



Hacettepe University Graduate School of Social Sciences
Department of Economics

**THE IMPACT OF SYRIAN REFUGEES ON THE
TURKISH HOUSING MARKET**

Kadir DİKİCİ

Master's Thesis

Ankara, 2023

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ACCEPTANCE AND APPROVAL

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Bu çalışmadaki bütün bilgi ve belgeleri akademik kurallar çerçevesinde elde ettiğimi, görsel, işitsel ve yazılı tüm bilgi ve sonuçları bilimsel ahlak kurallarına uygun olarak sunduğumu, kullandığım verilerde herhangi bir tahrifat yapmadığımı, yararlandığım kaynaklara bilimsel normlara uygun olarak atıfta bulunduğumu, tezimin kaynak gösterilen durumlar dışında özgün olduğunu, **Doç. Dr. Ali Berker** danışmanlığında tarafımdan üretildiğini ve Hacettepe Üniversitesi Sosyal Bilimler Enstitüsü Tez Yazım Yönergesine göre yazıldığını beyan ederim.

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ABSTRACT

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This thesis aims to analyze the impact of Syrian refugees on the Turkish housing market for the period 2009 and 2019. In order to evaluate how the housing market was affected, Survey of Income and Living Conditions (SILC) micro-level data retrieved from TurkStat was used. In addition to the analysis using rents and perceived rents, an index variable called Housing Quality Index (HQI) was defined and included in the analysis. Türkiye's mass refugee influx is heterogeneous across regions, and this rare situation allows for a quasi-experimental research design. The difference-in-differences (DiD) strategy was followed with a number of modifications. Then, the potential endogeneity problem was discussed, and an instrumental variable was introduced. The analysis indicates that rents increased by 1.19% for a 1% increase in the migrant-to-native ratio in the short run while the increase in perceived rents is 1.43% in the short run. The impact on rents and perceived rents are calculated as 0.66% and 0.89% in the long run, leading us to believe the impact slowly diminishes in the long run. The analysis was repeated on different types of housing units to understand if different cohorts were affected differently by the migration. High-quality housing units were affected more by immigration in the short run while low-quality houses were affected more in the long run. The impact on the natives with low education is significant in both the short run and the long run. In the short run, the development level of the region is found to be a significant determinant of the impact of migration on the housing market. Less developed regions are affected more by the migration. This effect disappears in the long run. Additionally, an analysis using the Housing Quality Index showed there was no decrease in the housing quality of the natives due to migration.

Keywords

Migration, Türkiye, Syrian Refugees, Housing Market, Rents, Housing Quality, Difference in Differences

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LIST OF ABBREVIATIONS

2SLS	Two Staged Ordinary Least Squares
CES	Constant Elasticity of Substitution
DiD	Difference-in-Differences
GDP	Gross Domestic Product
HQI	Housing Quality Index
IV	Instrumental Variable
NAR	Net Attendance Ratio
NUTS	Nomenclature of Territorial Units for Statistics
OLS	Ordinary Least Squares
PCA	Principal Component Analysis
SILC	Survey of Income and Living Conditions
SPM	Spatial Durbin Model
TDEMA	Turkish Disaster and Emergency Management Authority
TURKSTAT	Turkish Statistical Institute
TWFE	Two-way Fixed Effect

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INTRODUCTION

After the outbreak of the Syrian Civil War in 2011, millions of Syrians found their way to Türkiye in search of protection. This massive migration has serious consequences for Türkiye. The housing market is one of the markets that were affected by the migration both on the supply and demand side.

Before the arrival of Syrian refugees, the housing market in Türkiye was already transforming. Over the high inflation period during the 1994 and 1999 financial crises, Türkiye experienced a low inflation and low-interest rate period which prepared a suitable environment for the housing market to expand. “*The Mortgage Law*” which passed in 2007 along with the decline of interest rates from 50% in 2003 to 10% in 2010 encouraged households and investors to invest in the housing market and the sector realized a sharp increase during this period (Yıldırım, 2017). It should be noted that there was a setback in 2008 and 2009 as a result of the global financial crisis, but the housing market continued to expand afterward. During 2010 and 2011, the average growth of the housing market was 20,9%, twice as high as the average growth between 2003-2017 (Yıldırım, 2017).

Syrian refugees arrived in Türkiye at a time of housing market boom. Nevertheless, it is hard to assume the housing market would meet the demands of millions of Syrian refugees in such a short period of time. This thesis aims to understand the impact of the Syrian refugee influx on the Turkish housing market. There are few studies about how involuntary (or forced) migration affects the housing market. This thesis fills this gap in the literature by providing a detailed analysis of Türkiye. Understanding this effect helps us see which groups of native people are affected most by migration, as well as make better estimations about the future of the real estate market.

The main research question of this thesis is “How were housing rents affected by the Syrian refugee influx?”. The question is important for policymakers as it helps them develop effective housing policies to address the challenges caused by

migration. A comprehensive study of the impact of migration on the housing market can guide these policymakers in making informed decisions. For investors, understanding the dynamics of migration and the housing market leads to better investment decisions. Furthermore, the increase in rents is one of the major reasons for anti-immigration attitudes. A detailed analysis presents the true effect of migration with appropriate methods and the most comprehensive data.

Another important research question to consider is “Which groups are affected most by Syrian immigration?”. In the housing market context, the impact is expected to be heterogeneous across different groups. In other words, the effect on rents could be different for households with high education and low education given that most refugees belong to the lowest-income group, and it is reasonable to assume that they demand low-quality housing units. Moreover, whether less developed regions were affected more by migration is a research question that was targeted.

Lastly, whether the native’s housing conditions were changed due to immigration is another research question to be dealt with. To answer this question, an index variable was introduced, and used in the regression analysis.

Even though the main objective is to analyze the situation rather than suggest a policy, the analysis will be useful for anyone interested in the effects of massive migration flows, including policymakers and politicians. More research is still needed to provide a detailed policy recipe to overcome the negative effects of forced migration for both refugees and natives.

This thesis is organized as follows. Chapter 1 gives the theoretical framework of the subject, putting an emphasis on the distinctive properties of the housing market. Chapter 2 presents the literature review about how migration affects rents and house prices. Chapter 3 is about the institutional background. In this chapter, the history of the Syrian refugee influx and their housing characteristics in Türkiye was explained. Chapter 4 is about the data and methodology of the analysis.

Dependent and independent variables were introduced, and the assumptions and viability of the difference-in-difference method with the application of an instrumental variable were discussed. Following this, the estimation results of the analysis are given in Chapter 5. Finally, there is a conclusion and final remarks.

CHAPTER 1

THEORETICAL FRAMEWORK

Before examining the literature on migration, it is crucial to discuss the economic theory behind how migration could affect the housing market. The theoretical framework of the housing market was presented in this chapter, highlighting its relationship to the context of migration. Theorizing the migration is a difficult task; however, both due to the complexity of the subject and the conflicting mechanisms that occur simultaneously. The effect of migration is explained by the simple supply-demand framework and these conflicting mechanisms were mentioned. Then, the literature was introduced, followed by institutional background about the Syrian refugee influx toward Türkiye aiming to provide complete background information before the chapters on data and econometric analysis.

1.1. THE FUNDAMENTAL PROPERTIES OF THE HOUSING MARKET

Before explaining the housing demand and housing supply, it is best to identify the unique properties of the housing market. These properties help us understand why the housing market is different, and how immigrants affect this market.

Many researchers acknowledged the complexity of the subject and attempted to theorize the housing market by first describing its characteristics. Arnott (1987) listed 11 characteristics that are unique to housing or are much more prominent in the housing market even though most goods could contain these characteristics to some degree. These 11 characteristics of the housing market are presented in Table 1.

Table 1: Characteristics of Housing

<i>Characteristics</i>	<i>Definition</i>
Necessity	A housing unit typically satisfies the basic human need and right, to shelter.
Importance	Most households view their housing unit as the most important item of consumption.
Durability	Housing is the most durable major commodity.
Spatial fixity	Except for the container houses and very rare types of houses, most housing units cannot be moved from one place to another at a reasonable cost.
Indivisibility	The locations and borders of the fractions of a housing unit (the bathroom, rooms, and garage) are determined.
Complexity and multi-dimensional heterogeneity	A housing unit contains many different characteristics from the location of the house to the size of the dwellings that could all affect the price of the commodity.
Thinness of the market	The housing market generally has few buyers (or renters) and sellers compared to other goods.
Nonconvexities in production	Production nonconvexities create discontinuous changes in rehabilitation, demolition, reconstruction, and conversion.
The importance of informational asymmetries	Potential buyers do not fully know about the housing unit and its surroundings, same as the landlords who do not have complete information about their potential tenants.
The importance of transaction costs	Potential buyers and renters are subject to search costs and moving costs, while the house owner is supposed to pay transaction fees.
The near absence of relevant insurance and futures market	There are almost no future market operations for housing units.

Source: Adapted from Arnott (1987)

The literature mainly focused on the three aspects of the housing market (Çetin, 2020). These are durability, heterogeneity, and locational or spatial fixity

according to Maclennan et al. (1994). Before examining the supply and demand framework in the housing market, it is best to explain these three characteristics of the housing market in detail and how they are related to immigration.

1.1.1. Durability

Being considered the most important durable good for most households, the house as a commodity forms two types of demand. First, housing stocks are demanded by investors as a long-term investment and this type of demand should be analyzed with the investment theories. Second, when households demand a housing unit, they demand a variety of services such as heating, electricity, and running water. Thus, they do not solely demand the building and their consumer decisions are related to their overall satisfaction according to Leeuw (1971). This type of demand is commonly called the demand for housing services, and both the durability and heterogeneity aspects of the commodity are increasing the complexity of this subject.

The durability of the housing units allowed buyers to loan a unique type of credit, the mortgage. This long-term credit system became the main channel for financing the real estate market, especially for households. Since the interest rates could be affected by the decisions of the central bank, the mortgage rates are directly linked to the demand for housing.

This property motivates wealthy migrants to acquire houses for investment purposes. This would increase the demand for housing units.

1.1.2. Heterogeneity

The Neo-Classical model perceives the housing market as homogeneous, and uniform (Çetin, 2020). This oversimplification leads to false inferences about the market as housing units appear to be very diversified. The multidimensional nature of housing units makes it hard for researchers to analyze the topic, as

many different factors could be contributing to the value of a housing unit. For instance, the building quality of a housing unit, the number of rooms, the number of bathrooms, the size of the dwellings, the distance to the closest hospital, school, and public transportation, and the crime rate in the neighborhood are all major factors when measuring the value of a housing unit. Thus, the demand for housing is too complex due to the heterogeneity aspect of the housing units.

Immigrants might have different preferences for housing. They may express a preference for neighborhoods with high proportions of immigrants while it might be the opposite for the natives.

1.1.3. Spatial (Locational) Fixity

One of the main differences between housing units and other goods is spatial fixity. It is almost impossible to move a house at a reasonable cost. Thus, a household must consider the neighborhood before deciding to buy or rent a house. The distances to the closest schools, hospitals, and workplaces play a significant role in their demand for housing. Then, buying or renting a house is not only about the physical structure of the house itself but the benefits and challenges due to their location are also decisive.

For immigrants, housing demand is more complicated as they cannot move their houses. If they do not plan to stay for an extended period, it may be more advantageous for them to rent housing rather than purchase one.

1.2. HOUSING DEMAND

The demand for housing embodies three choices by consumers (Fallis, 1985). The first decision is to form a household and how many members this household should have. Housing demand is a household decision, and it depends on the household size. For instance, a large family might demand a larger housing unit compared to a newly married couple. In the immigration context, household size

plays a significant role in order to evaluate the impact of migration on the housing market as the household composition of immigrants might be different from natives.

The second decision is whether to buy or rent housing. Since housing units are durable, this decision involves future expectations about the price of the commodity. The household maximizes utility as owner by choosing the housing unit while facing the cost of the house, transaction costs of changing houses, and other costs. The household can also maximize their utility as renters by choosing the housing unit while facing the rental price of the housing unit and other costs. Then, the household chooses to buy or rent housing to maximize their lifetime utility subject to their lifetime budget constraints (Fallis, 1985). This decision-making process might be different for immigrants. Immigrants, especially involuntary immigrants, may prefer to rent housing, anticipating their return to their home country within the next few years. In other words, if they are planning to move back to their original country in the short run, they might not perceive buying housing in the host country as a long-term investment.

The third decision is to determine how much housing the household will consume. This decision depends on household size, personal preferences, and many other factors. The household makes these three decisions simultaneously.

The heterogeneity in the housing market can be represented by a vector (z_1, \dots, z_n) defining characteristics of the housing units (Rosen, 1974; Fallis, 1985). These characteristics include the number of rooms, the size of the dwellings, the age of the building, and other measurable characteristics. The price of the housing unit is $p(z)$, associated with the vector of characteristics. $p(z)$ refers to the sale price of the housing unit in the ownership market, and it refers to rent in the rental market. Households perceive different housing units as different bundles of characteristics, and $p(z)$ is the minimum price for a given bundle.

According to Rosen (1974) and Fallis (1985), I can write the price, the utility function, and the budget constraint associated with housing characteristics as follows:

$$p(z) = p(z_1, \dots, z_n) \quad (1)$$

$$U = U(x_1, z_1, \dots, z_n) \quad (2)$$

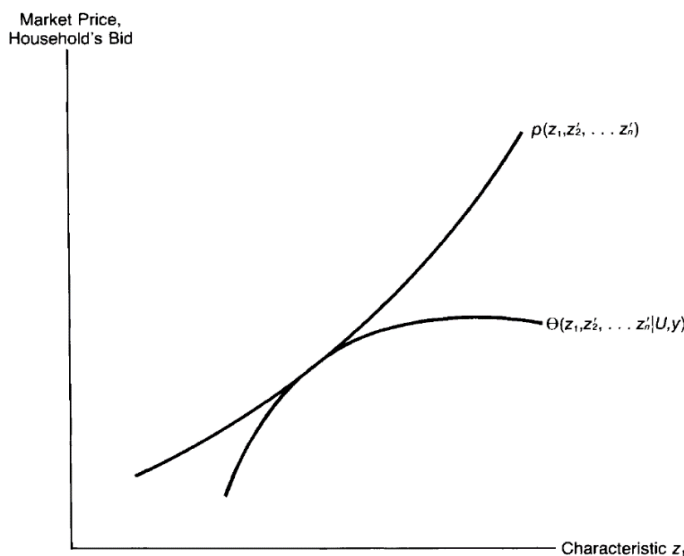
$$y = p_1 \cdot x_1 + p(z) \quad (3)$$

In order to solve the optimization problem, I can define a bid function that indicates how much a household is willing to pay for the bundle of characteristics given their utility and income level. The bid function is defined as:

$$\theta(z_1, \dots, z_n | U, y) \quad (4)$$

The indifference curves exist for different utility and income levels. The optimal solution is where the bid function is tangent to the price. At this point, the household maximizes its utility by purchasing (or renting) the bundle of characteristics (z_1, \dots, z_n) subject to household income. Households with varying preferences or incomes will exhibit different tangent points, as shown in Figure 1.

Figure 1: The Household Optimization Problem.



Source: Fallis (1985)

1.2.1. The Determinants of Housing Demand

There are many factors that affect the housing demand. In this section, I explained them briefly.

Income is one of the main determinants of housing demand. The demand for housing exhibits a positive correlation with household income due to three main reasons. Firstly, the increase in income can motivate people to form a new household. Secondly, renters might consider buying a housing unit when they have a higher income. Lastly, homeowners might prefer to buy a larger housing unit, or another housing unit as a means of long-term investment.

