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ISTANBUL AYDIN UNIVERSITY

INSTITUTE OF GRADUATE STUDIES

FACTORS INFLUENCING PRICES OF RESIDENTIAL REAL ESTATE IN TURKEY

MASTER'S THESIS

AMAN AL HABASH

Department of Business

Business Administration Program

JUNE, 2022

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Thesis Advisor: Assist. Prof. Dr. MURAT UNANOĞLU

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APPROVAL PAGE

DECLARATION

I hereby declare with respect that the study “Factors Influencing Prices Of Residential Real Estate In Turkey”, which I submitted as a Master thesis, is written without any assistance in violation of scientific ethics and traditions in all the processes from the Project phase to the conclusion of the thesis and that the works I have benefited are from those shown in the Bibliography. (.../.../20...)

AMAN AL HABASH

FOREWORD

First and foremost, I want to express my gratitude to the almighty God for his abundant grace and protection, which have enabled me to begin and finish this endeavor. I shall be eternally grateful for the courage and wisdom I had acquired;

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My special thanks go to my husband BASSAM MUSTAFA MISTOU who is always by my side and did his best to help me to succeed really there is no enough words to thank you.

June, 2022 AMAN AL HABASH

FACTORS INFLUENCING PRICES OF RESIDENTIAL REAL ESTATE IN TURKEY

ABSTRACT

In many nations, the real estate sector is a major determinant of economic growth.

It is critical to conduct market research and gain a thorough understanding of the market before making any decisions.

In real estate investing, market analysis is an underappreciated asset. In actuality, the most significant aspect of analysing a real estate investment is market analysis. Every calculation and choice that follows is based on the market analysis.

Market analysis should also take into account broader economic developments in region as well as at the national level. Despite the fact that all real estate is local, bigger macroeconomic factors have an impact on all local markets. As a result, market analysts must examine interest rates, present and proposed inflation fluctuations, GDP growth, population expansion, and interest rates. All of these elements have an impact on an economical base that surrounds the subject property's progress or decrease.

Changes in capital flows have a direct impact on the supply and demand dynamics for a property. Interest rates can affect the cost of borrowing and mortgage rates—changes in capital flows can also have a direct impact on the Demand and supply variables for a property.

There are also links between inflation and any limited-supply good.

Inflation has a significant impact on a wide range of industries. The utility market the banking, and energy are the most affected. Unlike these businesses, however, real estate investors often bear the brunt of the damage.

Global real estate offers the necessary investment characteristics: a consistent,

long-term income, capital appreciation potential, and major diversification benefits. This has been especially true in most Asian countries, which have had consistent structural, long-term, and durable economic growth in recent years. In fact, because Gross Domestic Product Growth rate is the primary driver of real estate values and rentals, real estate investments offer a direct method to benefit from these economies' significant growth.

Growth in the population It's also important to comprehend the fundamental causes of population growth. If births are the primary cause of population growth, this is not as beneficial in the near term as if the growth is due to migration. Because the majority of these migrants require immediate housing, net interstate migration plus net overseas migration is an essential component of population expansion. As a result of the unprecedented rates of foreign migration and net interstate migration in both Sydney and Melbourne, demand has surged and driven up the median price in those two cities.

Key Words: Key Words: Real estate, Macroeconomic factors, Real estate sales, Opportunities, House Pricing, Real Estate Pricing, Turkish real estate market, House Price Index, Interest Rate, Customer Price Index, Inflation, Gross Domestic Product, Population.

TÜRKİYE'DE KONUT FİYATLARINI ETKİLEYEN FAKTÖRLER

ÖZET

Birçok ülkede gayrimenkul sektörü ekonomik büyümenin önemli bir belirleyicisidir.

Herhangi bir karar vermeden önce pazar araştırması yapmak ve pazar hakkında kapsamlı bir anlayış kazanmak çok önemlidir.

Gayrimenkul yatırımında piyasa analizi, değeri bilinmeyen bir varlıktır. Aslında bir gayrimenkul yatırımını analiz etmenin en önemli yönü piyasa analizidir. Takip eden her hesaplama ve seçim, piyasa analizine dayanmaktadır.

Pazar analizi, ulusal düzeyde olduğu kadar bölgedeki daha geniş ekonomik gelişmeleri de hesaba katmalıdır. Tüm gayrimenkullerin yerel olmasına rağmen, daha büyük makroekonomik faktörlerin tüm yerel pazarlar üzerinde etkisi vardır. Sonuç olarak, piyasa analistleri faiz oranlarını, mevcut ve önerilen enflasyon dalgalanmalarını, GSYİH büyümesini, nüfus artışını ve faiz oranlarını incelemelidir. Tüm bu unsurların değerleme konusu gayrimenkulün ilerlemesini veya azalmasını çevreleyen ekonomik bir temel üzerinde etkisi vardır.

Sermaye akışlarındaki değişiklikler, bir mülkün arz ve talep dinamikleri üzerinde doğrudan bir etkiye sahiptir. Faiz oranları, borçlanma maliyetini ve ipotek oranlarını etkileyebilir—sermaye akışlarındaki değişiklikler, bir mülkün Talep ve arz değişkenleri üzerinde doğrudan bir etkiye sahip olabilir.

Enflasyon ile herhangi bir sınırlı arzlı mal arasında da bağlantılar vardır.

Enflasyonun çok çeşitli endüstriler üzerinde önemli bir etkisi vardır. Kamu hizmetleri piyasası bankacılık ve enerji en çok etkilenenlerdir. Ancak bu işletmelerin aksine, gayrimenkul yatırımcıları genellikle hasarın yükünü taşır.

Küresel gayrimenkul, gerekli yatırım özelliklerini sunar: tutarlı, uzun vadeli

bir gelir, sermaye değer kazanma potansiyeli ve büyük çeşitlilik avantajları. Bu, özellikle son yıllarda tutarlı yapısal, uzun vadeli ve dayanıklı ekonomik büyümeye sahip olan çoğu Asya ülkesinde geçerlidir. Aslında, Gayri Safi Yurtiçi Hasıla Artış oranı, gayrimenkul değerlerinin ve kiraların birincil itici gücü olduğundan, gayrimenkul yatırımları, bu ekonomilerin önemli büyümelerinden yararlanmak için doğrudan bir yöntem sunmaktadır.

Nüfus artışı Nüfus artışının temel nedenlerini anlamak da önemlidir. Nüfus artışının birincil nedeni doğumlarsa, bu yakın vadede büyümenin göçten kaynaklanması kadar faydalı değildir. Bu göçmenlerin çoğu acil barınma gerektirdiğinden, net eyaletler arası göç artı net deniz aşırı göç, nüfus artışının temel bir bileşenidir. Hem Sidney hem de Melbourne'deki benzeri görülmemiş dış göç oranlarının ve eyaletler arası net göçün bir sonucu olarak, talep arttı ve bu iki şehirde medyan fiyatı yükseltti.

Anahtar Kelimeler: Gayrimenkul, Makroekonomik faktörler, Gayrimenkul satışları, Fırsatlar, Konut Fiyatlandırması, Gayrimenkul Fiyatlandırması, Türkiye gayrimenkul piyasası, Konut Fiyat Endeksi, Faiz Oranı, Müşteri Fiyat Endeksi, Enflasyon, Gayri Safi Yurtiçi Hasıla, Nüfus.

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ABBREVIATIONS

GDP : Gross Domestic Product.

YOY : Year On Year.

CPI : Customer Price Index.

HPI : House Price Index.

FDI : Foreign Direct Investment.

FHFA : Federal Housing Finance Agency.

ADF : Augmented Dickey Fuller (unit test type).

SPSS : Statistical packages for social scientists (software).

CUSUM : Cumulative Sum of Recursive Residuals.

LM : Lagrange Multiplier.

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I. INTRODUCTION

A. Research Background:

The price determined by a system in which supply and demand forces control the prices and fluctuations of items. The price of a product or an item is determined by the sellers and buyers.

Pricing is also the result of an unpredictable and uncontrollable conflict between supply and demand in the market, which is referred to as the price mechanism. The government, on the other hand, has the ability to manipulate the price system in order to make products or commodities more affordable to the poor.

Now Turkey's economy has undergone a significant shift over the last decade, and its economic foundations are rather steady. Turkey in regard to its GDP growth it occupy the world's 17th largest and also it rankled as the 6th largest in Europe. Turkey's real estate sector accounts for 19.5 percent of the country's overall Gross Domestic Product.

FDI inflows increased to USD 12.5 billion in 2012, with real estate and building accounting for USD 1.6 billion of the total.

The real estate industry, often known as the property market, is an important economic component that has contributed to economic growth. In Turkey, the real estate market accounts for more than 23.5% of the country's GDP.

In theory, real estate encompasses all properties, including land and buildings on that property, as well as environmental resources such as minerals, Nature and water non-mobile assets, and also interest on these properties

The success of the real estate industry is due to prudent decision-making with the correct tools, as well as lead-generation events.

Turkey's real estate industry has grown at a rapid pace over the last few generations, and it is now one of the world's leading real estate markets.

The market forces which represented by supply and demand, in theory,

determine the real estate market circumstances. The total quantity of merchandise required by the consumer is referred to as demand. The Demand theory said that all other things being equal, more of a specific commodity is sought at low costs. As a result, demand and price have an indirect relationship. According to (Burnside et al, 2011), on the contrary, more of some items are being desired at greater costs. Now Supply, on the other hand, contains the entire amount of a product that a provider makes available to customers. According to the rule of supply, if all other factors are equal, the higher the price, the greater the amount supplied. As a result, the amount supplied and the price have a direct correlation. As a result, supply curve refers to the overall amount of goods and services available to customers in a given market.

As a result, demand and supply dictate housing and real estate prices. The assumption of consistent prices, like any other market, is untrue; as a result, price swings affecting housing market. As a result, the concept of demand and supply governs the prices of the housing market or real estate market. The assumption of consistent prices, like any other market, is unreal; as a result, price swings affect the real estate or housing market.

For example, in the United States, the real estate market experienced a subprime crisis as a result of price fluctuations, as households ended up paying a loan amount more than the house value. Housing prices are one of the main factors of the real estate market, according to Burnside et al, because prices are a crucial factor of demand in the market. Its demand is influenced by macroeconomic and microeconomic factors.

As a result, and to understand growth of the residential real estate market, we must comprehend the supply and demand variables, as well as the reasons that cause price changes (Burnside et al, 2011). The real estate or housing market differs significantly from other markets for commodities and services. This is due to the fact that the housing market serves a dual purpose as a commodity and an investment asset. As a result, both sides will be included while evaluating the housing market.

The 4-housing market, according to researchers such as Palmquist (1983), is distinctive in it does have a heterogeneous structure, with features based on the structure as well as those based on the building or location. Quigley (1992) also claims that there are 4 criteria that distinguish the real estate market from others. Due to construction time, durability (i.e., the house's lifetime or existence),

heterogeneity (i.e., there is no two homes are alike in every regard), and site stability, they have a high production cost (i.e., no cannot be displaced). These characteristics merely demonstrate that real estate markets are a collection of interconnected fragmented marketplaces.

Problem Statement

When a price is being defined generally that it is the amount of money needed to buy a product, and this price determined by a calculation of the benefits or services came from this product. Now the house price as for customer will be defined that it's the calculation of location, apatment's space, construction coasts including the materials quality, the view from the apartment, direction of building and other hedonic specifications, this is the general common information about how the high price came from and vise versa.

The investors may think farther to the real estste pricing concept and take the macroeconimic variables into consideration since they belive that investment needs stable economic status in a country and the stability of the economic will make the investment beneficial and profitable while the unstable economic will affect there capital which been putten and as a result it will affect the the price of the real estate bought through reducing the demmand curve or the amount of money earned from this ownership. Here in this study we will define the relation of house price index to the some important macro-econimical independent variables (Inflation, Interest Rate, Population, and GDP) we will take a historical statistic on quarterly basis and find its relation to the dependent variable (House Price Index) from 2010 till 2020 by doing calculation through statistical methodological study through the below tests:

Unit Test,

Normality Test,

Heteroskedasticity Test,

Autocorrelation,

VIF test,

Cusum Test

Linear Regression or ARDL Test.

B. Research Questions

Price of House is something so complicated because its regarded as the highest product the customer will pay the highest amount of money for it and generally every person through his/her life will buy and sell for 1 time and sure the buyer or seller should know what are the indicators that may affect this amount of money from year to year beside the difference of price between one home to another based on its hedonic characteristics, through this study we will check by evidance if there is a correclation or no relation between the independent macroeconomical variables which are interest rate, GDP, population and inflation rate in Turkey and other country.

we will check if interest rate have effect on House Price Index and also Population if there is correlation with the House price index beside the gross domestic product whethere is connection between its change and the house price index change and finally the inflation and its influence on the house price index. This will be done through many tests will apply and get the result to define the relation and have final findings from these tests.

C. Research objective:

According to the purpose of this study work, four selected macroeconomic variables (GDP, interest rate, inflation rate, and population) will be used to assess the long-run impact on housing prices in Turkey. This research is important because, up until now, the majority of studies had looked at the causes of housing prices from a macroeconomic correlation point of view, but they had mostly been conducted in United States and Europe, making this research particularly significant. Individual countries in Asia, such as Japan and China, have also been subjected to research, as has the situation in the United States. Consequently, this study contributes to the current literature by investigating the impact of macroeconomic variables on house values in both countries. It is possible that policymakers would find the information presented to be valuable in modifying or implementing new policies for their respective countries in order to achieve economic stability. Furthermore, this research will be useful to future academics who are interested in the economies of Turkey, according to the authors. Finally, the study will promote knowledge among

the general public about the macroeconomic factors that influence homes prices in the nations that have been chosen for research. People will be able to understand the influence of their spending decisions on the country as a result of this information (Muhammad, A., & Yvonne, Lee., 2022).

D. Significance Of Study:

The purpose of this study was to look at the factors that influence residential housing prices in Istanbul. There is already a lot of studies and researches talking about similar problem large body of literature on real estate pricing; this piece of work aims to add to what is already known about real estate price determinants, which will be useful to researchers and future students. It will serve as a platform for future study on the drivers of real estate prices, thereby expanding the literature on real estate pricing, particularly at the residential level. This study will contribute to clarifying important points for businessmen interested in buying and investing real estate by providing information on the driving reasons behind market fluctuations in real estate values, allowing them to make more informed investment decisions. Homeowners who are planning to buy and own a home will be educated on the factors of supply & demand, allowing them to make the best purchase decision possible. This work will be highly valuable to financial institutions, both central and commercial, because it will help with price fluctuation, which impacts the long-term evolution of real estate financing. These studies will also assist the government and the public sector since they will serve as a foundation for government policies such as taxation and will aid in the formulation of the finest policies that will aid in economic growth. It will also serve as a springboard for future study in the topic. This will add to the body of knowledge about the factors that influence residential property pricing. This study will be valuable to financial institutions when it comes to price variations, which affect the long-term evolution of real estate financing. Knowing how government policies on areas like taxation affect the industry can help the government and regulatory authorities establish a suitable regulatory framework to boost the sector's growth.

E. Organization of Chapters:

This study is divided into five chapters. The first chapter serves as a general overview. The literature review is presented in Chapter 2, the technique is described in Chapter 3, and the data analysis is presented in Chapter 4. Finally, in Chapter 5, the research findings, conclusions, and recommendations for further research are presented.

II. LITERATURE REVIEW

Analysis of the Turkish Housing Market's Efficiency is the Investors' main goal to raise the value of their money by trading multiple investment tools based on the premise of minimal risk high returns. Financial or non-financial investing instruments are available. Deposits, government and private sector bonds, treasury bills, and other financial investment instruments give a fixed or variable income, such as stocks, funds, and currencies. Esra, A., & Ünal, S. (2019). The Efficient Market Hypothesis (EPH) contends that investors cannot forecast future prices in an efficient market based on historical price movements because "prices completely reflect all available information" and so it is conceivable for investors to make above-average (extreme) returns in the markets. As a result, prices are produced completely at random, regardless of previous prices, and future prices cannot be predicted. Fama (1970) proposed that stock price changes are split into three categories: Weak efficient market hypothesis I semi-strong efficient market hypothesis (ii), and strong efficient market hypothesis (iii). Price changes in an efficient market are supposed to follow a random walk, according to the weak efficient market hypothesis, which is empirically tested using unit root tests. Many research have been conducted to examine the hypothesis in question, with the results largely supporting the notion. The EPH is used to assess the effectiveness of many different types of markets, in addition to stock and foreign currency markets. The efficacy of the markets where investment instruments are traded is critical in determining the likelihood of investors' gains and losses exceeding the average. Esra, A., & Ünal, S. (2019).

In Turkey, housing serves as an investment tool. Housing is in demand as an investment tool because it includes capital gains and rental income in addition to being a consumption instrument that serves the housing needs of households. Housing prices fluctuate due to factors such as interest rates, building construction costs, and land costs, and, like other investment vehicles, it provides financial gain to its owner by taking advantage of price variations.

(Coşkun 2016) states that According to the study, even in consumption house ownership, the view of housing as a wealth protection mechanism and the hope that it will protect/increase its worth might contribute to a certain investment incentive.

A. Real Estate:

Real estate is a word used to describe a status in which property consisting of land and structures on it, besides the natural resources for example: crops, natural environment, and water, among other things, may be considered real property buildings or homes in general.

The activity of selling, buying, or renting buildings, land, or housing is referred to as real estate. Residential real estate that is available for occupation and has a single family or multifamily structure. Case K. E.; Shiller R. J. (2003)

It is defined as land and everything movable and immovable properties on it, including constructing

And all natural resources. Vacant land, residential properties, and commercial properties are the three principal forms of real estate properties, according to Kimmonds(2017).

The home market and commercial real estate markets are the two main categories of real estate markets. Commercial real estate is utilized for business, whereas the housing market relates to the sale of landed properties or rentals to individuals and families for habitation. Turkey has had a growing economy with a rising rate of urbanization and increasing urbanization since the 1950s.

A high incidence of rural-to-urban migration has resulted in the growth of main cities, for example Istanbul. Turkey's real estate sector has grown at a breakneck pace over the previous three decades, accounting for about 20% of the country's GDP.

Turkey had occupied the 17th largest economy in the world, and the 6th largest in Europe in 2019, with a massive GDP of 786 billion dollars and real estate accounting for 19.5 percent in 2021.

Many factors have contributed to the tremendous rise of Turkey's real estate industry in recent decades, including (FDI) Foreign Direct Investment. FDI inflow in

Turkey is USD 012.5 billion, with real estate accounting for USD 1.6 billion, or 12.8 percent of overall FDI.

The Turkish economy published record growth and its GDP and PPP climbed from 18th place to 11th globally from 2003 to 2020. (Deloit, 2013).

B. Factors that promoted the Real Estate Market Growth in Turkey:

Many elements, including political, economic, and environmental considerations, have influenced and promoted the expansion of Turkey's real estate market. These aspects will be discussed further in the following paragraphs.

1. Turkey's geographical strategic location between Europe and Asia:

Turkey is located between Europe and Asia continents, and hence functions as a crossroads. Istanbul's massive airport, which is the largest in the Middle East and Europe, as well as Ankara's airports, are a convenient way to travel to important cities in Europe, and give Istanbul and Turkey very important positive points between the continents, Asia, the Africa, and Middle East, with an average of Four hours direct flight. Turkey's geographic location, makes the trade between those continents has converged, leading in a rapid increase of warehouse and logistics infrastructure. Istanbul, has a universal past stretching starts from age of the Ottoman Empire, and also a young and highly skilled workforce, making it a corporate magnet as well as laying the groundwork for the real estate market. (Deloitte, 2013)

2. Turkey’s population:

is also a pull factor for the real estate market, since a large population means a greater demand for housing, causing the real estate market to flourish. In 2015, Turkey's population was estimated to be 78.67 million people. Turkey's population is quickly increasing, with an estimated population of 88.5 million by 2030. As a result, Turkey's growth rate is higher than other European countries. By 2030, Germany, As an example, is expected to have a negative growth rate, implying that there will be less than 1 million people.

