Domestic and Foreign Investors in the Residential Real Estate Market: A Quantitative Approach

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ABSTRACT

The real estate market is becoming more internationally orientated. This process is reflected in increasing cross-border investment volumes. One of the sectors that attract great interest from foreign investors is the residential market, stimulated by the positive market fundamentals and rental growth perspectives. Investing cross-border is about exploring new markets. This cross-border activity has several risks and benefits. Prior research showed that distant buyers are often at a disadvantage compared to local buyers. Furthermore, the outlook and strategy between domestic and foreign investors differ noticeably. This study expands the literature on the distance effect and addresses the relationship between the investor's origin and transaction prices. It is one of the first studies that explores this effect on a nationality level and within the residential real estate market of the Netherlands. The effect of the investor's origin is explored by applying multiple linear regression models. This study uses 667 residential investment transactions between 2014-2019, which encompasses 85% of the total residential investment volume in the Netherlands. The results of the multiple linear regressions indicate that foreign investors transact at a premium of respectively 6.7%, 8.4% and 9.2%. Furthermore, the results of the different continents of origin show that European (8.2%) investors pay a slightly higher premium than North-American investors (8%). The sensitivity analyses provide evidence of a premium by foreign investors and indicate that the founded premiums are primarily driven by single asset transactions. The outcomes can be used by municipalities, housing associations and real estate developers in attracting investment capital and selling existing and developed housing stock.

TABLE OF CONTENT

1. INTRODUCTION

1.1. Motivation

Due to the globalization process and integration of capital markets, real estate is becoming more internationally orientated (Geltner & Miller, 2001). As a result, the amount of foreign investments in real estate has increased over the past decade. This is reflected in the Dutch real estate market, which is flourishing at the moment. The year 2018 was the fourth record-breaking year in a row with a total investment volume of 20 billion euros in the Netherlands (CBRE, 2019). When the total investment volume is divided by the number of inhabitants, the Netherlands is the most popular destination for cross-border investment in the world (Van der Sluys, 2019). Until 2012, investment in the Dutch real estate sector was primarily done by Dutch investors, who were responsible for 70% of the investment volume. In the years 2013 and 2014, after the great financial crisis, the demand for real estate shifted towards foreign investors. In 2014, this resulted in a foreign investment volume of 62% of the total investment volume. The tendency of this high investment volume by foreign investors is still ongoing, stimulated by the low interest rates and the positive underlying market fundamentals in the Netherlands. Besides the fact that foreign investors change the geographical distribution of their real estate, the investors' perspective is also changing in terms of distribution among asset classes. Due to the aggressive pricing and the limited supply of assets in the traditional office and logistics markets in the Netherlands, investors are encouraged to invest in other asset classes. This has led to increasing demand in the residential market, which provides attractive risk-return profiles and rental growth perspective (CBRE, 2018).

The real estate market is complex and influenced by many different aspects and trends. International real estate can play a crucial role in achieving diversification benefits and realizing high positive returns. However, investing cross-border also involves several risks such as institutional barriers, market entry barriers and the presence of a certain distance effect. Given the importance of international real estate in order to achieve favorable benefits and pursue investment strategies, it is likely to have an influence on the price. Nonetheless, the willingness to pay a premium increase when the benefits of the investment exceed the risks. Moreover, the financial position of foreign investors is often stronger, therefore they can afford higher prices and attract larger portfolios (ABN Amro, 2015). On the other hand, if the risks that are faced cannot be compensated by the benefits, the willingness to pay decreases and this may lead to a

lower price. Given all these aspects, it is interesting to compare domestic and foreign investors, and to explore the presence of a potential price difference. This research addresses the relationship between the investor's origin and the transaction price of residential real estate in the Netherlands.

There are two primary motives that stimulate real estate investment and encourage investors to invest cross-border. Firstly, international real estate offers certain diversification benefits as proven by Conover et al. (2002) and Aussant et al. (2014). By investing cross-border, investors reap the benefits of reduced volatility in their portfolio performance; which could not be achieved locally. Secondly, the favorable return expectations are an underlying driver, that can be achieved due to the substantial risk premiums and growth expectation in foreign markets (Lynn and Wang, 2010). These benefits result in a decline of the conventional home biased focus that still exists in cross-border real estate investment (Aussant et al., 2014). The importance of real estate in a geographically and multi-asset diversification context has nowadays, been recognized and increased among investors.

Besides the benefits, there are several risks that come with investing in international real estate. Worzala (1994) states that institutional barriers, such as fiscal regimes, taxation and property rights, play an important role in terms of investment. In addition, Keogh and D'Arcy (1999) and Lee (2001) add market entry barriers to these, which include that real estate specific, legal, and institutional risks, to have a significant influence on cross-border investments. Furthermore, investing cross-border is about exploring new markets. The lack of transparency among countries discourages investors and increases the risks of investing cross-border (Lieser and Groh, 2011; Keogh and D'Arcy, 1999). These risks of investing abroad are strengthened by the fact that the real estate sector is characterized by complex, heterogeneous and immobile assets. Investing in foreign real estate requires proper local knowledge and intense management (Tiwari & White, 2010). These high levels of risks and required knowledge are explanations of home biasness in the real estate sector; despite the potential of international diversification, investors still prefer to invest in their home country. On the other hand, substantial differences among real estate markets cause inefficiencies, which makes real estate an interesting investment class on an international scale. As a result, investments come from a greater distance than the location of the properties.

1.2 Research Problem Statement

It is well observed that the prices of real estate are affected by physical and legal characteristics as well as the location of the property. However, the effect of investors' characteristics such as distance to the market and type of investor are less comprehended. It is likely that these characteristics do influence the prices of real estate, because of the nature of real estate markets in which the trading process of assets is affected by bargaining between buyers and seller. Aspects like investment risks, diversification benefits, information asymmetry, and bargaining strength have all been suggested in the literature as mechanisms for why there might be a certain premium between different groups of investors in the real estate markets. This study contributes to the literature of the investors' origin in relation to the investment area. Several studies focused on differences between local and non-local buyers in relation to transaction prices (Liu et al., 2015; Clauretie and Thistle 2007; Ihlanfeldt and Mayock 2012). These studies used distance to the investment are as one of the key variables. Price premiums are triggered by information asymmetry and information asymmetry arises from distance, this led to the distance-effect (McAllister and Nanda, 2016; Ling, et al., 2018).

Prior research by Devaney and Scofield (2017) focused on the effect of the investor's origin in relation to transaction prices in the New York office market. The study of Ling, et al. (2018) provide insights into the price effect of distant buyers while analyzing office, logistic and multi-family transactions in the U.S. market. Lastly, the effect of local and non-local buyers on residential pricing was explored in Florida and Nevada (Clauretie and Thistle 2007; Ihlanfeldt and Mayock 2012). Prior research has focused on local and non-local buyers of different regions or explored the effect of the investor's origin in different real estate markets. However, this effect might be different when it is applied in a transnational context. This research is one of the first studies that explores the effect of the investor's origin on a transnational level and within the residential real estate market. Therefore, the research aim of this study is to determine the effect of the investor's origin on the price of residential real estate in the Netherlands.

The central research question of this study is:

What is the effect of the investor's origin on the price of Dutch residential real estate?

In order to determine the effect of the investor's origin, a multiple linear regression model will be used. The multiple linear regression is applied to a dataset provided by CBRE, that contains residential investment transactions within the Netherlands in the period 2014-2018.

2. LITERATURE REVIEW

This chapter focusses on the key-studies in the field of cross-border investment in real estate. First the risks off cross-border investment will be discussed. Then the different benefits for investors are addressed. Next, there will be an outline of the distance effect. Finally, the hypotheses for this study are listed.

Over the past decades, several risks that influence cross-border investments have been examined. Geurts and Jaffe (1996) analyzed the institutional factors that influence the risk and return of investing cross-border. The authors found that legal institutions play an important role in the risk and return relationship although they have been neglected in asset capital pricing models for years. Institutional risk has a direct link to the world market economy as it is a barrier for foreign investors and, consequently, affects the price of real estate. In addition, according to Keogh and D'Arcy (1999) and Lee (2001), one of the possible explanations for attracting high investment volumes are market entry barriers, which include real estate specific, legal, and institutional risks. Another finding of Geurts and Jaffe (1996) is the effect of political risk in relation to the level of investment; a high level of political risk will result in a lower level of investment, given the required risk premium. Besides these risks, Eichholtz et al. (2011) note the presence of tax-related issues and currency risks when investing abroad.

Lieser and Groh (2011) studied the determinants of the decision to investment in commercial real estate by analyzing demographic, institutional and socio-economic, characteristics. They observed that urbanization, demographics, and economic growth attract international real estate investors. However, the lack of transparency, socio-cultural challenges, and political instabilities discourage international real estate investors. Lack of transparency is also named by Keogh and D'Arcy (1999) as a barrier. However, risks of investing are nowadays declining due to the increasing transparency among countries. Consequently, resulting in an increase of cross-border investment volumes.