The price level is another determinant of housing demand. The demand is expected to decrease due to the increase in the price level since a higher price level decreases the purchasing power of the household. However, a higher price level might also create expectations about even higher prices in the housing market in the future. Thus, households will consider purchasing a housing unit expecting that its value will increase in the future.

Demographics of the household can also determine housing demand. One of the most important demographic variables is the rate of household formation (Charles, 1977). Housing demand and the rate of household formation are positively correlated. While marriage is the most significant factor for household formation, it does not always mean the newly married couple will demand an additional housing unit. Moreover, Mayo (1981) states that female household heads tend to spend more on housing compared to male household heads. Furthermore, the young population has a higher demand for housing due to their desire to form their own households (Ermisch, 1996). Lastly, education is expected to have a positive relationship with housing demand because high education is generally associated with high income (Eichholtz and Lindenthal, 2014).

1.3. HOUSING SUPPLY

There are two types of producers in the housing market. These are the suppliers of housing stocks and suppliers of housing services. The supply of housing stocks refers to the construction of the housing unit. On the other hand, one unit of housing service is defined as the quantity of service yielded by one unit of housing stock per unit of time (Olsen, 1969). In equilibrium, it is assumed that the price per unit of housing service is the same in all dwelling units (Fallis, 1985). In the extremely short run, housing stock is assumed to be constant, and the housing services can only be produced using the existing capital stock (Fallis, 1985). In other words, the housing supply is perfectly inelastic. However, the housing supply is expected to be more elastic in the long run. Thus, the housing supply should be analyzed for both the short-run and the long-run separately. After explaining the heterogeneous housing supply, I explained the difference between short-run and long-run housing supply.

1.3.1. Heterogeneous Housing Supply

I can describe the supply of heterogeneous housing as the production of housing units which are represented by the vector (z_1, \dots, z_n) . Following the study of Rosen (1974), I can assume the firm produces only one type of housing stock. Then, the firm's production function will be as follows:

$$(z_1, \dots, z_n, q) = f(L, N, M) \quad (5)$$

Total cost function $C(z_1, \dots, z_n, q)$ can also be derived. Then, the firm aims to maximize the profit given the price is $p(z)$, the price per dwelling for characteristics z . Thus, the marginal revenue from adding a unit of a characteristic will be equivalent to its marginal cost at the profit maximum, given the optimally chosen vector of characteristics (Fallis, 1985). This can be formulated as:

$$q \frac{\partial p(z_1, \dots, z_n)}{\partial z_i} = \frac{\partial C(z_1, \dots, z_n, q)}{\partial z_i} \quad (6)$$

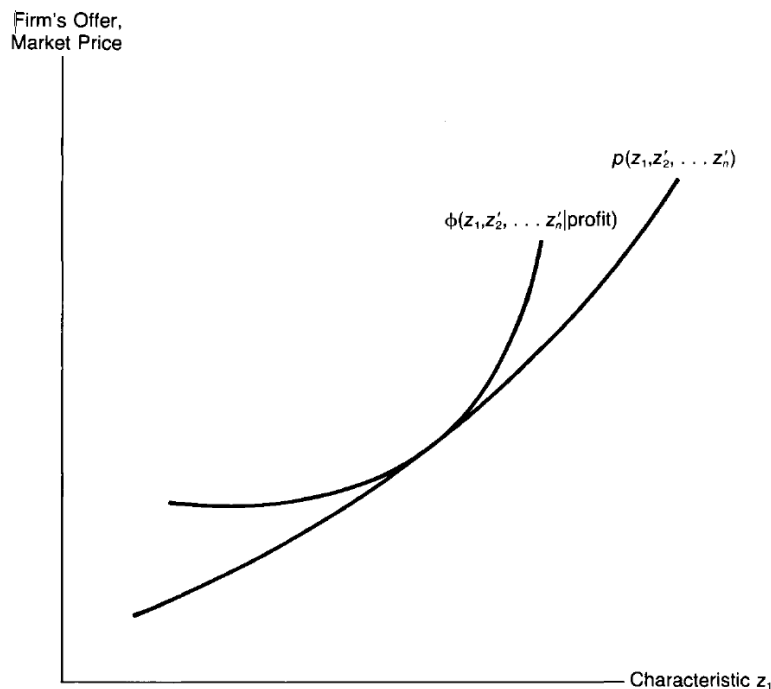
$$p(z_1, \dots, z_n) = \frac{\partial C(z_1, \dots, z_n, q)}{\partial q} \quad (7)$$

Similar to households' bid function, I can now define an offer function that shows the price that the firm is willing to accept given the optimally chosen output level (see Equation 8).

$$\phi(z_1, \dots, z_n | profit) \quad (8)$$

Using the offer function, I can draw the isoprofit curves. At the profit maximum, the isoprofit curve will be tangent to the hedonic price function $p(z)$. Figure 2 visualizes this phenomenon.

Figure 2: *Landlord's Profit Maximization Problem*



Source: Fallis (1985).

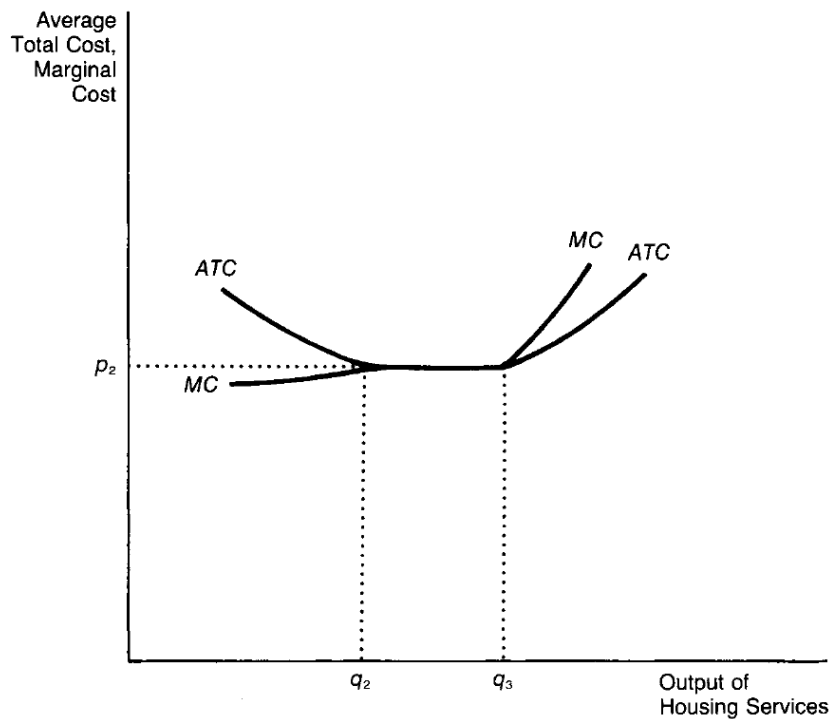
1.3.2. The Long-Run Housing Supply

For simplicity, I can assume that the only input for the supply of housing services is the housing stock. In the long run, production using existing dwellings is irrelevant. Therefore, I can consider the supply of housing services and the supply of housing stocks as the same. The production function for the housing services can be formulated as:

$$q_s = f(L, K) \quad (9)$$

While equation (9) represents the production function for a single firm, I must consider all potential firms in the long run. If the price of housing services is p_2 , the firm can choose any level of output from q_2 to q_3 , as shown in Figure 3. However, since it is true for all firms in the market, the long-run supply curve is perfectly elastic.

Figure 3: Average and Marginal Cost Curves



Source: Fallis (1985)

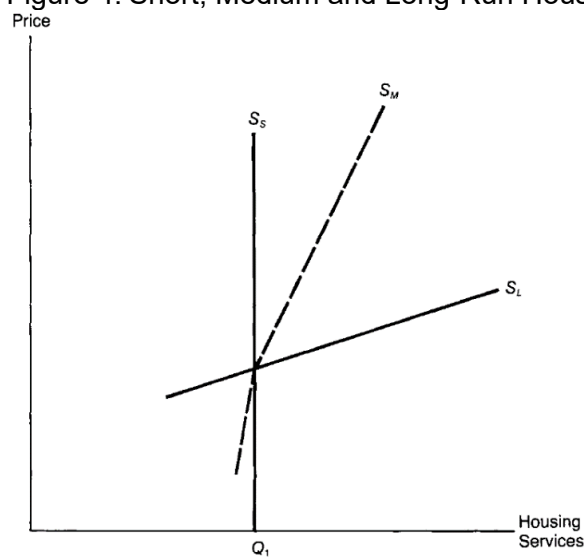
1.3.3. The Short-Run and Medium-Run Housing Supply

The concept of the extremely short-run supply curve pertains to the situation where all housing services must be generated using existing capital stocks, and that cannot be varied. Thus, the short-run supply curve will be perfectly inelastic.

The transition from the short-run supply curve to the long-run supply curve occurs through the medium-run housing supply, which encompasses both the construction of new housing stocks and the utilization of existing housing stocks as inputs for housing services. It is important to recognize that the construction of a housing unit takes several years, making the medium-run housing supply generated by newly constructed stock inelastic. Moreover, governments have the ability to impose restrictions on the usage of land for new construction. Therefore, most of the housing services are produced using existing housing stocks in the medium run.

Figure 4 visualizes these three periods of the housing supply. The medium-run housing supply is more elastic than the short-run housing supply. Nevertheless, it is still expected to be inelastic compared to the long-run supply curve.

Figure 4: Short, Medium and Long-Run Housing Supply



Source: Fallis (1985)

1.3.4. Determinants of the Housing Supply

In this subsection, I briefly explained the determinants of the housing supply and how migration can be a factor in the housing supply.

Assuming that the input prices are constant, an increase in the price of the housing stock leads to a corresponding rise in profitability for the suppliers. Then, the construction firms increase their supply of housing stocks.

The cost of production in the housing market can be classified into four distinct categories according to Charles (1977). Those are land costs, pre-construction costs, construction costs, and financial costs. Migration has the potential to reduce labor costs in the construction sector, as immigrants can actively participate in the labor force. If the immigrants are generally low-skilled workers, the impact will be bigger.

Interest rates also play a significant role as numerous producers rely on loans to initiate the production process. When interest rates are high, producers face challenges in obtaining loans in order to construct the housing stock.

Public policies can affect the supply of housing stock through various channels. Firstly, the government can subsidize the production. This leads to an increase in the production of housing stock. Secondly, the government can support social housing programs that target low-income and middle-income people. These non-profit social projects increase the housing supply. Lastly, tax policy can affect the production of housing stock. High tax levels increase production costs, thereby causing a decrease in the housing supply. There are also public policies related to migration. The government can build refugee camps in order to host refugees who fled their country as a result of a war or a natural disaster. Moreover, the government might provide work permits for immigrants, and this could result in a more abundant labor force in the construction sector if the immigrants generally belong to the low-income group.

1.4. THE EFFECT OF MIGRATION ON THE HOUSING MARKET

Migration has two different mechanisms that affect housing demand. First, the increasing demand for housing due to the higher population will shift the demand curve outward. This is the main reason for the increases in rents and house prices.

There is a conflicting mechanism, however. The increase in migration might push the natives to outer regions. This phenomenon is also called “the native flight”. Natives tend to believe immigrants are increasing crime rates even though it has been proven to be false (Kayaoglu, 2021). Additionally, the natives sometimes do not feel comfortable living with immigrants due to their cultural differences. These reasons encourage natives to move to the regions with fewer migrants. Thus, the regional prices and rents are expected to decrease as fewer natives are now demanding these houses because of their perception of the immigrants.

Migration can also affect the housing supply, as it was mentioned. Immigrants can participate in the labor force for the production of housing stock if they are given work permits by the government. This is especially true when immigrants belong to the low-income group. They can supply additional labor for the construction sector. Furthermore, the government can build or subsidize housing to meet the demand caused by immigration. Therefore, public policies related to migration can affect the housing supply.

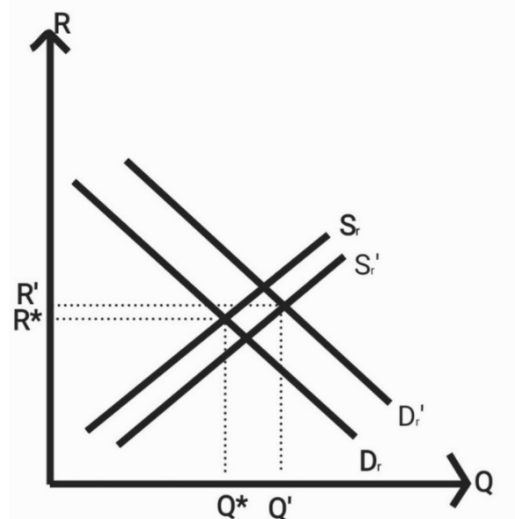
Immigrants might also affect the economic activity in the host country. They can affect inflation, unemployment, and even international trade. The macroeconomic effects of migration might have indirect impacts on housing demand and housing supply. For instance, if the immigrants are complementary to natives in the labor market, the disposable incomes of natives will increase, and the natives can demand better housing units.

Houses are durable goods that can be leased, occupied, or held as an investment. Considering that it takes months and sometimes more than a year to design and build a house or an apartment, I can assume the supply for the stock of houses is inelastic at least in the short run.

Figure 2 shows the demand curve for the rental houses, labeled as D_r , and the supply curve, labeled as S_r . The market is in equilibrium at R^* where the stock of rental houses is equal to the demand for rental houses. Any exogenous shock in the demand for the rental market, such as the increase in the population, will shift the demand curve upwards, which is shown by D_r' . Similarly, any exogenous increase in the stock of rental houses; either as a result of an increase in the number of enlisted existing houses for rent or as a result of building new houses for rent, will result in shifting the supply curve outwards, which is shown by S_r' . Therefore, the new equilibrium will be achieved at the intersection of the new demand and supply curve, labeled as R' .

As can be seen from Figure 5, if the supply is assumed to be inelastic, the increase in demand for housing due to migration will lead to an increase in rent, shifting from R^* to R' . In the long run, however, the supply is also expected to shift to the right, adjusting the long-run equilibrium with a slightly lower rent level.

Figure 5: The Supply and Demand Framework in Housing Market



CHAPTER 2

LITERATURE REVIEW

This chapter focuses on empirical evidence about the effects of migration on rents and house prices. Although the difference in differences is a common approach for this context, the methods vary as well as the usage and the content of instrumental variables according to the design of the researcher and their needs.

The literature can be categorized into two subsections. The first subsection concentrates on the studies about the effect of migration on rents. The positive, negative, or limited effects are mentioned. The second subsection presents the literature about the impact of migration on house prices. Similarly, the positive effects, negative, and limited effects are analyzed within their context.

2.1. IMPACT OF MIGRATION ON RENTS

Most studies found that migration significantly increases rents while Greulich et al. (2004) found no impact. The literature aims to find the percentage change in rents caused by immigration.

While discussing the results of each paper, I should be cautious about generalizing the findings since each country has a distinct housing market mechanism, and the type of migration could play a crucial role in determining the impact.

Table 2 presents the literature review matrix on how international migration affects housing rents. Most research focused on voluntary migration while Türkiye experienced a sudden, unexpected, involuntary mass migration. While discussing the results of each paper, I should be cautious about generalizing the findings since each country has a distinct housing market mechanism, and the type of migration could play a crucial role in determining the impact.