Turkey is a rising economy, as evidenced by its population increase. The population of Turkey is predicted to reach 84.2 million people by 2023, according to the Turkish Statistic Institute.

Most of this population is between the ages of 15 and 65, resulting in a robust labour force (Deloitte, 2013).

Another important element is Turkey's geographic location, particularly in Istanbul, as well as demographic advantages and population composition, which have all contributed to the country's rapid real estate market expansion. Turkey is geographically positioned between the European and Asian continents, with a population of 85,870,645 people in 2021, a growth rate of 1.27% percent, and over 67% of the population aged 15 to 65 years (Deloitte, 2013).

On the Global Real Estate Transparency Index, Turkey was the best improved Country. 97 Real estate markets were studied by The Global Real Estate Transparency Index in 2012 in order to evaluate the performance of real estate investments in terms of ownership. On a scale of the 97 markets, Turkey is the one that has improved the most. Turkey was also ranked 69th in the 2014 Conducting Business Report

Foreigners are able to buy property in Turkey with relative ease. In 2012, the percentage of houses purchased by foreigners in Turkey approximately reached 31 percent, with a total amount of $2.64 billion Dollar. While in the same year, higher than 13,000 properties were purchased by foreigners. A resident permit is not required to purchase property in Turkey, and likewise is the opposite.

The majority of foreign investors are drawn to retail malls and offices. other Association of Real Estate Companies, the best period for an office market was in 2012. It’s issued in the official gazette that Land Registry Law No. 6302 altered provisions such as the cancellation of the principle of reciprocity and from 2.5 to 30 hectares raised the area of land that can be purchased. Land and space, whether it is under the road and infrastructure organization plan or not, agricultural or non-agricultural, may be purchased by foreigners, so finally as a result, the foreigners can own property in Turkey (Deloitte, 2013).

C. Opportunities for Real Estate Investing:

As an emerging economy, Turkey's economy necessitates infrastructure investment in all sectors, including residential and non-residential real estate, including energy and power and also transportation.

Turkey intends to attain the following goals by 2023. Being one of the top 10 performing countries by 2023. Aiming for a staggering 2 trillion USD of the gross domestic product by 2023. Increased export deals to more than 500 billion dollars.

By raising export volume from 152 billion dollars to 500 billion dollars, the world trade share will rise to 1.46 percent. Construction enterprises must also set their goals in accordance with the country's goals.

1. Infrastructure:

Increase the length of the speed train track from 888 kilometres to 10.000 kilometres. The Turkish State Railways has set aside 514.9 million Turkish Liras for the construction of logistic communities. The government intends to construct 16 more logistic centres. TOKI, Turkey's Housing Development Administration, aims to develop 1 million residences for Turkish citizens by 2023.

2. Urbanization:

Turkey has experienced massive urbanization during the last six decades. The proportion of population in Turkey who were living in cities has climbed from 25% in 1950 to almost 75% presently. Urbanization's demands have grown over time, especially in secondary cities with considerable infrastructure and investment requirements.

3. Tourism:

By 2023, the government hopes to expand the number of tourists to 50 million by building additional facilities like as hotels, health centres, and sports centres to attract the tourists to come to Turkey.

D. SWOT Analysis Turkey's Real Estate Market:

To make a brief study for the Opportunities, and Threats, Strengths, and Weaknesses, in the Turkish Real Estate Market we can conduct the below points:

1. Strengths:

Several elements have influenced the development of the real estate sector concept, including Turkey's strong and sophisticated infrastructure.

Legislation, investment, and banking that is appropriate.

Foreign investors continue to receive government backing.

Turkey has a large population (over 82 million).

Turkey is regarded as one of the most appealing tourist destinations in the world.

The government and municipalities are planning urban renovation initiatives in the foreseeable future.

The updated regulation that had been settled and published to save The investor who became able to buy and sell under government supervision

2. Weaknesses:

The irregular housing practices based on Studies done in (2008 by Turhan 5-6).

A huge number of residences that have been licensed do not meet the criteria for obtaining a mortgage.

Land is expensive, particularly in large cities like Istanbul, Antalya, and Ankara.

3. Threats:

-Sector volatility, as is expected.

-The earthquake rate in Turkey is unusually high, particularly along the Mamara zones, such as Istanbul and Bodrum

4. Opportunities:

-House demand exceeds supply, indicating growth potential

-House quality has increased to meet seismic standards.

-Increasing demand for residences and shopping malls

- As part of the urban rehabilitation process, run-down districts and residences are demolished and replaced with contemporary structures. (2017, Istanbul Investment House)

In Turkey, there is a thriving real estate sector.

In general, we'll be discussing supply & demand in Turkey's real estate market, which may be classified into the following categories: (Retail Real Estate, Logistic Real Estate, Hotel Real Estate, Housing Market, Office Real Estate,)

E. Real Estate Market Trends in Residential Housing:

The foundation of Turkey's real estate market, is consists primarily of properties purchased from individuals for their own use. And this is a vital component of the industry, and the primarily given by private individuals, as well as public and cooperated organizations. The increase in population, urban regeneration, and natural calamities have all contributed to the growth of the housing sector. Construction of residential buildings increased after the 2001 financial crisis.

Turkey had a total of 13.6 million homes by the year 2000, with 38% of those being built under license. When comparing the number of constructions permits issued between 2002 and 2006, the number of residential units increased. Its increased from 164 $ o 318 $ The average per meter square value of approved houses after the crisis in 2002. The rural departure, or migration of individuals from rural areas to cities, has risen, particularly in Istanbul, Izmir, and Ankara. Residential construction accounted for 77 percent of all new homes built in 2005. (Deloitte, 2013).

F. Retail Industry:

The retail market, on the other hand, refers to assets such as shopping malls that are used for the exchange of customer products and services. Because of the increased demand for retail marketplaces in recent years, there has been continuous growth. From 2002 to 2008, the percentage of the retail market increased from 28% to 38%. At constant prices, household final consumption spending increased by 4.7 percent in the fourth quarter of 2015. In the same year, overall private demand was higher than it had been in the prior years. Household final consumption expenditures increased by 4.7 percent at constant prices by the end of 2015. In 2015, overall private demand was higher than it had been in prior years.

Sales per leasable space were around 644 TL per square meter, according to

the Turkish 15 Council of Shopping Centres. In 2016, the expenditure increased to 9.7%. With the opening of 1 shopping centre, Turkey's shopping centre supply increased to 10.5 million square meters, bringing the total number of shopping centres to 356. The shopping centre market is in high demand from international investors. Global investors own 33 percent of the average total inventory of shopping centres. (Deloitte, 2013).

Because of its strategic position spanning three continents, Turkey is one of the countries in Europe with a rising logistic industry, according to the JLL research (2015). According to LODER, Turkey's logistic sector is expected to reach 108-140 billion dollars in 2017.

Turkey's major logistical markets are in the Marmara region, particularly in Kocaeli and Istanbul. They may be located at Esenyurt, Gebze, Tuza, Hamidikoy, and Kocaeli in Istanbul. This market is primarily based on sales volume, which is influenced by macroeconomic and microeconomic variables.

G. Price:

Price refers to the amount of money or compensation given by one party to another in return for products and services. Prices for commodities given in the commodity's currency are considered as units of some type of currency in modern economics. Prices can be represented in terms of amounts of other items or services; however, this type of provided money is rare (Herring & Wachter, 2003).

Any economy, no matter where it is located, relies heavily on real estate. It produces a function with a large multiplier effect, which is a useful economic indicator. "Land and anything fixed, immovable, or attached directly to the earth or floor, such as buildings, roads, and plants" is how real estate is defined (Brueggeman & Fisher, 2007).

There was changes in House prices in the past in a number of countries. This has been related to the current state of the economy. In some countries, notably the United States, price shifts have increased home defaults, with millions of residential homes having negative equity mortgages with outstanding loan instalments bigger than the property prices (Burnside, Eichenbaum & Rebelo, 2011).

Because prices are influenced by market demand, house prices are an important indicator of the real estate market. At the same time Demand is influenced by a variety of micro and macroeconomic factors. To completely comprehend developments and changes in a real estate market, it is necessary to comprehend the variables that cause price swings.

Higher real estate prices also tend to increase economic activity by promoting investment and consumption spending through financial returns.

Theoretical Review (section 2.2)

The theoretical study provides a theoretical foundation on which theorists have provided an explanation for pricing adjustments, particularly in the country's residential home management.

1. Pricing Hedonic Model:

Lancaster's key study on the hedonic model of pricing is the first academician to discuss the hedonic model of price. Lancaster presented a ground-breaking hedonic value hypothesis. According to him, utility is formed by the individual attribute of the commodities that create the utility, not by the product itself. As a result, the utility of an item is the sum of the individual utility of each of the qualities.

Lancaster suggested that goods might be categorized based on the traits they hold or contain, based on the principle. As a result, a consumer's selection is based on a variety of characteristics or attributes that a specific commodity or service possesses per unit cost.

Lancaster, on the other hand, was the first to discuss hedonic utility, but he did not mention the pricing in his study. In 1974, Rosen, a fellow researcher, was the first to mention the hedonic pricing model.

He claimed that the sum of all parts or ingredients values are equal to the total price, and that it’s possible that the product's value is being computed as the sum of all resource features or traits. As a conclusion, the price can be expressed as the sum of the prices of all the different attributes.

Rosen, at the same time, did not provide a workable version of the hedonic pricing function. The model also, could be regarded as a company's non-linear asset pricing structure that influences household item prices.

Several key assumptions underpin the theoretical application of the hedonic price model to the property market. Initially, the housing product is presumed to be homogeneous. Another assumption is that the market is perfectly competitive, with a large number of buyers and sellers who can freely enter and depart the market. The model assumes that both buyers and sellers have complete knowledge of the housing product and its price.

Furthermore, the hedonic pricing model can only work if the market is in equilibrium and the implicit prices of the qualities that determine the house's cost do not interact (Rosen, 1974).

The most perplexing feature of the model is the presence of independent variable that is not included, un important or misspecifications of variables known as over-specification, or when an important independent variable is removed. As a result, the coefficient will be skewed and unreliable (Rosen, 1974).

The essential need is that we just need basic information, such as the cost of the building, the composition of its components, and the functional relationship characteristics. It is a direct approach since the coefficient to build the hedonic regression requires knowledge of the house structure, styles, and nature. It is unnecessary to learn anything about the home buyer (Rosen, 1974).

2. The Housing Sector’s Developments:

Since the beginning of the second millennium, the housing industry has played a critical role in the Turkish economy's success. Following the banking crisis of 2001, Turkey implemented fundamental changes such as banking sector regulation and fiscal discipline. Aside from that, the "full membership negotiation with the EU" has become a crucial anchor for Turkey in its efforts to strengthen the operation of the free market, improve international relations, and expand international trade volume. Furthermore, subjects such as democracy, the supremacy of the law, human rights, and intellectual freedom have become central to social programs. All of these

favourable trends prompted international direct and portfolio investments in Turkey, raising expectations in a variety of industries. Between 2002 and 2007, the housing sector was one of those that benefited greatly from the strong investment and consumption environment. The global financial crisis of 2008, which impacted advanced countries first due to significant use of derivative financial instruments and then emerging market countries with a lag, halted these beneficial tendencies. In Turkey, the housing industry recovered quickly in sync with the country's relatively swift economic recovery. **(**Reşat 2021)

H. Residential real estate pricing determinants

In numerous countries, a variety of factors influenced the residential real estate market. The size of the real estate market is one of the characteristics included in this study's analysis. Several factors influence the price of residential real estate. Interest Rates, Gross Domestic Product, and Inflation Rate (Mak, Choy, & Ho, 2012).

Interest rate is the main influence on the residential real estate market. Fluctuation of interest rates in developed countries have a significant impact on a person's capacity to purchase residential real estate in that country.

This is due to the fact that a decrease in interest rates raises the cost of obtaining money to pay for real estate prices in a country. Interest, on the other hand, raises the cost of obtaining loans or mortgages, which reduces demand for residential real estate prices. Because of the predominance of low interest rates, purchasers are able to obtain more money and finance the purchase of several residences due to the lender receiving less or lower mortgage payments. The circumstance attracts a lot of buyers to the market, which can lead to a lot of people bidding on property and an increase in overall prices.

The impact of interest rates on an individual's ability to purchase residential real estate by increasing or decreasing the cost of a mortgage is significant. Many people incorrectly believe that the greatest and cheapest component for real estate acquisition is a mortgage.

Mortgage rates, on the other hand, are merely one essential and pivotal component that influences property values. The interest rate has a variety of effects

on capital flows, supply and demand for capital, as well as the needed rates of return on investments for investors (Liow, & Huang, 2005).

Aside from the aforementioned factors, the status of the economy has an impact on the price of residential real estate. Economic indicators such as employment, manufacturing activity, GDP, and commodity prices in a country are used to assess the economy as a whole.

The GDP defined as the total value of services and finished good produced in a country through a given duration of time. on the other hand the GDP per capita of a country is used to determine its standard of living. As per an economic theory, per capita income equals GDP per capita income. Low GDP means less purchasing power, which reduces real estate demand and lowers prices.

When the demand for residential real estate grows, so does the economy; conversely, when the economy slows, so does demand for real estate; and the economy's cyclical nature has a particular impact on different forms of residential real estate. An investment in a hotel, for example, will be more affected by the economic slump than an investment in an office building. The hotels are a business asset whose lease structure is influenced by economic activity. When the economy is terrible, renting a hotel room is considered as a form of short-term lease that hotel guests can use to get away from it all.

On the other hand, office tenants typically have longer-term leases that cannot be modified during a downturn (Case, K., Shiller et al. (2005).

Another element that affects residential real prices, according to AFI (2004), is disposable income and the availability of financing, which are the key drivers of home prices in different nations. In reality, rising disposable income is unquestionably important in understanding past price increases. In addition, income discrepancies are a direct cause of residential property price levels in different parts of the country. Unemployment is closely linked to disposable income. As unemployment (or the possibility of future unemployment) rises, demand for housing falls, and prices fall with it. At this moment, it's difficult to say if unemployment rates in different countries will vary significantly in the near future. The majority of homes are purchased with the help of a mortgage.

Inflation is another factor that influences the value of residential properties. This is due to the need for real estate to respond to rising expenses; in this case, the cost of the land and building should be taken into consideration; the data which is available reveals that as people's security improves, construction prices in the country have risen significantly. In this case, the costs of land are different. Land Price are not a cause of real estate prices, but instead a consequence of them, because higher property prices resulted in increased demand for land and increased the land prices, which in turn resulted to increase prices of real estate (Gallagher, 2011).

As a result, inflation affects the purchasing power of money. Inflation is assessed by changes in the customer price index, which monitors retail prices for household goods and services (Liow, Ibrahim, and Huang, 2005). In Turkey, there is a clear correlation between inflation and residential property values. One of the main factors that determines residential real estate prices is the money supply, which is a broad measure of money in circulation.

An expansionary fiscal policy will have an impact on the inflation rate, which will almost certainly rise, resulting in negative effects for the economy. The excess supply of money as a result of the increasing discount rate may lead to an increase in inflation and the environment, damaging investment (Liow, Ibrahim & Huang, 2005).

Mak, Choy, & Ho (2012) conducted several research, including Region Specific Estimate of the Determinants of Real Estate Investment in China, which used a reduced form of equilibrium model to determine the source of real estate investment in China (22 province, 5 regions and 4 municipality). The study covered the years 2001 to 2006, with 186 data points.

Particularly, the findings revealed that demographic, economic, and planning issues all influence rent costs. The research suggests that the Chinese government should focus on numerous policy parameters to create a balanced real estate investment in Chinese areas, despite the relatively tiny coefficients in real estate indicating that it has an effect, albeit a minor one.

Alves, Yoshino, Corralo, and Amtein (2011) conducted additional study to evaluate the dimensions of asset pricing. From January 2001 to March 2000, the researcher gathered data on real estate in San Paulo. The results showed that the

longer the mortgage financing term, the higher the house prices, while the reducing interest rate spread boosted the real estate market. As market risk indicators grow more prominent and relevant in the study, the hedonic model loses its significance in pricing, according to the study.

According to Lieser and Groh (2011), the factors for commercial real estate investments using a sample of 47 nations from 2007 to 2009 investigated how diverse socio-economic, demographic, and institutional traits affect real estate investments owing to pricing using a panel of 47 countries.

Using cross-sectional and time series analysis, run enhanced random effect panel regressions. Their findings revealed that economic growth, rapid urbanization, and compelling demographics attract real estate investments, while a lack of legal clarity, administrative burdens of doing business in real estate, socio-cultural challenges, and country political instabilities deter real estate allocations.

According to Lu (2012), Chinese real estate firms have been aggressively seeking new marketing strategies, including e-commerce, as a result of circumstances such as the subprime mortgage crisis, stock market volatility, and strong market competition (Lu, 2012).

Sun Lu undertook a survey-based investigation into the current state of affairs. of 27 Chinese real estate enterprises. Intensity of industry completion, support from senior executives, organization size, costs, and other deterministic elements, according to the study, all influence whether or not to adopt an e-commerce business model. The elements that influence the choice of an application model in e-business are organization size, compatibility, executive support, and associated risks.

The invested relationship between the e-business model and their performance was discovered that there are differences in facilitating customer service, economic growth, and improving the company image.

A hedonic regression model, according to Selim (2008), could be used to investigate the drivers of housing prices in both urban and rural areas. According to the study, the water system, type of house, pool, number of rooms, house size, style of building, and location are the most important factors influencing property prices. According to Mikhed (2009), fast declining house prices in the United States are

justified by criteria such as income, population, housing rent, stock, market wealth, construction expenses, and mortgage rate. With the aggregate data, the study was conducted using the conventional unit root and cointegration test. The overall analysis could be hampered by a lack of power stationarity and a lack of knowledge about regional housing markets. As a result, the panel data stationarity tests were used, which are resistant to cross sectional dependence. Previous studies of residential real estate in the United States, on the other hand, looked at a variety of characteristics rather than just one.

In contrast to past studies of the US housing market, they looked at a number of factors rather than just one. The results revealed that panel data unit root tests outperform Univariate tests in terms of power. The general conclusion is that all of the pricing techniques do not correspond with the alignment in the sub-samples prior to 1996 and between 1997 and 2006. Real estate values have been observed to vary substantially from their core worth and take generations to recover to it.

Furthermore, Doerner (2011) revealed that the pathways are through change in home prices can affect city revenue per capita and test for symmetric effect during housing booms and busts using a unique 15-year panel in Florida.

They discovered that rises in house price enhance revenues, but declines in price have no influence on revenues in the median-sized city. Furthermore, the size of the effect is minor. While the most direct connection is through assessed values, the results show that changes in housing prices have an impact on revenue sources. The study's overall conclusion is that home price fluctuations in Florida are weekly and linked to city tax payments and revenue per capita, contradicting common press claims that price fluctuations affect budgets.

Stadelmann (2010) examined the solidity of 33 communities with specific explanations of both variables the dependent and the independent, property prices in Zurich the Swiss capital using a Bayesian model Study of averaging. When predicting residential house prices or forecasting the influence of other community specific traits in a highly developed country's major city, critical analysis provides a new way to apply hedonic variable selection and is responsible for the smallest list of variables that serve as a prior limitation. In this situation, location specific real estate is a critical variable that capitalizes with a high posterior probability. Consequently, demographics, and also other socioeconomic indicators, are considered secondary.

Egert and Mihaljek (2007) employed the panel technique to determine the house price dynamics in eight economic growths in east and central Europe, as well as the 19 OECD countries, in a similar way to the previous study. The study lays the groundwork for real-world interest and demographics.

The analysis also confirms the relevance of transition-specific elements such as housing quality improvement and residential marketing in the study.

In CEE and OECD countries, the real interest rate, gross domestic product, and housing credit all have a considerable impact on property prices, according to the study. In the nations analysed, demography and labour market development play critical roles in residential real estate price dynamics.

