THE EMERGENCE OF FOREIGN INVESTORS IN THE DUTCH RESIDENTIAL REAL ESTATE MARKET AND HOUSE PRICE LEVEL ASSOCIATION:

A QUANTITATIVE APPROACH

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Abstract.

The Dutch Real Estate market has noticed an increase in foreign direct investment (FDI). On a national scale the concern grows among Dutch house buyers/renters on the emergence of foreign investors and the increasing amount of FDI in Real Estate (FDIRE). The Netherlands is one of the largest recipients of FDI in Europe and has recently overtaken the UK as the first destination for FDI in Europe. Previous research has highlighted differences in pricing between investors. However in the literature there is no academic consensus on the relation between FDIRE and house price appreciation. Gholipour et al. (2014) did not find evidence between FDI and house price appreciation on a national scale level, Guest and Rohde (2017) did find a relationship between house price appreciation and FDIRE on a municipal scale level. Therefore this paper studies the relationship between house prices and the nationality of the investor in the Dutch Real Estate market, within the Randstad, with a multiple linear regression model. The results of the models indicate that there is a positive significant effect between transaction prices per square meter and the nationality of the investor in the Randstad on the residential market. However this study shows that this only applies to foreign investors buying assets and not to foreign investors selling.

Keywords:
Residential, Real Estate, House Prices, FDIRE, Nationality.

Preface

This thesis has been written for the completion of my Master degree Real Estate Studies at the University of Groningen.

Before continuing to the introduction of this Thesis, I would briefly take the time to express my gratitude towards Casper Doldersum and his cooperation, Doldersum Vastgoed, in providing me the necessary data which enabled me to conduct this research on this topic.

I would also like to express my sincere appreciation to my research supervisor, prof. dr. E.F. Nozeman, for his advice and constructive feedback, his expertise and his patience during my long and though graduation process. He didn't message me often, but he knew precisely the moment to contact me and kept me involved and motivated to the end. It means a lot to me.

1. Introduction

1.1. Background information

Nowadays, many countries encourage Foreign Direct Investment[1] (FDI) to promote their economic development. Among all sectors, the real estate sector has been experiencing a significant movement toward increasing internationalization and FDI in Real Estate (FDIRE[2]) has been rising in many countries (UNCTAD 2011, Gholipour et al. 2014). The global investment volumes showcase the increasing globalization of real estate. Hobbs et al. (2007) state that cross-border investments tripled to a level of $116 billion, in the five years leading up to 2006, representing 20% of all property investments worldwide. The real estate sector attracted growing FDI before the 2020 pandemic, it now faces significant pressure from slowing demand and financing constraints (UNCTAD 2020).

The share of this worldwide property investment is greatest in Europe, and especially in the Netherlands. That country is one of the largest recipients of FDI in the EU and has recently overtaken the UK as the first destination for FDI in Europe. even when, according to the UNCTAD's 2020 World Investment Report, FDI flows to the Netherlands decreased to USD 84 billion in 2019, down from USD 114 billion in 2018 (-26.3%) (Nordea, 2020). Reasons for this high FDI volume are because the Netherlands offers a stable political and macroeconomic climate, has a highly developed financial sector, a strategic location, a well-educated and productive labor force and high-quality physical and communications infrastructure (Everts, 2019).

The Dutch real estate market, as one of the most interesting destinations for FDI, has noticed an increase in FDIRE during the last decade. An analysis by the Netherlands Environmental Assessment Agency on investment volume in the Dutch real estate market shows evidence that from 2009 to 2013 the annual transaction volume was predominately represented by domestic investors. In this period the latter were responsible for 70% of the acquisitions. The strong increase in transaction volume since 2013 can partly be explained by the demand shift from domestic to foreign parties; over 50% of the transaction volume is FDI. Almost 45% of the transaction volume from foreign investors is invested in offices and 10% in residential real estate (PBL, 2016). The impact on the pricing of foreign investors is showcased in the Netherlands, where the arrival of foreign investors on the Dutch real estate market, mainly Amsterdam, is causing discussion whether the city will be ‘taken over’, possibly leading to price increases and unaffordability (PBL, 2016). For example in Amsterdam the difference in housing price growth with the Netherlands as a whole has increased to as much as 44.6 percentage points (figure 1) since the beginning of 2013 (Groot & Spiegelaar, 2019, Rabobank). Although this cannot be linked to FDI one-to-one, it could be possible that there is an association between the emergence of foreign investors into the Dutch real estate sector and house price levels. According to Capital Value (2020), foreign investors in 2019 invested a total of 4.2 billion euros in rental properties, in other words 46% of the total transaction volume is FDIRE. The overall concern among Dutch house buyers/renters has been growing, since these investors have a bad reputation in the public eye, who consider them profit-seeking and risk-averse (He et al., 2009). Dr. Filipa Sá, senior lecturer in Economics at King's Business School, summarizes this problem in the following statement: “Housing costs form a big part of households' budgets and so they are a concern for a large portion of the UK population. One of the issues on people’s minds is that foreign investors are buying properties with the purpose of making money as opposed to creating a home to live in and that this

[1] “Foreign direct investment is an investment made by a firm or individual in one country into business interests located in another country. Generally, FDI takes place when an investor establishes foreign business operations or acquires foreign business assets in a foreign company.” (Chen, 2020)

[2] FDIRE is an investment made by an individual in one country into real estate in another country.

is pushing house prices up." Resembling the English opinion, the Dutch public fears that the presence of foreign investors has a price-boosting effect on the Dutch residential real estate market.

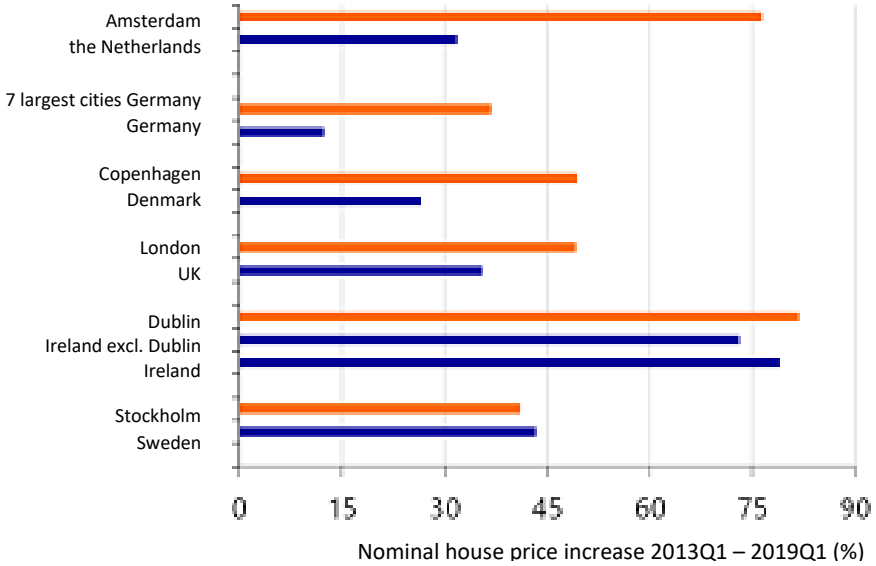

Figure 1: House price increase in European capitals (Groot & Spiegelaar, 2019, Rabobank)

1.2. Literature review

According to the literature there are multiple drivers behind the increasing FDIRE trend. Firstly, real estate transparency is an important factor in strategic real estate decision making. It reduces the information asymmetry problem. Especially with high levels of real estate transparency in the developed markets in Europe and significant improvements in emerging markets in Europe, the continent sets a positive context for FDIRE (Gerlowski et al,. 1994; Newell, 2016). This is confirmed by Eichholtz et al. (2011) whom state that underperformance of international property companies is driven by the institutional environment, the level of economic integration and the real estate market transparency of those countries. Second, there are diversification benefits and return expectations. According to Conover et al. (2002) foreign real estate provides lower risk and higher return on low stock correlation. Additionally, foreign real estate has a significant weight in the efficient international portfolios. International real estate investments increase risk reduction in diversified portfolios and so is the weight that should be devoted to real estate in diversified portfolios. Real estate allocation between domestic and non-domestic assets varies substantially across countries, depending on whether or not returns are hedged (Hoesli et al., 2004). Thirdly, the reduction of institutional, political and cultural barriers drives cross-border investments, because it reduces the amount of risk taken (Hoesli et al., 2004; Keogh and D'Arcy, 1999).

In spite of the reduction of mentioned barriers, many real estate investors remain investing locally because of the amount of risk involved in cross border investments (Daude and Stein, 2007). When the level of institutional, political and cultural barriers is relatively high and advantages do not outweigh the disadvantages, it is assumed that foreign investors push down the price and are only willing to purchase at a discount, where they would otherwise pay a premium, when diversification benefits and favourable returns outweigh the risks involved in cross-border investment. The expected returns should be sufficient to compensate investors for the increased risks of investing abroad.