A number of studies have sought to determine the benefits of foreign real estate. Unlike the risks, investing cross-border can be favorable by achieving certain diversification benefits. Conover, Friday and Sirmans (2002) examined whether international real estate investments offer superior diversification benefits in comparison to international stocks. By analyzing foreign stocks and foreign real estate in relation to U.S. stocks, they explored if foreign real

estate can be characterized as a segmented market. They found that international real estate investments have a lower correlation with U.S. stocks than international stocks, therefore they offer superior diversification benefits to U.S. investors. This outcome stresses the importance of foreign real estate in efficient international portfolios. In addition, due to the increased diversification, the contribution of international real estate to the portfolio performance could lead to a higher willingness to pay.

Unlike the better portfolio performance that can be achieved in mixed-asset portfolios including bonds and stocks, real estate also offers diversification benefits that can be achieved by geographical distribution of assets among countries. The principle of these two strategies is that such investments offer diversification potential if there is a low correlation with other assets in the portfolio (Geltner and Miller, 2007). However, Walmsley (2013) claims that the correlation between countries has increased over the years. As a result, the diversification effect that can be achieved due to geographically distribution has reduced. In addition, Wilson and Zurbruegg (2003) say that these reduced diversification benefits hold if markets are more integrated with each other. Concluding, driven by the globalization process, integrated markets get simultaneously affected in economic and financial terms.

Due to the heterogeneity, complexity, and immobility that characterize real estate, investments have traditionally been home biased; in light of the potential of international diversification, investors prefer to invest in their home country. However, according to Aussant et al. (2014), the traditional home-biased focus for real estate investment shifts towards a multi-asset and country diversification context. Stimulated by the reduction of barriers between countries and the increasing investment opportunities of real estate through new digital platforms, the home bias focus has further declined.

Besides the risks and benefits of investing in real estate, a number of studies have focused on the investors' characteristics in order to explain price premiums between domestic and foreign investors. Chinloy et al. (2013) examined the relation between apartment prices and investor characteristics in Georgia and Atlanta. They found that experienced local investors received a higher discount compared to inexperienced and non-local buyers when buying real estate assets. Furthermore, the most experienced investors received the highest discount. To explore the effect of investor type, Colwell and Munneke (2016) studied 477 commercial real estate transactions. Their outcome shows that the bargaining power of different types of

investors has an influence on the price of real estate. Individuals and corporations that were financed by a bank had lower bargaining power resulting in a higher price. However, corporations that used internal financing had higher bargaining power with lower prices as a result. Moreover, non-trust parties were found to have lower bargaining power than trust parties.

A number of studies focused on the differences between local and non-local buyers with distance as a key variable to explain price premiums. Distance has a link with informational, cultural, and institutional characteristics that consequently enhances search costs and information asymmetry. A key principle is that price premiums are triggered by information asymmetry. Many studies found proof of the distance effect; a price premium for buyers with a greater distance to the investment area. Ling et al. (2018), analyzed 114.588 commercial real estate transactions in the period between 1997-2010. They reported an outcome of a 12.19% premium on multi-family transactions for distant buyers. The study of Clauretie and Thistle (2007) focused on transactions in the residential market of Las Vegas. Their outcome provided evidence of a price premium and an anchoring effect of buyers from outside Nevada. Moreover, Ihlanfeldt and Mayock (2012) did similar research in the Florida area. These results were in line with the founded premium and anchoring effect of Clauretie and Thistle (2007). They claim that if buyers come from high priced markets, they will tend to pay a premium compared to local buyers. Lastly, Zhou et al. (2015) provide evidence from a Chinese perspective. Buyers from outside the Chengdu area paid a price premium of 1% compared to local buyers and besides this, they claim to have found anchoring prospects. According to Lambson et al. (2004), possible explanations for these founded distance premiums are higher search costs, short amount of time for buying assets, and biased pricing expectations. These outcomes might explain the distance effect with a price premium as result, however, it should be noted that these effects might be different when it is analyzed in a transnational context.

Some authors have studied the distance effect within the office market, providing useful insights. Liu et al. (2015) examined the investors' location in relation to transaction prices. They found evidence of a significant price premium paid by non-local buyers induced by proximity and anchoring effects. Moreover, they sold their assets at a discount compared to local investors. However, this premium was mainly caused by the fact that non-local buyers selected newer and higher quality assets. In addition, Eichholtz et al. (2016) explored the pricing-distance effect as a result of property management outcomes. Investors with greater distance to their assets obtained lower rental cash flows than investors that were located nearby. The effect

was primarily the result of higher occupancy rates rather than rental income. This outcome might explain the lower selling price that was found by Liu et al. (2015). McAllister and Nanda (2015) note that global investment firms have local offices, which become rooted in the local business network. Therefore, they can erode the information asymmetry and might not experience a price premium when buying assets. Conversely, investors that use the experience and knowledge of brokers for acquiring assets may face price premiums. However, this distance effect of a price premium would be caused by the broker's fee instead of an absolute price premium.

Hence, according to the literature, there is a relationship between the pricing of real estate and the investor's origin. The hypotheses that will be tested are as follows:

H0 = There is *no relationship* between the investor's origin and the transaction prices per square meter in the Dutch residential market.
H1 = There is *a relationship* between the investor's origin and the transaction prices per square meter in the Dutch residential market.

3. BACKGROUND AND DATA

3.1 Background

Across Europe, the Netherlands has developed as one of the major real estate markets in terms of investment volume. The current 4th position and a regular place within the top 5 over the past years confirm this development. Next to that, the ongoing trend of high residential investment volumes by foreign investors highlights the relevancy and makes the residential market of the Netherlands interesting to explore extensively. Figure 1 reports the annual investment volume in the residential sector of the Netherlands. As shown, the end of the great financial crisis was the beginning of substantial investment volumes by foreign investors. From this point on, there is a continuous inflow of foreign investment volume in the Dutch residential market.

The empirical analysis of this study starts in the year 2014. During this year there was a large increase of total investment volume in Dutch real estate, going from €5.4 billion to €10 billion due to the end of the great financial crisis. The investment volume in the residential market rose from €864 million in 2013 to €2.8 billion in 2014. In 2018, the investment volume in residential real estate almost doubled and grew to a record of 7 billion Euros. Traditionally, the office sector has the highest investment volume in the Netherlands. However, it was last year, 2018, that the residential sector has the highest investment volume (34%) for the first time in history (CBRE, 2019). This trend is stimulated by the attractive price level of the Netherlands compared to other important real estate markets in Europe.

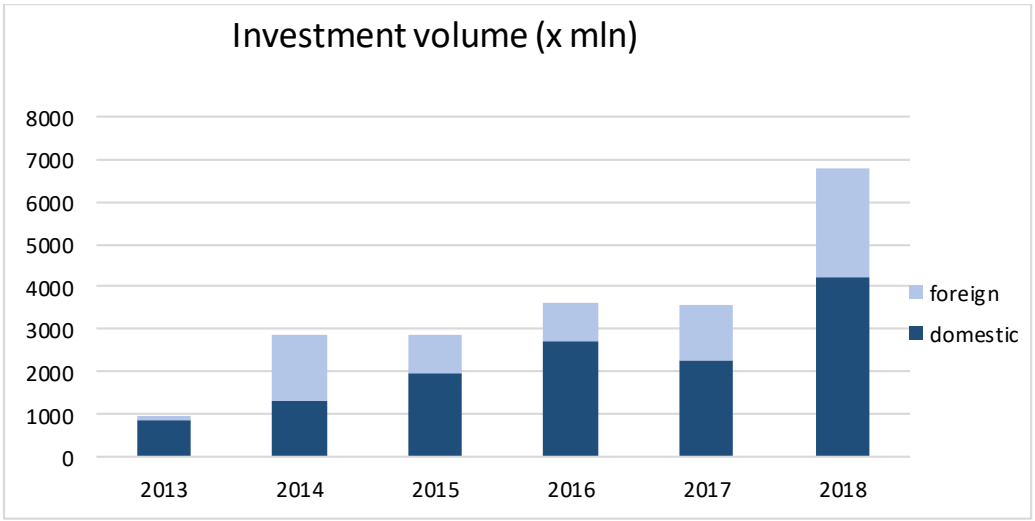

Figure 1 Total investment volume in residential real estate in the Netherlands. (CBRE Research, 2018)

The increasing interest of these foreign investors has a big influence on the residential market. Due to the, often, strong financial position of these parties, they can add value in terms of sustainability and renovations to the previous housing corporation portfolios (FD, 2018). Furthermore, because these parties want to enter or strengthen their position in the Dutch real estate market, they are more willing to pay a higher price or acquire portfolios with lower quality or at a moderate location. Currently, there are more than 20 major foreign investors in the residential market of the Netherlands. These foreign investors are often from the U.S., Canada, Germany, the UK or newly entered Asian parties with an interest in large residential portfolios. In addition, there is an increasing ongoing trend of new build social housing that is acquired by foreign investors (Capital Value, 2018).