Posedel, P & Vizek, M. (2009) found that property price changes in six European countries: Estonia, Croatia, Ireland, Spain, and the United Kingdom. The study focused on the factors affect the homes prices to rise in the nations investigated. Because housing price increases in the recent two decades have not been limited to transition countries, the analysis was broadened to cover three EU-15 countries. Concerns about similarity and difference between groupings of nations were addressed in terms of housing price factors. The empirical study of VAR was used to predict how interest rates, GDP, housing loans, and construction affect real estate prices.

Moreover, multiple regression analysis revealed that price inflation was the driving factor for home prices in all of the groupings of countries investigated, with comparable findings including a mix of personal and private income, as well as interest rates.

Julius (2012) investigated the factors that influence the price of residential real estate in Kenya, Nairobi. The study found that inflation, money supply, interest rate, and employment rate, as well as population dynamics, had an impact on property prices, despite the fact that there was little or no empirical evidence available. The study employed data obtained from Kenyan statistics organizations and the Kenyan Central Bank and other, including Hass Consulting Ltd, to establish the existence of a relationship between variables using a multivariate regression using SPSS.

At the end, the conclusion revealed that data on money supply and

employment growth can be used in financial research to gain a better comprehension of the real estate market and how home prices affected by it.

As per Muli (2011) study which investigated the relationship between lending mortgage and Kenyan real estate prices. In recent years, there was exceptionally huge changes in property values, from 2006 to 2010, a quarterly data base was used for the study. The dynamic of the model developed using multiple regressions to examine the impact of home prices and credit. The authors of this study come to the conclusion that fluctuations in home prices are caused by changes in mortgage lending.

Muthee (2012) looked into the relationship between economic growth and housing real estate values in Kenya. During a five-year period, data was collected from numerous sources but linked in a similar or equal time and period, evaluated, subjected to regression analysis, and evaluated for validity while tracking the Hass Housing Price Index and Kenya's GDP numbers. The results demonstrated that variables are linked, on a quarterly basis, the change in HPI resulting to change in GDP. According to the statistics and analysis, Residential real estate is a powerful asset sector that has been overlooked by many investors.

Investors' varied concerns in attempt to provide an acceptable assessment of the manner in which real estate values are influenced, which has an impact on the status of the annual rent rate.

İ. Turkish Economy and Real Estate:

Turkey's population is made up of about 17 million households, with an average household size of five persons. Marriage is the most essential component in growing household numbers; for a long time, house hold capacity has been shrinking or declining due to social and economic considerations; divorce and single houses, as well as the necessity to construct suitable homes, have all contributed to this. (Altan, Ozgür, 2009).

After Turkey's 2001 crisis, building permits considerably were granted to a lot of locations. Today, the largest source of housing demand is that the ownership for foreigners opened, however the necessity for substitution has boosted demand for real estate development. The number of annual residence licenses varies between two

and four, according to statistics (280.000 and 320.000), a sign of the country's low level of unregistered construction sector activities, which could pose regulatory challenges to the economy.

The 1999 earthquake in Izmit, which is part of Turkey's metropolitan area, had a devastating impact on a large part of the country, including Izmit, Adpazari and Istanbul, as well as the important areas of the north. The occurrence of the earthquake resulted in a decrease in the construction quality in Turkey. There were laws enacted to ensure that new estates development mechanisms comply with the earthquake standard, but current real estate still need checking to validate the standard and reassurance to improve the property's firms' ranking to more than the average levels (BRSA, 2008)

Turkey's economy is one of the most powerful in the world today. In terms of economic growth, the country is ranked 17th largest in the world. The GDP become 742 billion dollars. According to recent advances in international study findings, Turkey will be able to compete among the world's top ten first-world economies in less than 40 years (DPT, 2009).

The trend in this economic overview provides the trends and movement of the economy and the investing in real estate sector, if it is managed appropriately. Turkey is considered to be at the high point of growth, and its future in the European Union can successfully affect the economic value to enhance the investment opportunity for the partners and in the trade in sectors that are not growing in this sort of economic important side. If Turkey is properly managed, its future in the European Union will be successful.

Turkey covers a total of an area of 778.000.000 km2, with forested regions accounting for 26% of the total, and pasture land accounting for 12.3% of the total. The remaining 480,000Km2 of the remaining territories makes up the total area. Residential land accounts for 5% of the total area, or 40,000 km2. The percentage of people living in rural areas is 56 percent (440,000 Square kilometers). In addition, the registered land in Turkey comprises approximately 35 million pieces and 600,000 acres (Bank and Matarac, 2004). The real estate and construction industries are extremely important to the functioning of the country, as well as to the growth of Turkish economies. The housing and finance sectors, along with the real estate market, are able to function effectively and have an effect on the development of the

nation as a whole as a result of economic growth and migration to urban regions. Real investment must be made on a consistent basis.

Turkey covers an area of 778.000.000 km2, with, agricultural land accounting for 12.3% of the total, and forested regions standing for 26% of the total. The remaining 480,000Km2 of the remaining lands makes up the total area. Residential populated land accounts for 5% of the total area, or 40,000 km2. The percentage of people living in country side areas is 56 percent (440,000KM2). In addition, Turkey has about 35 million parcels and 600,000 acres of land titles (Bank and Matarac, 2004). The real estate and construction sectors are essential to the functioning and growth of the country, as well as the growth of Turkish economies.

Consistent real investment is necessary if it is to work properly and have an impact on the development of the nation as a result of economic growth and migration to urban regions. This is true for the housing and finance sector as well as the real estate market.

The country's growing population and cross border movement are projected to have a substantial impact on the country's real estate markets. Turkey's population was estimated to be at 70.6 million people at the end of 2007 according to the 2007 Census. At the same time, the fertility rate in the country is 2.2 children per adult woman, which is higher than the 1.5 children per woman in other European countries. In the current setting, 53% of individuals are under the age of 30, indicating that there is room for population expansion

The country's real estate demand and commercial housing developments are heavily influenced by population demography changes (Deutsche Ban Research, 2008).

Furthermore, the projected population expansion and size necessitate the development of an environmentally sound housing design capable of sustaining the building industry's growth. Deloitte (2009)

The investment through building or real estate is a good and protective but the revenue will not be immediate or short term, particularly in the context of the specific setting for the middle and low-income citizens. The focus on rural areas and residents necessitates a critical awareness of how important housing and development are to the people in the country. The consumer's incentive is tied to the

protection of savings from the destructive impact of inflation, which creates high inflation for interest rates, which damage the economy and have dominated the Turkish economy for over 30 years.

The asset market in Turkey cannot be expected to develop at a high rate due to the fundamental results in the direction of high housing costs and the costs of the economy in terms of financial liabilities. (Berna Onder, 2004).

Foreign direct investment (FDI) enters into the nation by the real estate industry, which generates value by renting and has seen a growth in recent years. Inflows into the real estate industry accounted for 4.5% building for rent and financial gain and about 5% of total foreign investment inflows to Turkey's economy. In 2002, the real estate company essentially in the real estate business began to experience a positive growth margin. Population expansion, as well as immigration from towns, necessitate the building of more situationally resistant structures, especially in areas along danger lines, for the development of factors that stimulate investments in the construction sector in order to achieve growth (Under-secretariat of Treasury, 2009). The disclosures bring to the spotlight and a discovery that basically, economic growth supports the country's development activities and is essential for the country's growth and development.

The according to the research done (Deal watch data) it shows that there were 259 alliances in Turkey in 2008. In the same year, the active sector, which includes industry, real estate, and transports, grew by 26 percent. From 2003 to 2008, the total net estate for the purchasing was 13 B dollars. There were 21,079 foreign organizations at the end of 2008, with the majority (6,210) working in the wholesale and small business sectors, 3,757 in the industrial sector, and 2,408 in the building leasing sector (Undersecretariat of Treasury, 2009). On average, the real estate industry has thus given the necessary foundation for the country's support through mergers and acquisitions, which has a significant impact on the country's growth and development composition.

The state of the economy has also aided the generation, development, and extension of the real estate industry in the country, suggesting that the economy has supported company growth while not leaving the real estate industry behind. Fundamentally, a solid economic condition provides fertile ground for businesses to develop and survive for a long time, suggesting that the country's business

environment is conducive to enterprises thriving and surviving for a long time.

Turkey is at the top of the list of countries that participate in the building industry's export. The leading magazine in the country, with 31 companies exporting 225 for the construction industry. In 2009, Turkey was ranked second in the world, behind China. For the Turkish construction companies between 1972 and 2009. Building projects that are sold produce cash, and Turkish construction projects are estimated to reach 155 billion dollars over the next five years (Turhan, 2008). According to estimates, the demand in real estate in the country is increasing because of the lack of high-quality houses.

So consequently, the favourable environment presence, which is needed for the building industry, offers direction to this environment. The real estate industry not only promotes Ankara's inflows, but also gives a fertile foundation for the country's businesses to develop, resulting in improved firm profitability.

The Turhan's study results and housing planning for Turkey's residential demands for the country are estimated to be approximately 2 million, either for the renewal or for the modification of project quantity and quality to satisfy the needed housing requirements.

Due to rising population and urbanization, Turkey's economy would require 5.5 million homes by 2015. The occurrence of housing shortages means that more than half a million dwelling units must be produced each year. The findings also show that, given the rising economy and rapid urban expansion of buildings, as well as the growing economy and quick commercial expansion, efficiency in office buildings is on the rise (Turhan, 2008). According to research published in 2008, 5.300.000 new houses will be required from 2007 to 2017 (3.700.000 for replacement and 1.600.000 for new construction), with another 500,000 more dwelling units required every year for the next ten years (2018 to 2027). The demographic qualities of the chance create a positive economic effect of the European Union, which aids participants in gaining political benefits and boosting stability and manufacturing for the country and other interest groups. The techniques for this evaluation will be to emphasize the positive impact of the few concerns provided. The favourable impact, according to the report, stimulates local demand for real estate in the nation.

J. The effects of the economic crisis on Turkey's real estate market:

Turkey has been hit by many financial crises, including those caused by the banking sector in 1994-1995 and 2000-2001, as well as the worldwide financial crisis in 2008. Turkey's political, social, and economic perspective have been radically altered as a result of these crises (CosKun, 2010).

During economic downturns, the building industry has thrived. From 1999 to 2013, the construction industry's growth rate was combined with the fluctuation in the real GDP growth rate in the graph above. In 1998 and 2013, the share of the total real estate industry reflected by market value rose from 8.3 percent to 9.8 percent. By end of 2013, 5.8% was the contribution building sector's to GDP, while other sectors and real estate renting contributed 4%. The financial crises in 1999, 2001, and 2009 had a big impact on the real estate market. The real estate sector increased strongly in 2006, 2010, and 2011, with 16.6%, 13.9 percent, and 10.7% growth rates, accordingly. Because of the financial crisis in 2001, loans were thoroughly scrutinized, and the cost of borrowing overseas became prohibitively expensive for Turkish financial firms as a result of the liquidity problem. During this time, interest rates were raised, causing the amount of lending to double.

Several overseas investors have returned to their home markets in order to generate fresh chances for themselves. The rise in borrowing rates led to a small increase in investment yields on commercial standing assets. To put it another way, banks offer more complicated and expensive financing arrangements, allowing only active investors with high equity ratio means to participate, resulting in higher commercial asset returns. Following the crisis, and particularly between 2003 and 2007, the Turkish economy experienced phenomenal growth for a variety of reasons, including EU full membership candidacy, improved liquidity as a result of increased direct and portfolio investments. After 2001, interest rates and inflation rates fell, and liquidity increased, resulting in a boom in real estate and construction investments. The construction sub-sector had a 3.5 percent to 5.3 percent impact on the gross national product over the course of its operation from 2004 to 2006 by TurkStat (Turkish Statistical Institution).

Yasemin Kabalci is a second-year Istanbul University business finance student. She believes she will be able to get a good career one day, but that

purchasing a home will be much more difficult.

(Property Guru 2021) At the moment, it’s too early for my age to buy a house, Kabalci, 22, adds, and I deeply know that buying a house is something too expensive. Turkey's house construction industry is quite well, with about 800,000 units built each year. However, most of those are currently on the high-end of the market, potentially pricing many people out.

The World Bank's Country Economic Memorandum on Turkey addresses this and other concerns concerning the Turkish housing sector.

While Turkey's property finance industry has some positive aspects, such as the prevalence of fixed-rate local-currency mortgages and modern regulations, it is underdeveloped in terms of product variation, funding channels, and market penetration, according to the memorandum.

According to the survey, lenders only provide affluent clients with loans that are affordable to the top 20% of metropolitan households.

"In the case of Turkey, we have a large number of structures that must be cheap, so correlating supply with demand is critical," explains Orhan Vatandas, Data Analytics Manager for REIDIN, a Turkish real estate market intelligence service.

"That also goes to home buying power, which is mostly determined by income and conditions, as well as mortgage interest rates and its end date," he explains.

The king and queen of market forces are supply and demand. It is the most basic economic principle: if people desire to buy something that is in short supply, prices will rise. Prices will fall if there is a higher supply of an item than there are people eager to buy it. Since this oversimplified statement may not convey the nuances of market interactions, it does summarize a key property market idea.

If there is a significant excess of a particular type of property, demand will be low in comparison to supply, and prices will suffer.

Current developments in Malaysia's property market show a slowing, and even a drop in prices in some locations, as a result of recent overstock in some categories.

Even while the general market conditions imply a mismatch in some sectors,

supply and demand means that popular regions continue to enjoy price growth.

Depending on whether you're a buyer or a seller, how you react to shifting property market economics may differ.

When price recession or depreciation offers an opportune opportunity to purchase in some places, a property mismatch might create a buyers' market.

Due to these reasons, property owners may choose to consider options such as renting rather than selling during a weak market.

In important locations and categories, high demand and low supply still persist, with landed property under attractive Kuala Lumpur suburbs demonstrating how property with a restricted supply can continue to experience price increase even in less favourable market conditions.

In 2021 Q2, housing sales increased by around 10.2% compared to the previous quarter and reached 289.760 units. 2.1% increase was recorded in housing sales compared to the same period of the previous year. First-hand sales rose by 8.9% compared to the previous quarter and was recorded as 87.508 units. This figure was the second lowest quarterly figure of the first-hand sales. Second hand sales increased by 10.7%, and 202.252 second-hand houses were exchanged in Q2. The ratio of first-hand sales to total sales dropped to 30.2%. Despite a limited decline in housing loan interest rates, there was a 20.6% increase in mortgage sales in Q2 compared to the previous quarter. While 56.952 mortgage houses were sold, other sales were recorded as 232.808. Compared to the same period of the previous year, mortgage sales fell by 58.5%, while other sales rose by 58.7%, with the effect of mortgage sales in June, when the reduction in housing loan interest rates began. Housing prices reached 32.39% in April, the all-time high in historical data, and dropped to 29.07% as of May due to the base effect. The new house price index was 32.27% in May. Yet, as of May, the real return on housing prices decreased to 10.7% and to 13.4% for new houses. On the other hand, sales to foreigners increased by 7.2% compared to the previous quarter. In Q2, 10.601 houses were sold to foreigners and 20.488 in the first half. Both were the highest sales figures in the data set. In housing sales to foreigners in Q2, Istanbul ranked first with a 48% share, followed by Antalya with a 19.9% share.

Housing sales climbed by 10.2 percent in the second quarter of 2021

compared to the previous quarter, reaching 289.760 units. In comparison to the same period the previous year, housing sales increased by 2.1 percent. In comparison to the previous quarter, 1st sales increased by 8.9% to 87.508 units. This was the 2nd quarterly result in the history of used houses sales. In the second quarter, second-hand housing sales climbed by 10.7%, with 202.252 used houses traded. First-hand sales as a percentage of total sales fell to 30.2 percent. Despite a little drop in house loan interest rates, mortgage sales increased by 20.6 percent in Q2 compared to the previous quarter. Other sales totalled 232.808 while 56.952 mortgage houses were sold. Mortgage sales declined 58.5 percent year over year, while other sales grew 58.7 percent, with the effect of mortgage sales beginning in June, when the fall in home loan interest rates began. Due to the base effect, housing prices rose to 32.39 percent in April, an all-time high in historical statistics, before falling to 29.07 percent in May. In May, the new housing price index was 32.27 percent. However, till May, the real return on housing prices had dropped to 10.7% for existing homes and 13.4% for new homes. Sales to foreigners, on the other hand, grew by 7.2 percent over the previous quarter. Foreigners bought 10.601 residences in 2nd quarter and 20.488 in the first quarter. Both sales statistics were the highest in the data set. In 2nd quarter, Istanbul placed first with a 48 percent share of foreigner house sales, then Antalya with a 19.9 percent share.

The demand for housing represents the demand for both a consumption as well as an investment good. The stock of housing provides a flow of housing services whose demand can theoretically be derived by maximizing a homeowner's utility function subject to a budget constraint (ALAN 1990). Aggregate demand becomes a function of wealth or permanent income, mortgage rates, the price of housing services, population growth, household tastes, and the price of other goods and services.

K. Influence of Macroeconomic Factors on Prices of Real:

A household income is commonly considered as a key component that fundamentally determines apartment costs (European Central Bank, 2013). According to Paiella (2007), there is a significant link between property and consumption, which suggests that when property values rise, so does household property. Reichert (1990) investigated the impact of interest rates,

employment, household incomes, and migration on apartment prices on a state and international basis. He concluded that interest rates on mortgage credit had the most impact on prices on a national basis, but population migration, household incomes, and employment had the greatest impact on prices on a regional level. According to Bardhan et al. (2007), the Gross Domestic product is one of the most important factor that drives real estate demand. Zull Kepili Izati and Masron (2011) looked into the relationship between GDP and real estate prices. They studied the relationship involving real estate prices, foreign investment growth, and GDP in South Korea and Malaysia in their study. They discovered that the growth of GDP and real estate values in South Korea were higher as a result of a concurrent increase in foreign investments. Valadez investigated the relationships between real estate prices, real estate price indexes, and GDP in the United States (2010). He discovered that there was a strong relationship between the real estate price index and GDP, but he couldn't pinpoint why.

On the other hand, the findings of a study conducted by Giussani et al. (1993) revealed that GDP is linked to the price of commercial real estate. The authors looked at the elements that influenced the cost of renting commercial real estate in European cities. The research was based on a supply and demand analysis. They discovered that unemployment and GDP and unemployment were statistically directly correlated to the rental values of commercial real estate. After investigating factors related to the price of commercial real estate rental in twenty European cities from 1982 to 1993, D'Arcy et al. (1994) came to similar results. The findings of the study revealed that unemployment and GDP are the most important factors affecting the price of commercial real estate leasing in the cities studied. Chin (2003) investigated the impact of macroeconomic conditions on the price of commercial real estate leasing in five Southeast Asian cities from 1988 to 2001: Taipei, Hong Kong, Singapore, Bangkok and Kuala Lumpur. He took into account the following macroeconomic aspects in his research: Customer Price Index, credit interest rate, GDP, scope of production, and so on. Unemployment and the surface of a company's site, by Bojan Grum and Darja Kobe Govekar / Procedia Economics and Finance 39 (2016) 597–604 599 He discovered that the surface of the company premise and the credit interest rate were the two most important elements in determining the price of real estate leasing. A comparing with European studies reveals that scope of

output, GDP, and unemployment rate are the most important elements influencing the rental price of real estate. However, in the case of five Asian cities, these criteria are unrelated to the cost of business real estate renting (Chin, 2003). Ping-Ma (2010) investigated the impact of real estate price fluctuations on China's economy and GDP. Using scientific data, he demonstrated that a rise in real estate investments has a considerable impact on GDP growth. Such a finding, in the author's perspective, is understandable given that real estate investments account for more than 11% of Gross Domestic Product. His forecast for the coming years, when he predicts real estate values to rise again in China, the United States, and Europe, is pretty intriguing. Between 1995 and 2002, Shen and Liu (2004) demonstrated that real estate prices could be explained by unemployment rate, population growth, building expenses, consumer price index, family income, and the amount of real estate on the market in a sample of 14 Chinese cities. Zhou (2005) did a similar study between 2001 and 2004 on a sample of Chinese cities: Beijing, Shanghai, Tianjin, and Chongqing. He discovered that in Beijing, bank loans, number of sold apartments, and household income were statistically significant factors in determining apartment prices; in Tianjin, number of sold houses and household incomes were critical in determining prices; and in Chongqing and Shanghai, expected apartment prices and construction costs were the most important factors in determining house prices According to studies conducted by authors like Stiglitz (2011), Shiller et al. (2010) and Case (1988), and , the anticipation of possible customers were the most important element statistically significantly linked to the movement of real estate values. Ho and Wong (2008) found that the demand for real estate or residences in Hongkong influenced their pricing statistically considerably. As per Akbari and Aydede (2012), by the end of 2008, the prices of real estate in certain industrialized countries had climbed dramatically in compared to the increase in per capita income. They came to the conclusion that the low interest rate was the reason of the rise in prices since a cheap interest rate allowed a buyer to purchase real estate while having limited financial means

The researchers found that the interest rate and liquidity of the money supply were linked to the development of the real estate market, as demonstrated by Greiber and Setzer (2007). Those who studied the real estate prices in 18 industrialized

countries and established a substantial correlation between real estate price and monetary policy, such as Ahearne and colleagues (2005), have corroborated this. They came to the conclusion that the interest rate was the most important factor that influencing the demand for real estate. Jacobsen and Bjorn (2005) came to a similar conclusion in their research when they discovered that the scope of residential real estate construction, interest rate, the unemployment rate, and the household income, were the most important factors that were statistically mainly correlated with real estate prices in Norway, according to their findings.

