MSc Thesis

The in-transparency of the Amsterdam office market - The underlying incentive and effective rental price development

A quantitative research into the market dynamics and spatial segmentation of the Amsterdam office market over the period 2002-2012

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Management Summary

Problem introduction

The current paradoxical situation in the Amsterdam office market

The opposite figure shows the vacancy and nominal rent level development in the Amsterdam office market over the period 2001-2012. It shows that the Amsterdam office market is characterized by large fluctuations in vacancy rates in this period. Especially during the burst of the ICT-bubble (2001-2003), and in the period before and at the start of the economic recession (2007-2009), the vacancy rates increased a lot in the market. However, a '*paradoxical situation*' occurred as the reported average rent levels do not demonstrate the sever price decrease one might expect, as the opposite figure indicates. In contrast, the rent levels remain relatively stable in the market. This phenomenon forms the starting point of this research.

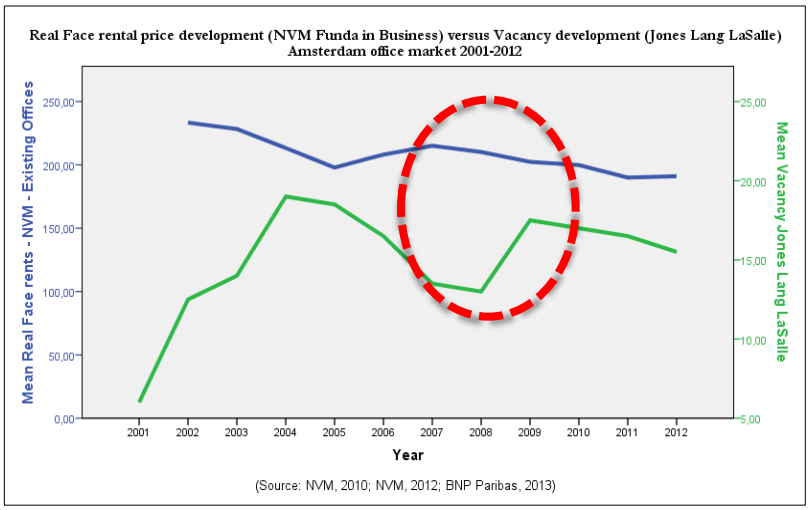


Figure 1. Vacancy (JLL) versus the average real rental price development of Existing offices (NVM) – Amsterdam office market, 2001-2012

Problem analysis

The theoretical functioning of the space market: the Four-Quadrant model

The theoretical functioning of the office rental market is schematically illustrated in the Four-Quadrant model (Wheaton and DiPasquale, 1992), of which the space/rental market quadrant is shown in figure 2. The Four-Quadrant model consists of two other market quadants; the investment market and the construction market quadrant, with mutual interactions between the other segments by means of the continuous adjustment between demand and supply.

The space market demand curve shows that in a well-functioning space market, when the demand increases, the real effective rent level should decrease in the market, and vice versa.

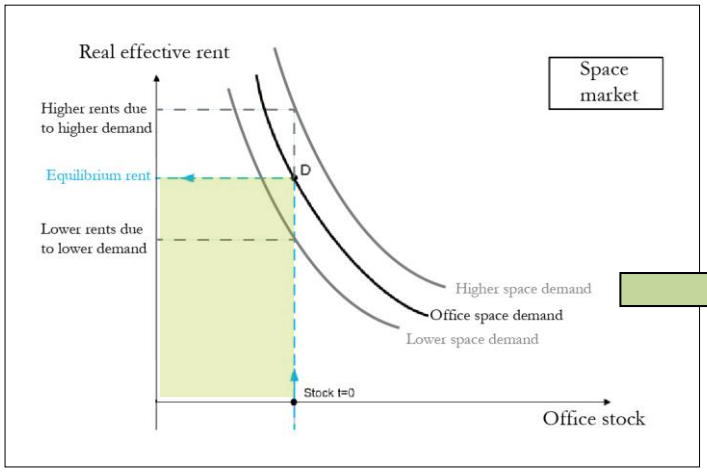


Figure 2 . Space market quadrant of Four-Quadrant model (DiPasquale and Wheaton, 1992); modified by Koppels and Soeters (2008)

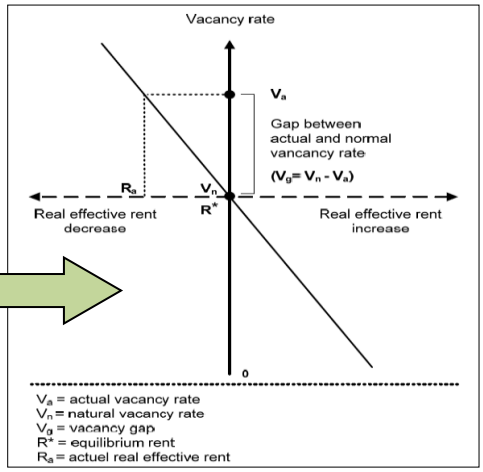


Figure 3. Rental Adjustment Equation (Hendershott, 2004); schematically illustrated by Koppels & Keeris (2006)

The supply curve reflects that in the short term, supply is inelastic or unable to anticipate demand. When the demand for office space changes, the equilibrium rent will adjust quickly in the short-term in order to balance demand and supply, which results is under- or overshooting. In the long run however, supply is capable to adjust to market

demand. Hence office rents will likely recover to their long run level, counterbalancing the short term overshooting. This results in dynamics in the development of office rents.

The theoretical relation between vacancy and real effective rent levels

The vacancy rate is an indicator of the prevailing market conditions. The relation between vacancy and the real effective rent level is based on the so-called '*rental adjustment equation*' (Hendershott, 2004):

$$\frac{(R_t - R_{t-1})}{R_{t-1}} = \lambda\,(V_n - V_a) \Rightarrow \Delta R = \lambda\,(V_n - V_a) \qquad \textit{(Hendershott, 2004)}$$

R = Real rent; V_n = natural vacancy rate; V_a = actual vacancy rate; λ = adjustment factor

The rental adjustment equation shows a *linear* relationship between the actual vacancy rate and the real effective rent level, which is schematically displayed in figure 3 by Koppels & Keeris (2006).
This mutual relation with the real effective rent level indicates that in a well-functioning market; when the vacancy rate increases (compared to the natural or long-term vacancy rate); for instance due to an economic decline; normally leads to a downward price-pressure and lower (real effective) average office rent levels, and vice versa.

The main reasons behind the current paradoxical situation

The current 'paradoxical situation' can be explained by two main market imperfections:

1. Segmented/sub-market behavior of office markets; the scale of the analysis might not reflect the actual market process.
2. Reasons related to the in-transparency or asymmetric information availability in the Amsterdam office market:
    a. Published *face* rental prices in the market
    b. Reported vacancy rates might not reflect the prevailing space market conditions

The reasons mentioned will be explained in depth in the following paragraphs:

Reason 1: Segmented/sub-market behaviour of office markets

The first reason for the paradoxical situation is that the scale of the analysis might not reflect the actual market process. Real estate markets are characterised by its spatial and structural segmented structure, due to their (interrelated) sub-market behaviour and the heterogeneity of its assets. However, most studies model the market as a whole, thereby ignoring the segmented structure. (Stevenson, 2007).

Different market trends might occur per market segment, which is illustrated in the opposite figure. As a result, the relation between the rental prices and the vacancy rate in the market might differ per scale level (for instance differences in relation with a national level, compared to a city-wide or city sub-market levels) in the market. However, there is no unambiguous answer on which scale level is the most appropriate scale level for evaluating the relation between both variables.

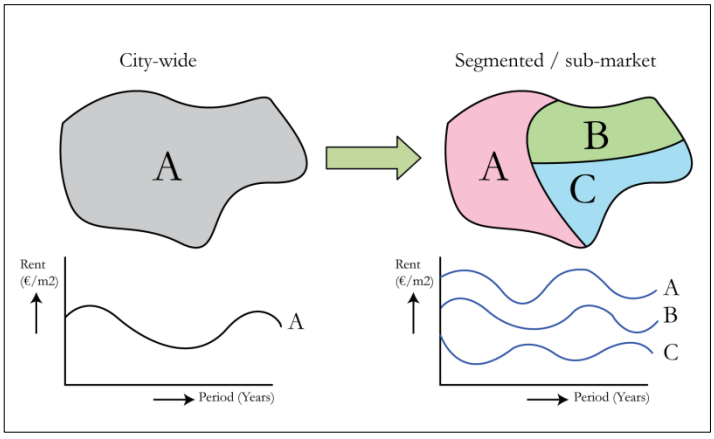


Figure 4. Spatial segmentation/sub-market behavior of office markets: different market trends per market segment (example: rent development)

Reason 2: In-transparency or asymmetric information availability in the Amsterdam office market

The other reasons behind the current paradoxical situation are related to the in-transparency or asymmetric information availability in the Amsterdam office market. In a fully transparent market, all parties have access to the same information. In the (Dutch) real estate market information is asymmetric distributed, as some information is only available to a small number of parties.

2a. Published face rental prices in the market

One of the ***causes*** of the current in-transparency in the Amsterdam office market, is due to the provision of so-called *lease incentives ((any factor apart from the contract rent and general asset quality, the enables or motivates a particular housing decision' (Harding 2012)*), by landlords instead of adjusting the long-term rental rate. The most common lease incentives in the Netherlands are one or more rent-free period(s), rental discount(s) or a contribution to the furnishing costs.

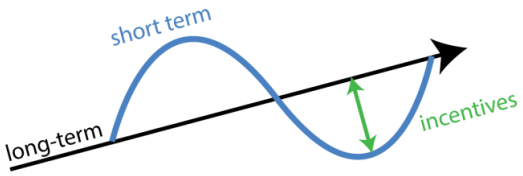


Figure 5. Incentives as rent fluctuation buffer; when the market rent level is below its long-run market rent

The main purpose of providing incentives is to simplify the negotiations between the tenant and the property owner.
In addition, investors try to prevent their investments against fluctuations, as this negatively influences the value and the predictability of the asset. Incentives are used as *rent fluctuation buffer,* which is illustrated in figure 5. Instead of a downward price adjustment of the contract rents (*"the gross yearly rent (in € per m2 LFA per year), which is contractually agreed to be paid, without [lease] incentive correction" (van Gool, 2011)),* landlords react on negative market circumstances by providing incentives without adjusting the long-term rental rate. As a consequence, the incentives are adjusted to the long-term rental price, which results in a rental price level which stays on a certain equilibrium, despite of changing market circumstances.
The use of this method requires investors to keep the amount of provided incentives privately, as publicly shared might cancel out the advantages of the incentive buffer. As a result, public lease incentive information is very scarce and qualified as being sensitive and confidential information. (Harding, 2012)

As published or reported market rental prices by real estate agents are expressed by the combination of a rental price with a rental incentive, they create a distorted picture of the rental price development in the market. The published rent levels are known as the so-called *asked* or *face* rent levels, which are illustrated by the blue line in the opposite figure.

The combination of the provision of lease incentives by landlords, instead of adjusting their long-term rental rate; and the published face rental prices in the market, might explain the stable face rental price development in the market the last years.

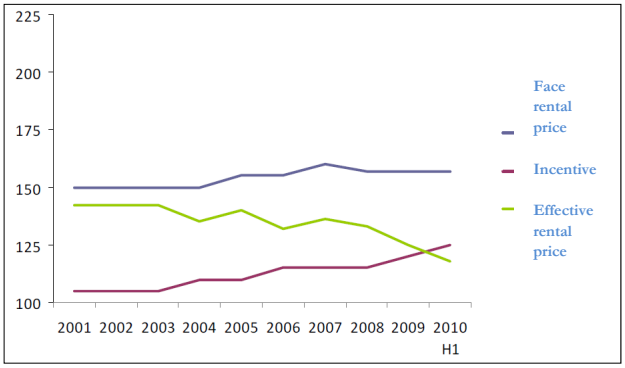


Figure 6. Schematic: underlying incentive and effective rental price development (Swagerman, 2010)

However, the true underlying *effective rental price* ((*"the contract rent yearly paid, corrected for [lease] incentives (in € per m2 LFA per year)" (van Gool, 2011))* development might differ from the published face rental prices and development in the market. This is illustrated by the green line in figure 6, which represents the underlying effective rental price development.
As a result, the relation with the vacancy rate in the market, might change when the vacancy rate is compared with the (real) effective rental price development in the market.

2b. Reported vacancy might not reflect the prevailing space market condition

Another reason for the paradoxical situation, is that the reported vacancy levels might not accurately reflect the prevailing space market condition, because figure 3. is distorted due to inclusion of obsolete office space. Vacancy in obsolete buildings might not lead to a downward price pressure on the office space market, because it is not considered a viable accommodation alternative by office space users. This is indicated by research of Koppels & Keeris (2006), which showed a stronger correlation between the rental price development and the vacancy rate, when the structural components of the vacancy rate were left out of the equation.

Other consequences of the in-transparency of the Dutch and Amsterdam office market

As almost all parties in the current real estate market provide incentives nowadays, the current situation seems to be a *self-sustaining system*: market conformity is expressed by a rental price in combination with a rental incentive

(Swagerman, 2010; van Gool, 2011). As the face rental prices remain relatively stable, *fluctuations* in the underlying incentive development currently dictate the underlying effective rental price development in the Amsterdam office market. This is illustrated by the purple line in figure 6.
The lack of information, especially due to the published face rental prices, can function as a barrier for entrants, outsiders and non-experienced participants in the market, for instance for international investors who are becoming more important in the Dutch real estate market nowadays. Accurate and reliable market data and price signals are important for a well-functioning and competitive real estate market, as they serve as input for real estate investments, for marking a well-considered value decision, for market analysis, etc. In contrast, the real estate industry has created a system with a lack of transparency, in which uninformed parties *can* be disadvantaged.

The current in-transparency, especially due to the published face rental prices has important research implications. Because real estate advisory firms and research institutes use published asked/face rental prices and contract rental prices for their publications or research - instead of effective rental prices – the outcomes provide an improper reflection of the current and historic real estate market development.
The overall market development based on face rents or contract rents including incentives might differ from the actual underlying development of the market, based on effective rent levels, which are excluded from incentives.
As data about incentives and effective rent levels are rather private, quantitative research about incentives and effective rent levels is hardly done. However, reliable research into the working of the real estate market is important to provide a clear market overview which is available for all actors in a competitive market, but also for policy and planning decisions for both public and private parties.

Problem definition

Research questions

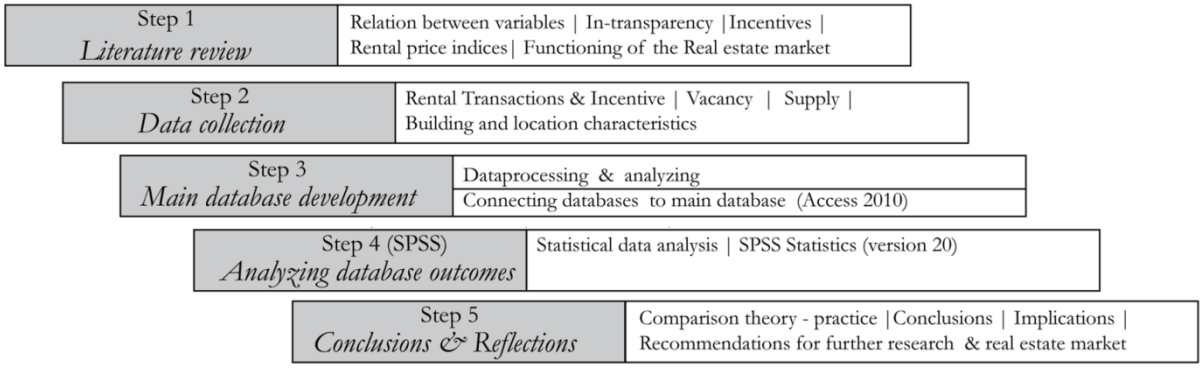
The problem analysis has led to the following main research questions:

1. "To what extend does a price index based on face rents, provide an accurate reflection of the market dynamics in the Amsterdam Office market over the period 2002 – 2012?"

2. "Do spatial market segments differentiate in market dynamics in the Amsterdam office market over the period 2002-2012?"

Research aim

1. *Set the next step in 'solving' the transparency problem in the Dutch real estate market, by giving openness about the underlying effective rental price and incentive development in the Amsterdam office (sub-)market(s), in order to make the office market more accessible and competitive for outsiders, entrants and non-experienced participants in the market*
2. *Constructing a '(real) effective rental price index' in order to provide an as market conform reflection of the market dynamics in the Amsterdam office market over the period 2002-2012*



Approach and methodology

Approach explained: data overview and data mining process

The figure above shows the approach followed during this research. The first two steps are self-explaining. During the third step the reliability of several data sources (which are shown in figure 8 on the next page) are analyzed. This

Figure 7. Approach / Research design

is followed by the development of a 'main' database from several individual data sources/databases. The individual databases are connected to the BAG (Basic registration of addresses and buildings in the Netherlands), by means of their address, place and postal code. This is followed by connecting the BAG database to the Total office stock database of the Delft University of Technology. This is a database of all *office buildings* in Amsterdam, including several building and location characteristics. This eventually results in one database with *listed* transactions, building and location characteristics *per office building* in Amsterdam, as shown in the figure below.

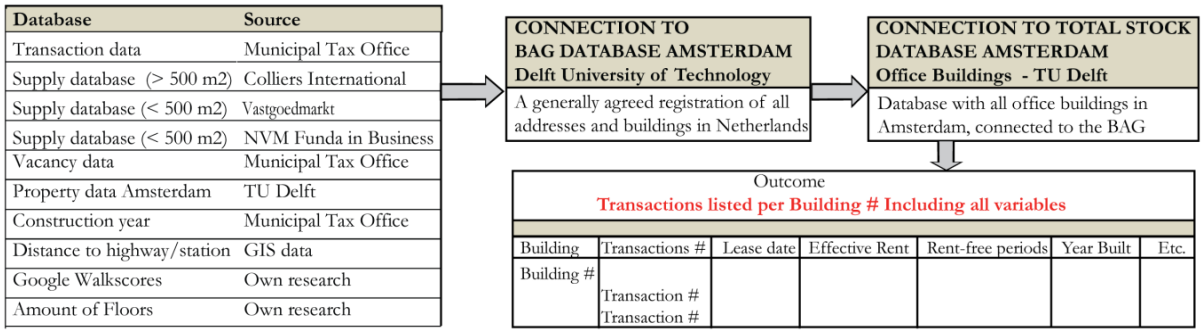


Figure 8. Overview data sources used in research & data mining process

In the fourth step, the statistical analysis is performed, which is divided in five individual studies, which are shown in the figures below. Per figure is mentioned which ***method*** is used. The methods are individually discussed in the second section (Part II- Problem definition) of this report.

In the final fifth step, the research questions are answered, the hypotheses are evaluated and the researched is reflected.

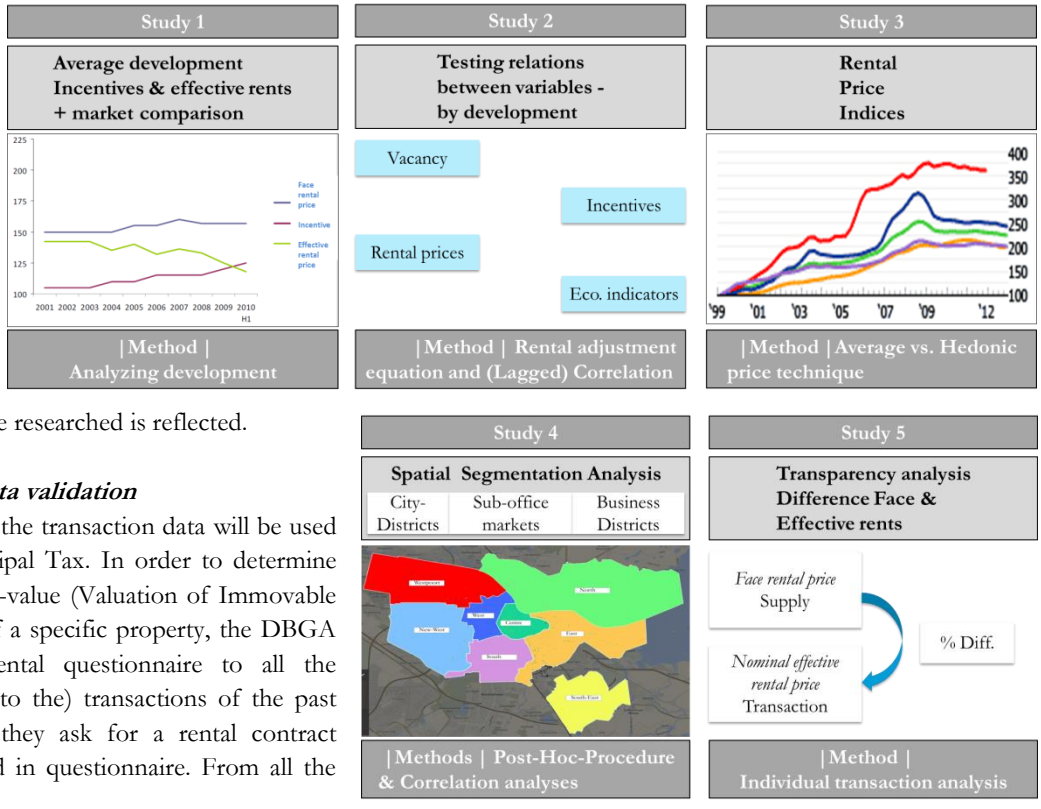


Figure 9. Approach step 4: Overview sub-studies

Transaction data validation

In this research, the transaction data will be used from the Municipal Tax. In order to determine the yearly WOZ-value (Valuation of Immovable Property Act) of a specific property, the DBGA sends out a rental questionnaire to all the (tenants related to the) transactions of the past year, in which they ask for a rental contract and/or the filled in questionnaire. From all the sent rental questionnaires they receive about 50-60% response, in which about 50% from the sent questionnaires also adds the rental contract. In this rental questionnaire the most important aspects of the transaction are requested, in order to give an as accurate possible assessment about the market conformity of the particular transaction. As a result, not only the start rental price, but also all type of incentives (rental discounts, rent-free periods, investments by the tenant/landlord) are requested.

This research uses only *accepted* market conform transactions of the Municipal Tax Office. The most important reasons for rejecting a transaction are based on the following main reasons: *1. Improbable sale or rental price; 2. Family transaction or 'possible' family transaction; 3. Multiple disciplines in rent; 4. Objects which are out of use; (5. Only a parking lot is rented).*

Calculating the effective rental price per transaction: DCF method

In this research the effective rental price is calculated per transaction, in which the initial contract rental price is corrected for parking lots and incentives.

In the calculations there is only corrected for two types of incentives, namely:

- *Rent-free periods (in months/years)*
- *Rental discounts (in Euros)*

in which there is assumed that all incentives are provided at the beginning of the contract term. In addition, there is assumed that investments by the landlord are already incorporated in the contract rent. Investments by the tenant are not taken into account, as there is assumed that the rental price is already negotiated after discussing the investments by the tenant. Furthermore, it is too difficult to make an accurate correction about the influence of investments by the tenant on the rental price.

The effective rental price (t=0) per transaction is calculated by means of the *Discounted-Cash-Flow* technique.

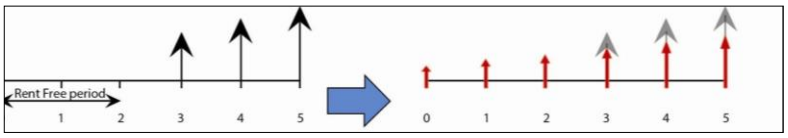


Figure 10. Rent free periods discounted over the entire lease period

In a DCF) calculation the future gross rental income is discounted to the present. In case of incentives, the incentives are discounted over the entire lease period, as shown in figure 10.

An Excel-Cash-Flow-template is developed, which calculates the percentage incentives and the effective rental price / m2 (**t=0**) per contract term, for each individual transaction.

In the DCF calculations, the Net Present Value (NPV) of the nominal contract rent including incentives (orange) is the **same** as the NPV of the effective rent calculated (**dark blue**). The light blue bars represent the contract rent excluding incentives. The amount of incentives is calculated as percentage difference between the NPV of the contract rent excluding and including incentives.

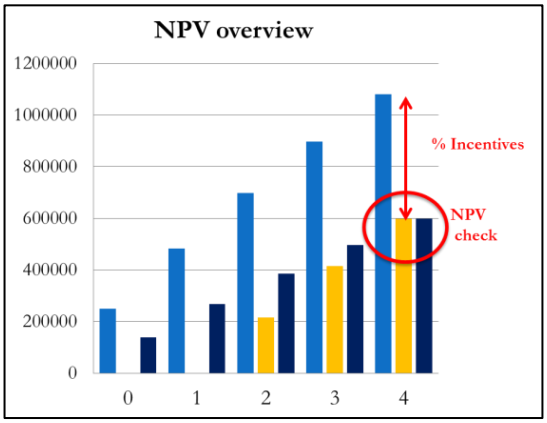


Figure 11. NPV check and % Incentives calculated per transaction

Explanations by literature

Market dynamic: cyclical behavior

The real estate market and especially the office market can be described as a cyclical market, in which supply, demand, prices and returns vary around their long term trend. The cyclical behavior of the office market gives inside in the functioning of the real estate market and the interaction with the broader economy. The opposite figure shows the different periods of the office market cycle, namely *recession, recovery, expansion* and *contraction*, per moment of the cycle (Theebe, 2013).

Figure 13. shows a typical phenomenon of the office market, namely the lag between demand and supply, in which the supply cycle is following the demand cycle. The vacancy rate is used as an indicator of the specific cycle position.

According to Witten (1987), it is important to realize that office markets are local markets, subject to local influences, in which office markets in different regions have local cycles. Research of Mueller (1995) showed that submarkets can move differently from the overall market cycle in the short run, but submarkets will typically trend with overall market movements in the long run. According to Hordijk (2005) the office market is the market with the most pronounced cycle,

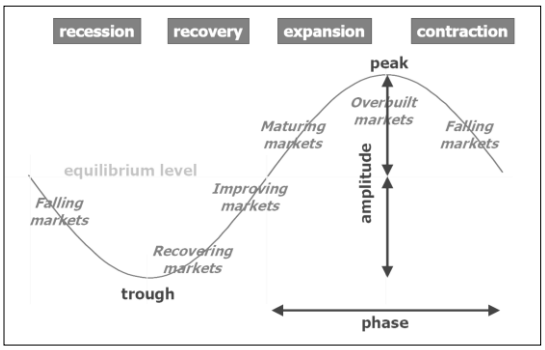


Figure 12 . The office market cycle (Theebe, 2013)

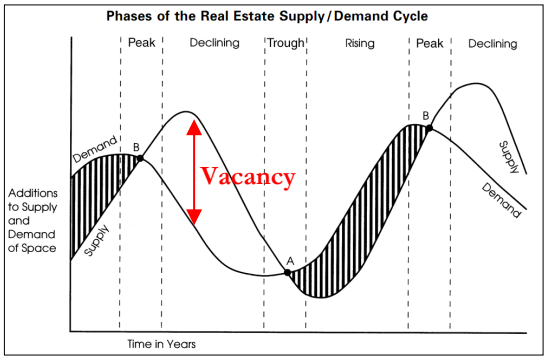


Figure 13. Demand/Supply curve (Phyrr, et al., 1999)

since office employment growth and economic growth are assumed to be closely linked.

The segmented and sub-office market behavior of office markets

As explained in the problem analysis, the real estate market is characterized by its segmented structure. According to Stevenson (2007) segmentation of the real estate market, can consist of two types: spatial segmentation and structural segmentation. Spatial segmentation is related to locational features, while structural segmentation is based on differences in property specific aspects.

Most office markets are modeled or described per country or city as a whole. As a result, the segmented structure of office markets is thereby ignored. Stevenson (2007) tested the interrelated rental adjustment process between four submarkets in the London office market. The outcomes showed several differences in characteristics between them, with one sub-market functioning as the prime submarket in London.

Research of Hanink (1996) showed that the regional office vacancy effect on rent levels is stronger than the national office vacancy effect in both downtown and sub-urban office markets. Jones (1995) implies that the sub-urban office market would be the most appropriate level for analyzing office market dynamics.

Research into sub-market behavior in the Netherlands is mostly done by Brounen and Jennen (2009, 2009a, 2009b). They found that clustering offices results in higher rents in the Amsterdam office markets, regardless of the prevailing economic conditions. They also described that office rents vary significantly across submarkets, with Amsterdam Centre and Amsterdam South as the most expensive markets.

The relation between vacancy and rent levels

Research of Koppels and Keeris (2006) showed a *two-year time-lag* between the *vacancy rates* and *rent adjustments*, which confirmed their hypothesis that landlords are reluctant to adjust their rental rates when there are fluctuations in the vacancy rate. In the same research another hypothesis was tested that *incentives* are *used for short-time price adjustments* and therefore should correlate with the vacancy rate without any time-lag. The *correlation analysis showed a strong correlation with the vacancy rate without a time-lag*. However, the rent levels used were not fully corrected for incentives. Their research therefore distorts the relation between both variables. Another hypothesis tested in this research was: real rent levels adjusted for incentives have a stronger relation with the vacancy rate then a non-adjusted rent level has. Due to insignificant outcomes and data there was no clear-cut answer possible to confirm or reject this hypothesis.

Research of Brounen and Jennen (2009a,b) showed that rents adjust to short-run changes in the economy. Their research also showed that second tier office markets show the same cyclical vacancy pattern as their related premier office markets, only less volatile. In contrast to Hendershott et al. (2009); Brounen and Jennen 2009b concluded that rental adjustments in the office markets are asymmetrical.

Research of Remøy (2010) showed that structural vacant offices do not have the building or location qualities to compete within a supply shocked market. This is in line with research of Koppels & Keeris (2006), which showed that the correlation between vacancy and real effective rents is higher when the structural components of vacancy are left out of the equation.

Rental price indices

Rental price indices can be distinguished by three main aspects, namely by *technique*, by *type of rents* and by *inflation correction*, as shown in the figure 14. The figure also shows the expected improved market realistic situation between each type of technique, type of rents or inflation correction.

The most important distinction in *technique* is based on a so-called quality adjustment, in which the

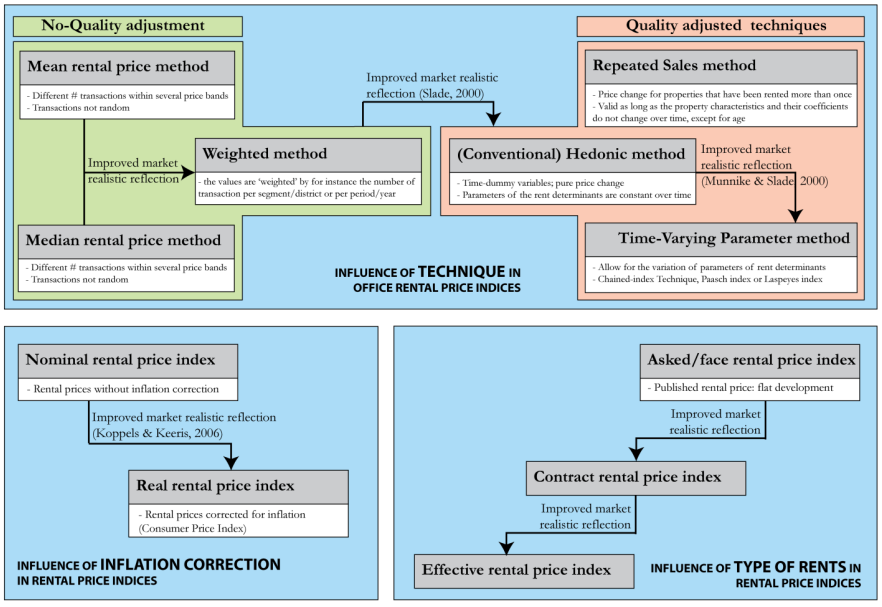


Figure 14. Different types of rental price indices

average rental price index is corrected for location and building characteristics over time.
This research compares the average rental price index technique with the time-dummy hedonic rental price index technique. The above figure indicates that the *real effective quality-adjusted rental price index* should provide the most realistic reflection of the market developments in the Amsterdam office market.

Empirical research

Data overview

The total transaction database of the Municipal Tax Office consists of 4413 office transactions in the period 2002-2012. In this research only accepted transactions (2957) by the Municipal Tax Office are used, which consists of about two-third (67%) of the total database.
From all the accepted transactions (2957), there are 2535 transactions with an 'available' Lettable Floor Area by the Municipal Tax Office.
From these available transactions with a lettable floor area, there are 464 transactions with a lettable floor area higher than 500 m2, which are most common for analyzing the commercial real estate market. Most theories and market reports about the global and national real estate/office market, are almost all related to the real estate/office market for transactions with an LFA > 500 m2. This study also researches the market segment below 500 m2, which is often ignored and less researched.

Contract Year	Count	Transactions LFA < 500 m2	Transactions LFA > 500 m2	Transactions with a known LFA
2002	378	247	53	300
2003	315	213	45	258
2004	342	231	43	274
2005	269	194	39	233
2006	325	239	53	292
2007	341	227	67	294
2008	288	189	50	239
2009	228	167	34	201
2010	187	142	30	172
2011	157	113	32	145
2012	127	109	18	127
Total #	**2957**	**2071**	**464**	**2535**

Study 1: Average incentive and effective rental price development in the Amsterdam office market

Incentives in the Amsterdam office market

The frequency analysis (not displayed) indicates that incentives are becoming generally acceptable and used in the Amsterdam Office market nowadays, as the ratio incentive transactions-total transactions in the researched database, has grown from 9% in 2002, till almost 45% in 2011 and 2012.

Average incentive development

Figure 15. shows an *upward-cyclical incentive development* in the Amsterdam office market over the period 2002-2012 for transactions with an LFA > 500 m2, from around 2% in 2002 till 15% of the contract rental price in 2012.
The high incentives the last years led to a large gap between contract and effective rental prices. The incentive development shows that incentives are provided at different moments of the cycle. The incentive development for transactions below 500 m2 also increases in the market the last years, till 3-4% in 2011-2012.

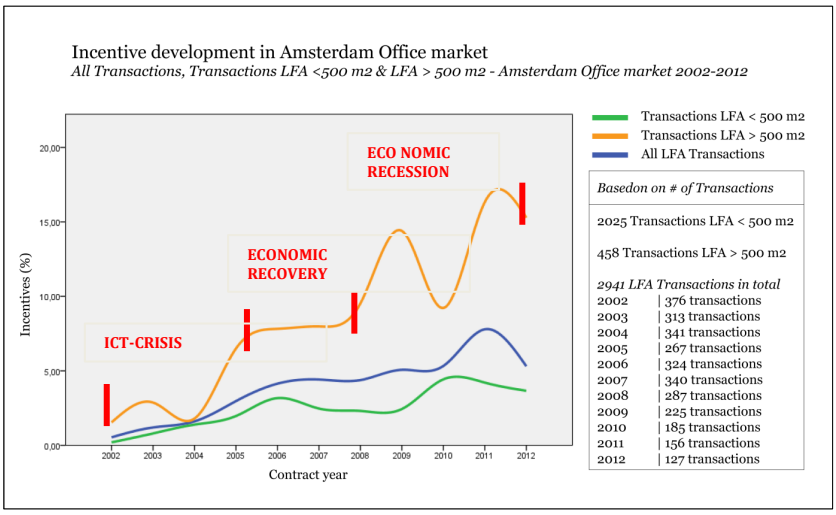


Figure 15. Incentive development in Amsterdam office market

The real effective rental price development

Figure 16. shows the real effective rental price development (orange and green) in the Amsterdam office market, compared with the real GDP Growth (blue bars), several important economic and market events (yellow) and the overall division in economic periods (van Eijk, 2012; dark grey).

The effective rental price *development* for transactions with an LFA below and above 500 m2, is really similar. One contradiction exists in the development of both rent levels, namely in the period 2003-2005. In this period the rental prices of larger transactions declined, while the rental prices of smaller transactions increased in the market. This might be explained by the so-called 'hog-cycle' (Dutch: varkenscyclus), which occurred in the market in this period, due to the rising supply and decreasing demand. As a result, investors had to decrease their rent level in order to attract tenants. It might have occurred that this influence was stronger for larger offices compared to smaller offices.

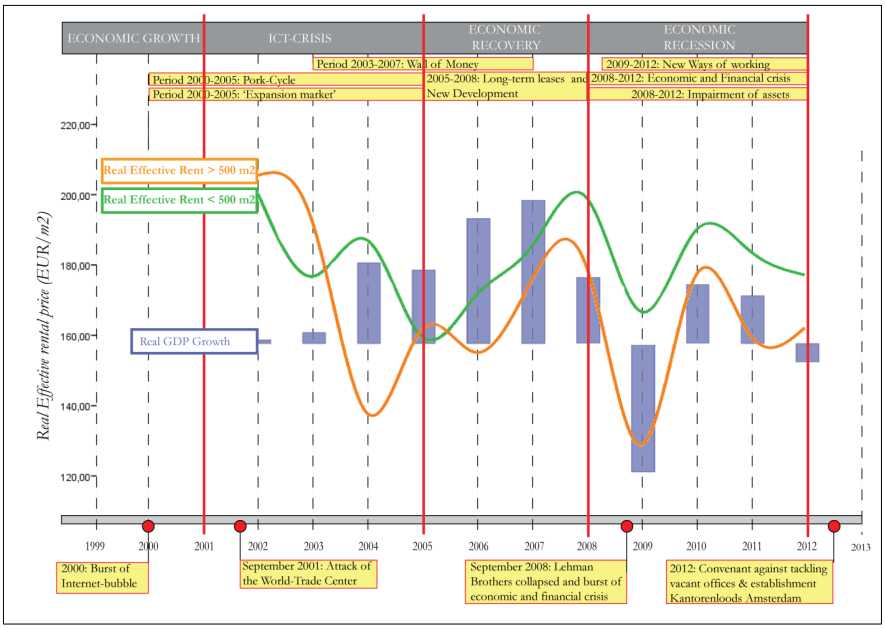


Figure 16. Average real effective rental price development in the Amsterdam office market

Overall the effective rent development is divided in three main periods; a strong decline in prices during the ICT crisis; a rise in prices during the period of economic recovery and a strong decline followed by a strong recovery during the period of recession.

Face rental price comparison market reports

The comparison between the face rental price development published in market reports (NVM Funda in Business, Bak; LFA > 500 m2) with the underlying contract and effective rental price development of this research, showed that the contract or effective rental prices are on average 15-23% lower compared to the face rental price development.

However, the *development* itself is comparable between the face rental price development and the contract or effective rental price development. This is confirmed by the significant correlation between the face rental price and the contract or effective rental price development. In contrast there are no significant correlations with published *prime* face rental prices in the market.

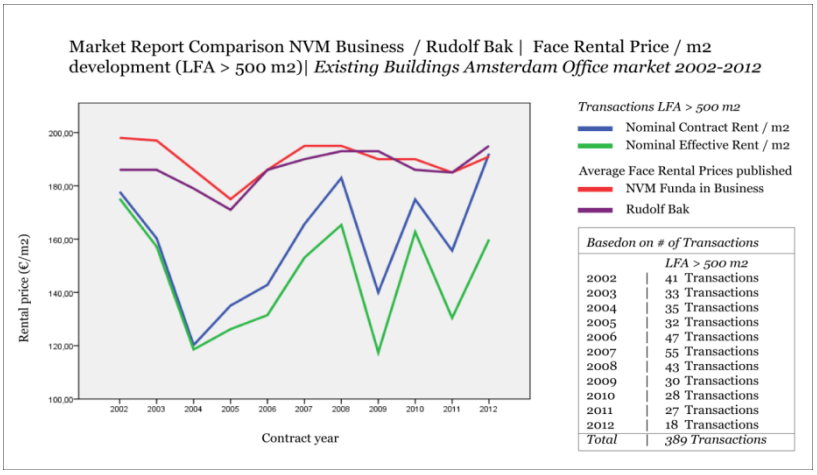


Figure 17. Face rental price comparison market report NVM Funda in Business

		Contract rents / m2 - Existing offices – LFA > 500 m2	Effective rents / m2 - Existing offices – LFA > 500 m2
NVM Face rents – Existing Offices	Pearson Corr.	,628*	,723*
	Sig. (2-tailed)	,038	,012
Bak – Face rents Existing Offices	Pearson Corr.	,647*	,421
	Sig. (2-tailed)	,031	,197
Prime Face rents BNP Paribas	Pearson Corr.	,539	,311
	Sig. (2-tailed)	,087	,353

Study 2: Average vs. Hedonic rental price indices

The second study compares the average ('mean') rental price index technique with the hedonic rental price index technique, between contract and effective rental prices. The literature review showed that the hedonic rental price index technique should be more market realistic compared to an average rental price index technique. Both rental price indices show a really cyclical behavior in rental prices in the market (figure 19), in which both rental price index techniques show a more or less similar 'overall' development.

Two contradictions exists between both real effective rental price developments, namely in the period 2003-2005 and in the period 2010-2012. In the latter period, the real effective rental price development in the 'average' rental price index is rather stable, while the 'hedonic' real effective rental price shows a decline and recovery in rental prices in this period. In the period 2006-2008, the 'hedonic' real effective rental price index shows a small lag compared with the 'average' rental price index based.
The average rental price index shows large deviation between real contract and real effective rental prices in 2011 and 2012; while the hedonic rental price index shows a large deviation in 2010 and 2011.

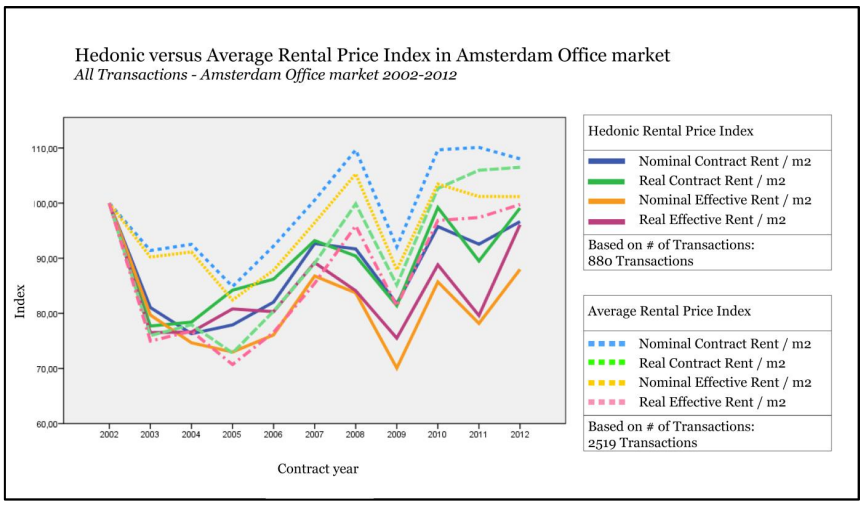


Figure 18. Average vs. Hedonic rental price indices

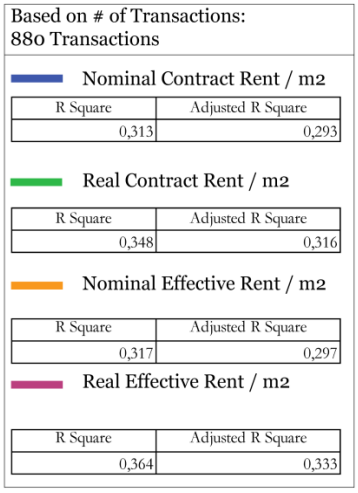


Figure 19. R-Square per rent level

The largest limitation of the hedonic rental price index technique in this research, is the small (adjusted) R-Square, which is around 0,3; which indicates that the independent variables (building and location characteristics; yearly time-dummies; and location dummies) in the model account for 30% of the variation in the dependent variable (rent levels). The remaining 70% of the variation might be explained by other variables which influence the dependent variable. In comparable hedonic rental price indices, similar indepent variables account for 70-90% of the total variance in the dependent variable, which should led to a more accurate reflection of the overall market developments.

Study 3: Testing relations between variables: Vacancy vs. Incentives and Rents

This paragraph compares the incentive and rental price development in the Amsterdam office with the vacancy rates published in the market. As different vacancy rates are published in the market, an *average vacancy rate* is constructed from all the individual vacancy rates, for this research.
In addition, as market reports only report vacancy rates of offices in Amsterdam with an LFA > 500 m2, the vacancy rates are only compared to the incentive and rent level development of transactions with an LFA > 500 m2.

Vacancy vs. Rental price

This research showed a stronger correlation of the vacancy rate with effective rent levels in the market compared to contract rent levels. In addition, the correlation between 'real' rent levels and the vacancy rate is higher than 'nominal' rent levels and the vacancy rate, which is in accordance with earlier research of Koppels & Keeris (2006).

The *real face rental price* showed to be a significant indicator of the rental adjustments in the Amsterdam office market, due to high correlation with the average vacancy rate.

		Real face rents / m2			Real contract rent / m2			Real effective rent / m2		
		No-time lag	*lag 1 year*	*lag 2 years*	*No-time lag*	*lag 1 year*	*lag 2 years*	*No-time lag*	*lag 1 year*	*lag 2 years*
Average vacancy rate market reports	Pearson	-,765**	-,698*	-,396	-,570	-,262	,405	-,751**	-,557	,047
	Sig. (2-	,006	,017	,258	,067	,436	,246	,008	,075	,898
	N	11	11	10	11	11	10	11	11	10

In addition, the correlation between the contract or effective rental price and the average vacancy rate, showed that the *real effective rent level* is also a significant indicator for rental price adjustments in the Amsterdam office market due to the stronger mutual correlation, compared to contract rental prices. This is in line with the rental adjustment equation (Hendershott, 2004).

The relation between vacancy and the rental price shows the highest correlation without a time-lag in each rent level. This is in contrary to earlier research of Koppels and Keeris in 2006, which found a two-year time-lag between the vacancy rates and rent adjustments. Their explanation for this behavior was that landlords are reluctant to adjust their rental rates when there are fluctuations in the vacancy rate.

Vacancy vs. Incentives

The incentive development is significant positively correlated with the vacancy rate in the market, in which the relation with the percentage incentives is the strongest with a two-year lagged vacancy rate, in each vacancy rate researched. This is in contrast to research of Koppels and Keeris (2006), which indicated that incentives are used for short-time price adjustments and therefore should correlate with the vacancy rate without any time-lag. In contrary to my results, they found a strong correlation between incentives and the vacancy rate without any time-lag.

		Percentage incentives		
		No-time lag	*lag 1 year*	*lag 2 years*
Average vacancy rate market reports	Pearson Correlation	,523	,678*	,714*
	Sig. (2-tailed)	,098	,022	,020
	N	11	11	10

Study 4: Spatial segmentation analysis

The spatial segmentation analysis is divided in two main researches, namely an analysis of the incentive and the nominal effective rental price development per city-district, sub-office market and business-district.

Incentive analysis – spatial segmentation

The height of incentives differs per city-district, sub-office market and business district the last years. However, a correlation analysis showed that the *development* of incentives over the entire period is very similar per city-district and sub-office markets.

In general, the incentives in Amsterdam South(-Axis), Amsterdam West and Amsterdam South-East are most of the time significantly higher compared to other city-districts or sub-office markets.

The correlation analysis per business district showed that the incentive development is (more or less) similar for each other in the surrounding areas. For instance, the incentives in the three business districts located in the Centre of Amsterdam are all (significantly) mutually correlated. Furthermore, the incentive development in Amsterdam Teleport and the surrounding Sloterdijk Business district are also (significantly) mutually correlated.

This research also showed that the incentive development in the most important business district in Amsterdam, the South-Axis, WTC, RAI district significantly correlates with other important business districts, namely Teleport, Arena/Bijlmerplein and the Canal District area.

Real effective rental price analysis – spatial segmentation

The effective rental price analysis showed that the rental price levels significantly differ per city-district, per sub-office market and per business district in Amsterdam the last 10 years. The correlation analysis showed - in contrast to the incentive analysis – only some significant correlations in development between city-districts, sub-office markets and business districts in real effective rental price development. The real effective rental price correlation analysis indicates that spatial market segments mostly differ in market dynamics in the Amsterdam office market over the period 2002-2012. In line with the incentive analysis, the business district analysis showed that the three surrounding business districts in City-District South-East are all significantly correlated.

In line with research of Brounen and Jennen (2009), the rental price level in Amsterdam South-Axis, WTC, RAI; the Vondelpark and the Canal district are significantly higher compared to the other business districts, in which the difference between the South-Axis and the other districts is growing the last years.

Study 5: Transparency analysis; difference between face and effective rental prices

The 'transparency' analysis compares individual face rental prices when an office is for rent, and the effective rental price at the moment of the transaction. The supply databases of Colliers International and the (online) supply database of the Vastgoedmarkt are used for the comparison (LFA > 500 m2).

From the 458 transactions with an LFA above 500m2; *238 transactions* were initially connected with an associated face rental price in the market. While connecting the face rental prices with the effective rent transactions, one major implications made it difficult to make an accurate comparison of the difference in rental price per transaction:

- Most of the time more square meters were available for rent, but only a small amount is rented by the tenant, which most of the time changes the height of the rent level. The other way around also occurred, with less square meter for rent; compared to higher square meters rented at the moment of the transaction.

In order to provide an accurate conclusion about the overall difference between face rental prices and effective rental prices in the market, the following transactions are deleted from the sample:
- LFA (m2) of Transaction Rent ≥ 25% LFA (m2) of Face Rent
- LFA (m2) of Transaction Rent ≤ 100% LFA (m2) of Face Rent

As a result, more than 50% of the associated transactions are deleted from the sample and only *106* accurate transactions are left in the final sample. From these 106 transactions there can be assumed that the effective rental price of the transaction corresponds with the face rental price on the market.

The results of the 106 transactions show that the difference between face rental prices and effective rental prices is on average *around 20 per cent* in the sample. The median and mean of the difference between asked rental prices and effective rental prices do not really differ from each other. The overall box plot indicates that 50% of all the values are between a 5% difference and a 40% difference in rental prices.

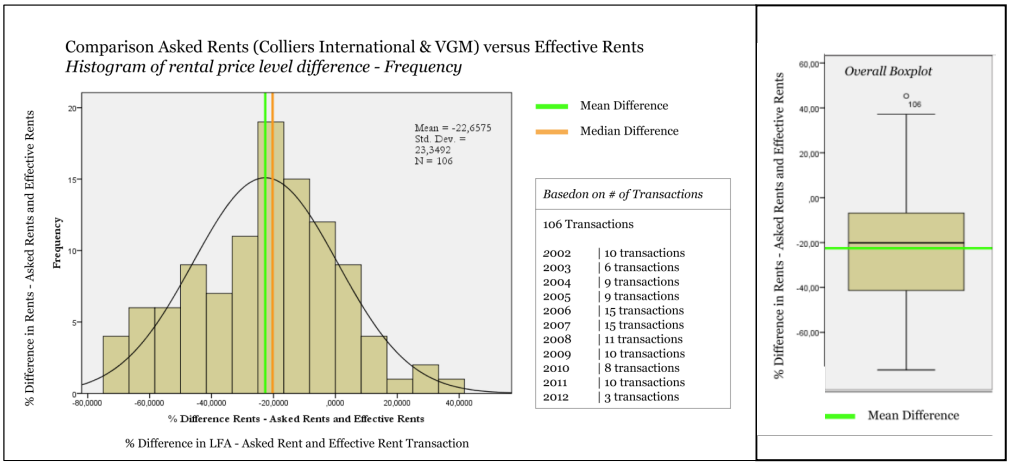


Figure 20. Individual transaction analysis: face vs. effective rental prices

The literature review showed that an effective rental price index should provide a more market realistic reflection, compared to a rental price index based on face rents. This is more or less proved in this research due to the following reasons:

Conclusions

1. "To what extend does a price index based on face rents, provide an accurate reflection of the market dynamics in the Amsterdam Office market over the period 2002 – 2012?

1. The comparison between the face and effective rental price development in the Amsterdam office market showed that the average effective rental price development is about 23% lower compared to the face rental price development for existing offices. This is in line with the individual transaction analysis which showed an average difference of 20% between both rental prices.

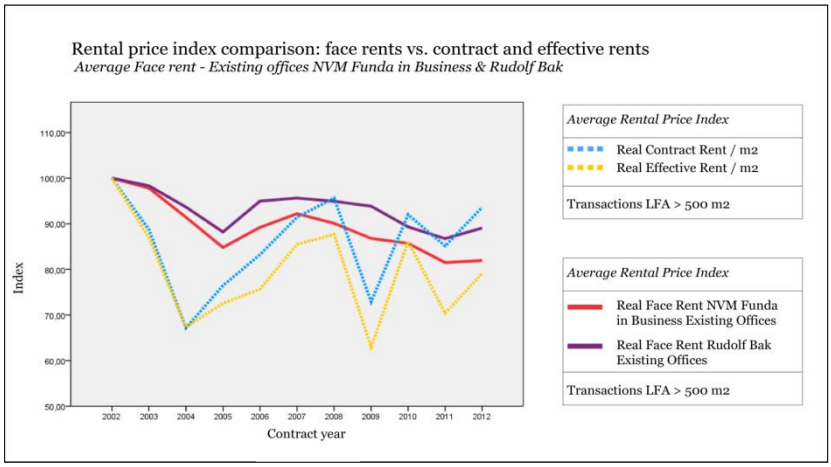


Figure 21. Average face rental price vs. contract and effective rental price index comparison

In contrast, the correlation analysis showed that the *development* itself is comparable, due to the significant correlation between the face rental price development and the contract or effective rental price development. In contrast, the comparison with the *prime* rental

price development showed no significant correlations in development with both the contract or the effective rental price development.

2. The rental price indices constructed in this research showed that either a rental price index based on *prime* face rental prices published in the market, as well as rental price indices based on *average* face rental prices for *existing* offices differ from the more realistic contract and effective rental price developments in the Amsterdam office markets over the period 2002-2012. Both face rental price indices show a less volatile *face* rental price index compared to the contract or effective rental price index in the market. Furthermore, the rental prices indices based on contract or effective rents are more cyclical compared to the face rental price indices.

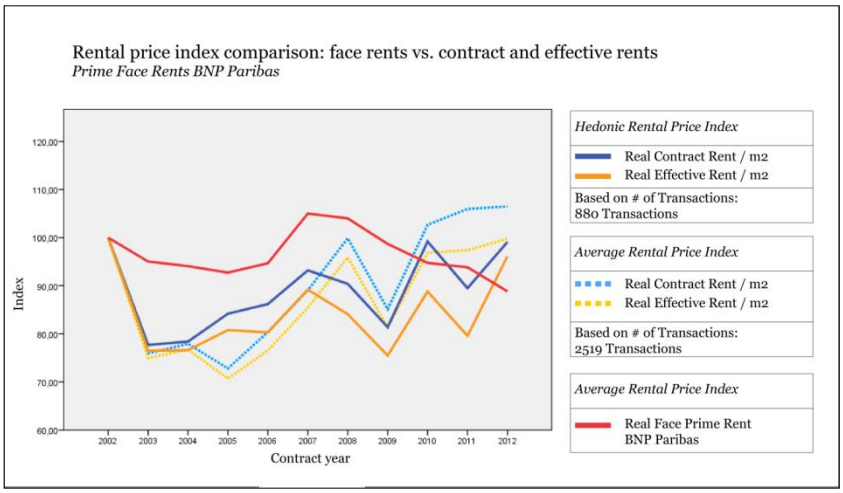


Figure 22. Prime face rental price vs. contract and effective rental price index comparison

3. Testing the relation between vacancy and rents showed that the *real face rental price* is a significant indicator of the rental adjustments in the Amsterdam office market, due to high correlation with the average vacancy rate. In addition, the correlation between the contract or effective rental price and the average vacancy rate, showed that the *real effective rent level* is also a significant indicator for rental price adjustments in the Amsterdam office market due to the stronger mutual correlation. The latter is in line with the rental adjustment equation (Hendershott, 2004).
This research indicates that both the real face rental price as well as the real effective rental price are significant indicators for analyzing rental price adjustments in the Amsterdam office market.

