# Disasters and Evaluation of Tenants not Included in Vulnerable Population Groups in Türkiye Based on Housing-Oriented Real Estate Phenomenon[τ]

## Afetler ve Türkiye'de Kırılgan Nüfus Gruplarına Dahil Edilmeyen Kiracıların Konut Odaklı Emlak Olgusu Üzerinden Değerlendirilmesi

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**Abstract**

In the New Urban Agenda, also included tenants as vulnerable population groups. Tenants, who have no place in academic studies and disaster exposure legislation in our country, are defined as one of important as they take on an equal role in the process and are not excluded from the process for any reason. In housing-oriented disaster management, it is possible to ensure that not only The owners but also The tenants are involved in the process to support the process. By knowing the adaptability and resilience of a property to disasters, when housing costs are also taken into account, renters can reflect the restrictions of laws and regulations in their preferences, maximizing the benefit. In this study, it is the evaluation of the analysis whether tenants are willing to pay for the anti-seismic safety measures in the context of housing safety following the legal provisions contained in the anti-seismic legislation. In addition, the effects of regional seismic risk in Türkiye and of earthquake resistant houses on the rental housing market pricing were investigated.

**Keywords**: Disaster, Earthquake, Safe Housing, Tenants, Vulnerable Groups.

**Öz**

Yeni Kentsel Gündemde kırılgan nüfus gruplarına kiracılar da dahil edilmiştir. Ülkemizde afetlere maruziyet açısından akademik çalışmalarda ve mevzuatta yer bulamayan kiracılar, süreçte eşit rol almalarının sağlanması, herhangi bir sebeple süreç dışına itilmemeleri anlamında önemli olarak tanımlanmıştır. Konut odaklı afet yönetiminde sadece mülk sahiplerinin değil, aynı zamanda

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kiracıların da sürece dahil edilmesiyle süreci desteklemeleri sağlanabilir. Kiracılar, bir mülkün afetlere karşı uyumu ve dayanıklılığına ilişkin bilgilerine sahip olarak konut maliyetlerinin de hesaba katıldığı durumlarda, faydayı üst düzeye çıkarırken, kanun ve yönetmeliklerdeki kısıtlamaları da tercihlerine yansıtabilirler. Bu çalışmada deprem yönetmeliklerinde yapılan hukuki düzenlemeler sonucunda konut güvenliği bağlamında, kiracıların depreme yönelik güvenlik önlemlerine ödeme yapmaya istekli olup olmadığının analizi değerlendirilmiştir. Ayrıca Türkiye'de bölgesel deprem riskinin ve depreme dayanıklı konutların kiralık emlak piyasasında fiyatlanması araştırılmıştır.

**Anahtar Kelimeler**: Afet, Deprem, Konut Güvenliği, Kiracılar, Hassas Gruplar.

## Introduction

Nowadays, despite natural disasters have become increasingly more severe and more frequent, the studies conducted on housing markets are limited to hedonic property analyses that do not consider their effects on tenants. However, the missed point is that the reactions of tenants have a capacity to significantly influence the housing market and the quality of the housing stock. Assessment of disasters within urban planning is important for tenants in regard to choosing the correct areas for urban housing stocks and the development of these housing areas. When it is considered that rents are based on location, physical properties of the building, and social facilities, it should be expected that disasters must also have an effect on the preferences of the tenants. House ownership is an important tool in financial accumulation. Property ownership is an important means of saving wealth. Tenants' preferences for housing act as a measurement for safety for low- and middle-income households but also cause economic and social inequality in the long run. The literature on housing demand shows that the uncertainty connected with property ownership is negatively affected by the probability of property ownership. Low-income tenants are defenseless because of a lack of available funds and of social policies that limit accessibility to affordable housing. The effects of natural disasters on the tenants are not tested, who constitute an important element in understanding the housing market. The renting preferences of the tenant families based on general price changes after a disaster have never been defined before. Moreover, there is not enough data on the rentable housing market, similarly on the job market; tenant quality cannot be monitored easily, as in the case of laborer quality. The process of annulling a contract between the tenant and the property owner is as complicated as in the case of annulling a contract between an employee and the employer and makes evicting the tenant a more costly affair. Data on the housing market can significantly influence how long the tenants decide to stay in a certain property. Frequent natural disasters not only damage the existing stocks of housing opportunities but also indicate an increasing risk for property owners and may affect occupancy rates as a result. Security of life, one of the core requirements of human existence, is a concept that includes many disciplines such as healthy diet, clean environment, safe urban surroundings, safe housing, job opportunities, job life and technology, and is an assessment of many risks that may arise or present in various areas of life and by taking necessary measure against them and demand shows that the uncertainty that is connected to property ownership has a negative relation to the possibility of property ownership.

## Theoretical Framework

A 2200-year-old inscription found in the ruins of Teos in Seferihisar, İzmir, is accepted to be the oldest and most comprehensive tenancy contract in Anatolia (Seferihisar Municipality, 2016, October 3). The contract was prepared including a guarantor and six witnesses and contains the kinds of sanctions that could be enforced in case the land with houses in it was not used properly. Rent is a concept that goes back thousands of years and is defined as temporary transfer of the right of use of a certain house, vehicle or similar property by its owner. Property is not limited to immovables and can include movables, immovables and intangibles (Özlük B., 2019: 141). Property owners can also be tenants but not all tenants

are property owners. Tenant is the person who has the right to use a property in exchange for a certain price. Public administration has formulated policies, mechanisms, financing models and collective actions for property and rentable property selection. A households share from total rent or purchase forms the basis of property demand. There are many factors that influence whether a person rents a property. These may include the persons income, the property's rent, consumer wealth, personal preferences, urbanization, family structure, population increase, social opportunities, new property supply and local property preferences (Yayar & Bursal, 2019: 2012).