Glaeser et al. (2010) revealed that, between 1996 and 2006, the prices of real estate climbed by 53 percent when compared to the prices of essential commodities; yet, low interest rates could only explain a fifth of the increase in price over this time period. During the period 1980 to 2002, Goodhard and Hofman (2007) conducted research to determine the relationship between the Loans, amount of money in circulation, the price of real estate, and the economy of industrialized countries. Real estate values, money amounts, loans, and macroeconomic effects were all found to be statistically significant in the research. There was a strong relationship between loans and the quantity of money available, whereas there was a relationship between loans and the amount of money available and the value of real estate available. As a result of their research, Gerlach and Peng (2005) discovered that real estate values were linked to bank loans rather than the other way around. The findings of Zhang et al. (2006)'s study on Chinese real estate prices and bank loans confirmed a statistically significant and positive relationship between the two variables. When Liang and Gao (2007) looked at the relationship between monetary policy and real estate prices, they found that it was the same as before.

Real estate, being the most valuable personal possession, has always attracted the attention of society. Turkey's real estate prices have been dramatically growing in recent years. It has become a key gauge of living costs, particularly in large cities. To combat this trend, the government has enacted policies to regulate the overheated real estate market and alter the CPI. Based on these patterns, we can conclude that real estate prices have an economic and social impact on our monetary policy. In this research, we will examine Turkey's monetary policy transmission effect through real estate prices, as well as the inflation, Population, Interest rate, GDP measure method modification based on real estate prices, and then quantitatively analyse the monetary

policy transmission mechanism using available data (Chen, Qin Si 2011).

L. Definition of Terms:

1. House Price Index:

The House Price Index, known as the HPI, is an index that is calculated on a quarterly basis that tracks the changes in the cost of single-family homes in the United States. By collecting and compiling data on the median price changes of houses that have recently been resold or refinanced, the Home Price Index (HPI) serves as an indicator of trends in home pricing. The Home Price Index (HPI) is compiled and distributed by the Federal Housing Finance Agency (FHFA) with the assistance of data provided by the (Freddie Mac) Federal Home Loan Mortgage Corporation and, the (Fannie Mae) Federal National Mortgage Association (JASON 2022).

The Federal Housing Finance Agency (FHFA) keeps track of the price of single-family dwellings. The House Price Index (HPI) is a single-family house value index maintained by the (FHFA). Since the mid-1970s, the index has calculated property prices using data from purchases and re-mortgage in the 50 states and over 400 U.S. cities. The House Price Index (HPI) is a weighted index that measures changes in single-family home values from the mid-1970s to the present. It calculates the average price change in repeat property sales or refinancing's. (Danielle 2022)

Because the difference in housing quality is regulated by following the same properties across time, the House Price Index is termed a "constant quality" index. The HPI is not adjusted for inflation, therefore nominal gains are reflected.

Tens of millions of house sales in the United States are included in the statistics. The index provides information on house price fluctuations at the regional, census, state, city, counties, and Postal codes levels since it analyses home transactions over time.

The quarterly and monthly House Price Index reports are free and open to the public. The index is frequently used by journalists and scholars investigating business cycles, local government budgets, aggregate demand, and demographic shifts, among other topics. (Danielle 2022) Function of the House Price Index, is that the HPI is a tool for analysing housing market movements, which have a

considerable economic impact. The HPI can be used by academicians to better analyse changes in home ownership, prepaid expenses, and mortgage defaults. The FHFA's House Price Index (HPI) is a free, publicly available indicator of housing prices in the United States. The index is produced using single-family mortgages purchased or mortgage-backed securities by Fannie Mae and Freddie Mac, the two biggest loan finance companies in the United States. Monthly, quarterly, and annual HPI index reports are issued.

Inflation and deflation are influenced by home prices. In the United States, the CPI is one of the most frequently used indices of inflation and deflation. The CPI takes into account a variety of factors, including home prices. (Danielle 2022).

2. GDP:

GDP measures the monetary value of a country's final products and services produced during a certain time period (i.e., those purchased by the end user on a quarterly or annual basis). It is a statistic that quantifies all of the production generated inside the limits of a country. GDP is composed of commodities and services generated for market sale, as well as certain nonmarket output, such as government-provided military and educational services. GNP, or Gross National Product, is a separate concept that accounts for all of a country's output. As a result, if a German-owned firm operates a facility in the United States, the production of the factory is included in both US GDP and German GNP (TIM 2020),

GDP does not take into account all productive activities. Unpaid labour (such as that done at home or for charity) and black-market transactions are excluded because they are difficult to measure and value. That is, a baker who produces a loaf of bread for a customer contributes to GDP, but he does not contribute to GDP if he produces the same loaf for his family (although the components he purchased would be counted).

Furthermore, the "gross" domestic product excludes "depreciation" on the building, machinery, and other assets (the "capital stock") used to produce the goods. Net domestic product is calculated by deducting the depletion of capital assets, commonly known as depreciation, from GDP. (TIM 2020),

In theory, GDP can be seen in three ways:

At each stage of production, the "VAT" is added up, where value-added is defined as total sales less the cost of intermediate items. Similarly, architectural services are an intermediate input, with the building completed as the end outcome.

The spending method sums up the value of final user purchases, such as home consumption of food, televisions, and health care services; firm expenditures on equipment; and government and foreigner purchases of goods and services.

In most situations, the GDP of a country is calculated by the national statistical agency, which gathers data from various sources. In contrast, most nations adhere to globally agreed-upon rules in their calculations. In 1993, the European Commission, the United Nations, the International Monetary Fund, the Organization for Economic Cooperation and Development, and the World Bank developed the System of National Accounts as the international standard for determining GDP. (TIM 2020).

3. 3 Inflation:

Inflation is a measure of ability to buy through value of money. It is defined as the rate at which the prices of goods and services fluctuate over time (rated on Annual basis in general). we can define it by the fluctuation of a product's price within a specific period of time and it affects the ability of consumer to buy because when inflation occur people can no longer afford to purchase as before the inflation. Inflation, for example, is when your grandfather tells grandchildren that the ice cream cone price was only $0.50 while today its price 3.00 $, this is Inflation. Inflation cheapens a currency over time because the same quantity of money buys much less things. (The Street Staff 2022)

Inflation is one of those things that is constantly present—expected. it's We expect the cost of ordinary products and services to rise steadily over time, and economists account for this in their estimates. Inflation that occurs unexpectedly, on the other hand, is a different matter. When inflation is higher than analysts expect, this phenomenon happens, resulting in economic volatility. Governments and policymakers aim to prevent unpredicted inflation and its negative consequences. There is Different ways to calculate Inflation?

Inflation is measured in percentages and takes into account a variety of elements, ranging from broad metrics such as a country's general cost of living to more particular necessities such as fuel, heating expenditures, and groceries, and even the cost of a haircut. (The Street Staff 2022)

These goods and services are designed to track specific economic segments. Market baskets are a measurement tool used by economists to categorize various sectors. They then compare the prices of goods and services throughout various time periods, resulting in the creation of a price index.

To talk about price indices, and how do it been used you use them?

The US Bureau of Labour Statistics publishes two primary price indexes, one for consumer goods and the other for wholesale items.

- (CPI) The Consumer Price Index: tracks changes in the price of food, as well as other products and services such as housing, clothing, and automobiles.

- (WPI) The Wholesale Price Index: measures changes in product prices before they reach end users. Chemicals, gasoline, raw resources, fruit, coffee, fibres and machinery, are all examples.

When assessed over extended periods of time, the CPI and the WPI both show similar rates of inflation.

We can calculate the yearly rate of inflation by taking the CPI over a two-year period then, we subtract the price of the old year from the price of the new year and divide the result by the value of the old price and multiply the result by 100. Inflation can be caused by a variety of factors. Natural or man-made crises, such as oil spills or wars, can send raw material prices flying high. Inflation can be triggered by increased customer's demand for items or services. Inflation is influenced by federal policies like interest rate hikes and cuts, as well as monetary policies that can strengthen or weaken currencies.

Inflation have three different types or forms

According to economists, there are three basic forms of inflation, each with its own fundamental cause:

- Push-Pull When supply and demand are out of balance, inflation results. If demand for a product exceeds manufacturing capacity, it puts stress on resources,

leading to a price increase.

- Cost-Cutting Inflation occurs when the cost of production rises. The energy industry is a good example of this. When petroleum oil supplies are affected, demand might stay constant, but gasoline prices will rise as supplies are limited.
- Consumers expect inflationary pressures to continue in the future, which is known as built-in inflation. They want their income to rise in parallel with their living standards in order to maintain their standard of living. As a result of these higher earnings, goods and service prices rise. A "wage-price spiral" is another name for this situation. Beside that there are 5 different rates for the Inflation, economists have even devised a scale to measure the rate of increase in inflation. There are five inflation rates on the scale: hyperinflation, galloping, running, walking, and creeping. C creeping of inflation is scarcely noticeable in the economy, while galloping inflation depicts a rapid rise in prices that is difficult to control.
if we ask is there a relationship between Inflation and Interest Rates.

The Federal Reserve, the country's central bank, helps to control inflation by raising, maintaining, or lowering interest rates, which has a significant impact on the overall economy. Their actions have an impact on everything from real estate financing costs to bond yields to the prices of basic materials such as commodities.

Usually, the Inflation be Reduced by Raising Interest Rates, lower interest rates are often believed to stimulate economic growth. Lower interest rates, by definition, mean that the expenses of borrowing money, i.e., the "interest" or premium that investor must pay to acquire funds quickly, are lower. When customers pay less interest, they have more cash money to buy and feel tempted to buy more and more expensive products, such as houses and cars because paying for them will cost them less in the long term. Similarly, reduced interest rates benefit firms, industries, and even farms, as they can afford to make larger purchases, such as machinery or land, which can boost output.

Consumers often cut back on spending and big-ticket purchases in a climate of rising interest rates, and the economy slows as a result.

Inflation is managed in a number of ways. Not only the customers borrow money. Banks lend money to one another, and the name of this operation is Fed Funds Rate. The Federal Reserve, ever wary of inflationary pressures, will hike the

Fed Funds rate if the CPI and WPI rise more than 2% to 3% per year. This helps to keep inflation under control because when prices increase, demand decrease, and inflation follows suit. In order to achieve low inflation and price stability, and hence contribute to a healthy economy, the Fed must walk a delicate line. Now to know if the Inflation is beneficial or harmful, People usually associate inflation with the bad because when prices rise and items become more expensive, people are unable to purchase them.

Certain people, on the other hand, can see inflation as a good thing:

a. Assumed benefits of inflation:

Inflation can help borrowers, especially if it is reflected in higher income. If a borrower borrowed the money before inflation, and wages have climbed, the borrower gains since their pay checks now contain more money to pay off their debts. (The Street Staff 2022)

People who receive Social Security payments see an increase in their monthly pay-outs, which climb in lockstep with the CPI.

Inflation can help businesses as well, if they raise prices to match rising consumer demand.

Owners of physical goods, such as real estate or commodities, may benefit from inflation since it raises their worth.

Lenders may benefit from inflationary conditions because they know they will receive a premium on their loans if the Federal Reserve raises interest rates to combat inflation.

The impact of Inflation on the Housing Market is that Inflationary pressures have an impact on the housing market as well. Because mortgage rates are higher, lending becomes harder and it’s difficult to borrow money when inflation rises. Housing costs, like the prices of other goods and services, tend to rise with inflation. This confluence of circumstances effectively inhibits people from getting mortgages, which has a negative impact on housing markets and the economy as a whole.

b. Inflation-Related Terms Glossary:

Deflation, on the other hand, occurs when the cost of goods and services fall, usually as a result of monetary supply change. On the plus side, consumers'

purchasing power grows, i.e., they "get more for their dollar," yet deflation is usually associated with a slowing economy.

Disinflation, its different from deflation merely implies that inflation is rising more slowly than predicted. For example, if CPI monthly was 4.2 percent in June and 3 percent in July, prices deflated by 1.2 percent in June but are still rising at a 3 percent annual rate in July.

Hyperinflation is extremely high inflation that is still increasing. when the percentage is higher than +1000. Hyperinflation can harm an economy and cause a currency to fail.

Stagflation is defined as a dangerous combination of high unemployment, high inflation, and no or little economic growth. (The Street Staff 2022)

4. Interest Rate:

The interest rate is a proportion of the principal—the amount borrowed—that a lender adds it on the basic lend amount as charges a borrower. The annual percentage rate (APR) is the term used to describe the interest rate on a loan (APR).

An interest rate can also be applied to money earned via a certificate of deposit or savings account at a credit union or bank. The income generated on these deposit accounts is referred to as the annual percentage yield (APY) (Caroline 2021).

5. Nominal and Real Interest Rates:

The interest rate is the amount a lender charges a borrower client for the use of assets on top of the principal.

An interest rate also applies to money generated from a deposit account at a credit union or a bank.

Simple interest is used in most mortgages. Compound interest is applied on the principal as well as the accrued interest from prior periods in some loans.

A lender will charge a reduced interest rate to mortgagor who is considered low risk.

A loan with a high-risk rating will be charged with a higher interest rate.

Consumer loans are commonly calculated using an annual percentage rate (APR), which does not include compound interest.

The annual percentage yield (APY) is the interest rate earned on a savings account or CD at a bank or credit union. Compound interest is used in savings accounts and CDs.

a. Interest Rates Overview:

Interest is a fee levied on a borrower for the use of an asset. Cash, consumer items, vehicles, and real estate are examples of assets that can be borrowed.

The majority of loan and borrowing transactions are subject to interest rates. Individuals take out loans to buy houses, fund projects, start or fund enterprises, and pay for college tuition. Businesses borrow money to fund capital projects and expand their business by buying fixed and long-term assets like buildings, land and machinery. Borrowed funds are repaid in full on a previously agreed date or in monthly payments.

The interest rate on a loan is charged to the principal, or the amount borrowed. The interest rate is the borrower's cost of debt and the lender's rate of return.

Typically, the amount to be repaid exceeds the amount borrowed since lenders seek refund amount for the duration of time of lending the amount of money. Instead of granting a loan, the lender may have invested the funds over that time period, generating income from the asset. The interest charged is the difference between the total repayment amount and the original loan amount. When a lender considers a borrower to be low risk, the lender will normally charge a decrease the interest rate. If a borrower is deemed high risk, so the rate amount of interest charged to them will be higher, resulting in a higher loan cost.

b. Rate of Compound Interest:

Some lenders favour the compound interest strategy, which increases the amount of interest paid by the borrower. Compound interest, often known as interest on interest, is calculated on both the principal and previous periods' accrued interest. The bank assumes that the borrower owes the principle plus interest for the first year at the end of the year. The bank also expects that in the final of the 2nd year, the

borrower owes the principle plus the first year's interest plus interest on interest. Compounded interest is greater than plain interest. Monthly interest is calculated on the principal, including interest earned in prior months. For shorter time periods, both techniques will calculate interest in the same way. The discrepancy between the two methods of interest estimates develops as the length of the loan increases.

c. Savings Accounts and Compound Interest

When saving money in a savings account, compound interest is helpful. The compounded interest earned on these accounts pays the account holder for allowing the bank to invest the monies deposited.

If you deposit $500,000 in a high-yield deposit account with a bank, the bank can borrow $300,000 and utilize it as a home loan. Every year, the bank compensates you by giving you 1% interest on your account. So, while the bank gets 4% from the borrower, it provides 1% to the account holder, resulting in the bank collecting 3% in interest from the account holder. Savings are effectively given to the bank, which subsequently loans money to the mortgagor in exchange for interest.

d. Borrower's Debt Cost:

Although interest rates are a source of income for lenders, they are a cost of debt for borrowers. Companies compare borrowing costs to the cost of equity, and add it under dividend payments item, to decide which source of funding is the most cost-effective. The cost of capital is examined to establish an appropriate capital structure because most businesses finance their capital by issuing shares or taking on debt.

e. Annual percentage yield vs. Annual Percentage Rate:

Consumer loan interest rates are usually expressed as an annual percentage rate (APR). Lenders expect this rate of return in exchange to be able to borrow money. The interest rate on credit cards, for example, is expressed as an APR. Compound interest for annually is not taken into account by the APR.

The annual percentage yield (APY) is the interest rate earned on a savings or credit account at a bank or credit union. This interest rate takes into consideration the compounding.

f. What Factors Affect Interest Rates:

A range of factors, including the state of the economy, influence bank interest rates. The interest rate set by a country's central bank (in the United States, the Federal Reserve) is used by every bank to define the APR range it offers. When the financial system sets interest rates at a high level, the cost of debt rises. People are less willing to borrow when loan prices are high, which reduces consumer demand. Interest rates tend to rise in tandem with inflation.

Banks may raise reserve requirements, limit the money supply, or stimulate credit demand to counteract inflation. People prefer to save their money in a high-interest-rate economy because the savings rate is higher. The stock market suffers as investors choose to preserve their money rather than participate in the stock market, which provides a lower return. Companies have also had limited access to debt-based finance, resulting in an economic downturn.

Economic activity is often promoted during low-interest times because borrowers may get loans at cheap interest rates. Because savings rates are low, businesses and individuals are more willing to spend and invest in risky assets like stocks. This spending boosts the economy and puts money into the markets, resulting in economic development. While governments strive to cut interest rates, the end result is market disequilibrium, which leads to inflation. When inflation happens, interest rates rise, which may be connected to Walras' law.

6. Population:

A population is a distinct group of people, whether it is a country or a group of individuals who share a similar characteristic. A population is a group of individuals from which a quantitative sample is drawn for statistical study. A population is defined as a collection of people who share a trait.

A sample, not the entire population, is a statistically significant subset of it. As a result, the estimated standard deviation, or standard error, of a statistical analysis of the outcomes of a sample from the entire population must be presented. Only a population-wide study would be free of sampling error.
A population is a unique group of people who share a common identity, citizenship, or trait. (Osikhotsali 2021).

A population in statistics is a sample of a bigger group of individuals (or even items) who share one or more characteristics.

The participants of a population sample must be chosen at random in order for the study's findings to correctly reflect the entire community.

Given that it is a door-to-door canvass of the total population rather than a small group study, the US Census is possibly the most massive survey in existence.

Many, if not all, government and commercial decisions are based on the results of large and local population surveys.