As a result, their can be concluded that rental price indices based on face rents do not provide an accurate reflection of the market dynamics in the Amsterdam office market over the period 2002-2012. Although the development between face rental prices and effective rental prices is similar, and the relation between face rental prices and the vacancy rate is significant; this research showed that the *(real)effective rental price* is a better indicator of the market dynamics in the Amsterdam office market, especially due to the large difference between face and effective rental prices in the market.

2. Do spatial market segments differentiate in market dynamics in the Amsterdam office market over the period 2002-2012?

This research showed no unambiguous answer to this question. The spatial segmentation analysis showed that the *height* of incentives differs per city-district, sub-office market and business district the last years. However, the correlation analysis showed that the *development* of incentives over the entire period is very similar per city-district and sub-office markets. As a result, the incentive analysis indicates that spatial market segments do not differentiate in market dynamics in the Amsterdam office market over the period 2002-2012. This is proved by the business district analysis, as the incentive development in the South-Axis, WTC and RAI district is significantly correlated with other important business districts, namely Teleport, Arena/Bijlmerplein and the Canal District area.
In addition, the correlation analysis per business district showed that the incentive development is similar in several surrounding business districts, which indicates that market dynamics in surrounding areas are comparable.

The effective rental price analysis showed that the rental price levels significantly differ per city-district, per sub-office market and per business district in Amsterdam the last 10 years. The correlation analysis showed - in contrast to the incentive analysis – only some significant correlations in development between city-districts, sub-office markets and business districts in real effective rental price development. The real effective rental price correlation analysis indicates that spatial market segments mostly differ in market dynamics in the Amsterdam office market over the period 2002-2012. In line with the strong correlation between surrounding districts in the incentive analysis, the business district analysis showed that the three surrounding business districts in City-District South-East are all significantly correlated in real effective rental price development.

Reflection on - and limitations of - research outcomes

The most important limitation of this research is that only *accepted* market conform transactions from the Municipal Tax office are used, instead of the entire transaction database. This database consists of only 1/5th of transactions with an LFA above 500 m2, of which most theories and market reports in the real estate market are based.

Furthermore, this research uses a general incentive correction for all transactions, instead of analyzing each transaction individually. In addition, in calculating the effective rental price, only rent-free periods and rental discounts are used as incentives. As a result, the amount of incentives might be higher when all transactions were individually analyzed, and all other incentives were also taken into account.

As there are different vacancy rates in the market, other vacancy rates might provide different relations with the incentive development or the rental prices in the market. Furthermore, in the rental adjustment formula the actual vacancy rate is compared with the natural vacancy rate. This research only uses the actual vacancy rate in the calculations. This research indicates that both the real face rental price as well as the real effective rental price are significant indicators for analyzing rental price adjustments in the Amsterdam office market. This is in contrast to the rental adjustment equation, which indicates a stronger relation with real effective rent levels in the market. This difference might be explained by the following aspects: the small amount of transactions with an LFA > 500 m2 in the database; the vacancy is compared with the average rental price development for existing offices insteadof the entire market; or the current scale level (city-wide) is not the most appropriate scale level for evaluating the relation between both variables.

The hedonic rental price analysis has a Low R-Square (max. 0,33). This might be explained by the small amount of transactions with an LFA > 500 m2 or because there are also transactions included with an LFA < 500 m2. As a result, the cyclicality, development and market realistic situation might change in a model with a higher R-Square.

In the transparency transaction analysis, only 106 accurate transactions are connected. This amount is too few in order to provide an accurate conclusion about the *difference* between the face rental prices and effective rental prices in the market. This is similar for the *development* of both rental prices.

Recommendations for further research

This research could be extended by researching the relation between the (real) effective rental price and the vacancy rate per city-districts, sub-office markets and business districts in the Amsterdam sub-office markets. Furthermore, this research could also be conducted for other market segments, for instance the retail market, in order to research the in-transparency by means of the incentive and effective rental price development.
It is also interesting to research the determinants (building and location characteristics) in an (real) effective rental price index compared to a (real) contract rental price index.
In addition, the research could be improved by adding non-accepted transactions to the research, in order to have a larger database, especially for transactions LFA > 500 m2, or analyzing each transaction individually in order to calculate the 'true' incentive percentage in the Amsterdam office market.

Recommendations for the real estate market

In order to increase the transparency in the Dutch real estate market, all regular players should publish effective rental prices in the market. A transparent real estate market will lead to a better functioning, and more competitive real estate market, which is also more attractive for foreign investors. Currently some institutions are publishing effective rental prices, although it could never be validated whether a rental price is an effective rental price or a face rental price in the market. As all regular players in the real estate market, have a knowledge advantage due to the in-transparency in the market, I expect that this is really difficult to implement.
As a result of the in-transparency in the market, I would recommend all Municipal Tax offices in the Netherlands, to publish their average calculated market conform effective rental prices per office building or per sub-area in the market. In my opinion, this is the ideal first step to make the office market more transparent. In my opinion, when the market conform rental prices of the Municipal Tax Offices are available for all actors in the market, this might trigger all other regular and private parties to publish effective rental prices (and market conform incentives) in the market. As a result, this will eventually led to a better functioning, more competitive and more transparent office market which is accessible for all actors with an interest in the Dutch real estate market.

Preface

In order to accomplish the Master of Science-degree at the Delft University of Technology, a graduation research is conducted. This graduation report describes the findings of a research in the area of Real Estate Management, section Building Economics.

The subject of this research is based on a small news-item on AT5, the Dutch TV Channel of the city of Amsterdam on August 9, 2009:

"Through the economic recession, office rents in European cities fell by an average of 15.4% compared to last year, in contrast to the Amsterdam office market. This is shown by a report by broker Jones Lang LaSalle. Moscow has the hardest decline with as much as 30%. In Amsterdam the rental prices remain more or less stable. However, a remarkable fact is that there are many vacant offices in the city" (AT 5, 2009)

The Dutch and Amsterdam office market is characterized by large fluctuations in vacancy rates the last 10 years. Especially during the burst of the ICT-bubble (2001-2003), and the moment before and at the start of the economic recession (2007-2009), the vacancy rates increased a lot in the market. However, a 'paradoxical situation' occurred as the reported average rent levels do not demonstrate the sever price decrease one might expect, as the opposite figure indicates. In contrast, the rent levels remain relatively stable in the market.

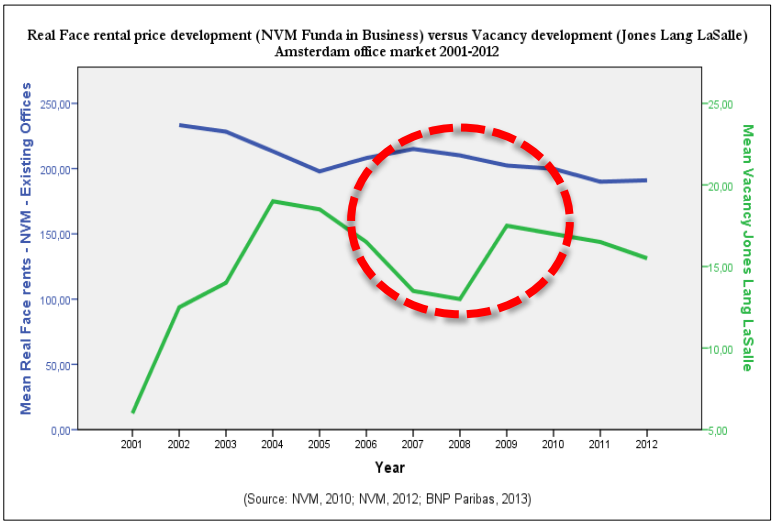


Figure 23. Paradoxical situation in Amsterdam office market

One of the explanations for this occurrence is due to the provision of so-called *incentives* by landlords instead of decreasing their rental price. As rental prices published are not corrected for these incentives, the rental price development remains on a relatively stable level, as shown by the blue line in the opposite figure.

However, the true and *underlying* rental price *corrected* for incentives might differ from the published rental prices. In addition, the *underlying* rental price development might indicate a more realistic relation with the vacancy rate in the Amsterdam office market.

This master thesis will research this interesting phenomenon in the Amsterdam office market over the period 2002-2012.

Delft, April 2014

Ruud Boots

Word of thanks

Cyclicality, not only one of the main research subjects of this report. In my opinion, cyclicality is also a comprehensive description of my entire graduation process, as many ups and downs alternated each other. This influenced not only my behavior, but also many other people during my graduation process. As a result, I would like to thank some persons in special.

At first, I would like to thank all my colleagues of my internship, but in special Sander Sijm and Henk Balke, for providing me the opportunity to graduate at the Municipal Tax Office. Not only it enabled me to provide the necessary transaction data for this research, it also gave me a very pleasant work environment, with many interested colleagues eager in helping me whenever I asked. The contribution I got from everyone was really encouraging.
I really want to thank Sander and Henk for the confidence provided, even though my research took longer than expected. Furthermore, I would like to say sorry for my worse communication sometimes during the entire graduation process.

Next to the Municipal Tax Office, I would like to thank Colliers International, NVM Funda in Business and the Vastgoedmarkt, for providing additional data for this research.

In addition, I would like to thank my mentors Hilde and Philip. Not only for their essential feedback during the graduation period, but especially for my behavior during the graduation process. You were always positive and encouraging during my graduation process, which helped me a lot. Because of this I would really like to say sorry for always promising to send my report prior to the feedback meetings, and never did.

At last I would like to thank especially my parents, my sister and my roommates for all their support, helping me through this long and exhausting graduation process.

Readers' Guide

This master thesis is divided into four main parts:

I. Research proposal
II. Theoretical framework
III. Empirical research
IV. Conclusions, Reflections and Recommendations
V. References
VI. Appendix

In Part I, the research proposal is described. The first part includes the problem introduction, analysis and definition, hypotheses, the research' relevancy, the research methods and products used, and finally the research design. The research proposal will form the basis of the conducted research in the rest of the report.

Part II consists of the theoretical framework. The theoretical framework will form the outline of the conducted research and will consist of a literature study on the major findings and conclusions.

Part III describes the results of the done empirical analysis, including data description, analysis and outcomes. In this part, the conclusions from the theoretical framework will also be compared with the results in practice.

Part IV describes the main conclusions, reflections on the research conducted, and recommendations for further research will be provided.

Definitions

The market rent: : the expected gross yearly rent (in € per m2 LFA per year) excluding VAT and service costs for the specified real property space in the current marketplace assuming an optimal marketing, a willing market and rented out to the highest bidder. (van Gool, 2011)

Face/asked rent level: is the rent level published in media and/or the asking price rent (in € per m2 LFA per year)

Contract rent level: the gross yearly rent (in € per m2 LFA per year), which is contractually agreed to be paid, without [lease] incentive correction" (van Gool, 2011).

Effective rent level: the contract rent yearly paid, corrected for [lease] incentives (in € per m2 LFA per year) (van Gool, 2011)).

Vacancy rate: the percentage of built space in the market that is currently unoccupied and available for rent. (Geltner, et al., 2007)

Real GDP Growth; the annual growth rate in Gross Domestic Product measures the increase in value of the goods and services produced by an economy over the period of a year. The 'Real' GDP Growth is the GDP Growth adjusted for inflation or deflation.

Unemployment rate in Amsterdam; the percentage of unemployed labor force as a percentage of the total labor force in Amsterdam (Centraal Bureau Statistiek, 2013)

Consumer Spending; is the amount of money that households spend on goods and services in order to satisfy their needs. (Tradingeconomics.com, 2013)

Consumer Confidence ; is an indicator designed to measure the degree of optimism that consumers feel about the overall state of the economy and their personal financial situation. How confident people are about stability of their incomes determines their spending activity and therefore serves as one of the key indicators for the overall shape of the economy. (Tradingeconomics.com, 2013)

Lease incentives: "A lease incentive is any factor (financial or nonfinancial) -apart from the contract rent and general asset quality- that enables or motivates a particular housing decision*"* (Harding, 2012)

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I - Research Proposal

1. Problem Analysis

1.1. The theoretical relation between vacancy and rents

1.1.1. The Four-Quadrant model: the theoretical relation between office stock and the rental price

The general and theoretical functioning of the real estate market is schematically illustrated in the Four-Quadrant model (Wheaton and DiPasquale , 1992), as shown in figure 24. In this model, the real estate market is divided in multiple market segments, like the tenant or user market, the investment market, and the construction market, with mutual interactions between all the different segments by means of the continueas adjustment between demand and supply.

This research focuses on rental transactions in the 'space/rental office market; between landlords and tenants, which is shown by the green surface in the Four-Quadrant model. Figure 25 shows the space market quadrant of the Four-Quadrant model more in depth. The space market demand curve shows that in a well-functioning space market, when the demand increases, the real effective rent level should decrease in the market, and vice versa.

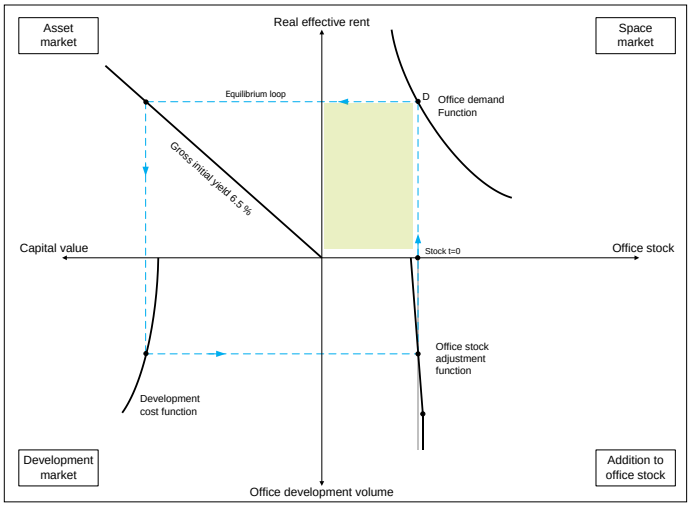


Figure 24. Four-Quadrant model (DiPasquale and Wheaton, 1992); modified by Koppels and Soeters (2008)

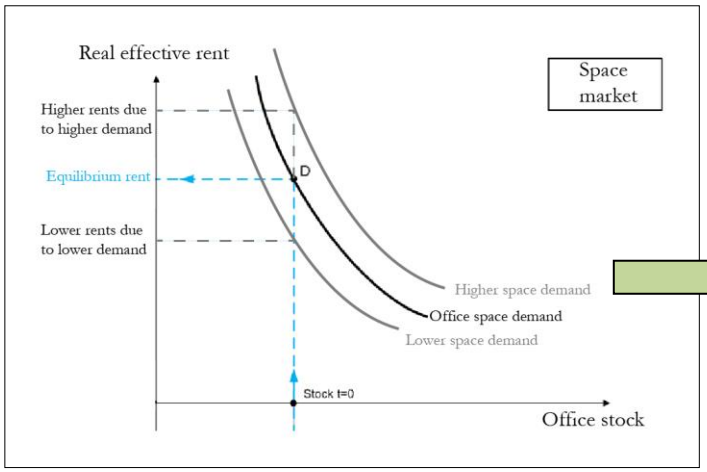


Figure 25. Space market Quadrant of Four-Quadrant model (DiPasquale and Wheaton, 1992); modified by Koppels and Soeters (2008)

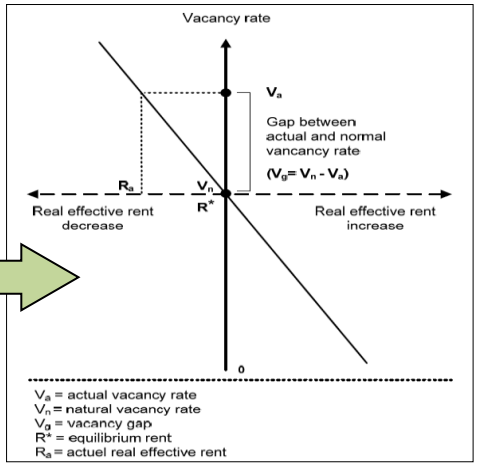


Figure 26. Rental Adjustment Equation (Hendershott, 2004); schematically illustrated by Koppels & Keeris (2006)

The supply curve reflects that in the short term, supply is inelastic or unable to anticipate demand. When the demand for office space changes, the equilibrium rent will adjust quickly in the short-term in order to balance demand and supply, which results is under- or overshooting. In the long run however, supply is capable to adjust to market demand. Hence office rents will likely recover to their long run level, counterbalancing the short term overshooting. This results in dynamics in the development of office rents.

1.1.2. Rental adjustment equation: the theoretical relation between vacancy and the rental price

The vacancy rate can be used as an indicator of the prevailing market conditions. The relation between vacancy and the real effective rent level is based on the so-called '*rental adjustment equation*' (Hendershott, 2004):

$$\frac{(R_t - R_{t-1})}{R_{t-1}} = \lambda\,(V_n - V_a) \Rightarrow \Delta R = \lambda\,(V_n - V_a) \qquad \textit{(Hendershott, 2004)}$$

R = Real rent; V_n = natural vacancy rate; V_a = actual vacancy rate; λ = adjustment factor

In line with the relation between the changes in office stock and the real effective rental price from the Four-Quadrant model, the rental adjustment equation shows a *linear* relationship between the actual vacancy rate (compared to the natural or long-term vacancy rate in the market) and the real effective rent level, which is schematically illustrated in figure 26. by Koppels & Keeris (2006). This indicates that in a well-functioning market; when the vacancy rate increases (compared to the natural or long-term vacancy rate); for instance due to an economic decline; normally leads to a downward price-pressure and lower (real effective) average office rent levels, and vice versa.

However, as the figure in the introduction indicated, the reported rent levels do not demonstrate the expected price decrease in the Amsterdam office market.

1.2. The main reasons behind the paradoxical situation

The paradoxical situation between vacancy and the rental prices in the Amsterdam office market can be explained by two main market imperfections:

1. The segmented/sub-market behavior of office markets, with heterogeneous products
    a. The scale of the analysis might not reflect the actual market process.

2. Reasons related to the in-transparency or asymmetric information availability in the Amsterdam office market
    a. Published *face* rental prices in the market
    b. Reported vacancy rates might not reflect the prevailing space market condition

In the following paragraphs, both reasons will be explained in depth. After discussing the reasons related to the paradoxical relation between the vacancy rate and the rental price, other consequences of the in-transparent behavior of the Amsterdam office market will be explained.

1.3. Reason 1: Segmented/sub-market behavior of office markets

The first reason for the paradoxical situation is that the scale of the analysis might not reflect the actual market process. Real estate markets are characterised by its spatial and structural segmented structure, due to their (interrelated) sub-market behaviour and the heterogeneity of its assets. However, most studies model the market as a whole, thereby ignoring the segmented structure. (Stevenson, 2007).

Different market trends might occur per market segment, which is illustrated in the opposite figure. As a result, the relation between the rental prices and the vacancy rate in the market might differ per scale level (for instance differences in relation with a national level, compared to a city-wide or city sub-market levels) in the market. However, there is no unambiguous answer on which scale level is the most appropriate scale level for evaluating the relation between both variables.

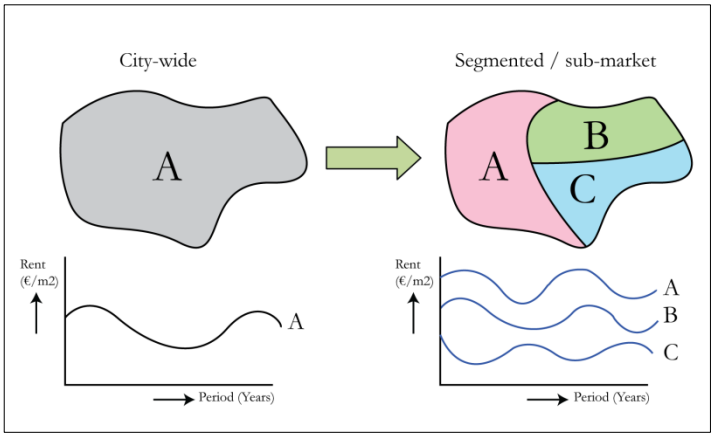


Figure 27. Spatial segmentation/sub-market behavior of office markets: different market trends per market segment (example: rent development)

1.4. Reason 2: In-transparency or asymmetric information availability in the Amsterdam office market

1.4.1. The Dutch real estate market: limited / in-transparent

Overall, the Dutch real estate market is considered transparent compared to other countries in the world, which is indicated by the latest 'Global Transparency Index 2012', developed by real estate advisor Jones Lang LaSalle. In this index the Netherlands is ranked in the fourth place globally, which indicates a 'highly transparent' state of the market (Jones Lang LaSalle, 2013).

However, several aspects of the Dutch real estate market can be characterised as 'limited or in-transparent'. As a result, this research will only focus on the so-called 'transaction transparency', as several transaction details are limited or almost not available in the Dutch real estate market nowadays. In addition, due to the associated limited accessibility of data, this research focuses on the most important (commercial) real estate market in the Netherlands; the Amsterdam office market.

Although the information is limited or non-available for several actors in the market, the demand and the relevance of this information is particularly high. Within all large institutional real estate investors, financial institutions and large real estate advisors there are active researchers which identify and analyse transactions. They are constantly collecting and processing information, in which a lot of ('transaction') costs are involved. However, the same large real estate investors and real estate advisors are reluctant or unwilling to share details about these transactions with the market. As a result, this phenomenon ensures that the transparency in the property market stays on a limited level for years now. (Elferink, 2012)

1.4.2. Asymmetrically distributed information in general

Not sharing knowledge on completed transactions means that information is '*asymmetrically distributed*' in the real estate market. Asymmetric information occurs when one side of the market is less well-informed than the other, and therefore leads to a knowledge advantage (Barr, 2000). Parties who have been involved in transactions have a knowledge advantage relative to parties which are not involved. In the Dutch real estate market information about several transaction aspects are only available by a small number of parties will influence the price formation process and can be considered as market imperfections.

The main reasons behind the in-transparency and the asymmetrically distributed information in the Dutch office market are the knowledge advantage, taking advantage of ignorance of other parties, the risks associated with the publicity of a subsequent negotiation, or the fear of attracting more competition. Other reasons are privacy issues, the fact that there is nothing directly in return, or the fear of misinterpretation of data. (Elferink, 2012).

1.4.3. Indicators of transaction-transparency

Elferink (2012) researched the publicly available information of eight core-aspects of a transaction, based on the 75 largest retail, office and logistics transactions. In his research he made a distinction between transparent (>50% available in all transactions), semi-transparent (25-50% available in all transactions) and in-transparent (0-25% available in all transactions) transaction aspects.
His research showed that the following aspects were in-transparent: *incentives, (effective) rental income, market rents, yields and lease terms*. Vacancy and transaction prices per floor area can be seen as semi-transparent. The tenant which rents the building is most of the time available and is therefore transparent.
This master thesis will focus on two main in-transparent transactions aspects, namely lease incentives and the effective rental price. As incentives mainly influence the other in-transparent and semi-transparent aspects, the other aspects will indirectly be discussed.

In the following paragraphs the underlying reasons and associated consequences behind the current in-transparency of the Dutch and Amsterdam Office market will be described:

1.5. Reason 2a: Published *face* rental price in the market

The first reason related to the in-transparency or asymmetric information availability in the Amsterdam office market is caused by publishing so-called *face* rental prices in the market. Reported market rent levels (face rental prices) by real estate agents are expressed by the combination of a rental price with a so called *lease incentive*, which creates a distorted picture of the market rental price (development) in the Dutch office market. This paragraph will explain this phenomenon more in depth.

1.5.1. Lease incentives defined

One of the *causes* of the current in-transparency in the Amsterdam office market is due to the provision of so-called *lease incentives* by landlords instead of adjusting the long-term rental rate. In general, lease incentives are defined as

"*any factor (financial or nonfinancial) that enables or motivates a particular course of action, or counts as a reason for preferring one choice over alternatives. It is an expectation that encourages people to behave in a certain way*." Sullivan (2003)
Applied to real estate this definition is somewhat different. According to Muijsson (2010) lease incentives are *"a factor, financial or non-financial, which enables or stimulated a certain housing decision"*. Furthermore, Harding (2012) defines lease incentives as: *"A lease incentive is any factor (financial or nonfinancial) -apart from the contract rent and general asset quality- that enables or motivates a particular housing decision"*

In this thesis the definition of Harding (2012) will be used.

1.5.2. The purpose of providing lease incentives by landlords

The use of incentives has become a major factor in the Dutch real estate market the last years. The most common lease incentives in the Netherlands are one (or more) rent-free period(s), a rental discount or a contribution to the furnishing costs.

Incentives as negotiation tool

According to Swagerman (2010) the main purpose of providing incentives is to simplify the negotiations between the potential tenant and the property owner. Furthermore, research of Muijsson (2010) and Swagerman (2010) showed that the system of incentives is more or less based on trying to get advantage out of creating in-transparency.

Offering incentives by the landlord will facilitate the tenant to move to a particular building. In general, the transaction costs of a moving exercise are quite high and obtaining capital can be quite problematic. As a result, the landlord will offer the tenant to pay for these costs as an incentive gift, which will lower the threshold for the tenant of moving to this particular building. Therefore, the financial or non-financial incentive will look like a free gift from the landlord to the tenant. However, the tenant will actually pay a higher contract rent in return (Hordijk, 2005; Muijsson 2010). As a result, the tenant should decide whether the level of incentives provided by the landlord is representative to the offered increase in contract rent.

Incentives as rent fluctuation buffer

From the investor perspective, another purpose of offering incentives is to use incentives as a rent fluctuation buffer (Zuidema & van Elp, 2010b; Muijsson, 2010). Investors try to prevent their investment against fluctuations, as this negatively influences the value and the predictability of the asset. Furthermore, real estate investments are usually established by means of a mortgage loan. A decline in value will affect the liquidity of the investment, as the financier needs to be repaid. In order to withstand against these temporal decreases in value, every investor would need a constant liquidity buffer.

This is illustrated in the opposite figure. Instead of a downward price adjustment of the contract rents (*"the gross yearly rent (in € per m2 LFA per year), which is contractually agreed to be paid, without [lease] incentive correction" (van Gool, 2011))*, landlords react on negative market circumstances by providing lease incentives without adjusting the long-term rental rate.

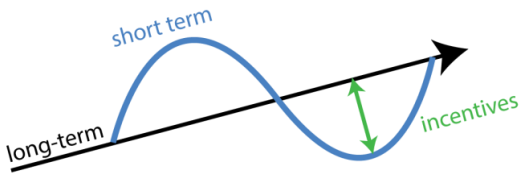


Figure 28. Incentives as rent fluctuation buffer; when the market rent level is below its long-run market rent

As a consequence, instead of a downward price-pressure and lower rent levels, the incentives are adjusted to the long-term rental price, which results in a rental price level which stays on a certain equilibrium, despite of the changing market circumstances.

For instance, an asset's value is determined at the top of the market. In return the investor expects the rent height to be continued to be earned in the future. However, the market rent drops. In order to attract (or maintain) tenants the investor will need to lower its rent level. However, doing so would decrease the asset's value. (Harding, 2012) Instead, the incentives provided, which keeps the contract rent level fixed, while the tenant pays a lower effective rent. The provision of incentives will be calculated as a one-time loss on the liquidity of the investor instead of a direct loss on the fund (Zuidema & van Elp, 2010b). Therefore both the asset's value as the fund's outlook remains stable, and the financier does not have to be repaid (Zuidema & van Elp, 2010b).

In general, investors will only supply incentives in times of low space demand (Zuidema & Elp, 2010). In addition incentive rent buffering will only be applied by investors when outlooks are positive, as the value paid for incentives need to be earned back. As a result, the negative value changes should be temporarily (Zuidema & Elp, 2010b). The use of this method requires investors to keep the amount of provided incentives privately, as publicly shared would cancel out all advantages of the incentive buffer. This would lower their funds certitude and allow financiers to demand payment earlier. It would allow tenants to obtain a better negotiation position being able to decide how much incentives they would be entitled to. Therefore public lease incentive information is very scarce and qualified as being sensitive and confidential information. (Harding, 2012)

1.5.3. Incentives in the Amsterdam Office market

A comparison with other European cities showed that, in 2009, Amsterdam was ranked on a second place in Europe providing long rent-free periods, according to an article in Property EU by Dutch broker Savills (6 October 2009):

"The longest rent-free periods were recorded in London (24-36 months over a typical lease length of 120 months), Amsterdam (21 months over 120 months), Paris La Defense (12 months over 72 months) and Brussels (nine months over 72 months). In the remaining locations landlords offered six months or less."

Furthermore, the same article implied that Amsterdam showed the highest increase in rent-free periods in Europe compared to one year earlier (2009 compared to 2008): *"The highest increase in rent-free periods offered was in Amsterdam (from six to 21 months)."*

The last years, the incentives are very volatile in the Amsterdam office market, showing a slightly decrease from 10 percent in 2008 to 18 percent in 2010, to 15 percent in 2011 (Colliers International & Dienst Belastingen Gemeentelijke Amsterdam, 2011).

In addition to the growing incentives in the overall Amsterdam office market, there are large differences between sub-markets. For instance in the Centre of Amsterdam in 2010 the incentive level was only 6 percent, while the incentive level of Amsterdam South-East is about 33 percent. It shows that the level of incentives might be related to the *quality* of the location, as in the more popular areas the incentives might be lower. (Huizinga, 2010)

1.5.4. Rental prices published in the market

Reported market rent levels by real estate agents are expressed by the *combination of a rental price with a lease incentive*, which therefore creates a distorted picture of the market rental price (development) in the Dutch and Amsterdam office market. As a result, publications and market reports on rent developments should therefore be studied with care, in order to find out the true/real underlying situation.
The rent levels published in media, also known as 'asked rental prices' or 'face rental prices', are illustrated by the blue line in the opposite figure.

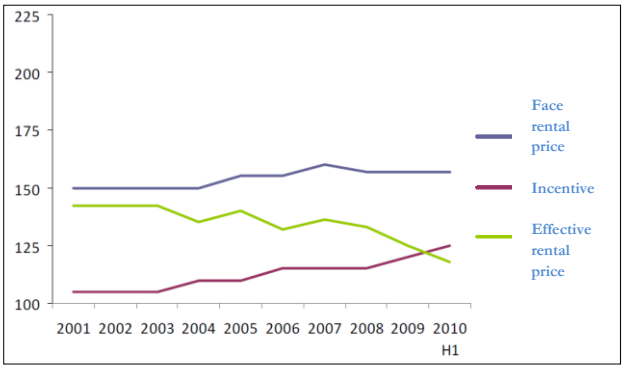


Figure 29. Schematic: underlying incentive and effective rental price development (Swagerman, 2010)

The combination of the provision of lease incentives by landlords, instead of adjusting their long-term rental rate; and the published face rental prices in the market including incentives, might explain the stable rent development in the market the last years.

In addition, the true underlying effective rental price (*"the contract rent yearly paid, corrected for [lease] incentives (in € per m2 LFA per year)" (van Gool, 2011)).* (Swagerman, 2010; van Gool, 2011) development might differ a lot from the published rental price and development in the market. This is shown by the green line in figure 29.

As a result, the face rental price published might conceal the downward price effect of rising vacancy rates in the market. Furthermore, the relation with the vacancy rate in the market, might change when the vacancy rate is compared with the underlying (*real*) *effective* rental price development. This comparison might show the expected *linear* relation between both variables, according to the rental adjustment equation (Hendershott, 2004).

1.6. Reason 2b: reported vacancy might not reflect the prevailing market condition

Another reason for the paradoxical situation is that the reported vacancy levels might not accurately reflect the prevailing space market condition, as vacancy rates published in market reports are distorted due to inclusion of obsolete office space.
Obsolete office space is not considered a potential office accommodation alternative by office space users, as it does not meet their general (basic) requirements on basis of its location or physical building characteristic. Only properties that do meet these general requirements influence the perceived supply of office space. For that reason, obsolete offices should not be included in the vacancy rate when this is used for analyzing the rental adjustment equation. (Koppels & Keeris, 2006)

Research of Koppels & Keeris (2006) showed a stronger correlation between the rental price development and the vacancy rate, when the structural components of the vacancy rate were left out of the equation.

1.7. Other consequences of the in-transparency of the Dutch office market

This paragraph discusses other consequences of the in-transparency or assymetric information availability in the Dutch and Amsterdam office market:

1.7.1. Incentives: a self-sustaining system in the Dutch office market

As all parties in the current real estate market provide incentives nowadays, the current situation seems to be a self-sustaining system: market conformity is expressed by a rental price in combination with a rental incentive, instead of appointing a market conform effective rental price. Due to the published face rental prices in the Dutch office market; a (nominal) rental price development does in fact, not exist. Instead of a (nominal) rental price development, *fluctuations* in the underlying incentive development currently dictate the underlying rental price development in the Dutch office market. This is illustrated by the purple line in figure 29.

1.7.2. Barrier for third parties and consequences for a perfect functioning and competitive market

In a perfect competitive market there is *complete information* which is *available for all market participants*. (van Geffen, 2001). As the real estate market is an illiquid market, little information is available on the establishment of prices. In addition, the objects are identical and therefore the information about prices is difficult to interpret for outsiders of the market. (Garmaise & Moskovitz, 2004).
The lack of information can function as a barrier for entrants, outsiders and non-experienced participants in the market, for instance for international investors who are becoming more important in the Dutch real estate market nowadays. As entrants, outsiders and non-experienced participants are to a large extent dependent on the availability of the information, acceding, for instance foreign parties are limited in making decisions based on equivalent market knowledge relative to other parties. (Elferink, 2012).

Accurate and reliable *market data and price signals* serve as important input for real estate investments, market analyses, housing issues, appraisals, feasibility analysis etc. A lack of transparency leads to a lack of available market data, which influences several decisions which has to be made, and therefore influences a perfect competitive functioning of the real estate market. As incentives and effective rental prices are not reported and/or published (deliberately) in the Dutch real estate market, the market becomes less transparant for third parties. Knowlegde about incentives and effective rental prices is currently only available at the regular players in the real estate market (Boer Hartog Hooft, 2009).

According to Harding (2012), the stable *face rent levels* in the market, indicate that the market is functioning stable as well. A stable market rent level (*"the expected gross yearly rent excluding VAT and service costs for the specified real property space in the current marketplace assuming an optimal marketing, a willing market and rented out to the highest bidder."* (Gool, 2011)) is a sign of a stable market, meaning that this market is good to invest in. However, in fact incentives are used to buffer for changes in rent levels.
It can be stated that the real estate industry has created a system with a lack of transparency; in which uninformed parties *can* be disadvantaged (van Gool, 2011). As incentives conceal the actual rental price, they prevent - in theory - a correct allocation on the office market.

This was for instance the case in 2001, when the increase in the supply in office rents would normally have led to a decline in office rents; followed by an inhibiting effect on the construction of new offices, based on the theory of the Four-Quadrant model by D. DiPasquale and W.C. Wheaton (1992), as shown in the figure 21. However, in reality it was different: the rents were kept high by using incentives, in which new developments remained lucrative (for developers who found non observant investors). As a result, incentives contributed to the market failure in the Dutch office market. (van Gool, 2011).

1.7.3. Improper market reflection and research implications

The current in-transparency, especially due to the published face rental prices has important research implications. Because real estate advisory firms and research institutes use published asked/face rental prices and contract rental prices for their publications or research - instead of effective rental prices – the outcomes provide an improper reflection of the current and historic real estate market development.

The overall market development based on face rents or contract rents including incentives, might differ from the actual underlying development of the market, based on effective rent levels, which are excluded from incentives.

As data about incentives and effective rent levels are rather private, quantitative research about incentives and effective rent levels is hardly done. However, reliable research into the working of the real estate market is important to provide a clear market overview which is available for all actors in a competitive market, but also for policy and planning decisions for both public and private parties.

2. Problem definition

2.1. Main research questions

The problem analysis has led to the following main research questions:

1. *"To what extend does a price index based on face rents, provide an accurate reflection of the market dynamics in the Amsterdam Office market over the period 2002 – 2012?"*

2. *"Do spatial market segments differentiate in market dynamics in the Amsterdam office market over the period 2002-2012?"*

2.2. Sub-research questions and hypotheses

1. What is the effect of incentives on the working of the Dutch office market?
   Hypothesis: 'Incentives contribute to an in-transparent and in-efficient functioning office market

2. How do incentives correlate with the vacancy rate, in the Amsterdam office market?
   Hypothesis: Incentives are influencing the vacancy rate without any time-lag, as incentives are used for short-time price adjustments. (Koppels & Keeris, 2006)

3. How does the effective rent level correlate with the vacancy rate, in the Amsterdam office market, compared to the contract rent and face rent level?
   Hypothesis: "Effective rent levels are stronger correlated to the vacancy rate than contract rent levels"

4. Spatial segmentation analysis: Do incentives and effective rental prices significantly differ in height and mutual development per sub-area?
   Hypothesis: "Incentives and effective rental prices significantly differ in height and development per sub-area"

5. Structural segmentation analysis: What is the relation between the use of incentives and the quality of a building or location? **
   Hypothesis: "Incentives have a stronger relation with a minor quality building or location instead of a high-quality building or location"

6. What is the influence of economic conditions on incentives and effective rent levels? **
   Hypothesis: "Incentives are following the economic conditions, in which they are higher in a period of economic decline, instead of a period of economic growth."

7. Do several price index measures differ in cyclicality and outcomes?
   Hypothesis: "Quality-adjusted rental price indices are more cyclical and market realistic compared to non-adjusted rental price indices"

8. Transparency analysis: How do face rental prices differ from effective rental prices in the Amsterdam Office market?
   Hypothesis: "The effective rental price (development) is much lower (and cyclical) compared to the asked rental price (development)"

** = *The structural segmentation analysis (sub-question 5) and the influence of economic conditions on incentives and rent levels (sub-question 6) are added as Appendix to this research, as the other research questions are directly related to the main research questions. As a result, it will serve as an extra addition to this research.*

2.3. Hypothetic conceptual models

The hypotheses of the previous paragraph are illustrated in the following conceptual model:

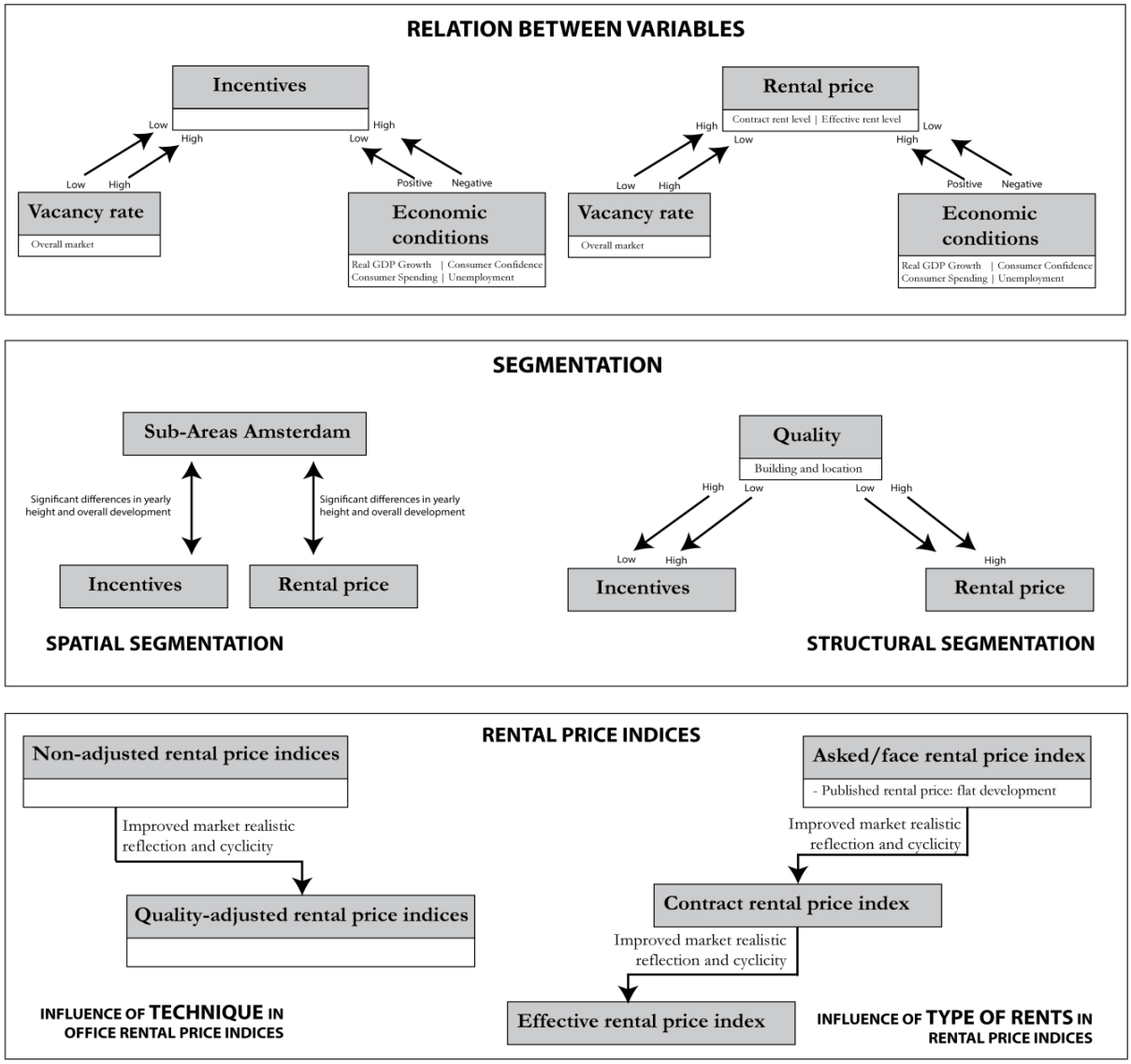


Figure 30. Hypothetic Schematic conceptual model

2.4. Research objectives

The main aims of this research are:

1. *Set the next step in 'solving' the transparency problem in the Dutch real estate market, by giving openness about the underlying effective rental price and incentive development in the Amsterdam office (sub-)market(s), in order to make the office market more accessible and competitive for outsiders, entrants and non-experienced participants in the market*

2. *Constructing a '(real) effective rental price index' in order to provide an as market conform reflection of the market dynamics in the Amsterdam office market over the period 2002-2012*

2.5. Methods used for answering sub-research questions

The following table shows which method(s) will be used to answer each sub-research question. The last column shows which variables will be researched per sub-research question.

#	*Sub-question*	*Method/Product*	*Period*	*Variables*
1	What is the effect of incentives on the working of the Dutch office market?	Literature review	-	- Incentives - In-transparency - Efficient market functioning - Face and effective rent levels
2	How do incentives correlate with the vacancy rate, in the Amsterdam office market?	- Literature review - Quantitative research: correlation analysis	2002-2012	- Actual vacancy rate - Financial incentives
3	How does the effective rent level correlate with the vacancy rate, in the Amsterdam office market, compared to the contract rent level?	- Literature review - Quantitative research: Correlation analysis	2002-2012	- Nominal contract rent level - Real contract rent level - Nominal effective rent level - Real effective rent level - Actual vacancy rate
4	Spatial segmentation analysis: Do incentives and effective rental prices significantly differ in height and mutual development per sub-area?	- Literature review - Quantitative research: Post-Hoc test & Correlation analysis	2002-2012	- Financial incentives (D) - Nominal effective rent level (D) - Different area samples (ID)
5	Structural segmentation analysis: What is the relation between the use of incentives and the quality of a building or location?	- Literature review - Quantitative research: Post-Hoc test	2002-2012	- Financial incentives (D) - Construction period (ID) - Age (ID) - Amenities (ID) - Distance to station (ID) - Distance to highway (ID) - Floor area (ID)
6	What is the influence of economic conditions on incentives and effective rent levels?	- Literature review - Quantitative research: Correlation analysis	2002-2012	- Nominal effective rent level (D) - Real GDP Growth (ID) - Unemployment Amsterdam (ID) - Consumer Spending (ID) - Consumer Confidence (ID)
7	Do several price index measures differ in cyclicality and outcomes?	- Literature review - Average rental price index - Conventional hedonic rental price index	2002-2012	- Face rent level (D) - Nominal Contract rent level (D) - Nominal Effective rent level (D) Hedonic corrected for: - Time-dummy variables (ID) - Building characteristics (ID) - Location characteristics (ID) - Contract term influence (ID)
8	Transparency analysis: How do asked /face rental prices differ from effective rental prices in the Amsterdam Office market, and how is this difference explained?	- Literature review - Analysis of relative difference	2002-2012	- Nominal asked rental prices - Nominal effective rental prices

** = The 'D' is the Dependent variable used, the 'ID' is/are the independent variables used.*

Variables defined

Each variable discussed in the schematic models and the table on the previous page will be shortly discussed below:

Incentives

The difference in Euros between the contract rent and the effective rent can be described as the so-called 'incentive' given.

In general, lease incentives can only be given to tenants. In order to properly use the data about incentives, it is important to have a helicopter view about the difference between the 'incentive' given to the tenant on the one hand, and therefore a higher contract rent in return during the remaining lease term on the other hand. It is also possible that the tenant invests in the building by itself.

There are several types of incentives: (van Gool, 2011; B. Harding, 2012)

- Physical alternations of the rented space on request of the potential tenant (tenant improvements)
- One or multiple rent free periods during a lease term.
- Rent discounts e.g. in the first few years and stepped rents
- A reimbursement of the tenant's fitting-out costs and /or delivering the building turn-key.
- A reimbursement of the tenant's move/relocation costs
- Signing bonus or money for spending freely (cash incentive/lump sum)
- Financial discounts by the owner

The other types of incentives will be further explained in the literature review.

This research only uses rent-free periods and financial discounts by the landlord as incentives in the calculations. This will be further explained in the methods chapter.

Vacancy rate:

Vacancy rate is the percentage of built space in the market that is currently unoccupied and available for rent. (Geltner, et al., 2007)

The market rent

The most common used rent level is the 'market rent' which can be defined as: "*the expected gross yearly rent (in € per m2 LFA per year) excluding VAT and service costs for the specified real property space in the current marketplace assuming an optimal marketing, a willing market and rented out to the highest bidder.*" (van Gool, 2011)

Face/asked rent level

The asked rent level is the rent level published in media and/or the asking price rent (in € per m2 LFA per year), also known as so-called "*face rents*". In order to give significant conclusions about the difference between the asked rental price and the effective rental price; the latest asked rental level price on the market is used, instead of the asked rent level price when it enters the market.

Contract rent level

The initial or nominal contract rent level, can be defined as: *"the gross yearly rent (in € per m2 LFA per year), which is contractually agreed to be paid, without [lease] incentive correction" (van Gool, 2011).* In this calculation the inflation is included. The 'real contract rent level' can be defined as the contract rent level but excluded for inflation.

Effective rent level

The (nominal) effective rent level, can be defined as: "*the contract rent yearly paid, corrected for [lease] incentives (in € per m2 LFA per year)" (van Gool, 2011)).* In this calculation the inflation is included. The 'real effective rent level' can be defined as the effective rent level but excluded for inflation.

Economic conditions:

In this research, the most important economic indicators will be used as comparable variables:

- *Real GDP Growth*; the annual growth rate in Gross Domestic Product measures the increase in value of the goods and services produced by an economy over the period of a year. The 'Real' GDP Growth is the GDP Growth adjusted for inflation or deflation.

- *Unemployment rate in Amsterdam;* the percentage of unemployed labor force as a percentage of the total labor force in Amsterdam (Centraal Bureau Statistiek, 2013)

- *Consumer Spending;* is the amount of money that households spend on goods and services in order to satisfy their needs. It is very important measure to check the health of the economy. (Tradingeconomics.com, 2013)

- *Consumer Confidence*; is an indicator designed to measure the degree of optimism that consumers feel about the overall state of the economy and their personal financial situation. How confident people are about stability of their incomes determines their spending activity and therefore serves as one of the key indicators for the overall shape of the economy. (Tradingeconomics.com, 2013)

Structural segmentation analysis:
The structural segmentation analysis is divided in building, location and user characteristics:

Building characteristics:
- The construction period
- The age of the building
- Floor area of the building.

Location characteristics
- The amount of amenities in this area (Google Walkscore)
- The distance to station
- The distance to highway

User characteristics:
- Contract term

3. Relevance

This chapter describes the relevance of the research subject. It is divided in the following aspects: the personal motivation, the scientific relevance & originality, the societal relevance and the utilization potential.

3.1. Personal Motivation

My main criteria in choosing a subject of my graduation thesis, was the fact that it had to be a trend in the Real Estate Market. Furthermore, I wanted to research a particular topic or problem which was (almost) never been researched before. In order to realize this, I have read many articles and annual reports of many huge Real Estate companies and research firms. In all those reports, one particular trend was nearly almost mentioned: the use of *incentives* in commercial real estate markets. After researching this topic more and more, I found an interesting research topic which was still in its infancy.

My research proposal has some challenging aspects, but also has a lot of drawbacks. The level of successfulness will largely depend on how successfully I will be in obtaining the required data. As a result, I will start in an early phase with acquiring the data, to protect myself against the problem of not having the data needed for a successful completion. Furthermore, I made a plan B to react to a possible lack of data (as shown in the next Approach chapter)

Although the drawbacks of data insufficiency, I am really motivated to successfully acquire the data, especially by examining the benefits which my research could have for the particular company. In my opinion, when I succeed in acquiring the data, my research might lead to unexpected outcomes, which might function as an eye-opener for the Dutch real estate market.

3.2. Scientific relevance

This research mainly builds on earlier research by Koppels & Keeris (2006) into the paradoxical situation and rental adjustment equation (Hendershott, 2004) in the Amsterdam office market, research about the influence of vacancy (Zuidema & van Elp (2010) and structural vacancy (Remøy (2010) for the working of the real estate market, and research into office market dynamics and rental price indices in the Dutch Real Estate market by Hordijk (2005). The impact of incentives for the real estate and office market is earlier qualitatively researched by Swagerman (2010), Muijsson (2010) and van Gool (2011), and by Harding (2012) for the development market. Research into the segmented behavior of office markets is earlier conducted by Stevenson (2007) for London, or by Brounen & Jennen (2009) for the Dutch and Amsterdam office market.

The researches mentioned will be clarified per research below:

The research mainly builds on earlier research into the relation between vacancy and rents by Koppels and Keeris (2006), which they researched by means of the rental adjustment equation of Hendershott (2004). They investigated a stronger correlation between real rent and the vacancy rate, compared to nominal rent levels in the Amsterdam office market. In this research a time-lag was found between the vacancy rates and rent adjustments and a strong correlation between incentives and the vacancy rate without a time-lag. Another hypothesis tested in this research was: real rent levels adjusted for incentives have a stronger relation with the vacancy rate then a non-adjusted rent level has. Due to insignificant outcomes and data there was no clear-cut answer possible to confirm or reject this hypothesis, as rent levels used in this research were only corrected for 2% incentives.

Much research is conducted on vacancy, about for instance the effect of vacancy on the working of the real estate market (Remøy, 2010, Zuidema & van Elp, 2010) or the influence of structural vacancy (Remøy, 2010). This research will build on both researches, by investigating the relation of vacancy with different rental prices and economic indicators in the market.

Hakfoort (1994) and Hordijk (2005) already described the office market dynamics in the Dutch Real Estate market. Hakfoort researched the relationship between macro-economic factors , and the vacancy rate. In his research he also addresses the difference between contract rents and effective rents. He suggested that concessions such as rent free periods and tenant improvements may well be cyclical; omitting them effectively, means smoothing of the series.

Hordijk(2005) explained that the office market is the market with the most pronounced cycle. However, in his outcomes the relation between historic office rents and the demand and supply ratio is more or less smoothed and lagged. This smoothed picture might be explained by the incentives, according to Hordijk (2005). As only an incentive correction is made, he mentioned: "…*it was decided not to include those observations in the chapter, but there are strong feelings that this subject should be further investigated.* My research will build further on the office market dynamics research of Hordijk (2005) and Hakfoort (1994), in which the influence of incentives on the effective rental price development will be researched.

In recent years many qualitative research is performed about incentives. These studies have identified numerous types of incentives and analyzed what their impact is on the real estate or office market. (Swagerman, 2010; Muijsson (2010); van Gool (2011) or in the development market (B. Harding, 2012). However, quantitative research about incentives is almost never conducted, due to data limitations.

Stevenson (2007) and Brounen and Jennen (2009) researched the segmented structure of the urban office markets, in which both explained that office market are consisting of (inter-related) submarkets. Most studies model the market as an unitary – city-wide – office market ignoring the segmented structure. This research will further research the segmented structure of the Amsterdam office market, by researching the differences and influences of the several sub-office markets in Amsterdam.

In the Netherlands there has never been created a rental prices index, based on effective rental prices. In previous research only a face or contract rental price index was used. This is interesting as the development and the determinants of value might change in an effective rental price index, compared to a face or contract rental price index.

For the real estate market, especially the effective rental price and incentive development is interesting as this research not only focuses on transactions with an LFA > 500 m2, but also on transactions with an LFA < 500 m2, which is almost never researched before.

3.3. The societal relevance

Market data and market conform price signals serve as important input for real estate investments, housing issues, appraisals, feasibility analysis etc. A lack of transparency leads to a lack of available market data, which influences several decisions which has to be made, and therefore influences a perfect competitive functioning of the real estate market.
The current real estate market is characterized by lack of transparency, through the high level of incentives and the published face rental prices. This research might for instance give an indication of the real rental prices during several economic periods in time, which might reflect an overpayment by many parties. Furthermore, would investors continue investing if they know that rents are sometimes much lower than mentioned in the market.

Another important aspect is that this research might 'set' the next step in the transparency of the Dutch Real Estate market, by making all the outsiders and non-experienced participants in the market aware of the difference between the published face rental price (development) and the underlying effective rental price (development). Furthermore, this research could make the office market more accessible for all the actors with an interest in a well-functioning, competitive and transparent market.

3.4. Originality and the utilization potential

In the Netherlands there have never been created an 'effective' rental price index before. Earlier research has only been done with a face or contract rental price index. The developed effective rental price index can be used for other research in the field of office rent dynamics, in order to analyze the working of the real estate market and the predictability of the real estate market in the future.

As data about incentives is almost never used in any research before, almost all outcomes will be new to the market. In addition, the difference between face rents and effective rent levels in the Amsterdam office market has never been research before, due to the lack of data availability. Furthermore, in many research papers there is said a lot about incentives and its relation with vacancy and quality, but it is almost never substantiated with quantitative data, as the data is hardly available.