Table 2: The Effects of Migration on Rents

<i>Author</i>	<i>Country</i>	<i>Time Period</i>	<i>Effects on rents</i>
Saiz (2003)	USA (Miami)	1974-1983	8%-11% increase
Greulich et al. (2004)	USA (106 Largest Metropolitan areas)	1970-2000	No significant increase in rent to income ratio
Ottavino and Peri (2007)	USA (50 States and DC)	1970-2005	7.6% increase in the long run
Saiz (2007)	USA (306 MSAs)	1983-1997	1% increase for 1% immigration
Latif (2015)	Canada	1983-2010	0.14%-0.17% increase for 1% immigration
Balkan et al. (2018)	Türkiye	2010-2013	5.5% increase
Kürschner (2017)	Germany	1990-1992	3.3% increase for 1% immigration
Mussa et al. (2017)	USA (275 MSAs)	2002-2012	1.165% increase for 1% immigration
Sanchis-Guarner (2022)	Spain	2001-2012	0.98% increase for 1% immigration

In one of the oldest studies relating international migration to the housing market, Saiz (2003) concluded that migration toward Miami caused an additional increase in housing rents by 8% to 11% from 1979 to 1981, even though the effect slightly decreased in the following years. The author used the “Mariel Boatlift” as a natural experiment that is relatable to our context. Another study by Saiz (2007) introduced the “shift-share” instrument to calculate the real effect of migration on USA destination cities for the period of 1983-1997. This instrumental variable takes the “network effect” into consideration. That is, the immigrants are more likely to move to areas that are already inhabited by people of the same origin. This approach was later used in many different papers. Saiz (2007) found that a 1% increase in the city population as a result of migration inflow caused a 1% increase in house rents. A study by Ottaviano and Peri (2007) reported a 7.6% increase in rents in the long run due to migration when they control for education. Latif (2015) analyzed the panel data for Canada and concluded that an increase

in immigration inflow equal to 1 percent of the province population leads to an increase in the average rent by 0.14 percent to 0.17 percent.

Balkan et al. (2018) defined a “treatment group” and a “control group” in Türkiye to differentiate the regions with high refugee influx and with low refugee influx in order to calculate the impact of Syrian refugees on the Turkish economy. He applied a difference-in-differences strategy, which is also the basis of our identification strategy, and reported a 5.5% increase in rents. He also calculated the heterogeneous effect of migration across different types of housing units and found that rents of the lower-quality units have only increased by 1.7%, while the high-quality rental units have increased by 11%. (Balkan et al., 2016). Their study is among the first studies that aim at calculating the impact of Syrian migration toward Türkiye on economic outcomes. Thus, their methodology is the basis of our study. Our contributions to this strategy were discussed in detail in the identification strategy section.

Kürschner (2017) studied a natural experiment to analyze how migration affected the rental market. After the fall of the Berlin Wall in 1989, a large number of East Germans migrated to West Germany. The context is similar to our unexpected Syrian immigration case. Using a spatial correlation approach on the 72 West German metropolitan districts from 1990 to 1992, Kürschner (2017) reported that a one percent increase in population due to migration resulted in a 3.3% increase in the average rents. Kürschner acknowledged that the model might suffer from the endogeneity problem even with the inclusion of control variables. It could be reasonable to argue that migrants selected their destination according to house market conditions. To overcome this problem, Kürschner (2017) applied an instrumental variable approach (IV) and reported a one percent increase in population due to migration caused average rents to increase by 4.1%. Interestingly, when Kürschner controlled for the border area situation, an 8.3% increase in the rents of the upper segment houses was found. It is worth noting that Kürschner’s study has found a greater impact of migration on the housing market, perhaps due to the unexpected nature of the event.

In another study, Mussa et al. (2017) estimated the effect of migration toward the USA on rents between 2002 and 2012 with the Spatial Durbin Model (SPM) and found that a 1% immigration inflow increased the rents by 1.18%. A similar result was found when they controlled for the time-period fixed effects. They concluded 1% increase in MSA's population caused the rents to rise by 1.165%. Sanchis-Guarner (2022) studied the effect of migration toward Spain on house rents and house prices. She used the data for 50 provinces in Spain and reported a semi-elasticity of 0.675 for rents for an increase of 1% in migration rate when she included time-varying control variables, time-period fixed effects, province fixed effects, and their interactions. Later in that study, she claimed the effect of migration on rents increased to 0.98 when she added an instrumental variable. Her study is also interesting in the way that she took native mobility as a result of migration into account and found that when 10 migrants settle in a province, about 3 natives settle there due to the migration inflow. It should be noted that even though she suspected that the immigrants might be complementary to the natives, in our context, the native flight might be the case.

Interestingly, another study by Greulich et al. (2004) analyzing metropolitan areas in the USA found migrants did not contribute to natives' rent burden. They argued the increase in the migrant population caused an increase in income for natives, thus the rent burden did not change significantly. It is one of the rare studies which found no positive effect of immigration on rent.

2.2. IMPACT OF MIGRATION ON HOUSE PRICES

The effect on house prices is another crucial topic as house market attracts both real estate investors and residents. There is a relatively large literature about the impact of migration on house prices as numerous studies were carried out to evaluate the effect. The literature review is given in Table 3. The common perspective is that migration can be seen as a direct demand shock for the housing market that is hard to be met in the short run. Therefore, migration should lead to an increase in house prices. There could be another mechanism,

however. Increasing density in the migrant population might push natives to move to areas that are highly populated with natives. This would unarguably decrease the house prices in the areas that are dense with migrant populations. The conflicting results of different studies can be explained by these mechanisms and the context in which the study was concerned.

Table 3: The Effects of Migration on House Prices

<i>Author</i>	<i>Country</i>	<i>Time Period</i>	<i>Effects on house prices</i>
Ley and Tutchener (2001)	Canada	1971-1984	Positive
Carter (2005)	Canada	1990-2010	Insignificant
Ottaviano and Peri (2005)	USA	1990-2000	1.1 to 1.6% increase for 1% immigration
Saiz (2007)	USA (306 MSAs)	1983-1997	1% increase for 1% immigration
Coleman and Landon-Lane (2007)	New Zealand	1962-2006	8% to 12% increase for 1% immigration
Stillman and Maré (2008)	New Zealand	1986-2006	0.2% to 0.5% increase for a 1% increase in the population
Meen (2011)	UK	1990-2010	Insignificant
Saiz and Wachter (2011)	USA	1990-2000	Negative
Akbari and Aydede (2012)	Canada	1996-2006	Insignificant, only 0.10-0.12% increase
Sá (2014)	UK	2003-2010	Negative, 1.7% decrease for 1% immigration
Akgündüz et al. (2023)	Türkiye	2010-2017	Positive, 0.8% to 2.5% increase for a 1% increase in the refugee-to-native ratio

Ley and Tutchener (2001) studied the cities of Canada for the period 1971-1984 using correlation analysis. They questioned that if higher house prices force people to move out, why would low-income immigrants migrate to these areas? This dilemma leads researchers to think that immigrants are more likely to tolerate the low quality and overcrowded buildings when compared to natives. This phenomenon is relatable in our Syrian-Türkiye context considering that Syrian refugees mostly belong to low-income groups. Although this early study found a positive effect of immigration on house prices, the problem of

endogeneity arose. The recent literature focused more on how to construct the causality relationship. Ottaviano and Peri (2005) attempted to calculate the elasticities of substitution between foreign and U.S.-born workers using constant elasticity of substitution (CES). This allowed them to calculate the impact of immigration on the labor market. They also introduced a model for production-consumption-housing to evaluate how house market outcomes were affected by immigration. They concluded that an increase of 1% in immigrant employees produces a 1.1 to 1.6 percentage point increase in home prices for native-born Americans. As mentioned in the literature about house rents, Saiz (2007) used the “shift-share” instrument to overcome the endogeneity problem and reported a 1% increase in house prices as a result of a 1% increase in the city population due to migration. Again, the instrumental variable approach was repeatedly used in the next papers.

Coleman and Landon-Lane (2007) found a much bigger impact compared to the literature. When they analyzed the New Zealand housing market using the structural vector autoregressive model, they concluded that net immigration inflow that has a size of 1 percent of the population would increase house prices by about 10 percent. The authors tried to explain these rather unusual results from two perspectives. The first one was that immigration could change the housing demands for the locals as immigration is generally associated with high growth. The second explanation was that migration could destabilize the expectations about house prices. Nevertheless, many other studies were conducted on the New Zealand case. Stillman and Maré (2008) acknowledged the potential endogeneity problem and used the instrumental variable approach to estimate the impact of migration on the New Zealand housing market. Surprisingly, they found that a one percent increase in the population causes an increase in house prices by only 0.2 to 0.5 percent. They emphasized that the return migration of New Zealanders abroad had a bigger impact than foreign-born migration. A one percent increase in population due to the returning New Zealanders is associated with a 6 to 9 percent increase in house prices. They explain this gap by suggesting that foreign-born migrants are much less likely to

buy houses when compared to New Zealanders once living abroad and migrate back to their country.

Carter (2005) agreed that immigration was a factor in increasing house prices in Canada. However, the author believes that immigration is only a small part of the equation. Even though the author did find a positive relationship between immigration and house prices, mortgage rates in Canada were quite low in the period of analysis which would definitely have a positive effect on house prices. Moreover, the decreasing unemployment and steady income growth must have increased the housing demand according to Carter (2005). Akbari and Aydede (2012) used five-year census data to analyze the Canadian case once again. Their econometric analysis conducted on panel data showed that migration increased house prices only by 0.10 to 0.12%. They argued only immigrants who migrated more than ten years ago had a significant effect on house prices. These results indicate that migration might have a delayed effect. Meen (2011) constructed a long-run model of housing affordability for the United Kingdom. The model takes migration, demographics as well as labor market outcomes into account. The effect of international migration on house prices was subtle. The explanation was that immigrants might push some natives away, thus limiting the pressure on house prices.

Some other studies have reported that migration could have a negative effect on house prices. Saiz and Wachter (2011) found that the native flight effect was more dominant. Their geographical diffusion model showed that immigration leads to a decrease in the growth of house prices. Sá (2015) agreed that immigration causes UK natives, especially the ones with the highest income, to move out. Thus, it was reasonable to assume that this negative income effect would decrease house prices. The author followed the approach of using the spatial correlation between migration and house prices, implemented with an instrumental variable to overcome endogeneity. This analysis indicated that a 1% increase in the immigrant population would decrease house prices by 1.7%. The effect is more visible in areas where migrants have low education.

The literature is mainly focused on the developed world, but Akgündüz et al. (2023) studied the impact of involuntary immigration on house prices in Türkiye. They followed a difference-in-differences and instrumental variable method to evaluate the impact of the treatment intensity; that is, the migrant-to-native ratio. While the methodology in the study by Balkan et al. (2018) is the basis of our model, our identification strategy is more similar to Akgündüz et al. (2023) as I want to calculate and compare the long-run effects in addition to the short-run effects. They found that the house prices increased by 0.8% to 2.5% as a result of a one percent increase in the migrant-to-native ratio. They added that the effect is absent in the long run. When they analyzed the heterogenous effect, they suggested the increase in low-price houses is higher, estimated between 1.8% to 3.5%.

CHAPTER 3

THE CONTEXT OF THE SYRIAN REFUGEE INFLUX TOWARD TÜRKİYE

The mass Syrian migration toward Türkiye sets an example of a quasi-experimental research design. In order to understand how to construct a proper identification method, background information about the Syrian migration toward Türkiye is needed. A brief history of the situation is followed by the public policies and the demographic characteristics of Syrian immigrants.

As a country that spans from the Middle East to Eastern Europe, it is not surprising for Türkiye to be a center of mass migration throughout its history. As a matter of fact, the mass movement started at the very beginning of Türkiye's existence. Only months before the declaration of the Turkish Republic, Türkiye, and Greece signed the "*Convention Concerning the Exchange of Greek and Turkish Populations*" on January 30, 1923, allowing the exchange of the Orthodox population in Türkiye with the Muslim population presence in Greece. The population exchange concerned more than 1.5 million people (Alpan, 2008) and it is estimated that about 350,000 Muslims moved to Türkiye (Kayam, 1993). In the following years, about 800,000 people migrated from the Balkans due to wars and conflict.

Throughout history, Türkiye witnessed massive migration flows from the Balkans, Iraq, Syria, and Afghanistan. Yet the most significant of all is the Syrian refugee influx which started in March 2011 as a consequence of the Syrian Civil War. It was not the first time Türkiye welcomed Syrian immigrants. The political conditions forced Syrians to move to Türkiye many times in the last century. However, the migration after the Syrian Civil War was tremendous. Since 2011, about 3.7 million Syrian refugees have been settled in Türkiye according to the Presidency of Migration Management. This makes Türkiye the country that hosts the most refugees globally.

3.1. HISTORY OF SYRIAN REFUGEE INFLUX TOWARD TÜRKİYE

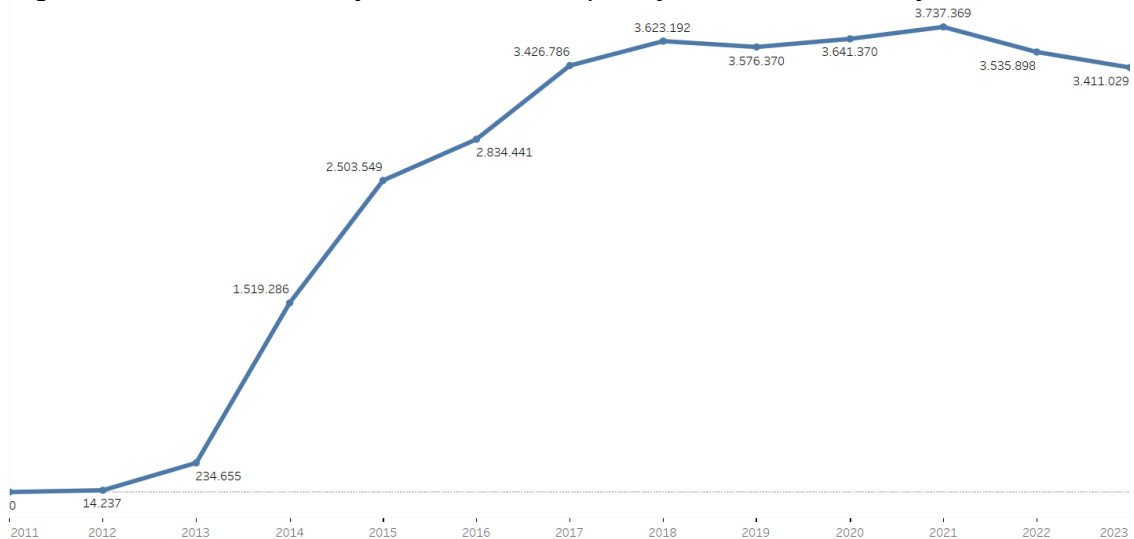
In March 2011, huge protests against the Syrian government erupted in the city of Deraa. These protests, like the others that occurred in nearby countries, were pro-democracy and against the oppression and corruption of the central government. On 18 March 2011, “Friday of Dignity”, local forces opened fire on the crowd, accelerating what was already heating in the streets of Deraa. Since 2011, more than 400,000 people died because of the civil war, forcing more than half of the population to be displaced (World Bank, 2021). The civilians were displaced after the conflict found their way to nearby countries, mainly Türkiye, Lebanon, Jordan, Iraq, Egypt, and Sudan as well as European countries such as Germany and Sweden.

