The relationship between foreign residents, housing price index, inflation and unemployment in Turkiye

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Abstract   There is a large economy behind relationship real estate markets and the migration process. This paper mainly concentrates on this economy by relating inflation, unemployment, Housing Price Index (HPI) and Foreign Residents (FR) in Turkiye with a DCC GARCH Model. According to the findings, there are high correlative relations between the changes in HPI and inflation and unemployment sequentially. On the other side, a relatively calm relationship is found between changes in HP and changes in FR. %18 of the correlations are formed because of the shocks, conversely, %45 of the correlations are formed depending on the lags structure of the model. In light of this research, it can be said that the macro policies have less direct impacts on the FR. Through the mediating role of the HPI, inflation and unemployment can indirectly impact the FR. Income levels, the economic and political situations of the domestic and migration-aimed countries, and psychological and sociological factors can affect this equation.

Index Terms foreign residents, housing price index, inflation, unemployment, DCC GARCH model

I. Introduction

Obani and Odalonu [1] determine that poverty is the major driving force for the migration of Nigerians to developed countries. The security, economic and political conditions in Nigeria have worsened the surge of people migrating in search of better living conditions and safety. Their study revealed that Nigeria has lost skilled personnel with the capacity to transform the economy through the wealth of knowledge at their disposal to developed countries. The countries' migration policies have been in great change since the beginning of the 21. siecle. For Posso [2], food insecurity; scarcity of health products/services; crime; and diminished purchasing power are significant determinants in migration. Turkiye is one of these countries with its migration numbers. On the other side, education, sanitation and housing are causes of important changes regarding migration policies with all of their complexities [3], [4]. With these policies, migration's culture, sociology and psychology are quite different from other mobility dimensions. The emotions, attitudes and behaviours of homeowners can be problematic toward migrants, conversely, migrants can realise unwanted or unaccepted behaviour with their home country's social, legal and cultural dimensions. For example, the domestic labour force can be discouraged by migration movements and policies [5]. One of the behaviours of the migrants, highly skilled corporate migrants such as Japanese are subjected to the analysis of White and Hurdley [6], according to their analysis, Japanese migrants behave according to Japanese corporate movement in their housing behaviour that closing to ground transportation, the importance of the language-speaking are considered as some variables in this equation. From a different perspective, as much as North-South migration is a reality, also South-North migration is a reality of the global world with different explanations, causes and expansions [7]. On the other side, this paper mainly concentrates on another dimension, so financial and economic dimensions of migration in Turkey.

   Kowalski et al. [8] argue that special times can be affected by migration policies, so real estate markets such as COVID-19 by maintaining pandemic period bring huge uncertainty, especially for the real estate sector. On the one hand, restrictions on the mobility of a population, a decline in travel demands, popularization of remote work and education models caused doubts among investors questioning the future of the sector and the functions of real estate. However, the large supply of cash after the first waves of the pandemic and the upcoming increase in inflation resulted in many investors boldly investing cash in real estate, considering them as assets of stable value. Besides these, the slowdown in migration can be considered another important period, for example, the slowdown in migration, can be a cause of an unprecedented run-up in both housing values and housing-related debt as in the United States [9]. Hromada et al. [10] state the importance of spatial connectivity and migration patterns in shaping regional housing markets, with potential policy implications for addressing imbalances between growth areas. With

an important point, Ma et al. [11] underline the activities of foreign real estate investors abroad in the definition of the domestic housing markets in Australia which is a big force regarding migrants. Liu [12] and Erol and Unal [13] accept the force of mobility in real estate bombs and price increases emphasizing the importance of inside migration. One of the reasons behind the migration policies, naturally real estate, is globalization [14]. With these explanations, it is understood that the flows of the migrations are some causes of real estate booms and crises, also the social and cultural conditions of migrants (within them) such as gentrification (class conflicts) are causes of the domestic housing crisis [15]. In this context, it should be taken into account the will and wishes of the migrants who want to purchase properties in their home country as a financial and economic reality for countries [16], [17].

In light of these arguments, the relationship between migrants and homeowning is problematic. This paper aims to analyze the economy of homeowning for migrants in Turkiye benefiting from the DCC GARCH (Multivariate and Dynamic Conditional Correlation Generalized Autoregressive Conditional Heteroskedasticity) Model. The main reason for selecting this method is to investigate the structural changes, volatility transmission and contagions in a dynamic environment, so Turkish real estate markets for a specific period. As it is understood, there are a lot of unstructured research gaps between the real estate sector and migrant policies. By introducing these kinds of relationships between variables, it will be possible to make inferences and policies will be argumented.