Population Examples in the Real World

Public policy and commercial decisions are influenced by population data. Some instances include:

The World Bank is an international institution whose mission is to alleviate world hunger by lending money to developing countries to fund initiatives that enhance their economies and better their overall level of living. The Bank undertakes an accurate, country-by-country headcount of people living in severe poverty depending on local data in order to indicate where assistance is most needed. As per the Bank, the numbers have progressively decreased from over 40% of the world's population in 1985 to become as low as 9.2 percent in 2017. However, the COVID-19 outbreak was predicted to result in the first annual increase in absolute poverty in more than 20 years in 2020. 4 The US Census, which is required by the US Government every 10 years, is possibly the most significant demographic research ever undertaken, as it is a true door-to-door count rather than a sampling. It is used to decide how federal monies are dispersed and how many statehouses each state receives. Many other commercial and public bodies utilize the data to decide where schools & hospitals should be built, where businesses should be located, and what types of residences should be developed. (Osikhotsali 2021).

Since 1957, the Centres for Prevention and Disease Control has conducted a National Health Interview Survey to detect and track health problems and issues. Its most recent reports look at chronic illnesses among war members, opioid-related emergency room visits, and dementia care quality in the United States.

According to a forecast from the UN Department of Social Affairs and Economic, the global population will expand from 2019 7.7 billion to 9.7 billion in 2050.

The fastest-growing region is Sub-Saharan Africa, where the population is predicted to double, whereas North America and Europe are expected to expand at only by 2%.

III. METHODOLOGY

This chapter will cover the data collection techniques for this project, particularly how they will be designed and carried out. Both quantity and quality research, as well as its rationales, methodology, and data gathering processes, will be discussed and explained in this part. It will also cover issues such as access, sampling procedures, and ethical considerations, as well as concerns about the study's validity and reliability. The chapter will also attempt to describe data analysis. To answer the research questions stated in section one, qualitative research methods of data gathering will be used.

A. Research Design:

A research design is a formula that guides a researcher through the process of gathering, examining, and interpreting data. This project will utilize cross-sectional research with a time series method and a quantitative technique to analyse the determinants of residential real estate prices in Turkey during a 11 years period (2010 to 2020).

A methodical, step-by-step technique to describing and testing connections is known as quantitative research design. as well as examining the source and effect of variable interactions.

(Kothari, 2004) stated that also, the descriptive design, namely the descriptive research model, will be used in this study. Non-experimental descriptive design research describes the features of a single person or a group of people. It also includes past experiences that may or may not be relevant to current circumstances.

The descriptive design will be utilized to find normal accepted explanations, provide exact quantitative descriptions, and observe behaviours. The study is descriptive facilitates the collection of data that demonstrates interrelationships and gives a situational description.

B. Data Collection:

Data can be collected in two ways: primary and secondary. Primary data is collected directly from researcher, but secondary data is typically required when the analyser is attempting to establish a link between variables. Secondary data will be collected, which will entail analysing previously available statistical data. The researcher collects secondary data in order to check the established relationship between the variables. The House Price Index (dependent Variable), Population, interest rate, GDP, and inflation rate are all used in this study (Independent Variable). We obtained secondary data from Global Property Website guide for the House Price Index for a ten-year period. We acquired secondary quarterly data for the period of 10 years from Fred Stlouisfed website Data for the interest rate, and secondary data for the period of 10 years on quarterly basis from Trading Economics Website Data for the inflation rate. We obtained also secondary quarterly data from Country Economy Website Data for GDP and annual data for period of 10 years as secondary data for population from Country Economy Website.
On the basis of the publishers' credibility, the data's validity, accuracy, and correctness were presumed.

C. Sampling Design:

Since this research is about secondary data which is Data gathered by someone other than the primary user is referred to as secondary data. Censuses, information collected by government departments, organizational records, and data acquired for other research purposes are all common sources of secondary data for social science.

D. Analyse Instrument:

Data collected for studying will be tested by many statistical tests in order to check its validity using statistical applications: SPSS “Statistical packages for social scientists” and EViews statistic which are used to apply the below mentioned Tests on data variation and relationship between all data each of them with each other and between the dependent and independent variables, the statistical tests will be applied as below with the need and the result of test will be mentioned in the next chapter:

VIF (Multicollinearity) Test

CUSUM Test

Regression and Multi Regression Test

Normality Test

Plot Point Test

White Heteroscedasticity Test

Autocorrelation (Durbin Watson) Test

Heteroscedasticity Test

Unit Root Test

Kolmogorov-Smirnov Test

Correlation Test

IV. ANALYSIS AND FINDINGS

In this Research we will check the data collected to reach finally to our conclusion which is that is there a relation between the House price and the macroeconomic selected factors for our research, the data collected from 3 websites and compared with another there is a small difference but it doesn't make sense so we can assume that the data are reliable and accurate and start our tests to be applies upon them to have our findings at the end, each of the tests will be explained on its own regarding its need and also the test results if it will push the researcher to continue with testing or there is problem with data's relation with each other especially the independent variables if there is problem with its relation that will lead to null results or unreliable results. data for the time period of 10 years for the period in between 2010 till 2020 for all variables on Quarterly basis unless for the Population it's on annual basis, the gathering of the data done from the below mentioned statistical websites**:**

Global property guide data, Country economy data, The Turkish Central Bank, Fred Economic Data, and Trading economics data.

SPSS Statistical packages for social scientists' application and EViews statistic application will be utilized to apply the needed below mentioned tests, used to apply statistical checking models which are:

A. Descriptive Study:

1. Housing Price Descriptive Study:

Pricing real estate properties and predicting price fluctuations by constructing a worldwide housing price index play a vital role in controlling the money supply in national economies and predicting the emergence of financial crises. In this regard, selecting the method to be employed in indictors are significant, the unit technique (and diversified housing price index), the repeat sales methodology, and the hedonic regression approach are employed in the construction of house price indicators, and

accumulating price-related data.

Deed data, data from real estate evaluation businesses, pricing data collected from real estate project manufacturers, and statements connected to real estate's put on the market are all employed in the compilation of real estate price indexes, according to academic studies. The main importance of Real Estate pricing index is to underline its importance for financial markets and economic affection. Home price indexes are important for a variety of reasons, including the fact that they are important inputs for academic research that uses the data set available globally to better understand how the housing market works, such as how it analyses the causes of house prices and the efficiency of the housing market, and f how the housing market works by analysing the causes of the housing market and the profitability of home prices.

It's also utilized to look at societal concerns like finding cheap homes and determining if there is or there is not housing bubbles occur.

As we progress, we can observe that housing has a significant impact on household wealth. While analysing the significance of home prices indexes, it is important to note that they should possess certain characteristics. Because median house price indexes are commonly could be found easily in numerous nations data banks, they have several biases due to the variety of their properties, and such methodologies cannot distinguish across modifications of dwellings sold from one period to the next, or between price movements. As a result, it is critical to employ procedures that include quality control, two of which are famed, namely the repeat sales and hedonic approaches. Multiple regression models containing factors such as macroeconomic independent variables are used to regulate the hedonic technique. Likewise, quality control is implemented in repeat sales theory approach by examining a property which is purchased so many times over a period of time.

It is reasonable to analyse the HPI as a dependent variable during the time frame of the study because the research primary purpose is to conduct an in-depth investigation of the factors that influence the prices of residential real estate. The following are some of the benefits and drawbacks of using alternate methods: The advantages and disadvantages of the different kinds of index values are broken down into four categories: first, it is determined whether or not the index method produces a constant quality index; second; Second, the index should measure the

change in price for a property whose attributes have stayed constant through time; third, price rises will only arise from changes in the characteristics of market pricing; and fourth, price shifts will not be caused by variations in the features of properties that have been sold ; and finally, the four categories are And it is possible to notice that this is a trait that is worth highlighting for any real estate index. Beside this, HPI are usually used to gauge tolerance, and as a result, they should be managed inside an index. The second consideration is whether or not the subgroup of properties that served as the foundation for the creation of the index can be considered to be indicative of the general inventory of properties. The third reason is the lack of revision, which implies that when transaction prices for subsequent time periods within a certain period of time are added, the historical index values do not change. Finally, it is important to note that the process of constructing an index should be as straightforward and uncomplicated as possible, and that it should not require an excessively sophisticated estimation method or an excessively large amount of data.

Table give us the mean house prices from 2010 to 2020 which shows how the square meter price of housing has increased steadily from 46$ in 2010 to 152$ in 2020. The standard deviations are also increasing steadily in parallel with the means.

- Kurtosis 2.30 lower than 3 so distribution is normal.
- Skewness 0.47 since skewness is (-0.5 to 0.5) fairly symmetrical.
- Probability 0.27 since higher than 0.05 so its normally distributed.
- Jaruque bera not far from 0 so its normally distributed data set.

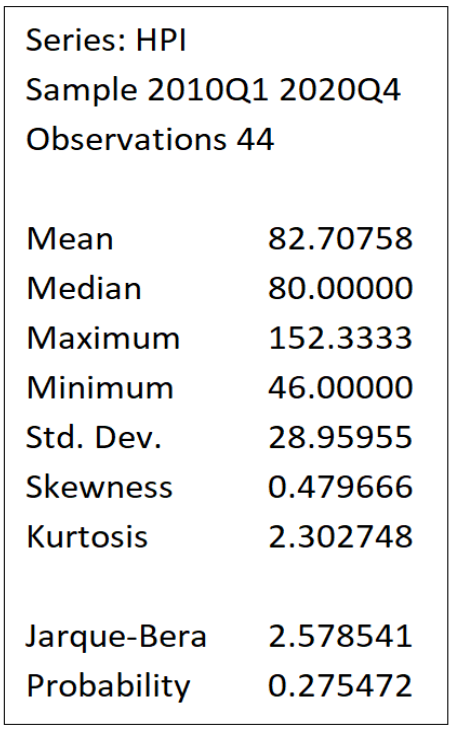


Figure 1 Descriptive HPI Statistic

Source E-views Test

2. Interest Rate Descriptive Study:

The interest rate could be defined as a rate that is either charged or paid in exchange for the usage of money. It is common practice to quote an interest rate as yearly percentage of the loan balance. Another method for determining it is to divide the whole amount of interest accrued over the total amount of the principal debt owed.

In addition, interest rates are subject to vary for a variety of reasons, including circumstances brought about as a direct consequence and the policies of the Federal Reserve Board. The yearly percentage rate is the best definition for the mortgage loan interest rate, From the perspective of a customer, the interest rate is frequently expressed as an annual percentage yield.

The second thing that we notice is that nearly all kinds of loans have two interest rates attached to them. These rates are known as annual percentage rate and actual interest rate, and they frequently assist borrowers in determining what the real cost of the loans will be from one lender or another. However, borrowers are frequently misled at various points throughout the procedure. Furthermore, the

interest rate is defined as the amount of charge that must be paid per unit of time, and this amount is always expressed in terms of a year.

In the course of our research, we compiled information regarding the effective annual percentage rate for a period of seven years, specifically from 2010 to 2020.

Standard deviation is 3.41 so it means that the data set is consistent and isn't far from the mean with a large amount.

- Kurtosis 1.78 lower than 3 so distribution is normal.
- Skewness 0.43 since skewness is (-0.5 to 0.5) fairly symmetrical.
- Probability 0.12 since higher than 0.05 so its normally distributed.
- Jaruque bera not far from 0 so its normally distributed data set.

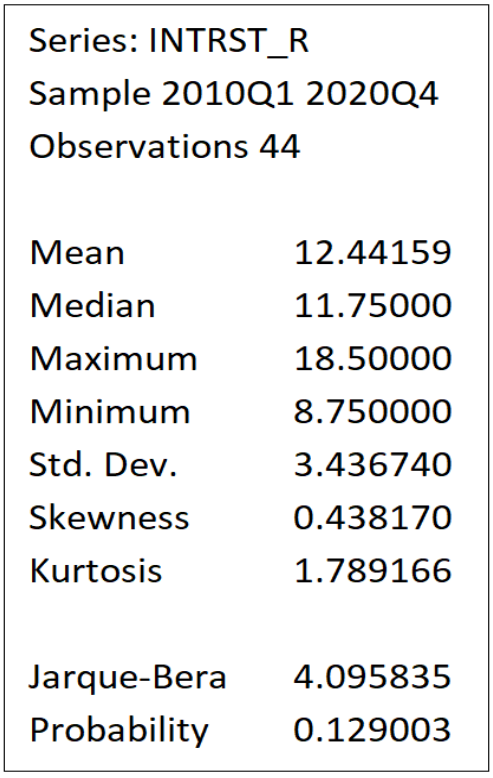


Figure 2 Descriptive Interest Rate Statistic

Source E-views Test

3. Inflation Rate Descriptive Study:

The consumer price index is a statistic that is widely used to estimate the mean price of a large number of regularly used products and services over a period of

time. C.P.I. is the abbreviation for "consumer price index." The price of the basket during the base period is set at 100, and whether the consumer price index value is above or below 100 helps indicate if the average price has reduced or increased throughout the specified time period. When we know the CPI values for two different time periods, we can easily calculate the level of inflation over the whole time period once we have those values. In order to achieve reliable findings when predicting a CPI, we need to conduct a poll of individuals to find out what sorts of goods they buy on a regular basis. This also aids in determining the number of widely used products and services, which is then followed by the basket's total price, which is collected from the market during both the current and base periods.

As a result of the fact that inflation is one of the most important factors influencing the cost of housing, it is imperative that we investigate inflation as a significant element in our study. The information regarding the rate of inflation comes from the Consumer Price Index (CPI). According to the data, the rate of inflation measured by the CPI is on the rise, with 2011 recording the lowest rate of 6.33 percent and 2014 recording the highest rate of 8.8 percent throughout the time period covered by our research.

- Kurtosis 5.41 higher than 3 so it’s not normally distributed.
- Skewness 1.59 since greater than 1, the data are highly skewed.
- Probability 0 since less than 0.05 so it’s not normally distributed.
- Jaruque bera 29.3 far from 0 so it’s not normally distributed data set.

Since the inflation data is not normally distributed so Spearman's correlation test done instead of Pearson correlation test, and the result was too similar so I keep the normal correlation results.

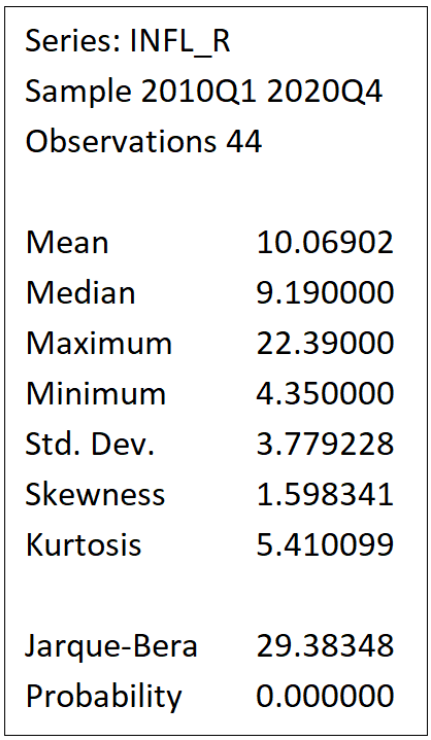


Figure 3 Descriptive Inflation Rate Statistic

Source E-views Test

4. GDP Descriptive Study:

The GDP of a country is a measurement that is used to determine how well the economy of a country is doing, or generally the situation of a country overall. The gross domestic product (GDP) of a nation is the total worth of all the goods and services that are generated within that nation by its citizens as well as the businesses that are based there. And it doesn't really make much of a difference if they are firms owned by foreigners or individuals from other countries who are resident in that country. However, if all of their locations are within the borders of that country, so the government will calculate their produced goods as part of the GDP of that country. When it comes to determining a nation's Gross Domestic Product, the components that go into the calculation are as follows: personal consumption expenditures + government spending t + spending on experts + business investment subtracted by - imports. The numerous metrics derived from GDP are important tools for examining the economies of different nations and how they grow over time or over a period of time.

Gross Domestic Product (GDP) of other countries can often be deduced from the size of an economy. Consequently, if it comes to this matter, growth rate of a

country enables us to determine whether the economy of that country is expanding or working to develop at a faster rate than before, or whether the economy of that country is expanding at a rate that is more slowly than it was in the years prior.

If the country provides less than it did in the previous quarter, the country's growth rate is minus, which is an indicator of a slowdown in the year. If the country provides less than it did in the previous quarter, the country's growth rate is minus, which is an indicator of a slowdown in the year 51. After this, if the growth rate is actually high, so the country will be recognized because it is having high levels of inflation. When the Gross Domestic Product (GDP) of a nation is spoken or mentioned, it goes a long way toward having numerous consequences on the citizens of that nation. These effects include having an impact on our personal finances, the rate at which our jobs increase, and also our investments. To begin, investors are able to determine where the best chances are by comparing the rates of growth of various countries and determining where the best opportunities are appropriate or suitable for investment. This is how they determine whether or not they need to modify their allocation. In addition to this, the vast majority of investors always choose purchasing stock in companies that can be seen to be already present in nations that are rapidly rising.

- Kurtosis 2.488 lower than 3 so distribution is normal.
- Skewness -0.39 since skewness is (-0.5 to 0.5) fairly symmetrical.
- Probability 0.44 since higher than 0.05 so its normally distributed.
- Jaruque bera not far from 0 so its normally distributed data set.

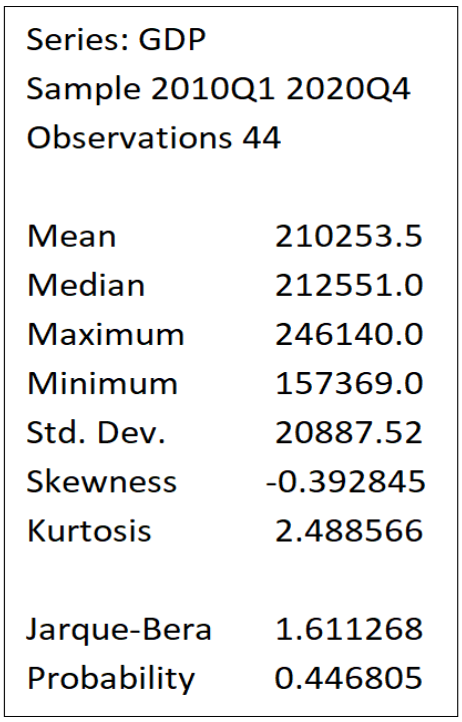


Figure 4 Descriptive GDP Statistic

Source E-views Test

(GDP) of a nation can tell us which countries offer the best or most suitable work opportunities for us to pursue. because unemployment will either be caused by or lead to certain countries having a weak growth rate or a negative growth rate. As a result of looking into this matter, we will be able to determine which nation offers the best career opportunities. Business cycles produce changes in a country's GDP because as the economy improves and GDP rises, inflationary pressures begin to grow swiftly. This occurs when the capacity of production and labour has almost reached or is on the verge of being fully used.

In addition, when we talk about a country's GDP, the situation is not completely representing the general standards of living or countries' luxury level as a whole. Although the rate at which output of goods and services varies per person is frequently employed as a measure of whether or not the ordinary citizen in one nation is better off than in another, this is not always the case. The Gross Domestic Product (GDP) has a significant role in setting the price of residential real estate. The GDP that is used is the quarterly GDP that is computed using the income technique. When looking at the data, we can see that the GDP has been growing at a consistent rate from 2010 to 2020.

5. Population Descriptive Study:

By various disciplines and research, a population is defined as a group of people, animals, or other objects that can be defined by at least one common attribute for the purposes of data collection and analysis. As a result, data is frequently collected from a population sample in order to gain knowledge about a broader population. Population pyramids are graphical representations of a population's age and gender.

Age-sex triangles are another name for population pyramids. These graphs are commonly referred to as triangles because they typically have pyramid structures, while others may have different shapes. Females are always on the right, while, Males are on the left side of the chart separated by a line segment in the centre that separates the females from the males. There are three different forms of population pyramids: stable, expansive, and constrictive. Pyramids that indicate a roughly equal percentage of the population in different age groups are known as stationary population pyramids. There is normally no rise or fall in population here, and the population remains constant.