The story of Syrian refugee migration toward Türkiye started in April 2011. Türkiye announced the “open door policy” for Syrian refugees, aiming to take care of the basic needs of Syrians in temporary protection. At the beginning of the crisis, the number of refugees was low, and Türkiye was planning to look after the refugees in the camps. Nevertheless, the number of refugees was more than tenfold in 2013, with more than 200 thousand registered Syrian refugees who are under temporary protection. It soon became apparent that it was impossible to host all Syrian refugees in the camps. Then, Syrians in Türkiye mainly migrated to the southern regions of Türkiye as can be seen in Figure 6. The number of registered Syrians in Türkiye exceeded 1.5 million in 2014 and 3.5 million in 2018 according to Figure 6. After the influx, Türkiye became the country with the largest refugee population in the world.

Syrian refugees demanded food, housing, health services, public transportation, and jobs to cover their expenses. Turkish and Syrian cultures have similarities, yet the languages were quite different. This came as a barrier for Syrian refugees who desire to work in Türkiye after fleeing from Syria. The doctors would not be employed as doctors in Türkiye. Engineers would have a difficult time finding a job related to their profession. Regardless of their backgrounds, refugees were

all potential low-skilled workers if they intend to join the labor market. This made their effect on the labor market even more significant as the migration was clearly a low-skilled labor shock.

Figure 6: The Number of Syrians Under Temporary Protection in Türkiye



Source: Presidency of Migration Management, Distributions of Syrians Under Temporary Protection by Year, Retrieved on May 2, 2023 from <https://en.goc.gov.tr/temporary-protection27>

There are many distinctive features of Syrian migration toward Türkiye. First of all, the migration was involuntary. Syrians were displaced after the war, and many of them lost their families, wealth, and socioeconomic status due to the conflict. This caused a very disadvantageous group to demand food, housing, health services, and jobs in a different country. As a result of the forced migration, Syrians stay in overcrowded houses to pay their rent and other expenses (Şimşek, 2018). Women are also suffering greatly from the accommodation problem, as 36% of the women describe their houses as bad or very bad to live in (UN, 2018).

Secondly, Syrians migrated to Türkiye in great numbers in a relatively short time. Their numbers exceeded 1.5 million only in the first three years. Hence, it was more difficult for Turkish authorities to help the integration of the Syrians and fulfill their basic needs. The same is true for the supply of goods and services. This

aspect of the Syrian migration explains why I expect a greater effect on the Turkish housing market in the short run.

In addition, the geographic distribution of the Syrian refugees is not homogenous across Türkiye. In the first years of the migration, Syrian refugees were highly concentrated in the southeastern part of the country, where the Turkish-Syrian border is located. Other parts of Türkiye have much lower shares of refugees, even after Syrians had the opportunity to move across the country. This uneven distribution of the Syrians enables us to construct quasi-experimental designs to evaluate the impact of migration on housing market outcomes since the decision to migrate and the location choice of the refugees were exogenous in the first two years (Tumen, 2016). Regions with high refugee populations can be compared with regions with few refugees using the difference-in-differences methodology. However, after Syrians self-selected the regions to migrate, this quasi-experimental design suffered from endogeneity. I explained this potential endogeneity problem and how to overcome this problem in the next chapter.

Lastly, the mass migration of Syrian refugees transformed public policy in Türkiye. Laws and regulations were developed by Turkish authorities in order to manage the worsening situation regarding the accommodation of refugees. In the next subsection, I explained the history of public policies related to Syrian migration.

3.2. HISTORY OF PUBLIC POLICIES IN TÜRKİYE AFTER THE SYRIAN MIGRATION

The Syrian migration forced Turkish authorities to take necessary actions on how to host Syrian refugees safely, and how to integrate them into the society. Türkiye announced many regulations regarding refugee centers and work permit for Syrian refugees.

After Türkiye announced the open-door policy for Syrians, regulations about the people in temporary protection were much needed. In 2013, “*Law on Foreigners and International Protection*” came into force. The law established The General Directorate of Migration Management under the Ministry of Interior and authorized The General Directorate of Migration Management to monitor and coordinate the implementation of policies related to migration, carry out actions related to people in temporary protection, and take the necessary actions to prevent the illegal migration (Presidency of Migration Management, 2023). This law built a fair, efficient, and modern system in line with international and European standards (İçduygu, 2015).

The period of 2011-2014 was classified as the refugee center intense period according to Özçürümez and İçduygu (2020). Türkiye focused on public policies to increase the number of refugee centers since the Syrians were expected to live the country after the end of the war.

In 2015, healthcare facilities were built for immigrants to meet their basic healthcare needs (Özçürümez and İçduygu, 2020). In 2017, one commission report of The Urbanization Council mainly focused on the impact of migration on urbanization and the integration of immigrants. These developments suggest that after 2015, Turkish authorities started to implement policies in order to integrate Syrian refugees into society. In the period 2015-2018, it was clear that refugee centers could not host millions of Syrian refugees.

In 2018, six refugee centers were shut down and residents of the refugee centers received financial support to move to the cities (Aida, 2018). In the following period, the refugee centers lost their importance and the policies about integration became more related.

3.3. DEMOGRAPHIC CHARACTERISTICS OF SYRIAN REFUGEES IN TÜRKİYE

As housing demand is a household decision, demographic factors can be decisive in identifying housing demand. In this section, I aim to explain the age, sex, and education distributions of Syrian refugees.

Table 4: Percent Distribution of Household Population by Age and Sex for Syrians and Natives

Syrian Sample (Non-camp)				Turkish Sample			
Age	Male	Female	Total	Age	Male	Female	Total
<5	18.6	17.4	18	<5	8.1	8	8
5-9	13.2	13.9	13.5	5-9	8.3	7.2	7.8
10-14	12.6	13.6	13.1	10-14	8.8	8.6	8.7
15-19	10.6	9.9	10.2	15-19	8	7.4	7.7
20-24	10.7	10.1	10.4	20-24	6.8	6.7	6.8
25-29	8.4	8.6	8.5	25-29	6.9	6.9	6.9
30-34	7.6	6.5	7.1	30-34	7	7	7
35-39	5.3	4.9	5.1	35-39	6.9	7.3	7.1
40-44	3.6	3.9	3.8	40-44	6.9	6.9	6.9
45-49	2.7	2.5	2.6	45-49	6.4	6.2	6.3
50-54	2.4	2.9	2.6	50-54	5.8	6.5	6.2
55-59	1.3	2	1.6	55-59	5.6	6	5.8
60-64	1.5	1.5	1.5	60-64	4.8	4.8	4.8
65-69	0.7	1.1	0.9	65-69	3.7	3.8	3.7
70-74	0.5	0.6	0.5	70-74	2.3	2.6	2.5
75-79	0.3	0.2	0.2	75-79	1.6	1.8	1.7
80 +	0.2	0.4	9.3	80 +	1.9	2.3	2.1

Source: Turkey Demographic and Health Survey (2018)

Table 4 presents the age and sex distributions of Syrians living outside of camps and natives. More than 54% of Syrians are under 19, while around 32% of the natives belong to this age group. This significant gap signals large Syrian families, and their housing demand should differ from that of natives. 2018 Turkey Demographic and Health Survey also reveals gender differences. According to the data, the sex ratio in the Syrian sample is 108 males per 100 females, whereas in the Turkish sample, it is 96 males per 100 females.

Table 5: Household Composition of Turkish People and Syrian Refugees in Türkiye

The Size of Household	Turkish Sample	Syrian Sample
1	8.5%	0.7%
2	23.9%	6.3%
3	22.1%	9.1%
4	22.1%	14.3%
5	12.2%	18.1%
6	6%	16.5%
7	2.4%	12.5%
8	1.2%	7.6%
9+	1.4%	14.9%

Source: Turkey Demographic and Health Survey (2018)

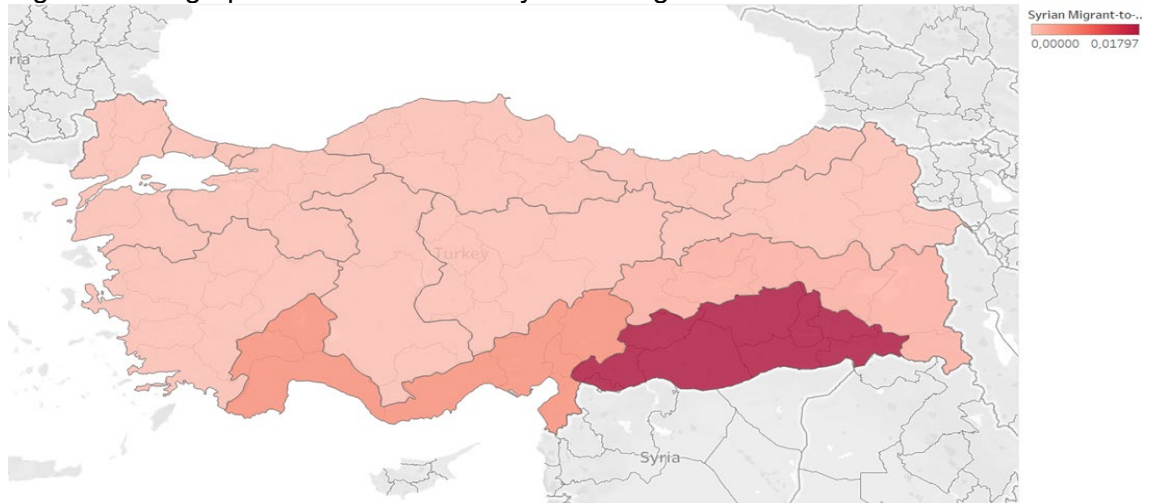
Table 5 shows the household compositions of natives and Syrian refugees. More than 51% of Syrian refugees have a family size larger than 5, while it is only about 11% for the Turkish sample. This suggests that the demand function for housing units is expected to be different for natives in Türkiye and the refugees. For instance, a native family of four and a Syrian family with nine members might demand the same housing unit.

Net attendance ratio (NAR) is defined as the percentage of the school-age population that attends primary, secondary, or high school. The NAR is calculated as 94.2% for primary and secondary schools in the Turkish sample, and it is 75.2% for primary schools among Syrians living outside of camps, according to 2018 Turkey Demographic and Health Survey.

3.4. GEOGRAPHICAL DISTRIBUTION OF SYRIAN REFUGEES

In the first years of the influx, Syrians were located in the southern part of Türkiye. Figure 7 visualizes the migrant-to-native ratio for NUTS-1 regions in 2013.

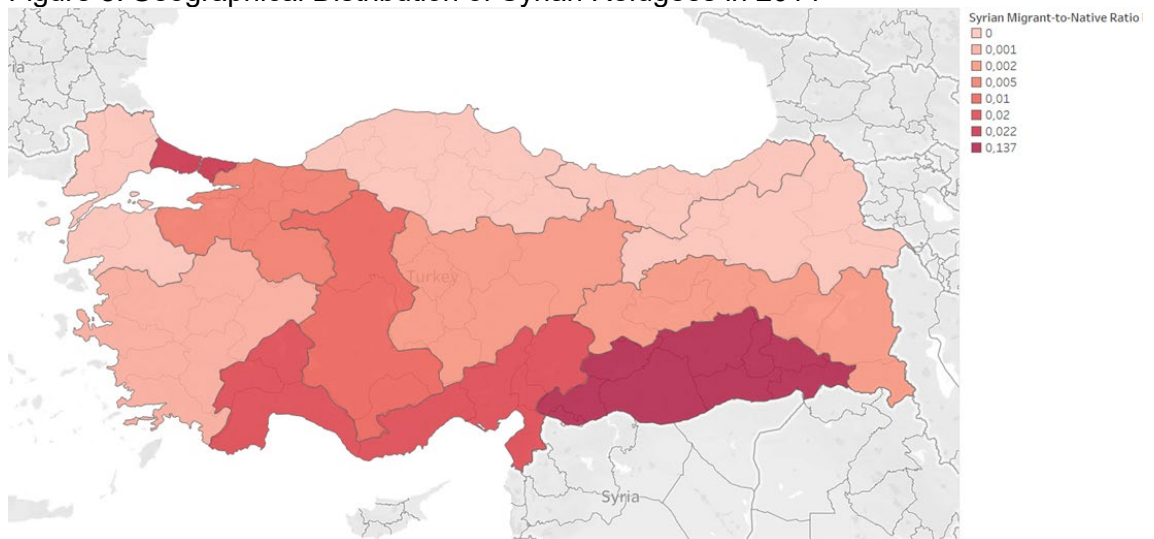
Figure 7: Geographical Distribution of Syrian Refugees in 2013



Source: Created by author using data from Turkish Disaster and Emergency Management Authority (TDEMA) and TurkStat

In 2013, Syrian refugees were settled in the refugee camps located in the southern part of Türkiye. On the other hand, most of the country remained unaffected by migration. This uneven distribution of refugees lets us apply a difference-in-differences strategy. I defined the southern regions as treatment regions and the rest of the country as control regions. However, Syrians spread across the country in the following years. Figure 8 presents the migrant-to-native ratio of NUTS-1 regions in 2014.

Figure 8: Geographical Distribution of Syrian Refugees in 2014



Source: Created by author using data from Erdoğan (2014) and Turkstat

In 2014, the Syrian population was still largely present in the southern regions. Nevertheless, it became apparent that refugee camps cannot host millions of refugees, and Syrians moved across Türkiye. There are other regions with high Syrian populations. This situation forces us to modify our difference-in-difference analysis. I can define regions with high Syrian populations as treatment regions while enabling the treatment group and intensity to vary over time.

While the treatment is an exogenous shock in the beginning, I can encounter a self-selection problem after 2014. Syrians moved to the regions considering their housing market structure. Thus, they might endogenously select their place to migrate. This potential endogeneity problem was discussed in the following chapter.

CHAPTER 4

RESEARCH METHOD

This chapter focuses on the data and methodology aspect of this research. First, the data was briefly introduced, and both dependent and independent variables were explained. Limitations of data with their potential drawbacks were discussed. The second part of this chapter begins with the identification method. Then, the relevance and the structure of difference-in-differences and instrumental variable approaches within this context were examined in detail.

4.1. DATA

Survey of Income and Living Conditions (SILC) micro-level data sets for the 2009-2019 period provided by the Turkish Statistical Institute (TURKSTAT) are used for our estimations. SILC data reveals a variety of household characteristics, demographic characteristics, and detailed information about income. It does not offer information about Syrian refugees by design, the survey is conducted on registered households in Türkiye, but inferences about the impact of Syrian refugees are possible when I consider the number of refugees across regions in our estimate.

The nature of the data is pooled cross-sectional, a combination of annual cross-section data. The country-level data is available across 26 NUTS-2 regions since 2013. However, to analyze the impact of migration I need data on the pre-migration period, before 2012, which does not exist. This unavailability of data makes the difference in differences analysis impossible across NUTS-2 regions, thus NUTS-1 regions were considered for the identification.

NUTS refers to “nomenclature of territorial units for statistics”, and it is a regional classification for data. NUTS-1 consists of 12 geographical regions that allow researchers to compare and analyze the regional statistics. The method of

utilizing NUTS-1 regions to identify treatment and control areas, along with its limitations, is also discussed in this chapter.

The number of Syrian refugees in Türkiye for 2013 is retrieved from the report by Turkish Disaster and Emergency Management Authority (TDEMA). In 2013, a big share of refugees was residing in the camps. The data for the number of Syrian refugees in 2014 was provided by Erdoğan (2014). The data for the following years was taken from the Ministry of Interior.