1.3. Research problem statement.

There is no academic consensus on the association of the emergence of foreign investors on house price appreciation and house price levels. Additionally, Gholipour et al. (2014) analysed the interrelationship between FDIRE, economic growth, and property prices on a national level in different OECD countries. They found no relationship on national level between FDIRE and property price appreciation. However in a more recent study Guest and Rohde (2017) researched house price increase in Australian capital cities and FDIRE, finding that one quarter of the price increase in Sydney and Melbourne can be attributed to FDIRE while in other capital cities the effects appear to be negligible. Theorizing this could mean that the effect of FDIRE is minimal on national level, but is endogenous and has measurable impact on metropolitan level. Guest and Rohde find evidence for house price appreciation on municipal level, however the subject of foreign investors associated with house price levels has rarely been touched upon. The essence of this research is whether the arrival/growth of foreign investors has led to increased price levels among other factors. This study provides information for the Dutch public to better understand RE market dynamics and for policy makers to decide whether or not to attract, limit or avert FDIRE into residential markets on municipal level, and possibly find and confirm a relation on a local level between house price growth and the increase in foreign investors for the Netherlands. To achieve the above objective the following central question is formulated:

"Are higher house price levels associated with the emergence of foreign investors in the Netherlands and if so to what extent?"

In order to be able answering the central research question, the following sub questions have been formulated to gain a better understanding in the theoretical background of this study and the variables to be considered while analysing the dataset.

1. Which factors determine the price of a home according to the literature? Does the nationality of an investor have impact on the house price?

Answering this sub question provides insight in the way in which house prices are drawn up and which factors influence the way in which house prices fluctuate. In addition, the nationality of investors is emphasized, as this is a key determinant for the research of this paper.

2. Does a proprietary empirical study at urban or metropolitan level of the Netherlands indicate a price effect of foreign investors?

This sub question elaborates on the type of research and the scale level of measured differences as theorized above due to the different findings between Gholipour *et al.* (2014) and the paper of Guest and Rohde (2017).

3. Are there identifiable differences between the four major cities of the Netherlands in terms of price association of foreign investors?

To stay in line with the paper of Guest and Rhode, this sub question elaborates on the price association differences between the major cities: Amsterdam, Rotterdam, Utrecht and The Hague in the Netherlands, with Rotterdam as the base category. Comparing the price levels of homes in Rotterdam with that of Utrecht, The Hague and Amsterdam, is based on the assumption that the price levels, assuming a limited and fixed supply, is mainly influenced by the strongly increased demand (since the end of the GFC). Before the crisis the difference in price levels was already there,

however it may have become stronger due to the growth of (foreign) investors, but also that of domestic households.

The background information implies that Gholipour *et al.* (2014) found no relationship on national level between FDIRE and property prices and Guest and Rohde (2017) did found evidence on the municipal level. Therefore a theory testing research will be conducted to answer the central question of this paper and a multiple regression analysis will be carried out to test for the existence of a house price association with FDI at both national and city level.

There are multiple causes for the state of house price levels. One of the main variables is demand. An increase in household population, as shown above, implies an increase in demand. Supply is fixed in the short term as we learned from DiPasquale and Wheaton's (1992) four quadrant model. In the first quadrant, when supply is fixed and an increase in demand occurs, the only variable that can change is price. In the second quadrant the rent to price ratio increases as well. Therefore house price levels are subject to changes in demand due to the increase or decrease of households. However there are other variables that have effect on house prices and this study examines in addition to this subject, the possible impact of the emergence of foreign investors. In their research DiPasquale and Wheaton (1992) give the example of the shopping centre, where they state that the value of a shopping centre depends on the quantity of investors that wish to own the centre and how many centres there are to invest in. As shown before, an increase in the amount of foreign investors on a market means more competition. This could lead to higher price levels, since supply is fixed in the short term and investors have to pay higher prices to get the property they want.

According to PBL (2014) the Randstad will function as a magnet for (im)migration, within 5 years, from 2006 till 2010 the Randstad experienced an increase of 225.000 people, 71% natural growth and 29% due to immigration and internal migration. The prospect of 2026 till 2030 is an increase of 170.000 people and the increase is mainly determined by natural growth (PBL, 2014). Not only is there an increase in population, the number of foreign investors on the Dutch market also increases. According to Paling (2019), the share of foreign investors was in 2017 27%, in 2019 that percentage went up to 43%. This is due to the fact that the rents are low and Dutch homes offer security in addition to returns (Paling, 2019). Loeb and van Dijk (2016) forecasted that demand for housing in the Netherlands will be rising from 7.1 million to approximately 7.8 million homes between 2015 and 2020. As existing newly-built sites will not be able to meet this demand, the Dutch will face a shortage of homes, particularly in the mid-priced rental segment in the G4 (Amsterdam, Rotterdam, The Hague and Utrecht).

The dependent variable of this study is the transaction price per square meter. The absolute size of the sale/acquisition could be interesting, because small size apartments often have a higher price per square meter than a larger apartment has. Therefore the number of units in the sale is an interesting variable.

The independent variable for this regression is the nationality of the investor whereby a dummy variable is created between foreign and domestic, the type of nationality is left out of the equation for this regression.

Several control variables can influence the correlation between the dependent and independent variable and the main criteria for selecting these variables is the academic relevance. Not including these control variables will lead to strange strong correlation that is completely spurious. Control variables to consider in relation to house price levels are supply and demand, long-term interest rates, construction costs and rents (DiPasquale and Wheaton, 1992).

There are many factors in demand and supply that affect house prices. Visser & van Dam (2006) researched a number of control variables mainly concerning supply factors (housing and neighbourhood characteristics) which affect house prices. These variables are: the vicinity of (recreational) green space, the social status of neighbourhoods, employment ratings and the overall accessibility of an asset. Housing type and dwelling characteristics are variables on the demand/supply side that should also be taken into consideration.

Tassel:
The rest of the paper is structured as follows. The second chapter contains the literature review, presenting an overview of the relevant literature on this subject. The methodology section elaborates on the available data, the variables in the regression and the methodology, while the results are discussed in the fourth chapter. The fifth and final chapter elaborates on the conclusion and recommendations for further research.

2. Literature review

This chapter contains an overview of the relevant literature, to provide an contextual framework in which this research is conducted. This literature has been found mainly on Smartcat, the main search engine of the University of Groningen and the following websites: “Google Scholar, Academic Web Search Premier, Elsevier’s Scopus and sources within key articles. Using keywords linked to this topic, for example: house price increase, FDI, FDIRE, foreign investment, housing markets, globalization, information asymmetry, 4Q model, residential real estate, economic growth. This background information is needed to understand FDIRE and the benefits and disadvantages behind foreign investment.

The House price levels reach in theory equilibrium in the long run, however when demand is increasing and supply is fixed in the short term, house prices will rise (DiPasquale and Wheaton, 1992). DiPasquale and Wheaton build the 4Q model, which explains the demand and supply side of real estate and what would happen if one of both experiences a change. For example, an increase in household sizes or an increase in the number of households implies a fall in the availability of space and therefore an increase in demand for housing/space which would shift out the demand curve in the NE quadrant in the 4Q model. And similar as the macroeconomic variable supply for housing is fixed in the short run, resulting in an increase in rents. These higher rents lead to increased asset prices until in the long run equilibrium levels will be reached. The supply side of the real estate markets is influenced by factors such as long term interest rates and construction costs. Across different markets high construction costs mean that the short run responsiveness of supply to demand shocks is reduced (Capozza *et al.*, 2002). Higher construction costs, due to increased material costs or higher labour costs, lead to a decrease in construction activity and in the long-run to a lower level of the housing stock. At a given demand the rents will rise and with these the house prices on the asset market (DiPasquale & Wheaton, 1992).

With a growing demand among foreign investors in the Dutch real estate markets and comparing advantages and disadvantages of FDI and FDIRE it is arguable that there are negative effects. However earlier literature shows that the Inflow of FDI and especially FDIRE has proven to have positive impacts on different economic indicators in many countries. For instance, Basu and Yao (2009) found in their study that real estate investment by foreign firms leaves a favourable impact on the enrolment in higher education in China, improving human capital. Rodríguez and Bustillo (2010) found for Spain, when studying the impact of FDIRE on tourism, that tourism follows from property acquisition in foreign countries, leading to increasing tourism inbounds. An individual investor who previously has been a tourist visitor coming from a high income country who, taking into account the current price of houses, seeks to obtain a future return for his investment too.

Before investors decide to invest in a host country’s market, they will assess the attractiveness of that market to ensure a successful allocation of the investment. The attractiveness of the market is defined by its socio-economic environment and its institutional framework (Keogh and D’Arcy, 1999). Other research found that in individual countries, real estate investment prospers within a broad institutional context defined by (i) economic activity; (ii) RE investment opportunities; (iii) the depth and liquidity of capital markets; (iv) investor protection and legal framework; (v) administrative burdens and regulatory limitations and (vi) the political and socio-economic structure (Lieser and Groh, 2014). In addition, multiple researchers find other different drivers behind the FDIRE trend. A transparent real estate market (Newell, 2016; Eichholtz et al., 2011), diversification benefits and expected returns (Conover et al., 2002; Hoesli et al., 2004) and reduction of institutional constraints, political and cultural barriers (Lieser and Groh, 2014; Hoesli et al., 2004; Keogh and D’Arcy, 1999). For example, it is possible to newly construct or trade in assets, however these opportunities may be

limited by local planning law, market customs and practice, or banking guidelines (Keogh and D'Arcy, 1999). Reducing these type of political barriers can be a reason for foreign investors too invest abroad. For example, when Australia eased its restrictions on foreign ownership, and China had tightened her environment on domestic housing investment, Chinese investors took the opportunity to invest in Australian real estate instead of the domestic real estate market (Liu and Gurran, 2017). Foreign investors in China are attracted to places with huge potential of the real estate industry and in turn boost housing prices (He et al., 2009). They also emphasize the necessity of strengthening regulation and supervision on FDIRE, due to the fact that FDIRE is attracted to provinces with favourable institutions (He et al., 2009).