Housing security during disasters covers the health of the dwellers, prevention of accidents for safety and continuation of daily life. Changes in law in regards to housing and land development should adhere to development plan goals, economic plans, population mobility and public disaster risk plans. Emigration from the countryside into urban areas has caused poor urbanization in Turkey that has also affected tenants. The inability of individuals to provide their basic needs in urban areas has created urban poverty. People need to feel safe against risks and dangers while in their houses. However, it is not enough for the tenants to take personal precautions against disasters. In addition to the ontological meaning of security for property owners, those who do not own any property for a fragile group of individuals who are more susceptible to urban poverty and security risks. Especially in Türkiye, tenants are not included in the group of people designated as vulnerable. For this, tenants have to be supported by the authorities with changes in the legislation policymakers and insurance against risks, starting from the construction of housing until and during their eventual use. Urban resilience levels are determined by individuals, groups, and governments. When the effects of personal features and living conditions on resilience are considered, important parameters are age, income, housing type, rent situation, unemployment, disability and debt. Rents are higher in places with no social security. The consumer demand for stable buildings starts after construction standards are met and made better but when housing is constructed poorly, natural disasters (e.g., earthquakes, floods, etc.) will threaten people's lives. Priority should be given to increase health and safety standards for those without property ownership. Although "Safe and healthy housing" is not a priority for people who want to rent, this can be influenced by increasing awareness on international health and safety standards among tenants. Nevertheless, it should not be forgotten that variations will occur when the demographical distributions for urban and rural areas in a country are considered. The two most important security risks to be faced by tenants are owners renting out properties that are neither stable nor strong, and not repairing such properties after an occurrence of damage. These things can happen in slums, tenements and even in private homes of which their prices are determined by the market. Tenants have more housing problems if compared to owners and natural disasters exacerbate the conditions (Lee & Van Zandt, 2019). Tenants are especially defenseless because of the physical conditions of the houses and other factors that increase financial instability. These could be shanties, tenements or even private homes that got more valuable through the changes in the housing market. Risks also increase when the tenant has a low income or does not have a contract. Taking disasters into consideration in urban planning is crucial for locating new housing areas and the proper development of these areas. If factors determining rent levels are considered such as physical properties and social opportunities, it can be expected that natural disasters will also have an effect on personal choices in housing selection. Tenants not only have to cope with moving to another property by also face problems with their work, health and social security (Peppercorn & Taffin, 2013). Also, a higher price difference between older and newer buildings in areas with higher earthquake risk (buildings constructed before and after the enactment of the Earthquake Legislations) will cause people to prefer investing in buildings with higher earthquake safety. It is necessary that housing bound to be rented or sold should be inspected if they adhere to

these legislations in regards to Development Act, Building Inspection Act and Development Guidelines of the respective local governmental body. There are not enough studies made in Türkiye on the housing security of tenants, which is a very important factor in the housing market. The changes in the values of security investments made for tenants by the property owners in the housing market, who choose housing as the choice for investment, will provide valuable data to other investors. While proximity to public facilities, infrastructure, location and social support mechanisms are deemed important factors for tenants, concepts such as structural stability and quality can be ignored while choosing a rental property (Khan & Scholtz, 2011). The analysis of the physical characteristics of a house in terms of disaster risks will cause the outcomes of a disaster on it more predictable. Also, the movements of the tenants after a disaster due to structural damage will become more manageable. Rentable property is generally older, less maintained and has a greater risk of damage. Also, renovations made on rentable properties after disasters last longer and this may cause tenants to find affordable housing. Physical rehabilitation takes longer for houses that have an asymmetrical relation with the market (Seymour & Akers, 2021). Türkiye ranks second as the most populated country in Europe after Germany. According to the European Union Statistics Office the Eurostat, the country with the highest percentage of tenants in Europe is Germany. Türkiye is number four in this regard after Switzerland and Austria and according to the Turkish Bureau of Statistics (TÜİK) there is a downward trend in property ownership as the price indices of the Central Bank have increased. Eurostat data show that on average 3 people in 10 are tenants through the 27 member states while the percentage of tenants in Türkiye is 42.1. ("Central Bank of Türkiye", 2022). House ownership rate of 61.1% in 2014 dropped to 57.8% in 2020; in contrast, approximately 70% of EU citizens own houses. Countries with percentages of tenants higher than the EU average include Denmark, France, Sweden, Luxembourg, Cyprus and the Netherlands. The country with the highest percentage of house owners is Romania and is followed by Slovakia, Hungary and Croatia ("Eurostat", 2022). Some EU countries try to solve housing problems by encouraging their local governments and private enterprise, as in the example of Germany, but because the problem is seen to be more serious to be left itself, the governments appear as regulators especially by controlling rents (Table 1).

| Countries | Home Owner % | | Tenant % | | WRI | House Price Index Increase (%) | Annual Rent Increase % |
|---|---|---|---|---|---|---|---|
| | 2020 | 2021 | 2020 | 2021 | 2022 | (2020-2021) | 2022 |
| European Union | 70,0 | : | 30,0 | : | | 7,3 | 1,7 |
| Belgium | 71,1 | 71,3 | 28,9 | 28,7 | 2,71 | 7,4 | 2,9 |
| Bulgaria | 84,3 | 84,9 | 15,7 | 15,1 | 4,16 | 14,5 | 6,3 |
| Czechia | 78,9 | 78,3 | 21,1 | 21,7 | 3,06 | 9,1 | 4,8 |
| Denmark | 59,3 | 59,2 | 40,7 | 40,8 | 2,79 | 15,6 | |
| Germany | 50,5 | 49,5 | 49,5 | 50,5 | 2,66 | 10,9 | 1,6 |
| Estonia | 81,4 | 81,6 | 18,6 | 18,4 | 1,99 | 16,1 | 24,5 |
| Ireland | 69,3 | 70,0 | 30,7 | 30,0 | 4,49 | 5,6 | 10,1 |
| Greece | 73,9 | 73,3 | 26,1 | 26,7 | 6,93 | : | 0,9 |
| Spain | 75,1 | 75,8 | 24,9 | 24,2 | 3,62 | 3,3 | 1,3 |
| France | 64,0 | : | 36,0 | : | 2,51 | 5,7 | 0,6 |
| Croatia | 91,3 | 90,5 | 8,7 | 9,5 | 4,16 | 6,5 | 3 |
| Italy | 75,1 | 73,7 | 24,9 | 26,3 | 4,74 | 0,4 | 1 |
| Cyprus | 68,6 | : | 31,4 | : | 3,21 | -4,9 | 3 |
| Latvia | 81,2 | 83,2 | 18,8 | 16,8 | 3,01 | 12,4 | 6 |
| Lithuania | 88,6 | : | 11,4 | : | 2,18 | 13,3 | 13,9 |
| Luxembourg | 68,4 | : | 31,6 | : | 2,53 | 13,3 | 1,6 |
| Hungary | 91,3 | : | 8,7 | : | 5,07 | 11,9 | 9,1 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Malta | 81,9 | : | 18,1 | : | 0,69 | 5,3 | 5,6 |
| Netherlands | 69,1 | 70,1 | 30,9 | 29,9 | 7,98 | 12,8 | 0,8 |
| Austria | 55,3 | 54,2 | 44,7 | 45,8 | 3,06 | 11,7 | -0,9 |
| Poland | 85,6 | : | 14,4 | : | 3,07 | 8,3 | 13,9 |
| Portugal | 77,3 | : | 22,7 | : | 3,52 | 6,6 | 2,6 |
| Romania | 96,1 | 95,3 | 3,9 | 4,7 | 5,51 | 3 | 4,1 |
| Slovenia | 74,6 | : | 25,4 | : | 3,42 | 9,9 | 26,4 |
| Slovakia | 92,3 | : | 7,7 | : | 3,33 | 4,7 | 3,8 |
| Finland | 70,7 | 70,3 | 29,3 | 29,7 | 2,00 | 5,4 | 1 |
| Sweden | 64,5 | 64,9 | 35,5 | 35,1 | 2,25 | 10,9 | 1,8 |
| Iceland | : | : | : | : | 1,74 | 12 | 4 |
| Norway | 80,8 | : | 19,2 | : | 2,87 | 10,3 | 1,8 |
| Switzerland | 42,3 | : | 57,7 | : | 2,04 | : | 1,4 |
| Montenegro | 90,2 | : | 9,8 | : | 6,75 | : | |
| North Macedonia | 85,8 | : | 14,2 | : | 5,82 | : | 2,5 |
| Albania | 96,3 | : | 3,7 | : | 8,23 | : | |
| Serbia | 86,0 | : | 14,0 | : | 5,42 | : | 14,9 |
| Türkiye | 57,9 | : | 42,1 | : | 5,11 | 29,2 | 20 |

