the supply-side considerations during these short- and long-run effects of returnees, we found that for up to four lags, new builds had an overall influence on house prices, with a combined coefficient of 0.060. This means that in the short term, there has been a positive impact of newly built properties that has made a statistically significant and positive contribution to housing prices. The increased prices associated with new builds also reflect the

longstanding lack in the housing supply, as well as high COVID-19-related costs of construction materials and labour in the short term. We argue, therefore, that returnees to New Zealand played an important role in the housing market during the COVID-19 pandemic.

The results also showed the impact of the efficient MIQ system and increased flight frequencies and capacities, which further improved the dynamic changes in demand and thus house prices, particularly with the returnees who sought longer-term roots back in New Zealand, and who had significant financial capital to purchase properties in a more favourable financial environment. As a headline statistic, we found the weaker positive impact of returnees on house prices in the short term (with a coefficient of 0.0006) but a stronger relationship between the two in the long term (with a coefficient of 0.078). As such, these short and long-term effects on the housing market created by returnees will, no doubt, be structurally embedded in the housing market for many decades to come.

This research has several important implications for housing policy, urban planning, and future research, particularly within the unique context of return migration to New Zealand. First, the findings highlight the critical need for policymakers and planners in New Zealand to explicitly incorporate migration dynamics, particularly the sudden influx of returning citizens, into housing demand projections and supply strategies. Given the clear and measurable impact that return migrants have had on housing prices during the COVID-19 pandemic, proactive measures such as coordinated infrastructure investments, flexible zoning regulations, and targeted housing provisions become essential. Specifically, urban planning frameworks should be designed with flexibility to enable rapid responses to housing demand surges resulting from future crises, whether pandemics or climate-related displacement.

Second, this study provides empirical evidence supporting the integration of returnee migration flows into broader economic and urban policy considerations. It illustrates how New Zealand's MIQ system and adaptive housing policies played crucial roles in stabilising housing markets under extraordinary circumstances. Therefore, recognising return migrants as a distinct and influential group within the housing market will enable New Zealand's government and relevant stakeholders to better anticipate housing pressures and develop targeted interventions. Such preparedness could help mitigate potential social inequalities and alleviate risks associated with housing affordability crises during periods of disruption.

Finally, the insights gained from this study can be generalized beyond New Zealand. Other small, supply-constrained economies facing similar structural challenges and exposure to external shocks could adopt analogous policy strategies. For instance, economies experiencing limited housing supply should consider proactive planning and flexible land-use policies to better accommodate sudden increases in demand triggered by unforeseen return migration events. By applying these findings, policymakers in comparable contexts can enhance resilience, reduce housing market volatility and better manage future shocks.

Our work is not free from limitations. One may find that our sample consists of only 60 monthly observations at (New Zealand) national-level data. Therefore, future studies can extend our approach to (i) a larger sample covering longer period with different events (e.g. not only COVID-19 but also other widespread infectious diseases such as bird flu, monkeypox or mouth-hand-foot disease), or (ii) for different countries, or (iii) using micro-level data from regions or even households. Extensions can also be achieved using different instrumental variables, where data is available, to improve the robustness of the results. It is also interesting to apply advanced (big data) techniques such as machine learning (e.g. neural network and SARIMA/SARIMAX) to gain better insights on the role of returned migrants in the housing market.

Note

1. We examined the effect of the COVID-19 pandemic by using a dummy variable for COVID-19 (equal to a value of 1 for the months after January 2020, and 0 otherwise) and the Christchurch terrorist attacks with the dummy variable of CHCH (equal to a value of 1 for March 2019, and 0 otherwise).

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Further reading

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Appendix 1

Table A1. Unit root test

Time series variables	Augmented dickey−fuller test				Phillips−perron test			
	Level		First-difference		Level		First-difference	
	Trend	No trend	Trend	No trend	Trend	No trend	Trend	No trend
HPI	−0.016	3.301	−4.573***	−4.032***	−0.238	2.689	−4.359***	−3.905***
RETURNEES	−3.270*	−2.576*	−6.987***	−7.045***	−3.394*	−2.611*	−6.967***	−7.033***
RENT	−3.202*	−0.618	−10.219***	−10.275***	−3.281*	−0.436	−10.416***	−10.430***
RATES	1.321	−1.073	−4.675***	−4.509***	−0.071	−1.164	−4.713***	−4.560***
NEWBUILT	−5.834***	−4.762***	−10.907***	−10.995***	−5.900***	−4.787***	−12.001***	−12.126***

Note(s): *, **, and *** indicate that the explanatory variable is significant at the 10, 5, and 1% significance levels, respectively
Source(s): Authors' own creation

Appendix 2

Table A2. Endogeneity test

	Durbin statistics		Durbin–Wu–hausman statistics	
Hypotheses	χ_1^2	*p*-value	*F*-statistic	*p*-value
H_0: *RETURNEES* is exogenous	11.561***	0.001	11.211***	0.002
H_0: IVs are sufficient	Sagran statistics		Stock–yogo statistics	
	χ_1^2	*p*-value	*F*-statistic	Critical value (10%)
	1.985	0.159	30.512	19.93

Note(s): *** indicates that the explanatory variable is significant at the 1% significance level. The alternative hypothesis of the Sargan (1958) test is that overidentification exists in the model, whereas the alternative hypothesis for the Stock and Yogo (2005) test is that the IVs are weak instruments
Source(s): Authors' own creation

Corresponding author
Thanh Ngo can be contacted at: t.ngo@massey.ac.nz