4. Approach

4.1. Schematic overview

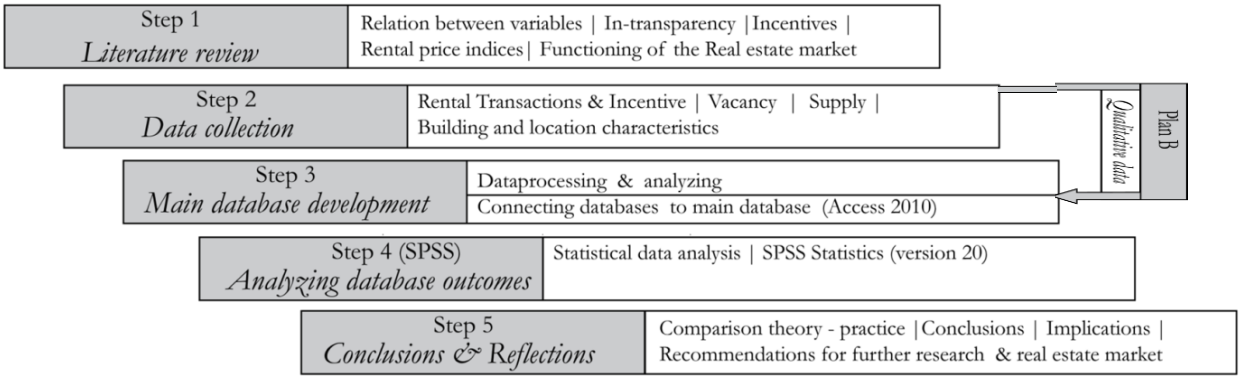


Figure 31. Approach overview

4.2. Step 1. Input variables & literature review

By means of a literature review, the variables which function as input for the database will be defined and the relation between different variables will be researched. Furthermore, theory behind incentives, in-transparency, rental price indices and the functioning of the real estate market will be conducted.

4.3. Step 2. Collecting data

For this research, several types of data are needed:.

4.3.1. Transaction data including incentives

The transaction data will be requested at the Municipal Tax Office (Dutch: 'Dienst Belastingen Gemeentelijke Amsterdam' - DBGA). In order to determine the yearly WOZ-value (Valuation of Immovable Property Act) of a specific property, the Municipal Tax Office sends out a rental questionnaire to all the transactions of the past year. In this rental questionnaire the most important incentives like rental discounts, rent-free periods and tenant investments are also included. As this questionnaire is send to the tenants of the properties instead of the owners, it can be assumed that the data is reliable. However, a clear reliability check will be done before using the data. This will be further explained in the next 'methods' chapter.

As the requested incentive data is rather 'private', only aggregated data (non-traceable to a particular tenant/owner) will be published in the final report.

4.3.2. Supply data

The supply data is needed in order to investigate the difference between effective rental prices and face rents. These market data will be requested at 'Colliers International', as they work together with the Municipal Tax Office in their yearly publication of the Amsterdam Office market: 'We-re Amsterdam'. When this data is not appropriate, the data will be requested (online) at the Vastgoedmarkt, an independent real estate magazine, as they also have an added value in the transparency of the Dutch Office market. As both data sources mainly focus on transactions with an LFA > 500 m2, the supply database of NVM Funda in Business might also be requested in order to make a connection between face rents and effective rents for transactions with an LFA < 500 m2.

4.3.3. Price index data

Next to the transactions and market data in general, a lot of data about building/location characteristics are needed to make an accurate hedonic price analysis. This data will be mainly derived from property databases at the TU Delft, which include all the building/location characteristics of about 220 properties in Amsterdam, like for instance distance to the center/station, floor space, parking places, etc. This data might be complemented by data of the

brokers mentioned above, or by adding data through an analysis of buildings which are not in this database at the moment.

4.3.4. Vacancy data

In order to give significant conclusions about vacancy on macro and micro level, vacancy data is needed. For my research, vacancy data per object would lead to the most significant results, as this data can be added to the 'hedonic price analysis' and for instance the relation between vacancy and incentives per object.
Data about vacancy per object can be filtered at the Muncipal Tax Office. When there is nothing to 'tax' in a specific object, or part of an object, for either the tenant or the owner, a so-called 'vacancy code' is added to the object or object part. A comment which has to be made is when a specific tenant has a rental contract, although he is not present in de building, the building is 'marked' as leased instead of vacant. When this data is not sufficient, other data about vacancy will be conducted, for instance from market reports published by large real estate advisors in the Amsterdam office market.

4.3.5. Additional Property data

Property data can be required by the DBGA and the Property database of the TU Delft, complemented with data added by analyzing the remaining buildings. For instance, the distance to the station or nearest public transport connection. In the TU Delft property database, 220 properties are already with their building and location aspects in the database. As a result, the remaining properties have to be measured/ analysed on these characteristics and added to the database.

4.3.6. Data insufficiency

As problems in requesting the data might occur, especially in requesting the privacy sensitive incentive data, a 'Plan B' is established. In order to successfully finish this research, the use of qualitative research by questionnaires is another option to gather this data.
The transaction data of the researched period, might also be requested at large brokers, like DTZ Zadelhoff, CBRE, Jones Lang LaSalle, Colliers International or for instance the Vastgoedmarkt or PropertyNL, instead of the Municipal Tax Office. The latter all the transactions of every month in their magazines, including which tenant, owner and broker are involved in the transaction.

4.4. Step 3. Main database development

After all the data is acquired the 'main database will be developed, out of all the separate databases.

4.4.1. Analyzing and processing data

Before connecting all the different data sources to the Basisregistratie Adressen en Gebouwen (BAG), all the different data sources will be analyzed on its relevance and reliability. This will be further explained in the next 'Methods' chapter.

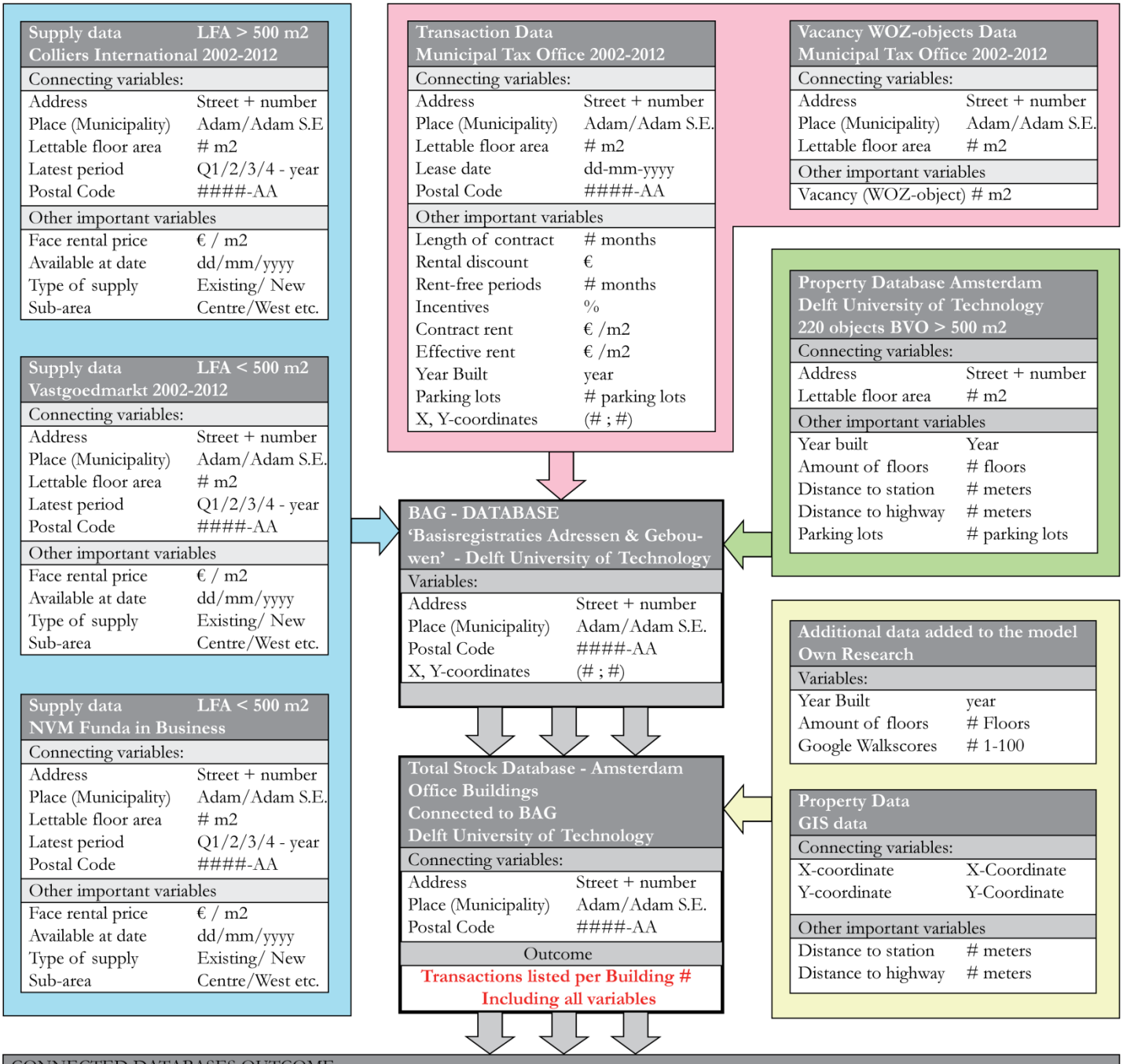
4.4.2. Connecting databases: data mining

After analyzing all the different data sources, all the different individual databases will be connected to one large '*Stock database'*, including all the different data sources. This is schematically visualized in the figure on the next page. There is made a distinction between the 'connecting variables' and the 'other important variables'. The connecting variables are the variables on which the several databases will be connected. The other important variables are variables which will be used in the data analysis.

Figure 32. shows that the different databases will be first connected to the Basisadministratie Adresssen en Gebouwen (BAG), which is a generally agreed registration of all addresses and buildings in the Netherlands. The Delft University of Technology has a license of the BAG, in which it developed a program to connect different databases to the BAG; based on address, place and postal code. This method will be in short explained in the following 'methods' chapter.

After connecting all the individual database to the BAG; the entire database will be connected to the '*Office Stock Database'* of the Delft University of Technology, which is a database of all *office buildings* in Amsterdam. As most of

the time one building consists of several addresses, the office stock database makes it possible to connect several addresses to each building in Amsterdam.



CONNECTED DATABASES OUTCOME

Building	Transactions #	Lease date	Contract Rent	Effective Rent	Incentive %	Contract Length	Face rent	Year Built	# Floors	Etc.
Building #										
	Transaction #									
	Transaction #									
Building #										
	Transaction #									

Figure 32. Data mining process: connecting several individual databases to one Total stock database with transactions listed per building in Amsterdam

4.4.3. Output connected databases

As a result, the entire Office Stock database provides an overview of '*all the individual transactions/supply data/vacancy data - including their corresponding variables - listed per office building in Amsterdam*', as shown in the 'connected database outcome' table in the figure on the previous page.

As the office stock database also includes all the X, Y coordinates of all office buildings in Amsterdam, other variables can be added to each transaction like distance to station or highway, by means of GIS-data. Other variables needed as correction in the hedonic price analysis, like the 'amount of floors per building', 'Google Walk scores', or 'Construction years' can be added to each building by hand. As all transactions are listed per building in Amsterdam (per 'Building ID), the researched variables (such as amount of floors) of each building can be used for all the underlying transactions.

4.5. Step 4. Analyzing database outcomes

In the fourth step, the statistical analysis will be performed (by means of the program SPSS Statistics, version 20). The statistical data analysis is divided in five individual studies, which are shown in the figures below. Per figure is mentioned which ***method*** is used.

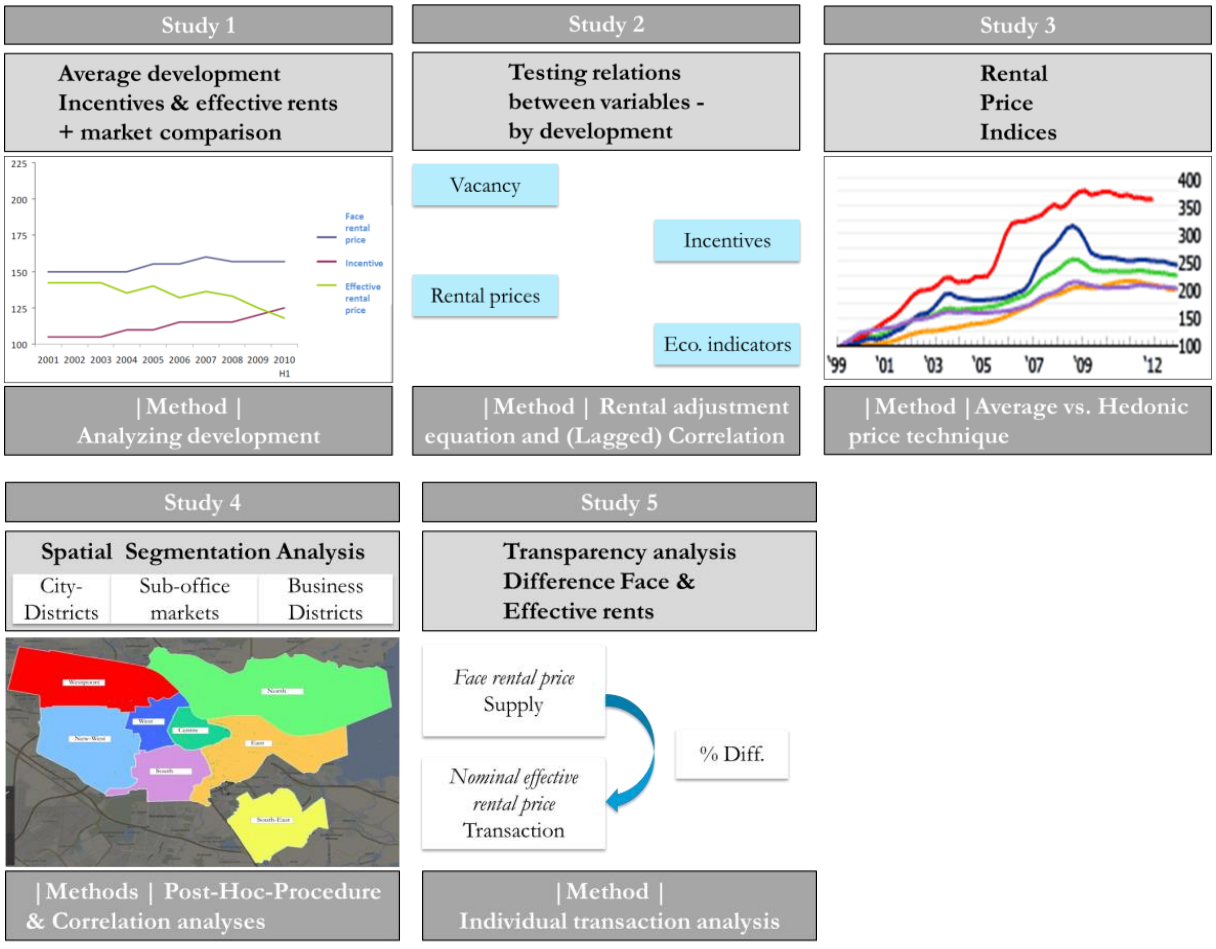


Figure 33. Approach step 4| Overview sub-studies

In the next chapter each method will be explained more in depth.

As already mentioned, the structural segmentation analysis is added as Appendix to this research, and can be seen as the sixth individual study of this research. This is similar for the relation between economic indicators and the incentive and effective rental price development.

4.6. Step 5. Theory comparison, conclusions and reflection on outcomes

In the last step, the outcomes are reflected on significance, hypothesis and relation between theory and practice. Furthermore, a recommendation for further research and practice will be conducted.

5. Methodology

5.1. Introduction

This chapter explains the different methods which will be used in the research. The following methods will be discussed:

- Data validity and reliability of the different data sources
- Connecting databases to the BAG (Basisregistratie Adressen en Gebouwen)
- Calculating the percentage incentives and effective rental price per transaction
- Rental adjustment equation and (Cross-)Correlation analysis between variables over time period
- Means comparison between variables over time period
- Hedonic Price Index and comparison with Average rental price index over time period
- Transparency analysis; analysis between face rents and effective rents over time period

5.2. Data validity and reliability check

5.2.1. Validity and reliability check transaction data

In this research, the transaction data will be used from the Municipal Tax Office or 'Dienst Belastingen Gemeentelijke Amsterdam' (DBGA). In order to determine the yearly WOZ-value (Valuation of Immovable Property Act) of a specific property, the DBGA sends out a rental questionnaire to all the transactions of the past year, in which they ask for a rental contract and/or the filled in questionnaire. From all the sent rental questionnaires they receive about 50-60% response, in which about 50% from the sent questionnaires also adds the rental contract. Although it is obligatory to fill in the questionnaire, it is answered on a more or less voluntary basis. Therefore, it is important to have a critical reflection on the relevance of the data.

In general, the rental questionnaire is sent to the tenant, instead of the landlord. As the tenant has no direct influence on the paid taxes, the reliability will be higher instead of sending the rental questionnaire to the landlord, who might influence the value in its best interest.

5.2.2. The rental questionnaire

In this rental questionnaire the most important aspects of the transaction are requested, in order to give an as accurate possible assessment about the market conformity of the particular transaction. The most important aspects requested in the rental questionnaire - related to my research - are the following:

Rental price and date	
Type of rental contract	New contract /Extension /Take-over existing contract/substitution
Commencement date of lease	dd-mm-yyyy
Start rent	€ / year (excluding VAT service costs, parking lots & incentives)
Contract term	months/years
Option years	months/years
Incentives by owner	
Rental discount	€
Rent-free periods	months
Contribution furnishing costs	€ + type of contribution (facade; walls etc)
Investments by tenant or owner	
Investment actor	Tenant/owner
Investment	€ + type of investment (facade; walls etc)
Other property aspects	
Living area included in rental price?	Yes/No
Parking lots included in rental price?	Yes/No + price and amount of lots in- and outside
Special rental conditions	

Condition:	Family; holding ; housing association; (anti-) squatters; charity; etc
Lettable Floor area	
Lettable Floor area	m2 (conform NEN 2580)
Function of object	
Function of object	Office/Retail/Restaurant/Cafe/Industrial etc
Use of object	Office/Retail/Restaurant/Cafe/Industrial etc

All aspect of the rental transaction are screened by the market analysis division of the Municipal Tax Office. When data about a particular transaction is missing, or inaccurate compared to other nearby transactions; the market analysis division of the Municipal Tax Office tries to retrieve the data by means of a personal conversation with the tenant. In case the rental contract is attached to the rental questionnaire, the filled in rental questionnaire will be verified by means of the rental contract.

5.2.3. Screening process by the Municipal Tax Office

The market analysis division within the Municipal Tax Office screens all the transactions on its market conformity. As this screening process is really important for the reliability of the data used, a summary of the screening process will be explained below. This research only uses transactions which are 'accepted' as market conform transactions by the Municipal Tax Office.

In general the following 5 steps are undertaken in the screening process:

- Step 1: Controlling/Checking input
- Step 2: Consistency analysis
- Step 3: Screening of the rental value
- Step 4: Reliability check
- Step 5: Assigning a particular status/condition to the transaction

In general, the main reasons for rejecting a certain transaction are the following:

- *Improbable sale or rental price.* The rejected transaction is not in line with the market or other market transactions. For instance due to forced auction sales, user agreements: (anti-) squatters, income requirement for a rent, a sale-leaseback transaction, rental price based on former rental contract, temporary lease obligation including a particular end-date, lower rent due to rental defects of property, too short rental contract term, large investments in object, etc.
- *Family transaction or 'possible' family transaction.* The latter for instance in case of a holding transaction, or a possible relation between tenant and landlord. Transactions with a particular 'social' aim of the landlord are also rejected, for instance in case of a housing association or a charitable institution.
- *Multiple disciplines in rent, especially the included living area.* If it is not possible to separate the rental price of the living area from the office area, the transaction is rejected.
- *Objects which are out of use (removed, or terminated).* The object no longer exists and the transaction is not linked to a new object.
- *Only a parking lot is rented*

5.3. Reliability other data sources

Next to the reliability-sensitive transaction data of the Municipal Tax Office, other data sources are also used in the research:

Data	Source	Data reliability	Reason
Supply database	Colliers International	High	Unreliable outcomes affect company
Supply database	Vastgoedmarkt	High	Data lease to companies
Supply database	NVM Funda in Business	High	Data lease to companies
Vacancy data	Municipal Tax Office	Medium	Not personally checked
Vacancy data	Market reports (Advisory firms)	High	Unreliable outcomes affect company

Property data Amsterdam	TU Delft	High	Personal research by TU Delft
Economic indicators	CBS; CPB	High	Unreliable outcomes affect company
Construction year	Municipal Tax Office	High	Personal check by company
Distance to highway/station	GIS data	Medium/High	Some errors occur on shortest distance
Google Walkscores	Own research	High	Own research
Amount of Floors	Own research	Medium/High	Sometimes difficult to estimate

The table shows that all the other data sources are medium-high reliable. As a result, the data will be analyzed and used in the calculations, but a thorough reliability check is not really necessary.

5.4. Connecting databases to the BAG

This paragraph describes in short the procedure of connecting the individual databases to the BAG database. As already explained in the approach chapter, the 'BAG-program' of the Delft University of Technology - which is developed in Microsoft Access - makes it possible to connect different databases to the BAG; based on *address, place and postal code*. In short the following steps are undertaken:

Procedure A

Verifying and correcting the 'house number notation' of the address to the general acceptable notation of the BAG, as shown in the following example:

Number input	House number begin (corrected)	House number end (corrected)	House number addition begin (corrected)	house number addition end (corrected)
24A-30C	24	30	A	C

Procedure B

Verifying and correcting the 'place notation' to the general acceptable notation of the BAG, as shown in the following example:

Place input	Place (Corrected)
Amsterdam SE	Amsterdam Zuidoost

Procedure C

Verifying and correcting the 'street notation' of the address to the general acceptable notation of the BAG; and the 'presence of the street' in the related place (based on postal code, if available). This is shown in the following examples:

Street input:	Place input:	Street (corrected)	Place (corrected)
1e Weteringdwarsstraat	Amsterdam	Eerste Weteringdwarsstraat	Amsterdam
Herikerbergweg	Amsterdam	Herikerbergweg	Amsterdam Zuidoost

Procedure D

The final procedure check whether the combination of the street + number + place are available in the BAG. In addition, all the transactions during the first three steps with unclear variables (street, place, house number), can be corrected in the final step.

After all the steps are undertaken, the entire database is corrected to general acceptable notation of the BAG.

5.5. Calculating the effective rental price (t=0) per transaction

5.5.1. Incentives

For calculating the effective rental price per transaction, there will be corrected for incentives. The following incentives are taken into account:

- *Rent-free periods (in months/years)*
- *Rental discount (in Euros)*

In the calculation of the rental income, the incentives received in/for a particular month/year are extracted from the rental price in that particular month/year. An example is shown in paragraph 5.5.4. For instance, when a rent-free

period of 1 year (in the first year) is received on a contract term of 5 years, the rental income in year 1 is set to zero. This is the same for a rental discount provided during a certain contract period: the rental discount is also extracted from the rental price. In this research, there is assumed that all incentives are provided at the beginning of the contract term.
In addition, it is assumed that other incentives received by the owner are already included in the rental price, for instance a contribution to the furnishing costs by the owner.
Investments by the tenant are not taken into account, as there is assumed that the rental price is already negotiated after discussing the investments by the tenant. Furthermore, it is too difficult to make an accurate correction about the influence of investments by the tenant on the rental price. For instance, if a tenant invests a lot in the building, he might agree a lower price with the tenant, as the overall building value is also rising, which is in the interest of the owner.

5.5.2. Discounted Cash-Flow method

The method which will be used to calculate the effective rental price (t=0) per transaction, is a Discounted Cash Flow (DCF) method. In a DCF) calculation the future gross rental income is discounted to the present. In case of incentives, the incentives are discounted over the entire lease period:

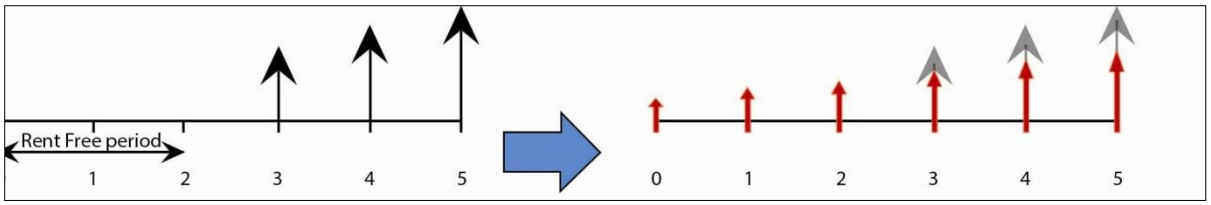


Figure 34. Rent free periods discounted over the entire lease period

In contrary to the explained DCF method in the literature review (next section), the DCF method explained in this paragraph does not use an annuity in the calculations.

5.5.3. Calculating the effective rental price

Present Value

The formula to calculate the PV of a rental income during a certain time period is shown in the following formula:

$$PV = \sum_{t=1}^{T} * (RI_t (1+i)^t) / (1+r)^t)$$

In which:

V = Present Value | RI = rental income | i = growth/inflation rate | r = discount rate

Percentage incentives:

The *amount of incentives (%)* is calculated by the difference between the Net Present Value (NPV) of the rental income over the rental period including incentives (*the contract rent, including incentives*) and the Net Present value of the rental income over the rental period excluding incentives (*the contract rent, excluding incentives*):

% = 100% - (Σ Net Present Value Contract rent level (excluding incentives) / Σ Net Present Value Contract rent level (including incentives)

Nominal effective rent level t=0:

€ = Contract rent level (t=0) * (100% - percentage incentives)

Effective rent level / square meter

€ / m² = effective rent level (€) / floor area (m²)

5.5.4. Example:

In the figure below an example of the calculation is shown. The following assumptions are taken into account:
- Contract length: 5 years | (Contract) Rent per square meters per year: € 250 |
- Floor area property: 1000 m²

- Inflation: 2 per cent
- Discount rate: 10 per cent
- Two-year rent free period, at the beginning of the contract period.
- Rent paid at the beginning of the year

** in this calculation the 'exploitation costs' are not taken into account.*

Nominal Contract Rent excluding incentives			
Year	Rental income	PV	NPV
0	€ 250.000	€ 250.000	€ 250.000
1	€ 255.000	€ 231.818	€ 481.818
2	€ 260.100	€ 214.959	€ 696.777
3	€ 265.302	€ 199.325	€ 896.102
4	€ 270.608	€ 184.829	€ 1.080.931

Nominal Contract Rent including incentives			
Year	Rental income	PV	NPV
0	€ 0	€ 0	€ 0
1	€ 0	€ 0	€ 0
2	€ 260.100	€ 214.959	€ 214.959
3	€ 265.302	€ 199.325	€ 414.284
4	€ 270.608	€ 184.829	€ 599.113

Nominal Effective Rent			
Year	Rental income	PV	NPV
0	€ 138.564	€ 138.564	€ 138.564
1	€ 141.335	€ 128.487	€ 267.051
2	€ 144.162	€ 119.142	€ 386.193
3	€ 147.045	€ 110.477	€ 496.670
4	€ 149.986	€ 102.443	€ 599.113

Percentage incentives = 44,57%

Effective rental price (t=0): € 138.564

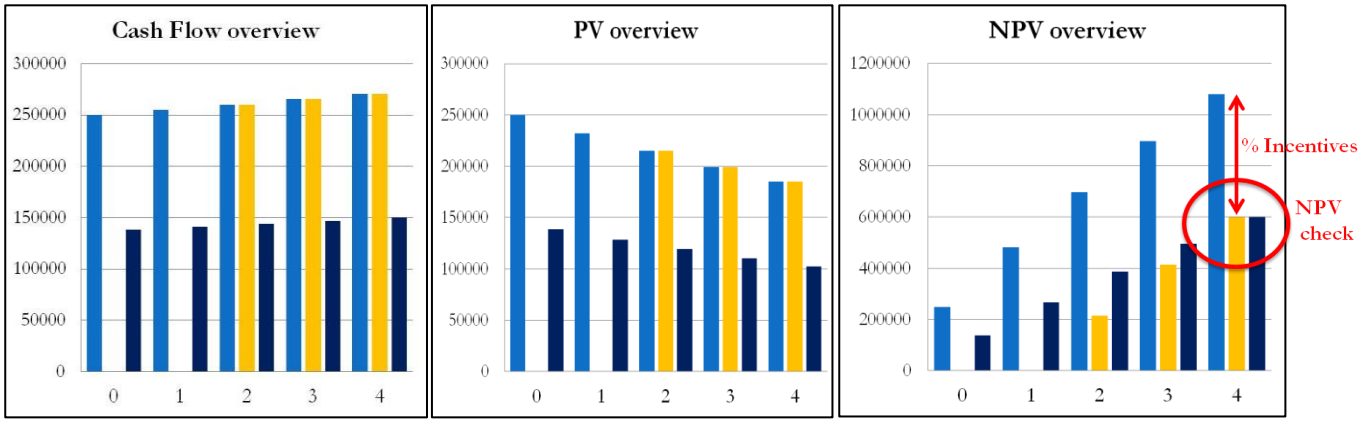


Figure 35. Example of calculating the effective rental price of a transaction, per contract term (t=0); NPV check and % Incentives calculated per transaction

In the DCF calculations, the Net Present Value (NPV) of the nominal contract rent including incentives (orange) is the **same** as the NPV of the effective rent (**dark blue**) when the calculated effective rental price (t=0) is taken as start rent (t=0). The light blue bars represent the contract rent excluding incentives. As already explained in the previous sub-paragraph, the amount of incentives is calculated as percentage difference between the NPV of the contract rent excluding and including incentives

5.5.5. Template used for calculations

In order to calculate the effective rental price for every transaction, a general Excel-template is made, which calculates the percentage incentives and the effective rental price / m2 per contract term, for every transaction. In the template it is also possible to calculate the incentive percentage and effective rental price for transactions with a rental discount as well as a one or more rent-free periods. In case both incentives take place in one transactions, there is assumed the rental discount occurs after the rent-free period(s).

As the effective rental price of many transactions with a lot of different input variables are calculated, a macro is developed in Visual Basics (VBA) which calculates all the output variables per individual transaction.

** Important: before correcting for incentives, the yearly contract rents are corrected for inside and outside parking costs.*
*** The template is added as Appendix to this report*

5.5.6. Other input variables

Next to the rental price and the incentives which are extracted from the rental questionnaire and the contracts delivered by the Municipal Tax Office, a yearly growth rate and a market conform discount rate are needed to calculate a market conform effective rental price per transaction.

Rental growth rate – Inflation

As the rental growth rate is in general annually indexed to the Consumer Price Index, a 5 year forecast of the *'annual average inflation rate' (Inflation.eu)* is used as yearly rental growth. This means: the average inflation of the last 5 years of is used as the inflation rate at that specific year. For instance the inflation rate in 2012 is the inflation of (2007+2008+2009+2010+2011/5).

2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
2,57%	2,79%	2,81%	2,62%	2,49%	1,90%	1,56%	1,64%	1,63%	1,55%	1,78%

Source: inflation.eu

Discount rate

There are different measures in calculating the discount rate. A common used formula is the following:

Discount rate = interest on 10 year bond yield + risk premium + expected inflation *(Osinga, 2006)*

In this research, the effective rental price and the related discount rate is calculated from the perspective of the tenant. Next to the capital risks of bankruptcy, there is almost no risk for the tenant available, due to payment rules of the contract. As a result, there is chosen to exclude the risk-premium and to calculate only with the 10-year risk-free rate of the DNB (The Dutch National Bank) on 31 December of every year

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Risk-free-rate (31 Dec previous year)	5,35%	4,49%	4,51%	3,81%	3,46%	4,21%	4,74%	3,80%	3,68%	3,43%	2,62%
Inflation	2,57%	2,79%	2,81%	2,62%	2,49%	1,90%	1,56%	1,64%	1,63%	1,55%	1,78%
Discount rate	7,92%	7,28%	7,32%	6,43%	5,95%	6,11%	6,30%	5,44%	5,31%	4,98%	4,40%

source: DNB (Dutch National Bank, 2013)

The general theory behind the discount rate and the rental growth rate is further explained in the theoretical framework.

5.6. Price index construction: Average vs. Hedonic technique

In this study a rental price index based on yearly average rental prices is compared with an hedonic rental price index, which is similar to a multiple regression analysis. An hedonic price analysis makes it possible to estimate the implicit price of each attribute of the rent, by relating the rent of the unit to its individual attributes (Dunse and Jones, 1998). In my research a traditional hedonic time-dummy technique is used, which is explained below.

5.6.1. The traditional hedonic time-dummy technique

In many studies a conventional hedonic technique is used to construct a constant-quality rent index (Wheaton and Torto, 1994; Fisher, Geltner and Web (1994) and Englund et al. (2008). The conventional hedonic approach is characterized by vectors of time-dummy variables in the model, as it is important to correct the total rental price for the period in which the price is established, as the price might vary over time.

The time-dummy hedonic technique is characterized by the following equation:

$$Yi = a + \sum_{k=1}^{K} bk\ Xik + \sum_{t=1}^{T} dt\ Tt + \varepsilon i \qquad (Moll, 2012)$$

Where:

- *Yi* = the logarithm of rent per square meter per year for rent transaction i;
- *Xik* = the natural log of the continuous variable *k* for rent transaction *i*;
- *bk* = the coefficient of the continuous variable *k* and *cl* for the dummy variable *l*;
- *a* = the constant term and *εi* the error term for property *i*.
- *T* = represents the vector of time-dummy variables.

The vector of the time variables contains a dichotomous variable for each contract year, with exception of the omitted period. This traditional hedonic time dummy variable approach assumes that the parameters of the variables are constant over time. It allows the parameters of the time dummy variable to capture the pure price change, while these implicit parameters may vary over time. (Moll, 2012)

5.6.2. Variables in the model

In an hedonic price analysis, the variable y shows the total price of the property. The explanatory-variables are the different aspects of the building, for which a tenant wants to pay a specific price. According to Maplezzi (2003), the explanatory-variables in a hedonic price analysis of a real estate property includes not only aspects of the property, the tenant, the rental contracts and the location, but also aspects of the location in the market as the moment the price has been established. As demand and supply most of the time differ per sub-market, the price of a particular office with the same characteristics might differ per region.

The explanatory variables are obtained from different data sources, which will be shortly discussed in the following sub-paragraphs.

Property database Delft University of Technology

The property databases of the TU Delft will be used as input for the hedonic price analysis, which includes lot of building and location characteristics of 220 properties in Amsterdam. The following characteristics are at least in the database (Remøy, 2010):

Building characteristics:				
Year Built	Parking places	Logistics	Flexibility floor plan	Safety
Amount of floors	Building facilities	appearance outside	Comfort	Technical condition
Floor space	Bicycle storage	apperance inside	Routing	Space efficiency
Energy use				

Location characteristics:	
Accessibility by car	Facilities
Accessibility by public transport	Safety
Status	clustering, related organizations in the area

As the database contains only 220 properties in Amsterdam, the most important building and location characteristics will be chosen for the hedonic price analysis, which are marked pink in the above table. The marked building and location characteristics of the remaining office building in Amsterdam will be obtained by own research.

Municipal Tax Office

The nominal start rents from the Muncipal Tax Office will be transformed into nominal contract rents by correcting for inside and outside parking costs. After correcting for incentives, the nominal effective rent level is calculated. The real rent levels are determined by correcting the nominal rent levels for inflation, by means of the inflation index of Statline (Centraal Bureau Statistiek, 2013). The real rent levels are based on the price level January 2013.

Variables			
Nominal contract rent / m2 (D)	Real contract rent /m2 (D)	Nominal effective rent /m2 (D)	Real effective rent/ m2 (D)
Contract term (months)	Multi-tenant	Year Built	

** D = will serve as dependent variables in the hedonic price analysis*

Other variables including source

Variable	**Source**	**Variable**	**Source**
Distance to station	GIS Data	Google walkscores	Own research from Walkscore.com
Distance to centre	GIS Data	Amount of floors	Own Research from Google Streetview

5.6.3. Regression approach in SPSS

The hedonic price analysis, or multiple regression analysis will be conducted in IBM SPSS Statistics version 20. This paragraph describes in short the regression approach which will be followed during the regression analysis. As the

regression approach is a more or less cyclic, iterative process; the steps described are continually taken, until the best model with significant variables and the highest (adjusted) R^2 is developed.

Step 1 - Transforming variables

The regression analysis will start with transforming the (in)dependent variable(s) into logarithmic variables and dummy variables. This is important as in some cases transformed variables have more effect that the normal variables in a multiple regression.

Step 2 – Adding variables to the model

In the second step - each variable is added to the regression model, in which the most important variables are added first to the model. By adding different types of one variable (normal, logarithmic, dummies) in the regression model, the *effect* of each variable *type* can be determined. As a result, the best variable will be chosen and added to the final model.

For example the number of floors of a building is determined for each building in the sample. This variable can be added in many ways to the model:

- Normal variable: *Number of Floors*
- Logarithmic : *ln(Number of floors)*
- Dummy variable: *high rise buildings: buildings with more than 6 floors = 1*
  low rise buildings: buildings with less than 6 floors = 0

In SPSS it is possible to review the direct R^2 , and F-ratio change, when adding a new variable to the regression model. Both variables will be shortly discussed:

F-ratio:

The F-ratio reports the analysis of variance. This value is the same as in the previous 'Comparing multiple means' paragraph. For instance, when F- has a value of 99,00 and is significant at a $p < 0,05$ level; this result tells us that there is less than 0,5% change that an F-ratio this large would happen if the null hypothesis were true. In this example, we can conclude that the variables in the regression model results in significantly better prediction of the dependent variable *than* if we used the mean value of the dependent variable. (Field, 2009)

The R Squared (R^2)

The R^2 is the amount of variation in the outcome variable that is accounted for by the model. For instance an R^2 of 0,4 explains that the independent variable(s) account for 40% of the variation in the dependent variable. Furthermore, the remaining 60% of the variation in the dependent variable cannot be explained by only the independent variables. Therefore, there must be other variables that also influences the independent variable.

In the regression model, the overall Adjusted R-Square *modifies* the general R Squared by taking into account the number of predictors included in the model. (Field, 2009)

In the 'R Square Change and the 'Sig. F change' column, the changed F-ratio and R^2 can be tested on its effect and significance of the added variable to the model. The change statistics therefore tell us about the difference made by adding new predictors to the model, which is shown in the table below.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	,129[a]	,017	,016	7,50499	,017	49,985	1	2939	,000
2	,167[b]	,028	,027	7,46322	,011	33,995	1	2938	,000

However, it is important to note that the influence of each variable for the overall R^2, differs by the sequence/moment of adding the variables to the model, as the 'R Square Change' always looks at the influence of the added variable to the R^2 of the overall model (including the other variables). As a result, it might occur that a variable might have a significant influence on the R^2 Change with only a few variables in the model, but when more variables are added to the model, the strength of this variable decreases. However, the method of the 'R Square Change' in general gives a good indication of the most important variables in the model.

Regression coefficients

The other regression output table, the '*regression coefficients'* table gives an indication of the individual contribution of each variables in the total model, of which an example is shown below:

Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	5,432	0,196		27,731	0,000
LnTransOppVVO	-0,095	0,015	-0,209	-6,407	0,000
DWalkscoreHigh	0,077	0,045	0,077	1,728	0,084
DContracttermshort	-0,298	0,067	-0,242	-4,46	0,000
DContracttermmedium	-0,153	0,058	-0,138	-2,61	0,009
DSouthAxis_WTC_RAI	0,523	0,07	0,243	7,421	0,000

a. Dependent Variable: LnContracthuurm2

The '*unstandardized B or b1'* represents the value of 'a change in the outcome associated with a unit change in the predictor'. As a result, different units of measurements can be compared with each other, even though the units of measurements differ. In case of dummy variables, the unstandardized beta values indicates the relative difference between each group and the group that is chosen as baseline category.

When the regression coefficient *b* represent the change in the outcome resulting from a unit change in the predictor and that a predictor is having a significant impact on the ability to predict the outcome, then the '*regression coefficient b'* should be different from 0 (and relatively large compared to its standard error). This is done by the *t-test*. SPSS provides the exact probability that the observed value of *t* would occur if the value of *b* in the population were 0. If this observed significance is less than .05, the predictor variable significantly predicts the outcome variable. (Field, 2009)

The height of the standardized beta value indicates the importance of each predictor in the model, in which a bigger absolute value is most important. The standardized beta values are provided by SPSS and they tell us the number of standard deviations that the outcome will change as a result of one standard deviation change in the predictor. The standardized beta values are all measured in standard deviation units and so are directly comparable: therefore, they provide a better insight into the 'importance' of a predictor in the model. (Field, 2009)

Step 3 - Checking outliers

The hedonic regression is based on linear regression, which means that the fitted data set could be summarized with a straight line. The line which best fits the data collected can be performed by the mathematical technique called: the *method of least squares*. This 'line of best fit' is found by ascertaining which line of all the possible lines that could be drawn, which results in the least amount of difference between the observed data point and the line. This is shown in figure 36. The difference between the predicted data and the actual data are the so-called *residuals* in regression, which is shown by the dotted red line in figure 36.

Outliers in regression is a case which differs substantially from the main trend of the data. Figure 37. shows an example of such a case in regression. The green line represents the original regression line for the data, whereas the red line represents the regression when an outlier is present. As a result, it is important to detect outliers in order to see whether the model is biased.

In this study, after the most important variables are added to the model, the residuals which differ more than 3 Standard Deviations (SD) from the mean (higher or lower) will be deleted from the sample, as they are assumed to be the most important outliers.

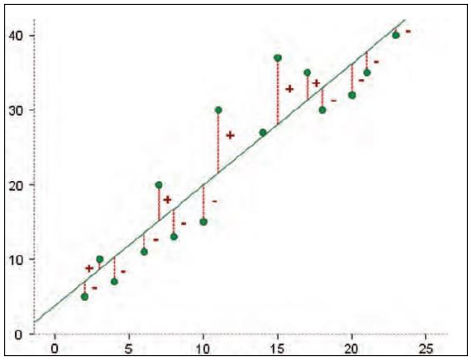


Figure 36. Regression line vs. residuals

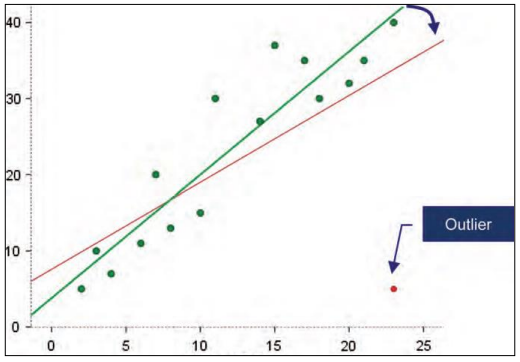


Figure 37. Regression line with and without outlier

Step 4 – Continuing Step 1-2-3

As already mentioned, steps 1-2-3 are continually taken, until the best model with significant variables and the highest (adjusted) R^2 is developed.

5.7. Rental adjustment equation

In order to test the relation between the real effective rent level and the vacancy, the '*rental adjustment equation*' will be used:

$$\frac{(R_t - R_{t-1})}{R_{t-1}} = \lambda\,(V_n - V_a) \Rightarrow \Delta R = \lambda\,(V_n - V_a) \qquad \textit{(Hendershott, 2004)}$$

R = Real rent; V_n = natural vacancy rate; V_a = actual vacancy rate; λ = adjustment factor

In the formula, the natural vacancy level is the vacancy rate that tends to prevail on average over the long run in the market, which indicates that the market is approximately in balance between supply and demand. (Geltner, Miller, Clayton, & Eichholtz, 2007). The natural vacancy rate can be considered as the amount of free office space, in a given economic condition, which is necessary for an efficient operating real estate market.

As the natural vacancy rate of the Amsterdam Office market is unknown in the market, the actual vacancy rate is directly compared with the real effective rent level, instead of correcting the vacancy with the natural vacancy rate. The theory behind the rental adjustment equation is further explained in the theoretical framework.

5.8. (Cross-)Correlation analysis – Testing relationships

5.8.1. Pearson Correlation

By means of a correlation analysis, the relation between two variables can be shown. A correlation analysis is used to test the similarities in the short-term. The correlation analysis will be performed in the statistical program IBM SPSS Statistics version 20.

Correlation can be measured by several *correlation coefficients*. This research uses the most common correlation coefficient, namely the Pearson correlation coefficient. The Pearson correlation coefficient is only sensitive to a *linear relationship/dependency* between two variables, which may also exist if one variable is a nonlinear function of the other. (Field, 2009). The formula for the Pearson correlation coefficient is:

$$r = \frac{cov_{xy}}{s_x s_y} = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{(N-1)\,s_x s_y} \qquad \text{Field (2009)}$$

Where:

r = the Pearson Correlation Coefficient | cov = the covariance | Sx or Sy= the standard deviation of x or y | $\bar{x}$ = the mean of x | $\sum$ = the expected value

A Pearson correlation coefficient of +1 indicates that the two variables are perfectly positively correlated, so as one variable increases, the other increases by a proportionate amount. Conversely, a coefficient of -1 indicates a perfect negative relationship: if one variable increases, the other decreases by a proportionate amount. A coefficient of zero indicates no linear relationship at all and so if one variable changes, the other stays the same. As a result, the significance of the correlation coefficient is a measure of testing the hypothesis that the correlation is different from zero (i.e. different from 'no relationship'). (Field, 2009)

5.8.2. Lagged Correlation

As some relations between variables might be lagged by one or more years, it is also useful to test the relation between one variable and the other lagged variable. This is shown in the following example:

Year	Rent	Incentives	Incentives-1	Incentives-2
2002	€ 120,00	6,00%	7,00%	6,00%
2003	€ 130,00	7,00%	6,00%	5,00%
2004	€ 140,00	6,00%	5,00%	6,00%
2005	€ 130,00	5,00%	6,00%	7,00%
2006	€ 120,00	6,00%	7,00%	8,00%
2007	€ 110,00	7,00%	8,00%	7,00%
2008	€ 120,00	8,00%	7,00%	6,00%
2009	€ 130,00	7,00%	6,00%	5,00%
2010	€ 140,00	6,00%	5,00%	4,00%
2011	€ 150,00	5,00%	4,00%	
2012	€ 160,00	4,00%		

Bivariate Correlation

Variable 1	*Variable 2*	*Pearson Correlation*	*Sig. (2-tailed)*
Rent vs.	Incentives	-,729*	,011

Variable 1	*Variable 2*	*Pearson Correlation*	*Sig. (2-tailed)*
Rent vs.	Incentives -1	-1,000**	0,000

Variable 1	*Variable 2*	*Pearson Correlation*	*Sig. (2-tailed)*
Rent vs.	Incentives -2	-,612	,080

The example shows that the highest Pearson correlation between the rental price (€) and the incentives (%) is when a time-lag of 1 year in incentives is used.

5.8.3. Correlation outputs

The (cross-)correlation analysis is used to test the following relations:
- the relation between the level of incentives and the vacancy rate
- the relation between different rent levels and the vacancy rate
- the relation between the level of incentives and several economic indicators
- the relation between different rent levels and several economic indicators

The correlation analysis will also be used to test for the spatial segmentation analysis, by means of comparing the mutual development in incentives and rental prices.

5.9. Testing for structural and spatial segmentation – Post-Hoc procedures

Next to the (cross-)correlation analysis and the hedonic price analysis; another statistical method will be used in this research, namely the statistical test of '*Comparing multiple means'*.

Comparing multiple means is especially useful in order to test the statistically difference between several means. In my research this will be used for the structural and spatial segmentation analysis, for example to test if the height of incentives and rental prices significantly differ per area sample per year, or the significantly difference between incentives and rent levels for several building and location characteristics.

5.9.1. Comparing two means | t-test

In statistics, comparing means is generally based on a specific test, the *t-test*. This t-test in comparing means focuses on testing whether two group means are statistically different from each other.
Most test statistics can be explained by the 'variance explained by the model' divided by the 'variance that the model can't explain'. In other words, the ratio of effect compared to its error. In a t-test, the 'effect' is the difference between the two group means. As means vary from sample to sample, the standard error of the mean is in general used as a measure of the fluctuation of the mean, or in other words the error in the estimate of the mean (*Field, 2009*). As a result, the standard error of the difference between the two means can be below, in which the top half of the equation is the 'effect' and the bottom half is the 'error': used as an estimate of the error in the model. Therefore, the *t-test* is calculated, based on the formula:

$$t = \frac{\text{observed difference between sample means} - \text{expected difference between population means (if null hypothesis is true)}}{\text{estimate of the standard error of the difference between two sample means}}$$

5.9.2. Comparing multiple means | F-test

Analyzing situations with more than two conditions is done by an *analysis of variance* or *ANOVA*. In my research only situations with more than two conditions are discussed.

In a t-test, the hypothesis is tested whether two samples have the same mean. Similarly, the ANOVA analysis, tests whether three or more means are the same, by testing the null hypothesis that all group means are equal. An

ANOVA produces an F-statistic or F-ratio, which is similar to the t-statistic in that it compares the amount of systematic variance in the data to the amount of unsystematic variance. In other words, *F* is the ratio of the model to its error.
The ANOVA tests the overall experimental effect. As a result, the ANOVA tells us whether the experimental manipulation was generally successful, but it does not provide information about which groups are affected. (Field, 2009)

Assuming an experiment was conducted with three different groups, the *F*-ratio tells us that the means of these three samples are not equal (i.e. that X1 = X2 = X3 is *not* true). However, there are several ways in which the means can differ. For instance, that the means of group 1 and 2 are the same but group 3 has a significantly different mean from both of the other groups. In conclusion, the *F*-ratio tells us only that the experimental manipulation has had some effect, but it doesn't tell us specifically what caused the effect.

Homogeneity of variance test
In order to explain the aspect of variance, the error bars of the mean of random values are shown in the opposite figure. It shows that all error bars overlap, which indicates that there are no between-group differences. The line that joins the means seems to show a linear trend, which indicates that in case one value increases, the other value is also increasing.

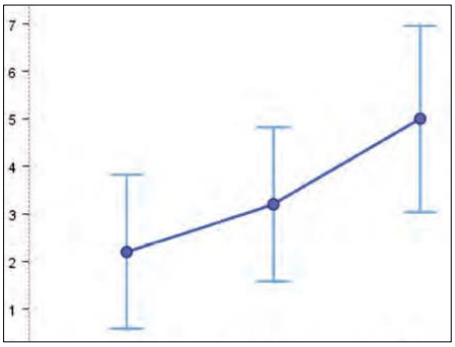


Figure 38. Error bars of the mean

The homogeneity of the variances between groups can be tested with the so-called Levene's test. The Levene's test, tests whether the variances of the several groups are significantly different from each other.

In order to check whether the means are significantly different from each other, the Levene's test gives two options:

- If the Levene's test is significant (variances significantly different, sig. < 0,05); the Robust Tests of Equality of Means table needs to be used
- If the Levene's test is not significant (variances not significantly different, sig. > 0,05); the ANOVA table needs to be used.

Test of Homogeneity of Variances

PercIncentive

Levene Statistic	df1	df2	Sig.
55,116	6	2928	,000

Figure 39. Levene's test

Robust Tests of Equality of Means

PercIncentive

	Statistic[a]	df1	df2	Sig.
Welch	17,732	6	668,257	,000
Brown-Forsythe	18,705	6	1280,581	,000

a. Asymptotically F distributed.

Figure 40. Robust Tests of Equality of Means

ANOVA

PercIncentive

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7296,372	6	1216,062	22,152	,000
Within Groups	160732,998	2928	54,895		
Total	168029,370	2934			

Figure 41. ANOVA table

Mean difference: ANOVA or Robust Test of Equality of Means
If the significance < 0,05 in the chosen table (ANOVA or Robust Tests of Equality of Means), then the group means are significantly different in the sample. This is represented by the height of the *F-value*.

Post-Hoc procedures
In order to determine which groups are statistically different from each other, a *Post-Hoc test* can be conducted. A Post-Hoc test consists of pair wise comparisons, in which all different combinations between treatment groups are compared. SPSS has 18 different Post-Hoc procedures, in which it is important to choose a specific test which fits best to the data used. Difference between Post-Hoc tests are in generally based on equality or inequality in sample sizes, the similarity in group variances in the sample, and the statistical power and control over the test.

In this research the opposite Post-procedures will be used, based on the equality of the sample size and the similarity of the group variances. (Field, 2009)

Post- Hoc-Procedure		Group Variances	
		Similar	Not similar
Sample size	Equal	REGWQ	Gabriel's
	Not equal	Hochberg's GT2.	Games-Howell

In the example *Multi Comparisons* table, the output of the Post-Hoc procedure is shown. It shows that all the means are statistically different from each other (sig. < 0,05). In this example, there can be concluded that the percentage incentives differs per contract type (short, medium, or long).

Figure 42. Output Post-Hoc procedure

Multiple Comparisons

Dependent Variable: PercIncentive
Games-Howell

(I) Contractterm		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Contract term short: <3 year	Contract term medium: 4-7 year	-1,29891*	,28480	,000	-1,9670	-,6309
	Contract term long: >8 year	-3,58066*	,74335	,000	-5,3349	-1,8264
Contract term medium: 4-7 year	Contract term short: <3 year	1,29891*	,28480	,000	,6309	1,9670
	Contract term long: >8 year	-2,28175*	,72973	,006	-4,0047	-,5588
Contract term long: >8 year	Contract term short: <3 year	3,58066*	,74335	,000	1,8264	5,3349
	Contract term medium: 4-7 year	2,28175*	,72973	,006	,5588	4,0047

*. The mean difference is significant at the 0.05 level.

5.9.3. Comparing multiple means in research

This research uses especially the comparing means method in the following cases:

Spatial segmentation:

- To test whether the incentives statistically differ yearly per city district, per sub-office market and per business district.
- To test whether the effective rental prices statistically differ yearly per city district, per sub-office market and per business district.

Structural segmentation:

- To test the influence of building characteristics; construction period, age, floor area; on incentives and effective rent levels
- To test the influence of location characteristics; Google Walkscores, distance to station, distance to highway; on incentives and effective rent levels
- To test the influence of the Contract term on the incentives and different rent levels

In the empirical analysis, only the outcomes of Post-hoc procedures will be discussed. The outcomes of the Levene's test, the ANOVA table and the Robust Equality of Means will be added as Appendix to the report.

5.10. Transparency analysis Amsterdam Office market

One of the main goals of this research is to provides openness about the underlying price development compared with the face rental price development, or average rental price development published in market reports in the Amsterdam Office market. This will be researched to provide an accurate conclusion about the overall (in-)transparency of rental prices in the Amsterdam Office market.