Although FDIRE may overall positively contribute to economic growth and globalisation, various papers discuss the possible relationship between FDIRE and housing price development, stating that an increase in FDIRE may result in higher house prices. Although this paper discusses the association between upcoming foreign investors and house price levels, it is worth mentioning that the literature has interesting findings regarding house price appreciation, especially when the literature on house price levels and FDIRE is rather scarce. A number of studies report that increasing amounts of FDIRE is one of the responsible factors for property price increases in economies (Mihaljek, 2005; Guest and Rohde, 2017; Cordero and Paus, 2008; Rodríguez and Bustillo, 2010). Mihaljek (2005) implied that the increase of FDIRE would dramatically affect the house prices through a demand increase and due to expectations of future house prices and housing supply rigidities. In a more recent study by Guest and Rohde (2017) on house price increase in Australian capital cities and FDIRE, they found scientific evidence that one quarter of the price increase in Sydney and Melbourne can be attributed to FDIRE while in other capital cities the effects appear to be negligible. This finding gives perspective to scale level since in contrast Gholipour et al. (2014) examined the effect in 21 emerging OECD countries. Their empirical results state that higher property prices are not caused by FDIRE and FDIRE does not contribute to economic growth in the OECD countries on national level. Their results show that property price development have a positive causal relationship with economic growth in the short run and the long run and policy makers should therefore not discourage FDIRE inflows. Chan (2007) argues that the total FDIRE covers a tiny portion of the total real estate investment in recipient economies and that it therefore cannot be a cause of property price development. Gauder *et al. (*2014) point out that an increase in FDIRE does not necessarily imply a net increase in housing demand and therefore higher housing prices. They find that the increase of property prices are the result of other macroeconomic factors. In a later research by Gholipour *et al.* (2019), these experts researched the question of whether there is a significant link between foreign investment in residential properties in Australia (FIRPA) and house prices, by using annual data for all Australian states and territories spanning the period of 1990-2013. The empirical results show that an increase in foreign investment in new houses has a negative impact on house prices in the long run, since a 10 per cent increase in foreign investment for housing development decreases house prices by 1.95 per cent. An increase in foreign investment in existing houses does not have a significant impact on house prices. With most literature therefore claiming that the effect of FDIRE on property price appreciation on a national/state scale is minimal to non-existing, the findings of Guest and Rohde (2017) offer a new perspective on a municipal scale level for this research topic. The lack of academic consensus on the topic FDIRE and house price development is an incentive to look more closely to the possible association between FDIRE and house price levels.

Since the emergence of foreign investors on local markets, research took an interest in transaction prices and nationality. Whether or not an investor is 'foreign' affects transaction prices paid for assets. Previous research has highlighted differences in pricing between different types of investors who are in-state or out-of-state investors. For commercial real estate investments, Lambson,

McQueen and Slade (2004) questioned whether out-of-state buyers paid more for commercial real estate investments and, if so, whether the premium was caused by anchoring of price expectations to home markets, information asymmetry or (a lack of) experience. Distance contains a number of institutional, cultural and informational factors that can increase information asymmetry, search costs and other costs, potentially putting the nonlocal investor at a disadvantage (McAllister and Nanda, 2016). Analysing 2854 apartment deals in Phoenix, Arizona (1990–2002), Lambson, McQueen and Slade (2004) found that out-of-state buyers paid a statistically significant premium compared to local buyers. Yet, they found weak evidence for both anchoring and informational explanations. The opportunities for foreign and domestic investors in the commercial real estate market in Ho Chi Minh City, are explored by Nguyen, van der Krabben and Samsura (2014). They find academic evidence that the playing field is not complete level for foreign and local real estate investors, due to 'ill-defined' land property rights. They also name a difference in investment interest, where foreign investors prefer larger scale mixed use projects with higher rents and their domestic counterpart concentrates on single office development with medium rents. They argue that this does not lead to a reduction in investments by foreign investors in the urban real estate market. In a research with over 3000 office transactions in the New York metro area from 2001 to 2015, Devaney and Scofield (2017) explored whether or not real estate prices are affected by nationality of the investors involved in a transaction in the commercial real estate office market. Their results show that the price per square foot was higher, all else equal, when offices were acquired by foreign investors. However, when an office building was sold by a foreign investor, it sold at a premium. Suggesting that it is unmeasured quality aspects in the assets and not information asymmetry that drive price differences between foreign and domestic investors in New York. In her MSc thesis, Zegger (2016) analysed FDI in the Dutch office market and the relationship between nationality and transaction prices, she found that foreign investors in comparison to domestic investors pay more for core assets and value add assets in the Dutch office market in the Randstad. The literature clearly states that aspects such as information asymmetry, experience/bargaining strength, search costs and anchoring have been suggested in several papers as explanations for why premiums might be paid by foreign investors. The main result is that foreign investors have a different investment strategy than their domestic counterpart, where quality and project size seems to matter more than lack of experience or information asymmetry. Another point of interest is the fact that the residential market has not been researched in the same way as the commercial real estate markets have been. Therefore, an obvious variable to include in the estimation is FDIRE, because this study examines the association between FDIRE and house price levels. To control for the variable the transaction prices are taken into account, measuring price differences between foreign and domestic investors.

To draw conclusions regarding the association between nationality, house price levels and the residential market, hypotheses must be formulated and tested. Based on literature, the main finding regarding this topic is that foreign investors do pay more than domestic investors, however due to quality aspects, type of asset and size. The hypothesis formulated ($H1_0$) is the null hypothesis:

- *$H1_0$. There is **no** relationship between the nationality of investors and the transaction prices per square meter in the Randstad residential real estate market.*

3. Data and Methodology

This section addresses the number of attention the Dutch residential market has gained in the time span of 2008 till 2019 and accounts for all the variables that have an influence on house prices in general. Before the hypothesis can be tested, this research needs to account for all the control variables in this research.

3.1. Trends on FDIRE in the Netherlands.

The fact that the Netherlands attracts a great deal of interest from foreign investors makes the market an interesting and relevant market to analyse. Figure 2 highlights important trends in the Dutch asset market. The first noticeable trend is the total investments volume from 2008 till 2019, the global financial crisis is clearly visible in the total investment volume of all investors. From 2008 till 2013 the crisis lowered investment opportunities in the Dutch market. The second noticeable trend is that traditionally, the office sector attracted the highest investment volume in the Netherlands (figure 2, CBRE). However after the global crisis the Dutch market reached new highs amid (foreign) investor's interest in the market. Lured by bargain prices and improving economic fundamentals, international investors swooped on assets in all sectors, helping to send the year-end volume to over € 10 billion, double the figure for 2013 and not far off the € 11-12 billion observed during the boom years (Loeb and van Dijk, 2016). The third trend visible in the figure from CBRE, is the increase of investments in the residential market of the Netherlands. According to Loeb and van Dijk (2016) the foreign investors dominated that market with a distribution of 65% against 35% for domestic investors, offices were the most sought-after asset class, accounting for 39% of the investment total, followed by rental homes (26%) (Loeb and van Dijk, 2016).

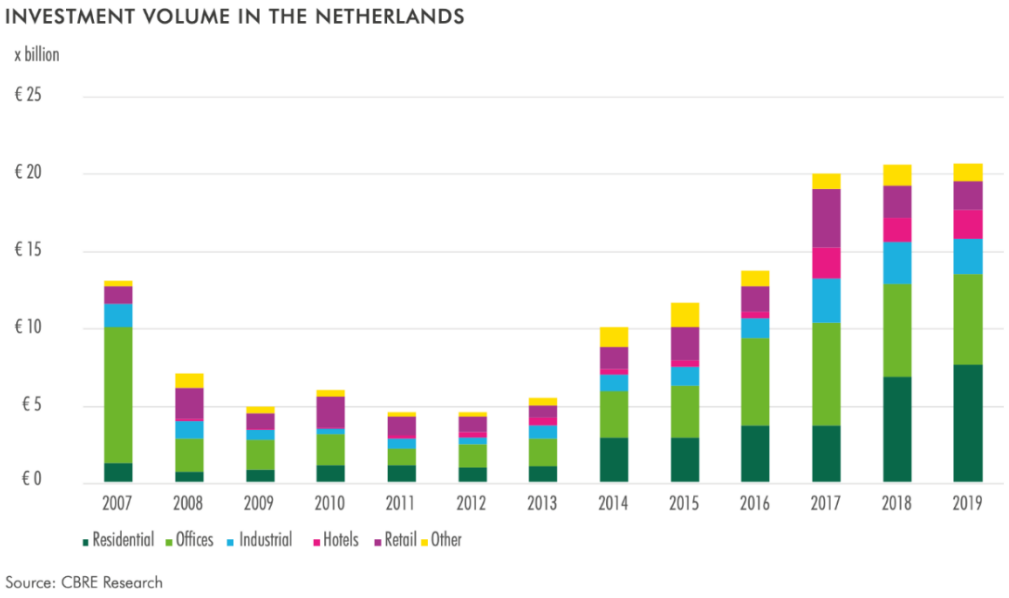

Figure 2. Investment volume per sector in the Netherlands (CBRE Research, 2019)

Within a short period of time the Netherlands has become one of the highest residential investment markets in Europe. Whereas the average annual residential investment volume between 2009 and 2013 is € 1 billon, and investors predominantly Dutch, those investments grew to € 3 billion in 2017 and included a significant proportion of foreign investors from the USA (18%), Canada (10%) Germany (3%) and the UK (2%) (CBRE, 2019). One of the main drivers of this increase of foreign investment is the low interest rates and the liberalisation of housing policies, increasing rent levels considerably (CBRE, 2019).