The period of the analysis was carefully chosen as 2009-2019. There are two reasons for choosing this period. Firstly, there was The Great Recession right before 2009, and the Covid-19 pandemic outbreak in 2020. These two events add more structural breaks to the model, making it more difficult to estimate. Thus, it is best to avoid these years in our analysis. Secondly, the period 2009-2019 enables us to utilize enough information about both the pre-migration period and the post-migration period.

The dependent variables, independent variables, and their summary statistics are presented in this section. The overview of the data helps us understand the identification method which is included in the second part of this chapter.

4.1.1. Dependent Variables

The literature on the effect of international migration on the housing market mainly focuses on the change in house prices or rents. This study aims to calculate the effect of international migration on house rents. Thus, the monthly rent variable is the core dependent variable in our analysis. The variable does not include any payment the renter made during their contract apart from the actual rent. The change in rent should be analyzed in the short run and the long run separately. The effect could be large in the short run but might shade away over time since the annual migration inflow decreased in our case. The rent is available for each household unless they do not pay any rent.

Another dependent variable of concern is perceived rents. This variable is a representative rent for the houses in which the homeowner resides, or in which the residents do not pay any rent due to their relationship to the owner. The perceived rent might affect the homeowner's decision to reside in the house in the near future. The perceived rent is given for each household if the household does not pay any rent. Both the rent variable and perceived rents variable were used by Balkan et al. (2018) in their analysis.

It should be noted that rents and perceived rents are from different samples. The rent is only available if the household pays any rent. If the household does not pay any rent for any reason, perceived rent is retrieved based on the household's declaration. Table 6 shows the list of the dependent variables with their corresponding descriptions.

Table 6: List of Dependent Variables

<i>List of Dependent Variables</i>	<i>Definitions</i>
Rents	Actual rents of the housing units collected by the renters
Perceived Rents	The estimated rents that are given by the house owners, or the residents who are not obliged to pay rents
Housing Quality Index (HQI)	An index that is composed of the housing characteristics of natives

4.1.1.1. The Construction of the Housing Quality Index (HQI)

The information about the housing characteristics in the SILC micro-level data was combined using the Principal Component Analysis (PCA) method in an attempt to construct an index variable to be used as the last dependent variable of the model. The purpose of this index is to analyze how the housing characteristics of natives changed after mass immigration. I also used the index

variable to find the heterogenous effects across the quality of the housing units if there were any.

Eight variables defining the housing characteristics of the natives are represented in Table 7. I transformed the SILC variables in order to make them suitable for the Principal Component Analysis (PCA). The main purpose of this analysis is to dimension reduction. In other words, I aim at combining all the information in these variables into a single variable. Following the methodology explained by Hair et al. (2013), I constructed an index variable. When I calculated the Kaiser-Meyer-Olkin measure of sampling adequacy, I found that the sampling adequacy is larger than 0.5 for all variables. Hair et al. (2013) suggest that the communality of each variable should be greater than 0.5. I calculated the communality of each variable and eliminated the one with the lowest communality which is less than 0.5. I repeated the factor analysis until all variables have the communalities that are greater than 0.5.

Table 7: The Initial Components of The Housing Quality Index (HQI)

<i>List of</i>	
<i>Components</i>	<i>Definitions</i>
Shower	1 if there is a shower inside the building, 0 otherwise
Toilet	1 if there is a toilet inside the building, 0 otherwise
Kitchen	1 if there is an independent kitchen inside the building, 0 otherwise
Water	1 if there is pipe water inside the building, 0 otherwise
Hot Water	1 if there is hot water inside the building, 0 otherwise
Leaking Roof	1 if there is no leaking roof problem, 0 otherwise
Adequate	
Heating	1 if there is no heating problem, 0 otherwise
Brightness	1 if there is no problem in terms of darkness, 0 otherwise

Table 8: The Final Components of The Housing Quality Index (HQI)

<i>List of</i>	
<i>Components</i>	<i>Definitions</i>
Shower	1 if there is a shower inside the building, 0 otherwise
Toilet	1 if there is a toilet inside the building, 0 otherwise
Leaking Roof	1 if there is no leaking roof problem, 0 otherwise
Adequate	
Heating	1 if there is no heating problem, 0 otherwise

After eliminating the variables which have the lowest explanatory power, I used four variables to construct the House Quality Index as shown in Table 8. Then, I calculated the eigenvalues of the components which are presented in Table 9. Only the first two components have eigenvalues larger than one. This suggests that I should only use the first two components to construct the House Quality Index. There are many ways to include more than one component in the analysis. After using the varimax rotation, I followed the weighted sum squares method suggested by DiStefano et al. (2009). According to this method, each item is multiplied by its loading value, and the sum of these weighted scores is retrieved as the final score of the House Quality Index. Lastly, I defined the observations that are in the lowest 8.24% as low-quality houses while defining the ones in the highest 12.27% as high-quality houses.

Table 9: Total Variance Explained for the Final PCA

<i>Component</i>	<i>Eigenvalue</i>	<i>Difference</i>	<i>Proportion</i>	<i>Cumulative</i>
Comp1	1.8157	0.556485	0.4539	0.4539
Comp2	1.25921	0.765714	0.3148	0.7687
Comp3	0.4935	0.0619133	0.1234	0.8921
Comp4	0.431587	.	0.1079	1

4.1.2. Independent Variables

The set of independent variables is presented in this section. There are two different types of independent variables that are used in this research. The first one is the Syrian migrant-to-native ratio, the endogenous variable that requires

specific approaches to deal with. This variable is our critical independent variable as it identifies the treatment and control regions that enable us to perform a difference-in-differences strategy. The same variable used in the literature by Akgündüz et al. (2023) and Aksu et al. (2022).

The second group of independent variables in this research is the control variables. The set of housing characteristics including the natural logarithm of the size of the house and the number of rooms along with the regional control variables such as the natural logarithm of regional GDP per capita and both region-fixed and year-fixed effects are in this group of independent variables.

The Syrian migrant-to-native ratio was calculated by dividing the official number of annual Syrian migrants in the region, which was provided by The Ministry of Interior, by the total native population in the region given by Turkish Statistical Institute (TURKSTAT). Even though the official number of migrants is available at the city level, the data were aggregated into 12 NUTS-1 regions since the SILC micro-level data is only available at the NUTS-1 level during the period of concern. Therefore, this variable is calculated for each of the 12 NUTS-1 regions annually.

The Syrian migrant-to-native ratio is the critical independent variable that aims at identifying the magnitude of the effect on rents. It takes a value between 0 and 1 and implicitly identifies the treatment and control groups as the regions with high migrant-to-native ratios are treated as the treatment group while the regions with a migrant-to-native ratio close to zero are treated as the control group. These concepts were discussed in more detail in the identification method of this study.

Although the Syrian migrant-to-native ratio could be seen as a perfect fit for our purpose of analyzing the effect of migration on house rents, the variable itself is endogenous by nature. The endogeneity problem with its potential solution is explained in the identification method section.

The control variables include the logarithm of the size of the dwellings in square meters and the number of rooms. This information is also available at the household level. These variables allow for controlling house characteristics. Region-specific control variables were also needed as they can capture regional dynamics in the housing market. For this purpose, the logarithm of GDP per capita was added for 12 regions.

Migration cannot be thought of separately from the culture it carries. The majority of Syrian refugees are Arabic, and it is widely accepted in the migration literature that people tend to migrate to places that have more people speaking their language. Since the regions with high ratios of Arabic-speaking populations were expected to receive more Syrian refugee influx, including the share of the Arabic-speaking population allows us to control for factors and policies that are specific to the regions with high refugee rates. The share of the Arabic-speaking population was obtained from the 1965 Türkiye census in which participants were asked to specify their mother language. The data was available for all cities in Türkiye, and it was converted into the NUTS-1 regions for the purpose of our study. The same variable was aggregated and used by Tumen (2019) for his analysis of the effect of migration on the native's education. Table 10 presents a list of the independent variables matched with their descriptions.

Table 10: List of Independent Variables

<i>List of Independent Variables</i>	<i>Definitions</i>
Syrian Migrant-To-Native Ratio	The total number of Syrian refugees divided by the total population of the region
Number of Rooms	The total number of rooms in the housing units except for kitchen, bathroom, and toilet
The Size of the Dwellings	The size of the dwellings in square meters
GDP Per Capita	Regional Gross Domestic Product per capita in US dollars (in 2009 prices)
The Share of Arabic-Speaking Population	The number of Arabic speaking population in 1965 divided by the total population

4.1.3. Limitations of the Study

The Survey of Income and Living Conditions (SILC) data are comprehensive. However, the regional classification of the data is not perfectly suitable for the design of this study. The city-level data are much more appreciated as even the cities close to each other may have different pre-migration dynamics and their Syrian migrants-to-natives ratios might be slightly different. Unfortunately, city-level data are not available, and the NUTS-2 regions are only available since 2013. This gives us no choice but to apply the analysis at the NUTS-1 level.

The Syrian migrants-to-natives ratio is our key independent variable identifying the treatment and control groups. The non-availability of city-level data makes it harder to emphasize the cities with the highest ratios of Syrian migrants. For example, the Syrian migrants-to-natives ratio for Kilis is close to 0.95 in 2015. The city belongs to the Southern Anatolian Region which has a Syrian migrants-to-natives ratio of 0.12 in the same year. Nevertheless, the aim of identifying the treatment regions with the control group is achieved considering the ratio is close to zero in most regions.

Even though the data on the number of Syrian refugees is available at the city level, it should be noted that our data are limited to the registered Syrian refugees. It might be perfectly possible that the real number of Syrian migrants in Türkiye is much higher than I anticipate. However, the ratio of Syrian migrants is expected to be close to our calculations.

Our analysis concerns the effect of migration on the housing market from a regional perspective. In order to conduct a more detailed analysis, data at the neighborhood level is needed. It might be true that some neighborhoods are affected more than others within the same city.

Apart from the data limitations, it should be mentioned that the difference-in-differences method is only viable when the assumptions are satisfied. I used the

relevant control variables, two-way fixed effects (TWFE), and the instrumental variable approach to satisfy the relevant assumptions.

4.1.4. Summary Statistics

Table 11 presents the summary statistics for the variables which are used in the analysis.

Table 11: Summary Statistics

Variable	Mean	sd	N
Rent	471.1	393.1	51731
Perceived Rent	3975	2952.7	165783
HQI	-0.041	1.09	216,267
Syrian Migrant-to-Native Ratio	0.02	0.03	216,267
Number of Rooms	3.47	0.85	216,267
Size of the Dwellings	105.85	34	216,267
The Share of Arabic-Speaking Population	0.013	0.02	216,267

Table 12 presents the number of observations in the SILC data by NUTS-1 regions for the period 2009-2019 in Türkiye. The weight variable provided by TURKSTAT was used in the analysis.

Table 12: The Number of Observations by NUTS-1 Regions

<i>NUTS-1 Regions</i>	<i>Number of Observations</i>
TR1 İstanbul Region	21,182
TR2 West Marmara Region	14,514
TR3 Aegean Region	30,302
TR4 East Marmara Region	19,000
TR5 West Anatolia Region	19,333
TR6 Mediterranean Region	25,477
TR7 Central Anatolia Region	14,322
TR8 West Black Sea Region	19,484
TR9 East Black Sea Region	7,600
TRA Northeast Anatolia Region	12,500
TRB Central East Anatolia Region	13,518
TRC Southeast Anatolia Region	19,035

4.2. METHODOLOGY

This section focuses on the identification method and the methodology behind our econometric analysis. The difference-in-differences method forms the basis of our analysis. The method allows calculating the additional increase in rents for regions with a high rate of Syrian migration compared to those in the control regions. The main assumptions of this model are mentioned with an emphasis on the parallel trend assumption. The method is not complete, however, without addressing the exogeneity. The exogenous nature of the Syrian migration toward Türkiye and how the instrumental variable method solves this problem is discussed in this section. The chapter ends with the description of the instrumental variable and a discussion about its validity.

4.2.1. Identification Method

The unexpected nature of the Syrian refugee flow toward Türkiye was covered in the previous chapters and it was mentioned that the Syrian migration was not homogeneous within the country. Regions close to the southern border were affected more by migration. This situation makes Türkiye's case a perfect example of a quasi-experiment. It can also be called a natural experiment, as the researcher does not have any control over the treatment. The benefit of the natural experiment is to enable us to differentiate the previous trends in rents with the treatment effect, which is the Syrian migration flow in our case. A difference-in-differences analysis identifying the regions with high ratios of Syrian migrants-to-natives as the treatment group serves our purpose. After introducing the baseline model with its assumptions, the necessity of an instrumental variable was discussed.

4.2.1.1. Difference-in-Differences

The baseline difference-in-differences estimation is as follows:

$$\ln(y_{ijt}) = \alpha + \beta(R_{jt}) + \tau X_{ijt} + \gamma Z_{jt} + \varphi A_j + \delta_j + \delta_t + u_{ijt} \quad (10)$$

In the estimation, y_{ijt} denotes the house market outcome for household i in region j at time t . R_{jt} is defined as the ratio of immigrants to natives in region j at time t . The key parameter of interest is β , which measures the impact of migration on the housing market. X is a vector consisting of household characteristics (number of rooms and size of dwellings) which allows us to control for the quality of the house. Z_{jt} is the logarithm of the regional gross domestic product (GDP) per capita for region j at time t . A_j is the share of Arabic speaking population in 1965 according to the census. δ_j is the region fixed effects, and δ_t is year fixed effects where u_{ijt} is the error term. I adopted the baseline equation from Aksu et al. (2022), and it provides a difference-in-differences estimation across 12 NUTS-1 regions with control variables related to house characteristics, regional macroeconomic indicators, and the share of Arabic speaking population in 1965. Finally, the weight variable of SILC data is applied in the estimation.

The power of the difference-in-differences method relies on the common-trend assumption, and relevant control variables are used to satisfy this assumption. Another important assumption is the exogeneity of the treatment. The policy, or in our case the demand shock, must be exogenous for the difference-in-differences methodology to perform well. It was discussed in the next section that the treatment is not exogenous, and the instrumental variable approach must be followed.

4.2.1.1.1. Parallel Trend Assumption

The difference in differences methodology relies on the parallel trend assumption, also referred to as common trend assumption. This assumption assumes common trends for the treatment and control groups for the pre-treatment period. The assumption is formulated as follows¹:

$$E(Y_1^0|X = x, D = 1) - E(Y_0^0|X = x, D = 1) \quad (11)$$

$$= E(Y_1^0|X = x, D = 0) - E(Y_0^0|X = x, D = 0) \quad (12)$$

$$= E(Y_1^0|X = x) - E(Y_0^0|X = x); \quad \forall x \in \mathcal{X}. \quad (13)$$

In a simple difference in differences model where the control group is defined by $D = 0$ and the treatment group are defined by $D = 1$, if the treatment group had not been subject to the treatment, both the treatment group and control group would have followed the same trend conditional on X (Letcher, 2010). The assumption forces researchers to use relevant control variables since the same trend might only be viable after controlling for these variables.

4.2.1.1.2. Instrumental Variable

The second assumption of the difference in differences model is the exogeneity of the treatment. In this subsection, I explained why the migration might be endogenous and how I dealt with this problem.

The Syrian refugee influx can be argued as an exogenous shock for the housing market in Türkiye. The mass migration was rapid and unexpected. Refugees increased the demand for housing in specific regions, while it cannot be met by a sudden supply change. However, Syrian refugees did not choose the region they were migrating to in Türkiye randomly. In fact, it is perfectly possible that pre-migration house market conditions might be a key determinant for settlement.

¹ The equation is adapted from Lechner (2010).