Expansive population pyramids depict populations with a higher number of people in their younger years. It's also worth noting that populations with this form have relatively high reproductive rates and shorter life spans. Furthermore, many third-world countries have large population pyramids. The name comes from the fact that the population pyramids are constricted at the bottom. There are less youthful individuals or persons of a younger age group. They also show diminishing birth percentage as each age group becomes lower and lower.

After an initial phase of development, the population expands at a slower rate due to the increased availability of residential space and resources. This approach is more dependable than the exponential model when it comes to measuring the growth of the population. The reason for this is that it takes into consideration the real-world elements that work to slow down population development. The goal of the mechanistic population model is to provide an explanation for the correlation that exists between the amount of food that is available, the amount of farm produce, and the total number of people. This model goes further to illustrate that an increase in the total amount of agricultural also goes a long way toward increasing the total quantity of food which is available while maintaining the growth rate at its level.

The rise of the population over the course of the study was another key focus of the research. The data that were acquired are on an annual basis, and they cover the period that was studied. Population can have an effect on house prices due to the fact that it has a direct connection with increase in demand. This is because, as the population grows, more people will require a place to live, which in turn will have an effect on the pricing of residential real estate.

If the skewness result is between -1 and – 0.5 or between 0.5 and 1, the data are moderately skewed. If the skewness is less than -1 or greater than 1, the data are highly skewed.

- Kurtosis 1.71 lower than 3 so distribution is normal.
- Skewness 0.004 since skewness is (-0.5 to 0.5) fairly symmetrical.
- Probability 0.21 since higher than 0.05 so its normally distributed.
- Jaruque bera not far from 0 so its normally distributed data set.

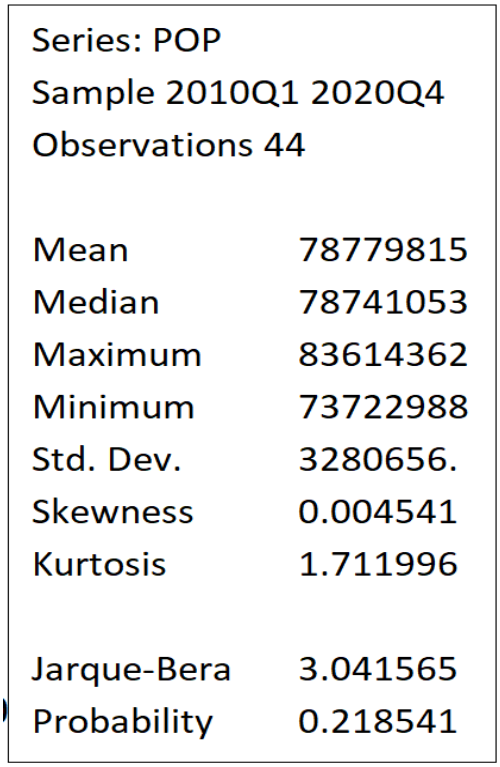


Figure 5 Descriptive Population Statistic

Source E-views Test

B. Statistical study:

In this study, statistical methods are used first to ensure that the data set is statistically testable, and then to determine whether or not there are relationships between the dependent variable HPI and the independent variables (Inter-rate, Infl-rate, GDP, and Pop), as well as to measure the strength of the relationship between the dependent and independent variables. In this part, we will do our inferential analysis, which will involve the Pearson Correlation test, the coefficient test of determination, and multiple regression analysis.

1. Unit Root Test:

In what ways does unit testing relate to the collection of statistical information?

Unit testing is a strategy to testing and evaluation that is used in the design of software. Duringthis type of testing, a researcher examines individual modules, components, methods, and functions to determine whether or not they are suitable for purpose.

The use of the unit test on a time data series will tell us whether or not the data is stationary (the stationary test is so significant before proceeding to apply regression analysis), and as a result, we will be able to determine whether or not we should continue testing the data or whether we will get erroneous results.

Taking into consideration that nonstationary data indicates that it is trend time series data, and that this data does not fit to our test because it would give us null findings, we can say that this data does not fit.

The application of this test will be carried out by the Eviews program, which will then provide us with the results. Based on the results, we will be able to determine whether or not the data can be utilized in regression analysis.

After first collecting the time series data, which ought to be chronological order interconnected like (Yearly, quarterly, or monthly level data), then organizing the data to be in the same row and column format, we will then manually enter the data into the software. This step comes after first collecting the data for the time series, which ought to be chronologically synchronized like (Annual, quarterly, or monthly level data).

Augmented Dickey Fuller (ADF)Unit test type will be used in this test

First on level then 1st difference and then 2nd difference In order to remove trend problem if any.

The Null Hypothesis of Unit Test is that the series is not stationary it should be stationary.

The (P) Value should be less than 0.05 to reject the above mentioned hypothesis and as a result to confirm that the data is Stationary.

Table 1 Unit Test Result Summary

Unit Test	GDP	House Price Index	Interest Rate	Inflation Rate	Population
Level with Intercept	0.2433	0.9999	0.1241	0.2225	0.5981
Level with Trend and Intercept	0.7264	0.8578	0.3559	0.0676	0.2808
Level with None	0.6064	0.9987	0.3868	5926	0.8076
First Difference with Intercept	0	0.602	0.0038	0.0003	0.7823
First Difference with Trend & Intercept	0	0.2679	0.0208	0.0018	0.9261
First Difference with None	0	0.5884	0.0002	0	0.3235
Second Difference with Intercept	0	0	0	0	0.0001
Second Difference with Trend and Intercept	0	0.0001	0	0	0
Second Difference with None	0	0	0	0	0

2. Correlation Test:

To test the hypotheses, Pearson correlation coefficient test was applied.

The degree of association between two variables is defined as the correlation. The correlation coefficient ranges from -1 to 1. A perfect positive correlation is represented by 1, whereas no correlation is represented by 0 and a perfect negative correlation is represented by a negative 1 as explained below. (2011) (Eysenck)

When r is equal to 0 There is no correlation

When r is equal to 0.00 <r< 0.33 it means correlation is weak positive

When r is equal to 0.33 <r< 0.66 it means correlation is Moderate positive

When r is equal to 0.66 <r< 0.99 it means correlation is Strong positive

When r is equal to 1 it means correlation is Perfect positive

When r is equal to 0.00 >r> -0.33 it means correlation is weak negative

When r is equal to -0.33 >r> -0.66 it means correlation is Moderate negative

When r is equal to -0.66 >r> -0.99 it means correlation is Strong negative

When r is equal to -1 it means correlation is Perfect negative correlation

A positive correlation is a relationship formed by two variables that move in the same direction. When one variable decrease while the other variable grows, or when one variable increase while the other variable decreases, there is a positive association.

Table 2 Correlation Test Result

Variables	GDP	HPI	INFL_R	INTRST_R	POP
GDP	-	0.276060	0.000507	-0.490408	0.393096
HPI	0.276060	-	0.612603	-0.144372	0.968985
INFL_R	0.000507	0.612603	-	0.476671	0.648274
INTRST_R	-0.490408	-0.144372	0.476671	-	-0.116035
POP	0.393096	0.968985	0.648274	-0.116035	-

As per the above-mentioned table we conclude that:

There is Weak Positive relationship between GDP & HPI

There is Weak Positive relationship between Inflation rate & HPI

There is Weak Negative relationship between Interest Rate & HPI

There is Strong Positive relationship between Population & HPI

There is Weak Positive relationship between Inflation & GDP

There is Moderate Negative relationship between Interest rate & GDP

There is Moderate Positive relationship between Population & GDP

There is Moderate Positive relationship between Interest rate & Inflation

There is Moderate Positive relationship between Population & Inflation

There is Weak Negative relationship between Interest rate & Population

To make sure from the correlation test results we should check the Probability value and it should be less than 0.05 to make sure that the correlation between

variables result is statistically significant or not.

So, its resulted that the HPI correlation with all independent variables is significant unless Interest Rate the relation is insignificant since all the results are less than 0.05 unless rate its 0.3487.

Covariance Analysis: Ordinary
Date: 05/19/22 Time: 14:15
Sample: 2010Q1 2020Q4
Included observations: 44

Correlation t-Statistic Probability	GDP	HPI	INFL_R	INTRST_R	POP
GDP	1.000000 ----- -----				
HPI	0.276060 1.861408 0.0496	1.000000 ----- -----			
INFL_R	0.000507 0.003288 0.9974	0.612603 5.022986 0.0000	1.000000 ----- -----		
INTRST_R	-0.490408 -3.646856 0.0007	-0.144372 -0.945541 0.3498	0.476671 3.514097 0.0011	1.000000 ----- -----	
POP	0.393096 2.770596 0.0083	0.968985 25.41161 0.0000	0.648274 5.517798 0.0000	-0.116035 -0.757109 0.4532	1.000000 ----- -----

Figure 6 Correlation significance test result

Source EViews Testing program.

3. Regression Analysis:

a. GDP & HPI:

The relationship is insignificant (0.0870) between the independent variable (GDP) and the dependent variable (house Price) Index since the probability result is greater than 0.05.

- GDP has a positive impact on HPI by 3 from 10.000
- If GDP increased by 1 unit the HPI will increase by 0.000347
- R-Squared tells us that GPD interpret the HPI with 7%.

Dependent Variable: LHPI
Method: Least Squares
Date: 05/20/22 Time: 13:25
Sample (adjusted): 2010Q2 2020Q4
Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	0.000347	0.000198	1.753325	0.0870
C	7.812129	41.98860	0.186054	0.8533

R-squared	0.069749	Mean dependent var	81.08837
Adjusted R-squared	0.047060	S.D. dependent var	27.21243
S.E. of regression	26.56440	Akaike info criterion	9.442416
Sum squared resid	28932.37	Schwarz criterion	9.524333
Log likelihood	-201.0120	Hannan-Quinn criter.	9.472625
F-statistic	3.074150	Durbin-Watson stat	0.048780
Prob(F-statistic)	0.087020		

Figure 7 Regression Analysis (GDP) Test Result

Source EViews Testing program.

b. Inflation and HPI:

- The relationship is significant (0.000010) between the independent variable (Inflation) and the dependent variable (house Price) Index since the probability result is less than 0.05

- Inflation has a positive impact on HPI by 496 from 100.

- If Inflation increased by 1 unit the HPI will increase by 4.69

- R-Squared tells us that Inflation interpret the HPI with 37%.

Dependent Variable: HPI
Method: Least Squares
Date: 05/16/22 Time: 14:29
Sample: 2010Q1 2020Q4
Included observations: 44

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFLATION	4.690253	0.932422	5.030184	0.0000
C	35.45524	10.01410	3.540532	0.0010

R-squared	0.375954	Mean dependent var	82.68182

Figure 8 Regression Analysis (inflation) Test Result

Source EViews Testing program

c. Population & HPI

- The relationship is significant) between the independent variable (Population) and the dependent variable (house Price) Index since the probability result is < 0.05.

- Population has a negative impact on HPI by too small impact.

- If HPI increased by 1 unit the population will increase by 94.

- R-Squared tells us that Population interpret the HPI with 94%.

Dependent Variable: HPI
Method: Least Squares
Date: 05/16/22 Time: 15:04
Sample: 2010Q1 2020Q4
Included observations: 44

Variable	Coefficient	Std. Error	t-Statistic	Prob.
POPULATION	8.46E-06	3.02E-07	28.02183	0.0000
C	-586.5870	23.90450	-24.53877	0.0000
R-squared	0.949228	Mean dependent var		82.68182

Figure 9 Regression Analysis (Population) Test Result.

Source EViews Testing program

d. Interest Rate & House Price Index

- The relationship is insignificant (0.34) between the independent variable (Interest Rate) and the dependent variable (house Price) Index since the probability result is greater than 0.05.

- Interest Rate has a negative impact on HPI by -1.214 from 100

- If Interest Rate increased by 1 unit the HPI will decrease by 1.214

- R-Squared tells us that Interest Rate interpret the HPI with 2%.

Dependent Variable: HPI
Method: Least Squares
Date: 05/16/22 Time: 15:34
Sample: 2010Q1 2020Q4
Included observations: 44

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INTEREST_RATE	-1.214277	1.284387	-0.945413	0.3499
C	97.78935	16.56491	5.903404	0.0000
R-squared	0.020838	Mean dependent var		82.68182

Figure 10 Regression Analysis (Interest Rate) Test Result

Source EViews Testing program

4. Multi regression – Linear Regression /Test Done using EViews App:

From below we can conclude that there is:

Negative correlation between HPI and GDP

Negative correlation between HPI and Interest rate

Positive correlation between HPI and Inflation rate

Positive correlation between HPI and Population

If GDP increase by 1 HPI will decrease by 0.000256

If Inflation increase by 1 HPI will increase by 0.036339

If Interest Rate increase by 1 HPI will decrease by 0.9974

If Population increase by 1 HPI will increase by very small decimal point multi zeros

Dependent Variable: HPI
Method: Least Squares
Date: 05/20/22 Time: 13:31
Sample: 2010Q1 2020Q4
Included observations: 44

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	-0.000256	5.39E-05	-4.756486	0.0000
INFL_R	0.036339	0.459408	0.079100	0.9374
INTRST_R	-0.997416	0.413122	-2.414335	0.0206
POP	9.05E-06	4.84E-07	18.69323	0.0000
C	-564.0558	36.57610	-15.42143	0.0000
R-squared	0.962018	Mean dependent var		82.70758

Figure 11 Regression Analysis (Population) Test Result

Source EViews Testing program

5. VIF Test (Variance inflation factor) or Multicollinearity Test using SPSS:

This kind of test is typically used to examine if the independent variables are similar in fluctuation so it tests the relation between them, and if the test concluded in a multicollinearity between them, then we can draw the conclusion that the interpretations are not entirely accurate.

In addition to this, it suggests that we are making use of repeated information in the model, which will lead to an inconsistent estimation of the regression coefficient.

In multiple regression, multicollinearity is a hurdle that needs to be overcome because all of the inputs influence each other. As a consequence of this, they are not fully independent, and as a consequence, it is challenging to estimate the degree to which the interaction of the independent variables effects the dependent variable, also known as the outcome, in a regression model.

Estimating the degree to which every one of the dependent variables and the independent variables are connected can be made more difficult by using a statistical technique known as multicollinear multiple regression modelling.

Since the independent variables are not connected with one another, the VIF value needs to be less than 5 in order to proceed with the testing of the variables.

As a result of the data presented in the table below, we are able to draw the conclusion that no multicollinearity between independent variables so there is no redundancy.

However, if we include the Population variable in the equation, the outcome will be different, and the inflation rate, in addition to the population, will be greater than 5 since both variables are growing along the time line in a manner that is parallel to one another.

VIF = 1/ 1 + R^2

When R^2 = 0 then no correlation b/w variables. Then VIF will be equal to 1.

When VIF value is greater than 5 then we consider it the problem of Multicollinearity.

Table 3 VIF Test

Coefficients [a] Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-587.773	31.142		-18.874	<.001		
	Inflation	-.398	.395	-.052	-1.006	.321	.255	3.917
	Interest Rate	-.660	.351	-.078	-1.881	.067	.391	2.555
	GDP	.000	.000	-.190	-5.832	<.001	.643	1.555
	Population	9.324E-6	.000	1.074	22.689	<.001	.304	3.289

a. Dependent Variable: HPI

6. Kolmogorov-Smirnov

Result is greater than 0.05

Shapiro Wilk sig is less than 0.05 so the data is normally distributed.

Table 4 Normality Test

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
HPI	.116	44	.162	.932	44	.013
a. Lilliefors Significance Correction						

7. Normality Test Done using EViews App

Null hypothesis is that the residual is normally distributed and from table we can see that its not distributed normally, and P valuse is bigger than >0.05 so we can proceed with our data set testing.

Now to test normality of dependent value we should test Kolmogorov-Smirnov and Shapiro-Wilk significant result and it should be greater than 0.05 so the data of dependent value is normally distributed

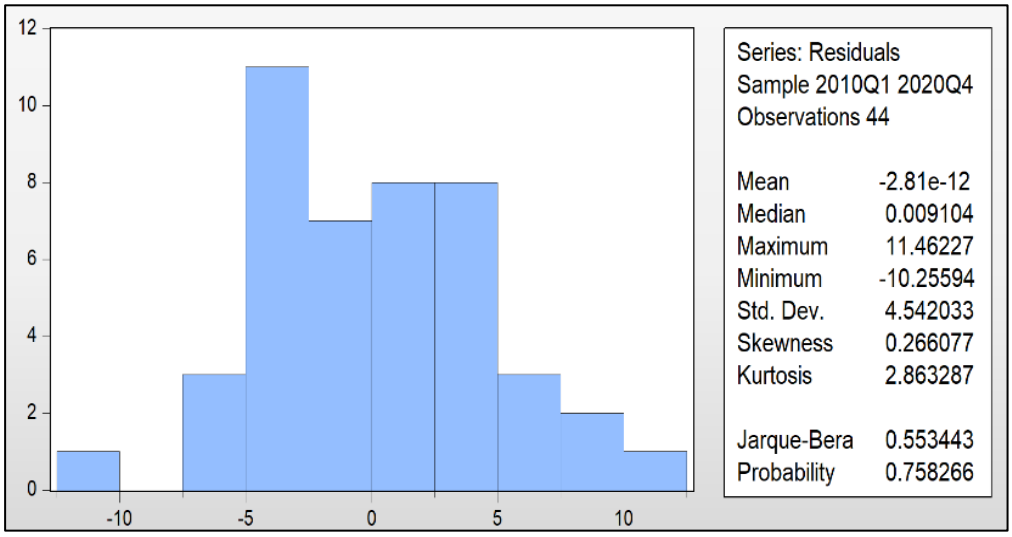


Figure 12 Normality Test Result

Resource EViews Testing program

8. Plot Point Test:

The test Done using SPSS App, the plot point distribution shows us that its Heteroscedasticity

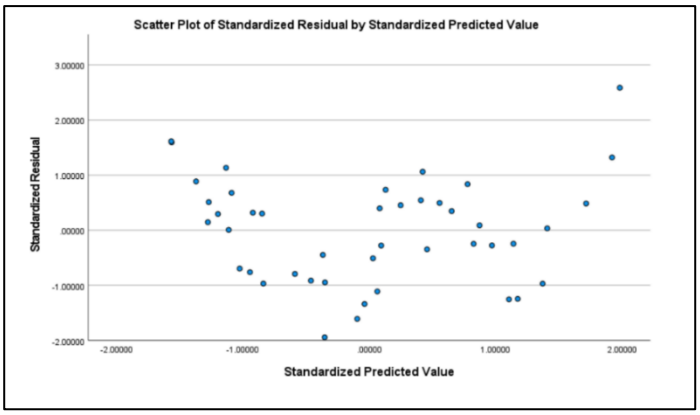


Figure 13 Plot Point Test Result

Resource EViews Testing

9. Heteroskedasticity Test:

We use this type of test to check that the error term has the same form of variance so we call it Homoscedasticity while if the error term variance is not constant so we call it Heteroscedasticity otherwise we call the test result as heteroskedasticity.

Residual values are the error terms we call error terms on the difference between the predicted value and the real resulted value of dependent variables.

So, homoscedasticity is referred to the residual distribution if it is distributed in a symmetric way while Heteroscedasticity when it has area with a lot of residuals while other areas are nearly empty.

After calculating the residual and predicted values.

In order to check Heteroscedasticity, we apply white heteroscedasticity test.

Null Hypothesis: No Heteroscedasticity in the model.

If probability is less than 0.05 then accept the null hypothesis and consider no heteroscedasticity in the model else so, Heteroscedasticity exists in the model.

The value of P is higher than 0.05 its 0.4171 so no need for any extra test

As the p value is less than 0.05 so heteroscedasticity exist, in order to remove it, we use HAC test in the regression model.