An important principle in the context of domestic and foreign investors is their difference in terms of outlooks and strategies within the real estate market. Although they want to acquire the same assets, investors with international real estate portfolios have a different strategy and outlook compared to investors with domestic portfolios. The strategies of investors can roughly be defined in investors who want to minimize their risks, such as institutional parties, and investors who strive for high returns, such as private equity parties. However, it should be noted that risk and return are interrelated to each other and therefore low risk and high returns cannot be achieved at the same time. International real estate can provide a positive effect for both strategies, by reducing volatility or increasing returns (Van Gool, 2009). From 2014 onwards, the interest in Dutch real estate was primarily from the return enhancers. This is reflected in the Dutch real estate market which provides an attractive yield spread; the difference between the initial yield and the interest rate on a 10-year government bond (ABN Amro, 2015). Currently, the market cycle has developed to its peak and the net initial yields declined, which tightened the yield gap and led to a shift in investors demand.

3.2 Study Area

The Dutch housing market is characterized by its high share of the rental market (43%) compared to (57%) the owner-occupied market. In addition, 30% of the rental market is regulated (<€711, - per month) while 13% encompasses the unregulated market (>€711, - per month). Investors, both domestic and foreign, predominantly operate in the rental market. Before the great financial crisis, the focus of investors was primarily on selling off properties separately, because of the high value in vacant state compared to the value in leased state. In addition, the recent liberalization of the housing policies stimulates rent level increase and,

consequently, investors nowadays primarily operate their real estate instead of selling it. This generates a stable, direct return on rental income. Considering the current positive market fundamentals in the Netherlands, such as low vacancy rates, high quality of properties, and a low amount of rental loss, there is a relatively low risk in the rental cashflow (CBRE, 2018).

Due to the attractive mix of functions, services, and a growing workforce, the Dutch cities experience a substantial increase of residents, especially within the G4 (Amsterdam, Rotterdam, Utrecht, and The Hague). Although the development of new housing stock is still increasing, the construction level faces a maximum production level due to a shortage of skilled workforce and construction material. While the demand exceeds the supply substantially, housing prices are increasing and as a result, the investment products run short. Nonetheless, developers are becoming more interested in selling their products to investors instead of owner-occupiers, this creates opportunities for new investment flows (CBRE, 2018).

The scope of this study is defined as the residential market of the Netherlands. Because this encompasses a large area, a subdivision was made regarding four specific areas to make it suitable for the analysis: G4, Randstad other, prime regional and other (table 1). The Randstad area consists of the four largest cities of the Netherlands (G4: Amsterdam, Rotterdam, Utrecht & The Hague) and almost 50% of the total population. Due to the high population increase, high demand to live in the 'G4' and the supply shortage, surrounding areas are being affected in terms of price levels. Therefore, we included the 'Randstad other' as a separate category. Moreover, the third category is 'prime regional', which consists of cities outside the Randstad area with a substantial (economic) function in their region such as; Eindhoven, Arnhem, Zwolle, and Groningen. Lastly, the fourth category is the remaining transactions outside the Randstad area and not defined as a regional prime city.

3.3 Dataset

The data used in this study are records from the transaction database compiled by CBRE, a leading worldwide real estate agency. CBRE has provided access to their transaction database, which contains investment transaction in the Netherlands from 2004 till present. Within this study, the residential transaction from 2014 until December 31st of 2018 has been analyzed. The investment database is updated continuously and acquired from reliable real estate news sources as PropertyNL, Vastgoedjournaal and Vastgoedmarkt combined with their own

broker's information. Data available on each transaction contains some or all of the following information; transaction price, size in m², location, the status of the property and information on the vendor and purchaser. If some important information regarding the transaction was missing, such as transaction price or size in m², the transactions were provided with information from the Kadaster and BAGviewer. The Kadaster is the public register of the government, which retains the official information of registered properties and transactions such as owners and transaction prices. BAGviewer is Kadaster's official registration of addresses and buildings, which among others, contains information on the size of buildings.

Regarding this research, specific interest is given to the purchaser's origin and square meter price, however, transactional, investors, and property specific information is needed to conduct the control variables that contribute to the explanation of transaction prices. The two continuous variables price per m² and size in m² are transformed into logarithms to interpret the results in percentages change and to obtain a normal distribution. The variable 'PropertyStatus' was a dummy variable and is transformed into a binary. Three of the four categories regarding new, planned and under construction are merged into 'new', while 'existing' is still a separate category. Furthermore, for the variable 'InvestorRegion' the deals of Asian and Middle Eastern parties were merged into the category MEA because these transactions are scarce within the dataset. The dummy variable 'InvestorType' exists of four categories; Institutional, Collective, Private and Property companies. First of all, the category 'Institutional' consists of institutional funds, insurance companies, and pension funds. Secondly, 'Collective vehicle' consists of investment funds, open-ended funds, property funds, limited partnerships, close-ended funds, special fund, and the public sector. The category 'Private' consists of private investors and a syndicate which is an alliance of several private investors. Lastly, 'Property company' consists of developers, property companies, housing associations, REITs, unlisted property companies and private property companies. In table 1 the variables that were compiled from the database and used in the empirical analysis are listed.

Table 1. Description of variables

Variable	Measure	Description of variable
Dependent variable		
lnPriceSQM	Continuous variable	Logarithm of the transaction price per square meters at the date of transaction
Independent variable		
Origin	Binary variable (0/1)	Origin of the investor (purchaser)
Foreign	(1)	Foreign investor
Domestic	(0)	Dutch investor
Control variables		
lnSizeSQM	Continuous variable	Logarithm of the size of transaction in square meters
LocationRegion	Dummy variable (0/1)	Region where property/properties of transaction are predominantly located
G4	(1) Yes, (0) No	Amsterdam, Rotterdam, Utrecht, The Hague
Randstad other	(1) Yes, (0) No	Randstad area except for G4
Regional prime	(1) Yes, (0) No	Prime regional cities
Other	(1) Yes, (0) No	Other locations
TransactionStatus	Binary variable (0/1)	
Portfolio	(1)	Transaction of set of properties
Single asset	(0)	Transaction of single property
TransactionType	Binary variable (0/1)	
Broker	(1)	Investor did transaction with use of a broker
Direct	(0)	Investor did direct transaction
PropertyStatus	Binary variable (0/1)	Property status at time of transaction
New	(1)	Property being built, planned or new
Existing	(0)	Existing property
InvestorType	Dummy variable (0/1)	Type of investor
Institutional	(1) Yes, (0) No	Institutional investor
Collective	(1) Yes, (0) No	Collective vehicle
Private	(1) Yes, (0) No	Private investor
PropertyCMP	(1) Yes, (0) No	Property company
Year	Dummy variable (0/1)	Year of transaction
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	
InvestorRegion	Dummy variable (0/1)	Continent of investor
Domestic	(1) Yes, (0) No	Domestic investor
Europe	(1) Yes, (0) No	Investor from Europe, not Dutch
NorthAmerica	(1) Yes, (0) No	Investor from North America
MEA	(1) Yes, (0) No	Investor from Middle East or Asia

3.4 Descriptive statistics

In order to make use of a reliable and relevant dataset, some adjustments and transformations have been made. The dependent variable for this research represents the transaction price per square meter. Table 2 reports a range from €964 per m² up till €5.383 per m² with an average transaction price of €2.525 per m². The lowest transaction price was recorded as a portfolio transaction of various cities categorized as 'other', while the highest transaction concerns a transaction in Amsterdam. The average size of the deals that were made was 11.351 m². Were the smallest transaction concerns a transaction of 200 m², the largest transaction in the dataset concerns a portfolio transaction of 696.456 m². Unreliable variables without information on transaction prices or size indicators, that could not be traced, were removed from the dataset. This left 667 residential investment transactions from 2014-2018 for the empirical analysis with a total investment volume of €16.8 billion Euros and 7.3 million square meters. The dataset covers 85% of the total residential investment volume in the Netherlands and is therefore assumed to be a representative population of the total market.

The independent variable for the analysis is the investor's origin which has been classified as either domestic or foreign. If there were multiple purchasers involved in the transaction, then transactions with at least one foreign party are classified as foreign. The descriptive statistics show that in the number of deals the domestic investors are predominant in the dataset (79.76%). However, because of the high number of total deals, there is still a substantial number (135) of transactions made by foreign investors. Moreover, the descriptive statistics provide insight into the distribution among the regions of investors, indicating that the investors from North America are predominant among the foreign investors followed by investors from Europe. In terms of investment location, the G4 is the most dominant category in the number of deals followed by the 'Randstad other' and 'Other'. In addition, this distribution can be affected by the fact that portfolio transactions are categorized based on the dominant location

within the portfolio. However, it is important to include the portfolios in the dataset since foreign investors are mostly involved in these transactions and it comprises a substantial amount of investment volume.

Table 2 reports that a large share of the deals within the dataset were single asset deals (78.11%). This high share is slightly affected by the fact that we could not determine all the dominant locations of the portfolio deals or that there was no information on the locations available. Therefore, we left 28 portfolio transactions out of the analysis. In terms of different investor types within the dataset, the institutional investors are predominant in the number of deals (43.03%). Furthermore, 26.24% of the deals were done by property companies, 17.69% by collective vehicles and 13.04% by private investors. Lastly, the transaction year dummies show the distribution of transactions among the different years, indicating a small range between the lowest (17.24%, 2014) and highest year (21.89%, 2016) in the number of deals.