For this particular reason, an instrumental variable that is related to the refugee ratio of the regions but independent of the residuals of the structural equation must be introduced.

Distance is one of the key factors when it comes to settlement decisions for refugees. Syrians fled from war and initially settled in the southern regions of Türkiye as they were the closest to Syria. Thus, the camps were built close to the Türkiye-Syria border, and foreign aid was focused on southern Türkiye. Moreover, investments in public and private sectors were made in this region as a result of the refugee influx. It can be argued that the increase in government expenditure in the southern region might attract more refugees and affect the housing market. These reasons indicate that distance should be a viable instrumental variable as it is both exogenous and related in this context.

Del Carpio and Wagner (2015) introduced an instrumental variable using pre-war population shares of Syrian provinces and Google Maps to calculate the travel distance between 13 Syrian governorates and 26 NUTS-2 regions in Türkiye. An instrumental variable with a similar approach was defined by Aksu et al. (2022) with a slight difference in that instead of using the distance only between Türkiye and Syria, they also calculated the distances between Syria and Lebanon, Jordan and Iraq. They suggested using such an instrument is more relevant since Türkiye is not the only neighbor of Syria (Aksu et al., 2022).

The instrumental variable introduced by Aksu et al. (2022), for NUTS-1 regions was used for our analysis.² It is defined as follows:

$$I_{n,t} = \sum_{s=1}^{13} \frac{\left(\frac{1}{d_{s,T}}\right) \pi_s}{\left(\frac{1}{d_{s,T}} + \frac{1}{d_{s,L}} + \frac{1}{d_{s,J}} + \frac{1}{d_{s,I}}\right)} \frac{T_t}{d_{n,s}} \quad (14)$$

² Even though the results of our analysis using the instrumental variable suggested by Aksu et al. (2022) were reported in the following sections, the instrumental variable defined by Del Carpio and Wagner (2015) was also calculated, and the results are presented in the appendix.

where n indicates NUTS-1 regions, $d_{s,X}$ for $X = T, L, J, I$ is the minimum travel distance between the Syrian province s and the closest entry point in the borders of Türkiye, Lebanon, Jordan, and Iraq, respectively. π_s stands for the pre-war population shares of Syrian provinces, T_t is the total number of Syrian refugees in four neighbor countries in year t , which is roughly equal to the total number of Syrian refugees in the world given that the Syrian refugee population in other countries is not significant. Lastly, $d_{n,s}$ defines the travel distance between Syrian province s and NUTS-1 region n in Türkiye. The instrumental variable, which is similar to the gravity model used in international trade literature, is expected to solve the potential endogeneity problem that would occur in our simple difference-in-difference analysis.

There are two main requirements for the instrumental variable approach to be viable. The first assumption is that the instrumental variable has a causal effect on the endogenous variable. The second assumption is that the instrumental variable affects the outcome variable only through the endogenous variable. This is also referred to as the exclusion assumption. It means that the instrumental variable must be uncorrelated with the residuals in the structural equation. These assumptions can be formulated as follows:

$$Y_i = \alpha + \delta S_i + \varepsilon_i \quad (15)$$

$$S_i = \gamma + \beta Z_i + \epsilon_i \quad (16)$$

where $Cov(Z, S) \neq 0$ and $Cov(Z, \varepsilon) = 0$.

There are two main advantages of this difference-in-differences specification when compared to Balkan et al. (2018). The first advantage is that the treatment and control groups were not identified with the dummy variables, but the treatment intensity (migrant-to-native ratio) was used. The treatment intensity would be better at identifying the effect of the treatment since the treatment is not homogenous. The impact of the migrant-to-native ratio calculates the effect of one percent immigration flow on the outcome variable. The second advantage is

that a distance-based instrumental variable aims at solving the potential endogeneity problem which enables us to perform a long-run analysis.

After setting our diff-in-diff IV approach, the first analysis is the short-run effect of refugees on house rents. The change in perceived rents after the migration is also an issue to address which concerns house owners. The change in the Housing Quality Index (HQI) is analyzed to understand if the natives' housing quality was affected by immigration. I also analyzed the quality of houses to identify if the rents for high-quality houses were affected more by immigration than low-quality houses, or vice versa. The heterogeneity analysis is completed after considering the education level of the household head and the development level of the hosting region. Lastly, the long-run impact was compared with the findings of the short-run analysis.

CHAPTER 5

EMPIRICAL RESULTS

Regression analyses are conducted using the SILC micro-level data in the period 2009 and 2019. The main critical dependent variable is household rent. Perceived rents and the Housing Quality Index (HQI) were also used in the analysis as explained in the research method section. First, I analyzed the impact of immigration on these dependent variables in the short run. I also analyzed the heterogeneous effects across the quality of the houses and the education level of the household head. Then, I checked if the impact of immigration changes according to the development level of the region. Finally, I repeated the analysis for the long run.

The Syrian refugee inflow toward Türkiye started in 2011 with a small number of refugees. In 2013, the migrant-to-native ratio in the Southeastern Anatolia Region exceeded 1%, becoming the first treated region. In 2014, the number of refugees had increased more than five times compared to the previous year, the migrant-to-native ratio was as high as 13.7% in Southeastern Türkiye. Also, Syrians moved to different parts of the country after 2014, causing an endogeneity in our research design, as it was illustrated in Figure 3.3. Thus, it is plausible to conduct a short-run analysis to evaluate the impact of migration on rents for the period 2009-2014 and a long-run analysis for the period of 2009-2019.

5.1. THE SHORT-RUN IMPACT OF SYRIAN REFUGEES ON THE HOUSING OUTCOMES

Türkiye faced exceptional mass immigration which is concentrated in mainly one part of the country in the beginning. The refugees were initially planned to stay in the camps located near the southern border. However, they traveled across the country as Türkiye pursued an open-door policy. The rapid increase in the number of refugees in 2014 was replaced by a steady inflow of refugees in the

following years. Therefore, it can be argued that the impact is larger in the short run and the effect slowly diminishes in the long run. To test this hypothesis, the short-run impact was evaluated for the period 2009-2014 using the difference-in-differences methodology with the implementation of the relevant instrumental variable which was discussed in the previous section.

5.1.1. Housing Market Outcomes

Before examining the effects of migration, the relevance assumption of the instrumental variable should be tested.

In order to test the relevance assumption of the instrumental variable, I can simply regress our endogenous variable R on the instrumental variable with the inclusion of the control variables.

Table 13: The Test of the Relevance Assumption

	Coefficient	Std. Err.	t	P>t	F(26, 216239)	Number of Observations
IV	0.0000115	0.0000000325	355.19	0	34611.52	216,266

In Table 13, a highly significant instrumental variable with a large F statistic indicates the instrumental variable is related to our treatment.

Table 14 and Table 15 present the short-run effects of migration on the dependent variables. 2SLS regressions are based on the instrumental variable developed by Aksu et al. (2022). When employing the instrumental variable defined by Del Carpio and Wagner (2015), our findings align consistently with previous results. These results are presented in Appendix 1.

Table 14: Estimation Results: Short-Run Effects of Migrant-to-Native Ratio on Rent Variables

<i>Dependent Variable</i>	(1)	(2)	(3)	(4)	(5)
Log. of Rents	2.264*** (0.224) [0.00]	3.021*** (0.176) [0.00]	0.674*** (0.207) [0.00]	1.192*** (0.233) [0.00]	1.583*** (0.280) [0.00]
N	22083	22083	22083	22083	22083
Log. of Perceived Rents	0.801*** (0.103) [0.00]	1.667*** (0.0848) [0.00]	0.503*** (0.104) [0.00]	1.436*** (0.118) [0.00]	1.823*** (0.134) [0.00]
N	77098	77098	77098	77098	77098
Controls for					
Housing Characteristics	No	Yes	Yes	Yes	No
Time Variant/Invariant Control Variables	No	Yes	Yes	Yes	Yes
Region Fixed Effects	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	Yes	Yes	Yes
Instrumental Variable	No	No	No	Yes	Yes

Notes: Table 14 presents the estimated coefficients for different specifications for the period 2009-2014. Robust standard errors are given in parenthesis while p values are given in square brackets. Time variant control variables are the logarithm of the size of the dwellings, the number of rooms, the logarithm of regional GDP per capita, and the time-invariant control variable is the share of the Arabic-speaking population in 1965. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$ denote significance levels at 1%, 5%, and 10%, respectively.

Regression (1) is a simple regression model with two variables, the natural logarithm of rents and the migrant-to-native ratios. Without any control variables, this model yields a 2.26% increase in rents as a result of a 1% increase in migration inflow. Although the beta coefficient is significant, the regression is clearly biased due to the omitted variable case. Regression (2) has time-variant control variables including house characteristics, the logarithm of regional GDP per capita, and a time-invariant variable which is the share of the Arabic-speaking population across NUTS-1 regions in 1965. Regression (3) has both control variables and two-way fixed effects (TWFE). The impact of migration is reduced to 0.67% for a 1% increase in migrant to native ratio. This model still suffers from endogeneity, as Syrians might make decisions about their migration destination

considering the housing market dynamics I discussed in the previous chapter. Finally, our suggested model (4) has all control variables, regional and time-fixed effects, and an instrumental variable to overcome the endogeneity problem that was discussed previously. While the previous models were estimated using the ordinary least squares (OLS) method, the suggested model (4) was estimated by two-stage least squares (2SLS). This model suggests that a 1% increase in migration to native ratio causes a 1.43% additional increase in rents. Model (5) has the same methodology as model (4) with the only exception that it does not control for housing characteristics. The housing characteristics might be endogenous, especially in the long run as the housing supply is expected to adjust to the changes after immigration. Therefore, I report the results both when I control for housing characteristics and when I do not. The model (5) reports a 1.58% increase when the migrant-to-native ratio increased by 1%.

The short-run analysis of the perceived rents, which are the estimated rents given by the homeowners or residents who do not pay any rent, concludes that they were increased by 1.43% for a 1% increase in the migrant-to-native ratio if I include housing characteristics in the model, and they were increased by 1.82% without controlling for housing characteristics. It is important to remember that perceived rents are from a different sample than the actual rents. They only represent the opinions of the homeowners and residents who do not pay any rent. While it is not surprising that the impact of immigration on perceived rents is also significant, it should be noted that the impact on perceived rents is larger than housing rents. This result contributes to the literature in two ways. Firstly, the result is robust even when clustering the standard errors at the year-region level despite the fact that Balkan et al. (2018) found no significant impact of immigration on perceived rents when they analyzed the period 2010-2013. Comparing these two results, it can be argued that homeowners started to realize the changes in the housing market after mass immigration. Secondly, the increase in the perceived rates is higher than the housing rents proving the misperception of the homeowners about their housing units. The mass migration

convinced the homeowners that the rental value of their housing units was much higher than their market value, at least in the short run.

Table 15: Estimation Results: Short-Run Effects of Migrant-to-Native Ratio on Housing Quality Index (HQI)

<i>Dependent Variable</i>	(1)	(2)	(3)	(4)
The Housing Quality Index (HQI)	-3.56*** (0.277) [0.00]	-1.801*** (0.361) [0.00]	-1.161** (0.497) [0.01]	0.144 (0.544) [0.79]
N	99202	99202	99202	99202
Controls for				
Time Variant/Invariant Control Variables	No	Yes	Yes	Yes
Region Fixed Effects	No	No	Yes	Yes
Year Fixed Effects	No	No	Yes	Yes
Instrumental Variable	No	No	No	Yes

Notes: Table 15 presents the estimated coefficients for different specifications for the period 2009-2014. Robust standard errors are given in parenthesis while p values are given in square brackets. Time variant control variables are the logarithm of regional GDP per capita, and the time-invariant control variable is the share of the Arabic-speaking population in 1965. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$ denote significance levels at 1%, 5%, and 10%, respectively.

When the Housing Quality Index (HQI) is treated as a dependent variable in the difference-in-differences model including the regional and year-fixed effects and the instrumental variable, it can be seen that the housing characteristics of the natives did not decrease due to the migration in the short-run. Our final model suggests that the housing conditions of the natives remain unaffected by migration.

5.1.2. Heterogenous Effects Across Housing Quality and Household Head's Education

Different groups might be affected differently by immigration because of the nature of the migration. Syrian migration, as explained in the previous chapters, involves low-skilled, involuntary migration that has occurred on an enormous scale. Thus, heterogeneous effects must be analyzed. Using the Housing Quality Index (HQI), high-quality and low-quality houses were compared in Table 16. It

is expected that low-quality houses were affected more by immigration as the Syrian refugees mostly belong to the low-educated group.

Table 16: Heterogeneous Effects of Migrant-to-Native Ratio on Rents across Housing Quality in the Short Run

<i>Dependent Variable</i>	<i>Low-Quality Houses</i>	<i>High-Quality Houses</i>
Log. of Rents	0.772 (1.21) [0.52]	1.775*** (0.4) [0.00]
Log. of Perceived Rents	0.9*** (0.17) [0.00]	1.911*** (0.22) [0.00]
Controls for		
Time Variant/Invariant Control Variables	Yes	Yes
Region Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Instrumental Variable	Yes	Yes

Notes: Low-quality houses and high-quality houses were determined by HQI. Robust standard errors are given in parenthesis while p values are given in square brackets. Time variant control variables are the logarithm of regional GDP per capita, and the time-invariant control variable is the share of the Arabic-speaking population in 1965. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$ denote significance levels at 1%, 5%, and 10%, respectively.

Interestingly, the difference in differences estimates with the instrumental variable indicated that high-quality houses are more affected by the immigrant shock. The impact on low-quality houses is insignificant. These findings are aligned with Balkan et al. (2018). They explained these unexpected results with segregation. According to Balkan et al. (2018), mass migration pushed natives to move the neighborhoods with fewer refugees. Thus, the migration increased the demand for high-quality houses for natives as refugees are demanding lower-quality units. Even though it is a possible mechanism, there could be another explanation. SILC data provides a variety of housing quality indicators such as adequate heating, darkness, and whether it has a leaking roof. These parameters might separate low-quality houses from others, but they are not enough to identify high-quality houses as most houses today already fulfill these criteria. In other words,

the high-quality houses I analyzed might be mostly regular houses with no visible problems.

The impact on rents might differ for different education levels as the education levels are used as a proxy for income (Balkan, 2018) Thus, it is useful to check for heterogeneous effects across education levels in order to understand which groups are affected more by immigration is given in Table 17.

Table 17: Heterogeneous Effects of Migrant-to-Native Ratio on Rents across Education Levels of Household Heads in the Short Run

<i>Dependent Variable</i>	<i>Lower Education</i>		<i>Higher Education</i>	
	(1)	(2)	(3)	(4)
Log. of Rents	1.36**** (0.248) [0.00]	1.75*** (0.311) [0.00]	0.952 (0.54) [0.07]	1.27** (0.55) [0.02]
N	15037	15037	7046	7046
Controls for				
Housing Characteristics	Yes	No	Yes	No
Time Variant/Invariant Control Variables	Yes	Yes	Yes	Yes
Region Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Instrumental Variable	Yes	Yes	Yes	Yes

Notes: Lower education level includes only the households where the household head has less than a high school degree. Higher education level includes only the households where the household head has at least a high school degree. Robust standard errors are given in parenthesis while p values are given in square brackets. Housing characteristics are the logarithm of the size of the dwellings and the number of rooms. Time-variant control variable is the logarithm of regional GDP per capita, and the time-invariant control variable is the share of the Arabic-speaking population in 1965. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$ denote significance levels at 1%, 5%, and 10%, respectively.