II. Literature review

There are many dimensions in real estate investment policies. Especially, after the borning of the new middle class and super-rich investors in the global context, purchasing real estate in foreign countries transformed into a purpose for the members of these classes [4]. Besides these, migration and mobility of the workforce are other important items in seeking a homeowning strategy in abroad. If it is realized a deep and comprehensive analysis of the concept of migration, it can be seen that national, regional and international crises are one of the main causes. Nelson and Frost [18] argue the relationships between these causes in COVID-19 context. Although this analysis concentrates on the inside migration dynamics of the United States, the results of showing the rising prices, reduced inventories, and increased sales volume are important regarding urban-rural migration systems. Moreover, the same results can be taken for the international migration policies. Similar findings can be found in the analysis of Szczepanska and Senetra [19] for the European side, for Poland. Frankly, if migration is assumed as a sudden and unexpected jump in population, it will impact house price appreciation with the impacts of housing demand and income [20]. It is another important scientific subject that there are a lot of dynamics behind migration and the real estate economy and business. Yee [21] confirms that marketing strategies such as social activities and exploratory tours to specific -property-destinations nourish the real estate market in the sample of Asia (Brunei, Singapore and Iskandar Malaysia). Again and again, it is an important consideration that the mobility of qualified workers regarding knowledge is a cause of the migration waves because of higher salaries and lower housing prices [22]. More interestingly, Meng et al. [23] find that migrants who decide to move out of destination cities experiencing housing bombs and housing booms do not affect the decisions of homeowners but affect renters through a negative income effect. The classification of Goodson et al. [24] and the International Organization for Migration (2011) is important in this context. According to it, forced migration is a movement in which an element of coercion exists, including threats to life and livelihood, whether arising from natural or man-made causes (e.g. movements of refugees and internally displaced persons as well as people displaced by natural or environmental disasters, chemical or nuclear disasters, famine, or development projects, conversely, labour migration is a movement of persons from one state to another, or within their own country of residence, for employment. If it is formed as an equation, it should include these two realities regarding migration, migration-related homeowning and the financial movements in the real estate markets analysis. Because, the income, wealth, life quality, education and sanitation of the migrants are framed by these two definitions.

Gross Domestic Product (GDP), inflation and short-term and long-term interest rates are effective and efficient in real estate investment [25]. Stryzhychenko and Matusova [26] find an influence between GDP and Migration. Inflation, which is individually a problem for the real estate financial markets, sources from in-country or out-country variables as in the United Kingdom. Frodsham [27] determines that high inflation is trouble for real estate markets because of inside dynamics such as the Brexit process and global ambiguities such as the Ukraine-Russian conflict, and the COVID-19 pandemic. Still, the inflation perceptions of different nations can cause different problems regarding migrants and homeowners, for example, [28] analyze the investment decisions and inflation-related behaviours of Polish households in Germany. According to this analysis, there are similarities between German and Polish households' behaviours. On the other side, in the eyes of consumers and investors, inflation serves the real estate markets as a hedging strategy and policy [29]–[31]. Also, Caballero et al. [32] determine that changes in migration flow help explain recent wage dynamics by stating in several Asian economies, for instance, Malaysia, Singapore and Thailand, migrant workers left the country during the pandemic and by end-2022 had only partly returned as the demand for labour recovered. The opposite happened in Poland, where a large number of Ukrainian refugees joined the labour force. James [33] supports this idea by maintaining that globalisation creates consistent pressures on wages through trade and migration. Therefore, it can be concluded that migration has impacts on the dynamics of domestic or local country economies through workforce movement that can cause a change in inflation of real estate prices and rent prices.

Unemployment is another determinant in the triangle of migration, real estate financial markets and economic development of a country. Pi and Duan [34] find that the proportion of appropriated capital plays a key role in the effects of appropriation on unemployment and rural-urban migration. When the proportion of appropriated capital is large, a stronger control on appropriation by the government results in a lower unemployment rate and more rural-urban migrants, and vice versa. The same impact can be observed in more macro-dimensions of migration. Iqbal et al. [35] demonstrate that in each of the selected economies (16 OECD - Organisation for Economic Co-operation and Development countries), there is evidence of an asymmetric bidirectional causal relationship between unemployment and house prices, as shown by at least one significant variable that runs either from unemployment to house prices or from house prices to unemployment. Omer et al. [36] reveal that the immigration of newcomers has no impact on the employment opportunities of residents. Further immigrants also contribute to the host country's economic growth. This might be a result of recent immigrants' high skill levels. Nevertheless, it has negative impacts in the long term on domestic employment markets. In the end, Unal et al. [?] state the important effect of international migration on the real estate markets by employing a panel-data approach and a manually constructed Bartik instrument and show that international migration has a significantly positive short-term effect on flat prices and rents. It can be understood from this literature that migration can have impacts on the macroeconomic variables and homeowning factors.