**Table 1:** Property Analysis in EU and Türkiye Based on Housing ("Eurostat", 2022).

In the duration after the Habitat I and II conferences that were held in Vancouver in 1976 and in Istanbul in 1996 respectively by the UN Human Settlements Program (United Nations HABITAT), a final declaration was implemented following the Third UN Housing and Sustainable Urban Development Conference (Habitat III) in 2016 in Quito, titled "The New Urban Program", which is to be followed by the member countries starting from December 2016, by the authority given by UN General Assembly ("Republic of Türkiye Minister of Environment, Urbanization and Climate Change", 2022). This study prioritizes earthquakes for their prevalence and effects, and showed that tenants value safety from earthquakes when there is a price difference between properties that were built before the earthquake legislations and after, and are willing to make investments in earthquake safety. As tenants reflect their rationalities on their investment decisions, it will not be necessary to legally interfere with the tenants who do not consider the earthquake regulations. In this regard, the National Report on Application of the New Urban Agenda was declared by the Republic of Türkiye on 31 March 2021. The new agenda aims to improve the housing stock, to prevent arbitrary evictions and ensure honorable resettlement by providing adequate housing opportunities for tenants and other types of dwellers through collective policies, mechanisms and financial models that influence availability and meet the demands. In summary, in the neo-classical economy model where there is no information asymmetry in the market and the actors act rationally, there will be no requirement for the government to involve apart from implementing legislation on housing that is more resistant to earthquakes.

**Figure 1:** Obligations of Tenant in Türkiye (Angloinfo Turkey, 2022, November 8).

**Literature Review**

Studies made in recent years give us an idea about the negative effects of natural disasters on the housing market and the tenants. Damage that occurs after disasters is an important cause for conflict between tenants and property owners. However, although there are studies on the housing market, there are not many national or international studies made on disasters with regards to tenants.

Thayer et al. (1993) have found a 2% decrease in housing prices after the Loma Prieta earthquake in California, US, and named it 'risk premium' (Thayer, Murdoch & Singh 1993) McCarthy et al. (2001) show a comprehensive analysis of the ways in which the tenants suffer more from disasters (McCarthy, Van Zandt & Rohe, 2001).

Hallstrom and Smith (2005) focused on property prices and tried to analyze a county in Florida that was not affected by Hurricane Andrew. Their data showed a 19% decrease in housing prices in the areas deemed with potential high risk (Hallstrom & Smith, 2005).

Okmyung and Landry (2013), shared their risk premium studies related to hurricanes for Pitt County in North Carolina. They found that the properties in the flooded areas are sold for 8.8% less and claimed that have not found any evidence for such a premium before that. Predictions of hedonic price models also show that the price changes are temporary in the absence of other large-scale events and show their complete disappearance 5 years after Hurricane Floyd (Okmyung & Landry, 2013).

According to Fayazi and Lizarralde (2013), disaster management efforts on housing at various stages of reconstruction programs generally play a big role in improving the rehabilitation of the society. However, information on the effects of the reconstruction policies and decisions on various social groups is very limited. The aim of their study was to see how

and why the reconstruction policies affected households. This study focused on low-income housing programs as responses to disasters (Fayazi &Lizarralde, 2013).

According to Koca (2015), to assess the quality of housing after 2000 in Türkiye and to understand the situation, the personal domiciles and practices has evolved into a multidisciplinary study by focusing on the actors with that role and the relations between the city and housing, and housing and architecture. A house's expected market value is designated by the changes made into the legislation after the 1999 Marmara Earthquake (Koca, 2015).

Şahin (2015) discusses the capital accumulation focused on construction and gains in Türkiye in his critique. After enacting the Law 6306 titled: 'Reconstruction of Areas Under Disaster Risk Act' in 2012 on earthquake safety, decreasing damages and improving engineering; it has been shown that enlarging the scope of the construction sector, opening urban areas for development and the continuous search for profit seriously harm housing areas, forests, parks, the environment and cultural elements (Şahin, 2015).

Desmond (2016), mentioned in his study that evictions after disasters are related to income loss, the incentive for the owner to increase rent and property damage. Whatever the cause, the studies made on housing show that evictions and even threats of evictions cause stress in a household and are detrimental to society (Desmond, 2016).

Akalın (2017) thought that affordable housing meant for the low-income families are not adequate and made a study on the incremental and graded housing projects of the Pritzker Architecture Award recipient Alejandro Aravena. He pointed out that housing shortages can be efficiently solved and will decrease socio-economical and psychological problems in Türkiye. This approach may totally eradicate housing shortage (Akalın, 2017).