Table 2. Descriptive statistics

Continuous variables	Mean	Std. Dev	Minimum	Maximum
PriceSQM	2.525	754	964	5.383
SizeSQM	11.351	33.605	200	696.456

Binary and Dummy variables	Nr. of observations	Proportion in the sample
Origin		
Foreign	135	20.24%
Domestic	532	79.76%
LocationRegion		
G4	216	32.31%
Randstad other	180	27.08%
Regional prime	123	18.46%
Other	148	22.15%
TransactionStatus		
Portfolio	146	21.89%
Single asset	521	78.11%
TransactionType		
Broker	367	55.02%
Direct	300	44.98%
PropertyStatus		
New	334	50.07%
Existing	323	49.93%
InvestorType		
Institutional	287	43.03%
Collective	118	17.69%
Private	87	13.04%
PropertyCMP	175	26.24%

Year		
2014	115	17.24%
2015	132	19.79%
2016	146	21.89%
2017	135	20.24%
2018	140	20.99%
InvestorRegion		
Domestic	531	79.61%
Europe	57	8.55%
NorthAmerica	72	10.79%
MEA	7	1.05%

Table 3 presents the descriptive statistics in terms of the value of deals. The descriptive statistics are separately stated to provide further insight than and to explore the differences between domestic and foreign investors. It is remarkable that in terms of the number of deals, domestic investors are predominant (Table 2), whereas in terms of total investment volume the presence of foreign investors (37.3%) significantly higher (Table 3). This suggests that the types of transactions and assets bought by foreign investors differ from the rest of the dataset. Moreover, the mean price per square meter paid by foreign investors (€2.674) is higher than of domestic investors (€2.507). In addition, this can be triggered by larger and better properties as well as price premiums. A higher share of the foreign investment volume was in the Randstad area (73.8%), while domestic investor volume has a higher share in the other category (18.6%). However, it should be noted that the distribution is affected by the location classification of portfolios. This distribution would be different when the portfolios were split out on a complex level.

The variable transaction status reports approximately the same distribution in the number of deals as in investment volume, regarding domestic investors. Nevertheless, the distribution of investment volume for foreign investors varies substantially. Foreign investors have a higher investment volume in portfolio deals compared to single asset deals. The portfolio deals consist of several residential complexes but are traded and acquired at once. As a result, the mean size in square meters (20.852m²) of deals made by foreign investors are substantially higher. This is in line with the financial position of foreign investors as well as their interest to enter or grow their share in the Dutch residential market. The distribution of property status in terms of investment volume is different from the number of deals, indicating that foreign investors predominantly invest in existing properties. This corresponds with the high volume in portfolio deals, which consist predominantly of existing properties. The difference in the property status distribution can be explained by the fact that new developments are forward funded and more

complicated in terms of financial structures. When looking into the type of investor, the highest volume of domestic investors come from institutional parties, while foreign investment is dominated by collective investment vehicles. Furthermore, transactions of private investors were solely done by domestic parties, both in the number of deals and investment volume.

The descriptive statistics of the year dummies reports a difference compared to the number of deals. The deal volume of 2018 is substantially higher than the years 2014-2017, although the distribution in the number of deals in table 2 is almost equally divided. This implies that there was a higher share of large transactions in 2018 compared to the years before. The high increase in volume is in line with the reported volume increase of figure 1. Lastly, the investor region variable provides insight into the distribution of investment volume among continents. While in number of deals the North American investors are the largest group, the European investors are predominant in terms of investment volume. This is due to the fact that European investors have acquired more of the largest residential portfolios than North American investors.

Table 3. Descriptive statistics in value of deals

Variable	Domestic			Foreign		
Total value of deals in €	10.544.182.366			6.268.835.100		
Total area in m²	4.441.557			2.898.033		
	Mean	Minimum	Maximum	Mean	Minimum	Maximum
PriceSQM	2.507	964	5.383	2.674	1.062	5.035
SizeSQM	8.507	200	696.456	20.852	510	330.000
Variable	Domestic value of deals x mln.			Foreign value of deals x mln.		
Location region						
G4	3.840			2.873		
Randstad other	3.658			1.754		
Regional prime	1.088			774		
Other	1.957			868		
TransactionStatus						
Portfolio	3.401			3.611		
Single asset	7.144			2.658		
TransactionType						
Brokered	5.943			4.995		
Direct	4.601			1.273		
PropertyStatus						
New	5.518			1.915		
Existing	5.026			4.354		
InvestorType						
Institutional	7.044			1.044		
Collective	1.014			3.782		
Private	621			-		
PropertyCMP	1.865			1.443		
Year						

2014	1.255	1.497
2015	1.631	659
2016	2.146	920
2017	1.975	1.227
2018	3.568	1.965
InvestorRegion		
Domestic	10.544	
Europe		3.371
NorthAmerica		2.503
MEA		395

4. METHODOLOGY

This study explores the effect of the investor's origin on transaction prices. The empirical part of this research is quantitatively conducted using a multiple linear regression analysis. A multiple linear regression helps to explain the possible relationship between the dependent variable and an independent variable while using multiple explanatory control variables. Therefore, the dependent variable, the transaction price is regressed on several transactional, and investors and property characteristics. The transactional characteristics include information such as size (m^2), year of the transaction and the transaction status. Secondly, the investors and property characteristics encompass information on the type of investor, region location of the property and the property status. All of these variables have been discussed and explained in further detail in the previous sections (3.2, 3.3).

In order to estimate the effect of the investor's origin on transaction prices, the following model will be used:

$$\ln(Y)_{it} = \alpha + \beta_1 \delta_{it} + \sum \beta_2 T_{it} + \sum \beta_3 P_{it} + \varepsilon_{it} \quad (1)$$

The first variable, Yit, is the transaction price per square meter of transaction i at transaction year t. The second variable, δ, denotes the origin dummy of the investor. The δ represents the investor's foreign binary or represents the investor's continent of origin dummy. The third variable T denotes a vector of transactional characteristics of transaction i at year t. The fourth variable P denotes a vector of property and investor's characteristics of transaction i at year t. Lastly, a constant α and the error term ε for the transaction of i at year t are included. β1, β2 and β3 represent the sets of parameters to be estimated in this model.

For the empirical part of this research, five different models will be estimated, based on the model above (1). The first model will estimate the effect of the foreign binary in relation to the transaction price, including the transactional characteristics of T. In the second model the property characteristics of P are added. The third model uses the region of the investor as the independent variable in order to explore differences among the different continents of origin. For the fourth and fifth model, a selection will be made based on the deal size. Due to the fact

that foreign investors are predominantly involved in large (portfolio) transactions, the distribution of the overall dataset in models 1,2 and 3 can be distorting. Consequently, the results of these models are likely to have a certain level of noise and therefore be not trustworthy. To correct for this, we moved to a sample with less noise and executed two regressions with transactions above 15 million. To finalize, the fourth model will estimate the foreign binary while the fifth model estimates the investor's continent dummy.

In order to obtain unbiased and valid results, the dataset has the meet several assumptions of the classical linear regression model. If any of these assumptions are not met, modifications to the model are necessary. The outcomes of the tested assumptions can be found in the Appendices. First of all, the variables are tested for their normal distribution. If variables are not normally distributed, log transformations have to be made to ensure normal distribution. Secondly, the Breusch-Pagan test is conducted to check if the residuals have a constant variance. If the variance of the residuals is not constant, then heteroscedasticity is likely to be a problem in the dataset. To overcome the issue of heteroscedasticity robust standard errors (RSE) are used. The next requirement is that the variables incorporated in the regression are not collinear. To use linear regression and to avoid biased results, the explanatory variables should not have a strong relationship with one another. To prevent this from happening, a variance inflation factor (VIF) check will be performed after we run the regression. Furthermore, the residuals have to show a normal distribution, which is shown in appendix E. Lastly, in order to use linear regression, the relationship between the dependent and explanatory variables have to be linear. This requirement has been tested for by plotting the residuals against each explanatory variable. Despite checking for all the model assumptions, the outcomes of the predicted value can still be biased due to outliers in the dataset. Therefore, we will check if the dataset contains outliers by calculating a z-score on individual observations. The z-score calculates how many standard deviations the individual observation is from the mean. Within a normal distribution, approximately 99% of the individual observations should have a z-score within a range of -3 and 3. None of the observations had a z-score below -3 however, 12 observations had z-score above 3. Thus, we excluded these 12 observations that did not meet this criterion.

5. RESULTS

5.1 All transactions

In this section, the results from the regression models are presented. Table 4 presents three different models using all the deals within the dataset. Table 5 presents the results of the large transactions where the deal size was above 15 million Euros. The transaction price and size in square meter are transformed into a logarithm, therefore the results can be interpreted as a change in percentage. The first column reports the results of model 1; the log transaction price per m² is regressed on the origin variable while using a number of transactional characteristics. Model 1 shows, with a significance level of 1%, that transactions made by foreign investors transact at an 11.6% premium relative to domestic investors. The explanatory power of model 1 (R^2) is relatively low because there is no information on the type of investor, location or property status included. However, the relationship of the key variable of interest, "foreign", is already in line with its expected positive effect on the transaction price.