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	1.054571	Prob. F(9,38)	0.4171
Obs*R-squared	9.592838	Prob. Chi-Square(9)	0.3844
Scaled explained SS	20.63727	Prob. Chi-Square(9)	0.0144

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/14/22 Time: 13:57
Sample: 2010Q1 2021Q4
Included observations: 48

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.32E+11	2.83E+11	-1.174101	0.2477
INFLATION^2	-460814.8	406647.4	-1.133205	0.2642
INFLATION*POPULATION	12.45400	9.864258	1.262538	0.2144
INFLATION*INTEREST RATE	4179138.	4176522.	1.000626	0.3233
INFLATION	-9.25E+08	7.39E+08	-1.250868	0.2186
POPULATION^2	-6.55E-05	5.45E-05	-1.201482	0.2370
POPULATION*INTEREST RATE	-41.16504	43.40851	-0.948317	0.3490
POPULATION	9378.075	7870.297	1.191578	0.2408
INTEREST RATE^2	548435.4	17994132	0.030479	0.9758
INTEREST RATE	2.74E+09	3.02E+09	0.905573	0.3709

R-squared	0.199851	Mean dependent var	2.89E+08
Adjusted R-squared	0.010342	S.D. dependent var	6.60E+08
S.E. of regression	6.57E+08	Akaike info criterion	43.62609
Sum squared resid	1.64E+19	Schwarz criterion	44.01593
Log likelihood	-1037.026	Hannan-Quinn criter.	43.77341
F-statistic	1.054571	Durbin-Watson stat	2.456908
Prob(F-statistic)	0.417133		

Figure14 Heteroskedasticity Test Result

Resource EViews Testing

10. White Test Heteroscedasticity Test:

The test done using EViews App, As per the result it shows that there is homoscedasticity since chi-Square test gave results higher than 0.05

Heteroskedasticity Test: White
Null hypothesis: Homoskedasticity

F-statistic	2.263644	Prob. F(14,29)	0.0308
Obs*R-squared	22.97547	Prob. Chi-Square(14)	0.0607
Scaled explained SS	17.34382	Prob. Chi-Square(14)	0.2383

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/15/22 Time: 20:34
Sample: 2010Q1 2020Q4
Included observations: 44

Figure 15 White Test Heteroscedasticity Test Result

Resource EViews Testing

11. Autocorrelation:

Autocorrelation occurs when the variable series is correlated with its lagged series. The error term should be random and not consistent or trending. If this is not the case, then the model has autocorrelation. The model's output is therefore unreliable.

The value of Durbin Watson range between 1.7 to 2.3. If the value between them so there is no autocorrelation. And if DW is greater than 2.3 or less than 1.7 then there is autocorrelation.

From below right table there is auto correlation since its less than 1.7

The LM test was utilized. The void This test's hypothesis is that there is no autocorrelation.

If the p value is more than 0.05, we accept the Ho; else, we reject it. As a result, we require p > 0.05 for no autocorrelation between variables.

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	2.112108	Prob. F(2,34)	0.1366
Obs*R-squared	4.751995	Prob. Chi-Square(2)	0.0929

Figure 16 Auto correlation Test Result

Resource EViews Testing

Dependent Variable: HPI
Method: Least Squares
Date: 05/20/22 Time: 13:17
Sample (adjusted): 2010Q2 2020Q4
Included observations: 43 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	-5.71E-05	1.49E-05	-3.833912	0.0005
DATE	0.002808	0.002547	1.102530	0.2775
INFL_R	-0.386513	0.108174	-3.573087	0.0010
INTRST_R	-0.094864	0.101533	-0.934314	0.3564
LHPI	1.024169	0.052644	19.45463	0.0000
POP	-3.59E-07	7.12E-07	-0.503584	0.6176
C	-2020.358	1822.376	-1.108639	0.2749

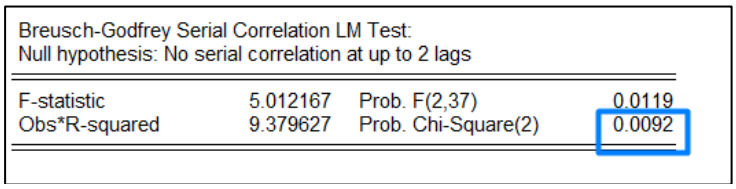
R-squared	0.998056	Mean dependent var	83.56124
Adjusted R-squared	0.997732	S.D. dependent var	28.73665
S.E. of regression	1.368462	Akaike info criterion	3.613152
Sum squared resid	67.41674	Schwarz criterion	3.899859
Log likelihood	-70.68276	Hannan-Quinn criter.	3.718880
F-statistic	3080.776	Durbin-Watson stat	1.663048
Prob(F-statistic)	0.000000		

Figure 17 Auto Correlation Probability Test Result

Resource EViews Testing

As the p value is less than 0.05 so there is autocorrelation existing.

Now to remove it we will include 1 Lag column from dependent variable and use it as independent variable with same tests

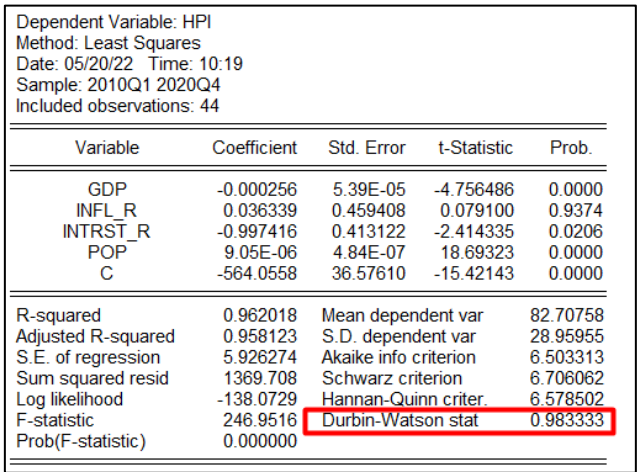


Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	5.012167	Prob. F(2,37)	0.0119
Obs*R-squared	9.379627	Prob. Chi-Square(2)	0.0092

Figure 18 Auto correlation Test Result (after data Modification)

Resource EViews Testing



Dependent Variable: HPI
Method: Least Squares
Date: 05/20/22 Time: 10:19
Sample: 2010Q1 2020Q4
Included observations: 44

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	-0.000256	5.39E-05	-4.756486	0.0000
INFL_R	0.036339	0.459408	0.079100	0.9374
INTRST_R	-0.997416	0.413122	-2.414335	0.0206
POP	9.05E-06	4.84E-07	18.69323	0.0000
C	-564.0558	36.57610	-15.42143	0.0000

R-squared	0.962018	Mean dependent var	82.70758
Adjusted R-squared	0.958123	S.D. dependent var	28.95955
S.E. of regression	5.926274	Akaike info criterion	6.503313
Sum squared resid	1369.708	Schwarz criterion	6.706062
Log likelihood	-138.0729	Hannan-Quinn criter.	6.578502
F-statistic	246.9516	Durbin-Watson stat	0.983333
Prob(F-statistic)	0.000000		

Figure 19 Auto Correlation Probability Test Result (after data Modification)

Resource EViews Testing

12. CUSUM or Stability Test:

The test Done using EViews App**,** Blue Line should be in between the red predicted lines in order to proceed with testing.

the graphic result for CUSUM is in between the 5% significance lines. This translated that our regression equation is stable over the period.

Its purpose is to determine whether or not the coefficients of the regression model are shifting in a predictable manner.

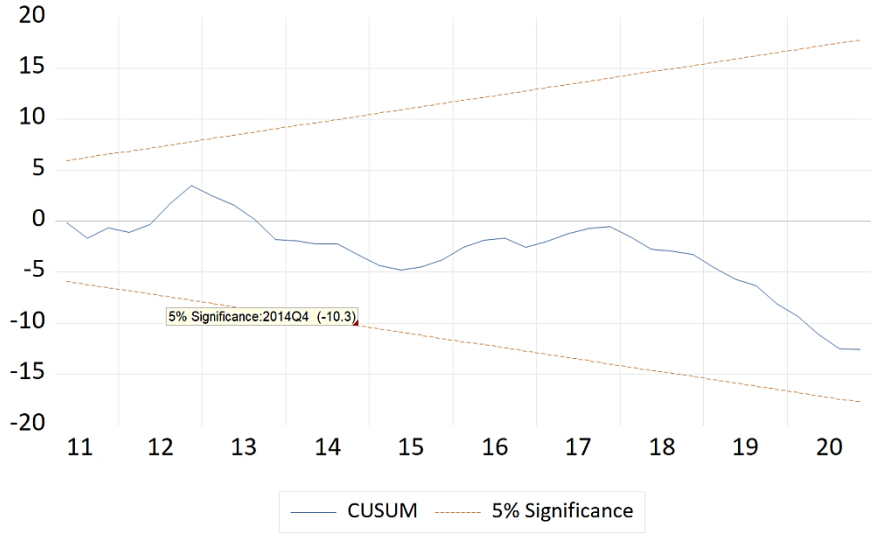


Figure 20 CUSUM Test Result

Resource EViews Testing

13. CUSUM Of Square Test:

The Test Done using EViews App, Blue Line should be in between the red predicted lines in order to proceed with testing. And the graphic result for CUSUM of squares is in between the 5% significance lines. This translated that our regression equation is stable over the period.

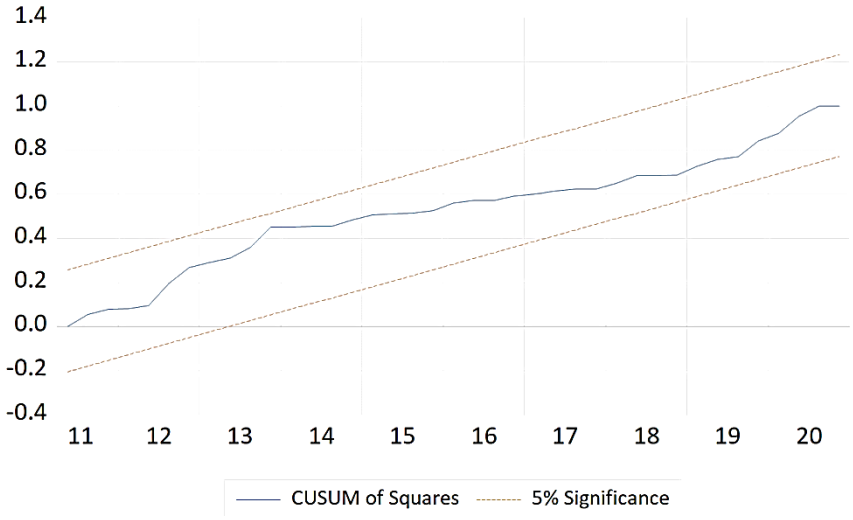


Figure 21 CUSUM Square Test Result

Resource EViews Testing

V. FINDINGS, SUMMARY, AND RECOMMENDATIONS

This chapter contains the findings' explanations, summaries, and suggestions depending on the study topic. Numerous methodological assessments in this chapter will be presented. The findings of the study are discussed, summarized, and recommendations are provided in this chapter. The first section summarizes the study's findings, while the second part gives the findings and summary of the study hypothesis, and the third section focuses on recommendations for further research. Then we will explain the research limitations as well as the challenges faced while doing the research.

A. Analysis of the findings:

Based on sample data taken from historical or previous statistical data for a period of ten years with quarterly frequency data collected staring from 2010 till 2020, the study analyses some of the factors that may affect housing prices in Istanbul, Turkey, which include GDP, exchange rate, population growth, and inflation. The goal was to see how these factors may have effect upon housing values in Turkey. According to the studied data sets, the presence of inflation, population expansion, and GDP growth resulted in increasing or decreasing for the House Price index as for inflation it affects the price positively but a weak affection so when the inflation rate and the GDP increase the HPI will also increase, regarding the Population it affect the Home Price strongly negative so when the Population increased the HPI will increase, for interest rate its relation with House price is insignificant so no relation between them.

B. Importance of Study:

Importance of this study on researcher level, or the researcher, the study provides an opportunity to establish the practical information and expertise that will be used in the study program. The technique also provides assurance that future academicians will be able to complete their research because it will provide good

explanation on practical level and descriptive level that will guide them.

What is important also for the organization in assessing inflation, interest rates, GDP, and population growth in Turkey, as well as providing a critical review of the underlying concerns in explaining home prices in Turkey. The investigation will allow for the identification of factors that affect home prices and to find solution and apply the needed corrective actions as much as it possible economically. The findings of the study will also point to ways to cope with rising home costs, such as lowering inflation, and controlling the interest rates in order to achieve stable housing prices. And also, one of the interesting and important things about this research and the study applied within it and after obtaining the results of the research is that the study will shed light on the genuine perceptions of government officials on matters such as inflation, exchange rates, GDP, and population growth as determinants of property prices.

C. Findings and Summary:

This section provides an assessment of the discussion of the degree of relation between dependent variable HPI and the independent variable (Macroeconomic 4 selected factors) Inflation, GDP, Interest Rate and the population count. we start with testing the reliability of data though statistical test and we find out that the data is statistically able to be tested by regression and correlation tests for check that if there is or is not relation between the fluctuation of the rates or numbers if each of the independent variables.

so we conclude that:

- The house price index best relation is with population since it has strong positive relation and its relation with house price the dependent value is significant and also in linear regression there is positive correlation.
- After it the inflation rate since its relation is significant even the relation is weak as per correlation test but still all test gave us good relation between those two variables population and house price index.
- As for the GDP the result of regression gave us answer for our thesis main question that the relation with house price index is insignificant so no relation between them.

- Also, for the Interest rate the regression result tells us that the relation is insignificant with the HPI.

Table 5 Summary for all the Study of Data

Test	Correlation	Regression	Linear Regression
GDP & HPI	Weak Positive Relation	Insignificant Relation	Negative Correlation
Inflation Rate & HPI	Weak Positive Relation	Significant Relation	Positive Correlation
Interest Rate & HPI	Insignificant Relation	Insignificant Relation	-
Population & HPI	Strong Positive Relation	Significant Relation	Positive Correlation

D. Frame Work & Result of Study Summary:

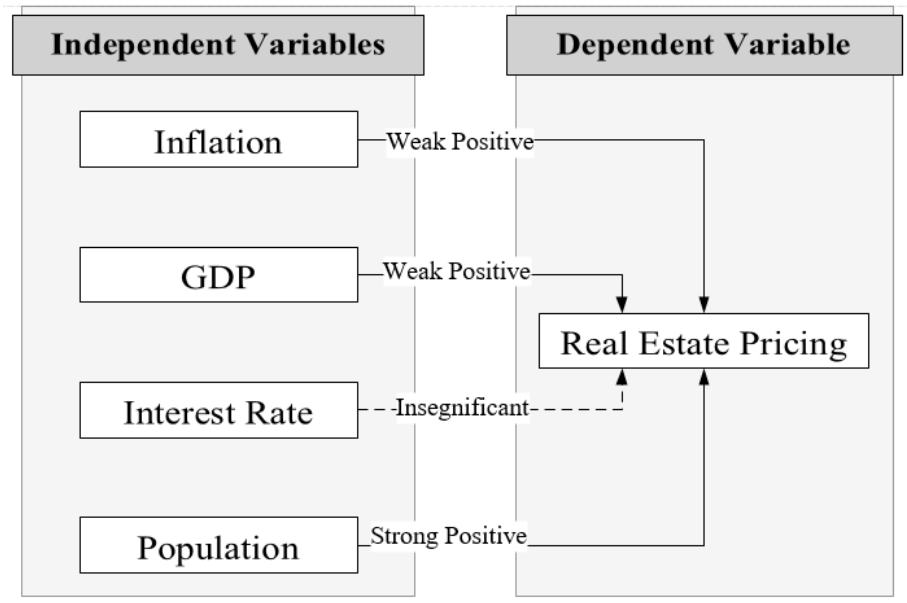


Figure 22 Correlation Test Result Summary:

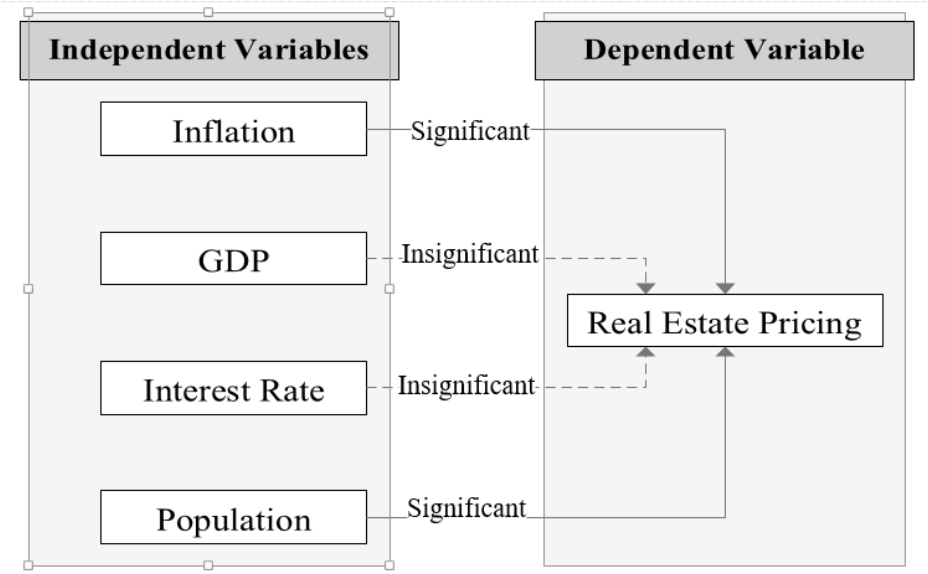


Figure 23 Regression Test Result Summary:

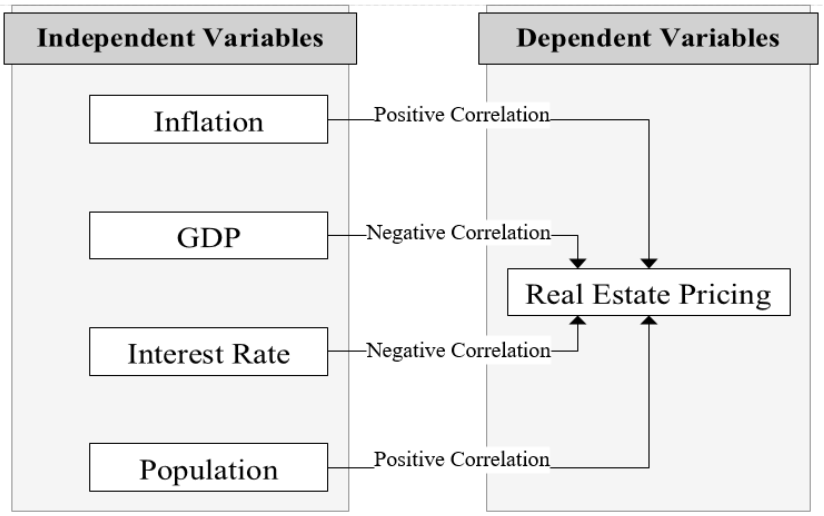


Figure 24 Linear Regression Test Summary

1. Limitation of Study and Recommendations:

Our thesis was studying a statistical data set for a period of 10 years starting from 01/01/2010 until 31/12/2020

After checking previous studies, it's found that most of them used annual data set which make the result not accurate same as when the data count is more detailed like monthly or quarterly,

What was different in this study is that I get more row data (40 record) through studying the variables fluctuation on Quarterly basis instead of yearly which gives us more accurate results, as upon (Global Headquarter 2022) A statistically

significant result is not due to chance, and it is determined by two main factors: sample size and effect size, The size of the sample for your experiment is referred to amount of sample or count of data. The more sample size you have, the surer you can be in the experiment's outcome. If you're doing tests on a website, the more visitors you have, the sooner you'll have a big enough data set to see if the results are statistically significant. If your sample size is too small, you will encounter sampling errors.