Ortega and Taşpınar (2018) studied the effects of Hurricane Sandy on New York's housing market, a hurricane that submerged 17% of the city and 90,000 buildings under water; they found that property prices dropped 9% on average regardless if the said property was damaged during the disaster. Moreover, the drop in the average prices caused an improvement in the remaining housing conditions (Ortega & Taşpınar, 2018).

Masih (2018) claimed that enough attention was not given to the effects of disasters on tenants, a fraction that is an important element of the housing markets. Also, the preferences of a tenant family in house selection after a disaster were not clear (Masih, 2018).

Binkovitz (2018) studied the evictions after Hurricane Harvey and found that the increased rates were not related to the physical damages on the structures. The evictions after the disaster were found to be results of lost wages due to economic downturn and the increases in rent due to the decrease in rentable properties (Binkovitz, 2018).

Orçanlı (2020) studied which criteria were crucial in determining house prices and tried to discover which factors were important in housing security and purchasing compulsory earthquake insurances, in his study that encompassed the Erzurum province (Orçanlı, 2020).

These studies that focus on natural disasters, compare the situations before and after, and reveal a downward risk premium for buyers. On the other hand, a study where tenants

are the focus point in secure property and property evaluation was not done before for natural disasters, and especially for earthquakes.

**Method**

The study was done cross-sectionally and with the regression method. STATA software was used. Preference was given to data from the TÜİK 2010 and 2011 reports on the Household Budget data, in which approximately 20 thousand households were analyzed, 26% being rented out and 55% being apartment flats. The study tested whether the owners and the tenants include a structures durability in an event of an earthquake to their decision making and pricing processes, as is predicted in the neo-classical economy model. The study's sample group is formed of 26 NUTS 2 (Nomenclature of Territorial Units for Statistics 2) regions where the risk of earthquake is different from one another, as is claimed by TÜİK data. The variable that tests earthquake safety for a structure is the construction year. Therefore, the exact year of the construction should be known to compare property prices for the structures immediately before or after the earthquake legislation was passed. If the TÜİK data set codes the construction dates in 5-year groups such as 1995-2000, then it is not possible to determine whether it was built before the legislation or not. Therefore, the most crucial value to be evaluated is nonexistent. Other data sets of TÜİK were not used because the date was not specified. This study is limited to 'earthquakes' because it is more prevalent in the disaster regulations. The innate nature of earthquakes causing serious damage and loss of life in a short time frame influenced policy makers to focus on it more and legislations required for newer constructions were determined by taking earthquakes and their effects on structures into account. The presence of a significant price increase in newly constructed buildings was analyzed, from the TÜİK data set for the period after the 17 August 1999 Marmara Earthquake and the 2009/5902 Disaster and State of Emergency Management Structure and Responsibilities Act. The increases in rents in earthquake regions were also analyzed. In this data set, the house's real value was determined by the data given by the owners and the rent value was determined by the paid amount. Another limitation was that İstanbul region was left out because it was a base category.

The study utilized data such as: rent and house price expectations, year of construction, location and detailed house characteristics from the TÜİK Household Budget Survey. It was analyzed whether the rents or market values increased significantly if they were built after the legislations were passed, and also if the rent increases were higher or not in areas with higher prevalence for earthquakes. Despite utilized fewer sources, using a safe and reliable source enabled access to periodical data from which quantitative and comparable analyses could be made.

$$Log(Rent) = b_0 + b_1 * 2000S + b_2 * YrCon + b_3 * YrCon^2 + b_4 * Z + \varepsilon$$

$Log(Rent)$: Dependent variable

(2000s): Independent variable. This value is taken as 1 for houses built after year 2000 and as 0 for others. The coefficient $b_1$ in this model denotes how different the rents are in newer constructions after 2000 are if compared to the ones built before that, when all factors are

considered (The reason behind it being a percentage is that the variable is not rent itself but the logarithm or rent in the model).

$YrCon$: Denotes the construction year of the building as a continuous variable, e.g., if the building was constructed in 1998 then the value becomes 1998, consequently the *2000S* value becomes 0. The reason behind its addition into the model is that the buildings age affects the price regardless of the period it was constructed in. This helps control building age.

$YrCon^2$: Denotes the square of the same variable. The reason behind adding this is to control the non-linear effects of building age on rent and price. If there was only the variable $YrCon$ in the model, then every 1 unit for change would mean a steady change in price but taking the square would mean the 1-unit changes would mean more at first and mean less as building age goes up.

(Z) Vector: Encompasses many different variables pertaining to the house's characteristics. These can be: house type, area, number of rooms, flooring, heating type, lifts, parking opportunities, urban vs suburban location, NUTS 2 category; proximity to malls, commuting, health and educational services; survey year, number of years spent in the house and household income. (All these factors were shown as *(Z)* to save space, rather than showing them individually)

(ε): Denotes all other unobservable factors that affect house prices.

The basic assumption is whether these unobservable factors have a correlation with the variable 2000s, which is the main concern. In other words, the buildings constructed after year 2000 do not have any other characteristics besides the control parameters that make them more valuable than the ones constructed before 2000. This assumption is open for debate. When it is considered that the year of construction and variables listed in the (Z) vector are the main factors that affect housing prices, the effects of the unobservable factors can be accepted to be limited. Therefore, when the assumption is valid, the effects of $b_1$ coefficient, of the legislation on the prices of houses, can be given free from all other factors.

**Data Analysis and Evaluation**

Obtaining the relation between the year of construction and price, free from all the effects that change with the construction period (Figure 2).
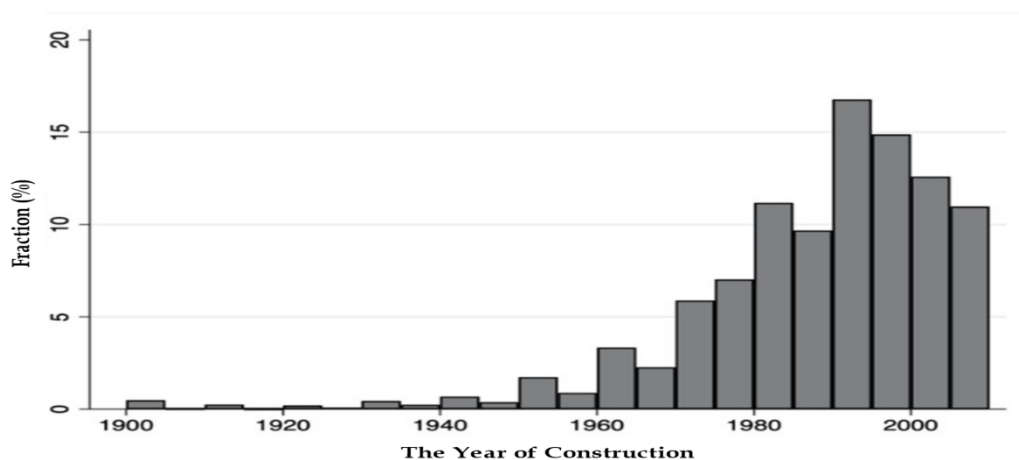