The suggested model with the control variables, two-way fixed effects, and a distance-based instrumental variable found no evidence of the impact of immigration on the rents for household heads with higher education when I control for the housing characteristics. The exclusion of the housing characteristics yields a significant result, but it might suffer from the omitted variable bias. On the other hand, the impact is significant for the low-education group. The sample composed of household heads with less than a high school

degree yielded a significant impact. These findings are in line with Balkan et al. (2018) even though the model specifications are different. This evidence suggests that the effect of immigration on the housing market is not homogenous. In fact, families with low education levels i.e., low-income families were affected worse by immigration. Even though this result is unexpected as I saw a significant increase in rent for high-quality houses, the segregation theory might have an explanation. If a large number of Syrians were to move into low-quality houses, it could potentially lead to an increased demand for high-quality houses among the native population. This preference might arise from natives seeking neighborhoods with lower refugee density. This mechanism could explain why the migration affects low-educated natives, even though the rent for low-quality houses did not see a significant increase in the short-run.

5.1.3. Development Levels of Regions

Aracı et al. (2022) found the impact of immigration on the labor market is smaller for more developed regions of Türkiye. Following the same methodology, the answer to another research question which was how the development of the region contributes to the effect of immigration on the rental market could be found. In other words, are less developed regions more sensitive to immigration? To answer this question, I included the development index provided by Turkish Ministry of Development in our analysis. Data from 2011 was used since mass migration might have affected the development level (Aracı et al., 2022). If I were to use a more recent development index, I would encounter an endogeneity problem that I cannot account for. Therefore, it is best to use the development index before the migration. Table 18 presents the development index for NUTS-1 regions.

Table 18: NUTS-1 Regions with Development Index in 2011

NUTS-1 Region	Major City	Development Index
TRA	Erzurum	-0.375
TRB	Van	-1.493
TRC	Gaziantep	-0.055
TR1	İstanbul	4.515
TR2	Balıkesir	0.513
TR3	İzmir	1.972
TR4	Bursa	1.267
TR5	Ankara	2.838
TR6	Antalya	1.231
TR7	Kayseri	0.113
TR8	Samsun	0
TR9	Trabzon	-0.076

The index was calculated with the Principal Component Analysis (PCA) and can take both negative and positive values. The development index was included in our estimation as follows³:

$$\ln(y_{ijt}) = \alpha + \beta(R_{jt}) + \theta D_j R_{jt} + \sigma D_j + \tau X_{ijt} + \varphi A_j + \rho \pi_{ijt} + \delta_j + \delta_t + u_{ijt} \quad (17)$$

y_{ijt} denotes the house market outcome for household i in region j at time t . R_{jt} is defined as the ratio of immigrants to natives in region j at time t . D_j is the development index for region j . The key parameter of interest is θ which measures how the impact of migration on the housing market differs according to the development level of the receiving region. X is a vector consisting of household characteristics (number of rooms and size of dwellings) which allows us to control for the quality of the house. A_j is the share of Arabic speaking population in 1965 according to the census. δ_j is the region fixed-effects, and δ_t is year fixed effects where u_{ijt} is the error term.

³ Adapted from Aracı et al., 2022.

Table 19: Heterogeneity in the Effects of Immigrants on Rents by Regional Development in the Short Run

	(1)	(2)	(3)	(4)	(5)
Interaction of Migrant-to-Native Ratio with Development Index	1.23***	1.22***	-0.79***	-0.79***	-1.038***
	(0.19)	(0.17)	(0.2)	(0.2)	(0.22)
	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
N	22083	22083	22083	22083	22083
Controls for					
Housing Characteristics	No	Yes	Yes	Yes	No
Time Invariant Control Variable	No	Yes	Yes	Yes	Yes
Region Fixed Effects	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	Yes	Yes	Yes
Instrumental Variable	No	No	No	Yes	Yes

Notes: The estimated coefficients are presented for the interaction term of the regional development index for 2011 and the migrant-to-native ratio. Development Index is provided by Turkish Ministry of Development. Robust standard errors are given in parenthesis while p values are given in square brackets. Housing characteristics are the logarithm of the size of the dwellings, and the number of rooms. The time-invariant control variable is the share of the Arabic-speaking population in 1965. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$ denote significance levels at 1%, 5%, and 10%, respectively.

More developed regions may be better equipped to absorb the significant influx of migration, particularly in the short run. The findings of the difference-in-differences model with the instrumental variable suggest a significant and negative relationship between the development level of the region and the impact of immigration on rents. Thus, it provides empirical evidence of the relationship between development and the impact of migration, aligned with our expectations. The less developed regions were more adversely affected in the short run. This result is important for policy recommendation since it proves the less developed regions are more sensitive to immigration both in the labor market and housing market even when controlling for other factors.

5.2. THE LONG-RUN IMPACT OF SYRIAN REFUGEES ON THE HOUSING OUTCOMES

As the Syrian migration steadily continued for the period 2015-2019, whether the impact on the housing market would persist in the long run is ambiguous. While

the effect should be visible in the long run given that Syrian immigration did not stop, the impact is expected to be diminished over time. To analyze the long-run effects, SILC data for the period 2009-2019 was analyzed using the same methodology.

5.2.1. Housing Market Outcomes

In this subsection, I presented my empirical results about the long-run effect of immigration on housing market outcomes.

The results of the long-run estimations are noteworthy and can be seen in Table 20. First of all, the impact of migration on housing rents decreased in the long run. The suggested model (4) concludes that a 1% increase in the migrant-to-native ratio results in a 0.66% additional increase in housing rents. Secondly, the effect on perceived rents is 0.89%, much closer to the impact on housing rents. This implies that in the long run, homeowners are better informed about the housing market and the value of their housing units.

The findings suggest that migration has an impact on rents for a long period. Governments should take into account the long-term effects of migration and pursue policies that subsidize the construction of housing units in affected regions.

Table 20: Estimation Results: Long-Run Effects of Migrant-to-Native Ratio on Rent Variables

<i>Dependent Variable</i>	(1)	(2)	(3)	(4)	(5)
Log. of Rents	4.34*** (0.08) [0.00]	9.022*** (0.1) [0.00]	0.6*** (0.12) [0.00]	0.66*** (0.18) [0.00]	1.42*** (0.21) [0.00]
N	50556	50556	50556	50556	50556
Log. of Perceived Rents	2.91*** (0.04) [0.00]	6.17*** (0.05) [0.00]	0.29*** (0.06) [0.00]	0.89*** (0.1) [0.00]	1.58*** (0.1) [0.00]
N	165783	165783	165783	165783	165783
Controls for					
Housing Characteristics	No	Yes	Yes	Yes	No
Time Variant/Invariant Control Variables	No	Yes	Yes	Yes	Yes
Region Fixed Effects	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	Yes	Yes	Yes
Instrumental Variable	No	No	No	Yes	Yes

Notes: Table 20 presents estimated coefficients for different specifications. Robust standard errors are given in parenthesis while p values are given in square brackets. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$ denote significance levels at 1%, 5%, and 10%, respectively.

Table 21 suggests that the natives' housing conditions increased as a result of the Syrian migration. The explanation could be lying on how the supply side of the housing market is affected. Many new houses were constructed in the region and these new houses are free from major problems such as the leaking roof or adequate heating. Thus, it is natural that natives are likely to take benefit from increasing the housing supply in the long run. On the other hand, there could be other reasons such as the housing expectations of the regions and other macroeconomic reasons which might trigger the demand for high-quality houses.

Table 21: Estimation Results: Long-Run Effects of Migrant-to-Native Ratio on Housing Quality Index (HQI)

<i>Dependent Variable</i>	(1)	(2)	(3)	(4)
The Housing Quality Index	-0.61***	1.5***	0.167	4.84***
	(0.09)	(0.118)	(0.245)	(0.41)
	[0.00]	[0.00]	[0.49]	[0.00]
N	216267	216267	216267	216267
Controls for Time Variant/Invariant Control Variables	No	Yes	Yes	Yes
Region Fixed Effects	No	No	Yes	Yes
Year Fixed Effects	No	No	Yes	Yes
Instrumental Variable	No	No	No	Yes

Notes: Table 21 presents the estimated coefficients for different specifications for the period 2009-2014. Robust standard errors are given in parenthesis while p values are given in square brackets. The time-variant control variable is the logarithm of regional GDP per capita, and the time-invariant control variable is the share of the Arabic-speaking population in 1965. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$ denote significance levels at 1%, 5%, and 10%, respectively.

5.2.2. Heterogeneous Effects Across Housing Quality and Household Head's Education

When the heterogeneous effects were estimated using HQI to identify low and high-quality houses, I can conclude that the impact on low-quality houses is greater in the long-run. This suggests that in the long-run, disadvantaged groups are affected more by immigration.

When analyzing various education groups, immigration has a significant long-term impact on both lower and higher education groups. However, in the short run, the effect was limited to the lower education group. The difference between coefficients is small in the long run, leading us to conclude that the heterogeneous effect might disappear in the long run.

Table 22: Heterogeneous Effects of Migrant-to-Native Ratio on Rents across Housing Quality in The Long Run

Dependent Variable	Low-Quality Houses	High-Quality Houses
Log. of Rents	3.72*** (0.99) [0.00]	1.4*** (0.28) [0.00]
Log of Perceived Rents	0.987*** (0.15) [0.00]	1.72*** (0.18) [0.00]
Controls for Time Variant/Invariant Control Variables	Yes	Yes
Region Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Instrumental Variable	Yes	Yes

Notes: Low-quality houses and high-quality houses were determined by HQI. Robust standard errors are given in parenthesis and p values are given in square brackets. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$ denote significance levels at 1%, 5%, and 10%, respectively.

Table 23: Heterogeneous Effects of Migrant-to-Native Ratio on Rents across Education Levels of Household Heads in the Long Run

<i>Dependent Variable</i>	<i>Lower Education</i>		<i>Higher Education</i>	
	(1)	(2)	(3)	(4)
Log. of Rents	1.11**** (0.18) [0.00]	1.81*** (0.22) [0.00]	1.08*** (0.4) [0.00]	1.6*** (0.43) [0.00]
N	30653	30653	19903	19903
Controls for Housing Characteristics	Yes	No	Yes	No
Time Variant/Invariant Control Variables	Yes	Yes	Yes	Yes
Region Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Instrumental Variable	Yes	Yes	Yes	Yes

Notes: Lower education level includes only the households where the household head has less than a high school degree. Higher education level includes only the households where the household head has at least a high school degree. Robust standard errors are given in parenthesis while p values are given in square brackets. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$ denote significance levels at 1%, 5%, and 10%, respectively.

5.2.3. Development Levels of the Regions

Another research question was how the development of the region contributes to the effect of immigration on the rental market. Following the methodology proposed by Aracı et al. (2022), the coefficient of the interaction term is calculated using data for 2009-2019. Once applying two-way fixed effects, the development level of the region loses its importance as an identifier of the impact of immigration on the housing market. These findings are presented in

Table 24 suggest the less-developed regions are more affected in the short run, but this disadvantage is not persistent in the long run after the housing market starts to adjust to the changes.

Table 24: Heterogeneity in the Effects of Immigrants on Rents by Regional Development in the Long Run

	(1)	(2)	(3)	(4)	(5)
Interaction of Migrant-to-Native Ratio with Development Index	3.15*** (0.07) [0.00]	2.54*** (0.06) [0.00]	0.14 (0.08) [0.08]	0.11 (0.08) [0.16]	-0.11 (0.09) [0.19]
N	50556	50556	50556	50556	50556
Controls for					
Housing Characteristics	No	Yes	Yes	Yes	No
Time Invariant Control Variable	No	Yes	Yes	Yes	Yes
Region Fixed Effects	No	No	Yes	Yes	Yes
Year Fixed Effects	No	No	Yes	Yes	Yes
Instrumental Variable	No	No	No	Yes	Yes

Notes: The estimated coefficients are presented for the interaction term of the regional development index for 2011 and the migrant-to-native ratio. Development Index is provided by Turkish Ministry of Development. Robust standard errors are given in parenthesis while p values are given in square brackets. Time-variant control variables are the logarithm of the size of the dwellings, and the number of rooms. The time-invariant control variable is the share of the Arabic-speaking population in 1965. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$ denote significance levels at 1%, 5%, and 10%, respectively.

5.3. ROBUSTNESS ANALYSIS

Following the methodology suggested by Jaeger et al. (2020), Goldsmith-Pinkham et al. (2020), and Aksu et al. (2022), placebo regressions of the pre-treatment residual trends in the dependent variables on the instrumental variable were conducted. In order to perform this test, I used the pre-treatment data selecting the treatment year as 2013. Then, I regress the dependent variables using the independent variables which were explained in the previous chapters. When I take the residuals and regress them on the values of the instrumental variable in 2015, I expect a non-significant relationship. The results of this test are presented in the Table 25.

Table 25: Placebo Regressions of Pre-Treatment Residual Trends in Dependent Variables on the Instrument

Dependent Variable	(1)	(2)
Log. of Rents	0.0000181*** (0.00000233) [0.00]	-0.00000366 (0.00000229) [0.11]
Log. of Perceived Rents	0.0000293*** (0.00000133) [0.00]	0.00000099 (0.00000124) [0.42]
House Quality Index (HQI)	-0.0000172*** (0.00000455) [0.00]	0.00000626 0.00000457 [0.17]
Controls for		
Region Fixed Effects	No	Yes
Year Fixed Effects	No	Yes

Notes: The coefficients are estimated using only the pre-treatment data (before 2013). Residuals are obtained after controlling for related independent variables including the natural logarithm of the regional gross domestic product (GDP) per capita and regressed on the values of the instrumental variable across regions in 2015. The number of observations is 12,596 for rents 43,992 for perceived rents, and 56,563 for HQI. Robust standard errors for each dependent variable and specification are given in parenthesis and the corresponding p values are given in square brackets. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$ denote significance levels at 1%, 5%, and 10%, respectively.

Table 25 indicates the instrumental variable is correlated to the pre-treatment residuals if I do not control for the two-way fixed effects. The inclusion of the region-fixed and year-fixed effects solves the issue. This test suggests two-way fixed effects (TWFE) method should be followed.

Two types of robustness analysis are conducted for the difference-in-differences strategy. The first test is called “no treatment in the pre-treatment period test”. The treatment year is defined as 2009 instead of 2013. The p value of the coefficient for this placebo regression is 0.69. This placebo test showed that if the treatment year was selected falsely, the impact would be insignificant.

The second placebo test is setting the treatment group randomly. When I define TRA and TR8 as the treatment group and the rest as the control group, it was found that the migrant-to-native ratio gives an insignificant result with a p value of 0.8. This placebo test indicates the impact is only visible when the treatment and control groups are specified correctly.

CONCLUSION

This thesis aims to identify how Syrian immigration affected the Turkish housing market. The main variable of interest is the housing rents which are expected to rise due to the increase in the housing demand. An analysis of the housing rents and perceived rents in Türkiye before and after the migration was conducted using SILC micro-level data provided by TURKSTAT. Then, the Housing Quality Index (HQI) was introduced and used as a dependent variable to understand whether natives are worse off in terms of housing conditions.