The second model presents the results including the property and investor's characteristics. The R^2, which indicates the explanatory power, is substantially higher and increases to 33.7%. In model 2, the independent variable of interest, "foreign", has a positive relationship with transaction prices at a significance level of 1%. This outcome indicates that deals made by foreign investors have an 8.3% premium compared to domestic investors. In model 2, the variable "size in m²" became significant. The log of size in m² implies a negative significant effect at a significance level of 1%, indicating that a 1% larger transaction in terms of m² leads to a 0.035% decrease in transaction price. This outcome is as expected; as a consequence of the nature of the real estate market, an increase in square meters will result in a decrease of the square meter price. Moreover, the large transactions in terms of m² concern portfolio transactions, which on average are of lower quality than single asset deals. As expected, the year transaction variable coefficients increase along with years and have a statistical significance of 1%. The increase in transaction price over the period 2014-2018 for all included deals is on average 11.5%. Regarding the transactional characteristics, the variables "transaction status" and "broker" had no significant results. Beforehand portfolio transactions were assumed to have a stimulating effect on the transaction price compared to single asset deals. This is due to the fact that it is common in the residential market to pay a premium for portfolio transactions over the total determined asset price. The premium is paid because of the

benefits that arise from portfolio transactions such as favorable geographic diversification, cost efficiencies, simplified acquisition processes and a lower brokerage fee (J. Torzewski, 2010). However, as discussed above, portfolios are on average of lower quality than the single asset deals and therefore it is likely that this premium diminishes due to the lower overall quality.

Turning to property and investor's characteristics, the outcome of the regression shows that the type of investor has an influence on the transaction price. Collective vehicles, private investors and property companies all transact at a discount compared to institutional investors. The effect of the type of investor ranges from -8.4% for a property company to -12.4% for a private investor. Institutional investors have a longer time horizon and therefore can afford lower return requirements than the other types of investors. This is reflected in the market were institutional parties acquire high-quality properties with the low returns and the highest prices. Furthermore, the distribution in terms of investor types among the transaction years can differ. Directly after the great financial crisis, the private equity parties were willing to acquire Dutch residential real estate (FD, 2018). As the economic conditions got better, more institutional investors participated as well. Consequently, the yearly increase in transaction price is contributing to the premium of institutional investors. As explained in the descriptive statistics section (3.3), private parties only consist of domestic investors. These investors do not participate in the new and outstanding projects, which have the highest transaction price.

The coefficients of the location region variables are all positive and significant at a 1% level. These variables behave as expected as the other category transact at the lowest price. Assets that are located in the G4 cities transact at a 28.7% premium compared to assets outside the G4, outside the Randstad area and not in a regional prime city. The difference in the coefficients between Randstad and regional prime shows that the Randstad area has more effect on the transaction price than the regional prime cities. This outcome can be explained by the proximity to and spillover effects of the G4 cities which is substantial. Lastly, the coefficient of the "property status" is significant at a 1% level. The coefficient is positive (10.4%) and shows that new properties transact at a higher price compared to existing properties. In addition, the transactions categorized as new can include planned or under construction transactions as well. Logically, this is due to the fact that new buildings or buildings under construction indicate a higher quality and state of repair.

The third model explores the effect of the investor's origin regarding the different continents. The change of the coefficients is caused by the inclusion of the investor region dummies and the exclusion of the origin binary. Most of the results are similar to the coefficients of model 2, with small differences. The key outcome of this model shows that European investors transact at an 11.1% premium, while North American investors transact at a 7.1% premium. This finding is partly contributing to the distance effect as described in McAllister and Nanda (2016). The foreign investors pay a premium compared to domestic investors. However, the European investors have a higher premium than North American investors, while they are at a shorter distance from the investment origin. This can be explained by a different strategy and outlook on the market between North American and European investors' in terms of types of transactions and segments of the market. The European investors' have primarily invested in single asset deals (66%), while the North American investors primarily invested in portfolio deals (58%). Second, the European investors had higher quality deals in terms of location, and a substantial higher share of new properties (54%) compared to North American investors' (22,2%). Another explanation for the difference in premiums is the high share of transactions in student housing by European investors' (42%). Student housing acquisitions generally transact at higher prices per m², because this type of product generates a high rental income per m².

Table 4. Regression outcomes

lnPriceSQM	Model 1: Multiple regression with transactional characteristics	Model 2: + Property and investors characteristics	Model 3: Multiple regression with investor region dummies
Variable	Coefficient (S.E.)	Coefficient (S.E.)	Coefficient (S.E.)
Foreign	0.116***	0.084***	
	(0.0313)	(0.0319)	
Europe			0.111***
			(0.0426)
NorthAmerica			0.071**
			(0.0392)
MEA			-0.017
			(0.0782)
lnSizeSQM	-0.001	-0.035***	-0.037***
	(0.0119)	(0.0109)	(0.0114)
2015	0.099***	0.060**	0.060**
	(0.0358)	(0.0308)	(0.0308)
2016	0.104***	0.082***	0.080***

	(0.0326)	(0.0284)	(0.0287)
2017	0.114***	0.093***	0.097***
	(0.0360)	(0.0314)	(0.0317)
2018	0.154***	0.115***	0.117***
	(0.0399)	(0.0360)	(0.0365)
TransactionStatus	-0.154***	-0.013	-0.007
	(0.0341)	(0.0327)	(0.0332)
Broker	-0.090***	0.004	0.005
	(0.0238)	(0.0236)	(0.0235)
Collective		-0.088**	-0.096***
		(0.0347)	(0.0364)
Private		-0.124***	-0.131***
		(0.0352)	(0.0365)
PropertyCMP		-0.084***	-0.093***
		(0.0261)	(0.0280)
G4		0.287***	0.289***
		(0.0291)	(0.0291)
RandstadOther		0.147***	0.147***
		(0.0255)	(0.0260)
RegionalPrime		0.072**	0.073**
		(0.0292)	(0.0296)
PropertyStatus		0.104***	0.100***
		(0.0243)	(0.0253)
Constant	7.762***	7.862***	7.880***
	(0.1037)	(0.0990)	(0.1045)
Observation	667	667	667
Prob>F	0.000	0.000	0.000
Adjusted R^2	0.122	0.337	0.336
Root MSE	0.284	0.248	0.249

Note: The reference category is a transaction made by a Domestic investor, transacted in 2014, categorized as Institutional and located in Other. ** = significant on 5% level, *** = significant on 1% level. Standard errors are in parentheses.

5.2 Large transactions

Table 5 presents the results of model 4 and model 5. The selection based on the total transaction price left 266 transactions for the analysis. The explanatory power of these models increased substantially to respectively 47.7% and 48.1%. Compared to model 2 and 3, the direction of the variables did not change. However, there are some differences in the coefficients and levels of significance. In model 4 it is observed that the effect of the investor's origin decreases to a premium of 6.7 at a significance level of 5%. The decrease in the coefficient is caused by the exclusion of the lower quality real estate from small transactions, which was primarily bought by domestic investors. The founded premium is in line with the study of Lambson et al. (2004), where distant (out of state) buyers paid a 5.5% premium. The size m^2 coefficient reports a substantial decrease, regarding the large transaction a 1% increase in m^2 will result in a 0.125% lower transaction price per m^2. Considering the larger transactions, the 1% increase will be

much higher compared to the 1% increase of the overall transaction, therefore the decrease in the coefficient is logical.

Regarding the transactional characteristics, the 2015 became variable insignificant, the 2016 variable reports a lower level of significance and the coefficients of 2017 and 2018 increased. This increase in year premium is driven by the growing interest of foreign investors during the 2014-2018 period, triggered by the positive market fundamentals in the Dutch residential sector. The demand exceeds the supply and the projected increase in rental income stimulates the direct return (CBRE, 2019). As a result, more foreign investors want to enter the market or grow their market share, which stimulates the price premium of large transactions. The investors and property characteristics show some differences compared to the results in table 4. The variables collective vehicles and regional prime are insignificant. In addition, the significance level of the other type of investor dummies decreased to a 5% and 10% level. Regarding the regional prime variable, this was triggered by categorization of the portfolio transactions, which decreased the number of regional prime transactions. Due to the composition of portfolios, most transactions have Randstad other or Other as their dominant location. To conclude, the other region dummies, and the property status showed hardly any changes in their coefficients compared to the results from table 4.

Lastly, model 5 reports the effects of the region of investor regarding the large transactions in the database. It is remarkable that the difference between European and North American investors as presented in model 3, almost diminishes to 8.2% and 8% in model 5. The founded price premiums are in line with results from previous studies. Devaney and Scofield (2017) found an equivalent premium of 9% for foreign buyers in the NY office market. However, Ling et al. (2018) found a higher premium (12.2%) for distant buyers in the residential market. The main reason for the founded premiums can be explained by Liu et al. (2015). They claim that foreign (non-local) buyers are at a disadvantage compared to domestic (local) buyers due to the geographical distance between investors and their assets and the information asymmetry, resulting in an overpayment of properties. Furthermore, the price premium paid by foreign investors is in line with the studies of Lambson et al. (2004), Clauretie and Thistle (2007), Ihlanfeldt and Mayock (2012) and Zhou et al. (2015) were price premiums are induced by upwardly biased beliefs and anchoring prospects. We could not include a broad range of property characteristics such as the building year or the state of repair. However, the variable property status (table 3) indicate that domestic parties have a substantially higher share in the "new" category, which implies better properties. Therefore, we can conclude that these found

premiums of foreign investors are primarily the result of anchoring prospects or upwardly biased beliefs that triggers an overpayment for properties. Next to that, the return requirements and financial positions of foreign can differ from domestic investors, which could lead to a higher willingness to pay for the same property. The decrease in the coefficient of European investors is mainly caused by the composition of the smaller deals. These smaller deals are, with the exception of 1 deal, all located in the G4, Randstad other or Regional Prime cities. As a result, the composition had a positive stimulating effect on the overall premium of European investors as reported in model 3. Next to that, the deals made by North American and domestic investors in model 3 consist of a higher share of low-quality deals. These deals were not included in model 5 and as a result the premium of North American and foreign increases.