5.10.1. *Comparing face rents with nominal effective rents*

The goal of this sub-study is to research the percentage difference between face rents and nominal effective rent levels in the Amsterdam office market in the period 2002-2012. The following sources will be used:

Variable	Database & Source	Type of transactions	Period
Nominal effective rental price/ m2	Transaction database | Municipal Tax Office	All type of transactions	2002-2012
Face rent / m2	Supply database | Colliers International	Transactions LFA > 500 m2	2001-2012
Face rent / m2	Supply database | Vastgoedmarkt	Transactions LFA > 500 m2	2001-2012
Face rent / m2	Supply database | NVM Funda in Business	Transactions LFA < 500 m2	2001-2012
Face rent / m2	Supply database | Vastgoedmarkt	Transactions LFA < 500 m2	2001-2012

The research is conducted by comparing the nominal effective rental price of the particular transaction with the latest face rental price / m2 on the market.

As there is assumed the in-transparency mostly occurs within transactions with an LFA > 500 m2, the research will focus on the comparison for these type of transactions. When this process shows to be a success, the difference between face rents and effective rental levels will also be researched for transactions with an LFA < 500 m2.

Comparison approach

As all the databases will be connected to the Office Stock Database of the TU Delft, all the individual transactions from the Municipal Tax Office and face rents from the different supply databases are listed per office building in Amsterdam. This measure makes easier to compare the nominal effective rental prices with the latest face rental price on the market.

5.10.2. *Comparing average published rental prices with nominal effective rents*

Another method of evaluating the transparency in the market is by comparing the average published rental prices development with the average nominal effective rental price development from the transaction database of the Municipal Tax Office.

II – Theoretical Framework

1. The Dutch office market, an efficient and transparent market?

1.1. Perfect and efficient markets by theory

1.1.1. The neoclassic theory and the perfect market

Transparency and the provision of information are important ingredients for a well-functioning market. In the general functioning of the market, an optimum exists between the needs of the consumer on the one hand and the maximum gain of the seller or producer on the one hand. This neoclassical theory, is a movement within microeconomics which describes the different approaches for determining prices of goods and services, and the income distribution within markets, by means of *supply* and *demand*.

The basic principle is based on a '*perfect market', which is an open market with perfect competition and an unobstructed functioning of the market*. In a perfect competitive market there is *complete information* which is *available for all market participants*.

The perfect or 'open-market model' consists of four fundamental characteristics: (Van Geffen, 2001)

1. The market consists of many buyers and sellers, which behave rationally;
2. Homogeneous goods are traded in there are no product differentiations;
3. There are no transaction costs involved;
4. The market does not have any entry or exit barriers.

An important feature of the open-market model is the symmetry between the price paid by consumers and the costs made by the producer. At the moment of the transaction, a balance is found between the attached value by the consumer and the profit maximization of the selling party. The transaction will be conducted at the highest value of the product. This is the optimum situation, which is known as the *Pareta-optimum-location,* and leads to an objective maximization of efficiency (Hilverink, 2004). If this optimum is not reached, the equilibrium is disturbed, and for that reason a perfect market no longer exist. These deviations from this optimum, are called '*market imperfections or market failures'*. (Elferink, 2012)

1.1.2. Efficient markets and market imperfections

The first *efficient market* theory was developed by Eugene Fama (1969), which stated that a market is efficient when it *'adjusts rapidly to new information'*. This theory, the '*Efficient Market Hypothesis'* (EMH) was related to the financial market, in which it emphasizes that financial markets are informationally efficient. As prices of traded assets already reveal all known information, it is *impossible* to consistently outperform the market by using any information that the market already knows. Information or news in the EMH is defined as anything that may affect prices that is unknowable in the present and thus appears randomly in the future (Fama, 1970). In the EMH price expectations are formed by rational expectations, and the expectations of future prices are based on the same mechanisms as the current and past market prices. As a result, no one can earn profits as far as the estimates are unbiased.

Fama (1970) extended and refined his theory, and included the definitions of three forms of market efficiency: *weak, semi-strong and strong*. The weak form states that it is not possible to predict the future price schedules using information about the previous price movements.

The semi-strong form argues that prices should reflect all publicly available information including past price information, all public financial information and other relevant information that might affect asset prices. Information advantage is only possible when a person possesses inside information. Market efficiency in the strong form, states that even nonpublic information is included in the asset values, and no one is able to achieve exceptional returns even those who possesses inside information (Maier, G. & Herath, S., 2010; Swagerman, 2010).
A notable recent definition for an efficient market that has been quoted very frequently is presented by Malkiel (1996), '*a capital market is said to be efficient if it fully and correctly reflects all relevant information in determining security prices'*. The definition implies that it is *impossible* to make economic profits by trading on the basis of that information set. (Maier, et al., 2010)

As all public information is incorporated in the price, any efficiencies i.e. over-or underpriced goods, will be directly arbitrated by the market. This differs from *market imperfections*. Despite the fact that all the public information is

incorporated in the market, it is still possible any market imperfections occur. For instance, if information is only available to a certain group of private parties. (Elferink, 2012)

Numerous researchers and academics agree that there are some other factors beyond information which influence the market efficiency. Existence of price cycles and the nature of goods sold in the market are two non-information factors. Price volatility, cycles and bubbles could be inter-related in a specific market at a given point in time. (Maier et al., 2010)

1.1.3. Market imperfections

According van Geffen (2001) market imperfections exists when:

1. A concentration of demand and supply, or collusion occurs;
2. If transaction costs are involved, such as a lack of information or due to strategic behavior;
3. The market has entry or exit barriers;
4. Externalities occur; which are not compensated, third party costs, or suffered damages as a result of an economic activity.

As there are infinite examples of market imperfections, DeGennaro (2005) made a division in five main categories, based on the *cause* of different market imperfections:

1. Transaction costs;
2. Taxes and regulations
3. Indivisibility of assets
4. Non-marketable assets
5. Agency and information problems.

This research will mainly focus on market imperfections which lead agency and information problems, and transaction costs.

1.1.4. Transparent or efficient markets

The *open-market model* discussed in paragraph 1.1.1. is related to *transparency*, as a lack of transparency (information) causes transaction costs. In this way, one of the fundamental characteristics of the 'open-market model is disturbed. A lack of transparency is therefore a market imperfection and disrupts the 'optimum functioning of the market'. Transaction costs mentioned here are not just the standard notary and property taxes costs, but all costs which occur due to limited availability of information which has to be collected and processed. Furthermore, transaction costs also occur if not all parties are fully informed, which is also known as asymmetric availability of information.

A full transparent market, in which all parties have access to the same information, is also known as an *efficient market.* After all, if all parties have the same information a transparent and translucent situation is created.

1.2. The real estate market in general, a perfect and efficient market?

The real estate market is in general, an imperfect and in-efficient market, due to the following reasons:

Heterogeneity of assets and segmented structure

As the previous paragraph explained, in a perfect market '*homogeneous goods are traded in there are no product differentiations*'. In general, the real estate market is characterized by its segmented structure, into various sub-markets along different dimensions and each type of real estate assets is quite heterogeneous in itself. As a result, the real estate market is considered as an imperfect market.

Furthermore, since the concerning submarkets are more or less related all the differentiation by type, locations and time, have potential implications for judging the efficiency of the real estate market. It can be stated that in an efficient market, the prices of each level fully reflects the prices at the respective disaggregate level. So in an efficient market, the prices of a portfolio should reflect the value of the buildings it contains; the price of a building should reflect the value of and the rent generated by its individual units. Similar arguments can be made for the relationship between several types of real estate, between spatial sub-markets and over time. Empirical tests of the efficiency of the real estate market typically focus on one of these aspects in one sub-market.

In the real estate market it is normally not common that prices of each level fully reflects the prices at the respective disaggregate level. As a result, the real estate market is in general not a fully-efficient market.

Asymmetrically distributed information

The real estate market is considered as an in-efficient market as information is 'asymmetrically distributed'. Asymmetric information occurs when one side of the market is less well-informed than the other, and therefore leads to a knowledge advantage (Barr, 2000).

Transaction costs

The real estate market is characterized by large transaction costs, mainly due to the asymmetric distributed information. Transaction costs are costs which are accompanied with the execution of a transaction (Geffen, 2001). Examples of those costs are search costs, information costs (information acquiring, information processing), costs of strategic behavior, costs of monitoring and communication (negotiation costs). Those different transaction costs, are made for instance by research teams, strategy and development employees and acquisition managers. Before a transaction is closed, a lot of research is already done. Transparency is also related to predictability, as when a lot is known about the market, it is more easily to predict how the market will react on certain developments. In order to have full-knowledge about the market, high costs are made. Furthermore, the use of consultants or costs of advisory reports are also part of transaction costs. (Elferink, 2012)

Principal-agency problem & Moral hazard

In commercial real estate transactions often advisors are included. Advisors often have a knowledge advantage, in which they are close to the information field or specialists in a particular area. As a result, the client does not always have full control over the consultants work, which is called the principal-agent problem. This will not always provides the best result for the client, which in turn means high transaction costs are involved. The consultant may even act against the interest of the client (the principal). This situation is called, a situation of moral hazard. (Zuidema, van Elp, 2010)

Adverse selection

Skewed or adverse selection occurs when one party, at the moment of the transaction, has information which the other does not have. This is pre-eminently a situation that occurs in the real estate market. The question is whether this information is important. Each party has a different view on the object and the future market, which leads to a transaction. However, some information is available from other transactions for only one side of the deal.
In addition, in real estate, the information available between buyer and seller differs. For instance, the seller has a better understanding of the functioning of the object, any complaints from tenants, or damages to the object. As a result, the sellers often has a better information position than the buyer. This is in contrast to for instance the buyer and seller of securities, in which the access to information for both parties is more evenly balanced.

1.3. The importance of transparency

1.3.1. Benefitting from in-transparency

The main reasons behind the in-transparency and the asymmetrically distributed information in the Dutch office market are the knowledge advantage, taking advantage of ignorance of other parties or the fear of attracting more competition. Other reasons are privacy issues, the fact that there is nothing directly in return, or the fear of misinterpretation of data. (Elferink, 2012).
Furthermore, some information is not made public as this information can influence another decision in the future. When certain rental agreements are concluded, it can function as a starting point for a subsequent negotiation. When those agreements are made public in the market, it is also a starting point by third parties for using them in negotiations. These 'precedents' have an impact on the availability of information about the agreed rents and lease renewals. Especially incentives and rental levels are rarely made public.

For example, when incentives are provided in a multi-tenant building to one tenant (for example a rent free period of 24 months on a five-year contract by the lesser), it will influence the next negotiation. The consequence is that the next tenant also requires a rent free period of at least 24 months, if the tenant is informed about this information.

1.3.2. The importance of transparent markets

According to Elferink (2012), the importance of transparency can be divided in five parts:

1. *To increase the mutual competition*. An increased market transparency will ensure that consumers could compare similar goods, services and prices, which led to an increased mutual competition. (Molgaard & Overgaard, 2001)
2. *Encourage confidence.* Only transparent markets can create trust and attractiveness to professional investors. Fewer transparent markets will attract substantially less new investors. (Schulte, Rottke and Pitschke, 2005)
3. *Lower volatility and higher liquidity*. The generally accepted theory is that a higher degree of transparency leads to a lower volatility in prices and higher market liquidity.
4. *Lower transaction costs and an increased business value*. Companies that show a higher degree of transparency, usually have lower transaction costs and a higher liquidity. (Lang, Lins, & Maffett, 2010).
5. *The structure of data sets.* A lack of transparency makes it difficult to create a good long-term and reliable theoretical range.

1.3.3. The importance of transparency per actor (Swagerman, 2010)

Investors

As already explained in the previous paragraphs, in particular international investors prefer a mature, open and transparent market, instead of an opaque market. However, on the other hand, the investor does not benefit from providing insight into closed transactions, especially when it comes to providing incentives. An opaque market gives the investor the opportunity to establish information advantage, in which he could achieve a better return. After all, by providing incentives the rent level can be kept artificially high and thus also often the book value. If the investor is willing to invest in a building a transparent market is desirable. However if the property is bought and added to the portfolio, the investors suddenly is reluctant in making the transaction data available.

End-users

End users are almost always in favor of a transparent market, as the end-user wants to know whether the total price paid for his real estate is in line with the market.

Advisors

In a transparent market, the demand and supply in real estate will increase, which has a positive influence on the amount of transactions. Furthermore, real estate advisors have the necessary information available to make a thorough decision. However, they will use this information in each separate case, in which they will not make this information available to the market, as property advisors try to protect its own market and knowledge position. For instance, the high degree of transparency ensured a major change on the position of brokers in the housing market. A higher degree of transparency could also led to the same occurrence in the commercial real estate market. As a result, property advisors are reluctant to contribute to more transparency.

The developer

Also with the developer we find this contradiction. On the one hand the developer might be taken advantage of market imperfections in order to increase the return, without additional risks. On the other hand, an increased market knowledge (transparency) will contribute to a lower risk.

The public party/government

The government will benefit from more transparency. The government attaches great importance to transparency in the value of registered properties, for instance for lifting various taxes. Incentives have an influence on the purchase value of real estate, in which they therefore influences the Valuation of Immovable Property Act (Dutch: WOZ-waarde).

2. Real estate & Office market dynamics

There chapter will start with explaining the general functioning of the real estate market and office market. This is followed by explaining the rental price adjustments and cyclical behavior of the office market. At last, the segmented structure of office markets will be discussed.

2.1. The general functioning of the real estate market

2.1.1. Segmented structure with heterogeneous assets

In economic terms the real estate market can be seen as the market where supply and demand for real estate meet and where real estate is traded. The real estate market is characterized by its *segmented structure, into various sub-markets along different dimensions*. The most important dimensions are the type of real estate, the location and the time. An office building traded in Amsterdam in 1970 is not in the same real estate submarket as an apartment building traded in the suburbs of Berlin in 2010.

Various types of real estate exist, each of them posing specific challenges and issues for investors and analysts. Important types are: housing, office, shopping centers, industrial building and infrastructure real estate. Each of these types of real estate are quite *heterogeneous* in itself. For instance, the office building category includes both high-rise buildings located in central business districts, like the South-Axis, as well as offices located in traditional building in the Centre of Amsterdam, or for instance office buildings in more industrial one-story height buildings.

Furthermore, real estate can be analyzed from more individual units as well as multi-unit buildings. The results will be different whether we consider transactions of individual units or buying and selling of whole office buildings. Furthermore, market transactions can take place at different levels, for instance a single physical object can be traded or a portfolio of objects, in which the portfolio can consist of different types of real estate.

2.1.2. The real estate market: interaction between different market segments

The real estate market can be divided in multiple market segments. The most important markets segments which can be distinguished are the tenants or user market, the investment market, and the construction market. These market segments have a mutual interaction as shown in the opposite 'Four Quadrant Model' by Wheaton and Dipasquale (1992). These interactions include the gathering of demand and supply which lead to transactions.

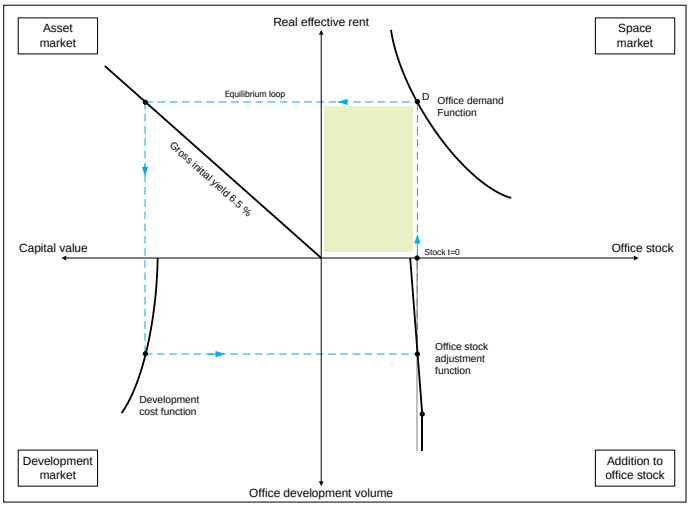


Figure 43 . Four-Quadrant model (DiPasquale and Wheaton, 1992); modified by Koppels and Soeters

The model shows how demand and supply are connected between different sub-markets (space market, asset market, contruction market). It shows that when the ratio shifts in one quadrant, it directly influences the next quadrant. For example, an improved macroeconomic situation creates an increased demand from users in real estate. As a consequence, the growing take-up will lead a reduced supply, which eventually will result in rising rents. This positively influences the value of the real estate, which will create the financial feasibility to start new developments in real estate. This is in short the working of the real estate market as described in the Four Quadrant Model. The continues adjustment between supply and demand will result in transactions in the several sub-markets. This concerns transactions in the rental market, the construction market and the investment market.

This research will focus on transactions in the 'space/ rental office market, between landlords and tenants, which is shown by the green surface in the Four-Quadrant model.

Each commercial property basically will deal with these various transactions. In the general development process, three types of transactions take place. The first transaction is between the land owner and the developer. After the developer bought the land he will construct a building, which will be bought by the investor. After all the tenant will rent space from the investor. In the above figure the process with multiple transactionmoments is shown. (Elferink, 2012)

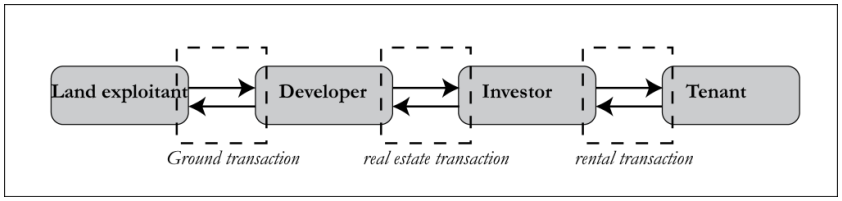


Figure 44 . Transactions between actors (Elferink, 2012)

The three basic transactions collectively show how the property market operates. It shows at which point a transaction is located, and how it relates to other markets, within or outside the property. In the real estate market, *transaction data* are important indicators for the circumstances of the market.

2.2. The office market: cyclical behavior and continuous adjustments of demand and supply, rental prices and returns along their long-term trend

2.2.1. The office market cycle

The real estate market, and especially the office market, can be described as a cyclical market, which indicates a recurring pattern of movements in the market. This so-called property cycle can be described as the propensity of property supply, demand, prices and returns to vary around their long term trend. The cyclical behavior of the office market gives insight in the functioning of the real estate market and the interaction with the broader economy. It may also provide for the right timing to purchase or sell real estate assets.

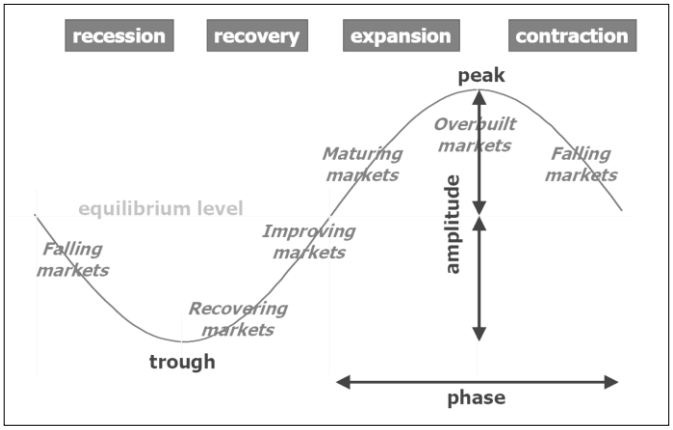


Figure 45. The office market cycle (Theebe, 2013)

The opposite figure shows the different periods of one market cycle: *recession, recovery, expansion and contradiction.* The *recovery* period is characterized by increased economic activity, followed by a rising demand for real estate, which results is vacant space which is absorbed. After the recovery period, the *expansion* period is entered, in which due to the increased absorption of space, the rents and prices will increase above their equilibrium value. The office market will be profitable for developers, when the prices exceed the construction costs and starts with new construction. Banks will more easily provide loans as prices are rising, resulting in high availability of debt. During this period, the market 'overshoots'. As market participants become aware of the possible overshooting, a deterioration of economic circumstances is expected, in which the property market enters the *contraction* period. The contraction period is characterized by lower absorption and credit availability decreases, as banks no longer supply loans more easily. The supply still increases, due to the building lag; construction which stated late in the recovery period provides the market with buildings in the expansion period, in which the vacancy rises due to the decreased demand. This is followed by a period of recession, with low absorption, rising vacancy and decreasing construction. As a result, rents and prices fall below their equilibrium value. After this period the economy will again reach the recovery phase. (Knoppel, 2009)

In the opposite figure, the office market cycle of the United Kingdom Office market is shown from 1982-2012 (based on IPD), with its most important influences on the value growth, related to the economy or related to financial markets.

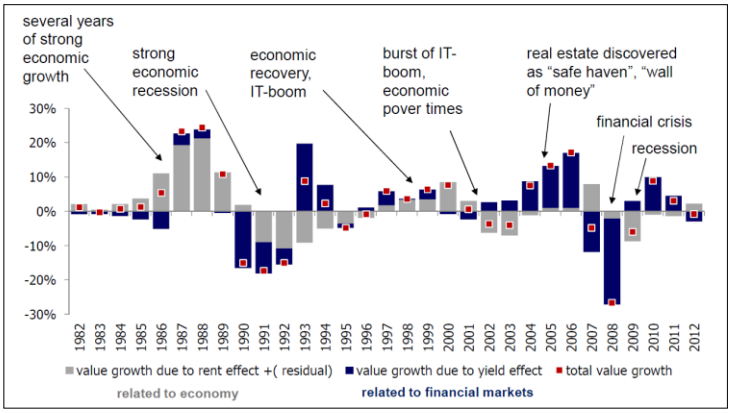


Figure 46. Economic and financial market influences on the UK office market 1982-2012 (IPD)

It is important to realize that office markets are local markets, subject to local influences. According to Witten (1987), office markets in different regions have local cycles. Additionally they likely find themselves at different moments within their cycle. Research of Mueller (1995) showed that submarkets can move differently from the overall market cycle in the short run, but submarkets will typically trend with overall market movements in the long run.

2.2.2. Demand/supply curve

The cyclicality shown in the opposite figure by Born, Phyrr, & Roulac (1999) shows a typical phenomenon for the office market, namely the lag between demand and supply, in which the supply cycle is following the demand cycle.

The authors state the best indicator of the current market position of the cycle is the occupancy rate. Although the level of vacancy can be a good indicator of the specific cycle position.

Bijkerk et. al (2003) found that for the Netherlands the lag of supply in the latest cycle seems to be approximately two years. The length of the cycle typically varies between each asset class, in which the length of the office market cycle varies between 4 and 12 years. This is more or less in line with findings of Wheaton (1987), who states that the length of the office market cycle can vary between 10 and 12 years. Within the office markets, different regions walk through the cycle at different paces. (Knoppel, 2009)

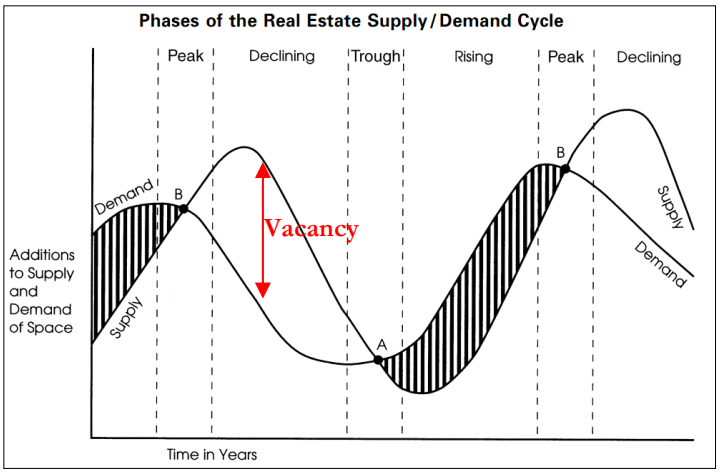


Figure 47. Demand/supply curve (Phyrr et al., 1999)

2.2.3. The economic leasing cycle

Bond (1994) continues on the principle of cyclical behavior of the office market and introduces the so-called '*economic leasing cycle*' as shown in the opposite figure. In the economic leasing cycle, the entire cycle of the office market will pass. The steps in the economic cycle will be shortly discussed in order to place the functioning of the Amsterdam or Dutch Office market within the cycle. This is interesting in order to reflect the development of the rental prices and incentive levels in the upcoming years.

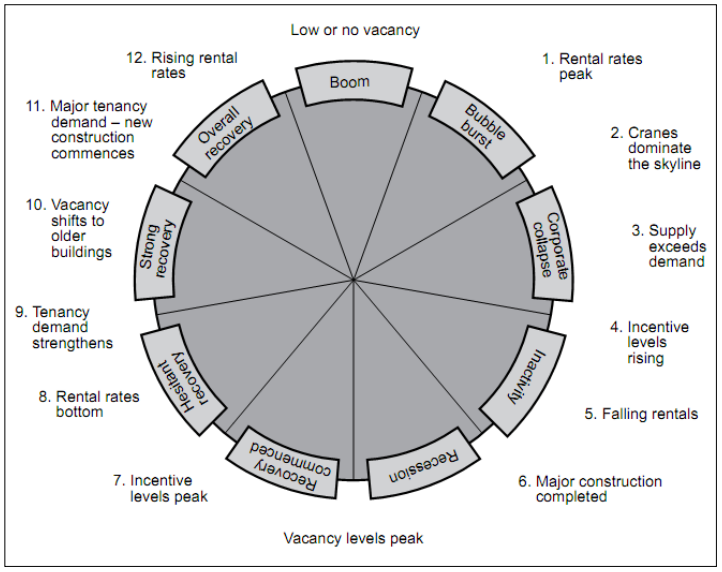


Figure 48 . Economic Leasing Cycle (Bond, 1994)

1. *Boom.* The cycle starts with a so-called boom situation, in which there is a healthy office market, with low or no vacancy(natural vacancy). Through healthy rental prices and a strong user-demand, there is no need for the provision of incentives.

2. Bubble burst. The next step is that the boom is situated at the point of change, but there still exists a healthy market. The tight office market leads to rising rents which in turn leads to an increased construction activity.

3. Corporate Collapse. The third step is characterized by a declining demand, which results in an oversupply in the office market.

4. Inactivity. Due to the oversupply in the market, in combination with investors who still refuse to lower the rent levels, the incentives are joining the market in order to attract tenants.

5. Recession. Then a period of recession occurs, in which it is no longer sufficient to provide incentives. The rent levels needs to decline, but it will not yet happen at this stage. The developed construction projects will put further pressure on the supply and the rent levels.

6. Recovery commenced. The economy is improving in which the vacancy levels stabilize.
7. Hesitant recovery. In this phase, the incentive levels will peak to their highest level. This creates an interesting situation in which the incentives are on such a high level that the investors can no longer pay them. A cash flow problem is occurring at the investor, as the interest and principal must be paid to the property financer. The only way to still enthuse the tenant is to reduce the rent level.
8. Strong recovery. The strong economy will result in a further increase in demand for jobs and office square meters. In this phase, especially the high quality buildings will welcome new tenants. As a result, the technical obsolete buildings will be left over, in which the structural vacancy will develop.
9. Overall recovery. In the last phase the market will again be tighter and construction activities will be started. Furthermore, the rental levels are rising often with the incentives levels which remain on a constant level.

Looking at the 'economic leasing cycle' of Bond, the Dutch Office market is currently situated in the phase recession/recovery. The economy is slowly recovering, in which the vacancy level is increasing to its maximum level. This creates a situation in which the incentives are on such a high level that the investors can no longer pay them. A cash flow problem is occurring at the investor, in which the only way to still enthuse the tenant is to reduce the rent level.

2.2.4. Research into the cyclical behavior of the Dutch office market

Hakfoort (1994) and Hordijk (2005) already described the office market dynamics in the Dutch Real Estate market. Hakfoort researched the relationship between macro-economic factors, like the GDP and the employment rate, and the vacancy rate between 1974 and 1992. However, he did not found a clear relation between them. Although, in his research he also addresses the difference between contract rents and effective rents. He suggested that concessions such as rent free periods and tenant improvements may well be cyclical; omitting them effectively, means smoothing of the series.

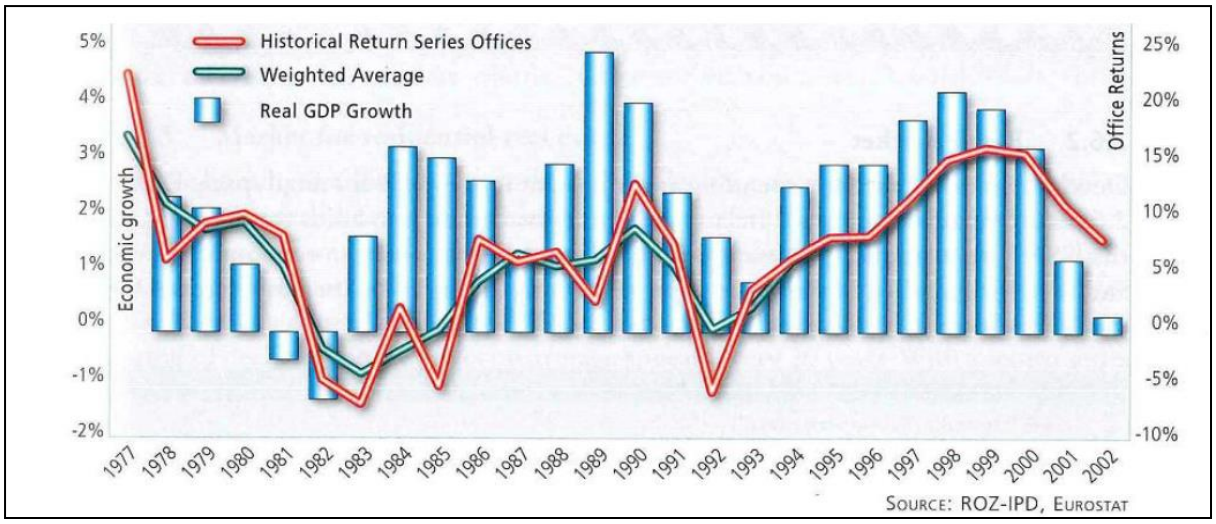


Figure 49. Office market returns and demand/supply ratio in the Netherlands (Hordijk, 2005)

In his research Hordijk (2005) explained that the office market is the market with the most pronounced cycle, since office employment growth and economic growth are assumed to be closely linked. He researched the relation between historic office rents and the demand/ supply ratio in the Dutch Office market. The rent levels show a two or three year time lag and are smoothed, compared to the demand and supply ratio. According to Hordijk (2005) an explanation for this occurrence might be the fact that incentives were not sufficiently reflected in the market rent. Furthermore, he also mentioned that the effects of incentives in a depressed market can be quite marked.

2.3. Vacancy-rental price adjustments in the office market

2.3.1. First models about the vacancy-rent adjustment process

Research about the influence of vacancy on rent levels in the office market was started in 1987 by Shilling et.al. (1987). In this research the price adjustment process for rental office space in 17 cities across the U.S. were analyzed.

The research showed that landlords react to fluctuations in demand by building up or drawing down inventories of unlet or vacant office space. In addition, higher levels of vacant office space mean that landlords lower their rents and reduce the difference between desired and actual vacancies. The second part of the article focuses on the rent adjustment related to the natural vacancy rate. According to the article, the natural vacancy rate can be described as an equilibrium in vacancy when rents are stable in the market.
In contrast to the cross 'sectional approach and regress natural office vacancy rates method used by Shilling et al. (1987); Wheaton and Torto (1988) used both time-series and cross-sectional panel data to estimate the vacancy-rental adjustment process between 1968 and 1986. In their research they found a strong relationship between rent changes and excess vacancy, in which they defined excess vacancy as vacancy which is above the 'average' vacancy. In contrast to the research by Shilling et al. (1987) which uses the desired and natural vacancy rate, Wheaton and Torto (1988) used the average vacancy rate deducted by the actual vacancy rate. They showed that for every extra base point excess vacancy the rent prices drop with two per cent. The time-series data analysis shows that both excess vacancy and structural vacancy are rising over time during the researched period.

Voith and Crone (1988) developed a model to analyze the decomposing vacancy rates in regard to market specific, time specific and random variables and researched how long deviations from the natural vacancy rate are likely to exist. They concluded that the natural vacancy levels differ between Central Business Districts and suburban markets. Furthermore, they also indicated the different adjustments of shocks across markets. According to Voith (1992) the lack of linearity in the equations used by Shilling et al. (1987) causes inconsistent natural vacancy rates.

2.3.2. The basic rental adjustment model

The basic rental adjustment model, is developed by Hendershott (1994). The basic rental adjustment model is a *linear* function, whereby the percentage change in real rents is linear related to the difference between the natural and the actual vacancy rate.
The basic rental adjustment model is based on the following equation:

$$\frac{(R_t - R_{t-1})}{R_{t-1}} = \lambda\,(V_n - V_a) \Rightarrow \Delta R = \lambda\,(V_n - V_a) \qquad \textit{(Hendershott, 2004)}$$

R = Real rent; V_n = natural vacancy rate; V_a = actual vacancy rate; λ = adjustment factor

The basic rental adjustment model is related to the relation between real effective rent and the office stock in the space market quadrant of the Four-Quadrant model. This is shown in the figures below.

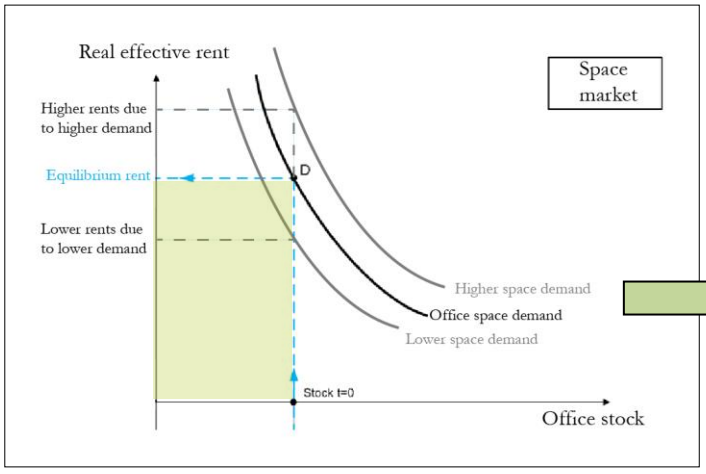


Figure 50. Space market quadrant of the Four-Quadrant model (DiPasquale and Wheaton, 1992); modified by Koppels and Soeters;

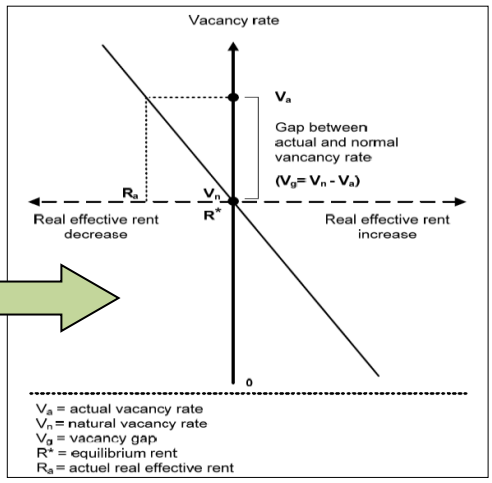


Figure 51. Rental Adjustment Equation (Hendershott, 2004); schematically illustrated by Koppels & Keeris (2006)

2.3.3. Other research into rental price adjustments

Brounen and Jennen (2009a, b) point out a differentiation in development of rent adjustment models in Europe and the United States. Brounen and Jennen (2009a) analyzed rent and vacancy dynamics in ten major European office markets; five premier tier office markets and five second tier office markets. In their research the rental adjustment

equation of Hendershott (2002) was used, in which they tested the vacancy-rent adjustment model on a city-wide and national level. They concluded that rents adjust to short-run changes in the economy. Their research also showed that second tier office markets show the same cyclical vacancy pattern as their related premier office markets, only less volatile.
A comparable research by Brounen and Jennen (2009b) about the asymmetric rent adjustment mechanisms for 15 U.S. metropolitan areas, indicated that office rents react significantly stronger to positive changes in office employment, when the actual vacancy rate is below their long term average.

When the vacancy rate is excluded, there is a positive correlation between office employment and (lagged) rent changes. When vacancy rates is taken into consideration and below the calculated equilibrium, the rents react significantly stronger to an increase in employment.
In contrast to Hendershott et al. (2009); Brounen and Jennen (2009b) concluded that that rental adjustment in the office market is asymmetrical. They also find that positive demand shocks have a positive impact on the rental growth and that positive supply shocks have a negative impact on the rent level.

Sanderson et al. (2006) take a different approach in researching the vacancy rent relation. By estimating natural vacancy rates across a larger range of markets, the writers want to contribute to the understanding of the dynamics of global office markets. The results show different measures of statistical robustness over the tested markets, especially emerging markets show invalid results. Regional differences are smallest in Europe, larger in the US and even larger in the Asia Pacific because of the emerging markets.

Sanderson et al. (2006) describes the following possible function to calculate the National Vacancy rate in the market:

$$\Delta R_t = \alpha - \beta\, VR_t \qquad NVR = \alpha / \beta$$

ΔR_t is the change in actual rents
VR_t is the vacancy rate
α is the rent growth when VR equals 0
β indicates the rent change per percent change in the actual vacancy rates

2.3.4. Rental price adjustments in the Amsterdam office market
Koppels and Keeris (2006) researched the relation between vacancy and rental price adjustments for the Amsterdam office market, by means of the rental adjustment equation. According to the authors, landlords react on the rising vacancy rates by trying to attract tenants through providing incentives, without adjusting the long-term rental rate. Landlords will only adjust the rental rates when the vacancy level continues to diverge from the previous vacancy level. Instead of a downward price-pressure and lower rent levels, the incentives are adjusted to the vacancy rate. This results in a rental price level which stays on a certain equilibrium, despite of the increasing vacancy rate (van Gool, 2011).

Their research showed a two-year time-lag between the vacancy rates and rent adjustments, which confirm that landlords are reluctant to adjust their rental rates when there are fluctuations in the vacancy rate.

In the same research another hypothesis was tested that incentives are used for short-time price adjustments and therefore should correlate with the vacancy rate without any time-lag. The correlation analysis showed a strong correlation with the vacancy rate without a time-lag. However, the rent levels used were not fully corrected for incentives. This research therefore distorts the relation between both variables. Another hypothesis tested in this research was: real rent levels adjusted for incentives have a stronger relation with the vacancy rate then a non-adjusted rent level has. Due to insignificant outcomes and data there was no clear-cut answer possible to confirm or reject this hypothesis.

2.3.5. The influence of excess vacancy and obsolete offices on rent levels
Office markets which are out of equilibrium, due to for instance excess supply, vacancy, or obsolete offices influences the vacancy rent relation.

The current paradoxical situation with relative stable nominal rent levels and at the same time a huge vacancy problem, might be explained by the inclusion of obsolete office space in the reported vacancy rates. Obsolete office space is not considered to be a viable accommodation alternative by office space users, as those offices do not meet their general location and physical building requirements. According to Koppels and Keeris (2006), obsolete offices should not be included in the vacancy rate part of the rental adjustment equation, as only properties which meet the general user requirements influence the perceived supply of office space. The general user requirements are the same for property investors, as the same properties no longer meet the investors' criteria for good investments.

In their research, they distinguish between natural (friction) vacancy and structural vacancy. The research showed that the correlation between vacancy and effective rent levels are significantly higher, when the structural components of vacancy are left out of the equation.

Hendershott (1994) researched the influence of excess supply on the rent adjustment in the Sydney office market. In this research, the rental adjustment equitation is used to test the relation between real rent changes, and the natural and actual vacancy rate. In order to calculate the value in times of excess vacancy, the periods of oversupply or rent below their equilibrium are pointed out. The model improved when measuring with a rent variable as a difference between gross rental rate and equilibrium rental rate.

Research by Voith and Crone (1988) showed that vacancy shocks disperse quickly to the vacancy equilibrium after a supply shock. Thirteen of the seventeen researched markets adjusted toward their equilibrium after a shock within one year.

Remøy (2010) described the difference between regular vacant offices and structural vacancy. Structural vacancy is defined as vacancy of the same space for three years or longer, and most of the time concentrated in mono-functional office locations and locations with a mix of distribution and industrial functions. From the 200 analyzed buildings in Amsterdam, 106 buildings had some level of structural vacancy. A Delphi-study showed that structural vacant offices do not have the building or location qualities to compete within a supply shocked market. According to this study, the status of the location and the accessibility by car are the most important location variables for causing structural vacancy, while parking facilities and appearance of the building are the most import building characteristics.

2.4. Spatial segmentation: sub-market behavior

Most office markets are modeled or described per country or city as a whole. As a result, the segmented structure of office markets is thereby ignored, as office markets are considered to consist of a system of submarkets, and interrelated submarkets (Stevenson, 2007). The 'submarket behavior' influences the relation between several mutual variables, like the relation between vacancy and rent in comparison to a city-wide or national level.

The sub-market behavior is already mentioned in research by Hanink (1996) related to vacancy, which shows that *'a mixed spatial auto regression analysis of the data pooled over time that the regional office vacancy effect is stronger than the national office vacancy effect in both downtown and sub-urban office markets.'* Some authors state that there are even supply imbalances within urban markets, this implies that the sub-urban level would be the most appropriate level for analyzing office market dynamics (Jones, 1995).

According to Stevenson (2007), segmentation of sub-markets can consist in two types; spatial segmentation and structural segmentation. Spatial segmentation is related to locational features, while structural segmentation is based on differences in property specific aspects. Most research into submarket behavior contains descriptive statistics or research into submarket dynamics within an hedonic framework. This is for instance the case in research by Dunse and Jones (2002, 2013) into the sub-market behavior of the Glasgow office market. They indicated that prices of office attributes are influenced by spatial influences, and are therefore not constant over the entire market.

In contrast to the hedonic approach, Stevenson (2007) uses in his research an extension of the rental adjustment error-correction model of Hendershott et al (2002), in which he tested the interrelated rental adjustment process between four submarkets in the London Office market. The research showed several differences in the characteristics of the four submarkets. The West-End submarket; one of the two largest submarkets in the London office market; showed to be less sensitive to both fundamentals and to market dynamics in other sub-markets. As a

result, this highlights the position as the prime submarket within London. Furthermore, the impact of the Docklands submarket, a smaller sub-market, showed to be apparent across the entire market.

Sub-market behavior in the Netherlands

In the Netherlands, research into sub-market behavior is mostly done by Brounen and Jennen (2009, 2009a, 2009b). Next to research into the influence of local factors on the rental adjustment process (2009a), and the existence of difference between supply and demand effects on a national and local level (2009), they also researched the rent effects of office clustering in the greater Amsterdam Office market over the period 2000-2005. By correcting for location and building characteristics, and the use of GIS data, they found that clustering of offices results in higher rents in the Amsterdam Office markets, regardless of the prevailing economic conditions. They concluded that this effect is mainly dominated by localization externalities, in which they showed that office space yields higher income as the density of the local office market increases. Doubling the local office market size had an increase in rent rates by over 4,5%. They furthermore described that office rents vary significantly across submarkets, with Amsterdam Center and Amsterdam South as the most expensive markets. (Brounen and Jennen, 2009)

3. Rental price indices

3.1. Several types of rental price indices

This chapter will discuss several types of rental price indices. Rental price indices can be distinguished by three main aspects, namely by *technique*, by *type of rents* and by *inflation correction*, as shown in the figure below. The figure also shows the *expected* improved market realistic situation between each type of technique, type of rents or inflation correction.

This following paragraphs will discuss the differences between each type of rental price index, based on explanations from literature.

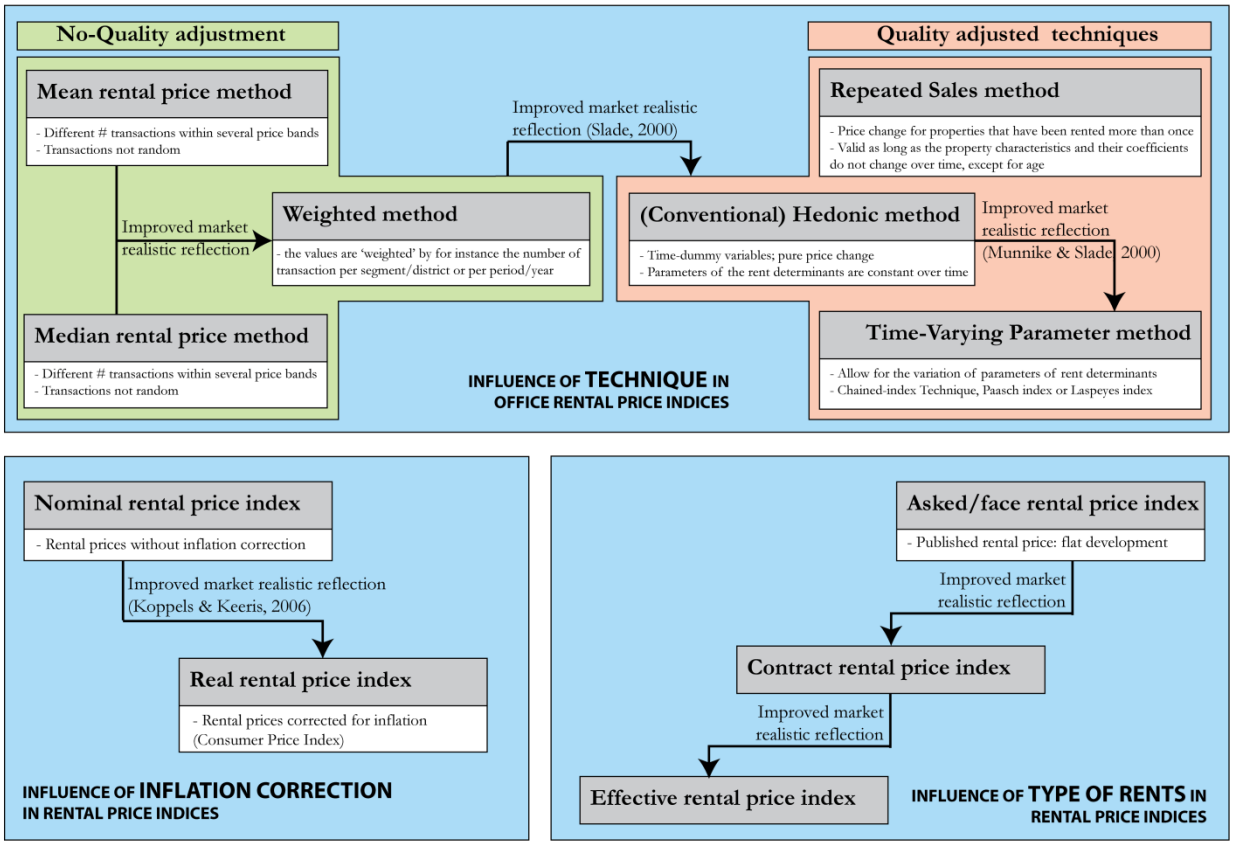


Figure 52. Different types of rental price indices

3.2. Type 1: Differences between 'type of rents' in index construction

Rental price indices can be constructed with different type of rental prices, namely face/asked rental prices, contract rental prices and effective rental prices. There is expected that the published rental price indices in the market based on face/asked rental prices, show the most flat development, as the face rental prices are not corrected for incentives.

This is similar for contract rental prices, which also include incentives. There is expected that a rental price index based on contract rental prices is more market realistic compared to a face rental price index. Furthermore, the rental prices will be more cyclical compared to the face rental price index. Compared to an effective rental price index, the rental price index based on contract rents, will be less cyclical, as the provided incentives will keep the contract rent level stable.

A rental price index based on effective rental prices should provide the most realistic price index, as effective rental prices are excluded for incentives, and a direct reflection of the market.

3.3. Type 2: Differences between nominal and real rental price indices

Research of Koppels and Keeris (2006) into the vacancy-rent relation in the Amsterdam office market, showed the same market circumstances currently occurring in the Dutch and Amsterdam office market, namely a rising vacancy rate, but a more or less stable rental price development.

In their research they compared nominal rent levels with real rent levels in constructing a rental price index, for the Amsterdam office market. The importance of using real rents instead of nominal rents is clearly illustrated by the opposite figures. The first figure shows the nominal rental price development in the Amsterdam office market over the period 1983 to 2005. Significant is the fact that from roughly 2000, the average rent levels have remained reasonably stable.

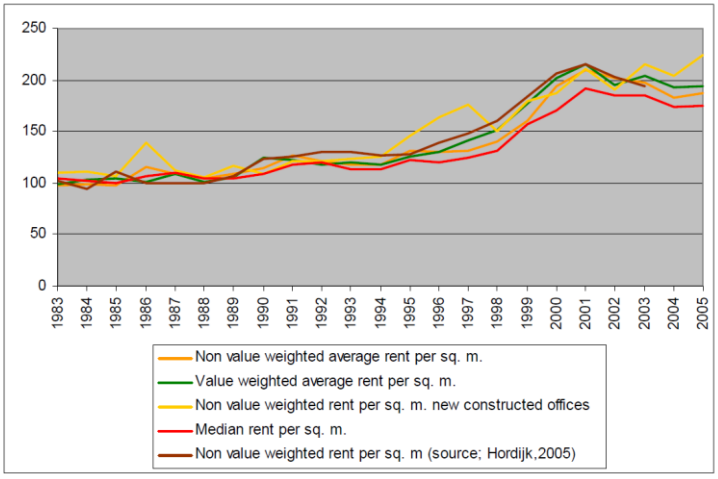


Figure 53 . Nominal rent level development Amsterdam 1983-2005 (Koppels & Keeris, 2006)

In the second figure, the nominal rent levels are corrected for inflation. The figure shows that the decrease of the average rent level after 2001 is much more evident when real average rents are employed, compared to nominal rent levels. This expresses a more realistic picture, because the vacancy rate was starting to rise rapidly in the market at that moment.

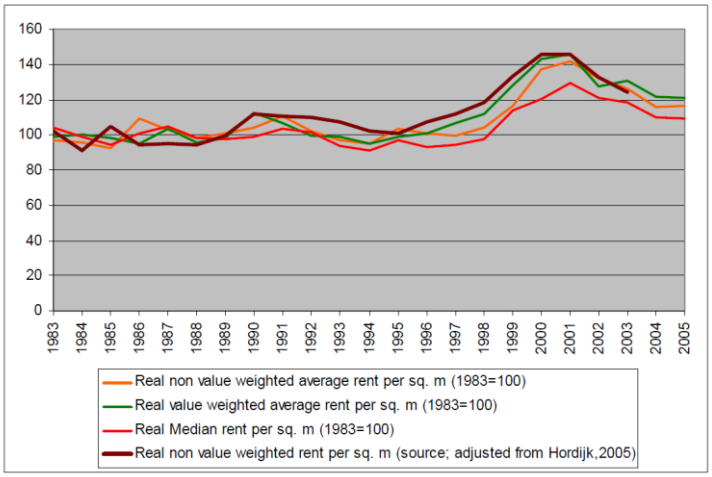


Figure 54 . Real rent level development Amsterdam 1983-2005 (Koppels & Keeris, 2006)

The results indicate that a rental price index based on real rents expresses a more realistic picture of the market developments, compared to nominal rent levels. The second figure also shows an improved cyclical rental price development.

3.4. Type 3: Difference in index construction techniques

This paragraph discusses the methods about rental prices indices in the real estate market. Existing literature is initially based on two main methods: the hedonic model (Rosen, 1974) and the repeated sales method (Bailey et al., 1963). Within years, both methods have been expanded and refined in several ways, with indices focused on typical market sectors, like offices and residential, and with applications controlling for a wide range of statistical biases, from sampling errors to temporarily aggregation. (Case and Quigley, 1991; Hoag, 1980; Clapp and Giacotto, 1992; Case et al., 1991; Geltner, 1991).

In the following sub-paragraphs, the most important rental price index techniques for the office market are discussed.

(Weighted) mean/median

The simplest measures of index construction is by means developing an average or median rental price index. As no data about building or location characteristics are needed, a rental index can be easily compiled. The main problem of creating an mean or median rental price index is that the samples are mostly subject to distortion by 'compositional' factors, which includes the volume of transactions within specific rental price bands or the fact that observed transactions cannot be considered to be random (Das, A., Senapati, S., and John, J., 2009).

Furthermore, it is also possible to develop an weighted-average or weighted mean/median rental price index. In a weighted index, the values are 'weighted' by for instance the number of transaction per market segment/district or per period/year.
Value weighted calculations have the disadvantage that one large transaction can distort the average rental value excessively. Then again, non-weighted rents have the disadvantage that rental income will be overstated, because larger premises will be rented out at lower rental values than smaller ones (Hordijk, 2005). The index used by Koppels & Keeris (2006) in the previous paragraph, is an example of a (weighted) mean / median rental price index.

An important drawback of the (weighted) mean/median approach is that there is no correction for differences in for instance buildings or locations characteristics, as this index is not quality-adjusted. (Francke, M.K., Kuijl, T., and Kramer, B., 2009)

3.5. Quality adjusted index construction techniques

Price changes for heterogeneous goods, like offices, often result from changes in quality characteristics. Therefore, constant-quality index construction techniques are essential to identify the inter-temporal pure rent change (Slade, 2000). Quality-adjusted index construction techniques are considered superior to the none-quality adjusted index construction methods.

This paragraph discusses the most important constant-quality index methods for commercial office buildings.

3.5.1. Repeated-Sales price index

The repeated-sales method is a broadly used method for index construction, although not common for rental price indices in the office market. However, Gatzlaff and Geltner (1998) successfully used the repeat-sales approach to generate their transaction-based price index, where no-excessive noise problems occurred. As almost no literature can be found about the use of repeated-sales index construction methods in the office market, this paragraph focuses on the general application of the repeated-sales technique in the residential market.
The literature on repeated-sales index construction has grown substantially since its first use by Bailey et al. (1963). Rather than focusing on the price level in each transaction, this approach relies on the observed changes in price for those properties that have been sold more than once. (Das et al., 2009). As a result, the increase in property value can be determined without having to account for the individual characteristics of the property.
The repeated sales method is valid as long as the property does not undergo major transformations that significantly change the nature of the asset, like updating the energy efficiency class. Furthermore, there has to be accounted for age in the measurement as well as the time between two transactions. (Francke et al., 2009)
The generally used basic repeated sales method (Case-Shillar three-stage generalized least squares (1987)) contains the following equation:

$$ln(P_{i,t)-}\ ln(P_{i,s)} = + \left(\sum_{j=1}^{k} \beta_j\, X_{i,j,t} - \sum_{j=1}^{k} \beta_j X_{i,j,s)}\right) + \left(\sum_{\tau=t}^{T} \mu_t\, D_{i,\tau} - \sum_{\tau=s}^{T} \mu_s D_{i,\tau)}\right) + \ e_{i,t}$$

$$reduced\ to\colon \ln\left(\frac{P_{i,t}}{P_{i,s}}\right) = \sum_{\tau=s}^{t} \mu_t D_{i,\tau)} + \ e_{i,t} \qquad (1)$$

Where $P_{i,t}$ and $P_{i,s}$ is the (logarithmic) price of the same property *i* at times *t* and *s,* explained by the hedonic variables of that property ($X_{i,j}$ is one variable, *k* is the total number of variables). Then the registered price difference for property *i* may be attributed to the passage of time as tracked by the time-dummies μ_t, with *t* running over the entire period that the index is evaluated. The coefficient μ_t is the logarithm of the cumulative price index at time t and the error term $e_{i,t,}$ is the random error.
The price dynamic in equation 1 is valid as long as the property characteristics and their coefficients do not change over time, except for age. (Francke et al., 2009)

3.5.2. The hedonic rental price technique

According to Dunse and Jones (1998), hedonic regression theory makes it possible to estimate the implicit price of each attribute by relating the rent of the unit to its individual attributes. Several studies (Brennan, Cannaday and

Colwell, 1984; Cannaday and Kang, 1984; Frew and Jud. 1988) which examine different functional forms for analyzing office rents, all suggest the log-linear model outperforms the other models. In the log-lineair model, both dependent and explanatory variables are the natural logarithm of the variable of interest, which allows the estimation of the relative effect of a change in the explanatory variable on the dependent variable. The log-linear model on analyzing office rents is already used in several studies (Clapp, 1980; Brennen et al., 1984; Sivitanidou, 1995; Colwell, Munnike and Trefzger, 1998; Slade, 2000).