Table 26: The Summary of Empirical Findings

<i>Dependent Variable</i>	<i>The Impact</i>	<i>Short-Run (2009-2014)</i>	<i>Long-Run (2009-2019)</i>
<i>Rents</i>	Total Effect	1.19%-1.58% increase for a 1% increase in the migrant-to-native ratio	0.66% to 1.42% increase for a 1% increase in the migrant-to-native ratio
	Effect on High-Quality Houses	1.77% increase for a 1% increase in the migrant-to-native ratio	1.4% increase for a 1% increase in the migrant-to-native ratio
	Effect on Low-Quality Houses	No significant effect	3.72% increase for a 1% increase in the migrant-to-native ratio
	Effect on Households with Higher Education	No impact if we control for the housing characteristics, 1.27% increase for a 1% increase in the migrant-to-native ratio when controlling for	1.08%-1.6% increase for a 1% increase in the migrant-to-native ratio

		the housing characteristics	
	Effect on Households with Lower Education	1.36%-1.75% increase for a 1% increase in the migrant-to-native ratio	1.1%-1.81% increase for a 1% increase in the migrant-to-native ratio
	The Development Level of The Region	A significant relationship, less developed regions are affected more by migration	No significant impact
<i>Perceived Rents</i>	Total Effect	1.43-1.58% increase for a 1% increase in the migrant-to-native ratio	0.89%-1.58% increase for a 1% increase in the migrant-to-native ratio
	Effect on High-Quality Houses	1.9% increase for a 1% increase in the migrant-to-native ratio	1.72% increase for a 1% increase in the migrant-to-native ratio
	Effect on Low-Quality Houses	0.9% increase for a 1% increase in the migrant-to-native ratio	0.98% increase for a 1% increase in the migrant-to-native ratio

After constructing the difference-in-differences model with a distance-based instrumental variable, it was found that a 1% increase in the migrant-to-native ratio causes a 1.19% increase in rents in the short run and a 0.66% increase in the long run. The increase in perceived rents is 1.43% in the short run while it is

0.89% in the long run. The gap between the change in rents and perceived rents closes in the long run. I can conclude during the first years of immigration, homeowners had biased information about the rental value of their housing units, but this misperception slowly decreased in the long run. The analysis using the Housing Price Index indicates that natives' housing conditions did not deteriorate due to migration. The summary of the empirical findings is given in Table 26.

Migration has a larger impact in the short run, but its impact slowly diminishes in the long run. The housing market is more elastic in the long run, it takes time to adjust for the market to the demand shock caused by immigrants. I found that migration did not change the housing conditions of the natives in the short run, and natives benefit from better housing conditions in the long run. Although it can be argued that the increase in the housing supply can play a role, socioeconomic factors might also be possible reasons behind the increase in housing conditions.

The main result is that immigration is a statistically significant cause of the increase in rent, but the effect slowly diminishes in the long run.

The results of the heterogeneous analysis suggested that low-quality houses are not significantly affected by immigration in the short run while the increase in rents for high-quality houses is significant. This could be due to the native-flight aspect of the mass immigration as well as the data limitations which could be misleading. However, low-quality houses were affected more by migration in the long run, suggesting that low-income natives were affected more.

The rent significantly increased for household heads with lower than high school education, both in the short run and in the long run while the impact of migration on the rents of household heads with high education is not significant once I control for the housing characteristics. This further indicates that low-income natives were affected more by migration.

Another interesting contribution is that the impact of migration on the housing market depends on the development level of the region. Less developed regions are affected more by the increase in rents in the short run. This implies that less developed regions face challenges to meet the huge demand caused by mass immigration. On the other hand, the development level of the region is not a determinant in the long run.

In order to perform a more detailed analysis, the data at the neighborhood level is needed. Such data enables researchers to focus on the native flight aspect of the migration which might happen in some neighborhoods. It should be noted that the data used in this analysis has its own limitations. While the official number of Syrians might not be entirely accurate, this data allows us to conduct the necessary difference-in-differences analysis to understand the impact of the migration.

The impact of migration on rents is similar to many studies in the literature although the literature is mostly focused on the developed countries.

This study gives a detailed analysis of the impact of migration on the housing market. It provides both short-run and long-run analysis and contributes to the literature with heterogeneous analysis across housing quality and education level of the natives. The inclusion of the development level of the regions is another contribution this study aims to make. Even though the usage of the instrumental variable is not absent in the related literature, this study gives a comparison to two different distance-based instrumental variables suggested by different researchers. This comparison concludes that both instrumental variables give similar results.

As a result of our analysis, a couple of policy recommendations can be made. First, to suppress the rents and house prices in the regions with high migration potential, new housing units must be constructed or subsidized by the government right after the migration influx. Second, if mass migration is

anticipated, the government should implement policies to allow refugees to spread across the country rather than concentrating them in the same place. This allows especially less developed regions to not be extremely affected by immigration.

REFERENCES

- Aida. (2018). *Country Report: Turkey*. https://asylumineurope.org/wp-content/uploads/2020/02/report-download_aida_tr_2018update_turkish.pdf
- Akbari, A. H., & Aydede, Y. (2012). Effects of immigration on house prices in Canada. *Applied Economics*, 44(13), 1645–1658. <https://doi.org/10.1080/00036846.2010.548788>
- Aksu, E., Erzan, R., & Kırdar, M. G. (2022). The impact of mass migration of Syrians on the Turkish labor market. *Labour Economics*, 76. <https://doi.org/10.1016/j.labeco.2022.102183>
- Alpan, A. S. (2008). *The Economic Impact of the 1923 Greco-Turkish Population Exchange upon Turkey*. The Graduate School of Social Sciences Of Middle East Technical University.
- Arnott, R. (1987). *Economic Theory and Housing* (E. S. Mills, Ed.; 1st ed.). Handbook of Regional and Urban Economics.
- Balkan, B., Özcan, E., Huzeyfe, T., & Tumen, T. S. (2018). *Immigration, Housing Rents, and Residential Segregation: Evidence from Syrian Refugees in Turkey*. www.iza.org
- Carpio, X. V. Del, & Wagner, M. (2015). *The Impact of Syrian Refugees on the Turkish Labor Market*. <http://econ.worldbank.org>.
- Carter, T. (2005). The Influence of Immigration on Global City Housing Markets: The Canadian Perspective. *Urban Policy and Research*, 23(3), 265–286. <https://doi.org/10.1080/08111470500197797>
- Çetin, M. A. (2020). *Türkiye’de Konut Piyasası Dinamikleri: Makroekonomik Yaklaşım* (1st ed.). Ekin Basım Yayın.
- Charles, S. (1977). *Macmillan Studies in Economics*.

- Coleman, A., & Landon-Lane, J. (2007). *Housing Markets and Migration in New Zealand, 1962-2006*. www.rbnz.govt.nz/research/discusspapers/
- Distefano, C., Zhu, M., & Mîndrilă, D. (2009). Understanding and Using Factor Scores: Considerations for the Applied Researcher. *Practical Assessment, Research, and Evaluation*, 14, 20. <https://doi.org/10.7275/da8t-4g52>
- Distributions of Syrians Under Temporary Protection by Year*. (2023). Presidency of Migration Management. <https://en.goc.gov.tr/temporary-protection27>
- Eichholtz, P., & Lindenthal, T. (2014). Demographics, Human Capital, and the Demand for Housing. *Journal of Housing Economics*, 26, 19–32. <https://doi.org/10.1016/j.jhe.2014.06.002>
- Emre Akgündüz, Y., Selim, Y., Glu, H. ~, & Yılmaz, F. (2023). *Refugees and Housing: Evidence from the Mortgage Market*.
- Erdoğan, M. (2014). *Syrians in Turkey: Social Acceptance and Integration Research*.
- Ermisch, J. (1996). The Demand for Housing in Britain and Population Ageing: Microeconomic Evidence. In *New Series* (Vol. 63, Issue 251).
- Fallis, G. (1985). *Housing Economics*. Butterworths.
- Goldsmith-Pinkham, P., Sorkin, I., & Swift, H. (2020). Bartik instruments: What, When, Why, and How. *American Economic Review*, 110(8), 2586–2624. <https://doi.org/10.1257/AER.20181047>
- Greulich, E., Quigley, J. M., Raphael, S., Tracy, J., & Jasso, G. (2004). The Anatomy of Rent Burdens: Immigration, Growth, and Rental Housing [with Comments]. In *Wharton Papers on Urban Affairs*. <https://www.jstor.org/stable/25067408?seq=1&cid=pdf->
- Hacettepe University Institute of Population Studies. (2019). 2018 Turkey Demographic and Health Survey. Hacettepe University Institute of

Population Studies, T.R. Presidency of Turkey Directorate of Strategy and Budget and TÜBİTAK, Ankara, Turkey.

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2013). *Multivariate Data Analysis*.

İçduygu, A. (2015). Syrian Refugees in Turkey: The Long Road Ahead. *MPI Reports*, 5. www.migrationpolicy.org/transatlantic.

Kayam, H. C. (1993). Lozan Barış Antlaşmasına Göre Türk-Yunan Nüfus Mübadelesi ve Konunun T.B.M.M'de Görüşülmesi. *Atatürk Araştırma Merkezi Dergisi*, 581–608.

Kayaoglu, A. (2021). Do Refugees Cause Crime? *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.3808588>

Kürschner, K. (2017). *Immigration and Rental Prices of Residential Housing: Evidence from the Fall of the Berlin Wall* *. <http://hdl.handle.net/10419/168092>

Latif, E. (2015). Immigration and Housing Rents in Canada: A Panel Data Analysis. *Economic Issues*, 20.

Ley, D., & Tutchener, J. (2001). Immigration, Globalisation and House Prices in Canada's Gateway Cities. *Housing Studies*, 16(2), 199–223. <https://doi.org/10.1080/02673030120038483>

Maclennan, D., Gibb, K., & More, A. (1994). Housing systems, regions and the national economy. In *Economic Modelling* (Vol. 11, Issue 2).

Mayo, S. K. (1981). Theory and Estimation in the Economics of Housing Demand'. *Journal of Urban Economics*, 10, 95–116.

Meen, G. (2011). A Long-Run Model of Housing Affordability. *Housing Studies*, 26(7–8), 1081–1103. <https://doi.org/10.1080/02673037.2011.609327>

- Mussa, A., Nwaogu, U. G., & Pozo, S. (2017). Immigration and housing: A spatial econometric analysis. *Journal of Housing Economics*, 35, 13–25. <https://doi.org/10.1016/j.jhe.2017.01.002>
- Needs Assessment of Syrian Women and Girls under Temporary Protection Status in Turkey. (2018). *United Nations*.
- Olsen, E. O. (1969). A Competitive Theory of the Housing Market. *The American Economic Review*, 59(4), 612–622.
- Ottaviano, G. I. P., & Peri, G. (2007). *The Effects of Immigration on U.S. Wages and Rents: A General Equilibrium Approach*. <https://doi.org/https://doi.org/10.4337/9780857934581.00010>
- Ottaviano, G. I., & Peri, G. (2005). *Rethinking the Gains from Immigration: Theory and Evidence from the U*. <http://www.nber.org/papers/w11672>
- Rosen, S. (1974). Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition. *Journal of Political Economy*, 82(1), 34–55.
- Sá, F. (2015). Immigration and House Prices in the UK. *Economic Journal*, 125(587), 1393–1424. <https://doi.org/10.1111/eoj.12158>
- Saime Özçürümez, & Ahmet İçduygu. (2020). *Zorunlu Göç Deneyimi ve Toplumsal Bütünleşme* (1st ed.). İstanbul Bilgi Üniversitesi Yayınları.
- Saiz, A. (2003). Room in the Kitchen for the Melting Pot: Immigration and Rental Prices. *Review of Economics and Statistics*, 85(3), 502–521. <https://doi.org/10.1162/003465303322369687>
- Saiz, A. (2007). Immigration and Housing Rents in American Cities. *Journal of Urban Economics*, 61(2), 345–371. <https://doi.org/10.1016/j.jue.2006.07.004>
- Saiz, A., & Wachter, S. (2011). Immigration and the Neighborhood. *American Economic Journal: Economic Policy*, 3(2), 169–188. <https://doi.org/10.1257/pol.3.2.169>

- Sanchis-Guarner, R. (2022). *Decomposing the Impact of Immigration on House Prices*. <https://cep.lse.ac.uk/pubs/download/sercdp0223.pdf>
- Sharpe, J. (2015). *Three Essays on the Economic Impact of Immigration*. https://uknowledge.uky.edu/economics_etds/20
- Şimşek, D. (2018). Refugee Integration, Migration Policies and Social Class: The Case of Syrian Refugees in Turkey. *Journal of Social Policy Studies*, 40(2), 367–392.
- Stillman, S., & Maré, D. C. (2008). *Housing Markets and Migration: Evidence from New Zealand*. www.motu.org.nz
- Tumen, S. (2016). The Economic Impact of Syrian Refugees on Host Countries: Quasi-experimental Evidence from Turkey. *American Economic Review*, 106(5), 456–460. <https://doi.org/10.1257/aer.p20161065>
- Tumen, S. (2019). *Refugees and “Native Flight” from Public to Private Schools*. www.iza.org
- Yıldırım, M. O. (2017). *Türkiye Ekonomisinde Konut Piyasası Dinamiklerinin Analizi*. Pamukkale University Graduate School of Social Sciences.

**APPENDIX 1 ESTIMATION RESULTS USING THE
INSTRUMENTAL VARIABLE BY DEL CARPIO AND WAGNER
(2015)**

$$IV_{r,t} = \sum_s \frac{1}{T_{sr}} \pi_s R_t$$

π_s the fraction of the Syrian population that lived in each governorate s in 2010 (pre-war population share), R_t is the number of Syrian refugees in Türkiye in year t , T_{sr} is the travel distance between Syrian province s and NUTS-1 region r in Türkiye (Del Carpio and Wagner, 2015).

Table 27: Short-Run Effects of Migrant-to-Native Ratio on Dependent Variables Using IV by Del Carpio and Wagner (2015)

<i>Dependent Variable</i>	(1)	(2)
Log. of Rents	1.17*** (0.23) [0.00]	1.58*** (0.28) [0.00]
N	22083	22083
Controls for		
Housing Characteristics	Yes	No
Time Variant/Invariant Control Variables	Yes	Yes
Region Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Instrumental Variable	Yes	Yes

Notes: Table 27 represents the estimated coefficients for the period 2009-2014. Robust standard errors are given in parenthesis while p values are given in square brackets. Housing characteristics are the logarithm of the size of the dwellings and the number of rooms. The time-variant control variable is the logarithm of regional GDP per capita, and the time-invariant control variable is the share of the Arabic-speaking population in 1965. The instrumental variable suggested by del Carpio and Wagner (2015) was used in the analysis. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$ denote significance levels at 1%, 5%, and 10%, respectively.

Table 28: Long-Run Effects of Migrant-to-Native Ratio on Dependent Variables Using IV by Del Carpio and Wagner (2015)

<i>Dependent Variable</i>	(1)	(2)
Log. of Rents	0.68*** (0.18) [0.00]	1.45*** (0.21) [0.00]
N	50556	50556
Controls for		
Housing Characteristics	Yes	No
Time Variant/Invariant Control Variables	Yes	Yes
Region Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Instrumental Variable	Yes	Yes

Notes: Table 28 represents the estimated coefficients for the period 2009-2019. Robust standard errors are given in parenthesis while p values are given in square brackets. Housing characteristics are the logarithm of the size of the dwellings and the number of rooms. The time-variant control variable is the logarithm of regional GDP per capita, and the time-invariant control variable is the share of the Arabic-speaking population in 1965. The instrumental variable suggested by del Carpio and Wagner (2015) was used in the analysis. *** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$ denote significance levels at 1%, 5%, and 10%, respectively.

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Department: Economics

Program: Economics Master's Programme

Status: MA Ph.D. Combined MA/ Ph.D.

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APPENDIX 3 ORIGINALITY REPORT



**HACETTEPE UNIVERSITY
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