**Figure 2:** Distribution of Houses Based on Date of Construction (Akdaş, 2021).

According to Figure 2, most of the existing buildings were built after year 1980. Türkiye has a newer supply of buildings if compared to Europe (Boran, 2020, April 10). This might be interpreted as the building supply is durable to earthquakes but the durability of buildings built after 1980 is up for debate. The previous earthquakes have shown that even buildings built recently can experience serious damage. Therefore, the main factor that shows if a building is durable or not is whether it was built after the new earthquake legislation had been passed. When approached from this angle, construction legislations have been changed 8 times including in 1947, 1953, 1961, 1968, 1975, 1998, 2007 and in 2018, which is the current one, but the ones most important are the ones that were enacted after the 1999 Gölcük Earthquake. 25% of the current building supply was made according to these legislations. Consequently, 75% of the current building supply was not constructed observing earthquake safety (İMO, 2018, November 9).
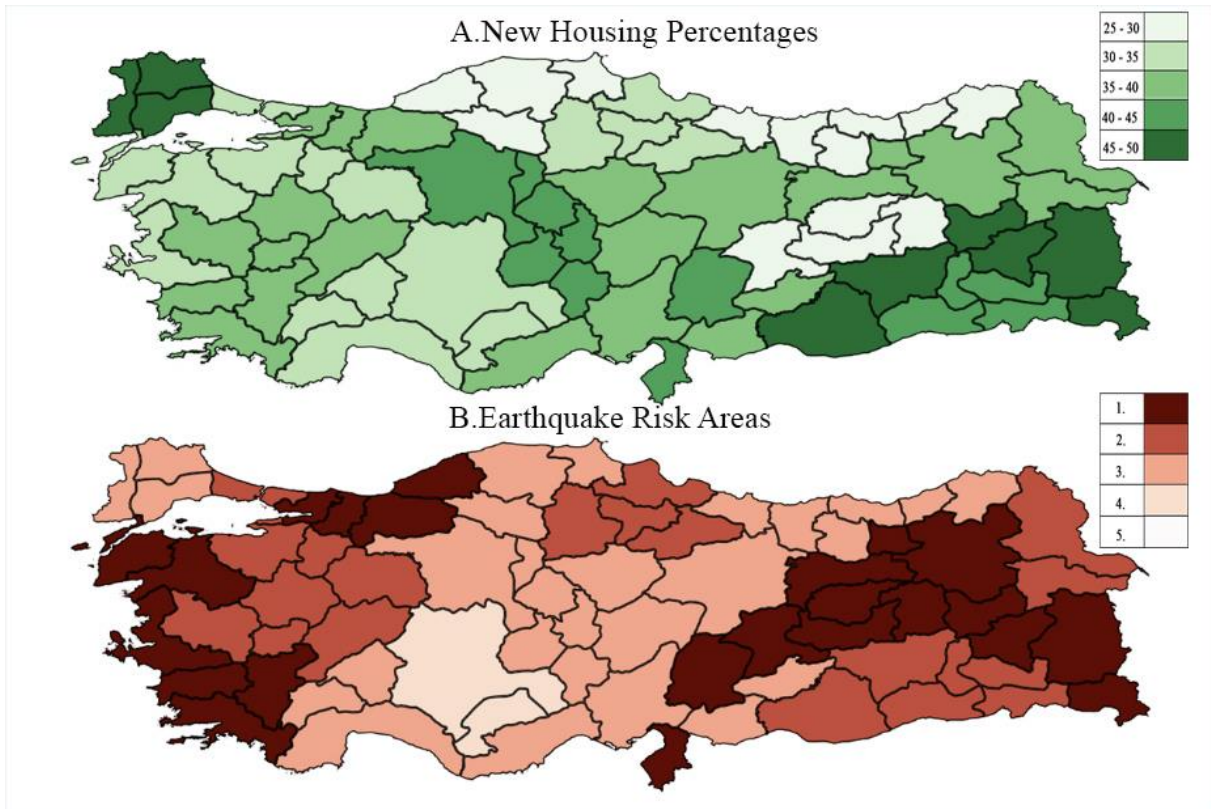


**Figure 3:** New Housing Percentages and Earthquake Risk Areas According to NUTS 2 Regions (Akdaş, 2021).

On Figure 3, it can be seen that the distribution of percentages of new constructions does not match the areas with higher risk of earthquakes. New housing construction percentages (ones built in and after 2000) are highest in Thrace and Southeast Anatolia when categorized according to NUTS 2 level areas. Higher rates should have been seen in areas with higher risk of earthquakes; however, these rates are seen in areas with secondary and tertiary risk. In primary risk areas such as Istanbul and surroundings, Eastern Anatolia and the Aegean coastline, the percentage of new housing stock is 30-40%. The lowest percentages stocks were found to be in Middle and Eastern Black Sea Regions. It can be concluded that the distribution