3.2. Data selection.

An interesting aspect of foreign investors are their different investment strategies compared to domestic investors as stated in the literature review. In addition Loeb and van Dijk (2016) describe multiple transactions of foreign investors in the Dutch market, where the latter acquire residential assets. However these acquisitions often include assets of other sectors, such as retail and offices (mixed use projects). The data used in this study are Dutch cadastre data from Doldersum Vastgoed on different investments by domestic and foreign investors in the Randstad in the Netherlands and data from the Dutch Central Bureau of Statistics (CBS) to control for variables on the supply and demand side. The Doldersum Vastgoed dataset allows for data options per city/region and for different segments such as the residential market. It contains numerous transactions in the real estate sector, registered by the land registry, of domestic and foreign investors. The timespan of the dataset is from 2008 till 2020, whereby transactions are still added in time of writing this thesis. Therefore the useable data cover 2008 to 2019 to analyse a complete dataset. The transaction prices in this dataset have a lower limit of one million euros and no upper limit. Unfortunately, due to the inclusion of assets of other sections and the transactions consisting of the total transaction price, some major foreign transactions could not be included in this research, as this study tries to find evidence solely for the residential market. In the dataset it is not possible to separate the investment share for offices/retail from the share of the residential investment, instead there is one transaction price for all assets within the investment. In the dataset there were a 4581 transactions, however 3369 cases had to be discarded because these transactions contained data outside residential data.

The dependent variable for this study is the transaction price per square meter. To make the data reliable, missing values and unreliable data have been removed from the set, leaving a total of 909 investments divided among the G4. Noticeable is the fact that the number of foreign investors solely on the residential market is relatively low compared to the number of domestic acquisitions. That confirms the findings that foreign investors prefer larger scale mixed use projects, where residential assets are mixed with offices and retail (Nguyen, van der Krabben and Samsura, 2014).

The independent variable for this regression is the nationality of the investor whereby a dummy variable is created between foreign and domestic. The type of nationality is left out of the equation for this regression, due to the fact that this information is not available within the dataset.

Besides the dependent and independent variable, this research accounts for several control variables. In the literature these variables are assumed to contribute to the explanation of the correlation between the dependent and independent variables. Not including these control variables will lead to strange strong correlation that is completely spurious. Control variables to consider in relation to house price levels are demand, supply, long-term interest rates, construction costs and rents (DiPasquale and Wheaton, 1992).

The house price level or the transaction price per square meter consists of multiple variables. One of the main determinants is demand. For this research the demand variable is split up in a macroeconomic variable and a demographic variable. The macroeconomic variable is economic activity. An upturn in economic activity is often linked to an increase in wages when the supply of labor is fixed. This means that if income increases, the possibility to get a (higher) mortgage increases, which translates into a higher demand for space and therefore higher house prices (Goodhart and Hofmann, 2008; Carrington and Madsen, 2011). Égert & Mihaljek (2007) researched the determinants of house price dynamics and established a strong positive relationship between GDP per capita and house prices. Therefore the GDP per capita will be used to measure economic activity in relation to house price levels. Data on GDP per capita for each city is available for every year between 2008 and 2019. Therefore the GDP per capita on a national and municipal level have been taken as the control variable.

The demographic variable for demand is measured in changing household dynamics. According to the reports of CBRE (2019) the G4 experience a substantial increase in residents, however it is difficult to build in the most desirable neighbourhoods, due to density and historic values. In addition, new regulations, soaring construction costs and a shortage of planning capacity and skilled workers, increasingly means that development of new homes lags behind demand. Therefore the household growth on a national and a municipal scale level are taken as a control variables for the demographic variable for demand within the model.

As stated before, the literature review sums up a number of explanations for why premiums might be paid by foreign investors. However the main result is that quality and project size seems to matter more than lack of experience or information asymmetry. However data on dwelling type and characteristics were not available within the dataset of Doldersum. The amount of dwellings within each transaction and this dataset as a whole were way too numerous and laborious to address them one by one to find out the type of dwelling and dwelling characteristics. Due to this reason these variables are not included in the model as control variables.

The supply factors researched by Visser & van Dam, as mentioned in chapter one, are also left out of the equation. Firstly, the mentioned characteristics were not available in this dataset, secondly they are strongly related to the willingness to pay (WTP) of a home owner and are therefore too subjective for this research. Other determinant to include on the supply side as mentioned in the previous chapters is the level of institutional barriers. However institutional barriers are mainly at stake on national level and do not influence differences in local level, therefore they are not taken into account in the regression model.

Long-term interest rates (LTIR) – This variable is important for house prices, since these rates have a strong regulatory role for real estate market supply and demand. Primarily, the cost of real estate investment is low when LTIR are low, resulting in a higher return on investment. Foreign investors often have long-term investment goals in which they would borrow money for a long term. For the owner-occupied market the LTIR is equivalent to mortgage payments. When these annual payments go up, the WTP will go down. This leads to a lower demand for buying homes. So, long-term interest rates have a negative relationship to house prices (DiPasquale & Wheaton, 1992). Secondly, long-term interest rates impact the required return on investment. Higher long-term interest rates lead to a reduction of the yield and will raise the asset prices. (DiPasquale & Wheaton, 1992). On the asset market that will result in lower construction rates and therefore a lower housing stock in the long run. A lower housing stock implies that rents increase, which also shows the negative effect of a change in long-term interest rates on house prices.

Construction Costs – Construction costs, as mentioned in the real estate outlook overview (CBRE 2019), impact house price levels due to the relationship to the real cost of new housing. When the price of construction grows, less can be build and therefore in the long run supply will be less.

Rents - The 4Q model implies that an increase in employment or in the number of households demand for space shifts out. For a given level of real estate space, rents must therefore rise and lead to higher asset prices in the NW quadrant. In acquiring rental assets, investors invest in future income. Therefore rent directly impacts house prices and thus the demand for assets (DiPasquale & Wheaton, 1992).

To control for differences in time, the year of the transaction is analysed. The G4 are used to account for location. The dataset contained addresses of assets in the transaction. However, because these transactions contained different zip codes within the cities and only a total transaction amount was given in the dataset, it was not possible to differentiate square meter prices to specific

districts/neighbourhoods. Therefore the transactions account for on a municipal level and not the neighbourhood scale level. Table 1 provides an overview of the variables and their description. A logarithm is created for the dependent variable and the average square meters, since they were significantly skewed, in order to make these normally distributed. The normally distributed graphs can be found in Appendix 1.

Bases on all the above control variables, the following hypothesis has been formulated:

- *$H2_0$. An increase in GDP/LTIR/CC/RENTS/POP will have **no** effect on residential house prices in the Randstad.*

Table 1 ***Overview of variables***

Variable Code	***Measure***	***Description of variable***
Dependent variable		
Log_TPsqm	Continuous variable	Logarithm of transaction price (€) per square meter.
Independent variable		
ID_Investor	Binary variable (0/1)	Nationality of investor
Domestic	(0)	Nationality: Dutch investor
Foreign	(1)	Nationality: Foreign investor (all nationalities besides Dutch)
Control Variables		
City of transaction	Dummy variable (0/1)	
Amsterdam	(1) Yes, (0) No	Amsterdam
The_Hague	(1) Yes, (0) No	The Hague
Rotterdam	(1) Yes, (0) No	Rotterdam
Utrecht	(1) Yes, (0) No	Utrecht
Log_SqmAV	Continuous variable	Logarithm of the average square meters residential
Demand		
GDPPC	Continuous variable	The GDP per capita
Rents	Continuous variable	The rate of rental increase
HHG_Netherlands	Continuous variable	Household growth in the Netherlands
HHG_Amsterdam	Continuous variable	Household growth in Amsterdam
HHG_Rotterdam	Continuous variable	Household growth in Rotterdam
HHG_Utrecht	Continuous variable	Household growth in Utrecht
HHG_TheHague	Continuous variable	Household growth in The Hague
Supply		
LTIR	Continuous variable	Long term interest rates
CCG	Continuous variable	The rate of construction costs growth
Year	Dummy variable (0/1)	Year of transaction
2008	(1) Yes, (0) No	
2009	(1) Yes, (0) No	
2010	(1) Yes, (0) No	
2011	(1) Yes, (0) No	
2012	(1) Yes, (0) No	
2013	(1) Yes, (0) No	
2014	(1) Yes, (0) No	
2015	(1) Yes, (0) No	
2016	(1) Yes, (0) No	
2017	(1) Yes, (0) No	
2018	(1) Yes, (0) No	
2019	(1) Yes, (0) No	

Table 2 provides an overview of the descriptive statistics of the dependent, independent and control variables.