Log-linear models most of the time include dummy variables (zero-one indicator) variable, which may signal the presence of qualitative attributes like building or location characteristics or for instance the transaction year. The traditional hedonic price model is shown in the following equation:

$$Ln\ R_i = \alpha + \sum_{k=1}^{K} \beta_k\, X_{ik} + \sum_{l=1}^{T} C_l D_{il} + \varepsilon_i \qquad (1)$$

Where:
- Ln R*i* = the logarithm of rent per square meter per year for rent transaction i;
- X_{ik} = the natural log of the continuous variable *k* for rent transaction *i*;
- D_{il} = the dummy variable *l* for rent transaction *i* which takes the value of 1 if it relates to the property of that rent transaction and 0 otherwise
- βk = the coefficient of the continuous variable *k* and *cl* for the dummy variable *l*;
- *a* = the constant term and *εi* the error term for property *i*.

In many studies a conventional hedonic technique is used to construct a constant-quality rent index (Wheaton and Torto, 1994; Fisher, Geltner and Web, 1994) and Englund et al., 2008). The conventional-hedonic technique includes vectors of time-dummy variables in the traditional regression model:

$$Ln\ R_i = \alpha + \sum_{k=1}^{K} \beta_k\, X_{ik} + \sum_{l=1}^{T} C_l D_{il} + T_{it}\ \varepsilon_i \qquad (2)$$

Where T_i represents a vector of time variables. The vector of the time variables contains a dichotomous variable for each period in the study, with exception of the omitted period. This traditional hedonic time dummy variable approach assumes that the parameters of the rent determinants are constant over time, in which the parameters of the time variables will capture the pure rent change.

3.5.3. Time-varying parameter techniques

However, if the parameters on the rent determinants are unstable and vary inter-temporally, then this restriction biases the parameters on the time variables, resulting in a biased index (Clapp and Giacotta, 1992; Knight, Dombrow and Sirmans, 1995). As a result, index construction methods which allow for the variation of parameters of rent determinants overcome this form of bias and are therefore considered superior to the discussed conventional hedonic technique.

In general, there are three time-varying parameter techniques for constructing constant-quality indices for heterogeneous properties: the Laspeyres index, the Paasche index and the Chained Index (Berndt, Griliches and Rappaport, 1995), which will be discussed below.

Laspeyres and Paasche index technique

The Laspeyres and Paasche index technique differs from the conventional hedonic index technique from the fact that the time variables are removed from the equation (2). This leads to the following equation:

$$Ln\ R_i = \alpha + \sum_{k=1}^{K} \beta_k\, X_{ik} + \varepsilon_i \qquad (3)$$

This process allows the parameters to vary each period.

Laspeyres index

In the Laspeyres index the predicted value is generated for each time-period, using the estimated parameters and the mean value of each variable from the omitted period. Normalizing all the predicted values to the omitted period provides the Laspeyres index. The rent level for period *t* is computed as:

$$RL_t = 100\left(\frac{e^{\beta_t \bar{X}_0}}{e^{\beta_0 \bar{X}_0}}\right) \quad (4)$$

In the Laspeyres index, the X_0 represents the mean value of each variable from the omitted year which is referred to as the fixed weights.

Paasche index

The Paasche index technique uses the same parameters as the Laspeyres index, but the weights are allowed to change over time. For example, the rent change between the first and second period is established by calculating the fitted value for the second period using the mean value of the explanatory variables for that period. The mean of the explanatory variables are also applied to the first-period parameters in order to arrive at a quality-adjusted fitted value for the first period. The difference (ratio) between both fitted values (second to first) provides the index change from the first period. The rent level for period *t* is computed as:

$$RL_t = 100\left(\frac{e^{\beta_t \bar{X}_t}}{e^{\beta_0 \bar{X}_t}}\right) \quad (5)$$

In which the Xt represents the mean value of each variable from period t. As a result, the difference between the Laspeyres and the Paasche index, is that in the Paasche index the weight variables might change over time.

The Chained-index technique

The chained technique improves on the conventional hedonic technique by allowing variation in the parameters of variables not directly related to time. In the chained index-technique, the entire sample is first divided into sub-intervals of time, and contiguous sub-intervals are combined into sub-samples. As a result, the first sub-sample contains the first two periods, the second sub-sample contains the second and firth period, etc. The total model is estimated over each of the combined subsamples and includes the vector of rent determinant explanatory variables, as well as a single dichotomous time variable. This is shown in the following equation:

$$Ln\ R_i = \alpha + \sum_{k=1}^{K} \beta_k\ X_{ik} + \sum_{l=1}^{L} C_l D_{il} + d\ T_{it}\ \varepsilon_i \quad (6)$$

The dichotomous variable *T* takes the value of one if the observation falls in the latter period, and a value of zero otherwise. The parameter *d* represents the relative change in rents between the two periods.

As these parameters are estimated for overlapping combined subintervals (for instance, periods one and two, periods two and three, etc.); the rent change for a period relative to the first period, denoted as $\lambda_{0,t}$, is found by adding the intra-interval rent changes over the desired interval. This process is shown in the following equation:

$$\lambda 0, t\ = \sum_{i=0}^{t-1} d_i \quad (7)$$

where t is the time period and $d_0 = 0$. The rent level for period t (relative to the omitted period) is then computed by raising $\lambda_{0,t}$ to the exponential and adjusting to the base of 100 (in effect; $RL_t = 100e^{\lambda_{0,t}}$ (Berndt, 1991)).

Comparison between time-varying techniques

The advantage of the chained index technique over the Laspeyres and Paasche methods is the absence of a particular weighting scheme. Furthermore, the chained-technique uses both data twice, expect the first and the last period, which is statistically not entirely correct (Moll, 2012). Research of Munneke and Slade (2000) into the three varying parameter techniques, found that the weighting schemes of the Laspeyres and Paasche indices overshadow the benefit from allowing the parameters on the explanatory variables to vary over time. Overall, the chained technique allows inter-temporal variation of the rent determinants but mitigates the adverse effects of using a particular weighting scheme (Slade, 2000).

4. Incentives in efficient and in-efficient markets

4.1. Different types of incentives

Muijsson (2010) made a distinction between 'financial lease incentives' and 'non-financial lease incentives'. Non-financial lease incentives are physical reimbursements, while financial lease incentives are non-physical/virtual reimbursements, representing money value. The non-financial lease incentives include tenant improvements, build-out allowances and turnkey delivery. Financial lease incentives are cash lease incentives, rent-free periods, etc. (Harding, 2012).

A summary table of the different types of incentives is shown in the figure below:

Summary of types of lease incentives (van Gool, 2011; Harding, 2012)

a. Physical alterations of the rented space on request of the (potential) tenant (tenant improvements)
b. One or multiple rent free periods. Normally this occurs at the start of the rent contract (e.g. first two years). Sometimes the rent free period is spread out over the first half of the contract period (e.g. until year five, every January is free of rent), but also later (e.g. when there is no break option in the tenant contract)
c. Rent discounts e.g. in the first few years and stepped rents.
d. A reimbursement of the tenant's fitting-out costs and/or delivering the building turn-key.
e. A reimbursement of the tenant's move/relocation costs
f. Signing bonus or money for spending freely (cash incentive / lump sum)
g. Reducing/capping the contractual rent indexation, including not indexing first year's rent
h. (Additional) Break options in the rent contract (escape clauses)
i. Capping service costs
j. Sharing the developer's profit after the developer has sold the building to an investor
k. Charging rent for a smaller floor area than actually used by the tenant
l. Agreeing that on moving out, tenant improvements don't have to be removed, and/or that the building doesn't need to be brought back to its hull condition (take-back of existing premises/build-out allowance)
m. Additional services (like shuttle buses)
n. Other incentives like: adopting the former rent contract of new tenant; including extra flexibility in the rent contract (renting more/less space); exclusive signage or advertising rights.

In general, incentives can only be given to tenants, in which they are normally mentioned in the lease contract of the tenant. However, there are some cases in which incentives are part of a (hidden) side-letter contract. Side-letters are side-contracts in which parties sometimes agree on aspects that are supplementary to another contract, but which are purposely not enclosed in that contract. Effectively these supplemental aspects often remain hidden by the landlord. (Harding, 2012)

4.2. Pros and cons of incentives in '*efficient functioning markets*'

According to van Gool (2011), the pros and cons of incentives differ in efficient functioning markets with full transparency and rational acting parties; and a situation in which this is absent. In the first situation, there is assumed that all parties are aware of the incentives and the associated value corrected for incentives. The parties are then able to choose between a lease contract with lease incentives, and a lease contract without incentives, but with a lower contract rent. In both options, the net present value from both leases are equal. As a result, a choice has to made between the difference in future cash flows, the applied interest/discount rate, and the expected inflation.

4.2.1. Pros and cons of receiving incentives by tenants (van Gool, 2011)

As new tenant normally face high moving and substantial furnishing costs, the tenant can certainly benefit from incentives at the beginning of the lease contract, for instance by receiving rent-free periods or a contribution to the furnishing costs. As a result, these large costs can be financed by incentives, and the total housing costs can be balanced over the entire lease period. The tenant needs to weigh the discounted value of the incentives to the higher (indexed) rent he will pay after the rent-free period(s). The alternative is internal or external financing of these initial

investments, in which the availability and the interest of the financing are important determinants. When the interest rate paid for financing the initial investments is higher compared to the agreed discount rate of the rental alternatives, the 'financing' of the initial investments through incentives seems more interesting for the tenant.
Initial incentives can after all be seen as a credit which is 'repaid' by a higher contract rent, after the incentive period. Nevertheless, the risk of a higher inflation correction related to the higher contract rental price of which is calculated, should be taken into account.

4.2.2. Pros and cons of providing incentives by landlords (van Gool, 2011)

In the situation mentioned, the landlords has only a few advantages for providing incentives compared to hiring without incentives, but with a lower contract rental price. The provision of incentives has an advantages if incentives are used to physically modify the rental property at the request of the tenant, in return for a higher rent. The property increased in quality after the modification, which is in the interest of the landlord.
The other situations, are almost all a disadvantage to the landlord, for instance due to the risk of bankruptcy after receiving the incentives. Compared with rental payments from the beginning of the lease, there is a greater harm. From this risk perspective, the landlord will maintain a relatively high discount rate in calculating the equivalent effective rental price. But as we assume market efficiency, the tenant will compared the present value of the future lease commitments including and excluding incentives, in which he will not accept high interest payments.
For investors who do not follow the IFRS-accounting rules, it is also true that incentives lead to a fluctuation of direct income yields and market value. During the rent-free periods a negative rental income occurs. In the period after the provided incentive, the market value will rise (explained in paragraph 4.3). The incentives are, after all, included as a deduction in the valuation.
Furthermore, the financing of the respective property might also lead to fluctuations in the Loan to Value, as shown by Muijsson(2010). With financing arrangements, this should be taken into account.
The provision of incentives by the landlord also leads to a higher risk of a lower inflation. The indexation is after all applicable to a higher contract rental price.
In conclusion, the provision of incentives compared to a lower rent, is most of the time more risky and rarely in favor of the landlord.

4.2.3. Pros and cons of incentives for appraisers and brokers (van Gool, 2011)

Appraisers already consider incentives as general accepted in the market, in which they include incentives in their calculations, for instance with a lease extension or in case of a new lease contract. An implication is that it is difficult to estimate the height of the market conform incentive in some individual cases.
Real estate brokers will also not benefit from incentives. Their letting fees, which generally relate to a percentage of the initial rental price, are based on the effective first year rental price, i.e. the commission rates are adjusted for incentives.
For the broker on the 'renting' side of the deal, it does not matter whether his client (the tenant), negotiated a lower rent without incentives or one with a higher rent and including incentives. As long as the situation is transparent for tenant, and the rental price including incentives is market conform, or generates a saving on the rental price for the client. Many brokers work regarding commission on the basis of the savings which they achieve for their clients, for instance due to a reduction of the rental price, a rent-free period, etc. As the commission is related to the savings for the client, the broker will strive for the largest savings, in any possible way.

4.3. Pros and cons of incentives in – '*in-efficient functioning markets*'

As chapter 3 showed, the real estate market can be described as an imperfect and in-efficient market, due to the heterogeneity of the assets, the in-transparency of the market, the incompleteness of information and relatively high transaction costs. This can manifest itself in the following situations:

4.3.1. Influence of incentives on tenants

Tenants might interpreted incentives as a relatively inexpensive and easily accessible source of financing, because they might interpreted it as a good negotiation result, in which they in-sufficiently realize they pay a high price during the remaining contract term.
Furthermore, tenants might be deterred by the high published asked /face rental prices in the market, while the true effective rental prices is much lower. In addition, tenants might pay an asked rental price, without realizing the

average market rent is much lower, as they rely on published asked/face rental prices which are not corrected for incentives.

4.3.2. Influence of incentives on landlords/investors

Due to the provision of initial incentives, investors are able to 'boost' there returns, compared to a lease without incentives. This is possible by charging a higher interest rate (although there is more risk in return).
The provision of initial incentives could also offer advantages for lease renewals, after the initial rental period. This arises when the tenants forgets to denounce the contract, or made a bad negotiation. As a result, he will or could continue paying higher contract rents. It is also possible a tax advantage arises because the cost of the incentives are taken in the beginning of the contract, which may lead to interest benefits.
Initial incentives can also result in a higher prices received upon sale. In case of sale after the incentive period, the contract rent often exceed the market rent, in which the investor might receive a higher selling price upon sale.

From the investor perspective, another purpose of offering incentives is to use incentives as a rent fluctuation buffer (Zuidema & van Elp, 2010b; Muijsson, 2010). Investors try to prevent their investment against fluctuations, as this negatively influences the value and the predictability of the asset. Furthermore, real estate investments are usually established by means of a mortgage loan. A decline in value will affect the liquidity of the investment, as the financier needs to be repaid. In order to withstand against these temporal decreases in value, every investor would need a constant liquidity buffer. As a result, incentives are provided which ensures the asset value remains stable. (Zuidema & van Elp, 2010b). The provision of incentives will be calculated as a one-time loss on the liquidity of the investor instead of a direct loss on the fund (Zuidema & van Elp, 2010b). Therefore both the asset's value as the fund's outlook remains stable, and the financier does not have to be repaid (Zuidema & van Elp, 2010b).

4.3.3. Influence of incentives on appraisers (van Gool, 2011)

Appraisers may not adequately correct for incentives, as they do not really know the height of market conform incentives. This is partly due to a lack of market information. It also happens that in leases no mention is made of the provided incentives, because the incentives are arranged in a 'side letter', which is not provided to the appraiser. Furthermore, incentives could also be provided a long time ago, in which they are currently out of sight for the appraiser.

4.3.4. Influence of incentives on brokers

Brokers on the tenant side of the deal, will rather strive in lease negotiations for more incentives instead of a lower rental price, as their commission is linked to the gross rental price, without being corrected for incentives.

4.4. Incentives and value increase

Research of Muijsson (2010) and van Gool (2011) showed that the use of incentives not directly leads to a higher value, as many investors actually think. The use of incentives leads to a so-called "saw-tooth (Dutch: zaagtand) effect," in the valuation, instead of a structurally higher level of value over a longer period. This is explained by the fact that during the rent-free periods a negative rental income occurs. In the period after the provided incentive, the value will rise. This is shown in the opposite figure which shows the appraised effective rental value (*red line*) and the appraised value including incentives (*blue line*).

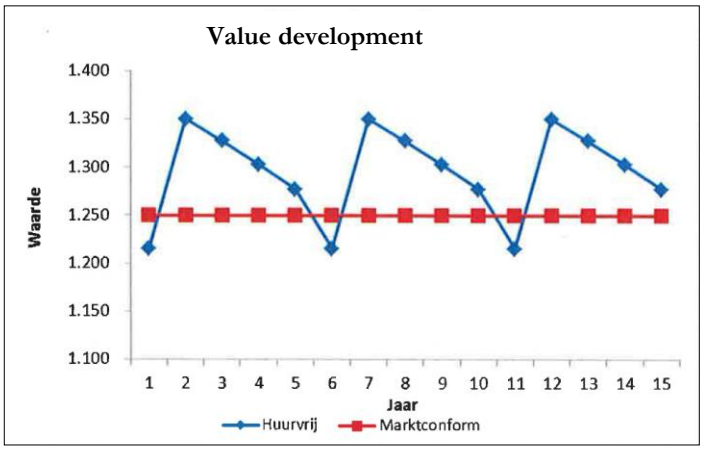


Figure 55. "Saw-tooth effect" schematically illustrated (Muijsson, 2010)

However, according to van Gool (2011) incentives may lead to a higher value. This occurs when a higher interest rate is used to determine the rents after the incentive period. Through a profitable financing of the incentives, an investor might achieve an additional return, which could lead to a higher value.

5. Effective rent level calculations

This chapter describes several methods for calculating the initial effective rental price by theory. Furthermore, several input variables will also be discussed. In the methods chapter, the final method will be chosen and further elaborated.

5.1. Calculating the effective rental price - several methods

As the initial contract rents contain the rental price including incentives, the initial effective rental price has to be calculated. There are different methods in calculating the effective rental price, in which this paragraph discusses three common used methods, respectively:

- The Discounted Cash Flow method with a annuity
- Method of Bond (1994)
- Method of van Meeuwen (2008)

After the individual methods are discussed, a final method is chosen, in the methods chapter.

5.1.1. Method Bond (1994)

In the method of Bond the incentive is discounted over the full lease term, using an appropriate discount rate. This is followed by an adjustment of the contract rent with the discounted incentive, after which the adjusted rent is related back to the equivalent true market rent on an induced basis.

S. Bond (1994) uses the following formula to calculate the effective rental price:

$EAV = SAV - (I / a*n*k)$

Where:
EAV = is the effective rental value; *SAV* = the annual contract rental value; *I* = the cash equivalent (discounted value) of the incentive and *1/a*n*k* = the annuity factor *a* for *n* years (lease term) at *k,* the requited rate of return, used to convert the incentive to a periodic equivalent amount.

This will be clarified by the following example:
"An office of 1000 m2 in Amsterdam has an annual contract rent of 175.000 Euro with a 5 year lease term, an incentive period of 18 months and a discount rate of 7%"

- *Annuity incentive (ank)* = 1- ((0,07 / (1- 1,07)^-5)) = 4,100
- *I* = incentive year 1: € 175.000; plus incentive year 2: (€ 175000)/(1,07) = € 81.776. In total = 256.775 Euro. The incentive in year two is discounted on a one year basis (1,07).
- *SAV* = 175.000

EAV = € 175.000 – (€ 256775 / 4,100) = € 62.625, = € 112,4/m2 / year; Excluding VAT

5.1.2. Method van Meeuwen (2008)

In 2008, R.M. van Meeuwen researched the transparency of rental transactions on the Dutch office market. In his research he analyzed 460 rental contracts from the period 1997 to 2007, after which he developed a new formula to calculate the effective rent level.

In his research he also refers to the article of S. Bond (1994), in which the yearly contract rent is corrected for incentives to calculate the effective rent level. However, in order to achieve a more significant outcome of the effective rental level, van Meeuwen developed a formula which also takes inflation into account. This formula is based on the investigated 460 rental contracts, in which the 'calculated' effective rent deviates with a maximum of 1 Euro from the 'real' effective rent, however on average the deviation is below 15 cent.

$$\frac{Total\ contract\ rent-((Incentive*(1{,}03^{(rental\ period/\ 2)})}{Total\ rental\ period} / m2$$ (van Meeuwen, 2008)

Where:

Total contract rent	= the contract rent per m2 * LFA (m2) * lease term
Incentive	= discounted overall incentive expressed in €
Contract term	= lease term
1,03	= a value established from *trial and error,* partly based on inflation and the discount rate.

This formula will be compared to the formula of S. Bond by means of an example with the same values. When we fill in the values, the following effective rent is calculated:

$$\frac{(€\ 175.000 * 5-((€\ 256.775*(1{,}03^{(5/\ 2)})}{5} = €\ 119.706\ = €\ 119{,}7\ /\ m2\ /year$$

Deviation: between both formulas: (119,7-112,4)/(112,4) * 100% = 6,5% . Both formulas leave the indexation outside the calculation. According to Swagerman (2010), the difference between them is explained by both the inflation which is taken into account and the established correction based on trial and error.

5.1.3. Discounted Cash Flow approach (DCF) with annuity

The most common method to calculate the effective rental price is through a Discounted Case Flow (DCF) calculation in which the future gross rental income is discounted to the present.

Furthermore, an equivalent level annuity over the term of the lease is calculated. An equivalent rent level annuity has

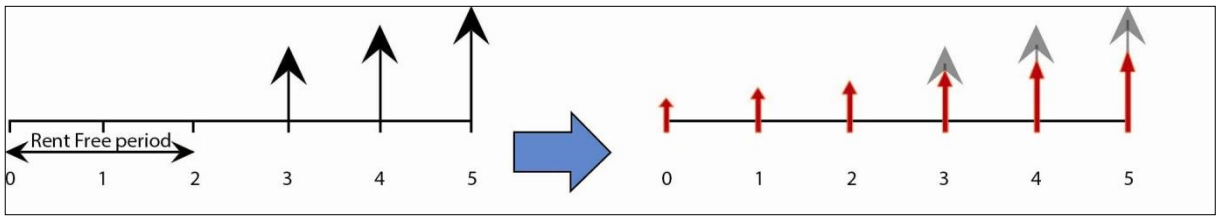


Figure 56. Rent free periods discounted over the entire lease period

the same present value as the original cash flow stream.

This methods requires a discount rate and an estimate of the future inflation. This method is explained by the following formula:

$$EA_{real=}\ \frac{NPV(alt)(r_{real})\ (1+r_{real})^n}{(1+r_{real})^n-1}$$

This method will be explained by three examples, which are shown in the opposite figure.

In the calculation a discount rate of 10% is used. As the equivalent level annuity is the same in all the calculations, namely:

$$\frac{(r_{real})\ (1+r_{real})^n}{(1+r_{real})^n-1} = \frac{(0{,}10)(1+0{,}10)^5}{(1+0{,}10)^5-1} =\ 0{,}26$$

Figure 57. Calculating effective rents – DCF method

Net lease with steps					
Year	*1*	*2*	*3*	*4*	*5*
Net Rent	175,00	175,00	175,00	175,00	175,00
PV	159,09	144,63	131,48	119,53	108,66
Average rent	175,00			Annuity	
Present value	663,39			0,26	
Effective Rent	175,00				

Net Lease Free Rent (concessions)					
Year	*1*	*2*	*3*	*4*	*5*
Net Rent	0,00	220,00	220,00	220,00	220,00
PV	0,00	181,82	165,29	150,26	136,60
Average rent	176,00			Annuity	
Present value	633,97			0,26	
Effective Rent	167,24				

Net lease with 100% CPI Adjustment					
Year	*1*	*2*	*3*	*4*	*5*
Expected CPI		2%	3%	4%	5%
Net Rent	175,00	178,5	183,86	191,21	200,77
PV	159,09	147,52	138,13	130,6	124,66
Average rent	185,87			Annuity	
Present value	700,01			0,26	
Effective Rent	184,66				

5.2. Input variables by theory: discount rate versus risk

In general, there are several definitions of the discount rate. For instance, the ROZ/IPD uses the following definition:

Discount rate = risk free rate + real estate risk + sector risk + object risk

In this definition, the risk free rate is usually equal to the 10-year government bond yield or the interest swap rate (IRS) over 10 years. The real estate risk covers the risk that (real estate) investors have relative to other investment options, like stocks or bonds. The sector risk concerns the specific risks of the various sectors of the real estate markets, like offices, retail and property. The object risk finally concerns the specific risks of the proposed project. (van Os, 2012)
The discount rate can also be defined as a reflection on the characteristics of an investment for which it needs to be compensated. The following formula is used:

Discount rate = real return + expected inflation + risk premium + premium for costs

In the definition the real return is the compensation for the postponed spending. The risk premium can be divided in three main aspects namely the risk for investing in real estate, the risk of unexpected inflation, and the risk associated with the illiquidity of real estate. (van Os, 2012)

Osinga (2006) defines the discount rate as following:

Discount rate = interest on 10 year bond yield + expected inflation + risk premium

5.3. Chosen method

In this research, the Discounted Cash Flow method will be used for calculating the effective rental price. Compared to the other methods explained of Bond (1994) and van Meeuwen (2008), the DCF method makes it possible to calculate the value of multiple types of incentives in one transaction; but also for incentives at different moments during the lease term, as the DCF method makes a full cash-flow stream of the entire lease term. Furthermore, the DCF method takes into account both the inflation as well as the discount rate, compared to the method of Bond, which therefore makes it more reliable. In addition, in the DCF method, the discount rate and the inflation can be adjusted per specific transaction, instead of the method of van Meeuwen, which uses a standard correction for the discount rate in combination with the rental price in all transactions. A small adjustment of the DCF method makes it possible to easily calculate the percentage incentives per transaction, which is discussed in the methods chapter.

5.4. Input variables by theory: inflation rate and rental growth

In theory there is one growth percentage used for net cash flows and value. However in practice there are different growth percentages, like for instance market rental growth, inflation growth and value growth. Furthermore, these percentages differ among the length of the rental contract.
In general in the Netherlands, the rental prices are indexed annually to the Consumer Price Index (CPI) (de Bruine, 2009). In order to calculate the discount rate, an assumption has to be included about the yearly growth rate. As there is assumed that the inflation is a significant alternative for the growth rate, the inflation is most of the time used as yearly growth rate in the DCF calculation as well as part of the growth rate in the discount rate.
However, according to research of Osinga (2006) this assumption is not always true. In his research he concluded that over a long time period, for instance 50 years, the rental and value growth are equivalent to the inflation. However, his research showed that for short time periods, the assumption that the inflation rate equals the growth rate does not always occur. For instance for the top-rents in the *Randstad* (urban conglomeration of four largest cities in the Netherlands: Amsterdam, Rotterdam, The Hague and Utrecht) the research showed that the average rental growth in the period 1987-1999 exceeds the average inflation over the same period by 1 per cent. Furthermore, over a longer period 1974-1999 the opposite occurred, as the average inflation rate exceeded the average rental growth by 1,2 per cent. In the research, an equivalent research was conducted about the South-Axis in Amsterdam. It showed that the rental growth between 1987-1999 averaged 6,2 per cent per year. This is about 4 per cent higher than the inflation rate for the same years. In conclusion, this researched showed that an estimation of the rental growth is highly dependent on the local market situation, or local area. (Osinga, 2006).

6. Dutch Office Market behavior 1996-2013

In order to compare the empirical research with the reported market development and theories, the most important exogenous and endogenous influences on the behavior of the Dutch and Amsterdam office market are illustrated in the following figure. In the figure a time-line is shown from 1996-2013, which is divided in four main periods, based on the substitution by van Eijk (2011): *Economic growth* (1996-2001*), the ICT Crisis* (2001-2005), *Economic recovery* (2005-2008) and *Economic recession* (2008-2012).

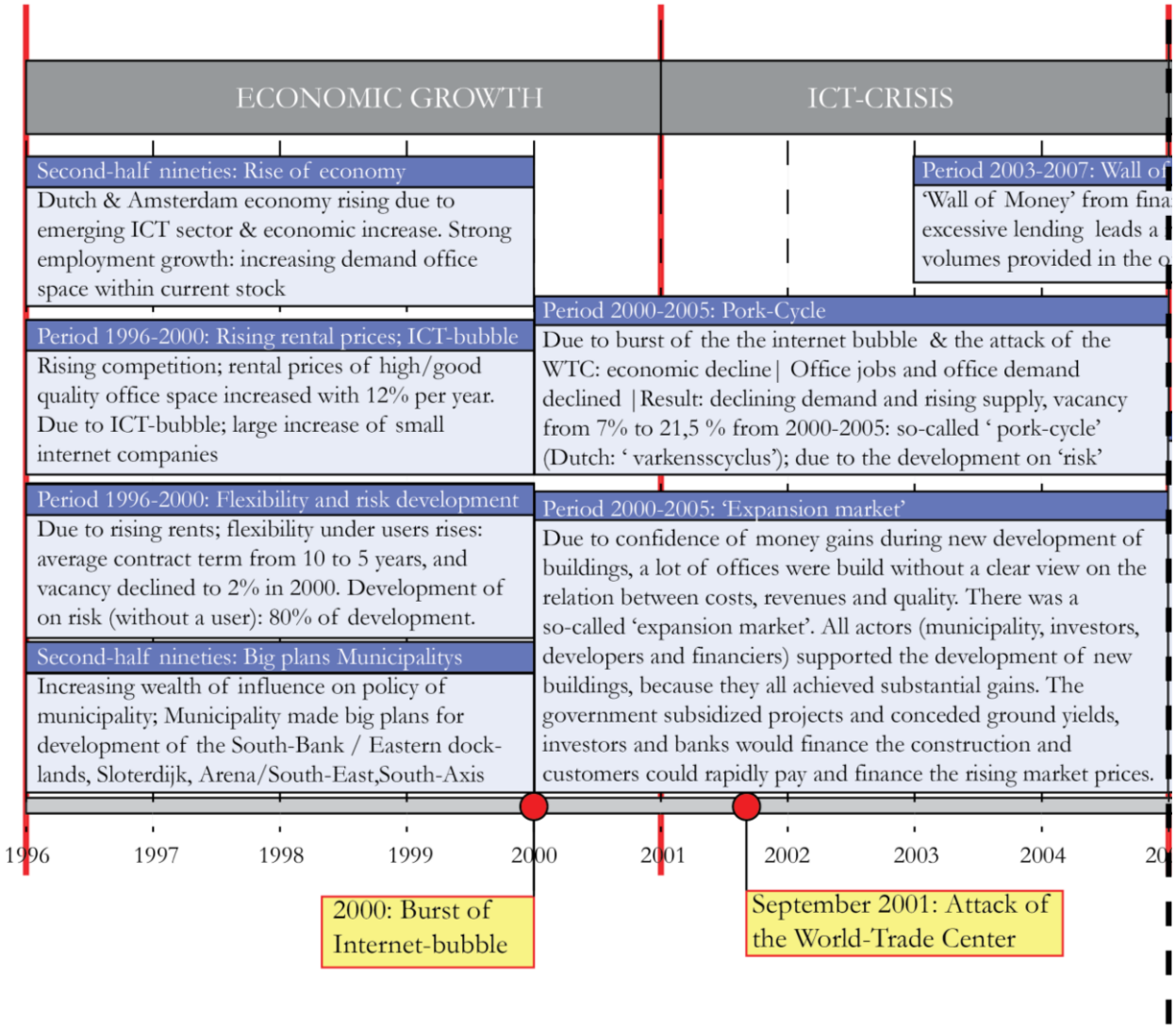


Figure 58. Market developments in Amsterdam office market – 1996-2005

The following main events are explained in the time-line:

- Second half-nineties: Rise of economy (Koeman, 2008)
- Period 1996-2000: Rising rental prices; ICT bubble (Koeman, 2008; ABN AMRO 2011)
- Period 1996-2000; Flexibility and development on risk (Zuidema & Van Elp, 2010b)
-Second half nineties: Big plans of the Municipality (Koeman, 2008)
- Period 2000-2005: Hog-Cycle (Dutch: 'Varkenscyclus' (Koeman, 2008; Zuidema & Van Elp ,2011)
- Period 2000-2005: An expansion market (De Zeeuw, 2011).
- Period 2003-2007: The Wall of Money (Ter Horst, 2009)

- Period 2005-2008: Economic recovery; long-term leases and focus on new development (Zuidema & Van Elp, 2010b; Remøy, 2010)
- Period 2008-2012: The double dip in the office market: economic and financial crisis (van Eijk, 2011; Soeter e.a., 2011).
- Period 2008-2012: Impairment of assets (Zuidema & Van Elp, 2010)
- Period 2009?-2012: New Ways of working (ABN AMRO, 2011)

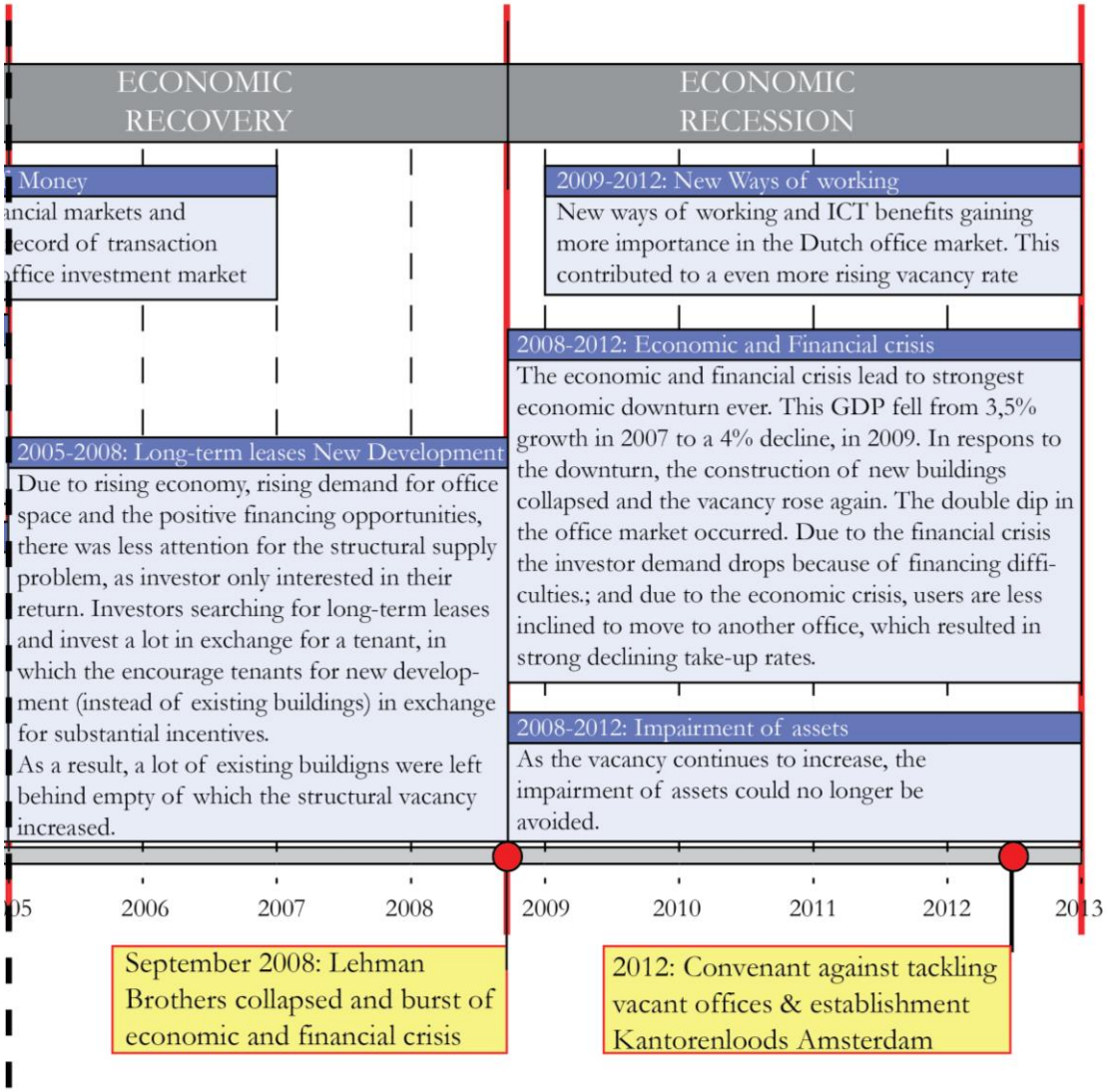


Figure 59. Market developments in Amsterdam office market – 2005-2013

In the empirical research part, the incentive and rental price development will be compared with the analysis in this chapter, in order to explain the possible outcomes.

III – Empirical Research

1. Descriptive statistics

1.1. Data overview

In the calculations, only *accepted transactions* by the Municipal Tax Office (2957 transactions) are used (see part II - methods).

1.1.1. Overview accepted transactions compared to non-accepted transactions

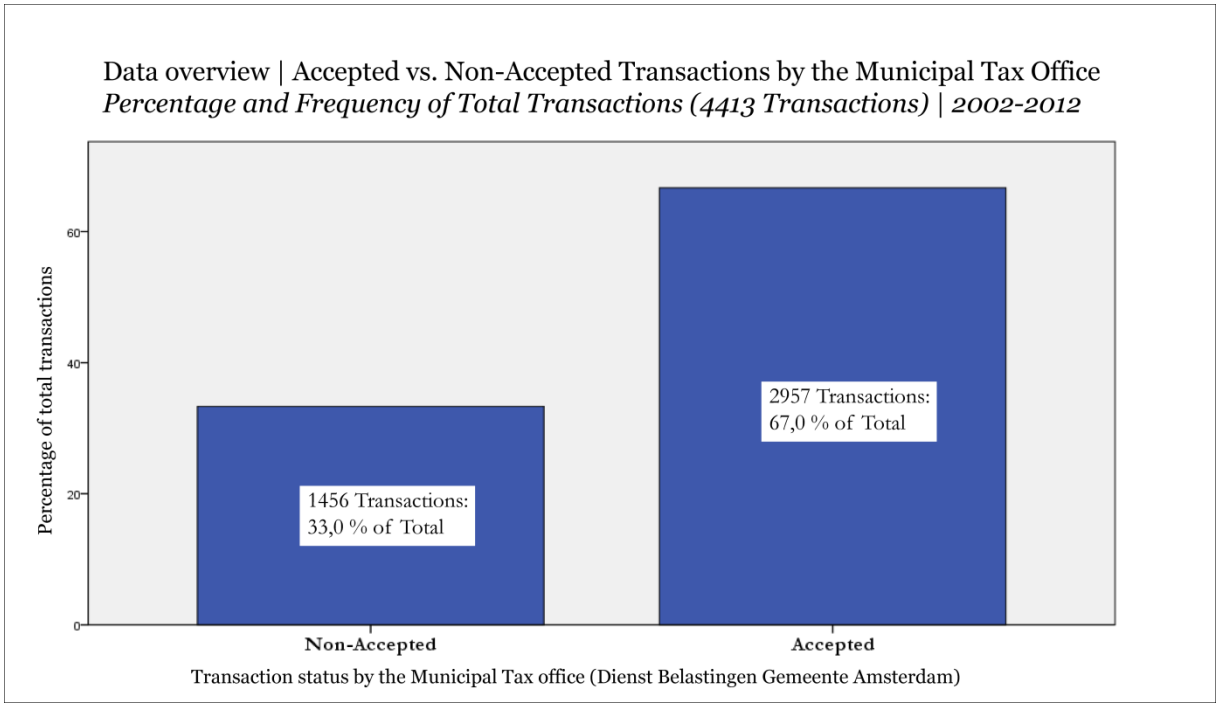


Figure 60. Data overview; accepted vs. non-accepted transactions

The total transaction database of the Municipal Tax Office consists of 4413 office transactions in the period 2002-2012. As explained, only the accepted transactions by the Municipal Tax Office will be used in this research, which consist of about two-third (67%) of the total database.

1.1.2. Overview main reasons rejecting transactions in sample

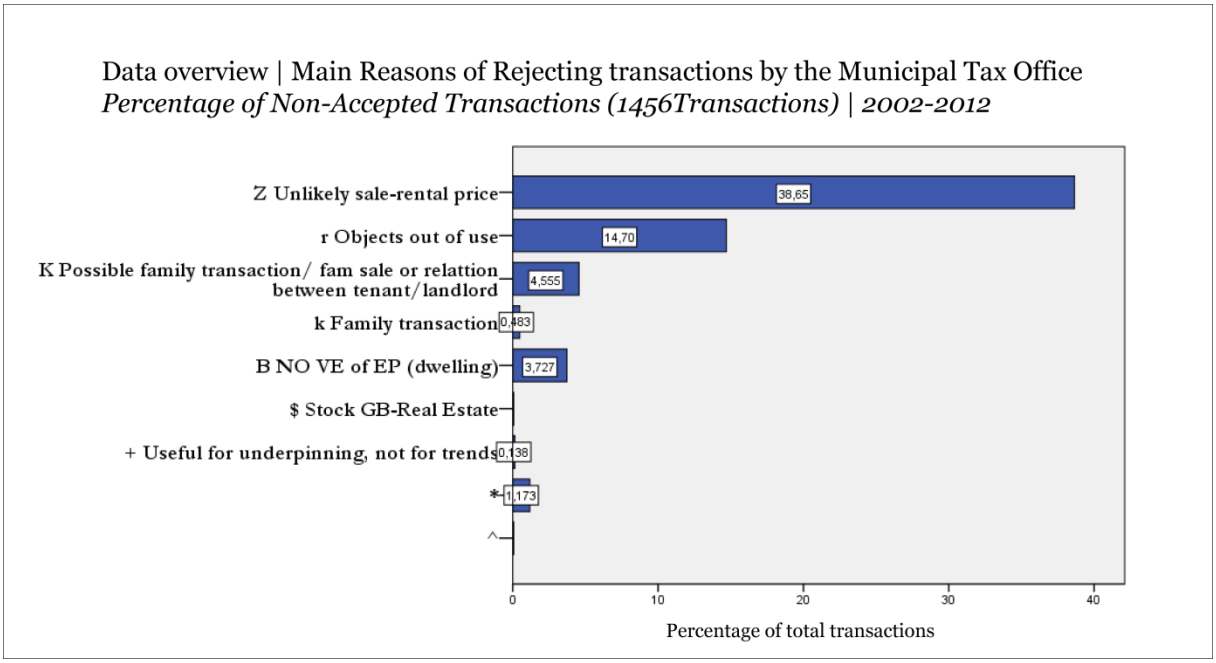


Figure 61. Data overview; main reasons rejecting transactions by the Municipal Tax Office

The figure on the previous page shows from the total non-accepted transactions (1456 transactions), a categorical overview for rejecting a transaction by the Municipal Tax Office.
From the screened transactions, the largest reason for rejecting transactions is due to an 'unlikely sale-rental price', which contains about 38% of all the rejected transactions. In this reason the surrounding sales and transactions are analyzed and compared to the particular transaction, in order to test its market conformity. The unlikely sale-rental price, is followed by 'objects which are out of use' which contains almost 15% of all the rejected transactions. Family transactions (5%) and possible family transactions (15%) are other important rejecting transaction reasons.

1.1.3. Transactions per contract year

	Contract	Count	Transactions LFA <	Transactions LFA >	Transactions with a known
# of Transactions	2002	378	247	53	300
	2003	315	213	45	258
	2004	342	231	43	274
	2005	269	194	39	233
	2006	325	239	53	292
	2007	341	227	67	294
	2008	288	189	50	239
	2009	228	167	34	201
	2010	187	142	30	172
	2011	157	113	32	145
	2012	127	109	18	127
Total #		**2957**	**2071**	**464**	**2535**

The table provides an overview of the amount of transactions per year, compared to the total amount of accepted transactions in the database. It shows that the number of accepted transactions decreases the last years, which emphasises the current market circumstances. From all the accepted transactions (2957), there are 2535 transactions with an 'available' Lettable Floor Area by the Municipal Tax Office.
From these available transactions with a lettable floor area, there are 464 transactions with a lettable floor area higher than 500 m2, which are most common for analyzing the commercial real estate market. Most theories and market reports about the global and national real estate/office market, are almost all related to the real estate/office market for transactions with an LFA > 500 m2. This study also researches the market segment below 500 m2, which is often ignored and less researched.

1.2. Outliers

1.2.1. Scatter plot real effective rents per m²

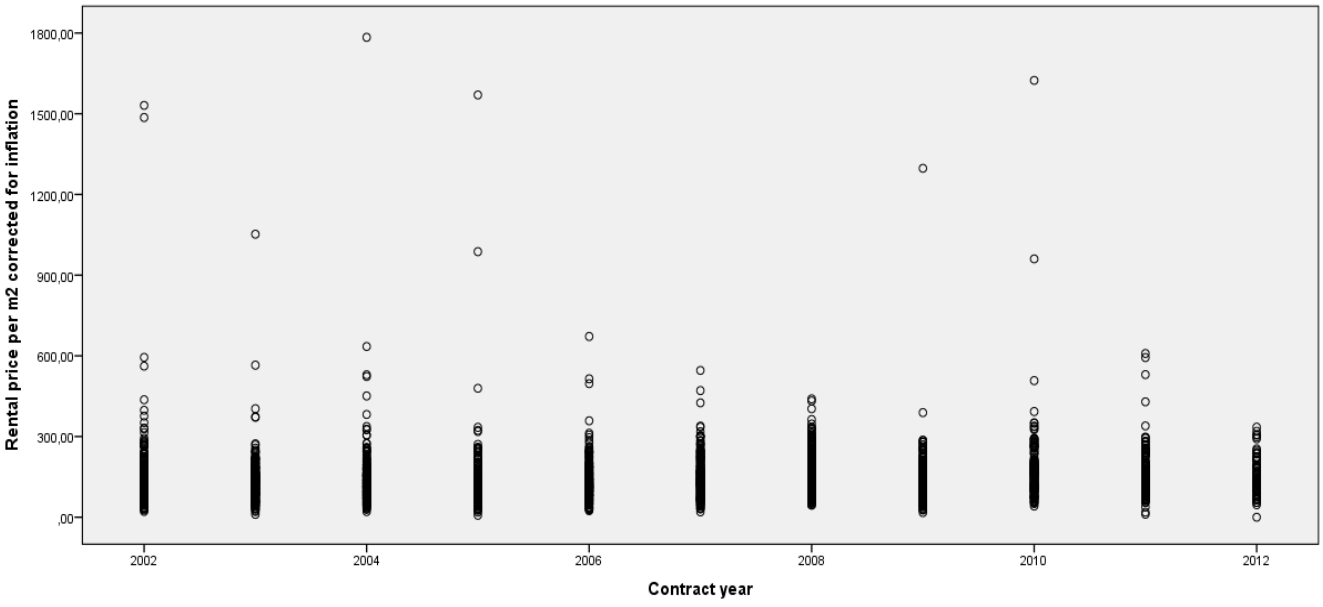


Figure 62: Outliers | Scatter plot real effective rents per m2

From the 2957 transactions, 17 outliers are deleted from the sample. This is done by analyzing the residuals/outliers in the hedonic/multiple regression analysis, in order to evaluate the normal distribution of the sample. The outliers which differ more than 3 Standard Deviations (SD) from the mean are deleted from the sample.
In general, most deleted outliers have an real effective rental price above 600 euro per m² or below 30 euro per m². These outliers are deleted as they might bias the outcomes due to market in-conformity.

1.2.2. Scatter plot percentage incentives per transaction

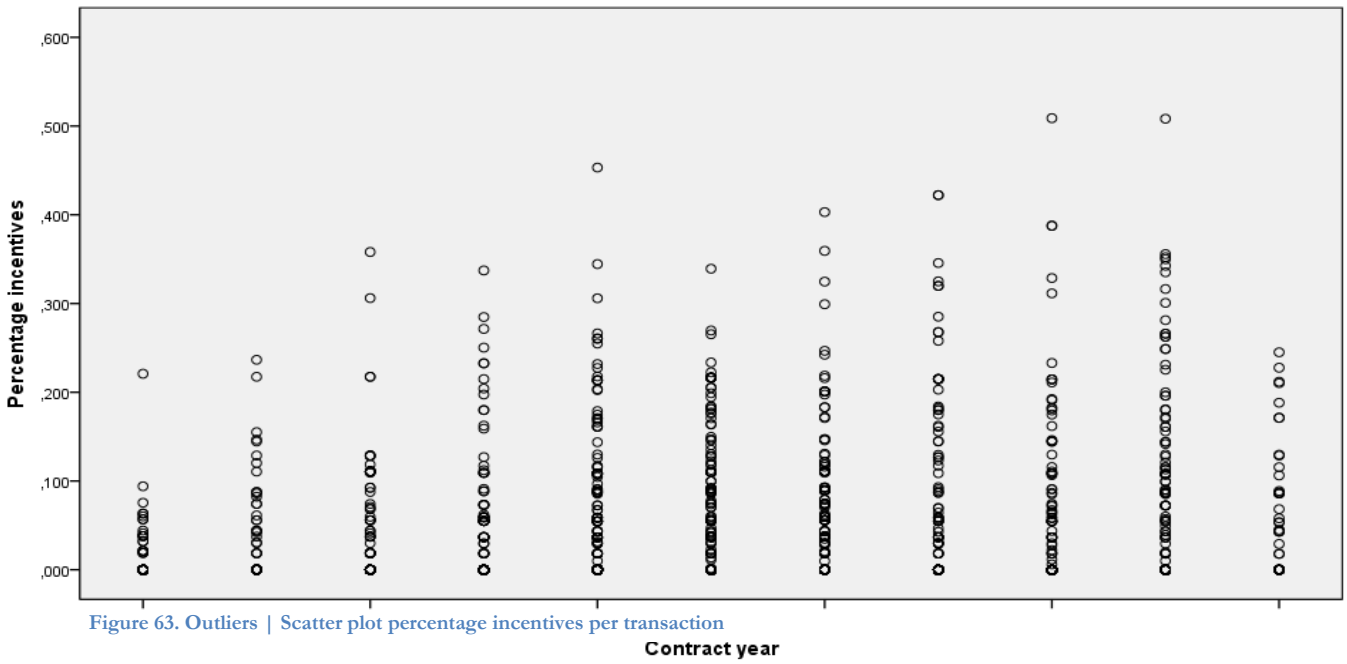


Figure 63. Outliers | Scatter plot percentage incentives per transaction

In the incentive analysis, there are no outliers which could be market in-conform, as incentives of about 50/60 % might occur in the real estate market nowadays.

1.3. Data overview per sample analysis

1.3.1. Sample overview

In this research, several scale levels will be analyzed and compared with each other.
As transaction data about Amsterdam is only available for transactions *within* the Municipality of Amsterdam, the following surrounding districts are not included of the research: Schiphol (Main Airport area of the Netherlands), Diemen and Amstelveen.

The market will be analyzed based on the following samples:

1.3.2. Sample 1. Municipality Amsterdam

(not displayed)

1. Entire Municipality of Amsterdam

1.3.3. Sample 2. City Districts Municipality Amsterdam

1. Amsterdam Centre
2. Amsterdam North
3. Amsterdam East
4. Amsterdam West
5. Amsterdam New-West
6. Amsterdam Westpoort
7. Amsterdam South
8. Amsterdam South-East

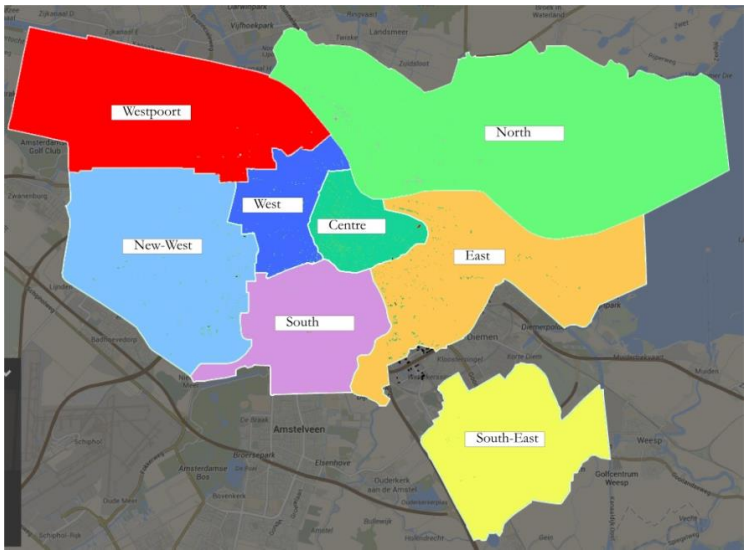


Figure 64. Sample 2 | City Districts Municipality Amsterdam

The classification is based on the division of city districts by the Municipality of Amsterdam.

*Transactions per City districts Municipality of Amsterdam (*due to privacy reasons; cells with less than 5 transactions and sum of total are deleted)*

City Districts Municipality Amsterdam								
	Centre	Westpoort	West	New-	South	East	North	South-East
Contract Year	Count	Count	Count	Count	Count	Count	Count	Count
2002	113	17	50	21	67	46	29	33
2003	107	12	29	22	63	25	22	32
2004	113	15	34	17	83	33	23	23
2005	91	14	32	20	57	18	16	19
2006	91	24	35	20	69	34	30	21
2007	94	18	29	23	91	31	23	31
2008	57	14	20	10	106	36	22	22
2009	72	7	23	14	47	22	13	27
2010	50	7	16	16	52	16	16	12
2011	39		19	10	47	20	7	10
2012	40		12	5	34	14	9	10

Most transactions in the database are in the districts Amsterdam Centre and Amsterdam South. This might have an influence on the average outcomes or development in the Amsterdam office market, which might correlate the most with those two districts. The city districts Westpoort, North, New West and South-East only contain a few transactions in 2011 and 2012, which might influence the reliability of the outcomes in both years.

1.3.4. Sample 3 | Sub-Office markets (We're Amsterdam)

(Classification based on division in We're Amsterdam, 2011)

1. Amsterdam Centre
2. Amsterdam North
3. Amsterdam East
4. Amsterdam West
5. Amsterdam South-Bank
6. Amsterdam South-Axis
7. Amsterdam South-East

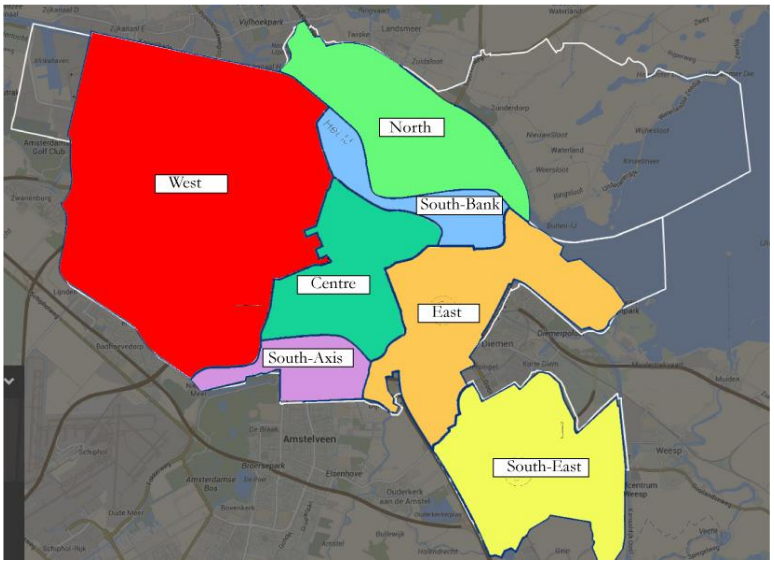


Figure 65. Sample 3 | Sub-Office markets Amsterdam (We're Amsterdam, 2011)

The third sample differs from the second sample on several points. For instance, in the sub-office market sample, 'Amsterdam West' consists of the city districts: Westpoort, New-West and a part of city district West. Furthermore, the sub-office market sample 'Amsterdam South-Axis' is taken as an individual sub-office market, in which the 'Centre' consists of both the city district Centre as well as a part of city district South. In addition, the South-Bank is added as a sub-office market to the analysis, and only the left part of Amsterdam North is analyzed. This is comparable for Amsterdam East. The area of Amsterdam South-East is similar to the city district Amsterdam South-East.