Table 5. Regression outcomes of large transactions >15 million

lnPriceSQM	Model 4: Large transactions with origin binary	Model 5: Large transactions with investor region dummies
Variable	Coefficient (S.E.)	Coefficient (S.E.)
Foreign	0.067**	
	(0.0382)	
Europe		0.082**
		(0.0482)
NorthAmerica		0.080**
		(0.0465)
MEA		-0.015
		(0.0820)
lnSizeSQM	-0.125***	-0.127***
	(0.0213)	(0.0213)
2015	-0.007	-0.009
	(0.0428)	(0.0424)
2016	0.073*	0.066
	(0.0430)	(0.0438)
2017	0.135***	0.126***
	(0.0446)	(0.0455)
2018	0.164***	0.163***
	(0.0462)	(0.0472)
TransactionStatus	0.028	0.041
	(0.0447)	(0.0447)
Broker	0.027	0.025
	(0.0361)	(0.0358)
Collective	-0.076	-0.088*
	(0.0498)	(0.0503)
Private	-0.138*	-0.147*
	(0.0794)	(0.0810)
PropertyCMP	-0.076**	-0.087**

	(0.0377)	(0.0412)
G4	0.270***	0.276***
	(0.0516)	(0.0518)
RandstadOther	0.130***	0.144***
	(0.0467)	(0.0490)
RegionalPrime	0.080	0.083
	(0.0558)	(0.0559)
PropertyStatus	0.091**	0.086**
	(0.0396)	(0.0422)
Constant	8.762***	8.781***
	(0.2144)	(0.2174)
Observation	266	266
Prob>F	0.000	0.000
Adjusted R^2	0.477	0.481
Root MSE	0.225	0.225

Note: The reference category is a transaction made by a Domestic investor, transacted in 2014, categorized as Institutional and located in Other. *=significant on 10* level, ** = significant on 5% level, *** = significant on 1% level. Standard errors are in parentheses.

5.3 Chow test

Finally, a check is conducted to see whether the results not only hold up for the entire dataset, but also for subgroups based on the transaction status. The Chow F test (Chow, 1960) allows testing for differences between two groups, which in this research are single asset and portfolio deals. Therefore, two subsets are created, and separate regressions are executed with either single asset or portfolio transactions. The results of Chow test (4.95) show that the null hypothesis is rejected at a significance level of 1%. This indicates that the coefficients of the two separated models (6 & 7) are not identical. In addition, table 6 shows that results of the portfolio transactions differ substantially from the single asset transactions. Most important, the key variable of interest has no significant result regarding the portfolio transactions. This indicates that the price premium as found in table 4 and table 5 is caused by single asset transactions. Next to that, most of the significant variables in model 6 became insignificant in model 7. This might indicate that the two types of transaction differ significantly. It is likely that the categorization in terms of location and varying quality within a portfolio has a substantial effect on this outcome. In general, portfolio deals consist of a variety of assets in terms of the quality of the location or the quality of the building. A common strategy is to sell lower or middle quality assets and add some higher quality assets to ensure that the portfolio is more attractive for potential investors. Consequently, the quality of the portfolios is more averaged out in comparison with single asset deals, which affects the categorization and outcomes in model 7.

Table 6. Regression outcomes for split groups

lnPriceSQM	Model 6: Single asset transactions	Model 7: Portfolio transactions
Variable	Coefficient (S.E.)	Coefficient (S.E.)
Foreign	0.126***	0.009
	(0.0364)	(0.0541)
Ln SizeSQM	-0.051***	-0.028
	(0.0136)	(0.0160)
2015	0.048*	0.017*
	(0.0332)	(0.0874)
2016	0.088***	0.001
	(0.0320)	(0.0888)
2017	0.094***	0.053
	(0.0337)	(0.0776)
2018	0.144***	0.040
	(0.0386)	(0.0740)
Broker	0.003	-0.024
	(0.0241)	(0.0931)
Collective	-0.145***	-0.037
	(0.0398)	(0.0696)
Private	-0.134***	-0.248***
	(0.0372)	(0.0931)
PropertyCMP	-0.091***	-0.093
	(0.0287)	(0.0689)
G4	0.271***	0.459***
	(0.0331)	(0.0649)
RandstadOther	0.152***	0.112*
	(0.0320)	(0.0535)
RegionalPrime	0.075*	0.034
	(0.0350)	(0.0626)
PropertyStatus	0.097***	0.114
	(0.0253)	(0.0730)
Constant	8.002***	7.879***
	(0.1169)	(0.2127)
Observation	521	146
Prob>F	0.000	0.000
Adjusted R^2	0.281	0.416

Note: The reference category is a transaction made by a Domestic investor, transacted in 2014, categorized as Institutional and located in Other. *=significant on 10* level, ** = significant on 5% level, *** = significant on 1% level. Standard errors are in parentheses.

5.4 Coarsened Exact Matching (CEM)

The regression results from the Chow F test as presented in table 5 indicate that there is a substantial difference between the domestic and foreign investors. The split groups indicate that this premium is primarily driven by single asset transactions. Foreign investors pay a 12,6% premium compared to domestic investors. A possible explanation for this found premium is due to imbalance between domestic and foreign transactions. To ensure more similarity between the two groups (domestic and foreign), the coarsened exact matching (CEM) method will be performed (Blackwell et al. 2009; Iacus et al. 2012). Based on the results from model 6, the type of transaction and the number of observations, the CEM performed on single asset deals. The CEM method coarsen the data into different groups (bins) based on selected variables of interest. Next, the coarsened data will be matched between a treated and control group based on the same values. The treated and control group in this study are the foreign and domestic transactions. The selected variables of interest are; SizeSQM, G4, RandstadOther, RegionalPrime and PropertyStatus. The CEM outcome resulted in 261 matches with a substantial decrease in imbalance between the treated and control group. Next, a multiple linear regression was performed based on the CEM matched data. Table 7 reports the results of this estimation. The key variable of interest, foreign, shows a 9.2% premium for foreign investors. This indicates a decline compared to the results from model 6. It seems that the 12.6% premium was inflated due to the imbalance between domestic and foreign transactions. Moreover, the results support the outcomes of the main analysis that foreign investors pay a premium compared to domestic investors. However, the found premium is primarily driven by single asset deals. To conclude, the outcomes of the main analysis can not be generalized over all types of transaction but are the result of overpayments in single asset deals.

Table 7. Regression outcomes from matched sample

lnPriceSQM	Model 8: Single asset transactions
Variable	Coefficient (S.E.)
Foreign	0.0922***
	(0.0418)
Ln SizeSQM	-0.0743***
	(0.0245)
2015	-0.003
	(0.0448)
2016	0.0460
	(0.0422)
2017	0.0368
	(0.0447)
2018	0.0651

	(0.0536)
Broker	-0.0134
	(0.0331)
Collective	-0.175***
	(0.0515)
Private	-0.131***
	(0.0539)
PropertyCMP	-0.132***
	(0.0382)
G4	0.286***
	(0.0486)
RandstadOther	0.122**
	(0.0512)
RegionalPrime	0.099**
	(0.0436)
PropertyStatus	0.062*
	(0.0348)
Constant	8.269***
	(0.2055)
Observation	261
Prob>F	0.000
Adjusted R^2	0.285

Note: The reference category is a transaction made by a Domestic investor, transacted in 2014, categorized as Institutional and located in Other. *=significant on 10* level, ** = significant on 5% level, *** = significant on 1% level. Standard errors are in parentheses.

6. CONCLUSION & RECOMMENDATION

6.1 Conclusion

This research studies the effect of the investor's origin on the transaction price per square meter of Dutch residential real estate between 2014 – 2018. This scope is relevant since it expands the literature on the distance effect that addresses the relationship between the investor's origin and transaction prices. In previous distance effect studies, the focus was on local and non-local buyers of different regions within a country or different states within the U.S. Furthermore, these findings elaborate on the relationship between transaction prices and the investor's origin on a nationality level, which has primarily been examined in the office sector.

According to previous studies by McAllister and Nanda (2016) & Ling et al. (2018), distance has a link with informational, cultural and institutional characteristics. As a result, distance enhances information asymmetry and search costs which, in turn, triggers price premiums. To understand the effect of the investor's origin on the transaction prices, five multiple linear regression models have been examined. Firstly, the models addressed the effect of an investor being domestic or foreign. Secondly, the effect of the different continents of origin has been explored. The multiple linear regression model was applied to an investment database of the Netherlands, provided by CBRE.