House Pricing Indice (HPI) is one of the key determinants in the subject of housing affordability [37]. Besides these, it is a specific indicator designed for a land piece and shows the real estate value changes for this specific land. Its efficient and effective utilization is disputed by many researchers. For example, Zhang and Yang [38] emphasized its augmented importance throughout the COVID-19 crisis in the United States. Throughout these arguments, Li and Razali [39] elaborate that land supply, GDP, disposable income, money supply, interest rates, demand and income level impact the HPIs. In large states such as China, it is used to define the changes in house values from one region to another [40].

III. Data and Methodology

The research data is taken from the Turkish Statistical Institute about the Housing Price Index (HPI), unemployment, inflation changes and foreign residents (FR) for January 2015 and December 2023 monthly. And the % changes are calculated for FR and HPI. The features of the research data are given in Table 1.

Table 1: Descriptive statistics

Statistical variable	HPI Changes	FR Changes	Inflation	Unemployment
Mean	0.026382	0.044858	1.908889	10.02407
Median	0.013874	0.023913	1.185000	9.450000
Maximum	0.136120	1.673423	13.58000	14.60000
Minimum	-0.010989	-0.739789	-1.440000	6.700000
Std. Dev.	0.030300	0.296947	2.324406	1.837200
Skewness	1.775951	1.544396	2.588465	0.396098
Kurtosis	5.716785	10.86181	11.04767	2.147746
Jarque-Bera	89.98618	321.0689	412.0455	6.092608
Probability	0.000000	0.000000	0.000000	0.047
Observations	107	107	107	107

The Augmented Dickey-Fuller (ADF) tests and Phillips Perron (PP) tests are utilized in Table 2 and Table 3.

Table 2: ADF test results

Variables	Test Statistics	%1	%5	%10
FR changes	-11.29464	-3.492523	-2.888669	-2.581313
HPI changes [1]	-5.447774	-3.494378	-2.889474	-2.581741
Inflation	-4.733395	-3.492523	-2.888669	-2.581313
Unemployment[1]	-9.664206	-3.493129	-2.888932	-2.581453

Table 3: PP test results

Variables	Test Statistics	%1	%5	%10
FR changes	-11.80192	-3.492523	-2.888669	-2.581313
HPI changes [1]	-11.97510	-3.493129	-2.888932	-2.581453
Inflation	-4.819345	-3.492523	-2.888669	-2.581313
Unemployment[1]	-10.19368	-3.493129	-2.888932	-2.581453

DCC GARCH (Multivariate and Dynamic Conditional Correlation Generalized Autoregressive Conditional Heteroskedasticity) Models and methodology are designed to detect the existence of contagion (monetary policy, risk measurement, asset pricing and portfolio allocation etc.) in the financial series. Its major advantage is detecting possible changes in conditional correlations over time. In this way, it can easily be detected the dynamic behaviours and volatilities of the related time series

[41], [42] or volatility transmissions between the time series [43]. While the univariate GARCH models can analyze the variance of the market shock in the univariate asymmetric models, the recent development of the class of multivariate GARCH models led to the incorporation of the asymmetric response of returns to the market shocks [44]. There are also other researches in which different DCC GARCH model versions are selected as research methods, for example, Akkoç and Civcir [45] determine the strategic relationships between gold, oil and stock market prices that are the main important variables under the impacts of liberalization policies in Turkey through this way. However, Hou and Li [38] examine the knowledge transmission between U.S. and China index futures markets with an Asymmetric DCC Garch Model. Chittedi [46] measured the transmission of volatilities between the United States and India for the period between the years 2002 and 2011. Besides these, Jones and Olson [47] make a relationship between macroeconomic uncertainty and inflation through the DCC GARCH method. The attempt of Joyo and Lefen [48] is also informative of the volatility transmissions of stock markets between Pakistan, China, Indonesia, Malaysia, the United Kingdom and the United States. DCC GARCH model can be written in the light of Engle [49] as follows,

$$y_t = \mu_t + \varepsilon_t \quad \varepsilon_t | F_{t-1} \sim N(0, H_t),$$
$$\varepsilon = H_t^{1/2} u_t u_t \sim N(0, 1),$$
$$H_t = D_t^{1/2} R_t D_t^{1/2},$$

where, F_{t-1} stands for all information available up to $t-1$, y_t, μ_t, ϵ_t, and u_t are $N \times 1$-dimensional vectors representing the analyzed time series, conditional mean, error term, and standardized error term, respectively. Furthermore, R_t, H_t, and $D_t = \text{diag}(h_{11t}^{1/2}, \ldots, h_{NNt}^{1/2})$, are $N \times N$-dimensional matrices illustrating the dynamic conditional correlations, time-varying conditional variance matrices, and the time-varying conditional variances. [43]. The important point in this formulization is that the value of R_t, CCC GARCH model assumes that the conditional correlation matrix is time-variant, whereas the DCC GARCH model and VCC GARCH model allow the conditional correlations to vary over time. Thus, the DCC GARCH and VCC GARCH models are more flexible than the CCC GARCH model [50].