*Transactions per Sub-Office markets We're Amsterdam (*due to privacy reasons; cells with less than 5 transactions and sum of total are deleted)*

Areas We´re Amsterdam							
	Centre	North	East	West	South-	South-Bank	South-East
Contract Year	Count	Count	Count	Count	Count	Count	Count
2002	176	29	38	69	18	13	33
2003	147	22	20	54	18	17	33
2004	174	23	29	54	23	13	23
2005	129	16	14	62	19	7	19
2006	139	30	27	75	18	14	21
2007	134	23	28	65	51	8	31
2008	102	22	19	41	60	21	22
2009	101	13	17	43	17	7	27
2010	89	16	12	38	14		12
2011	70	7	12	28	19	9	10
2012	57	9	12	16	16	7	10

The major differences in the sample is mainly due to the division of the 'South' District in a special 'South-Axis' Sub-market sample and the added 'South-Bank' sample, which has not only a few transactions per year in this sample. Furthermore, the City Districts 'West' and 'Westpoort' are combined into one Sub-Office market: 'West'.

As a result, most transactions are located in the Centre (1318) and West (545), followed by the South-Axis. Some areas only contain a few transactions per year, for instance the South-Bank and Amsterdam North in 2011 and 2012.

1.3.5. Sample 4/ Business Districts (We're Amsterdam)

(Classification based on division in We're Amsterdam, 2011)

1. Canal district
2. Oostelijke Handelskade
3. Weesperstraat
4. Vondelparkbuurt
5. Teleport
6. South-Axis, WTC, RAI
7. Omval
8. Riekerpolder
9. Arena/Bijlmersplein
10. World Fashion Centre
11. Holendrecht
12. ABP
13. Buikslotermeerplein
14. IJburg
15. Sloterdijk (not displayed in figure)
16. Amstel III (not displayed in figure)

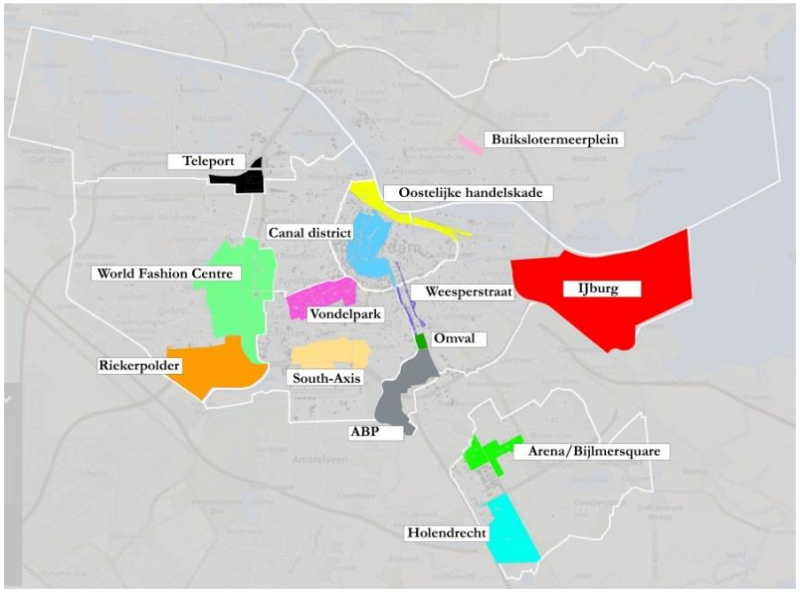


Figure 66. Sample 4. Business districts Amsterdam (We're Amsterdam, 2011)

The fourth sample consists of the most important business districts in Amsterdam, based on the classification in We're Amsterdam (2011).

*Transactions per Business District We're Amsterdam (*due to privacy reasons cells with less than 5 transactions and sum of total are deleted)*

Business Districts										
	Amsterdam Centre	Wibautstraat/ Weesperstraat	Vondelpark	Teleport	Sloterdijk	South-Axis, WTC, RAI	Arena/ Bijlmerplein	Holendrecht	Amstel III	World Fashion Centre
Contract Year	Count	Count	Count	Count	Count	Count	Count	Count	Count	Count
2002	65	15	28		7		12		5	7
2003	49	4	25	6		6	8	5	9	14
2004	65	9	35	8	6				6	10
2005	55	3	22	5		7		5	7	8
2006	56	3	19	5	10	5				10
2007	49	4	23	6	6	32	9		10	12
2008	37	5	15		7	45	5		8	6
2009	33		8			10	12		8	6
2010	28		23			8			1	11
2011	22		13			11			2	2
2012	19		11			13			2	2

In the table several business districts are deleted from the sample as they contain hardly any transactions (more than one time - zero transactions in a transaction year) to make an accurate analysis. As a result, the following business districts are deleted from the sample: Omval, ABP, Riekerpolder, Buikslotermeerplein and IJburg. Especially the Omval and the Riekerpolder are important business districts in Amsterdam, which makes it unfortunate that both districts had to be deleted from the sample.

2. Study 1 | The average incentive and rental price development in the Amsterdam office market

This chapter compares the average incentive, contract and effective rental price development in the Amsterdam office market. Furthermore, the incentive and effective rental price development will be compared with the Economic Leasing Cycle (Bond, 1994) and the market conditions from literature in the Amsterdam office market in the period 2002-2012. In addition, the contract and effective rental price development will be compared with the average published rental price development.

2.1. Incentive development in the Amsterdam office market

This paragraph analyzes the incentive development in the Amsterdam office market from 2002-2012. In this paragraph, the incentive development will be compared with the Economic Leasing Cycle (Bond, 1994) and the market developments in the Amsterdam office market.

2.1.1. Data sample overview – Percentage incentives

			Percentage Incentives					
			Count	Minimum	Maximum	Mean	Median	Standard Deviation
All Transactions	Contract Year	2002	376	0,000	23,895	,540	0,000	2,316
		2003	313	0,000	23,660	1,198	0,000	3,482
		2004	341	0,000	35,808	1,611	0,000	4,496
		2005	267	0,000	42,201	2,971	0,000	6,636
		2006	324	0,000	46,371	4,144	0,000	8,085
		2007	340	0,000	41,586	4,423	0,000	7,532
		2008	287	0,000	59,842	4,379	0,000	8,237
		2009	225	0,000	42,211	5,073	0,000	10,008
		2010	185	0,000	64,233	5,332	0,000	9,904
		2011	156	0,000	71,138	7,790	0,000	12,318
		2012	127	0,000	57,141	5,310	0,000	8,399
Transactions LFA > 500 m2	Contract Year	2002	53	0,000	22,085	1,545	0,000	3,812
		2003	44	0,000	23,660	2,872	0,000	6,165
		2004	42	0,000	21,753	1,795	0,000	4,489
		2005	38	0,000	42,201	6,498	0,000	9,923
		2006	52	0,000	45,320	7,817	0,000	11,377
		2007	67	0,000	35,326	7,976	1,376	10,390
		2008	50	0,000	40,181	9,530	7,438	10,664
		2009	32	0,000	42,211	14,393	9,094	13,476
		2010	30	0,000	31,149	9,221	5,466	10,222
		2011	32	0,000	49,779	16,334	15,142	14,201
		2012	18	0,000	57,141	15,283	18,220	14,304
Transactions LFA < 500 m2	Contract Year	2002	245	0,000	9,407	,199	0,000	1,010
		2003	212	0,000	12,870	,798	0,000	2,439
		2004	231	0,000	35,808	1,392	0,000	4,122
		2005	193	0,000	38,838	1,970	0,000	5,241
		2006	239	0,000	46,371	3,173	0,000	7,038
		2007	226	0,000	22,255	2,468	0,000	4,685
		2008	188	0,000	59,842	2,306	0,000	6,084
		2009	166	0,000	35,019	2,443	0,000	6,166
		2010	140	0,000	64,233	4,434	0,000	9,799
		2011	112	0,000	71,138	4,209	0,000	9,661
		2012	109	0,000	21,363	3,663	0,000	5,547

The sample overview shows some important aspects:

- The minimum of incentives in every year is zero.
- The mean and standard deviation of incentives in 'Transactions with an LFA > 500 m2' is in general higher than in 'Transactions with an LFA < 500 m2' and in the 'All Transactions' analysis.

- The median in incentives is in the analysis of 'All Transactions' and 'Transactions with an LFA < 500 m2' always zero. In the analysis of the 'Transactions with an LFA > 500 m2', the median is also zero until the year 2007, which might indicate that incentives are becoming more common use in this part of the Amsterdam office market the last years.
- In transactions with an LFA > 500 m2; the year 2012 contains only 18 transactions, which might form an implication in the average amount of incentives in 2012.

2.1.2. Ratio incentive transactions on total transactions

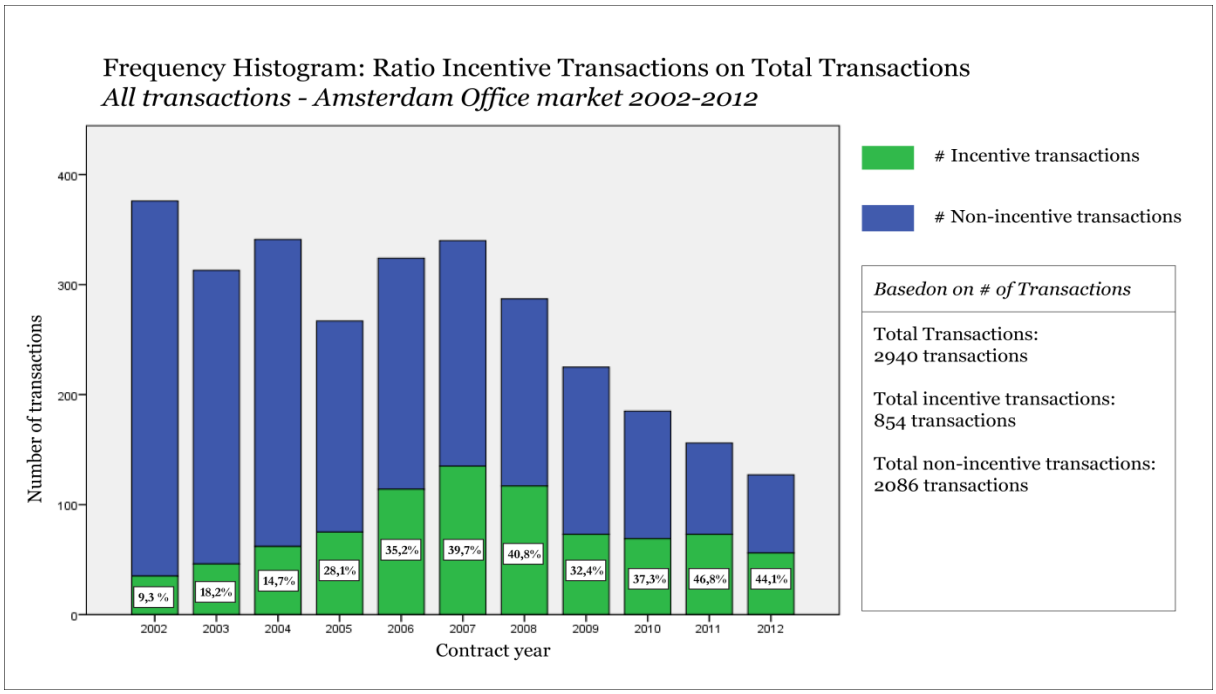


Figure 67. Frequency incentives diagram

From all the transactions in the sample, about 29% of all the transactions is corrected for incentives (rental discounts and rent-free periods). In the figure there is shown that the amount or ratio of incentive transactions compared with all the transactions in a specific year, is rising the last 10 years, from about 9% in 2002 till about 35-45% in the years 2006-2012. There can be concluded that incentives are becoming generally acceptable and used in the Amsterdam Office market nowadays. Especially the last two years in the sample, namely 2011 and 2012, almost 45% of all the transactions contains one or more rent-free periods and/or a rental discount.

As only rental discounts and rent-free periods are taken into account, it might be the case that the 'true' ratio between incentive transactions-non-incentive transactions is even higher. Especially investments by the tenant might form an important incentive in rental transactions which is not taken into account.

2.1.3. Average incentives in Amsterdam office market

The figure on the next page shows the average incentive development in Amsterdam in the period 2002-2012. The figure is divided in three main analyses:
- An analysis of the incentive development for all transactions
- An analysis of the incentive development for transactions with an LFA > 500 m2
- An analysis of the incentive development for transactions with an LFA < 500 m2

General conclusion

The figure on the next page shows a more or less similar trend in all the different samples, namely an *upward cyclical incentive development* in the overall Amsterdam Office market.

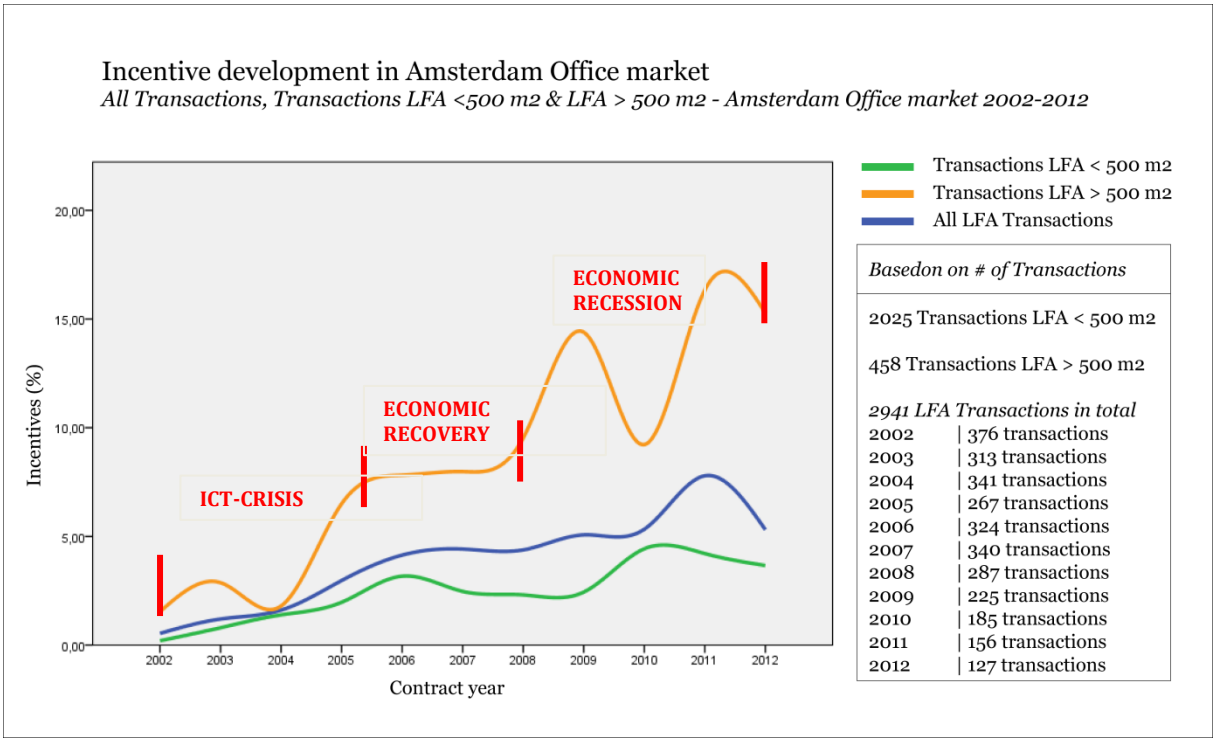


Figure 68. Incentive development in Amsterdam office market

Transactions with an LFA < 500 m2

In the transactions with an LFA < 500 m2, the incentives are also showing an upward trend to a level of 4% on average per transaction in 2010-2012.

Transactions with an LFA > 500 m2

The analysis of transactions with an LFA > 500 m2 shows the strongest upward cyclical trend.

The cyclical behaviour of the incentives are in line with the suggestions of Hakfoort (1994), who stated that rental concessions might be cyclical. The cyclical behaviour is more or less in accordance to the Economic Leasing Cycle of Bond (1994), which states that the Office market consists of a lot of different phases in which the incentives also differ per phase of the market. The development shows that incentives are offered at different periods of the market cycle. A full comparison with the Economic Leasing cycle will be made in the next sub-paragraph.

2.1.4. Incentive development explained by the Economic Leasing Cycle and prevailing market conditions

This paragraph compares the incentive development (LFA > 500 m2) with the Economic leasing cycle (Bond, 1994) and the market conditions and behaviour of the Amsterdam office market. In the following table the Economic leasing cycle is summarised:

Step	*State of market*	*Rental prices*	*Vacancy*	*Incentives*
Boom	Healthy office market	Healthy rental prices	No/low vacancy	No need for incentives
Bubble burst	Increased construction activity	Rising rents		
Corporate collapse	Declining demand; oversupply			
Inactivity	Oversupply	Investors refuse to lower rent		Incentives joining the market
Recession	Developed construction will pressure supply and rent levels	Rents need to decline, but not in this stage		No longer sufficient to provide incentives
Recovery demand	Economy is improving		Vacancy stabilizes	
Hesistant recoverty	Cash flow problem investor	Investors must reduce rent level; rental rates bottom		Incentives peak to highest level; investors can no longer pay them
Strong recovery	Increase in office jobs and square meter demand		Structural vacancy develops	
Overall recovery	Tight market; Construction activities started	rent levels rising		Incentives will remain on constant level

Economic leasing cycle (Bond, 1994)

In the following figure the incentive development (LFA > 500 m2) is positioned into the analysis of the Amsterdam office market, as shown in chapter 6 of the literature review: In addition, the different phases of the Economic Leasing Cycle are added (light-grey) to the figure. The blue bars show the Real GDP growth in the market. The figure is divided in four main economic periods, classified by van Eijk (2012): before 2001: Economic growth (ICT-bubble); 2001:2005: ICT-Crisis; 2005-2008: Economic recovery; 2008:2012; Economic recession.

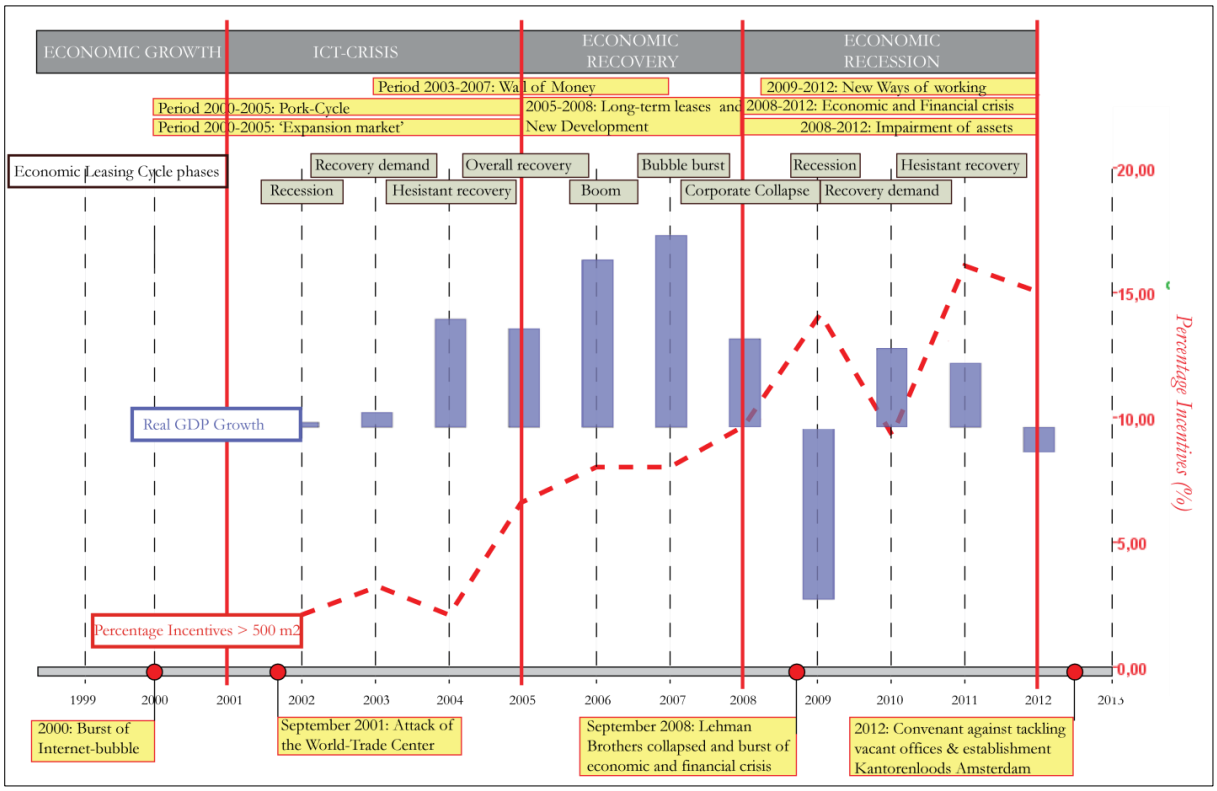


Figure 69. Incentive development explained

During the ICT-Crisis 2002-2005: A small cycle; with a peak in 2003, a trough in 2004 and a strong increase in incentives between 2004-2005 to a new peak in 2005.

The outcomes are more or less in line with the Economic Leasing Cycle, as it showed that during the '*Recession* period, which occurred in the Amsterdam office market in the period during the ICT-crisis, there were no need for incentives.

According to the Economic Leasing Cycle this period is followed by a '*hesistant recovery'* period in which incentives should peak to its highest level. This is not really the case in the Amsterdam office market, as incentives show a small peak, followed by a small decline.

The strong increase in incentives in 2004-2005 is in line with research from Zuidema & van Elp (2010b), which showed that from 2005 investors were only interested in their return. Investors were searching for long-term leases in which they would like to invest a lot in exchange for a tenant, thereby encouraging tenants for new development (instead of existing buildings) in exchange for substantial *incentives*.

During the economic recovery period 2005-2008: stability; with stable average incentive levels. The results might indicate that during a period of economic recovery the incentives remain relatively stable, which is in line with the economic leasing cycle of the '*overall recovery'*. However, in 2007, the analysis of the Real GDP Growth showed that Dutch economy was booming to its highest level, but the incentives remained stable in the market. This is in contrast to the Economic Leasing Cycle, which implied that there is no need for incentives in the market, during this phase.

During the economic recession 2008-2012: *a strong cycle;* with a strong increase directly after the start of the crisis to a new peak in 2009 of about 15%, which might be explained by the economic and financial crisis, in which investors tried to trigger tenants by providing high incentives. This is in contrast with the Economic Leasing Cycle of Bond (1994) which indicated that during a period of recession, investors provide incentives, although it is no longer sufficient.

The period is followed by a strong decrease in 2010 to 9%, which might be explained by the argument in the last sentence, that it is no longer sufficient to provide incentives in the market. In 2011, the incentives rose again to a new peak of almost 17%, which is in line with the Economic Leasing cycle, as in a period of '*Hesistant Recovery'* the incentives peak to its highest level, in which investors can no longer pay them and eventually should reduce their rent level.
This period is normally followed by a stable incentive development according to the Economic leasing cycle. This might be indicated by the small decline in incentives in 2012. However, a comment which has to be made is that this value is based on only 18 transactions, which therefore might form an in-accurate reflection of the market situation.

2.2. Rental price development in Amsterdam office market 2002-2012

2.2.1. Sample Overview real contract and effective rents

		Real Contract Rent / m2						Real Effective Rent / m2						Difference
		N	Min.	Max.	Mean	Median	SD (%)	N	Min.	Max.	Mean	Median	SD(%)	Mean diff. Contract-Eff
All Transactions	2002	296	38,12	579,88	199,07	188,05	45,54	296	38,12	579,88	198,17	188,05	45,48	0,90
	2003	255	34,48	558,24	179,79	179,16	42,96	255	34,49	547,80	177,42	177,34	42,88	2,37
	2004	270	39,73	511,10	177,10	167,08	46,66	270	39,73	492,03	174,34	161,06	46,52	2,76
	2005	230	37,47	437,94	163,19	153,52	46,38	230	33,42	437,94	158,41	150,23	46,19	4,78
	2006	290	32,24	630,50	175,74	160,40	46,96	290	32,25	495,88	167,29	154,17	44,99	8,44
	2007	292	39,05	591,71	189,23	177,16	47,20	292	39,06	591,72	181,51	169,46	47,33	7,72
	2008	238	57,98	536,47	203,65	179,65	47,25	238	51,16	536,47	195,53	176,01	47,19	8,12
	2009	198	33,29	447,68	168,73	163,96	43,50	198	31,06	447,68	161,14	153,68	44,07	7,59
	2010	170	46,60	586,24	198,90	188,74	44,53	170	46,60	586,25	187,66	181,92	45,16	11,24
	2011	142	43,78	584,57	185,93	171,29	45,44	142	38,86	584,58	172,46	157,61	47,16	13,47
	2012	103	58,14	374,57	186,81	161,51	44,21	103	48,92	352,56	174,95	152,28	43,28	11,87
Transactions LFA > 500 m2	2002	53	52,94	428,24	208,85	200,06	40,72	53	52,94	386,10	205,67	193,37	40,36	3,19
	2003	43	44,32	383,46	185,29	183,08	39,75	43	44,32	383,46	178,83	181,30	39,26	6,45
	2004	42	39,73	349,31	140,29	132,86	51,11	42	39,73	349,31	138,50	132,86	51,93	1,80
	2005	37	45,07	437,94	159,70	138,85	61,72	37	37,52	437,94	149,24	125,49	63,45	10,46
	2006	52	35,92	630,50	173,85	158,35	62,26	52	35,07	495,88	155,63	148,12	55,09	18,21
	2007	67	39,05	529,52	190,97	180,62	53,39	67	39,06	529,52	175,88	170,63	55,82	15,09
	2008	50	64,80	519,09	199,74	183,37	53,13	50	51,16	401,95	180,32	166,35	52,17	19,41
	2009	32	45,67	331,13	152,27	148,64	51,97	32	31,06	295,28	129,52	121,71	52,79	22,76
	2010	30	66,00	412,49	192,15	173,39	54,23	30	49,52	412,49	177,11	150,12	59,06	15,05
	2011	31	43,78	362,05	177,76	169,95	48,04	31	41,16	269,91	144,75	139,53	44,65	33,01
	2012	18	58,59	341,06	195,53	174,26	41,61	18	58,59	268,79	162,64	151,99	39,66	32,89
Transactions LFA < 500 m2	2002	243	38,12	579,88	196,94	185,26	46,64	243	38,12	579,88	196,54	184,96	46,65	0,40
	2003	212	34,48	558,24	178,68	179,11	43,69	212	34,49	547,80	177,14	174,80	43,68	1,54
	2004	228	43,42	511,10	183,88	174,05	45,06	228	42,61	492,03	180,94	171,87	44,83	2,94
	2005	193	37,47	426,94	163,86	156,18	43,19	193	33,42	426,94	160,17	154,77	42,73	3,69
	2006	238	32,24	458,74	176,15	162,68	43,16	238	32,25	458,75	169,84	158,91	42,82	6,31
	2007	225	42,79	591,71	188,72	176,22	45,27	225	42,79	591,72	183,19	168,17	44,80	5,53
	2008	188	57,98	536,47	204,69	178,27	45,77	188	57,99	536,47	199,57	176,50	45,91	5,11
	2009	166	33,29	447,68	171,90	167,73	41,92	166	33,28	447,68	167,23	159,43	41,90	4,67
	2010	140	46,60	586,24	200,35	189,99	42,53	140	46,60	586,25	189,92	186,58	42,19	10,43
	2011	111	65,09	584,57	188,21	172,37	44,89	111	38,86	584,58	180,20	166,10	46,64	8,01
	2012	109	58,14	374,57	184,97	159,16	44,98	109	48,92	352,56	177,55	152,28	43,92	7,41

The table above provides a descriptive overview of transaction in the sample. As already explained in the methods chapter, the nominal rent levels are corrected for inflation *from* the *price level of January 2013*, by means of a CPI index.
In line with the observations in the previous paragraph, the year 2012 contains only 18 transactions with an LFA > 500 m2, which might form an implication in the accuracy of the outcomes.
The results, show a relatively high standard deviation of the average rent levels, between 40-60%. According to Hordijk (2005), a high standard deviation of the average rent levels reflect a high office market volatility. An additional explanation may be the formulation of inter-urban submarkets. Jones (1995) argues that there are even supply imbalances within urban markets, this implies that the sub-urban level would be the most appropriate level of analysis. This could possibly explain the high standard deviation for average rent levels for the whole of Amsterdam.

Overall, the difference between the real effective and real contract rent is increasing in the market over the period 2002-2012 , which is in line with the outcomes of the incentive development. A contradiction is visible in the rental price difference between contract and effective rents in 2010, which is lower compared to other years for transactions with an LFA > 500 m2; and high compared to other years for transactions with an LFA < 500 m2.

2.2.2. Real contract and effective rental price / m2 development in Amsterdam

In the average contract and effective rent level development over the last 10 years more or less the same trends are occurring for transactions with an LFA below or above 500 m2. The last 5 years two peaks and one through are visible in the rental price development. The rental price development were on its lowest level in 2009, which is one year after the credit crunch in 2008, and therefore a logical result of this market circumstance. A conflicting development is shown in 2004/2005 between the transactions with an LFA below and above 500 m2. This will be further analyzed in paragraph 2.4.

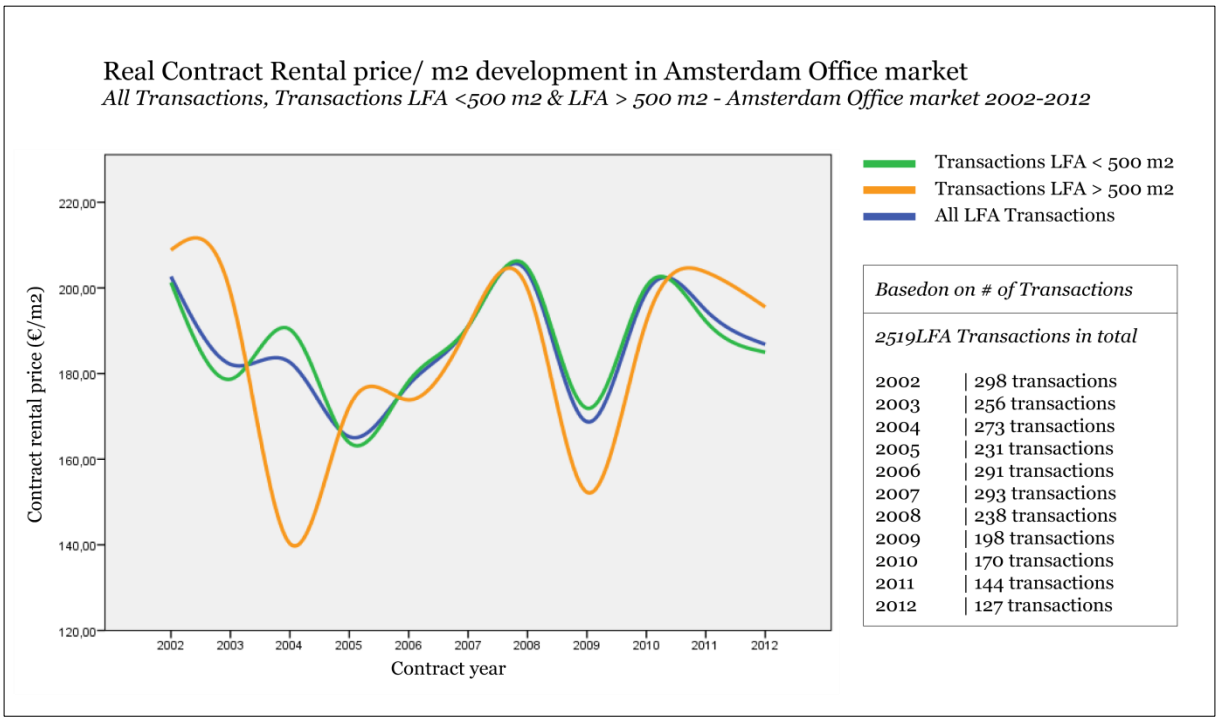


Figure 70. Real Contract rental price development in Amsterdam office market

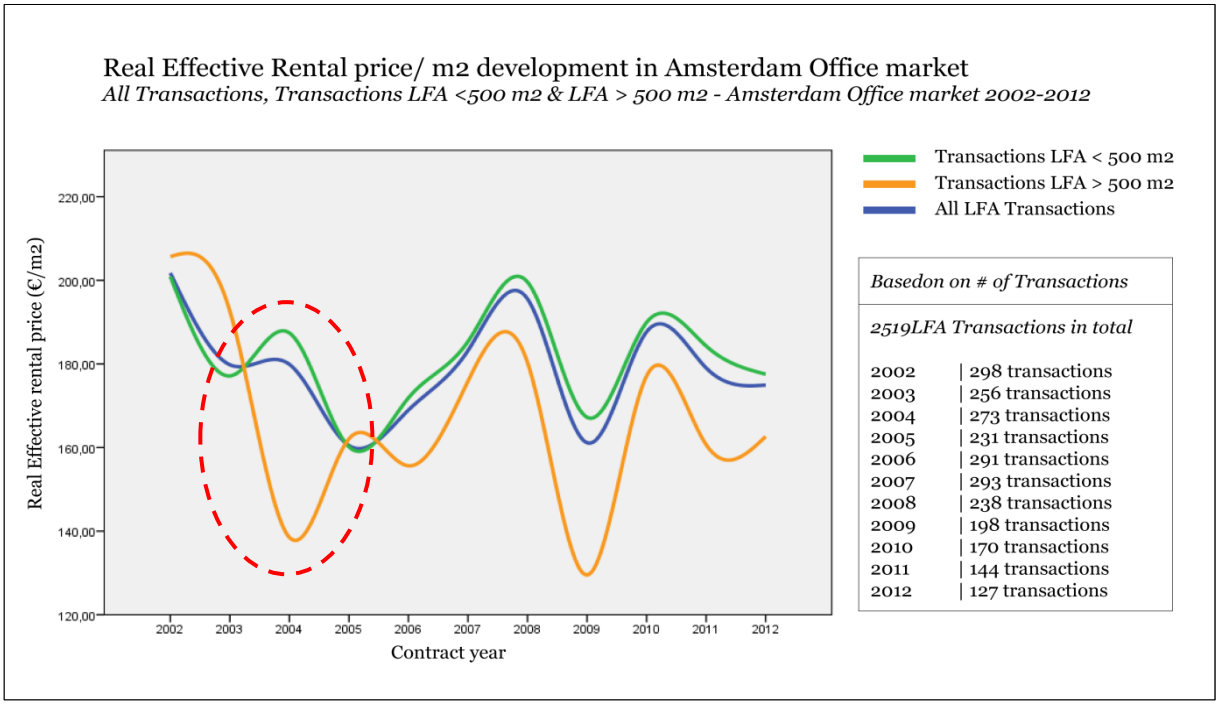


Figure 71. Real Effective rental price development in Amsterdam office market

2.2.3. Boxplot analysis - real effective rent level transactions < 500 m2 - Amsterdam Office market

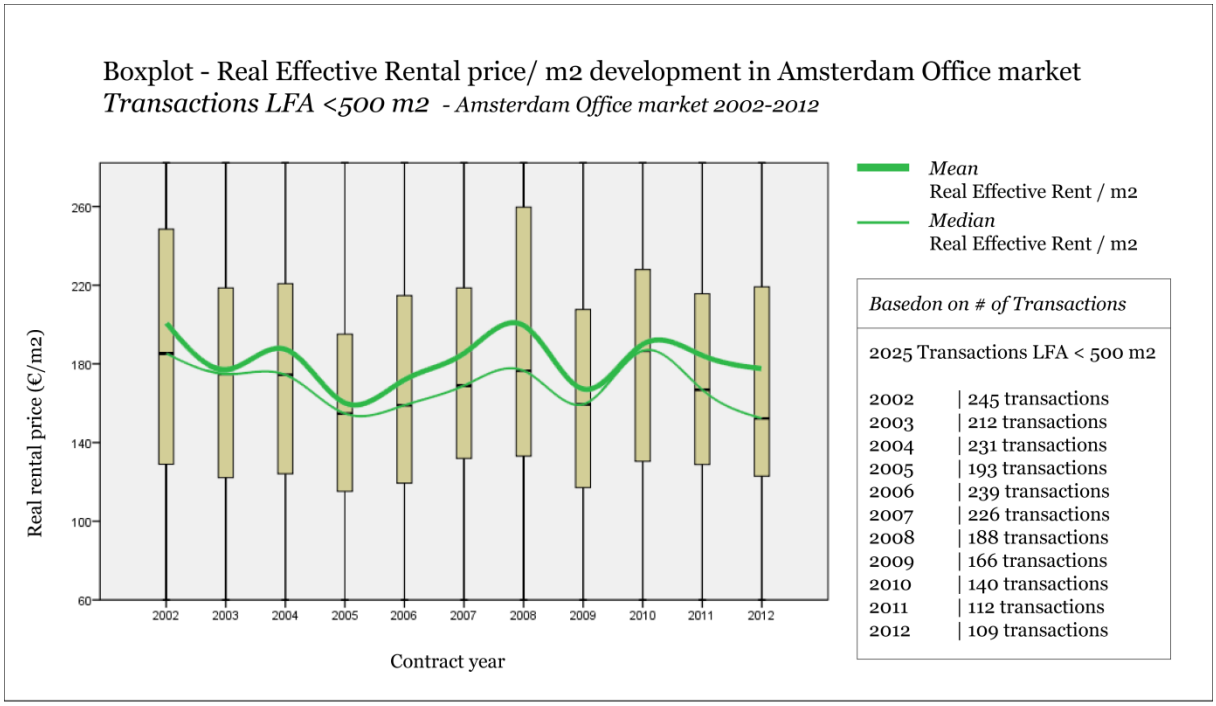


Figure 72. Boxplot Real Effective rental price development LFA < 500 m2

From the transactions with an LFA < 500 m2, the 'median' of the transactions (in the box plot) are near the mean of the transactions. It is remarkable that the mean is always above the median in the development.

2.2.6. Boxplot analysis - real effective rent level transactions > 500 m2 - Amsterdam Office market

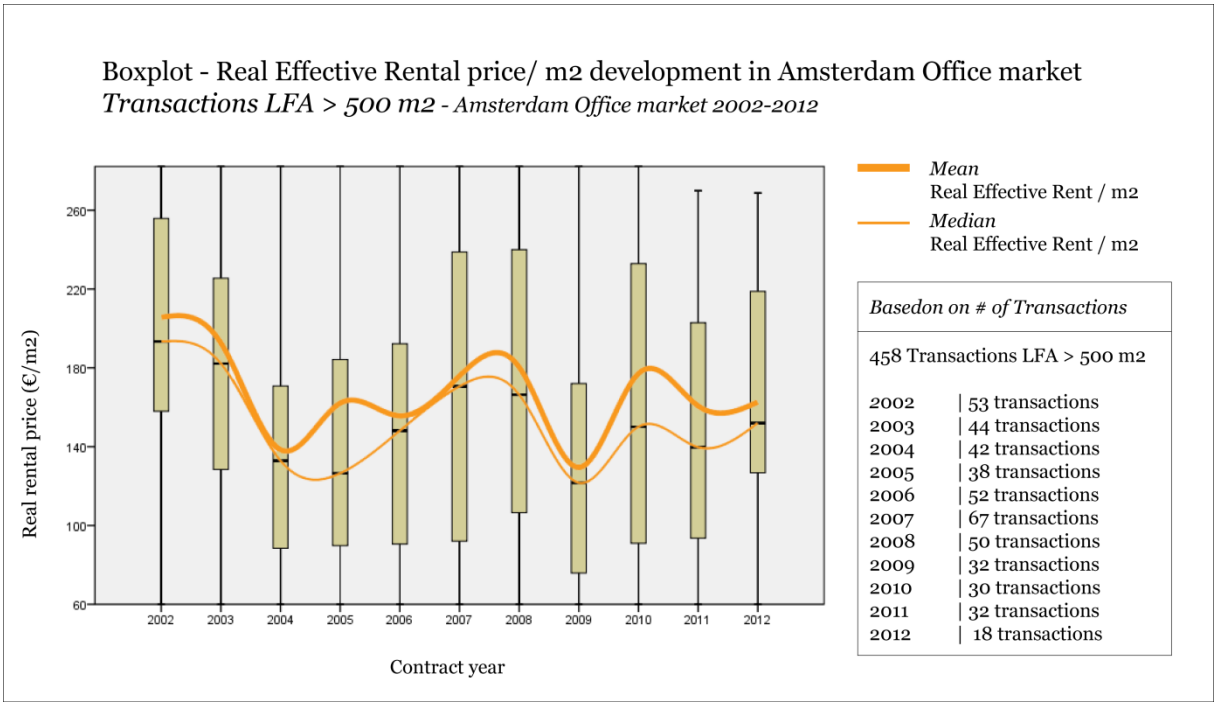


Figure 73. Boxplot Real Effective rental price development LFA > 500 m2

From the transactions with an LFA > 500 m2, the 'median' of the transactions (in the box plot) is also near the mean of the transactions. In the transactions with an LFA > 500 m2, the box plots are larger than in transactions with an LFA < 500 m2. This is related to the characteristics and size of the sample. Furthermore, the analysis shows that the development of the mean has an extra cycle in the period 2004-2006, compared to the development of the median.

2.3. Comparing contract and effective rental prices

2.3.1. Rental price / m2 development – Transactions LFA < 500 m2

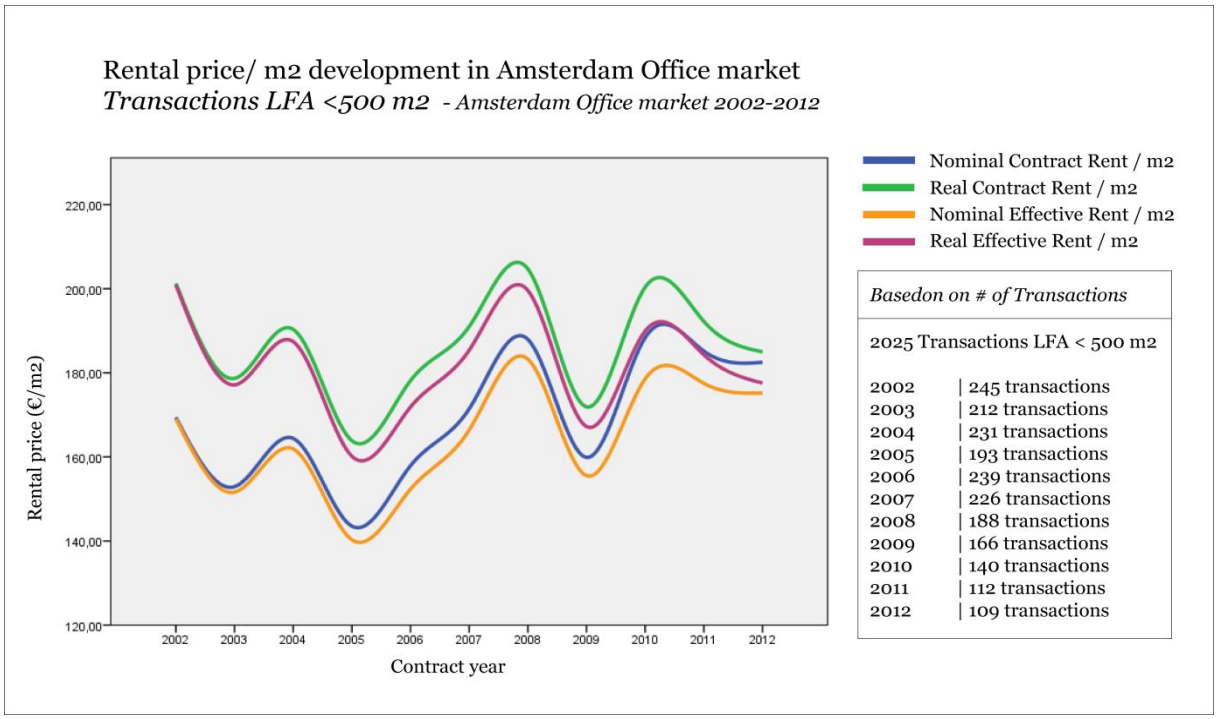


Figure 74. Rental price development LFA < 500 m2

The figure above showed that the rental prices of transactions < 500 m2, are rather similar and very cyclical. The figure shows a peak in rental prices in 2004, 2008 and 2011. A trough in rental prices is visible in 2003, 2005 and 2009.

During the ICT-crisis, the rental prices were really volatile, in which the prices rose in one year, and declined in the next year, and the other way around. During the period of economic recovery (2005-2008) the rental prices increased in the market to a peak in 2008.

Directly after the burst of the financial and economic crisis in 2008, the rental prices decreased in 2009. However, the rental prices recovered quite fast in 2010, to the similar rent level as in the year 2008. After 2010 the prices decreased in 2011 and 2012, however the decrease in 2012 is more stable.

2.3.2. Rental price / m2 development – Transactions LFA > 500 m2

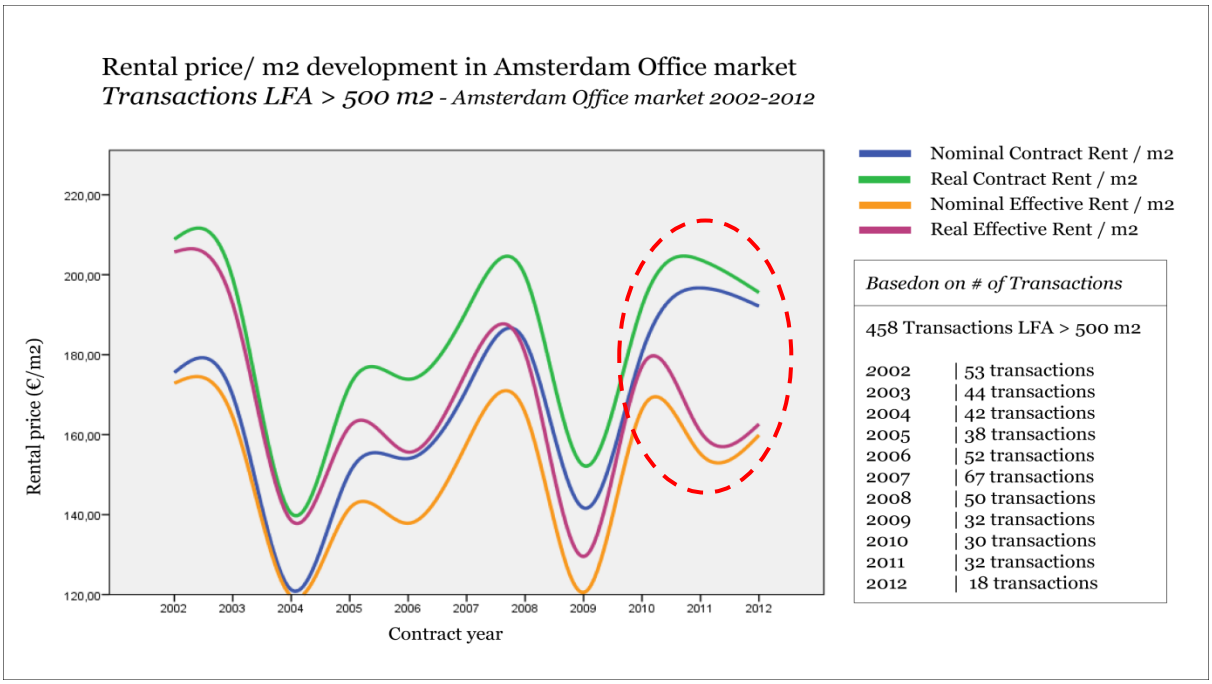


Figure 75. Rental price development LFA > 500 m2

The rental price development of larger office transactions (Transactions with an LFA > 500 m2) is also very cyclical. The development is in 2004 and 2009 on its lowest level. In 2002, 2008 and 2010/2011 the rental prices peaked in the market. Furthermore a small peak is shown in the year 2005, in all rent levels. The rental price development after 2006 is more or less comparable to the development of rental prices for transactions with an LFA below 500 m2. However, before 2006, both rental price levels developed in a contradicting way.

The most remarkable aspect in the development is the large difference between contract rental prices and effective rental prices in 2011 and 2012. This is illustrated by the red dotted line in the figure.

According to Economic Leasing Cycle of Bond (1994) the market in 2011 and 2012, is in a so-called 'hesistant recovery' phase, in which the incentives peak to its highest level. This explains the large difference between both rental prices. According to Bond, this period is characterized by such a high level of incentives, that investors can no longer pay them. As a result, investors eventually will reduce their rent level. This is in line with the effective rental price decrease in the market in this period.

2.4. Explaining the real effective rental price development with the associated market conditions

In the figure below, the real effective rental price development is shown for transactions with a lettable floor area above and below 500 m2. This sub-paragraph will try to explain the rental price developments based on discussed market conditions and behavior in chapter 6 of the literature review.

The analysis will be conducted per economic/office market period classified by van Eijk (2012):

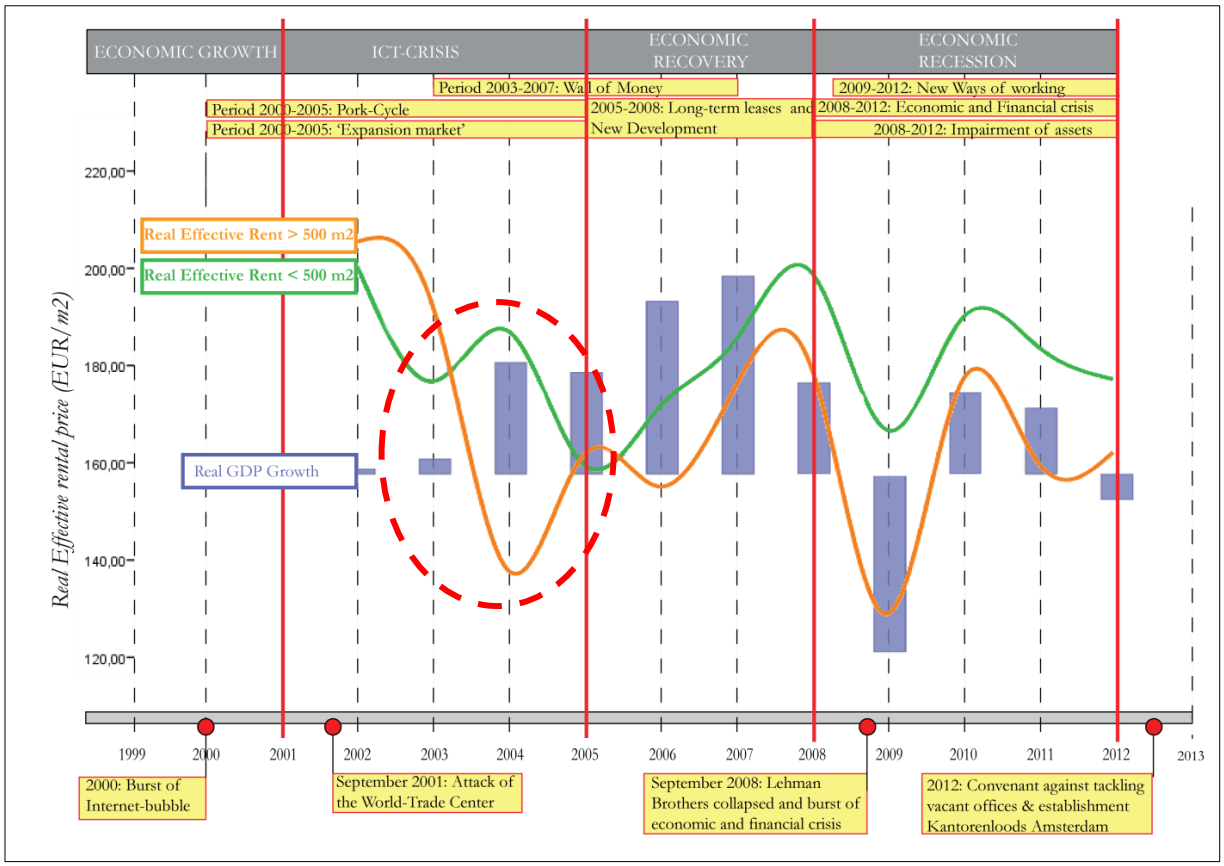


Figure 76. Explaining the real effective rental price development by prevailing market conditions

ICT Crisis 2001-2005;

In the entire investigated period, the effective rental price development for offices with a lettable floor area below and above 500 m2, is rather similar. However, during the ICT-Crisis, the effective rental price for offices with an

LFA below 500 m2 showed a small peak in rental prices, while the effective rental price for offices with an LFA above 500 m2 largely decreased in rental price.
This might be explained by the so-called 'hog-cycle' (Koeman, 2008; Zuidema & Van Elp ,2011). As in the period prior to the ICT-Crisis, many investors were developing on risk (without an already known user) due to the positive economic conditions and the strong employment growth (Zuidema & Van Elp, 2010b). As a result, during the ICT-Crisis, when the internet bubble collapsed together with the attack at the World Trade Center, office jobs and office demand declined, which resulted in a so-called hog-cycle: declining demand and rising supply. As a result, investors had to decrease their rent level in order to attract tenants. It might have occurred that this influence was stronger for larger offices compared to smaller offices. This is in line with the results of the effective rental price development of this research.
The development for transactions with an LFA < 500 m2, might be explained by the improving GDP in this period, which might trigger smaller companies and individuals to rent an office building. This figure shows that in the period between 2002-2003 the rental price for offices with an LFA < 500 m2, declined in the market. This might be explained by the burst of the ICT-bubble. During the ICT-bubble, there was a large increase of small internet companies renting an office (Zuidema & Van Elp, 2010b). After the burst of the ICT-bubble, the demand for small internet companies and offices declined in the market, which is explained by the decline in rental price.