Table 2 ***Descriptive statistics***

Continuous variables	***Mean***	***Standard Deviation***
Log_TPsqm – Logarithm of transaction price per square meter	7.868303	0.6242771
Log_SqmAV – Logarithm of square meter averge	4.67109	0.6645054
HHG_NL - Household Growth national scale	.0079043	.0019964
HHG_City – Household Growth municipal scale	.0076806	.0040008
CCG – Construction cost growth rate	.0200163	.0114497
GDPpc_NL – Global income distribution per capita in the Netherlands	.0098061	.0152305
GDPpc_City – Global Income distribution per capita on a municipal level	.0267471	.0247707
LTIR – Long term interest rate	.0147364	.0138334

Dummy variables	**Proportion in the Sample**	**Number of Observations**
Nationality Buyer		
Foreign	4.99%	43
Domestic	95.01%	818
Nationality Seller		
Foreign	2.90%	25
Domestic	97.10%	836
Location		
Amsterdam	56.33%	485
Utrecht	12.08%	104
Rotterdam	14.87%	128
The Hague	16.72%	144
Year of transaction		
Year2008	8.94%	77
Year2009	5.92%	51
Year2010	4.76%	41
Year2011	6.16%	53
Year2012	3.48%	30
Year2013	5.81%	50
Year2014	10.10%	87
Year2015	8.36%	72
Year2016	11.27%	97
Year2017	13.70%	118
Year2018	11.15%	96
Year2019	10.34%	89

The following steps show the empirical implementation of this research. In order to obtain unbiased values and valid results the data set needs to meet a number of assumptions for the validity of the linear model. If these assumptions are not met, certain modifications are necessary. First, the variables are examined separately, in case that variables are not normally distributed. When data is not normally distributed, a logarithm is created. In this case, the dependent variable and the average square meters variable where skewed (see appendix 1) and a logarithm has been created. Secondly, the residuals of the data are tested for heteroscedasticity, to overcome the issue of heteroscedasticity the variance of the residuals is tested for a constant variance. Thirdly, a strong relationship between the explanatory variables is not desirable. To make sure that the variables are not collinear the correlation coefficient is calculated (appendix 2) indicating that there is no multicollinearity. Lastly, two multiple regressions are applied. The first regression makes the distinction between the dependent, and independent variable with all control variables. The second regression only makes the distinction between the different years.

The empirical model for the multiple linear regressions is as follows:

$$lnY_{it} = \propto + \beta_1 X_{it} + \cdots + \sum \beta_k Z_t + \varepsilon_t \quad (1)$$

lnY_{it}	Dependent variable: Logarithm of transaction price per square meter
$\propto$	Intercept
β_1	Parameter of the independent variable
X_{it}	Independent variable: Nationality of investor
βk	Parameters of control variables
Z_t	Vector for control variables
ε_t	Error term
$t = 1,2, \dots, T$	Annual time periods 2008 – 2019

The first variable Yit, is the transaction price per square meter of transaction i at year t. The second variable Xit, denotes the dummy of the independent variable nationality of the investor for transaction i at year t. The third variable Zt denotes a vector of transactional characteristics of transaction 1 at year t. Lastly, a constant α and the error term ε for the transaction i at year t are included. β1 and βk represent the set of parameters to be estimated in the model and t denotes the year of transaction.

4. Results

In this section, the results from the regression models are presented. The results of the model are presented in table 3. In that table two models are computed. Model 1 showcases the relationship between the dependent and independent variable, based on a number of transactional characteristics. The second model makes a distinction between the cities of the G4.

Table 3 ***Results Multiple Regressions***

Log_TPsqm	**Model 1:** Multiple regression with city dummies			**Model 2:** Multiple regression with year dummies		
Variables	**Coeff.**	**S.E.**	**Sig.**	**Coeff.**	**S.E.**	**Sig.**
Nat_Buy	.173	.077	*	.173	.076	*
Nat_Sell	.105	.106		.105	.104	
Log_SqmAV	.162	.022	**	.162	.022	**
Amsterdam	.742	.064	**	.793	.064	**
Utrecht	.348	.0.90	**	.363	.093	**
Rotterdam	-	-	-	-	-	-
The_Hague	.374	.070	**	.343	.068	**
HHG_NL	.054	.088		-	-	-
HHG_City	-.141	.081	*	-	-	-
CC_Growth	.107	.021	**	-	-	-
GDPpc_NL	-.047	.018		-	-	-
GDPpc_City	.025	.012	*	-	-	-
LTIR_NL	-.178	.017	**	-	-	-
Year	-	-	-	-	-	-
Year2008	-	-	-	-	-	-
Year2009	-	-	-	-.092	.091	
Year2010	-	-	-	-.075	.093	
Year2011	-	-	-	-.090	.086	
Year2012	-	-	-	-.039	.104	
Year2013	-	-	-	-.034	.087	
Year2014	-	-	-	.126	.076	*
Year2015	-	-	-	.240	.077	**
Year2016	-	-	-	.324	.072	**
Year2017	-	-	-	.490	.068	**
Year2018	-	-	-	.642	.073	**
Year2019	-	-	-	.736	.073	**
Constant	6.742	.149	**	6.471	.140	**
N	908			908		
F statistic	56.331			40.585		
R-Squared	.430			.457		
Adj R-Squared	.422			.446		

**, * denote statistical significance at 1% and 5% level respectively

The dependent variable and the independent variable average size in square meter are transformed into a logarithm, the results of the model can therefore be interpreted as changes in percentages.

The results of the multiple regression infer that the null-hypothesis: "*There is **no** relationship between the nationality of investors and the transaction prices per square meter in the Randstad residential real estate market."* is rejected, therefore showing that there is a relationship between the nationality of the investor and the transaction price per square meter in the Randstad residential market. This is in line with findings in the literature used in this research which indicate the possible reasons between the relationship of foreign investors and increasing house price levels per square meter. First of all Mihaljek (2005) implied that the increase if FDIRE affect the house price levels through a demand increase and due to expectations of future house prices and housing supply rigidities. Guest and Rohde (2017) found results that an increase in foreign investment accounted for between 20% and 30% of the rise in housing prices between 2004 and 2014 in Sydney and Melbourne. However a difference in findings is that the models from table 1 suggest that this is significant on all capital cities used in the Randstad, with Rotterdam as the base category, while the findings of Guest and Rohde infer that this effect appear to be negligible in other capital cities. The result show that foreign investment had a minimal association with housing prices in the smaller capital cities, however this may well mask much larger effects in certain suburbs or in the higher price brackets (Guest and Rohde, 2017).

The results from the first model show that there is a significant and positive relationship between the dependant variable and the independent variables. However a distinction should be made between foreign investors buying and foreign investors selling. It shows that in terms of transaction price per square meter, foreign investors pay 17.3% more in comparison to the domestic investors at 5% significance level. However the model has an interesting finding for foreign sellers. Implying that when a residential asset was sold by a foreign investor, it is not sold at a premium within this dataset, which differentiates with the findings of Devaney and Scofield (2017) who state that when an office building was sold by a foreign investor, it sold at a premium. Possible explanations are the fact that within the dataset the amount of foreign sellers is very low. Out of 908 sells only 25 transactions were from foreign investors. In addition, of these 25 transactions 23 of them the buyer was of domestic origin. And although Lambson, McQueen and Slade (2004) found weak evidence for both anchoring and informational explanations, McAllister and Nanda (2016) found that the distance variable has a consistent and statistically significant negative effect on the quantity of FREI flows between two markets. A 1% increase in physical distance leads to a 0.5% decrease in FREI flow and stating that the negative effect is stronger for FDI. Therefore it may be a possibility that foreign sellers do not often sell at a premium to domestic investors, due to factors such as information asymmetry, search costs and other costs because their domestic counterpart understand and know the Dutch Residential market. Notice that quality and project size seems to matter more than lack of experience or information asymmetry. This model result may also simply reflect that foreign investors are buying into higher-quality property, due to the missing characteristics and dwelling types in the dataset. However to look into the "type" of assets, the number of dwellings within the foreign transactions are looked into. Finding that out of the 25 sells, 19 sells (76%) contained a large portfolio of 10 or more dwellings. For the foreign buyers, out of the 44 transactions, 25 transactions (56.8%) contained a large portfolio of 10 or more apartments. This implies that foreign investors bought more single assets and sold more portfolios with a minimum of 10 dwellings. However, whether this is due to higher-quality properties remains unclear within this dataset.