of percentages of newer constructions does not match the distribution of risks of earthquake of the said regions.
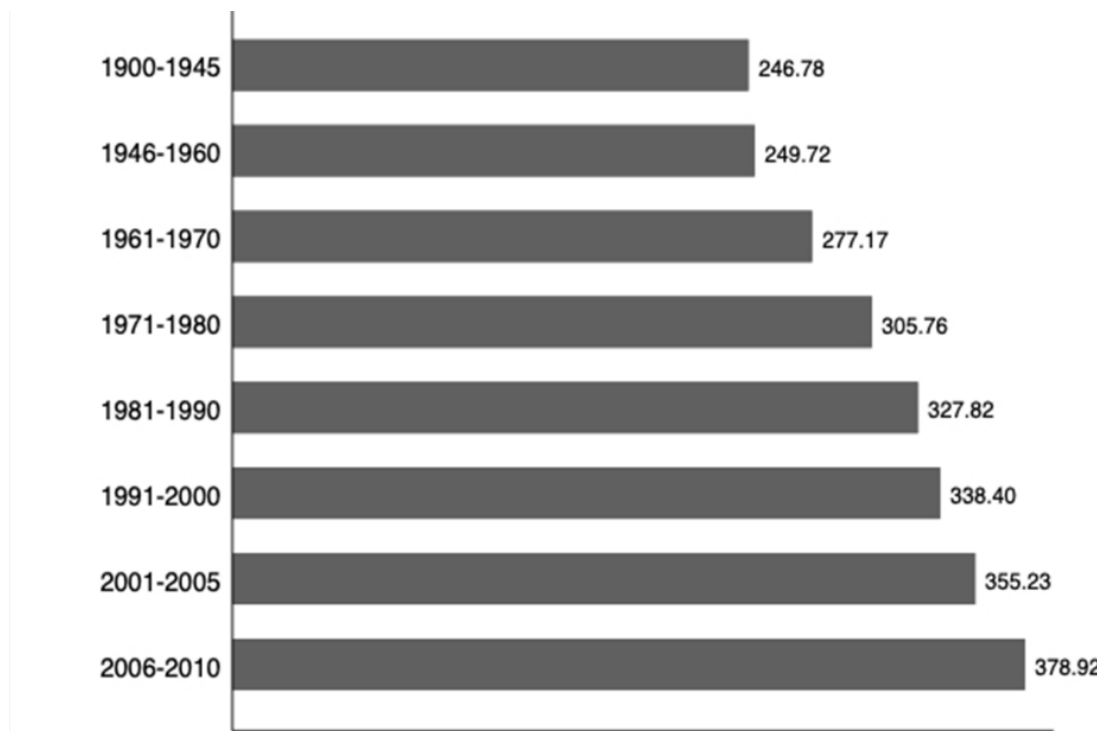


**Figure 4:** Average Rents for Houses According to Their Construction Periods (TL) (Akdaş, 2021).

The distribution of average rents can be seen for different years on Figure 4 and it can deduce that the rents for newer buildings are comparatively higher than the older ones; e.g., the market values of the houses constructed between 1900 and 1945 are almost half of the ones constructed between 2006 and 2010. However, it would be erroneous to claim that the only factor causing this difference is durability to earthquakes. Differences that come from construction periods also include appearance, technological infrastructure, location, security and size. All these differences can positively affect rents and the differences in prices can be explained mostly by these factors. Because of this reason, the differences in prices can be explained as a combination of all these factors plus durability against earthquakes.

| | (1)<br>House Owner | (2)<br>Tenant |
|---|---|---|
| **Monthly Rent** | . (.) | 325.075 (133.9) |
| **Expected House Value** | 67.245 (46.28) | .(.) |
| House Type (Private) | 0.520 (0.500) | 0.244 (0.429) |
| House Type (Apartment flat) | 0.480 (0.500) | 0.756 (0.429) |
| House Area (m²) | 104.601 (27.95) | 101.090 (25.20) |
| Number of Rooms | 3.550 (0.763) | 3.452 (0.677) |
| Construction Period (1900-1945) | 0.029 (0.169) | 0.016 (0.127) |
| Construction Period (1946-1960) | 0.055 (0.227) | 0.048 (0.214) |
| Construction Period (1961-1970) | 0.065 (0.247) | 0.064 (0.244) |
| Construction Period (1971-1980) | 0.155 (0.362) | 0.175 (0.380) |

| | | |
|---|---|---|
| Construction Period (1981-1990) | 0.204 (0.403) | 0.263 (0.440) |
| Construction Period (1991-2000) | 0.289 (0.453) | 0.264 (0.441) |
| Construction Period (2001-2005) | 0.109 (0.312) | 0.086 (0.281) |
| Construction Period (2006-2010) | 0.093 (0.290) | 0.083 (0.276) |
| Heating (Solid-fuel Stove) | 0.647 (0.478) | 0.624 (0.484) |
| Heating (Central Heating) | 0.096 (0.295) | 0.118 (0.322) |
| Heating (Private Boiler) | 0.217 (0.412) | 0.218 (0.413) |
| Heating (Air conditioner) | 0.040 (0.196) | 0.040 (0.196) |
| Elevator (1) | 0.125 (0.331) | 0.169 (0.374) |
| Parking Space (1) | 0.051 (0.221) | 0.031 (0.174) |
| Access to Malls (1=hard 4=easy) | 2.844 (0.772) | 3.144 (0.612) |
| Access to Commuting (1=hard 4=easy) | 2.853 (0.786) | 3.152 (0.607) |
| Access to Health Services (1=hard 4=easy) | 2.797 (0.794) | 3.115 (0.609) |
| Access to Educational Services (1=hard 4=easy) | 2.930 (0.733) | 3.179 (0.559) |
| Urbanization Level (Population<20000) (1) | 0.366 (0.482) | 0.111 (0.315) |
| Number of Observations | 11577 | 4152 |

Notes: Standard deviations in parentheses.

**Table 2:** Summary Data (Akdaş, 2021).

Table 2 contains summary average data for owners and tenants. When housing types are considered, 75% of tenants live in apartment flats, compared to 48% of homeowners. A big difference was not observed between the two groups in terms of average house sizes; it was 105m² for owners and 101m² for tenants. Similarly, a significant difference was not observed in the number of rooms and is at an average of 3.5 rooms per house. There is also not a significant difference in the construction periods for these houses. The only difference was observed in the newer buildings' groups, which was higher for owners. E.g., for constructions after the legislation, which is taken as year 2000, the percentage of owners in that category was 20% and was 17% for tenants (this number was obtained by adding the last two periods together). Both groups were similar in terms of heating practices. A striking observation was that in the period of 2010-2011, 64% of homeowners (and 62% of tenants) still used solid-fuel stoves in Türkiye. Since tenants mostly live in apartments, the prevalence of elevators was higher (17% for tenants vs 13% for owners). Parking places for both groups however were significantly lower (5% for owners and 3% for tenants). Presence of parking space was low for both groups (5% for owners, 3% for tenants). Another important factor that influences rents and house prices is location, therefore several control variables were present in the analysis and included which regions with the NUTS 2 level in Türkiye was the house was, urban-suburban distinction and proximity to various public services. Accessibility was graded on a scale from 1 to 4. According to that, if the house received 1 then it was in a bad location; if 4, then it was in a good location. Rentable property was found to have better access to services on average. Houses with owners received an average of 2.8-2.9 for accessibility to malls, commuting, health and education services, while houses with tenants received 3.1-3.2. Also, house owners were found to live more in the suburbs. TÜİK classifies all residential areas with