Period of economic recovery 2005-2008:
After the strong decline in rental prices for transactions with an LFA > 500 m2 in the period 2003-2004, the rental prices showed a strong increase in the period 2005-2008. This is in line with the market conditions explained in the theoretical framework.
Due to the Wall of Money' (2003-2007) from financial markets, and the excessive lending opportunities during this period has led to a record of transaction volumes provided in the office market. (Ter Horst, 2009). Due to confidence of money gains during new development of buildings, there was a so-called 'expansion market'. All actors (municipality, investors, developers and financiers) supported the development of new buildings, because they all achieved substantial gains. The government subsidized projects and conceded ground yields, investors and banks would finance the construction and customers could rapidly pay and finance the rising market prices. (De Zeeuw, 2011).
As a result, the rental prices increased during this period, which is in line with the outcomes of this research. Furthermore, investors encourage tenants for new development during this period in exchange for substantial incentives, which is explained in the previous paragraph. (Zuidema & Van Elp, 2010b; Remøy, 2010). This is comparable to this research, as the incentives increased significant during this period.

Period of economic recession 2008-2012
Directly after the burst of the financial and economic crisis, the prices significantly declined in 2009, in which the incentives were peaking in the market. This is in line with behavior on the market, as explained by van Eijk (2011) and Soeter e.a., (2011). Due the economic crisis, users are less inclined to move to another office, which resulted in strong declining take-up rates and decreasing rental prices in the market.
In 2010, the effective rental prices recovered quite fast, to a similar rent level during the peak in 2008. During the strong recovery, the incentives decreased in the market. In 2011 the rental prices showed a strong decrease, corresponding with a large increase in incentives provided. In the last year of this research, the rental prices rose again in the market, although the rental prices for transactions with an LFA < 500 m2, remained quite stable.

2.5. Market dynamics comparison – Published face rental price development

2.5.1. Introduction

This paragraph compares the outcomes of the average contract and effective rental price development with the rents published in market reports. The average face rental prices of NVM Funda in Business and Rudolf Bak are used as published market rent comparison for Amsterdam. As all market reports do not publish an overall average rental price for Amsterdam, but only an average rental price development for '*existing offices*' and '*new offices*', the nominal effective rental prices of the Municipal Tax Office are transformed in nominal effective rental prices for 'existing offices' and 'new offices'. The division between existing offices and new offices are based on the following assumptions:

New offices:
- Offices with: Contract year – Year built ≤ 3 years

Existing offices:
- All the remaining transactions

As published face rental prices in the market reports of NVM Funda in Business and Rudolf Bak are based on transactions above 500 m2, the face rental price will be compared with the contract and effective rental prices of transactions > 500 m2.

2.5.2. Overview

	Existing Offices LFA > 500 m2				New Offices LFA > 500 m2			
	Nominal Contract Rent / m2		Nominal Effective Rent / m2		Nominal Contract Rent / m2		Nominal Effective Rent /m2	
Year	Count	Mean	Count	Mean	Count	Mean	Count	Mean
2002	41	177,785	41	175,163	12	167,778	12	164,892
2003	33	160,288	33	157,189	10	150,596	10	137,108
2004	35	120,232	35	118,586	6	140,945	6	139,655
2005	32	135,070	32	126,217	5	169,217	5	158,072
2006	47	142,848	47	131,482	4	239,819	4	198,326
2007	55	165,620	55	153,038	11	193,368	11	178,493
2008	43	182,956	43	165,341	7	185,369	7	166,464
2009	30	140,048	30	117,495	2	165,893	2	165,893
2010	28	174,899	28	162,699	1	168,429	1	159,222
2011	27	155,684	27	130,427	4	277,045	4	201,588
2012	18	192,112	18	159,880	0		0	

NVM Business		Bak	
Existing Mean	New Mean	Existing Mean	New Mean
198	190	186	
197	190	186	
186	191	179	
175	292	171	
186	250	186	
195	243	190	
195	243	193	260
190	252	193	260
190	252	186	270
185	252	185	260
191	252	195	260

The overview table shows that the amount of transactions for 'new offices' is too low in order to make an accurate comparison. As a result, this analysis will not be provided in this paragraph.
The amount of transactions for existing offices is also quite low per year, especially in 2012, which only consists of 18 transactions. As a consequence, especially the year 2012 might bias the relation between the face rental price and the contract/effective rental price.

2.5.3. Face vs. Contract and Effective Rent Comparison - Existing Office Buildings

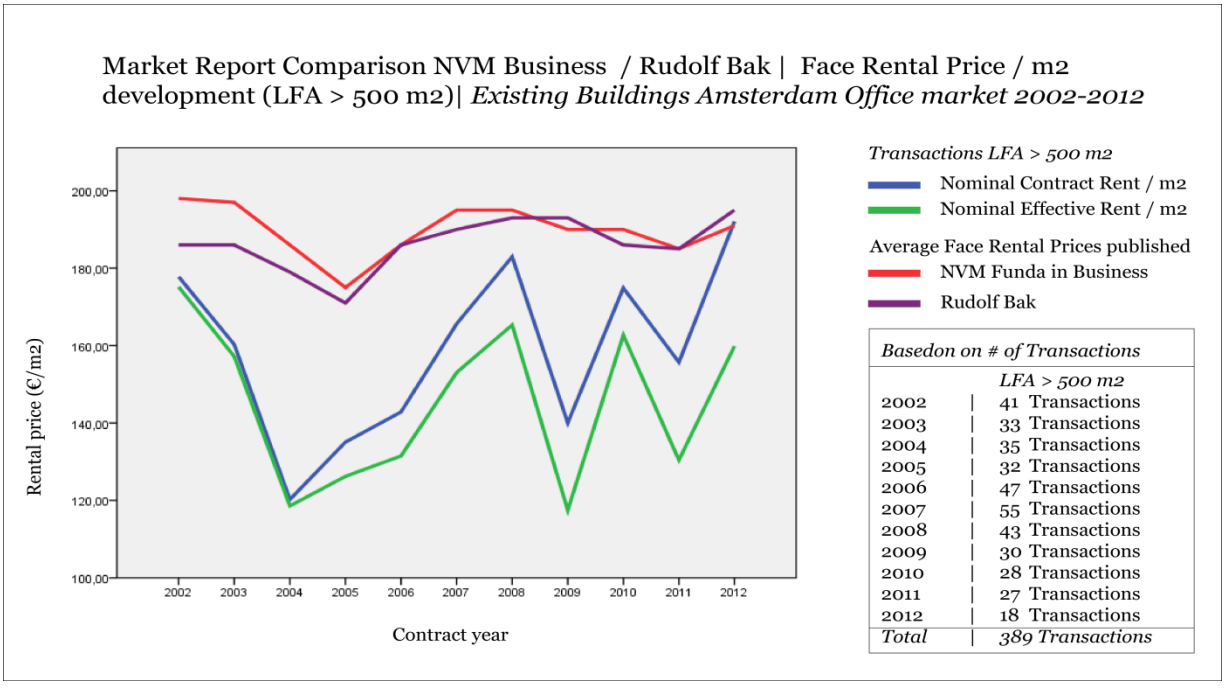


Figure 77. Market report comparison NVM Funda in Business / Rudolf Bak

The above figure shows the comparison between the average face rental prices published by NVM Funda in Business and Rudolf Bak, compared to the contract and effective rental prices development. The results show that the rental price published in market reports are in general not comparable to the underlying contract and effective rental price development. However, during moments of peaks in the contract rental price (2002/2003; 2008, 2010, 2012), the difference between the face rental prices and the contract rental prices becomes smaller.

Yearly differences

The opposite table shows the yearly percentage difference between face rental prices and contract/effective rental prices (calculated as difference in percentage from the face rental price), differs from 15% - 23 %, on average in this research. This provides an indication of the overall difference between face rental price and contract/effective rental prices.

	NVM Funda in Business		Rudolf Bak	
Percentage difference from average face rental price	Nominal Contract rents / m2	Nominal Effective rents / m2	Nominal Contract rents / m2	Nominal Effective rents / m2
2002	10,21%	11,53%	4,42%	5,83%
2003	18,64%	20,21%	13,82%	15,49%
2004	35,36%	36,24%	32,83%	33,75%
2005	22,82%	27,88%	21,01%	26,19%
2006	23,20%	29,31%	23,20%	29,31%
2007	15,07%	21,52%	12,83%	19,45%
2008	6,18%	15,21%	5,20%	14,33%
2009	26,29%	38,16%	27,44%	39,12%
2010	7,95%	14,37%	5,97%	12,53%
2011	15,85%	29,50%	15,85%	29,50%
2012	-0,58%	16,29%	1,48%	18,01%
Average	16,45%	23,66%	14,91%	22,14%

2.5.4. Mutual development comparison: correlation analysis

However, the face rental price *development* shows more or less the same behavior as the contract and effective rental price development. For instance, when the average face rental prices decline, the average effective rental price also decline, and the other way around.

This is proved by the correlation table above, which showed a significant correlation between the contract /effective rental price development of Existing offices, and the NVM face rental price development of Existing offices. In addition, the face rental price development of Rudolf Bak also shows a significant positive correlation with the contract rental price of this research. However, in contrast to the mutual relation with the face rental prices of NVM Funda in Business; the effective rental price development shows no significant mutual correlation with the face rental price development of Bak.

		Contract rents / m2 - Existing offices – LFA > 500 m2	Effective rents / m2 - Existing offices – LFA > 500 m2
NVM Face rents – Existing Offices	Pearson Correlation	,628*	,723*
	Sig. (2-tailed)	,038	,012
Bak – Face rents Existing Offices	Pearson Correlation	,647*	,421
	Sig. (2-tailed)	,031	,197

As a result, there can be concluded that the contract and effective rental development itself is about 15-23% lower compared to the face rental price development. However, the overall *development* is comparable between the face rental price development and the contract and effective rental price development.

Another face rent published in the media is the *prime* face rent. The opposite correlation table shows no significant relations in development with the prime face rental prices of BNP Paribas. This indicates that the market dynamics between published *prime* face rental prices - and the average contract or effective rental prices – differ in the Amsterdam office market.

		Nominal contract rents / m2 – LFA > 500 m2	Nominal Effective rents / m2 – LFA > 500 m2
Prime Face rents –	Pearson Correlation	,539	,311
	Sig. (2-tailed)	,087	,353

In order to provide a more accurate conclusion about the difference and development between face rental prices and effective rental prices in the Amsterdam office market, Study 5 provides an 'individual transaction analysis', by comparing the face rental prices of an office when it enters the market, with the corresponding effective rental price of the transaction. In combination of the outcomes with this paragraph, a conclusion will be provided about the differences between both rental prices in the Amsterdam office market.

3. Study 2 | Rental price indices

The second study compares the average ('mean') rental price index technique with the hedonic rental price index technique, between contract and effective rental prices. The literature review showed that the hedonic rental price index technique should be more market realistic compared to an average rental price index technique. A *real effective quality-adjusted rental price index* should provide the most realistic reflection of the market developments in the Amsterdam office market. This chapter finishes with comparing a rental price index based on face rents with a rental price index based on contract or effective rental prices.

3.1. Average Rental price index

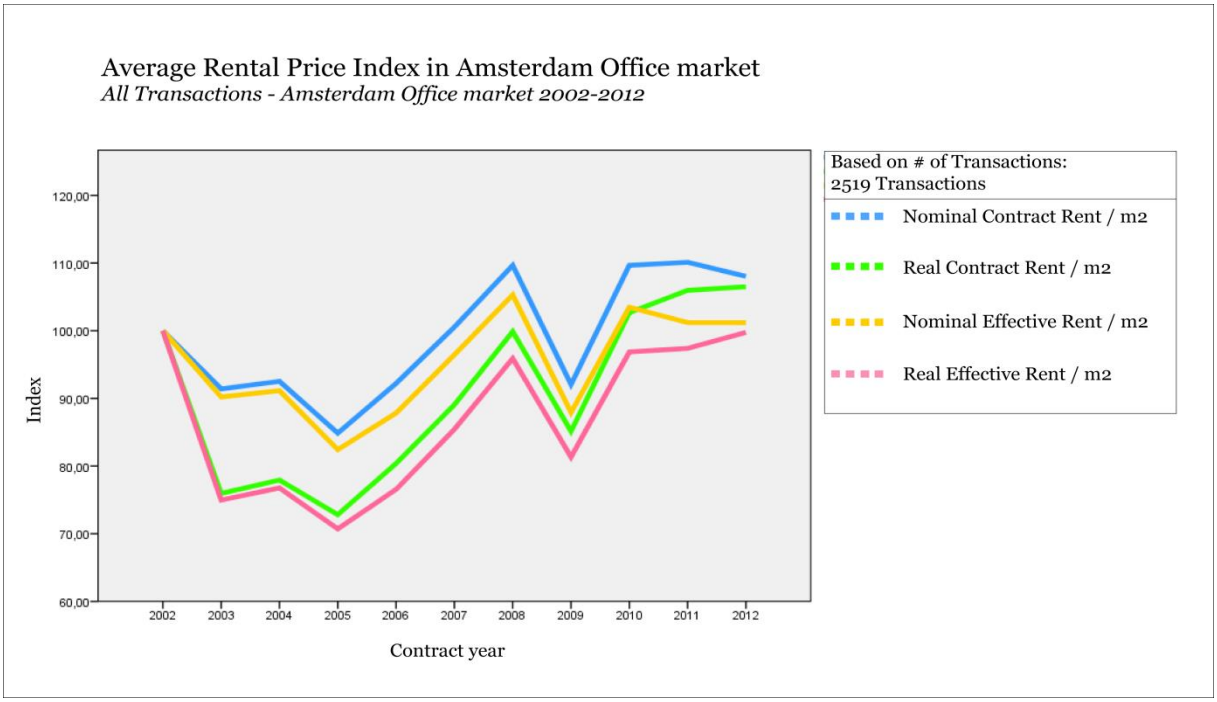


Figure 78. Rental price index based on average rental prices: Average rental price index

In the above figure, the average rental prices are transformed into an index, in which the rental price in 2002 = 100. In the average rental price index, a decline in prices is visible in the period 2002-2005 and 2008-2009. Both the contract rent and the effective rent development shows a similar trend, although in the years 2010-2012, the nominal rents are declining while the real rents are growing.

3.2. Conventional Hedonic Price index

The conventional Hedonic Price index is made by connecting the transaction database of the Municipal Tax Office to the office property stock file of the Delft University of Technology, which includes all the Office buildings in Amsterdam with a Gross Floor Area higher than 500 m2. In the property database of the University, several building characteristics are already available for most buildings in Amsterdam. Other characteristics are researched by means of own research. This is in depth explained in the 'Methods' chapter of the Research Design.
As some building information is missing for several buildings, not the full sample or transactions are used in the Hedonic price index. In the final Hedonic Price index, *1230 transactions* are used as input.

3.2.1. Variables

The table on the next page provides an overview of the variables used in the model, and the omitted variables which are left out of the model. In the third column, a small description of each variable is provided.

Variable in Model	Measure	Description	Source	Omitted
LnContracthuurm2 (D)	Number	The logarithm of nominal contract rent per square meter per year	DBGA	
LnRealContractrent (D)	Number	The logarithm of real contract rent per square meter per year	DBGA	
LnEffHuurm2 (D)	Number	The logarithm of nominal effective rent per square meter per year	DBGA	
LnReffHuurm2 (D)	Number	The logarithm of real effective rent per square meter per year	DBGA	
LnTransOppVVO	Number	The logarithm of the Lettable Floor Area leased (LFA)	DBGA	
LnAfstSnelweg	Number	The logarithm of the distance to the nearest highway	TU/ Own research	
LnAfstandStation	Number	The logarithm of the distance to the nearest station	TU/ Own research	***Omitted***
DJaar2002	Dummy	Transaction Year 2002	DBGA	***Omitted***
DJaar2003	Dummy	Transaction Year 2003	DBGA	
DJaar2004	Dummy	Transaction Year 2004	DBGA	
DJaar2005	Dummy	Transaction Year 2005	DBGA	
DJaar2006	Dummy	Transaction Year 2006	DBGA	
DJaar2007	Dummy	Transaction Year 2007	DBGA	
DJaar2008	Dummy	Transaction Year 2008	DBGA	
DJaar2009	Dummy	Transaction Year 2009	DBGA	
DJaar2010	Dummy	Transaction Year 2010	DBGA	
DJaar2011	Dummy	Transaction Year 2011	DBGA	
DJaar2012	Dummy	Transaction Year 2012	DBGA	
DLaagbouw	Dummy	Buildings with a maximum of 5 stories	TU/Own Research	***Omitted***
DHoogbouw	Dummy	Buildings with a minimum of 6 stories	TU/Own Research	
DContracttermshort	Dummy	Contract term ≤3 years (≤ 36 months)	DBGA	
DContracttermmedium	Dummy	Contract term 4-7 years (37-84 months)	DBGA	
DContracttermlong	Dummy	Contract term ≥ 8 years (≥85 months)	DBGA	***Omitted***
D_voor1900	Dummy	Building Constructed before 1900	DBGA/TU	***Omitted***
DBouwperiode1900_1950	Dummy	Building Constructed in period 1900-1949	DBGA/TU	***Omitted***
DBouwperiode1950_1970	Dummy	Building Constructed in period 1950-1969	DBGA/TU	
DBouwperiode1970_1990	Dummy	Building Constructed in period 1970-1989	DBGA/TU	***Omitted***
DBouwperiode1990_2000	Dummy	Building Constructed in period 1990-1999	DBGA/TU	***Omitted***
DBouwperiode_na2000	Dummy	Building Constructed after 1999	DBGA/TU	***Omitted***
DWalkscorelow	Dummy	Google Walkscore ≤ 59	Google WS	***Omitted***
DWalkscoremedium	Dummy	Google Walkscore 60-79	Google WS	***Omitted***
DWalkscoreHigh	Dummy	Google Walkscore ≥ 80	Google WS	
DStasddeelCentre	Dummy	City District Centre - Amsterdam	DBGA	
DStasddeelWestpoort	Dummy	City District Westpoort - Amsterdam	DBGA	***Omitted***
DStasddeelNewWest	Dummy	City District New-West - Amsterdam	DBGA	***Omitted***
DStasddeelSouth	Dummy	City District South - Amsterdam	DBGA	***Omitted***
DStasddeelWest	Dummy	City District West - Amsterdam	DBGA	***Omitted***
DStasddeelEast	Dummy	City District East - Amsterdam	DBGA	***Omitted***
DStasddeelNorth	Dummy	City District North - Amsterdam	DBGA	
DStasddeelSouthEast	Dummy	City District South-East - Amsterdam	DBGA	***Omitted***
DSouthAxis_WTC_RAI	Dummy	Business District South-Axis, WTC& RAI	DBGA	
DVondelpark	Dummy	Business District Vondelpark	DBGA	
DOmval	Dummy	Business District Omval	DBGA	
DHolendrecht	Dummy	Business District Holendrecht	DBGA	
DSouthEast2	Dummy	Business District Amstel III	DBGA	
DAdamCentre	Dummy	Business District Canal District	DBGA	***Omitted***
DOostelijkeHandelskade	Dummy	Business District Omval	DBGA	***Omitted***
DWibautstraat	Dummy	Business District Wibaut/Weesperstraat	DBGA	***Omitted***
DTeleport	Dummy	Business District Teleport	DBGA	***Omitted***
DRiekerpolder	Dummy	Business District Riekerpolder	DBGA	***Omitted***
DWorldFashionCentre	Dummy	Business District World Fashio Centre	DBGA	***Omitted***
DArena_Bijlmerplein	Dummy	Business District Arena/Bijlmerplein	DBGA	***Omitted***
DBuikslotermeerplein	Dummy	Business District Buikslotermeerplein	DBGA	***Omitted***
DABP	Dummy	Business District ABP	DBGA	***Omitted***
DIJburg	Dummy	Business District DIJburg	DBGA	***Omitted***
DSloterdijk2	Dummy	Business District Sloterdijk	DBGA	***Omitted***

D = Dependent variable, DBGA = Dienst Belastingen Gemeente Amsterdam / Municipal Tax Office , TU = Property Database TU Delft

3.2.2. Nominal Contract Rent versus Nominal Effective Rent / m2 analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,560[a]	,313	,293	,41889

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,573[a]	,329	,309	,41836

ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	68,475	25	2,739	15,609	,000[b]
Residual	150,028	855	,175		
Total	218,502	880			

a. Dependent Variable: LnContracthuurm2

ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	73,035	25	2,921	15,880	,000[b]
Residual	157,290	855	,184		
Total	230,325	880			

a. Dependent Variable: LnEffHuurm2

The regression output shows an R of around 0,6 and an R^2 of around 0.3, which indicates that the independent variables (building and location characteristics, yearly time dummies and location dummies) in the model account for 30% of the variation in the dependent variable. Furthermore, the remaining 70% of the variation in the dependent variable cannot be explained by only the independent variables, and might be explained by other variables that influence the independent variable. In comparable hedonic price analysis, similar independent variables account for 70-90% of the total variance in the dependent variable, which should led to a more accurate reflection of the overall market developments. An explanation for this occurrence might be the fact that in the transaction database of the Municipal Tax Office most transactions have an LFA below 500 m2. In corresponding Hedonic Price analyses in the Real Estate market, it is common to use transactions with an LFA above 500m2.

	Nominal Contract Rent					**Nominal Effective Rent**				
	Unstandardized Coefficients		Standardized Coefficients			Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	t	Sig.	B	Std. Error	Beta	t	Sig.
(Constant)	5,432	,196		27,731	,000	5,514	,201		27,489	,000
LnTransOppVVO	-,095	,015	-,209	-6,407	,000	-,111	,015	-,239	-7,327	,000
LnAfstSnelweg	,052	,020	,084	2,590	,010	,052	,020	,081	2,524	,012
DJaar2003	-,189	,059	-,119	-3,222	,001	-,203	,060	-,124	-3,374	,001
DJaar2004	-,237	,059	-,149	-4,018	,000	-,253	,060	-,155	-4,197	,000
DJaar2005	-,221	,061	-,132	-3,628	,000	-,270	,062	-,157	-4,332	,000
DJaar2006	-,180	,058	-,119	-3,114	,002	-,239	,059	-,154	-4,050	,000
DJaar2007	-,073	,057	-,049	-1,288	,198	-,132	,058	-,087	-2,267	,024
DJaar2008	-,083	,062	-,051	-1,348	,178	-,163	,063	-,096	-2,582	,010
DJaar2009	-,183	,072	-,086	-2,544	,011	-,299	,074	-,138	-4,073	,000
DJaar2010	-,043	,069	-,022	-,616	,538	-,143	,071	-,071	-2,021	,044
DJaar2011	-,075	,073	-,034	-1,026	,305	-,218	,074	-,098	-2,934	,003
DJaar2012	-,034	,111	-,009	-,302	,762	-,120	,114	-,032	-1,059	,290
DWalkscoreHigh	,077	,045	,077	1,728	,084	,102	,046	,099	2,245	,025
DHoogbouw	,170	,034	,163	5,016	,000	,153	,035	,143	4,409	,000
DBouwperiode1950_1970	-,147	,047	-,096	-3,127	,002	-,149	,048	-,094	-3,076	,002
DContracttermshort	-,298	,067	-,242	-4,460	,000	-,292	,068	-,230	-4,266	,000
DContracttermmedium	-,153	,058	-,138	-2,610	,009	-,167	,060	-,147	-2,791	,005
DStasddeelCentre	,025	,044	,023	,567	,571	,034	,045	,030	,743	,458
DStasddeelNorth	-,255	,064	-,135	-3,979	,000	-,203	,066	-,105	-3,105	,002
DSouthAxis_WTC_RAI	,523	,070	,243	7,421	,000	,545	,072	,247	7,557	,000
DVondelpark	,298	,056	,187	5,280	,000	,320	,058	,196	5,548	,000
DOmval	,714	,147	,144	4,845	,000	,699	,151	,137	4,631	,000
DHolendrecht	-,218	,095	-,070	-2,301	,022	-,193	,097	-,060	-1,981	,048
DSouthEast2	-,111	,068	-,052	-1,630	,104	-,119	,070	-,055	-1,714	,087
DSloterdijk2	-,242	,077	-,100	-3,139	,002	-,243	,079	-,098	-3,068	,002

a. Dependent Variable: LnContracthuurm2

a. Dependent Variable: LnEffHuurm2

Another implication of the hedonic price index, is that the B values indicate that the rental price in business district 'Omval' is significantly higher compared to the South-Axis, WTC, RAI district, which is not in line with the market circumstances.

The Standard Coefficients table on the previous page (Beta) shows the influence of several variables on the dependent variable; nominal contract rent and nominal effective rent. The Beta outcomes imply that the dependent variable is mostly influenced by the following variables:
- Dummy variable South-Axis, WTC, RAI;
- Dummy variable Vondelpark;
- Dummy variable contract term short;
- The lettable floor area (LFA) of the transaction;
- Dummy variable 'Hoogbouw';

3.2.5. Real Contract Rent versus Real Effective Rent / m2 analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,590[a]	,348	,316	,38643

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,604[a]	,364	,333	,38467

ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	40,453	25	1,618	10,836	,000[b]
Residual	75,710	507	,149		
Total	116,163	532			

a. Dependent Variable: LnRealContractrent

ANOVA[a]

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	43,001	25	1,720	11,624	,000[b]
Residual	75,020	507	,148		
Total	118,021	532			

a. Dependent Variable: LnReffHuurm2

The (adjusted) R-square for contract and effective rents corrected for inflation are a bit higher compared to the R-square for nominal rent levels, which indicates that the real rental prices provide a better reflection of the market, compared to the nominal rental prices, with the current independent variables in the regression model.

	Real Contract Rent					Real Effective Rent				
	Unstandardized Coefficients		Standardized Coefficients			Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.	B	Std. Error	Beta	t	Sig.
(Constant)	5,872	,268		21,875	,000	5,978	,267		22,372	,000
LnTransOppVVO	-,146	,028	-,199	-5,153	,000	-,168	,028	-,227	-5,938	,000
LnAfstSnelweg	,042	,024	,076	1,782	,075	,038	,024	,067	1,606	,109
DJaar2003	-,223	,069	-,153	-3,226	,001	-,235	,069	-,160	-3,407	,001
DJaar2004	-,216	,069	-,152	-3,142	,002	-,234	,068	-,164	-3,422	,001
DJaar2005	-,158	,073	-,102	-2,184	,029	-,192	,072	-,122	-2,655	,008
DJaar2006	-,138	,069	-,098	-2,001	,046	-,197	,068	-,139	-2,884	,004
DJaar2007	-,068	,070	-,048	-,967	,334	-,108	,070	-,076	-1,555	,121
DJaar2008	-,096	,076	-,061	-1,259	,209	-,159	,076	-,101	-2,098	,036
DJaar2009	-,186	,088	-,091	-2,112	,035	-,245	,088	-,118	-2,788	,005
DJaar2010	-,008	,085	-,004	-,100	,921	-,112	,084	-,059	-1,328	,185
DJaar2011	-,105	,090	-,050	-1,172	,242	-,204	,090	-,095	-2,282	,023
DJaar2012	-,009	,135	-,003	-,066	,947	-,039	,134	-,011	-,293	,770
DWalkscoreHigh	,088	,060	,091	1,453	,147	,139	,060	,144	2,319	,021
DHoogbouw	,192	,044	,190	4,366	,000	,187	,044	,183	4,268	,000

DBouwperiode1950_1970	-,080	,062	-,052	-1,304	,193	-,083	,061	-,053	-1,354	,176
DContracttermshort	-,345	,125	-,317	-2,750	,006	-,347	,125	-,316	-2,778	,006
DContracttermmedium	-,169	,121	-,160	-1,394	,164	-,181	,121	-,169	-1,498	,135
DStasddeelCentre	,054	,052	,054	1,032	,302	,057	,052	,057	1,105	,270
DStasddeelNorth	-,300	,072	-,197	-4,154	,000	-,228	,072	-,148	-3,160	,002
DSouthAxis_WTC_RAI	,490	,102	,218	4,805	,000	,545	,102	,240	5,363	,000
DVondelpark	,304	,065	,219	4,664	,000	,325	,065	,232	5,005	,000
DOmval	,929	,393	,086	2,362	,019	,970	,392	,089	2,476	,014
DHolendrecht	-,211	,126	-,064	-1,674	,095	-,134	,126	-,041	-1,068	,286
DSouthEast2	-,252	,095	-,107	-2,645	,008	-,274	,095	-,116	-2,888	,004
DSloterdijk2	-,290	,140	-,080	-2,065	,039	-,268	,140	-,073	-1,922	,055

a. Dependent Variable: LnRealContractrent

a. Dependent Variable: LnReffHuurm2

3.2.3. Overview Hedonic Rental Price Indices

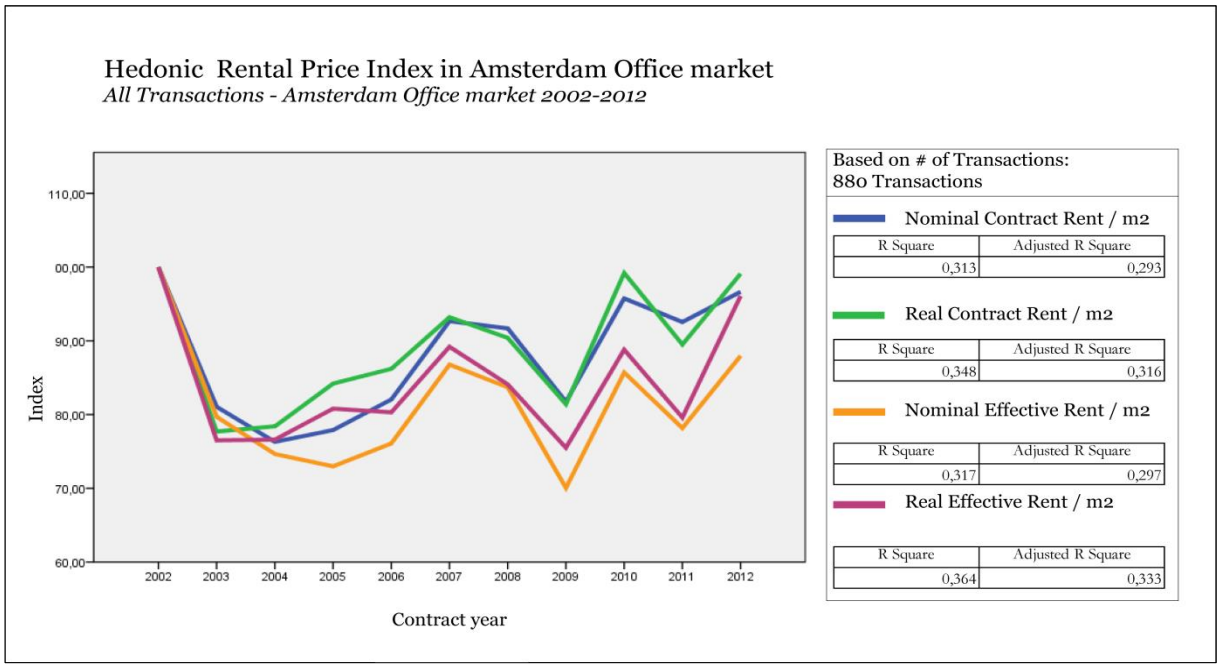


Figure 79. Hedonic rental price indices for different type of rents

Overall, the Hedonic price analysis shows a similar trend in each rent level in the period 2002-2012. The figure shows a full market cycle from 2002 till 2009: a decline in the period 2002-2004/2005 and 2007/2008-2009; Trough in the period 2004-2006; Recovery the period 2005/2006-2007 and a peak in the period 2007-2008

After the hard decline in rents 2009, the rents started to rise in 2010 to a similar level compared to 2008. After 2010, the rents slightly declined in 2011, in which the rents increased to a new peak in 2012.

The hedonic price analysis also shows that the difference between contract rents and effective rents increased since 2002, with large deviations between contract rents and effective rents in 2010 and 2011. In 2012, the difference becomes smaller, which might indicate that the incentives slightly decline in the market.

3.3. Comparison Hedonic versus Average Rental Price Index technique

The figure below shows both types of rental price index techniques for different rent levels used in this research. In order to compare both techniques, the *real effective rental price development* of both index techniques will be mutually compared.

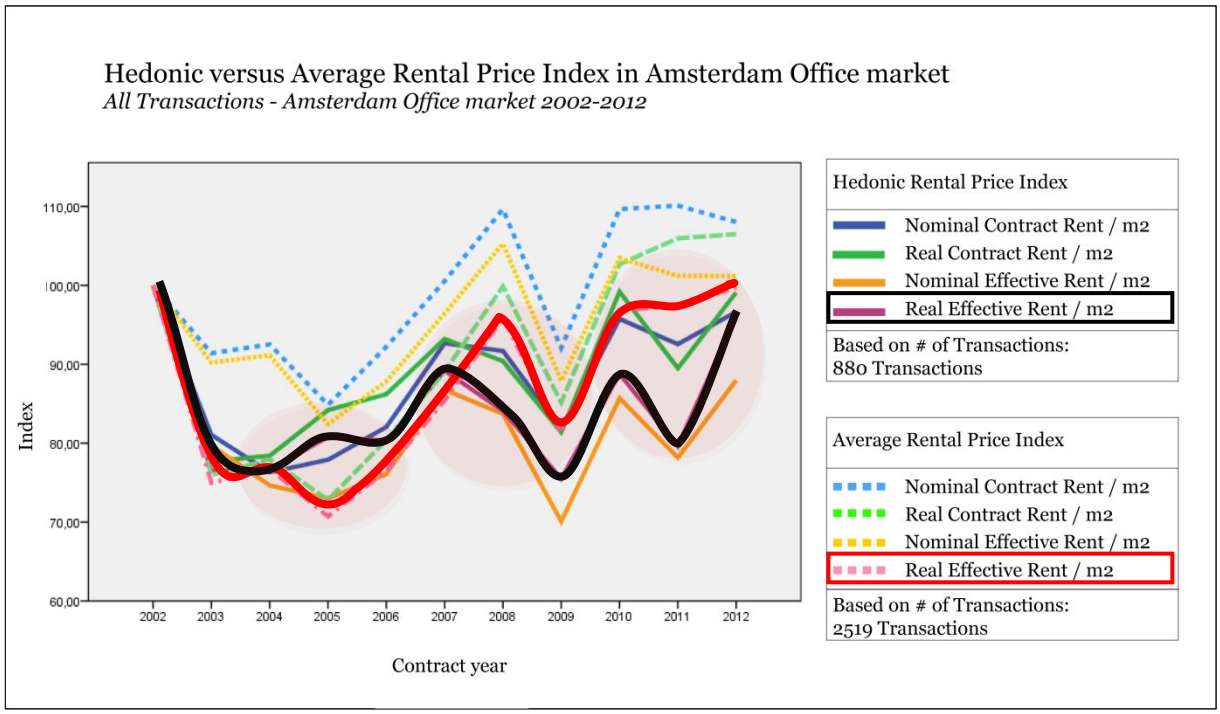


Figure 80. Hedonic vs. average rental price indices for different type of rents

The 'Average' rental price index technique differs from the Hedonic rental price index technique, even though 'overall' more or less the same trend is visible in the real effective rental price development. The hedonic rental price index technique differs from the average rental price index technique in the following aspects:

- In the period 2002-2004 the hedonic rental price index shows a clear decline in real effective rents, while in the average rental price index the real effective rental price slightly declines from 2002-2003, alternated by an increase in prices from 2003-2004, and followed by another decline from 2004-2005.
- In the period 2006-2008, the developments in both rental price indices are similar, although the hedonic rental price index more or less lags the 'average' rental price index by one year. From 2008-2010 the same trend is visible in real effective rental prices for both the average and the hedonic rental price index technique.
- In 2011, the hedonic rental price index shows a large deviation between real contract and real effective rental prices, and only a small difference between both rental price in 2012, while in the 'average' rental price index the difference is stable in 2011 and 2012. Furthermore, the real effective rental price index in the average rental price index is quite stable in the period 2010-2012, while the hedonic rental price index has an extra cycle in this period.

3.4. Average rental price indices based on published face rents

This paragraph compares several rental price indices based on published face rents compared to contract and effective rents. As already discussed in the previous chapter, published rental prices in the market are either average *prime* rents or divided in average rental prices for *existing* and *new* office buildings, instead of *average* rental prices for the entire market.

The figures on the next page show that either a rental price index based on *prime* face rental prices published in the market, as well as rental price indices based on *average* face rental prices for *existing* offices differ from the more realistic contract and effective rental price developments in the Amsterdam office markets over the period 2002-2012. Both figures show a less volatile *face* rental price index compared to the contract or effective rental price index in the market. Furthermore, the rental prices indices based on contract or effective rents are more cyclical compared to the face rental price indices. Nevertheless, the comparison with a rental price index based on *prime* rents, shows a more or less similar development with the real contract and real effective rental price index of the hedonic regression technique, over the period 2002-2008.

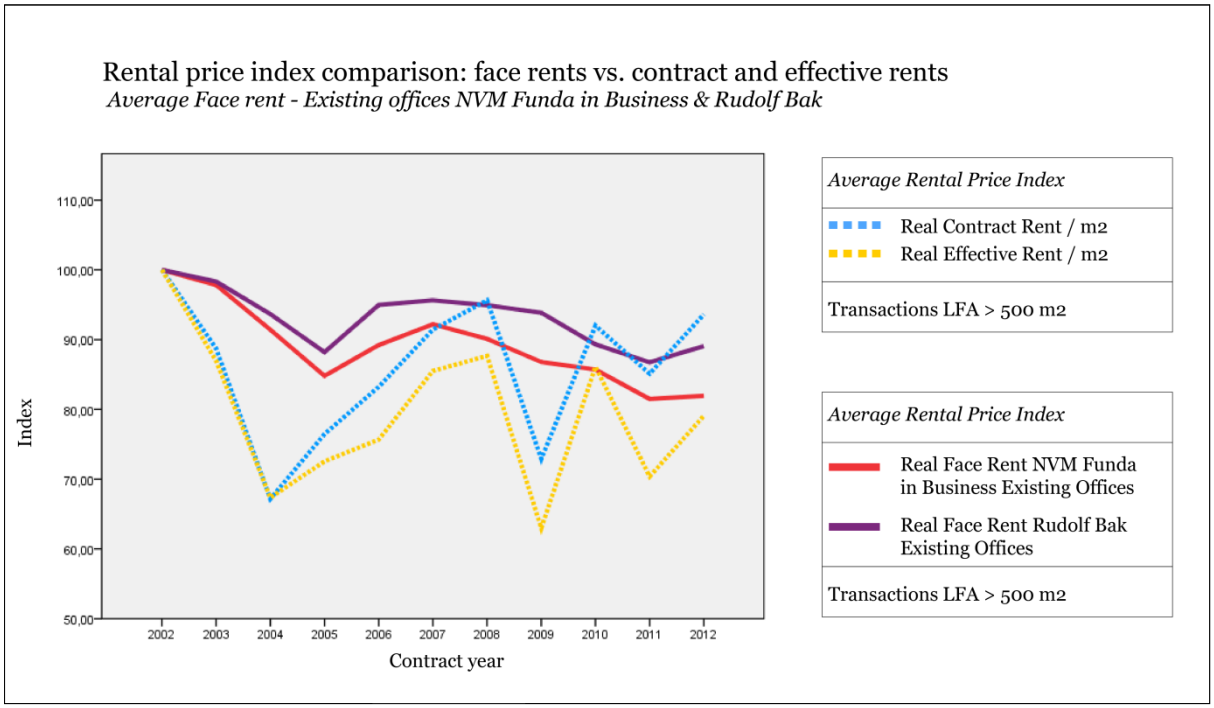


Figure 81. Price index comparison: face rental prices (NVM Funda in Business & Rudolf Bak; Existing offices) versus real effective rental prices (Transactions LFA > 500 m2; Existing offices)

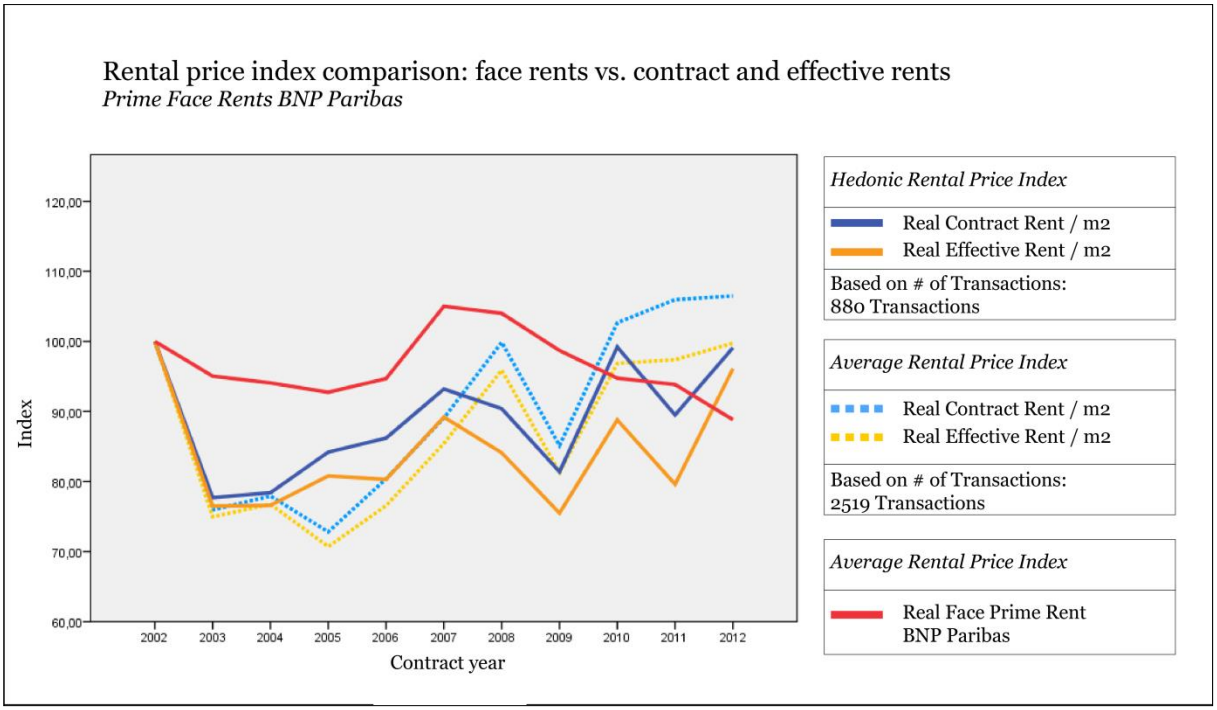


Figure 82. Price index comparison: prime face rental prices (BNP Paribas) versus contract and effective rental price indices

4. Study 3 | Testing relations between variables | Influences of vacancy on the incentive and rental price development

This chapter analyses the mutual relation between the vacancy and incentive development, and the relation between the vacancy and the face, contract and effective rental price development.

In this chapter, the reported vacancy rates from market reports, are compared to the incentive and rent level development of this research. As market reports only report vacancy rates of offices in Amsterdam with an LFA > 500 m2, the vacancy rates are only compared to the incentive and rent level development of transactions with an LFA> 500m2.

4.1. Reported vacancy rates in the Amsterdam Office market

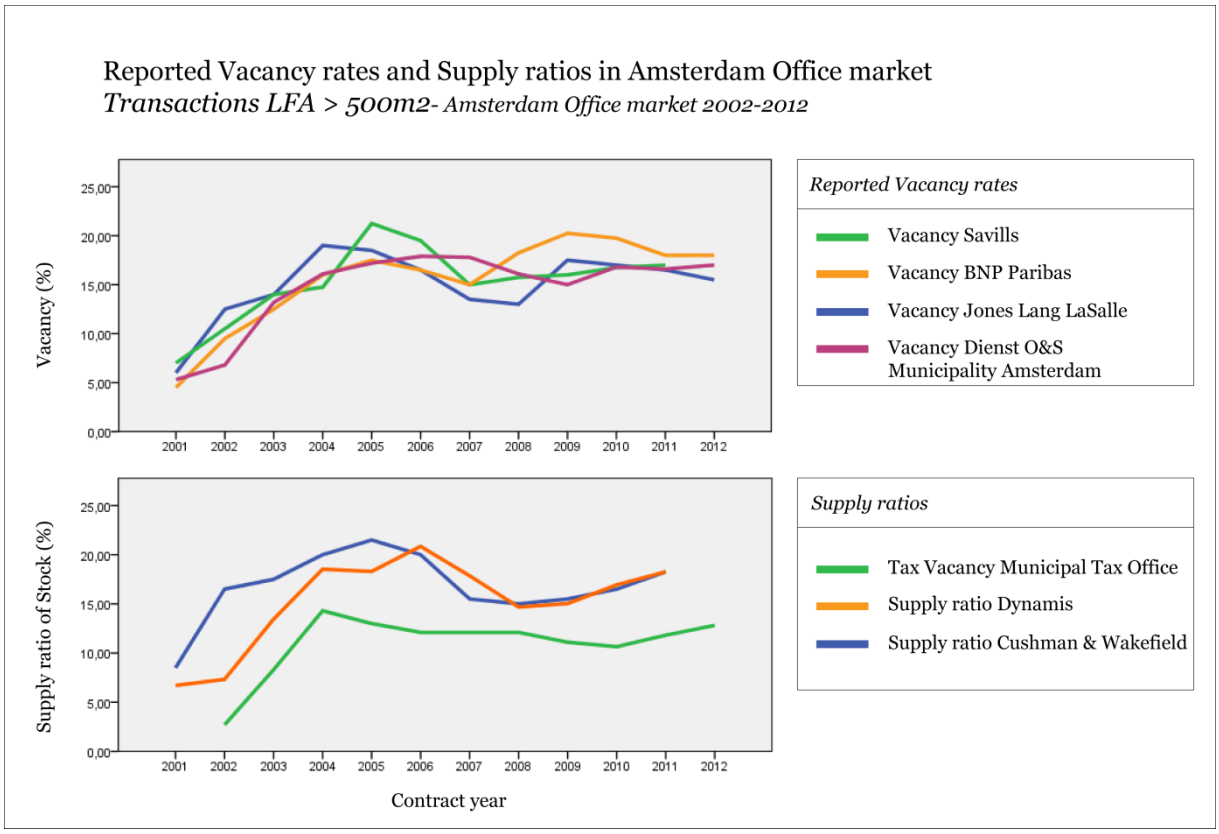


Figure 83. Reported vacancy rates and supply ratios in the Amsterdam office market

The figures above show that every market participant market uses other vacancy rates and supply ratios, which is *another indication of the in-transparent behavior* of the Dutch and Amsterdam office market. As a result it is difficult to compare vacancy rates with the performed research. Nevertheless, more or less the same trends are visible, with a rising vacancy in the periods 2002-2005 and 2007-2009, and a declining vacancy in the periods 2005-2007 and 2009 till 2012.

Another possible vacancy rate is the Tax-Vacancy rate by the Municipal Tax Office. This vacancy rate consists of buildings for which no user can be acquainted by the Municipal Tax Office. Unused buildings of which the user is unknown, fall outside the tax-vacancy. As a result, the Tax-Vacancy is more a registration of supply in the market compared to the vacancy. When comparing the Tax-Vacancy with other supply-ratios in the market, the Tax-vacancy showed to be 5% lower compared to the supply ratios from market reports. As a result, the Tax-vacancy will not be used in this research.

In the following paragraphs the vacancy rate will be compared with the rental price and incentive development in the Amsterdam office market. As it is difficult to compare all the different vacancy rates with the incentive and rental price development, an '*average vacancy rate*' is constructed from the four market reports.

4.2.Vacancy versus the rental price development for transactions LFA > 500 m2

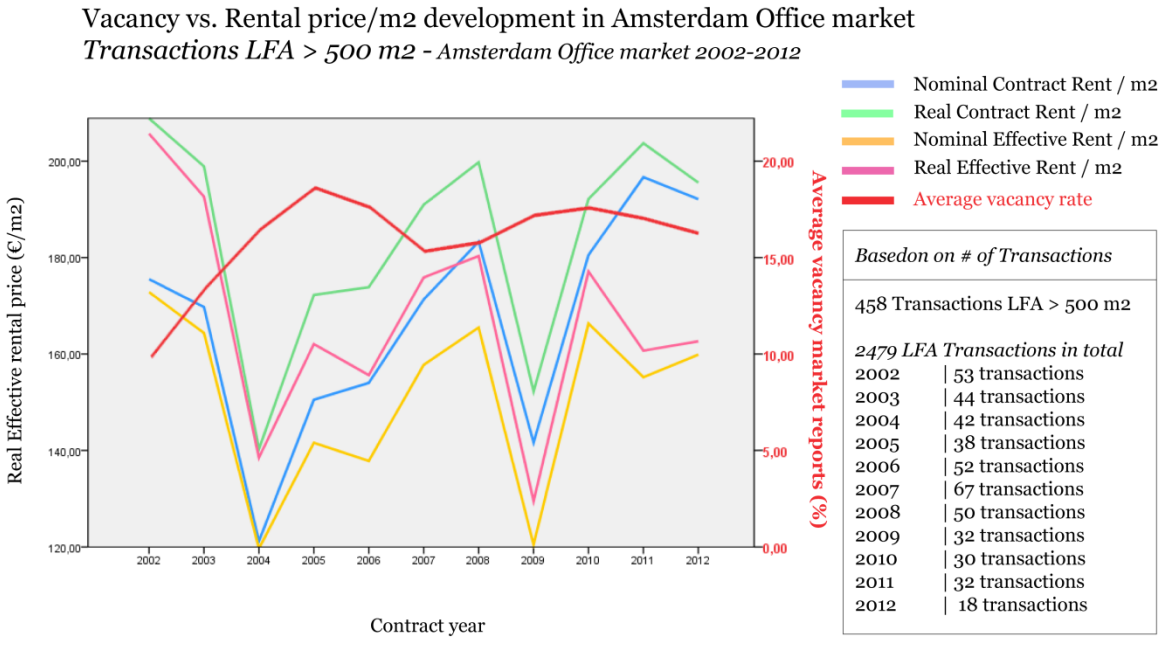


Figure 84. Vacancy vs. rental price development

In the figure above, the average vacancy rate from market reports is compared with the rental price development. The figure indicates a *negative relation* between the vacancy rate with the rent levels.
As it is hard to compare the different visual relationships, a correlation analysis is performed between each rent level and the vacancy rates published in market reports and the average vacancy rate. In the comparisons, the average face rental prices of Rudolf Bak (Existing offices) is used for the comparison with the published face rental prices in the market.

4.2.1. Analysis nominal rents per vacancy rate

		Nominal face rent / m2 (Bak, R. 2002-2012)			Nominal contract rent / m2			Nominal effective rent / m2		
		No-time lag	*lag 1 year*	*lag 2 years*	*No-time lag*	*lag 1 year*	*lag 2 years*	*No-time lag*	*lag 1 year*	*lag 2 years*
Vacancy rate Jones Lang LaSalle	Pearson Corr.	-,542	-,235	,251	-,678*	-,068	,343	-,807**	-,318	,109
	Sig. (2-tailed)	,085	,487	,484	,022	,843	,332	,003	,340	,765
	N	11	11	10	11	11	10	11	11	10
Vacancy rate BNP Paribas	Pearson Corr.	,152	,162	,421	-,021	,114	,627	-,364	-,267	,336
	Sig. (2-tailed)	,655	,635	,226	,952	,738	,052	,271	,427	,343
	N	11	11	10	11	11	10	11	11	10
Vacancy rate Savills	Pearson Corr.	-,440	,135	,427	-,278	-,042	,578	-,477	-,312	,407
	Sig. (2-tailed)	,203	,709	,252	,436	,909	,103	,163	,380	,277
	N	10	10	9	10	10	9	10	10	9
Vacancy Dienst O&S Municipality	Pearson Corr.	-,034	,167	,517	-,096	,069	,545	-,365	-,268	,306
	Sig. (2-tailed)	,921	,624	,126	,779	,839	,103	,270	,426	,389
	N	11	11	10	11	11	10	11	11	10
Average Correlation		-,216	,057	,404	-,268	,019	,523	-,503	-,291	,289

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

The relation between nominal rent levels and the vacancy rate shows no significant correlations between the face rental price development and each type of vacancy rate. Two significant correlations exists in the comparison with nominal contract and effective rent levels, namely with the vacancy rate of Jones Lang LaSalle. The strongest correlation is found in the correlation between the vacancy rate of Jones Lang LaSalle and the nominal effective rent level development. The other vacancy rates do not significantly correlate with the nominal contract or effective rent development.

4.2.2. Analysis real rents per vacancy rate

		Real face rent / m2 (Bak, R. 2002-2012)			Real contract rent / m2			Real effective rent / m2		
		No-time lag	*lag 1 year*	*lag 2 years*	*No-time lag*	*lag 1 year*	*lag 2 years*	*No-time lag*	*lag 1 year*	*lag 2 years*
Vacancy rate Jones Lang LaSalle	Pearson Corr.	-,622*	-,738**	-,325	-,858**	-,309	,215	-,837**	-,506	-,093
	Sig. (2-tailed)	,041	,010	,359	,001	,355	,551	,001	,112	,799
	N	11	11	10	11	11	10	11	11	10
Vacancy rate BNP Paribas	Pearson Corr.	-,735*	-,780**	-,588	-,369	-,238	,412	-,646*	-,573	,001
	Sig. (2-tailed)	,010	,005	,074	,264	,480	,237	,032	,065	,997
	N	11	11	10	11	11	10	11	11	10
Vacancy rate Savills	Pearson Corr.	-,708*	-,442	-,191	-,442	-,263	,460	-,572	-,480	,217
	Sig. (2-tailed)	,022	,201	,622	,201	,462	,213	,084	,160	,576
	N	10	10	9	10	10	9	10	10	9
Vacancy Dienst O&S Municipality	Pearson Corr.	-,637*	-,621*	-,304	-,366	-,228	,395	-,574	-,524	,046
	Sig. (2-tailed)	,035	,041	,392	,268	,500	,258	,065	,098	,900
	N	11	11	10	11	11	10	11	11	10
Average Correlation		-,676	-,645	-,352	-,509	-,260	,370	-,657	-,521	,043

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

The correlation table shows that each vacancy rate significantly correlates with the real face rental price development. In line with the outcomes of the comparison with nominal rent levels, the vacancy rate of Jones Lang LaSalle correlates the strongest correlation with the real contract and effective rental price development. The vacancy rate of BNP Paribas also significantly correlates with the real effective rental price development in the Amsterdam office market.

In general, each vacancy rate shows the strongest negative correlation with the 'real effective rental price' compared to the real contract rental price, with the exception of the vacancy rate of Jones Lang LaSalle. This is proved by the '*average correlation calculated*, which is the stronger for 'real effective rental prices' compared to real contract rental prices. On average, the real face rental price development show the strongest correlation with each vacancy rate compared to the real contract and real effective rental price development. As it is difficult to make accurate conclusions for each vacancy rate, a comparison will be made with the constructed '*average vacancy rate of market reports*' below.