Now one of the difficulties is that getting data on quarterly basis was not easy it takes so much time beside that the data collected from different resources, so it was not easy to find all the needed data with same frequency, and beside that I preferred to study data on monthly level but unfortunately it wasn't available especially for the GDP and Population data.

Lack of experience: when I start doing this study, I had no prior experience with master's dissertations' It was difficult to be a bachelor's degree graduate without a basic understanding of research difficulties, particularly statistical analysis. On the other hand, attending too many u-tube tutorial videos with so many interpretations theoretically and practically and beside taking support from some friends who had prior experience and could contribute to the analysis.

Also financially it was very high cost in regard to collected data from paid websites and also the subscription with programs that helps in applying the needed statistics tests for example SPSS and EViews since there was 1 month trial and it will be paid after it so it takes more than 1 month to have the needed tutorial sessions for applying the tests.

My recommendations for the coming studies is to take more detailed data as much as applicable and also to take more variables other than population which is already its number is always growing up so it may not give us an accurate results whether it's really have an effect the dependent variable or not.

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VII. APPENDIX

APPENDIX A: Tables

APPENDIX A Tables

Table A1: Quarterly GDP For Period 2010 to 2020:

Year	Q1	Q2	Q3	Q4
2010	182463	185756	157369	193540
2011	196148	192954	180706	190478
2012	175981	174190	209520	231509
2013	224163	227041	211656	196390
2014	217740	214256	223469	213422
2015	212735	209390	216427	225639
2016	236157	241010	236128	225662
2017	234386	237190	246140	240228
2018	231301	221662	216076	209165
2019	202687	206338	219164	209396
2020	212367	195820	185746	181591

Table A2: Population Growth for period 2010 to 2020:

Year	COUNT
2010	73722988
2011	74724269
2012	75627254
2013	76667865
2014	77695904
2015	78741053
2016	79814871
2017	80810525
2018	82003882
2019	83154997
2020	83614362

Table A3: Quarterly Inflation Rate for Period 2010 to 2020:

Year	Q1	Q2	Q3	Q4
2010	9.29	9.22	8.37	7.43
2011	4.35	5.89	6.37	9.20
2012	10.49	9.31	9.05	6.78
2013	7.21	6.98	8.31	7.47
2014	8.01	9.40	9.18	8.76
2015	7.47	7.73	7.30	8.16
2016	8.61	6.93	8.04	7.56
2017	10.21	11.50	10.56	12.27
2018	10.28	12.80	19.42	22.39
2019	19.91	17.82	13.64	10.32
2020	12.13	11.65	11.76	13.51

Table A4: Quarterly Interest Rate for Period 2010 to 2020:

Year	Q1	Q2	Q3	Q4
2010	15.00	15.00	15.00	14.67
2011	14.00	14.00	14.00	15.00
2012	17.00	16.67	16.00	15.17
2013	13.50	12.17	9.50	9.75
2014	10.25	10.25	10.25	9.83
2015	9.00	9.00	9.00	9.00
2016	9.00	9.00	9.00	8.92
2017	8.75	8.75	8.75	8.75
2018	8.75	12.00	18.50	18.50
2019	18.50	18.50	18.50	15.75
2020	12.75	11.50	9.00	11.25

Table A5: Quarterly House Price Index for Period 2010 to 2020:

Year	Q1	Q2	Q3	Q4
2010	46	46	47	48
2011	49	50	50	51
2012	52	54	55	56
2013	58	60	62	63
2014	65	68	70	72
2015	75	79	81	84
2016	87	90	92	94
2017	97	100	101	103
2018	105	108	109	109
2019	108	110	114	117
2020	123	134	144	152

Figure A1 GDP at Level with Intercept:

Null Hypothesis: GDP has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.106283	0.2433
Test critical values:	1% level	-3.592462	
	5% level	-2.931404	
	10% level	-2.603944	

*MacKinnon (1996) one-sided p-values.

Figure A2 GDP at Level with Trend and Intercept:

Null Hypothesis: GDP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.717108	0.7264
Test critical values:	1% level	-4.186481	
	5% level	-3.518090	
	10% level	-3.189732	

*MacKinnon (1996) one-sided p-values.

Figure A3 GDP at Level with None:

Null Hypothesis: GDP has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.205371	0.6064
Test critical values:	1% level	-2.619851	
	5% level	-1.948686	
	10% level	-1.612036	

*MacKinnon (1996) one-sided p-values.

Figure A4 GDP at First Difference with Intercept:

Null Hypothesis: D(GDP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.880337	0.0000
Test critical values:	1% level	-3.596616	
	5% level	-2.933158	
	10% level	-2.604867	

*MacKinnon (1996) one-sided p-values.

Figure A5 GDP at First Difference with Trend and Intercept:

Null Hypothesis: D(GDP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.038256	0.0000
Test critical values:	1% level	-4.192337	
	5% level	-3.520787	
	10% level	-3.191277	

*MacKinnon (1996) one-sided p-values.

Figure A6 GDP at First Difference with None:

Null Hypothesis: D(GDP) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.966034	0.0000
Test critical values:	1% level	-2.621185	
	5% level	-1.948886	
	10% level	-1.611932	

*MacKinnon (1996) one-sided p-values.

Figure A7 GDP at Second Difference with Intercept:

Null Hypothesis: D(GDP,2) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.020405	0.0000
Test critical values:	1% level	-3.592462	
	5% level	-2.931404	
	10% level	-2.603944	

*MacKinnon (1996) one-sided p-values.

Figure A8 GDP at Second Difference with Trend and Intercept:

Null Hypothesis: D(GDP,2) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 4 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.409856	0.0000
Test critical values:	1% level	-4.226815	
	5% level	-3.536601	
	10% level	-3.200320	

*MacKinnon (1996) one-sided p-values.

Figure A9 GDP at Second Difference with None:

Null Hypothesis: D(GDP,2) has a unit root
Exogenous: None
Lag Length: 4 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.553254	0.0000
Test critical values:	1% level	-2.628961	
	5% level	-1.950117	
	10% level	-1.611339	

*MacKinnon (1996) one-sided p-values.

Figure A10 House Price at Level with Intercept:

Null Hypothesis: HPI has a unit root
Exogenous: Constant
Lag Length: 5 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		2.214841	0.9999
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	

*MacKinnon (1996) one-sided p-values.

Figure A11 House Price at Level with Trend and Intercept:

Null Hypothesis: HPI has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 6 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.354383	0.8578
Test critical values:	1% level	-4.226815	
	5% level	-3.536601	
	10% level	-3.200320	

*MacKinnon (1996) one-sided p-values.

Figure A12 House Price at Level with None:

Null Hypothesis: HPI has a unit root
Exogenous: None
Lag Length: 5 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		2.920458	0.9987
Test critical values:	1% level	-2.627238	
	5% level	-1.949856	
	10% level	-1.611469	

*MacKinnon (1996) one-sided p-values.

Figure A13 House Price at First Difference with Intercept:

Null Hypothesis: D(HPI) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.340156	0.6020
Test critical values:	1% level	-3.596616	
	5% level	-2.933158	
	10% level	-2.604867	

*MacKinnon (1996) one-sided p-values.

Figure A14 House Price at First Difference with Trend and Intercept:

Null Hypothesis: D(HPI) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 4 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.635330	0.2679
Test critical values:	1% level	-4.219126	
	5% level	-3.533083	
	10% level	-3.198312	

*MacKinnon (1996) one-sided p-values.

Figure A15 House Price at First Difference with None:

Null Hypothesis: D(HPI) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.254789	0.5884
Test critical values:	1% level	-2.621185	
	5% level	-1.948886	
	10% level	-1.611932	

*MacKinnon (1996) one-sided p-values.

Figure A16 House Price at Second Difference with Intercept:

Null Hypothesis: D(HPI,2) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.760158	0.0000
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

*MacKinnon (1996) one-sided p-values.

Figure A17 House Price at Second Difference with Trend and Intercept:

Null Hypothesis: D(HPI,2) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.945053	0.0001
Test critical values:	1% level	-4.205004	
	5% level	-3.526609	
	10% level	-3.194611	

*MacKinnon (1996) one-sided p-values.

Figure A18 House Price at Second Difference with None:

Null Hypothesis: D(HPI,2) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.025168	0.0000
Test critical values:	1% level	-2.622585	
	5% level	-1.949097	
	10% level	-1.611824	

*MacKinnon (1996) one-sided p-values.

Figure A19 Interest Rate at Level with Intercept:

Null Hypothesis: INTRST_R has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.493766	0.1241
Test critical values:	1% level	-3.596616	
	5% level	-2.933158	
	10% level	-2.604867	

*MacKinnon (1996) one-sided p-values.

Figure A20 Interest Rate at Level with Trend and Intercept:

Null Hypothesis: INTRST_R has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.437848	0.3559
Test critical values:	1% level	-4.192337	
	5% level	-3.520787	
	10% level	-3.191277	

*MacKinnon (1996) one-sided p-values.

Figure A21 Interest Rate at Level with None:

Null Hypothesis: INTRST_R has a unit root
Exogenous: None
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.746988	0.3868
Test critical values:	1% level	-2.621185	
	5% level	-1.948886	
	10% level	-1.611932	

*MacKinnon (1996) one-sided p-values.

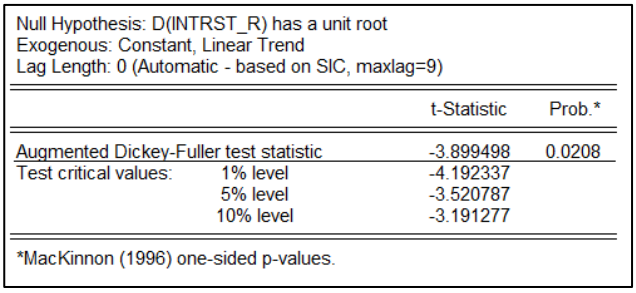
Figure A22 Interest Rate at First Difference with Intercept:

Null Hypothesis: D(INTRST_R) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.953654	0.0038
Test critical values:	1% level	-3.596616	
	5% level	-2.933158	
	10% level	-2.604867	

*MacKinnon (1996) one-sided p-values.

Figure A23 Interest Rate at First Difference with Trend and Intercept:

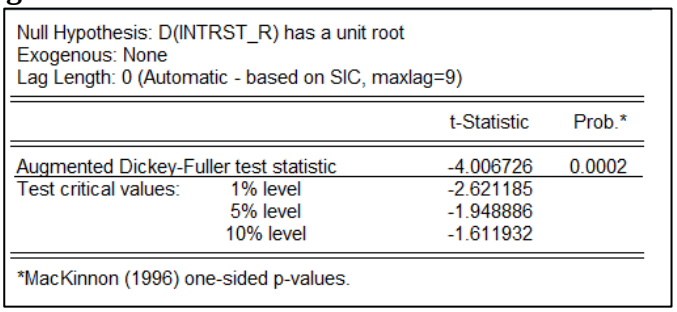


Null Hypothesis: D(INTRST_R) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.899498	0.0208
Test critical values:	1% level	-4.192337	
	5% level	-3.520787	
	10% level	-3.191277	

*MacKinnon (1996) one-sided p-values.

Figure A24 Interest Rate at First Difference with None:

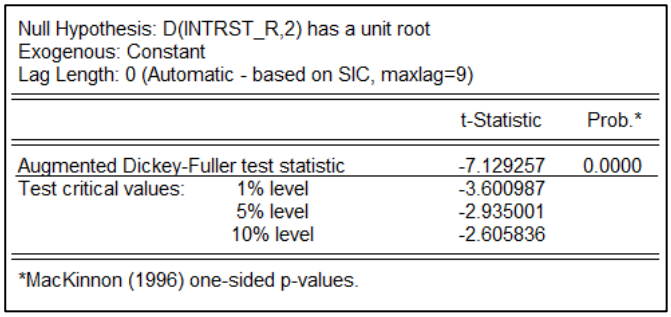


Null Hypothesis: D(INTRST_R) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.006726	0.0002
Test critical values:	1% level	-2.621185	
	5% level	-1.948886	
	10% level	-1.611932	

*MacKinnon (1996) one-sided p-values.

Figure A25 Interest Rate at Second Difference with Intercept:

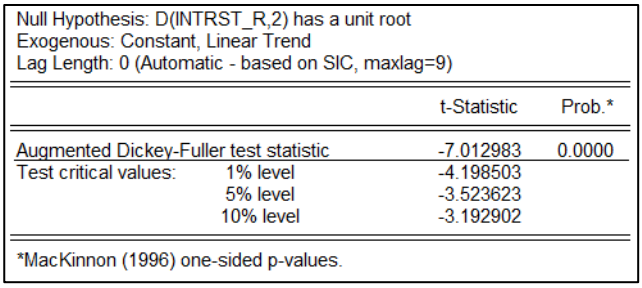


Null Hypothesis: D(INTRST_R,2) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.129257	0.0000
Test critical values:	1% level	-3.600987	
	5% level	-2.935001	
	10% level	-2.605836	

*MacKinnon (1996) one-sided p-values.

Figure A26 Interest Rate at Second Difference with Trend and Intercept:

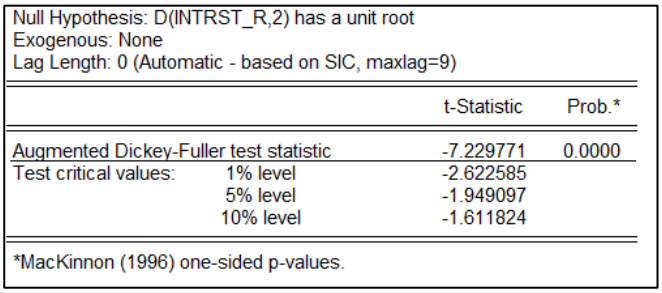


Null Hypothesis: D(INTRST_R,2) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.012983	0.0000
Test critical values:	1% level	-4.198503	
	5% level	-3.523623	
	10% level	-3.192902	

*MacKinnon (1996) one-sided p-values.

Figure A27 Interest Rate at Second Difference with None:



Null Hypothesis: D(INTRST_R,2) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.229771	0.0000
Test critical values:	1% level	-2.622585	
	5% level	-1.949097	
	10% level	-1.611824	

*MacKinnon (1996) one-sided p-values.

Figure A28 Inflation Rate at Level with Intercept:

Null Hypothesis: INFL_R has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.162550	0.2225
Test critical values:	1% level	-3.596616	
	5% level	-2.933158	
	10% level	-2.604867	

*MacKinnon (1996) one-sided p-values.

Figure A29 Inflation Rate at Level with Trend and Intercept:

Null Hypothesis: INFL_R has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.381263	0.0676
Test critical values:	1% level	-4.192337	
	5% level	-3.520787	
	10% level	-3.191277	

*MacKinnon (1996) one-sided p-values.

Figure A30 Inflation Rate at Level with None:

Null Hypothesis: INFL_R has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.243755	0.5926
Test critical values:	1% level	-2.619851	
	5% level	-1.948686	
	10% level	-1.612036	

*MacKinnon (1996) one-sided p-values.

Figure A31 Inflation Rate at First Difference with Intercept:

Null Hypothesis: D(INFL_R) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.876154	0.0003
Test critical values:	1% level	-3.596616	
	5% level	-2.933158	
	10% level	-2.604867	

*MacKinnon (1996) one-sided p-values.

Figure A32 Inflation Rate at First Difference with Trend and Intercept:

Null Hypothesis: D(INFL_R) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.827042	0.0018
Test critical values:	1% level	-4.192337	
	5% level	-3.520787	
	10% level	-3.191277	

*MacKinnon (1996) one-sided p-values.

Figure A33 Inflation Rate at First Difference with None:

Null Hypothesis: D(INFL_R) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.924953	0.0000
Test critical values:	1% level	-2.621185	
	5% level	-1.948886	
	10% level	-1.611932	

*MacKinnon (1996) one-sided p-values.

Figure A34 Inflation Rate at Second Difference with Intercept:

Null Hypothesis: D(INFL_R,2) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.620529	0.0000
Test critical values:	1% level	-3.600987	
	5% level	-2.935001	
	10% level	-2.605836	

*MacKinnon (1996) one-sided p-values.

Figure A35 Inflation Rate at Second Difference with Trend and Intercept:

Null Hypothesis: D(INFL_R,2) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.509841	0.0000
Test critical values:	1% level	-4.198503	
	5% level	-3.523623	
	10% level	-3.192902	

*MacKinnon (1996) one-sided p-values.

Figure A36 Inflation Rate at Second Difference with None:

Null Hypothesis: D(INFL_R,2) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.726630	0.0000
Test critical values:	1% level	-2.622585	
	5% level	-1.949097	
	10% level	-1.611824	

*MacKinnon (1996) one-sided p-values.

Figure A37 Population at Level with Interval:

Null Hypothesis: POP has a unit root
Exogenous: Constant
Lag Length: 4 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.346632	0.5981
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

*MacKinnon (1996) one-sided p-values.

Figure A38 Population at Level with Interval and Trend:

Null Hypothesis: POP has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 4 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.603909	0.2808
Test critical values:	1% level	-4.211868	
	5% level	-3.529758	
	10% level	-3.196411	

*MacKinnon (1996) one-sided p-values.

Figure A39 Population at Level with None:

Null Hypothesis: POP has a unit root
Exogenous: None
Lag Length: 4 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.453084	0.8076
Test critical values:	1% level	-2.625606	
	5% level	-1.949609	
	10% level	-1.611593	

*MacKinnon (1996) one-sided p-values.

Figure A40 Population at First Difference with Interval:

Null Hypothesis: D(POP) has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.885479	0.7823
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

*MacKinnon (1996) one-sided p-values.

Figure A41 Population at First Difference with Interval and trend:

Null Hypothesis: D(POP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 3 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.040666	0.9261
Test critical values:	1% level	-4.211868	
	5% level	-3.529758	
	10% level	-3.196411	

*MacKinnon (1996) one-sided p-values.

Figure A42 Population at First Difference with None:

Null Hypothesis: D(POP) has a unit root
Exogenous: None
Lag Length: 3 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.891809	0.3235
Test critical values:	1% level	-2.625606	
	5% level	-1.949609	
	10% level	-1.611593	

*MacKinnon (1996) one-sided p-values.

Figure A43 Population at 2nd Difference with Interval:

Null Hypothesis: D(POP,2) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-45.65481	0.0001
Test critical values:	1% level	-3.610453	
	5% level	-2.938987	
	10% level	-2.607932	

*MacKinnon (1996) one-sided p-values.

Figure A44 Population at 2nd Difference with Interval and Trend

Null Hypothesis: D(POP,2) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-45.84839	0.0000
Test critical values:	1% level	-4.211868	
	5% level	-3.529758	
	10% level	-3.196411	

*MacKinnon (1996) one-sided p-values.

Figure A45 Population at 2nd Difference with None

Null Hypothesis: D(POP,2) has a unit root
Exogenous: None
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-45.95461	0.0000
Test critical values:	1% level	-2.625606	
	5% level	-1.949609	
	10% level	-1.611593	

*MacKinnon (1996) one-sided p-values.

RESUME:

PERSONAL: **AMAN AL HABASH**

WORK EXPERIENCE:

01/2008–01/2018 **Syriatel Telecommunication company**

Customer service 2008 – 2010:

1- POS representative and cash controller.

2- In charge team leader at call centre.

Marketing and sales 2010 – 2016:

1- Corporate and VIP support specialist.

2- Number reservation coordinator.

3- Stock coordinator.

4- Logistics coordinator.

Quality management 2017 – 2018:

1- Quality management specialist

03/2018–05/2020 **PDR Group:**

1- Real Estate Sales Consultant Representative.

Reality Group:

1- Real Estate Sales Consultant Representative.

Fuzul Inşaat:

1- Account manager at KELES project sales Office.

2- Sales consultant Team leader.

EDUCATION: Graduated from Damascus University – English literature.

MBA Master at Istanbul Aydin University.

TRAINING: ISO course

PBMN management flow chart

7 thinking hats course E-learning course

NLP course E-learning course

Problem solving course

Communication skills