With this framework, this research measures the volatility transmission or contagion between the research variables of Inflation, Unemployment, Foreign Residents, Housing Price Index.

III. A. Findings

According to trial and error method and AIC and SIC information criteria, the findings of the research can be shown in Table 4.

Table 4: DCC Garch Results

Parameters	Models	DCC Garch Model Coefficient Results (z stats, prob.)
ARCH model for inflation	Arch (1) coefficient	1.110 (4.97, 0.000)
	Garch (1) coefficient	0.244 (3.57, 0.000)
	Constant	
ARCH model for Unemployment [1]	Arch (1) coefficient	0.765 (3.03, 0.002)
	Constant	32.24 (1.35, 0.177)
ARCH model for FR changes	Arch (1) coefficient	0.628 (2.86, 0.004)
	Constant	0.056 (5.66, 0.000)
ARCH model for HPI changes [1]	Arch (1) coefficient	1.447 (6.53, 0.000)
	Garch (1)	-0.111 (-3.72, 0.000)
	Constant	0.0000(2.98, 0.003)
Lambda 1	0.184	3.34 (0.001)
Lambda 2	0.425	4.32 (0.000)

The validity of the research model can be estimated with the chi-squared method. According to the results of the chi-square (62.26, p-value = 0.000), the model has model fit. It can be understood from Lambda 1 value (0.184) %18 of the correlation depends on the shocks. On the other hand, Lambda 2 value (0.425) %42.5 of the correlation depends on the lags of the model. The correlation coefficient results can be seen in Table 5.

Table 5: The Correlation Results.

Correlation Parameter	Coefficient	Z value (prob)
Inflation Unemployment	0.714	11.35 (0.000)
Inflation FR changes	-0.008	-0.07 (0.944)
Inflation HPI Changes	0.646	8.89 (0.000)
Unemployment FR changes	0.100	0.82 (0.410)
Unemployment HPI Changes	0.893	34.17 (0.000)
FR changes HPI Changes	0.275	2.43 (0.015)

According to correlation coefficient results, the relationship between Inflation Changes and Unemployment, Inflation and Housing Price Index (HPI) Changes, Unemployment and Housing Price Index(HPI) Changes are relatively high, positive and significant. On the other side, there are insignificant correlative relationships between Foreigner Resident (FR) Changes and Unemployment and Foreigner Resident (FR) Changes and Inflation Changes regardless of direction and power. Foreigner Resident (FR) Changes are in a calmly positive correlative relationship with Housing Price Index (HPI) Changes.

IV. Discussion and Conclusion

Mtiraoui [51] underlines the synergies between political instability and migration while unravelling the nuanced interplay among migration, unemployment, and economic growth within the Middle East and North African region. Huynh and Vo [52] detect similar problems around migration and unemployment variables in 47 Asian countries. Kiviaho and Toivonen [14] confirm that Urban shrinkage poses significant challenges to Real Estate markets in Shrinking Cities and has multiple negative impacts on society, the environment and the economy. Besides these, Redlin [53] explains the development of the youth employment problem which is rising with migration flows and finishes with demographic pressures, can cause real estate problems. Also, the relationship between immigration, growth and unemployment is subjected to Dritsaki and Dritsaki [54], according to their results, there is a large nexus of relationships between these variables. On the other side, Wolski [55] affirms the relationship between house prices and inflation. Foudeh and Al-Abdulrazag [56] state that foreign workers can give different responses to inflation changes in Saudi Arabia. The calming and hedging impacts of real estate returns over inflation regarding real estate investors is an important finding of Bond and Seiler [57] Sümer [58] and Muckenhaupt et al [59].

On the other side, the research period is so specific regarding Turkey for an earthquake, a trial of the military coup and COVID-19. For this cause, the research period permits financial-specific and structural changes financially.

As expected and in parallel with the literature review, the main macroeconomic variables, inflation and unemployment have no important direct impacts on the Foreign Residents' (FR) changes. So, It can be said that government and state policies at the macroeconomic level are not effective and efficient for foreign residents unless a political decision can not come regarding direct migration or international politics. On the other side, Housing Price Index (HPI) Changes have a relatively calm impact on the foreginer resident changes, this is another important finding by considering the high impacts of inflation and unemployment on the housing price index changes. Therefore, it can be said that inflation and unemployment indirectly affect foreign residents under the mediating impacts of HPI. Many variables such as the definition of migration (Forced migration or Labour migration (mobility)), income level, domestic economic conditions and living standards are effective in the decision to purchase a foreign resident. On the other side, political, social and cultural attitudes and behaviours of investment-aimed countries' citizens toward foreign residents gain importance for the next research and literature.

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