Within the control variables there are several significant findings. Therefore the second hypothesis: "*An increase in GDP/LTIR/CC/RENTS/POP will have **no** effect on residential house prices in the Randstad."* Is also rejected as expected. First of all the variable household growth within the cities show a positive relationship with transaction prices. An increase in immigration or an increase in population within the city implies a fall in the availability of space and therefore an increase in

demand for housing/space which is in line with the 4Q model. However the household growth in the Netherlands has not a significant relationship with the transaction price per square meter within the cities, which adds to the discussion on the differences in scale levels. As expected the variables long term interest rates and the construction costs growth rate also show a significant positive relationship with the transaction price per square meter, which is also in line with the 4Q-model. An interesting finding is the fact that the GDP per capita on a national scale level is not significant, but the GDP per capita on a municipal level has a significant positive relationship on at 5% significance level. The latter is in line with Égert & Mihaljek (2007) who established a strong positive relationship between GDP per capita and house prices.

In the first model, the year variable has been left out of the equation, due to multicollinearity with other control variables. However the second model shows the variable years split up in dummy variables showcasing the yearly observations. The results of this model indicate significant results from 2014 until 2019, which shows an increase in transaction price per square meter. The findings for these annual increase in transaction prices in combination with the yearly observations can therefore be separated in a period of global financial crisis (GFC) and a period post-GFC. The GFC started in 2007, had its peak in the end of the summer in 2008 and lasted until 2010. However the effects of the crisis are shown in the coefficients of the years 2011, 2012, and 2013. The model used by DiPasquale & Wheaton (1992) infers that real estate is fixed in the short term and reaches equilibrium in the long term. The same concept shows in results, where the effect of the GFC can be measured in the year dummy variables. Fu (2003) states that real estate sale prices and appraisals typically reflect changes in market conditions and fundamentals slowly rather than instantaneously. He reports the following reasons, namely the illiquidity and high transaction costs of real estate in combination with the high cost of gathering and interpreting decentralized information on heterogeneous real estate transactions which prevents investors to react immediately on market news (Fu, 2003). In their study Hoesli et al. (2004) quote the statement of Lai and Wang (1998) whom argue that the favourable risk-adjusted returns observed for real estate can be explained more by the fact that investors need to be compensated for the illiquidity and high information costs, than by the fact that the data is noisy.

5. Conclusion

This thesis studies the relationship between house price levels and emergence of foreign investors in the Dutch residential real estate market on a municipal scale level. The impact of the nationality of the investor is examined for the Randstad residential real estate market between 2008 and 2019. The results indicate that the null hypothesis: *"There is **no** relationship between the nationality of investors and the transaction prices per square meter in the Randstad residential real estate market."* can be rejected and that foreign investors indeed have an impact on transaction prices per square meter. A distinction is made between foreign investors buying and selling. Foreign investors selling Dutch residential real estate do not sell at a premium as the model shows, however the origin of the relationship remains unclear due to the exclusion of explanatory variables such as types of dwelling and dwelling characteristics.

This research tries to look more into the different scale levels of house price appreciation and the emergence of foreign investors. With Gholipour et al. (2014) stating that they did not find a relationship between FDIRE and house price appreciation on a national scale level and where Guest and Rohde (2017) did find a relationship between house price appreciation and FDIRE on a municipality scale level for Melbourne and Sydney. Results show that on municipal level in the Randstad the foreign investor buys at a premium, however the foreign seller does not sell at a premium, indicating that foreign investment only partially has a significant relationship with transaction prices per square meter.

For further research there are multiple opportunities. The dataset contained a lot of transactions that had to be discarded due to the fact that the transaction sum contained assets other than residential, such as offices or retail. In line with the statement of Nguyen, van der Krabben and Samsura (2014) that foreign investors prefer larger scale mixed use projects, it would be interesting to look into a possible relationship between the emergence of foreign investors and the price levels of mixed use projects within Europe or within the Netherlands as well.

Furthermore a different scale level would also be a possibility for further research. Now that research had been done on a national and municipal level, it could be interesting to dive further into the level of different neighbourhoods of cities. It would be interesting to research the relationship between house price appreciation and foreign investment on specific suburbs and neighbourhoods within the cities to find out if there are some areas foreign investors take a specific interest in, in combination with certain types of volumes of real estate.

Finally, it would be interesting to look into the increasing house prices within the Netherlands of the last couple of years (2018 till 2022) and the factors influencing this increase and see whether or not the nationality of the investor is still significant.

There were a couple of limitations within this research. It would have been valuable if information on the housing characteristics were available, which would account for a higher explanation rate for house prices according to Visser & van Dam (2006), and therefore could have accounted for a higher R-squared and a better insight in the established relationship. Another limitation is the fact that this research was not able to distinguish between prices of different types of assets within the total transaction price.