populations below 20,000 as suburbs. From that, 37% of house owners were found to live in the suburbs while 11% of the rentable property was located there.
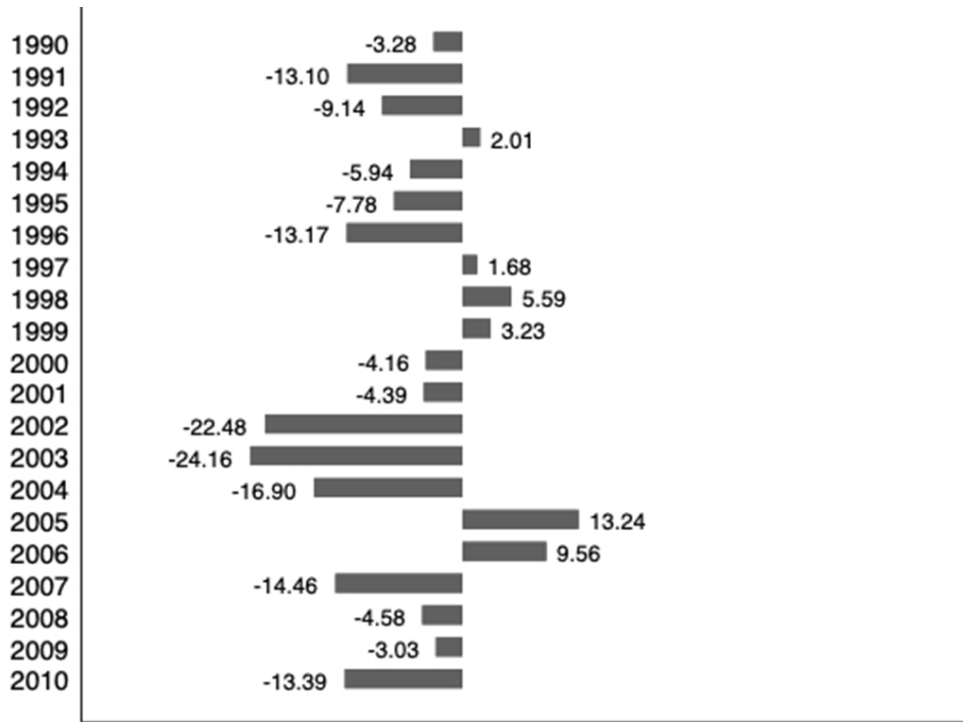


**Figure 5:** Average Rents According to Construction Year, Independent of Other Factors (TL-Turkish Liras) (Akdaş, 2021).

Figure 5 contains the obtained results from a sample with homogenous house characteristics. The sample was limited to buildings built after 1990 and contains the prices of similar houses. The figure shows average rents and average market prices for different years. It can be observed that the houses year of construction has no relations to the rent. It should be noted that the price difference is present when the other factors are considered. In other words, the price difference was not caused by newer houses having greater spaces or better facilities, the only difference came from different construction years.
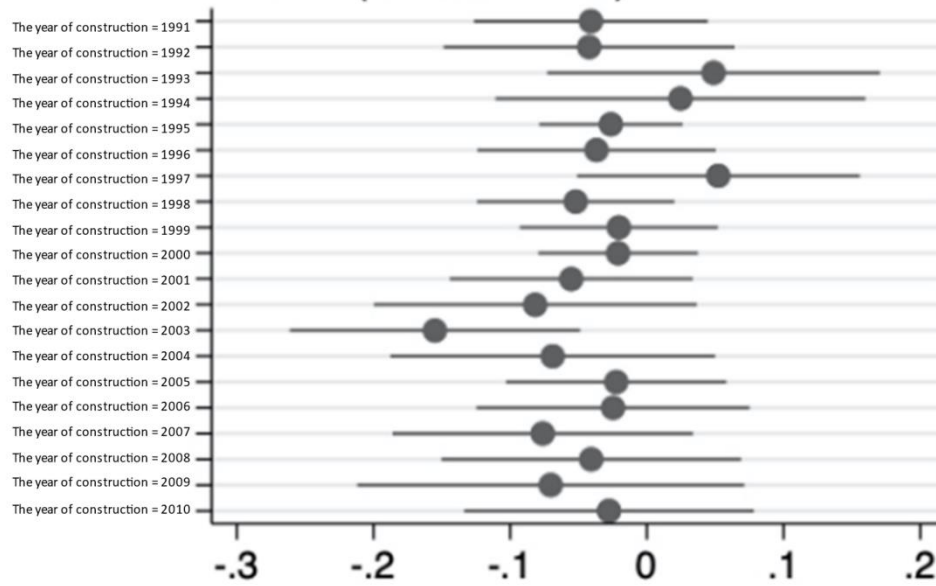
**Figure 6A:** Average Rents by Construction Years, Independent of Other Factors, All Housing (Primary Risk Earthquake Region) (Akdaş, 2021).
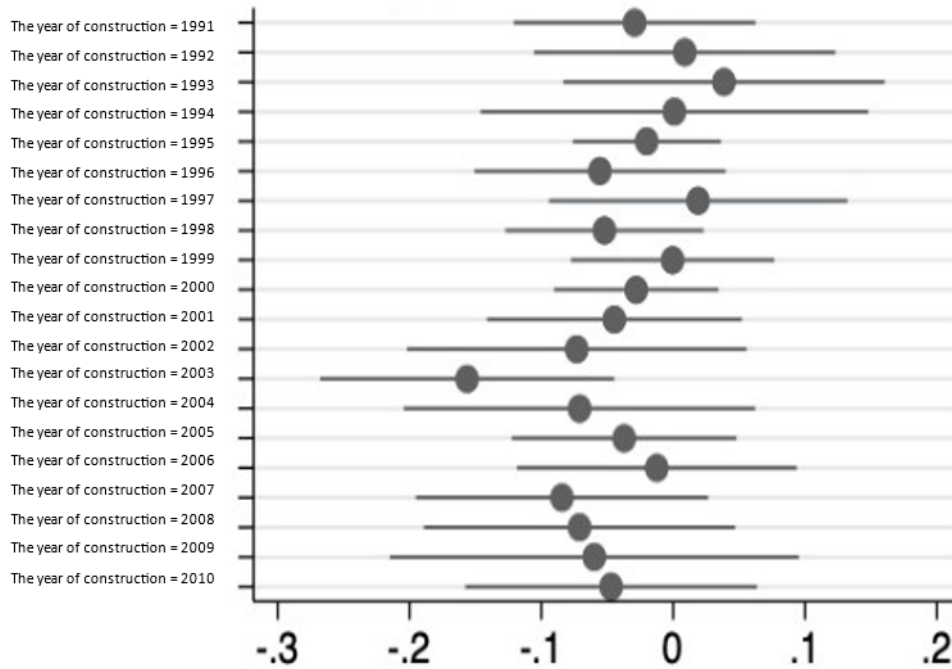


**Figure 6B:** Average Rents by Construction Years, Independent of Other Factors, Apartment (Primary Risk Earthquake Region) (Akdaş, 2021).