The null hypothesis tested was as follows: "There is *no relationship* between the origin of investors and the transaction prices per square meter in the Dutch residential market.". Based on the results of the empirical model the null hypothesis can be rejected. This indicates that there is a relationship between the investor's origin and the transaction price per square meter in the Dutch residential market. The investor's origin being foreign was shown to have a positive effect on the transaction prices per square meter. Indicating a price premium of respectively 8.4% on all transactions and 6.7% on the large transactions. This finding is in line with the effects found in other residential distance effect studies between local and non-local buyers. Furthermore, the results show that the European investors have a higher premium (11.1%) than the North American (7.1%) concerning all the transactions. This difference diminishes to 8.2% and 8% with the exclusion of the smaller transactions (< 15 million Euro). However, the sensitivity analyses indicate that these founded premiums are primarily driven by

single asset transactions. The outcomes of the matched sample show a 9.2% premium to foreign investors regarding single asset transactions. Due to the imbalance in the overall transaction dataset, it is expected that this premium is closer to the true value of the industry.

These outcomes can be explained by several mechanisms. First of all, distance enhances search costs and information asymmetry. A key principle is that price premiums are triggered by information asymmetry. Next to that, there is a different position and outlook on the market between foreign and domestic investors. This was also found in the literature by Lambson et al. (2004), were upward biased price expectations is named as a trigger for price premiums. Thirdly, entering the market and expanding the market share requires specific strategies that, consequently, trigger price premiums. In addition, other return requirements and more financial clout enhance price differences as well. To conclude, it seems that foreign investors get compensated in terms of favorable returns and diversification benefits to outperform the risks that are faced and to pay these price premiums. The outcomes of this study can be used by municipalities, housing associations and real estate developers in attracting investment capital and selling existing and developed housing stock.

6.2 Recommendations

Based on the results of this study there are multiple opportunities for further research. First of all, there can be a difference between the investor's origin and the origin of the financial source that is used for the investment. Some Dutch investors are funded by foreign financial flows and vice versa. Therefore, it would be interesting to explore the effect of the source of financial funding that is used by investors. Secondly, the market fundamentals in the Netherlands are very positive and, as a result, foreign parties are willing to grow their market share across many sectors. As there is great interest to grow substantial portfolios, it is likely that parties outbid each other and therefore drive up prices. An interesting scope for further research could be analyzing bidding procedures in popular investment categories. Lastly, a comparison between different sectors and countries can be interesting to see whether price premiums exist at the same level.

As with any study, this research was confronted with some limitations. First, the dataset was limited in terms of property characteristics to include in the analysis. There was no information on the state of repair or building year, for quality measurement, which has a dampening effect on the overall variance of the model. The inclusion of property characteristics could lead to

different results. Second, this type of study is difficult to examine in the residential sector since portfolio deals are very common among residential investment transactions. It is hard to include portfolio transactions in the analysis, because the location of assets within a portfolio varies. As a result, the dominant location of a portfolio is difficult to determine, and the categorization has an impact on the outcomes. Lastly, especially in the bigger cities, most of the newly developed residential apartment buildings have mixed functions at the ground level. Transactions in the database contain, unless valued by the broker itself, total transaction prices. This slightly affects the square meter price of the overall transaction.

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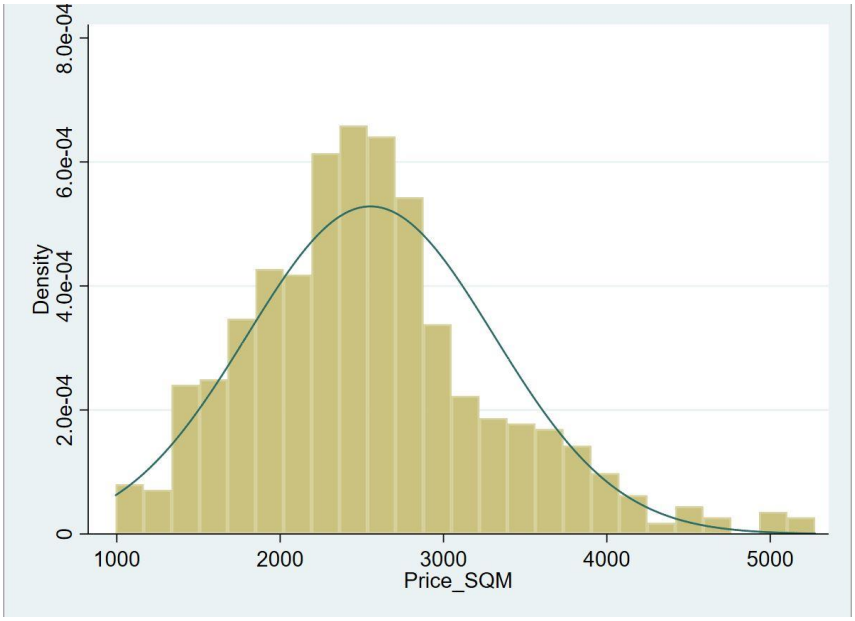
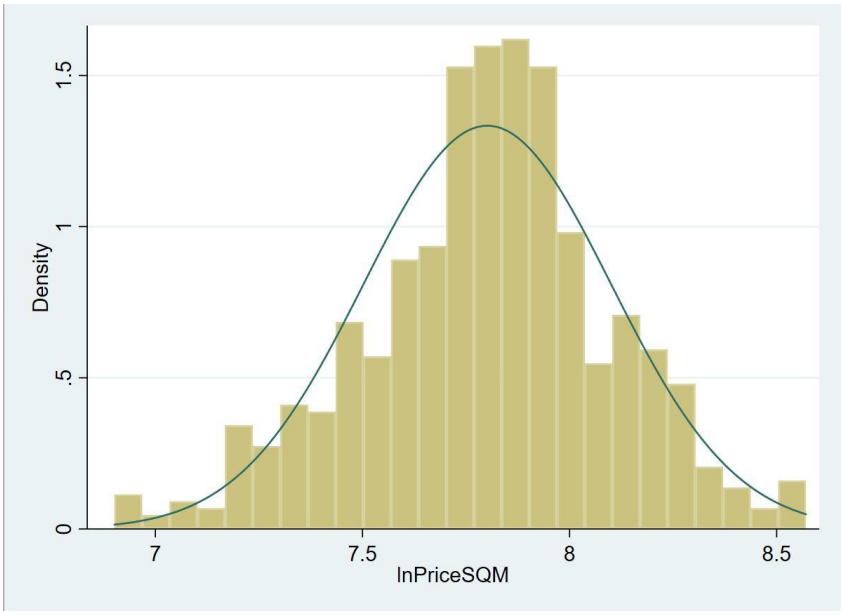
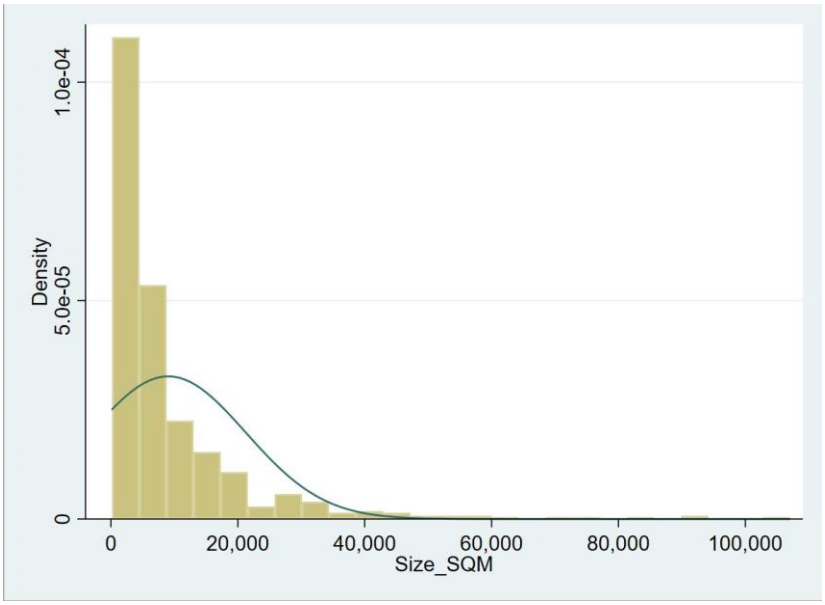
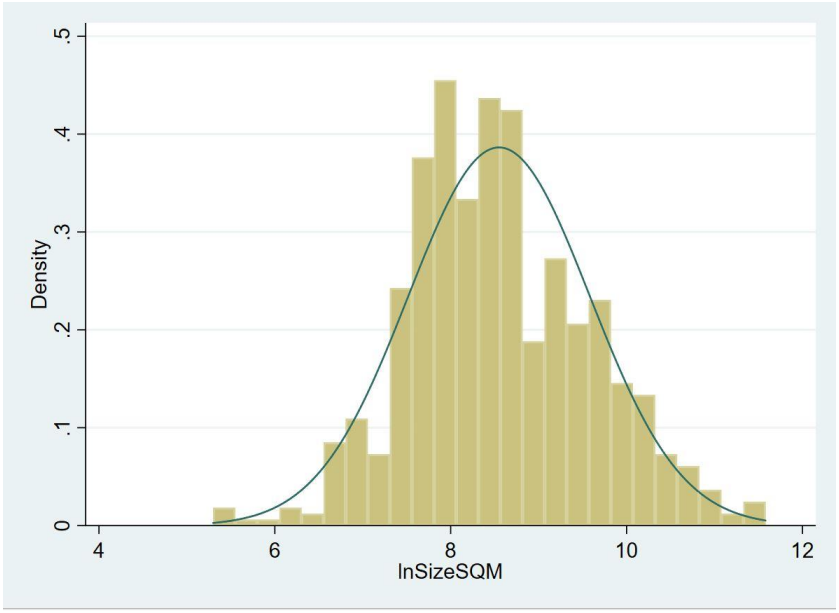
APPENDICES