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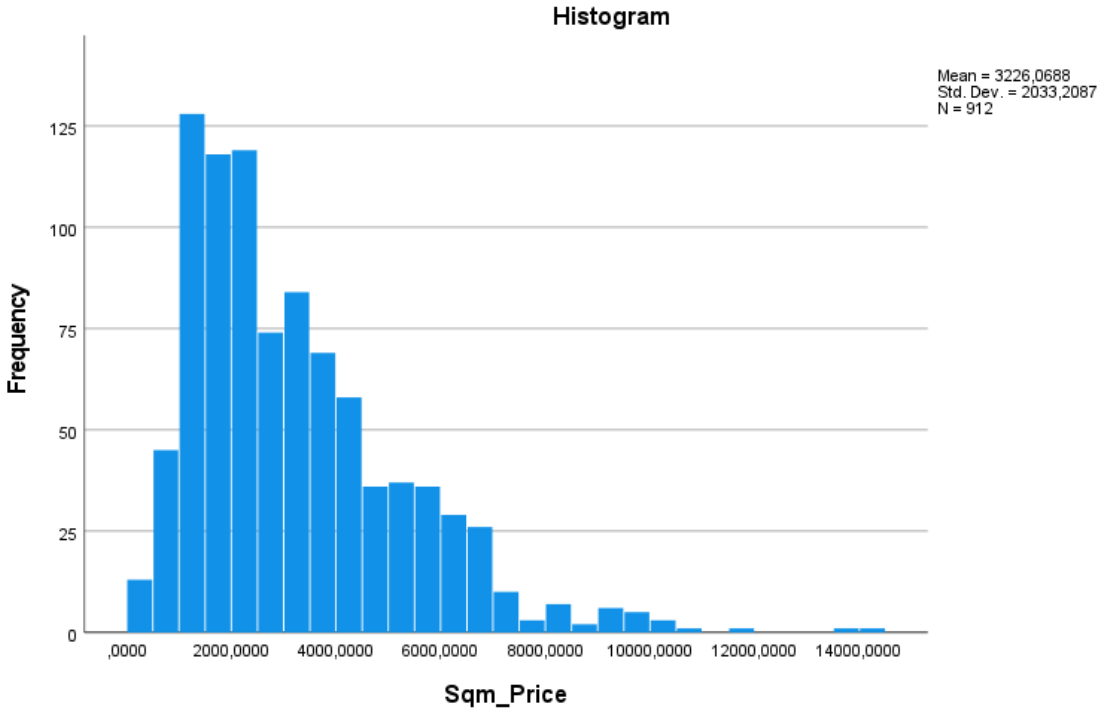
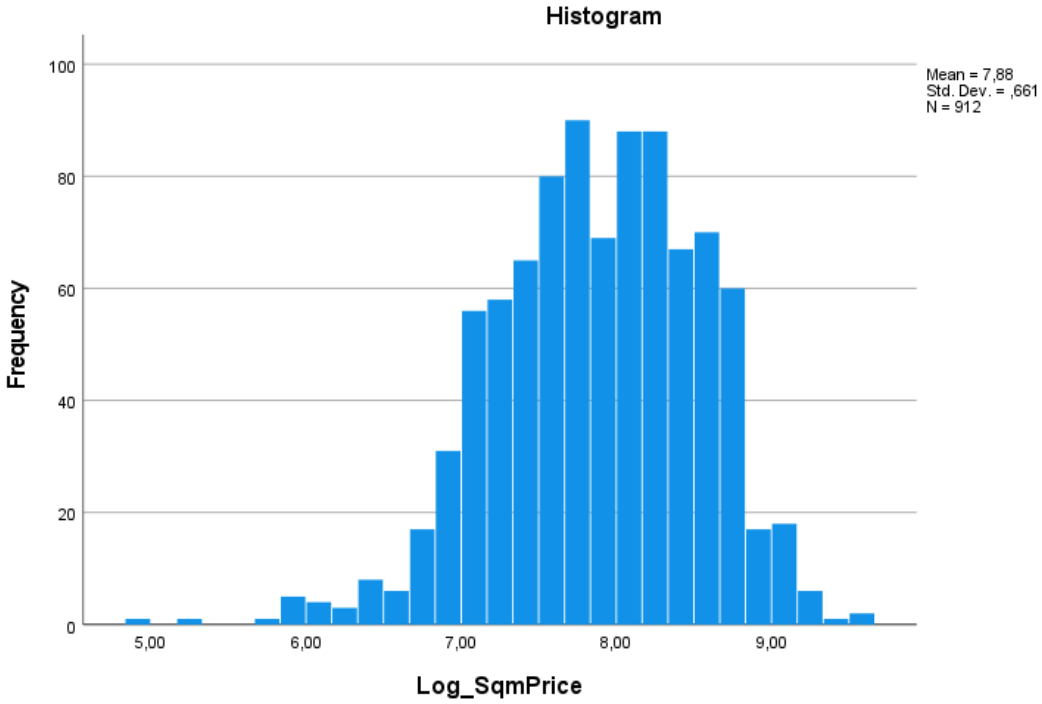
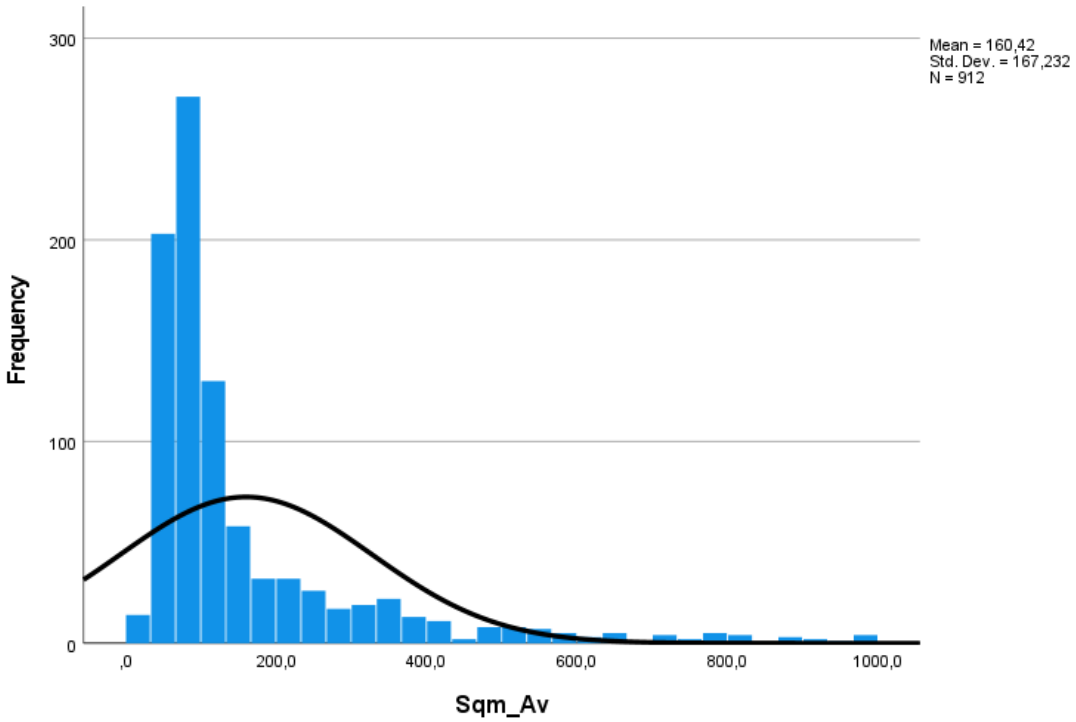
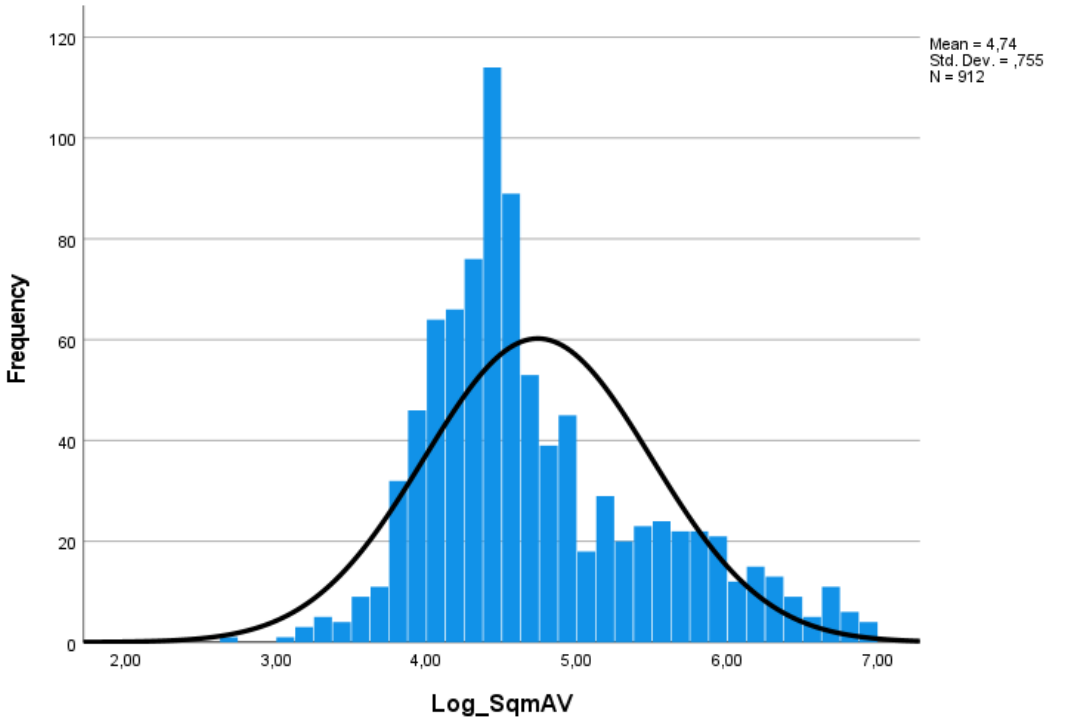
Appendix 1. Logarithms






Mean = 160,42
Std. Dev. = 167,232
N = 912
Frequency
300
200
100
0
,0
200,0
400,0
600,0
800,0
1000,0
Sqm_Av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Std. Dev. = ,755
N = 912
Frequency
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60
40
20
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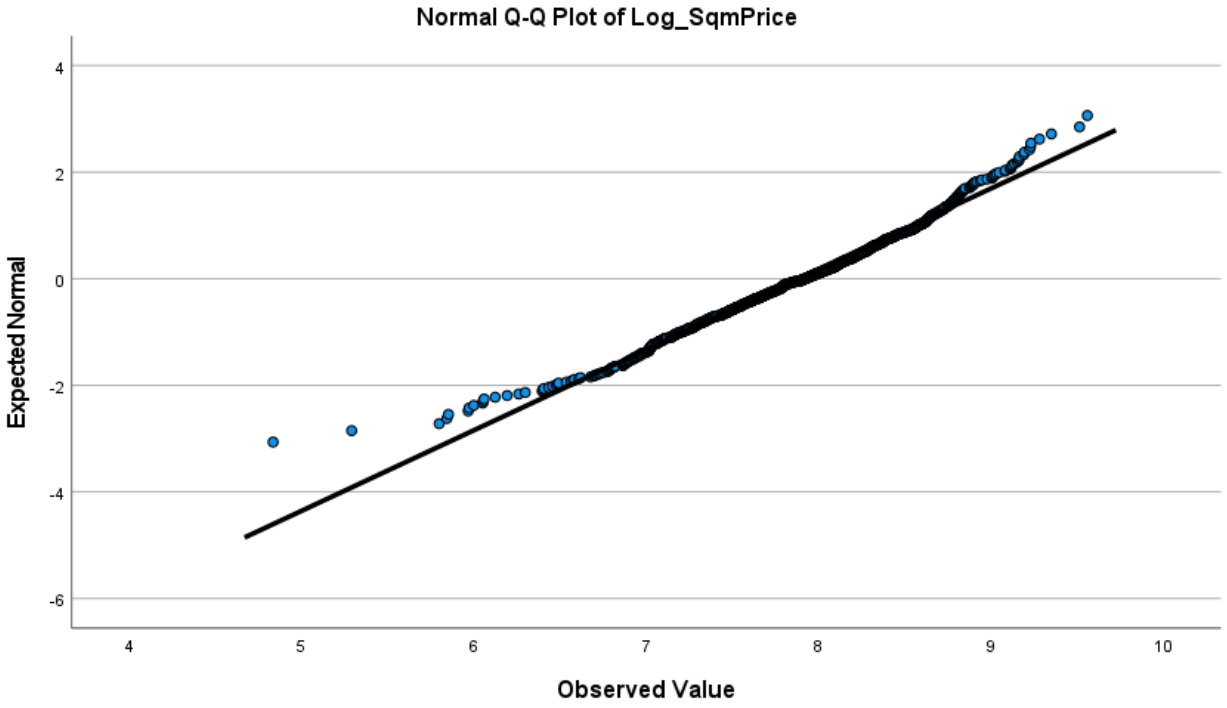
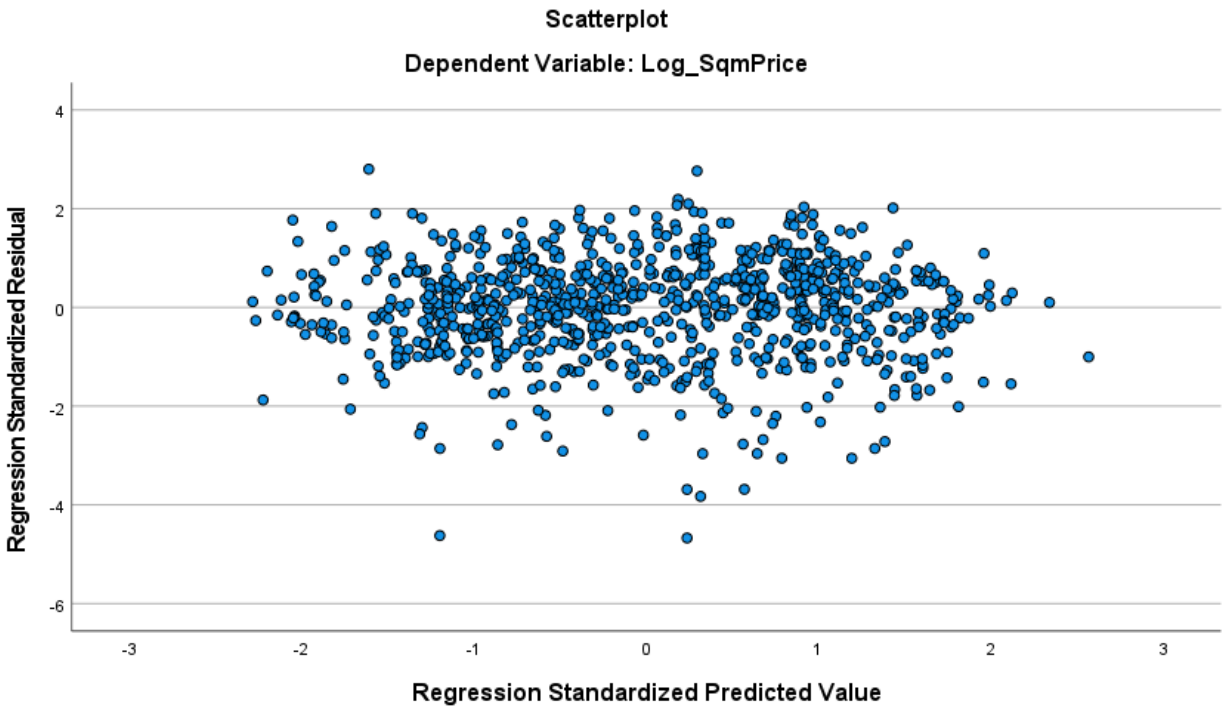
2,00
3,00
4,00
5,00
6,00
7,00
Log_SqmAV