The expectation from this study was households expecting greater earthquake safety standards from buildings for houses in primary risk areas and higher rents as a result. However, Figure 6A and Figure 6B did not point to such a thing. Despite having numerous studies on exposure to disasters, socio-economic vulnerability, resistance, and risk management; adequate number of quantitative studies cannot be seen covering pricing of durable houses in the housing market that are located in areas with high earthquake risks and most studies are found in the theoretical region. The studies made in Türkiye on the predicted

indices of socio-economical damages remain inadequate in influencing disaster safety policies, and also inadequate to influence the construction sector, which is an important factor in the field. More studies in this field are expected to influence more changes in legislation in terms of housing safety and when tenants are willing to pay more for durable housing will ease policy makers and construction firms to take the necessary steps. There are not many studies on the increases in value of more durable housing in the luxury housing consuming market. A consumer understanding of secure housing is formed of compulsory earthquake insurance, durable construction and inspections and urban reconstruction efforts. More studies should be made to form a resilient society and influence correct preferences and consumer habits for conscientious consumption of resources. Costs that come from safety are reflected into prices especially in the housing sector and are an important factor that influences buyer behavior. Tenants are not included into the groups deemed vulnerable during disasters and not studies, also not protected adequately by the legislation. Moreover, scientific studies such as WTP (willingness-to-pay) analysis of tenants have not been made, which would show effects of the public's understanding on housing market, speculations and pricing.

In days when Türkiye has reached a certain economical level, the government requires its citizens to take responsibility in finding durable housing and only aid them financially or by constructing itself through public organizations when there is absolutely no other way to find housing. According to the study, the percentage of new housing stock was found to be 30% in Istanbul while the average of Türkiye was 36%. However, when data was collected from studies of housing index calculating firms and frequent researches, it was found that the percentage of new housing stock was 80% in Istanbul and the national average as 83% (Hepsiemlak, 2018, August 14). It was found that in regions with primary risk of earthquakes, the differences in prices are not due to increased awareness towards earthquake security and pricing leading the buyers but due to other elements. Especially, local governments, who already shape the society through various policies, can be given more responsibilities and powers that allow them to monitor the actors in this field, such as construction firms. Coordination between these actors can be ensured by the central government and tenant behavior towards secure housing and consumer practices can be influenced positively. Especially tenants suffer in social and financial areas as well as housing.

**Conclusion**

When predictions based on rents are taken into account, it is estimated that rents for durable housing are 8.2% higher in areas with higher earthquake risks (comparing primary risk areas with secondary). According to SGK (Social Security Institution of Türkiye) data, 42% of the registered employees in Türkiye receive minimum wage (Euronews, 2021, November 12). It can be deduced that if safer housing is preferred then it will be more expensive than a house with similar characteristics. This causes people who earn minimum wage to find a balance between safe housing and insecurity against earthquakes in high-risk areas. The inequality in housing will likely rise in Türkiye as a result of upcoming climate changes in the coming decades. No statistically significant effect was found that influenced rents and market values of houses; whether if they were constructed after year 2000 no proof was found that the coefficient was different from zero for the 10% significance level. Coefficients that belong to the control variables were coherent with the predictions. Size of the house, number of rooms,

presence of an elevator, a more recent construction date, proximity to malls, commuting and health services and household income are all significantly positively correlated with a house's rent. Year of the survey and house's location also affect rent. For example, houses located in Tekirdağ are 41% cheaper than ones in Istanbul. Similarly, rents were 2% higher in 2011 than in 2010 while house prices were 9% higher. An increase of 0.5% in rent is to be expected for every 1% of increase in house area. The aim of the regression study was to discover whether adherence to the new construction legislation affected house prices as an increase, assuming that such an adherence was something preferable. Results showed that: although an increase was detected in the tenants' groups, this was not found to be significant. The reason behind this could be that the sample size was smaller for tenants if compared to house owners (i.e., 3,125 vs 5,543).

According to the DASK (Turkish Catastrophe Insurance Pool) data, there is a housing stock of 20 million in Türkiye, 54.30% of which is covered, which makes 10.8 million insurance policies in force. In this data announced by DASK, it is not certain which percentage of the insured residences are occupied by tenants because they are outside the policy coverage ("DASK", 2022). While housing rents have increased more than 100 percent on average in recent years throughout Türkiye, there have been significant changes in the criteria of renters, while features such as ease of transportation, building age and earthquake resistance have been at the forefront, the priority has become cheapness due to rapidly increasing prices. (Dünya Newspaper, 2022, June 4). In the one-year period starting from 2021, housing rents throughout Türkiye have increased by more than 100 percent, with the average rental figure being 3 thousand 100 TL, while in Istanbul it is twice the average of Türkiye. With the rapid increase in rents, the criteria of tenants have also changed. While criteria for rentable housing have been ease of transportation, building age and earthquake resistance, the priority in 2022 has been the price level due to the impact of economic conditions. Despite the increase in minimum wage, the annual share of rents has reached 61 percent of income from 47 percent (Zingat, 2022, April 4).

Universal Declaration of Human Rights states that the right to habitable housing is an essential human right. In this context, in the research conducted on advertisements for rental housing in Istanbul with criteria such as price, area, building age, floor, heating, presence of a balcony and occupancy, it was determined that only 2 percent of the 38.829 rentals were suitable for living. Moreover, there were no ads for suitable housing in eight districts (Center for Spatial Justice, 2021, August 25). The problems arised during the implementation of the legislation prepared by the lawmakers within the scope of disaster management are not only related to its content, but also to the fact that some actors who must fulfill these obligations sometimes do not necessarily take the ethical values into their considerations (Tenikler, 2012).

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