APPENDIX A – Log Transformations

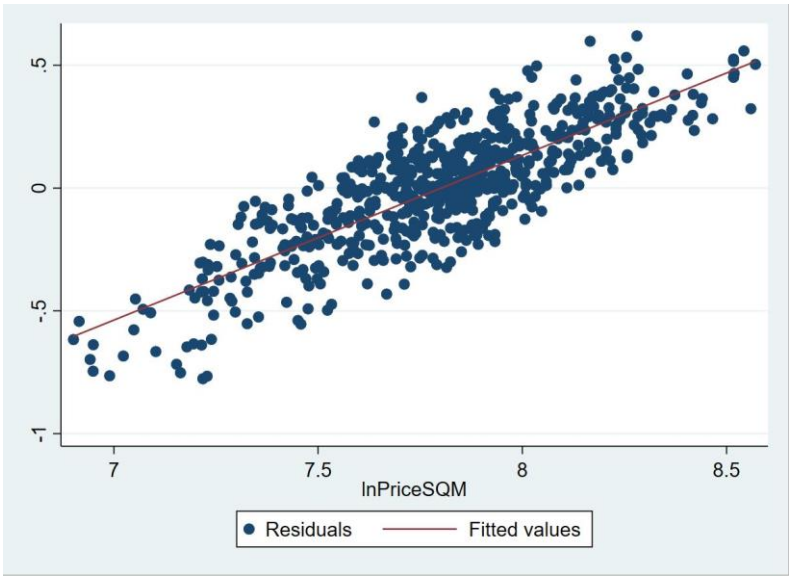




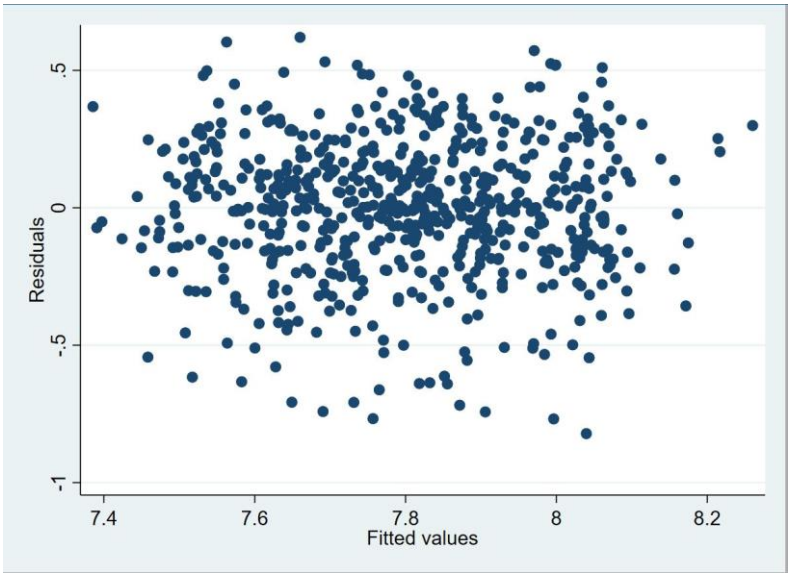




APPENDIX B – Linearity



APPENDIX C – Heteroscedasticity

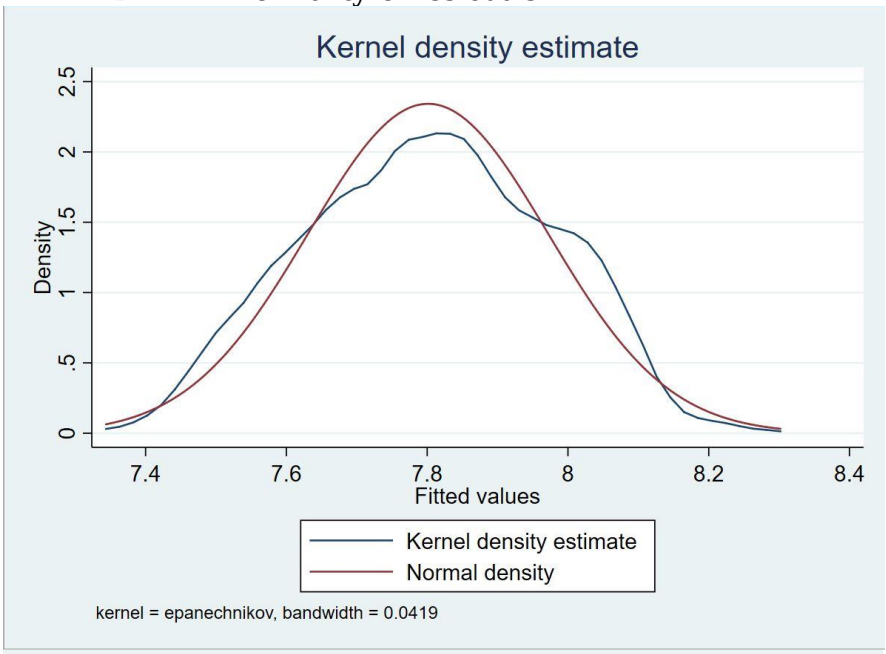


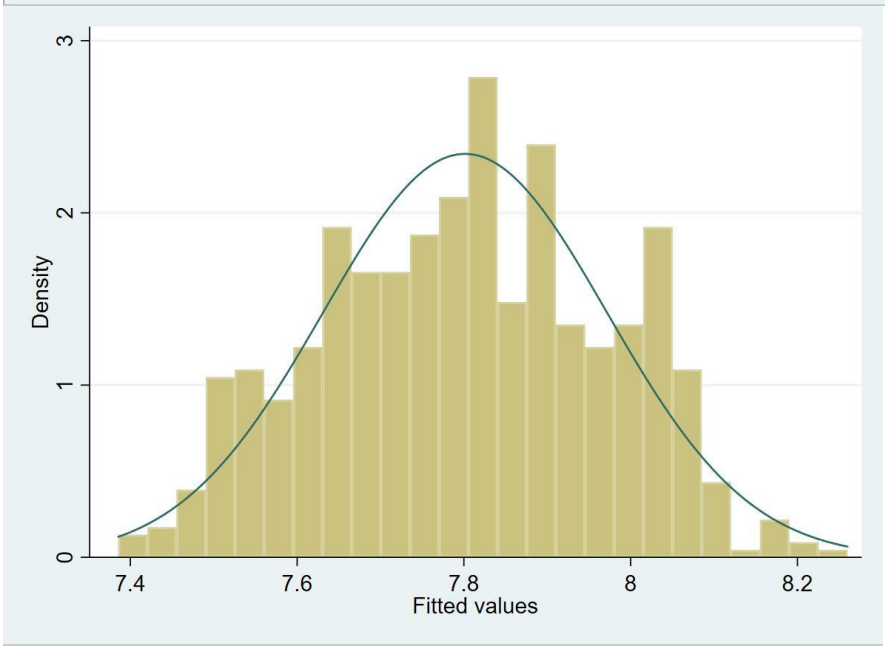
Breach-Pagan / Cook-Weisberg test for heteroscedasticity
Ho: Constant variance
Variables: fitted values of lnPriceSQM
Chi2(1) = 0.01
Prob > chi2 = 0.9250

APPENDIX D – Multicollinearity

Variable	VIF	1/VIF
Y5	2.00	0.499146
G4	1.94	0.515688
Collective	1.87	0.534171
Y3	1.87	0.534204
Y4	1.80	0.554416
Y2	1.80	0.556077
Portfoliodeal	1.71	0.584417
PropertyStatus	1.70	0.587160
RandstadOther	1.69	0.593306
PropertyCompany	1.63	0.612794
RegionalPrime	1.56	0.642938
Private	1.53	0.652036
Origin	1.53	0.652658
Broker	1.47	0.681110
lnSizeSQM	1.30	0.768739
Mean VIF	1.69	

APPENDIX E – Normality of residuals





APPENDIX F – Chow F test

```
.
. . di 40.0057-(29.75+8.6655)/(29.75+8.6655)*(667-2*18)/18
4.9501444

. di (521+146-(2*18))
631

.
.
. di invFtail(18,631,.1)
1.4552837

.  di invFtail(18,631,.05)
1.6202241

. di invFtail(18,631,.001)
2.4000892
```