Normal Q-Q Plot of Log_SqmPrice
Expected Normal
Observed Value
4
2
0
-2
-4
-6
4
5
6
7
8
9
10


Scatterplot
Dependent Variable: Log_SqmPrice
Regression Standardized Residual
Regression Standardized Predicted Value
4
2
0
-2
-4
-6
-3
-2
-1
0
1
2
3

Appendix 2. Correlations matrix

Correlations

		Log_TPsqm	Log_SqmAV	Amsterdam	Utrecht	The_Hague	HHG_NL	HHG_City	CC_Growth	GDPpc_NL	GDPpc_City	LTIR_NL	Year2009	Year2010	Year2011	Year2012	Year2013	Year2014	Year2015	Year2016	Year2017	Year2018	Year2019	Nat_Seller	Nat_Buyer
Pearson Correlation	Log_TPsqm	1,000	,163	,445	-,145	-,146	,060	,012	,174	,269	,449	-,407	-,179	-,126	-,180	-,109	-,100	-,065	-,012	,074	,175	,189	,232	-,113	,066
	Log_SqmAV	,163	1,000	,042	-,106	,078	,016	,031	,007	-,046	-,077	,122	,082	,031	-,035	-,021	,000	-,013	-,018	,001	,047	-,074	-,092	,010	,010
	Amsterdam	,445	,042	1,000	-,421	-,513	-,050	,165	-,004	,091	,461	-,095	-,081	-,020	-,044	-,056	,025	,038	,026	,087	,033	-,027	-,003	-,152	-,020
	Utrecht	-,145	-,106	-,421	1,000	-,165	,026	,414	-,036	-,033	-,073	-,041	,033	-,004	,005	,025	-,044	,006	,023	-,010	-,004	,012	,032	-,020	-,035
	The_Hague	-,146	,078	-,513	-,165	1,000	,068	-,024	,056	-,039	-,382	,105	,057	,036	-,017	-,003	,008	-,087	-,030	-,035	,002	,012	-,026	,015	,036
	HHG_NL	,060	,016	-,050	,026	,068	1,000	,001	,066	-,143	-,034	-,079	,241	,224	-,019	,120	-,066	-,870	,286	-,115	,302	,046	,096	-,057	-,080
	HHG_City	,012	,031	,165	,414	-,024	,001	1,000	-,235	-,226	-,043	,152	,285	,144	,046	-,199	-,044	,080	,103	,032	-,132	-,165	-,029	-,154	-,047
	CC_Growth	,174	,007	-,004	-,036	,056	,066	-,235	1,000	,572	,377	,010	-,405	-,278	-,025	-,035	-,381	-,317	-,030	-,004	,102	,149	,233	-,135	-,035
	GDPpc_NL	,269	-,046	,091	-,033	-,039	-,143	-,226	,572	1,000	,628	-,452	-,854	-,023	,016	-,290	-,220	,017	,104	,152	,350	,179	,007	-,118	,018
	GDPpc_City	,449	-,077	,461	-,073	-,382	-,034	-,043	,377	,628	1,000	-,525	-,591	,040	-,322	-,161	-,117	-,001	,181	,051	,078	,246	,301	-,204	,032
	LTIR_NL	-,407	,122	-,095	-,041	,105	-,079	,152	,010	-,452	-,525	1,000	,408	,246	,279	,057	,090	,004	-,171	-,298	-,288	-,222	-,386	,105	-,042
	Year2009	-,179	,082	-,081	,033	,057	,241	,285	-,405	-,854	-,591	,408	1,000	-,058	-,066	-,048	-,062	-,084	-,078	-,090	-,105	-,090	-,087	,069	-,036
	Year2010	-,126	,031	-,020	-,004	,036	,224	,144	-,278	-,023	,040	,246	-,058	1,000	-,058	-,042	-,054	-,074	-,069	-,079	-,092	-,079	-,077	,025	,045
	Year2011	-,180	-,035	-,044	,005	-,017	-,019	,046	-,025	,016	-,322	,279	-,066	-,058	1,000	-,048	-,062	-,084	-,078	-,090	-,105	-,090	-,087	,125	-,036
	Year2012	-,109	-,021	-,056	,025	-,003	,120	-,199	-,035	-,290	-,161	,057	-,048	-,042	-,048	1,000	-,045	-,062	-,057	-,066	-,077	-,066	-,064	,043	-,014
	Year2013	-,100	,000	,025	-,044	,008	-,066	-,044	-,381	-,220	-,117	,090	-,062	-,054	-,062	-,045	1,000	-,079	-,073	-,085	-,099	-,085	-,082	,048	-,009
	Year2014	-,065	-,013	,038	,006	-,087	-,870	,080	-,317	,017	-,001	,004	-,084	-,074	-,084	-,062	-,079	1,000	-,100	-,115	-,134	-,115	-,111	,081	,082
	Year2015	-,012	-,018	,026	,023	-,030	,286	,103	-,030	,104	,181	-,171	-,078	-,069	-,078	-,057	-,073	-,100	1,000	-,107	-,124	-,107	-,103	-,027	-,032
	Year2016	,074	,001	,087	-,010	-,035	-,115	,032	-,004	,152	,051	-,298	-,090	-,079	-,090	-,066	-,085	-,115	-,107	1,000	-,144	-,124	-,119	-,059	,035
	Year2017	,175	,047	,033	-,004	,002	,302	-,132	,102	,350	,078	-,288	-,105	-,092	-,105	-,077	-,099	-,134	-,124	-,144	1,000	-,144	-,139	-,049	-,048
	Year2018	,189	-,074	-,027	,012	,012	,046	-,165	,149	,179	,246	-,222	-,090	-,079	-,090	-,066	-,085	-,115	-,107	-,124	-,144	1,000	-,119	-,059	,003
	Year2019	,232	-,092	-,003	,032	-,026	,096	-,029	,233	,007	,301	-,386	-,087	-,077	-,087	-,064	-,082	-,111	-,103	-,119	-,139	-,119	1,000	-,057	,041
	Nat_Seller	-,113	,010	-,152	-,020	,015	-,057	-,154	-,135	-,118	-,204	,105	,069	,025	,125	,043	,048	,081	-,027	-,059	-,049	-,059	-,057	1,000	,150
	Nat_Buyer	,066	,010	-,020	-,035	,036	-,080	-,047	-,035	,018	,032	-,042	-,036	,045	-,036	-,014	-,009	,082	-,032	,035	-,048	,003	,041	,150	1,000