4.2.3. Analysis nominal rents compared to average vacancy rate market reports

		Nominal face rent / m2 (Bak, R. 2002-2012)			Nominal contract rent / m2			Nominal effective rent / m2		
		No-time lag	*lag 1 year*	*lag 2 years*	*No-time lag*	*lag 1 year*	*lag 2 years*	*No-time lag*	*lag 1 year*	*lag 2 years*
Average vacancy rate market reports	Pearson Corr.	-,220	,086	,442	-,286	,046	,565	-,565	-,297	,319
	Sig. (2-tailed)	,516	,802	,201	,395	,894	,089	,070	,374	,368
	N	11	11	10	11	11	10	11	11	10

The correlation table shows that nominal effective rental prices are the best indicator for analyzing rental adjustments compared to nominal face and nominal contract rental prices, although the correlation is not significant. The strongest correlation (-0,565) is visible for *nominal effective rental prices without a time-lag.*

4.2.4. Analysis real rents compared to average vacancy rate market reports

		Real face rent / m2 (Bak, R. 2002-2012)			Real contract rent / m2			Real effective rent / m2		
		No-time lag	*lag 1 year*	*lag 2 years*	*No-time lag*	*lag 1 year*	*lag 2 years*	*No-time lag*	*lag 1 year*	*lag 2 years*
Average vacancy rate market reports	Pearson Corr.	-,765**	-,698*	-,396	-,570	-,262	,405	-,751**	-,557	,047
	Sig. (2-tailed)	,006	,017	,258	,067	,436	,246	,008	,075	,898
	N	11	11	10	11	11	10	11	11	10

The correlation table shows a stronger correlation of the vacancy rate with real effective rent levels in the market compared to real contract rent levels. In addition, the correlation between 'real' rent levels and the vacancy rate is higher than for 'nominal' rent levels and the vacancy rate, which is in accordance with earlier research of Koppels & Keeris (2006).

The *real face rental price* is a significant indicator of the rental adjustments in the Amsterdam office market, due to high correlation with the average vacancy rate.
In addition, the correlation between the contract or effective rental price and the average vacancy rate, showed that the *real effective rent level* is also a significant indicator for rental price adjustments in the Amsterdam office market due to the stronger mutual correlation, compared to contract rental prices. This is in line with the rental adjustment equation (Hendershott, 2004).
Based on above outcomes, their can be concluded that both the real face rental price as well as the real effective rental price are significant indicators for analyzing rental price adjustments in the Amsterdam office market.

The relation between vacancy and the rental price shows the highest correlation without a time-lag in each rent level. This is in contrary to the research of Koppels and Keeris in 2006, in which they found a two-year time-lag between the vacancy rates and rent adjustments. The explanation for this behavior was that landlords are reluctant to adjust their rental rates when there are fluctuations in the vacancy rate. The difference might be explained by the fact that this research compares averages per year, in which a possible time-lag less than one year might already be incorporated in the yearly rents.

In addition, as Koppels and Keeris (2006) indicate, vacancy rates in market reports include obsolete office space, which is not considered to be a viable accommodation alternative by office space users. As a result, the relation between the vacancy rate and the rent levels might even be stronger when the obsolete office space is excluded from the calculations.

4.3. The relation between the vacancy and the incentive development

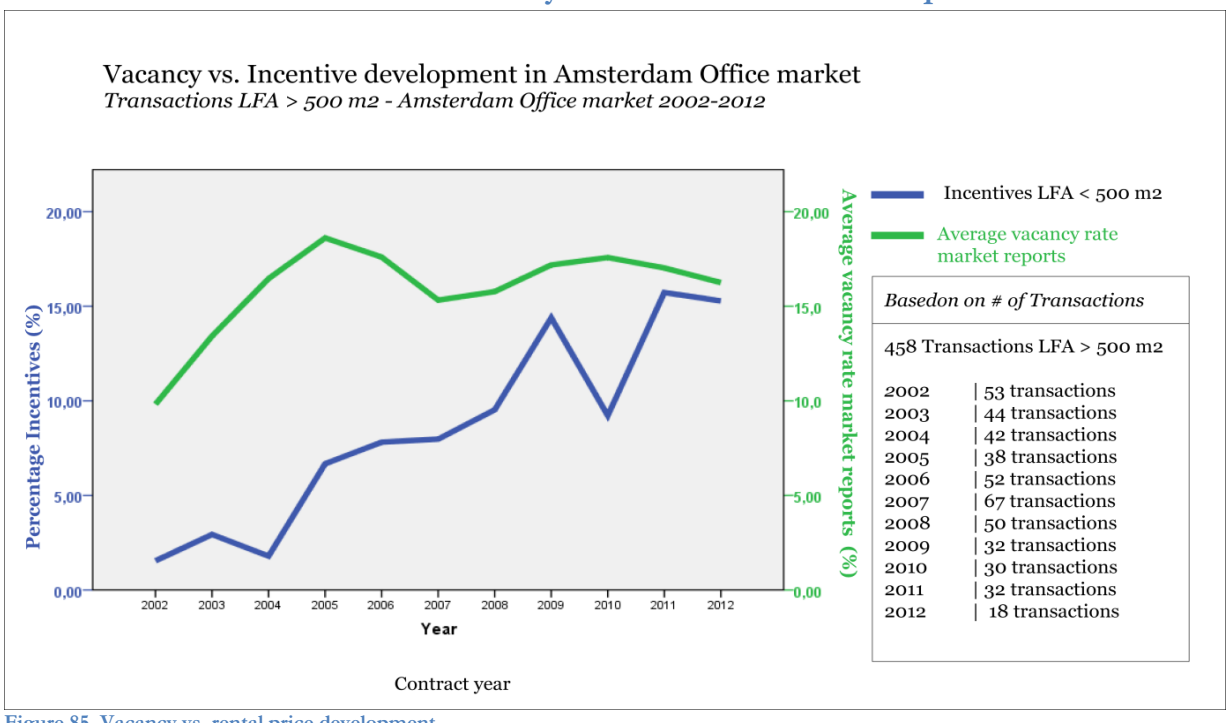


Figure 85. Vacancy vs. rental price development

The vacancy versus the incentive development shows some significant positive correlations between both variables. Especially in relation to the vacancy of BNP Paribas the correlation is really high.

The average correlation analysis indicates a *medium* relation between vacancy and the incentives in the market. In addition, the average reported vacancy rate reports two significant correlations with the percentage incentives in the market, namely with a one-year lagged vacancy rate and a two-year lagged vacancy.

		Percentage incentives		
		No-time lag	*lag 1 year*	*lag 2 years*
Vacancy rate Jones Lang LaSalle	Pearson Correlation	,159	,451	,526
	Sig. (2-tailed)	,640	,163	,118
	N	11	11	10
Vacancy rate BNP Paribas	Pearson Correlation	,741**	,797**	,805**
	Sig. (2-tailed)	,009	,003	,005
	N	11	11	10
Vacancy rate Savills	Pearson Correlation	,421	,559	,547
	Sig. (2-tailed)	,225	,093	,128
	N	10	10	9
Vacancy rate Dienst O&S Municipality of Amsterdam	Pearson Correlation	,491	,684*	,748*
	Sig. (2-tailed)	,125	,020	,013
	N	11	11	10
Average Correlation without "Average vacancy report"		0,357	0,505	0,536

The relation with the percentage incentives is the strongest with a two-year lagged vacancy rate, in each vacancy rate researched. This is in contrast to the hypothesis and research of of Koppels and Keeris (2006), which indicated that incentives are used for short-time price adjustments and therefore should correlate with the vacancy rate without any time-lag. In contrary to my results, they found a strong correlation between incentives and the vacancy rate without any time-lag. As their research only corrected for 2% incentives, the research outcomes of this study might provide a more accurate reflection of the market.

		Percentage incentives		
		No-time lag	*lag 1 year*	*lag 2 years*
Average vacancy rate market reports	Pearson Correlation	,523	,678*	,714*
	Sig. (2-tailed)	,098	,022	,020
	N	11	11	10

**The relation between the incentive or the rental price development and several economic indicators can be found in Appendix (A), as there is chosen to focus in this report on the relation with the vacancy rate and the rental price/ incentives in the market.*

5. Study 4 | Spatial segmentation analysis

5.1. Incentive analysis per sample

5.1.1. Introduction

This paragraph analyses if the incentive statistically differ per year in each sample; per City-District, Sub-Office market and per Business district. This will be tested by means of a One-Way ANOVA test, in which multiple means per variable will be compared by means of a Post-Hoc Procedure. The *Games-Howell Post Hoc-Procedure* is used as all variances show to be significantly different by the Levene's test and the sub-samples are not equal. In the Post-Hoc procedure, only an overview of the significantly different values (< 0,05) are shown.

After the Post-Hoc Procedure, the incentive developments in all sub-samples are mutually compared by means of a correlation analysis, in order to test whether there are some similarities in the incentive development between city districts, sub-office markets and business districts in Amsterdam.

5.1.2. Average incentive development per sample

In Appendix B the incentive development is shown per sub-sample (City Districts, Sub-Office markets and Business Districts). In the analysis the transactions are based on the entire sample, so no division is made between transactions with an LFA below or above 500 m2, as sometimes only a few transactions are available.

The different samples show that the incentives differ per City District, Sub-Office Market and Business District. However, all the graphs show on average a *rising trend of incentives in each sub-sample from 2002-2012*.

The highest incentives are provided in the City Districts Westpoort and South East. This is in line with my expectations as the Districts Westpoort and South-East are not really popular Office Districts in Amsterdam. As a result, this might indicate that incentives are related to the 'overall' quality of a location.

In line with the City-District analysis, the Sub-Office market analysis shows that incentives are on average the highest in Amsterdam South-East. They are followed by the high level of incentives in the Sub-Office market the South-Axis.

The Business District analysis show that the incentives are real volatile in the sample, which might be explained by the small amount of transactions available per Business District in some years. In the most important Business Districts: Teleport, South-Axis, Amstel III and Arena Bijlmerplein, the incentives are most active and volatile in the market.

5.1.3. City Districts Municipality of Amsterdam analysis

The figure on the previous page shows the average incentive development per year per city district shows that the incentives are becoming more different per city district the last years. In the period 2002-2005, the incentives are more or less similar per city district. After 2005/2006 the incentives are becoming more different per city district. In general, the incentives are the highest in the city districts Amsterdam South-East and Westpoort the last 10 years, compared to other city Districts.

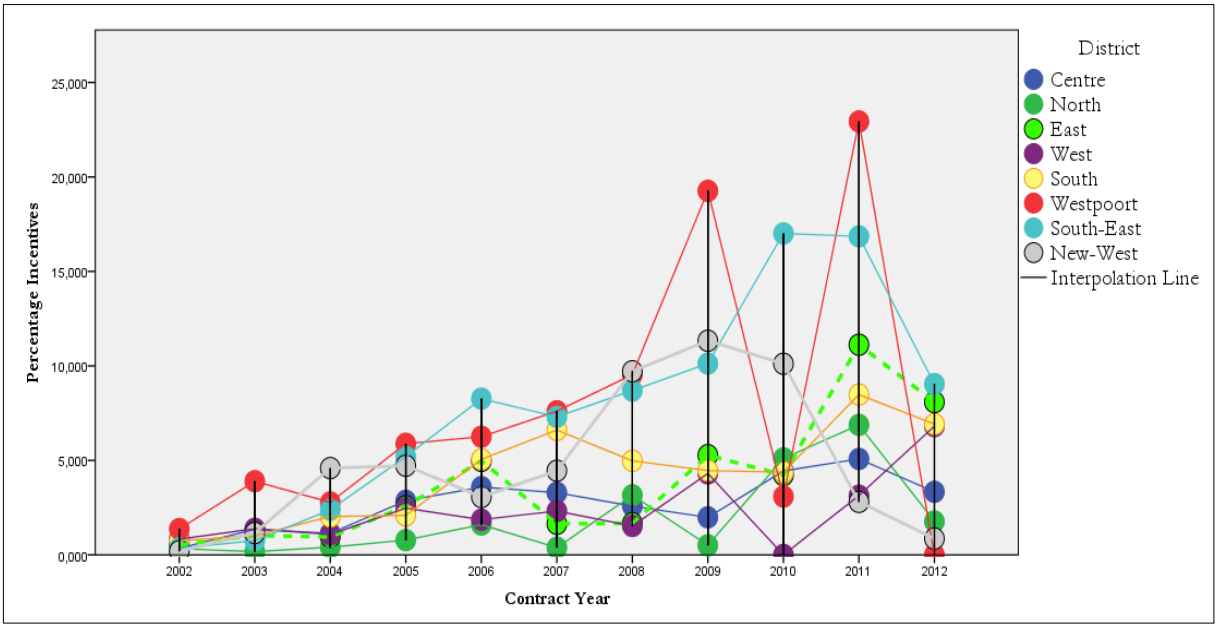


Figure 86. City-districts incentives development

As already expected, the Post-Hoc procedure table below, shows that there are almost no statistically significant differences in incentives in the period 2002-2006. The analysis showed that some incentives significantly differ from each other per city districts over the last 5 years. Especially in 2007, the incentives in Amsterdam South were significantly higher compared to the city districts Centre, West, East and North. The year 2008 showed a similar trend, as the incentives in Amsterdam South were significantly higher compared to Amsterdam West and

Post-Hoc Procedure – Games Howell						
Year	*Business District 1*	*>*	*Business District 2*	*Mean difference (%)*		*Sig.*
2003	Centre	>	North	1,181024*	%	,047
2007	South	>	Centre	3,317805*	%	,038
2007	South	>	West	4,287352*	%	,042
2007	South	>	East	4,964722*	%	,003
2007	South	>	North	6,230486*	%	,000
2007	South-East	>	North	6,927461*	%	,012
2007	Centre	>	North	2,912680*	%	,000
2008	South	>	West	3,451442*	%	,038
2008	South	>	East	3,302316*	%	,038
2009	South-East	>	North	2,609723	%	,020
2010	South	>	West	4,376667*	%	,001
2010	South-East	>	West	17,011896*	%	,039
2012	Centre	>	Westpoort	3,338771*	%	,043
2012	South	>	Westpoort	6,917209*	%	,000
2012	South	>	New-West	6,056563*	%	,005

Amsterdam East. The largest difference can be found between the incentives in Amsterdam South-East and Amsterdam West, which were 17 per cent in the year 2010. In 2012, the incentives showed to be significantly lower in Westpoort and New-West, compared to Amsterdam South and Amsterdam Centre.

Correlations

City Districts Municipality Amsterdam Incentives (%)		Incentives Centre	Incentives Westpoort	Incentives West	Incentives NewWest	Incentives South	Incentives East	Incentives North	Incentives South_East
Incentives Centre	Pearson	1	,391	,213	,197	,814**	,738**	,786**	,890**
	Sig. (2-		,235	,530	,561	,002	,010	,004	,000
Incentives Westpoort	Pearson	,391	1	,214	,375	,514	,553	,458	,534
	Sig. (2-	,235		,527	,256	,106	,077	,156	,091
Incentives West	Pearson	,213	,214	1	-,153	,529	,617*	-,046	,182
	Sig. (2-	,530	,527		,654	,094	,043	,893	,593
Incentives NewWest	Pearson	,197	,375	-,153	1	,132	-,041	,226	,485
	Sig. (2-	,561	,256	,654		,699	,904	,504	,131
Incentives South	Pearson	,814**	,514	,529	,132	1	,782**	,614*	,770**
	Sig. (2-	,002	,106	,094	,699		,004	,044	,006
Incentives East	Pearson	,738**	,553	,617*	-,041	,782**	1	,679*	,747**
	Sig. (2-	,010	,077	,043	,904	,004		,022	,008
Incentives North	Pearson	,786**	,458	-,046	,226	,614*	,679*	1	,858**
	Sig. (2-	,004	,156	,893	,504	,044	,022		,001
Incentives South_East	Pearson	,890**	,534	,182	,485	,770**	,747**	,858**	1
	Sig. (2-	,000	,091	,593	,131	,006	,008	,001	

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

The correlation analysis shows that the incentive development between some city districts are more or less equivalent. The incentive development in Amsterdam Westpoort and Amsterdam New-West are the only districts without any significant correlations with other districts. When both districts are 'excluded' from the analysis, the correlation table shows that the *incentive development between Amsterdam Centre, Amsterdam South, Amsterdam East, Amsterdam North and Amsterdam South-East are all significantly correlated with each other*. As a result, there can be concluded that the incentives might differ per city district in the height of incentives, but the yearly development is similar between each city district during the last 10 years.

5.1.4. Sub-Office markets We're Amsterdam

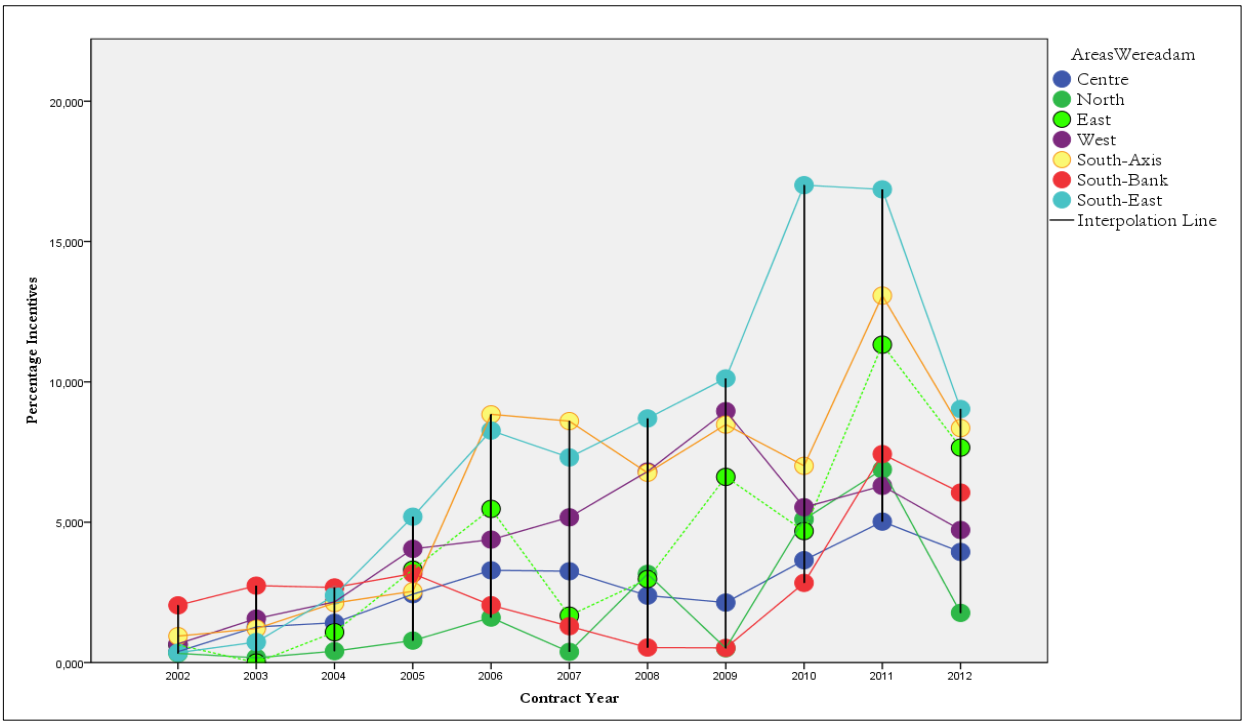


Figure 87. Sub-office marketsWe're Amsterdam - incentives

The analysis of the sub-office markets based on the division in We're Amsterdam, which is illustrated in the figure below, shows more or less the same overall trend as the city-districts analysis, as the incentives are more or less the same in the period 2002-2005 per sub-market. In general, the incentives are on average the highest in Amsterdam South-East and the South-Axis sub-office markets the last 7 years. The sub-office markets in the South-Bank, Centre and Amsterdam North are on average lower compared to other sub-office markets in Amsterdam

Post-Hoc Procedure – Games Howell						
Year	*Sub-market*	*>*	*Sub-market*	*Mean difference (%)*		*Sig.*
2003	Centre	>	North	1,099963*	%	,012
2003	Centre	>	East	1,270052*	%	,001
2004	Centre	>	North	1,010314*	%	,039
2007	South-Axis	>	Centre	5,349384*	%	,005
2007	South-Axis	>	North	8,224335*	%	,000
2007	South-Axis	>	East	6,930064*	%	,001
2007	South-Axis	>	South-Bank	7,310035*	%	,001
2007	Centre	>	North	2,874950*	%	,000
2007	West	>	North	8,224335*	%	,002
2007	South-East	>	North	6,927461*	%	,010
2008	Centre	>	South-Bank	1,853149*	%	,044
2008	West	>	South-Bank	6,274111*	%	,008
2008	South-Axis	>	South-Bank	6,225597*	%	,000
2008	South-Axis	>	Centre	4,372448*	%	,035
2009	West	>	Centre	6,819180*	%	,044
2009	West	>	North	8,448764*	%	,005
2009	West	>	South-Bank	8,434311*	%	,006
2009	South-East	>	South-Bank	9,603657*	%	,017
2009	South-East	>	North	9,618110*	%	,015

The Post-Hoc procedure shows that some incentives significantly differ per sub-market over the last 10 years. In accordance with the results of the previous sub-paragraph, the incentives were significantly higher in the Amsterdam South-Axis compared to other sub-markets in Amsterdam in the year 2007. In 2009 the incentives were significantly

higher in Amsterdam West compared to the Centre, North and the South Bank (6,8%-8,4%).The incentives in 2009 were significantly higher in Amsterdam South-East compared to the South Bank and Amsterdam North.

Correlations

Sub-Office markets We're Amsterdam Incentives (%)		Incentives Amsterdam Centre	Incentives North	Incentives East	Incentives West	Incentives South Axis	Incentives South Bank	Incentives South-East
Incentives Centre	Pearson	1	,739**	,824**	,575	,882**	,608*	,857**
	Sig. (2-tailed)		,009	,002	,064	,000	,047	,001
Incentives North	Pearson	,739**	1	,696*	,424	,648*	,556	,858**
	Sig. (2-tailed)	,009		,017	,193	,031	,075	,001
Incentives East	Pearson	,824**	,696*	1	,643*	,848**	,642*	,799**
	Sig. (2-tailed)	,002	,017		,033	,001	,033	,003
Incentives West	Pearson	,575	,424	,643*	1	,762**	-,078	,741**
	Sig. (2-tailed)	,064	,193	,033		,006	,820	,009
Incentives South Axis	Pearson	,882**	,648*	,848**	,762**	1	,360	,836**
	Sig. (2-tailed)	,000	,031	,001	,006		,276	,001
Incentives South Bank	Pearson	,608*	,556	,642*	-,078	,360	1	,374
	Sig. (2-tailed)	,047	,075	,033	,820	,276		,257
Incentives South-East	Pearson	,857**	,858**	,799**	,741**	,836**	,374	1
	Sig. (2-tailed)	,001	,001	,003	,009	,001	,257	

**. Correlation is significant at the 0.01 level (2-tailed).

The correlation table shows more or less the same outcomes as the city districts analysis, as many sub-office markets are significantly correlated with each other. Amsterdam South-Bank and Amsterdam West are the least correlated with the other sub-office markets. Excluding South Bank and Amsterdam West from the analysis results in the correlation of all the remaining sub-office markets, comparable to the city districts analysis.

5.1.5. Business Districts We're Amsterdam

The above figure shows the average yearly differences in incentives between several business districts. In general, the incentives in the Canal District (Amsterdam Centre) and the Vondelpark are on average lower and less volatile compared to the incentives in other business districts. The incentives in the other business districts are really volatile and differ per year, from 5 – 25% on average.

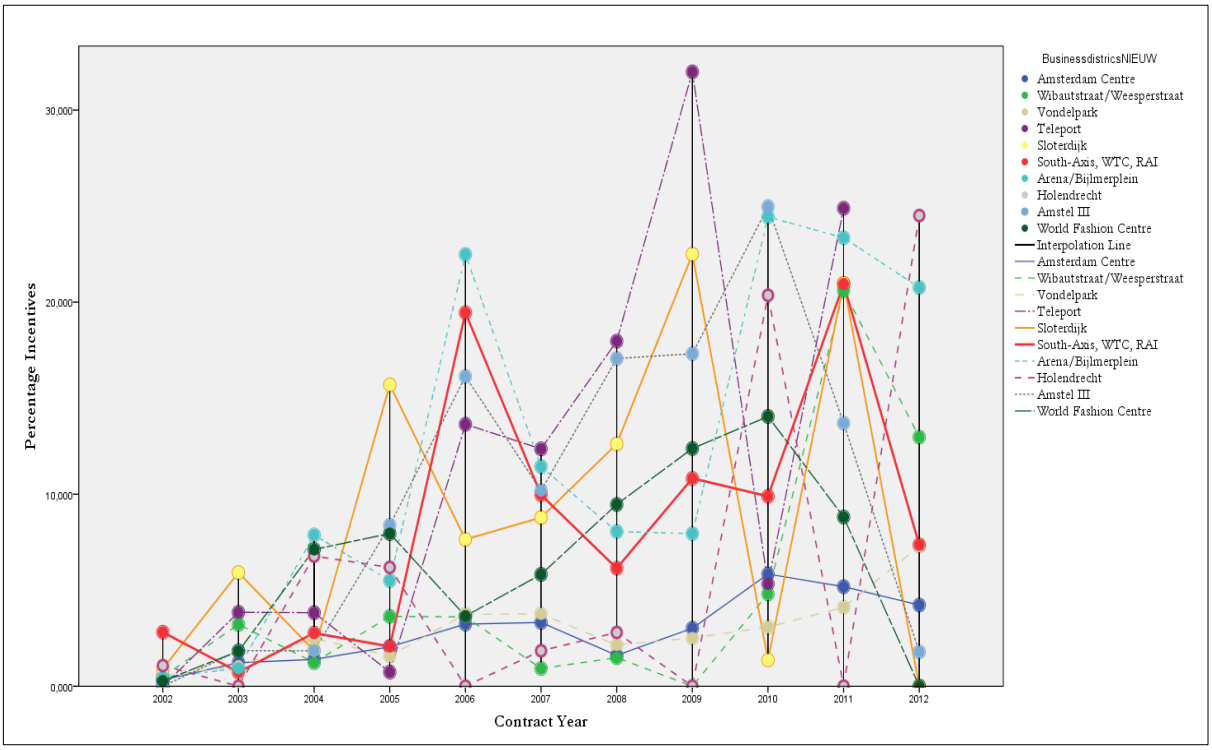


Figure 88. Business districts We're Amsterdam - incentives

Post-Hoc Procdeure – Games Howell						
Year	*Business District 1*	*>*	*Business District 2*	*Mean difference (%)*		*Sig.*
2006	Amstel III	>	Centre	12,893804*	%	,000
2006	Amstel III	>	Vondelpark	12,377232*	%	,000
2006	Amstel III	>	Holendrecht	16,128627*	%	,001
2006	Amstel III	>	World Fashion Centre	12,477706*	%	,019
2007	South-Axis, WTC, RAI	>	Centre	6,647228*	%	,020
2007	South-Axis, WTC, RAI	>	Wibaut/Weesperstraat	9,039751*	%	,002
2008	South-Axis, WTC, RAI	>	Centre	4,534872*	%	,015
2011	Amstel III	>	Centre	8,514813*	%	,031
2011	Amstel III	>	Vondelpark	9,587183*	%	,003
2011	South-Axis, WTC, RAI	>	Holendrecht	20,939712*	%	,003
2011	South-Axis, WTC, RAI	>	Vondelpark	16,829714*	%	,031
2012	Arena/Bijlmerplein	>	Amsterdam Centre	16,536201*	%	,016
2012	Arena/Bijlmerplein	>	Vondelpark	13,473414*	%	,034
2012	Arena/Bijlmerplein	>	South-Axis, WTC, RAI	13,400310*	%	,036
2012	Arena/Bijlmerplein	>	Amstel III	18,977975*	%	,034
2012	Arena/Bijlmerplein	>	World Fashion Centre	20,761821*	%	,041
2012	Vondelpark	>	World Fashion Centre	7,288407*	%	,038
2012	South-Axis, WTC, RAI	>	World Fashion Centre	-7,361512*	%	,014

The business district analysis shows that the incentives statistically differ between some business districts the last 10 years. In 2006, the incentives were significantly higher in Amstel III compared to Amsterdam Centre, Vondelpark, Holendrecht and World Fashion Centre. Especially in 2012, the incentives in Arena Bijlmerplein showed to be significantly higher compared to other city districts as Amsterdam Centre, Vondelpark, South-Axis, Amstel III and WFC. In 2007 and 2011 the incentives at the South-Axis were significantly higher compared to the Centre, and Wibaut/Weesperstraat and respectively Holendrecht and Vondelpark.

Correlations

Business Districts We're Amsterdam Incentives (%)		Amsterdam Canal District	Wibaut/ Weesper-straat	Vondel-park	Tele-port	Sloter-dijk	South-Axis, WTC, RAI	Arena/ Bijlmer-plein	Holen-drecht	Amstel III	World Fashion Centre
Amsterdam Canal District	Pearson	1	,626*	,678*	,412	,146	,685*	,907**	,496	,620*	,445
	Sig. (2-		,039	,022	,237	,669	,020	,000	,121	,042	,170
Wibautstraat/ Weesperstraat	Pearson	,626*	1	,610*	,319	,194	,536	,633*	,268	,023	-,061
	Sig. (2-	,039		,046	,370	,568	,089	,037	,425	,947	,858
Vondelpark	Pearson	,678*	,610*	1	,543	-,113	,486	,754**	,598	,081	-,126
	Sig. (2-	,022	,046		,105	,740	,130	,007	,052	,813	,712
Teleport	Pearson	,412	,319	,543	1	,786**	,654*	,350	-,383	,533	,480
	Sig. (2-	,237	,370	,105		,007	,040	,322	,274	,112	,161
Sloterdijk	Pearson	,146	,194	-,113	,786**	1	,411	-,010	-,542	,411	,510
	Sig. (2-	,669	,568	,740	,007		,209	,977	,085	,209	,109
South-Axis, WTC, RAI	Pearson	,685*	,536	,486	,654*	,411	1	,784**	-,146	,576	,252
	Sig. (2-	,020	,089	,130	,040	,209		,004	,669	,064	,455
Arena/ Bijlmerplein	Pearson	,907**	,633*	,754**	,350	-,010	,784**	1	,472	,553	,259
	Sig. (2-	,000	,037	,007	,322	,977	,004		,143	,078	,442
Holendrecht	Pearson	,496	,268	,598	-,383	-,542	-,146	,472	1	,041	,022
	Sig. (2-	,121	,425	,052	,274	,085	,669	,143		,906	,949
Amstel III	Pearson	,620*	,023	,081	,533	,411	,576	,553	,041	1	,813**
	Sig. (2-	,042	,947	,813	,112	,209	,064	,078	,906		,002
World Fashion	Pearson	,445	-,061	-,126	,480	,510	,252	,259	,022	,813**	1
	Sig. (2-	,170	,858	,712	,161	,109	,455	,442	,949	,002	

The correlation table shows same interesting outcomes. For instance the incentive development in Amsterdam Canal District, Wibaut/Weesperstraat and Vondelpark; all located in Amsterdam Centre; are significantly correlated with each other. The same occurs with the incentive development between Teleport and the surrounding Sloterdijk area,

which are also significantly correlated with each other. The incentive development in the most important business district, namely South-Axis, WTC & RAI; correlates with three other important business districts in Amsterdam: Teleport, Arena/Bijlmerplein and the Canal District area. On average most business districts correlate the most with the Canal District area.

5.2. Rental price analysis per sample

5.2.1. Introduction

This paragraph analyses if the effective rental price statistically differ per year in each sample; per City-District, Sub-Office market and per Business district. This will be tested by means of a One-Way ANOVA test, in which multiple means per variable will be compared by means of a Post-Hoc Procedure. The *Games-Howell Post Hoc-Procedure* is used as all variances show to be significantly different by the Levene's test and the sub-samples are not equal. In the post-hoc procedure, only an overview of the significantly different values (< 0,05) are shown.
After the Post-Hoc Procedure, the effective rental price developments in all sub-samples are mutually compared by means of a correlation analysis, in order to test whether there are some similarities in the effective rental price development between city districts, sub-office markets and business districts in Amsterdam.

5.2.2. Average rental price development per sample

In Appendix B the real effective rental price development is shown per sub-sample (City Districts, Sub-Office markets and Business Districts).

The rental price developments per sample shows that the rental prices are rather comparable, with the exception of Amsterdam South and Amsterdam Centre in the city district analysis, Amsterdam South-Axis and Amsterdam Cente in the sub-office market analysis, and Amsterdam Canal District, the Vondelpark, and the South-Axis, WTC and RAI; in the business district analysis. The mentioned districts, sub-office markets and business districts have a real effective rental price development which is higher compared to the other city-districts, sub-office markets and business districts in Amsterdam.

5.2.3. City Districts Municipality of Amsterdam

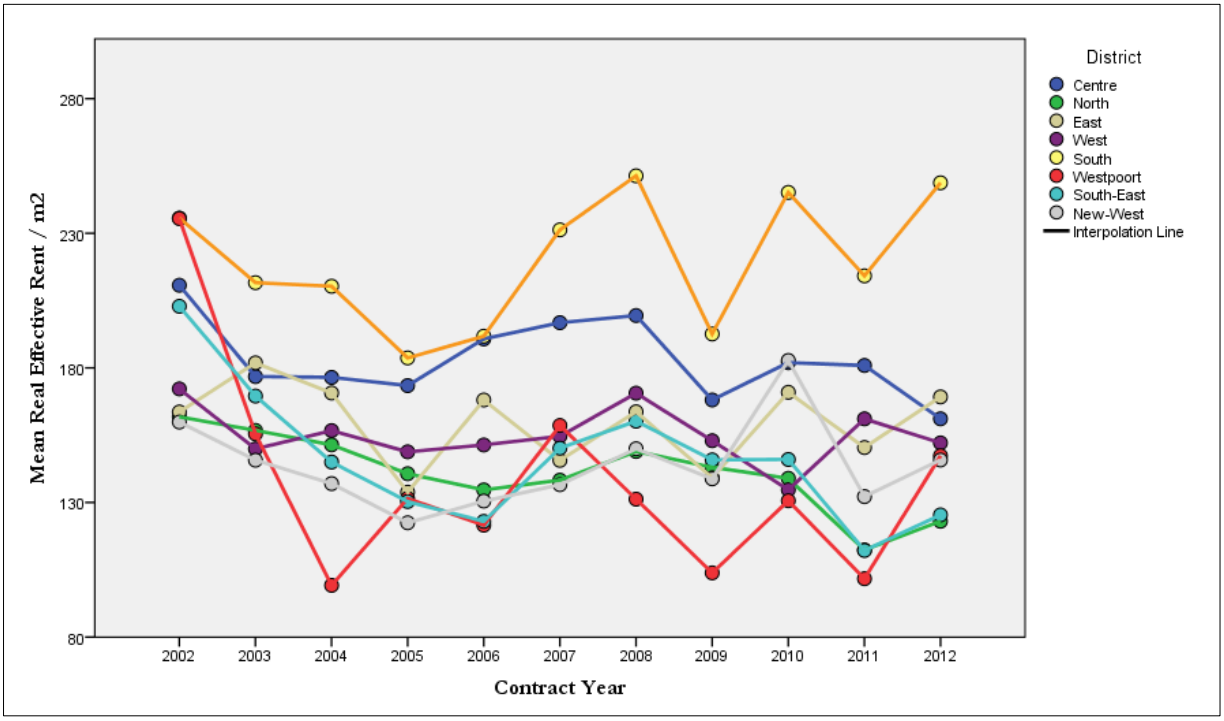


Figure 89. Real Effective rental price development – City- Districts

The figure of the average real effective rental price development shows that the rents in the Amsterdam office market are the highest in the South district, followed by the Centre district. The other districts show more or less the

same development, although the rents in Westpoort are most of the time lower compared to the other districts. The rents in district North are comparable with the rents in South-East, especially in the period 2006-2012. The rents in Westpoort, East and Amsterdam South are really volatile compared to the other districts.

The figure shows that the rental prices all differ in development, which indicates the segmented structure of the Amsterdam Office market. However, some similarities are visible. For instance, all the prices declined directly after the burst of the financial and economic crisis in 2009, in each city-district. Furthermore, all the rental prices increased one year later in the market, to more or less the same rental value as in 2008. In 2005, the rental prices were also in many districts on its lowest level.
Some districts are really cyclical, especially the Centre district and the East district. The South-East district and South district show also some cyclicality.

Post-Hoc Procedure - Games Howell

Year	City District 1	>	City District 2	Mean difference (€/m2)	Sig.
2002	Centre	>	East	43,701378*	,015
2002	South	>	West	61,573181*	,005
2002	South	>	New-West	72,170550*	,017
2002	South	>	East	68,808485*	,001
2002	South	>	North	70,111765*	,032
2003	South	>	West	53,237725*	,002
2003	South	>	New-West	56,277676*	,007
2004	Centre	>	Westpoort	66,791916*	,000
2004	South	>	Westpoort	107,331626*	,000
2004	South	>	West	57,614035*	,046
2004	South	>	New-West	74,513883*	,000
2004	East	>	Westpoort	61,461052*	,020
2005	Centre	>	New-West	44,930642*	,005
2005	Centre	>	South-East	37,796128*	,036
2005	South	>	New-West	62,855338*	,004
2005	South	>	North	46,339303*	,049
2005	South	>	South-East	55,720823*	,018
2006	Centre	>	New-West	53,814886*	,012
2006	Centre	>	North	52,833823*	,006
2006	Centre	>	South-East	41,767284*	,022
2006	South	>	Westpoort	65,134757*	,003
2006	South	>	New-West	84,790873*	,000
2006	South	>	East	77,180511*	,002
2006	South	>	North	83,809810*	,000
2006	South	>	South-East	72,743270*	,000
2007	Centre	>	Westpoort	62,965591*	,046
2007	South	>	Centre	47,800918*	,030
2007	South	>	Westpoort	110,766509*	,000
2007	South	>	West	73,289416*	,042
2007	South	>	New-West	92,655472*	,001

Post-Hoc Procedure - Games Howell

Year	City District 1	>	City District 2	Mean difference (€/m2)	Sig.
2007	South	>	East	79,163916*	,000
2007	South	>	North	93,458179*	,000
2007	South	>	South-East	83,108842*	,010
2008	South	>	Westpoort	82,548449*	,012
2009	South	>	Centre	58,885752*	,002
2009	South	>	Westpoort	108,437313*	,003
2009	South	>	West	103,150159*	,000
2009	South	>	East	68,980035*	,007
2009	South	>	North	99,714751*	,000
2009	South	>	South-East	93,116615*	,008
2010	Centre	>	New-West	46,746910*	,023
2010	Centre	>	South-East	66,875902*	,031
2010	South	>	Westpoort	118,513535*	,038
2010	South	>	New-West	88,694444*	,001
2010	South	>	North	108,880794*	,007
2010	South	>	South-East	108,823435*	,001
2011	Centre	>	Westpoort	61,644852*	,000
2011	Centre	>	New-West	53,135639*	,000
2011	Centre	>	North	49,742190*	,000
2011	Centre	>	South-East	60,421574*	,004
2011	South	>	Westpoort	68,632586*	,000
2011	South	>	New-West	60,123373*	,000
2011	South	>	North	56,729925*	,001
2011	South	>	South-East	67,409309*	,003
2012	South	>	Centre	88,059578*	,002
2012	South	>	Westpoort	102,647977*	,000
2012	South	>	West	96,425462*	,027
2012	South	>	New-West	103,527742*	,032
2012	South	>	North	124,602150*	,000
2012	South	>	South-East	122,530093*	,000

The post-hoc procedure analysis shows that the nominal effective rents in Amsterdam South and Amsterdam Centre are in most of the years significantly higher compared to rents in other city districts. In 2007, 2009 and 2012, the effective rents in Amsterdam South were significantly higher compared to the Centre district, which indicates a larger difference between the rents in the Centre district and the South district the last years. The Post-Hoc procedure indicates that the other city districts: Westpoort, South-East, North, New West and South-East are more or less comparable in rents.

The previous paragraph showed that the incentive development in most districts are significantly correlated with each other. In contrast to these outcomes, the rent correlation table shows only a few significant correlations between the city districts mutual rental price development. The correlation table indicates that the effective rental price development in Amsterdam South significantly correlates with the effective rental price development in Amsterdam New-West. In addition, the rental price development of Amsterdam South-East significantly correlates with both Westpoort and North district.

Correlations

City Districts Municipality Amsterdam - Real Effective Rents / m2 development		Centre	West-poort	West	New-West	South	East	North	South-East
Centre	Pearson Correlation	1	,591	,576	,245	,312	,084	,419	,599
	Sig. (2-tailed)		,055	,064	,468	,350	,805	,200	,052
Westpoort	Pearson Correlation	,591	1	,372	,373	,398	,190	,494	,776**
	Sig. (2-tailed)	,055		,261	,259	,225	,577	,123	,005
West	Pearson Correlation	,576	,372	1	-,188	,212	-,062	,242	,425
	Sig. (2-tailed)	,064	,261		,580	,531	,856	,472	,193
New-West	Pearson Correlation	,245	,373	-,188	1	,703*	,506	,280	,486
	Sig. (2-tailed)	,468	,259	,580		,016	,112	,405	,130
South	Pearson Correlation	,312	,398	,212	,703*	1	,439	,013	,331
	Sig. (2-tailed)	,350	,225	,531	,016		,177	,971	,319
East	Pearson Correlation	,084	,190	-,062	,506	,439	1	,276	,279
	Sig. (2-tailed)	,805	,577	,856	,112	,177		,411	,406
North	Pearson Correlation	,419	,494	,242	,280	,013	,276	1	,869**
	Sig. (2-tailed)	,200	,123	,472	,405	,971	,411		,001
South-East	Pearson Correlation	,599	,776**	,425	,486	,331	,279	,869**	1
	Sig. (2-tailed)	,052	,005	,193	,130	,319	,406	,001	

**. Correlation is significant at the 0.01 level (2-tailed). *. Correlation is significant at the 0.05 level (2-tailed).

5.2.4. Sub-Office markets We're Amsterdam

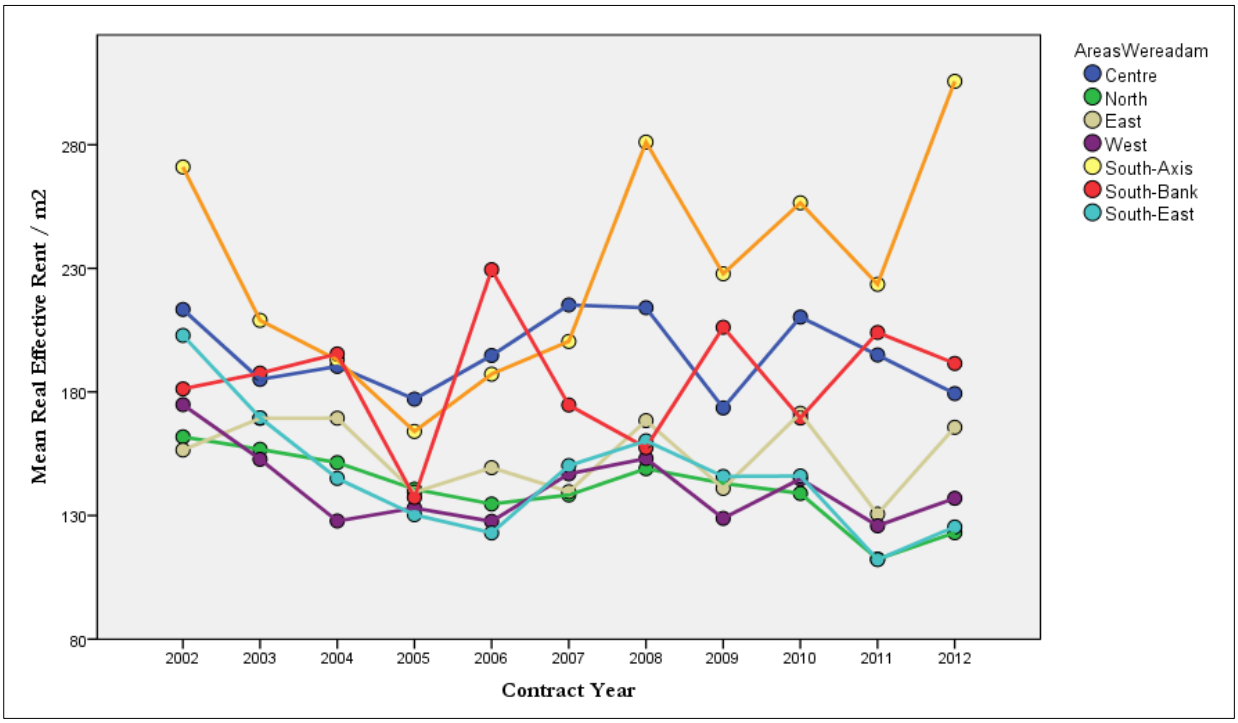


Figure 90. Real effective rental price development – Sub-office markets

The effective rental price development shows that the rental price development in the North, West and South-East sub-office market are relatively comparable to each other. The East sub-office market also shows a comparable development with the mentioned sub-office markets, although the last years the average rental price of the East sub-office market is growing compared to the North, West and South-East sub-office market. The highest effective rents are provided in Amsterdam South-Axis, followed by the Centre and the South-Bank. In accordance to the results of the previous paragraph, almost all the rental prices are on its lowest level in 2005-2006, in most districts.

In contrast to the city-district analysis, some sub-office markets show some cyclicity, though not so visible as shown in the city-district analysis. The Centre district and the South-East district are rather cyclical in the sub-office market analysis.

Post-Hoc Procedure Games-Howell					
Year	*City District 1*	*>*	*City District 2*	*Mean difference (€/m2)*	*Sig.*
2002	Centre	>	East	50,393116*	,000
2002	South-East	>	East	38,994476*	,031
2003	Centre	>	West	31,649065*	,038
2003	Centre	>	West	31,649065*	,038
2004	Centre	>	West	59,588515*	,000
2005	Centre	>	North	31,740744*	,015
2005	Centre	>	West	38,774041*	,001
2005	Centre	>	South-East	41,122264*	,008
2006	Centre	>	North	56,300390*	,000
2006	Centre	>	West	62,738671*	,000
2006	Centre	>	South-East	66,979774*	,001
2006	South-Axis	>	West	52,970272*	,031
2007	Centre	>	North	72,678161*	,000
2007	Centre	>	East	71,297826*	,004
2007	Centre	>	West	64,403382*	,000
2007	Centre	>	South-East	61,611622*	,000
2008	Centre	>	North	59,265698*	,004
2008	Centre	>	West	55,762249*	,002
2008	Centre	>	South-Bank	50,456728*	,000
2008	South-Axis	>	North	120,307672*	,000
2008	South-Axis	>	East	102,121352*	,006
2008	South-Axis	>	West	116,804223*	,000

Post-Hoc Procedure Games-Howell					
Year	*City District 1*	*>*	*City District 2*	*Mean difference (€/m2)*	*Sig.*
2008	South-Axis	>	South-Bank	111,498702*	,000
2008	South-Axis	>	South-East	109,958334*	,002
2009	Centre	>	West	41,862898*	,003
2010	Centre	>	North	67,260077*	,002
2010	Centre	>	West	62,128155*	,014
2010	South-Axis	>	North	110,767043*	,014
2010	South-Axis	>	West	105,635121*	,025
2010	South-Axis	>	South-East	104,168907*	,040
2011	Centre	>	North	80,749679*	,034
2011	Centre	>	West	66,915423*	,000
2011	Centre	>	South-East	80,692320*	,006
2011	South-Axis	>	North	130,899539*	,039
2011	South-Axis	>	West	117,065283*	,048
2011	South-Axis	>	South-East	130,842181*	,030
2012	Centre	>	North	54,864920*	,004
2012	Centre	>	South-East	52,792863*	,014
2012	South-Axis	>	Centre	126,842136*	,000
2012	South-Axis	>	North	181,707056*	,000
2012	South-Axis	>	East	139,717460*	,001
2012	South-Axis	>	West	169,008697*	,000
2012	South-Axis	>	South-East	179,634999*	,000

The post-hoc procedure shows similar outcomes compared to the city district analysis, as the rents in Amsterdam Centre and Amsterdam South-Axis are significantly higher compared to the other sub-office markets. The effective rent table shows that in the period 2002-2007, the rents in the Centre were significantly higher compared to the other sub-office markets. After 2007, the South-Axis became a more important sub-office market, in which the rents became significantly different from the other sub-office markets.

Correlations

Sub-Office markets We're Amsterdam - Real Effective Rents / m2 development		Centre	North	East	West	South	South-Bank	South-East
Centre	Pearson Correlation	1	,217	,181	,605*	,283	-,209	,449
	Sig. (2-tailed)		,522	,595	,048	,400	,537	,166
North	Pearson Correlation	,217	1	,481	,643*	-,051	-,270	,869**
	Sig. (2-tailed)	,522		,134	,033	,882	,422	,001
East	Pearson Correlation	,181	,481	1	,377	,458	-,128	,400
	Sig. (2-tailed)	,595	,134		,253	,157	,707	,223
West	Pearson Correlation	,605*	,643*	,377	1	,461	-,387	,902**
	Sig. (2-tailed)	,048	,033	,253		,153	,240	,000
South-Axis	Pearson Correlation	,283	-,051	,458	,461	1	-,048	,283
	Sig. (2-tailed)	,400	,882	,157	,153		,888	,399
South-Bank	Pearson Correlation	-,209	-,270	-,128	-,387	-,048	1	-,261
	Sig. (2-tailed)	,537	,422	,707	,240	,888		,438
South- East	Pearson Correlation	,449	,869**	,400	,902**	,283	-,261	1
	Sig. (2-tailed)	,166	,001	,223	,000	,399	,438	

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

The correlation tables show similar outcomes compared to the city districts analysis, as the South-East district is significantly correlated with the North and West sub-office market. The correlations between the sub-office markets is really strong (around 0,9) which indicates that those sub-office markets behave in a similar way. Other significant correlations are between Amsterdam West and the sub-office market Centre and North.

5.2.5. Business Districts We're Amsterdam

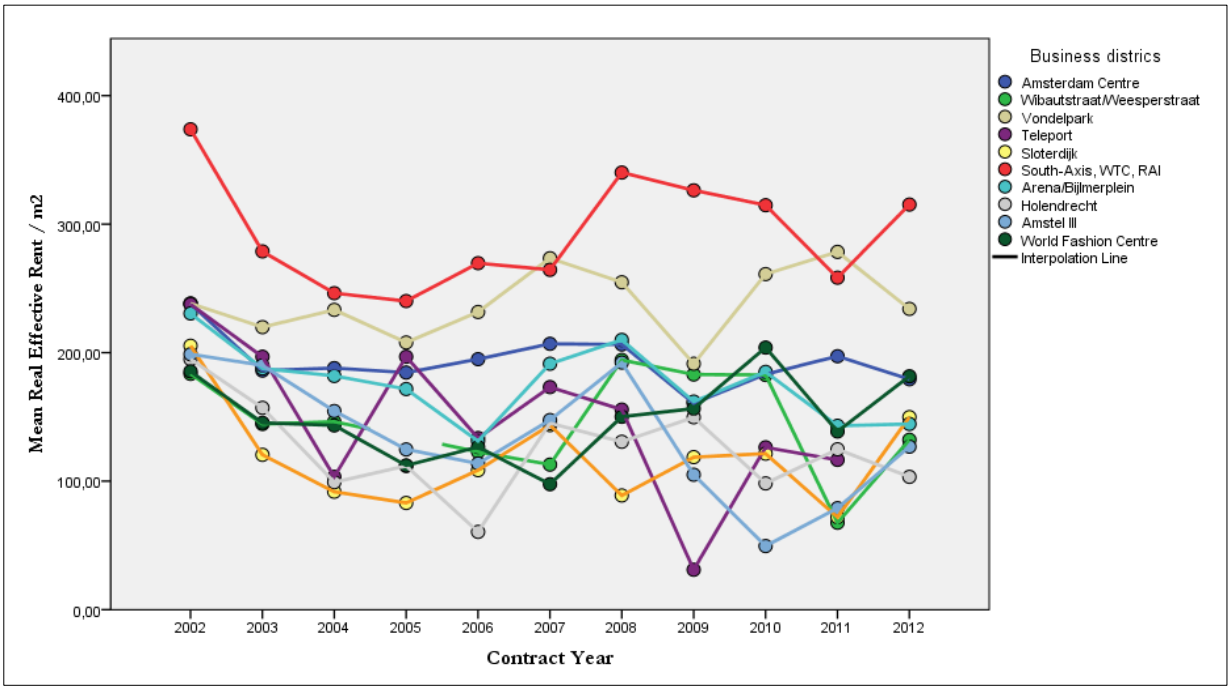


Figure 91. Real effective rental price – Business Disticts

The above figures show that the highest rents are paid in the South-Axis, WTC & RAI business district, followed by the Vondelpark business district. The Vondelpark district is followed by the Amsterdam Centre Canal district. Overall, the lowest rents are paid in Sloterdijk, followed by Holendrecht.

The rents in the most important business district in Amsterdam - the South Axis, WTC & RAI district - remained rather stable after the burst of the financial and economic crisis, which indicates that this business districts is well-protected against economic influences the last years. This is similar to the Canal district in Amsterdam, which shows a rather stable rental price development over the investigated period. The other business districts are more volatile in their behavior.

Overall the results indicate the segmented structure of the Amsterdam office market, in which there are two/three self-functioning business districts, namely the South-Axis, WTC, RAI; the Vondelpark; and the Canal District. The other business districts are more or less comparable in rental values, although the volatility in rent levels is quite high.

Post-Hoc Procedure Games-Howell					
Year	*City District 1*	*>*	*City District 2*	*Mean difference (€/m2)*	*Sig.*
2002	South-Axis, WTC	>	Canal District	107,661050*	,000
2002	South-Axis, WTC	>	Wibaut/Weesper	160,953768*	,000
2002	South-Axis, WTC	>	Vondelpark	114,391221*	,000
2002	South-Axis, WTC	>	Holendrecht	151,654476*	,046
2002	South-Axis, WTC	>	Amstel III	147,788409*	,007
2004	Canal District	>	Teleport	73,410319*	,002
2004	Canal District	>	Sloterdijk	82,993152*	,000
2004	Canal District	>	Holendrecht	77,347496*	,000
2004	Vondelpark	>	Wibaut/Weesper	76,045601*	,023
2004	Vondelpark	>	Teleport	112,795382*	,000
2004	Vondelpark	>	Sloterdijk	122,378214*	,000
2004	Vondelpark	>	Holendrecht	116,732559*	,000
2004	Vondelpark	>	World Fashion	77,853581*	,020
2005	Canal District	>	Sloterdijk	88,694118*	,025
2005	Vondelpark	>	Sloterdijk	109,565927*	,005
2005	Vondelpark	>	Holendrecht	84,240419*	,036

Post-Hoc Procedure Games-Howell					
Year	*City District 1*	*>*	*City District 2*	*Mean difference (€/m2)*	*Sig.*
2007	South-Axis, WTC	>	Wibaut/Weesper	136,559613*	,017
2007	South-Axis, WTC	>	Holendrecht	106,895065*	,013
2007	South-Axis, WTC	>	Amstel III	105,090707*	,013
2007	South-Axis, WTC	>	World Fashion	150,509867*	,001
2008	Canal District	>	Sloterdijk	107,609997*	,003
2008	Canal District	>	World Fashion	51,063764*	,018
2008	Vondelpark	>	Sloterdijk	151,481277*	,001
2008	Vondelpark	>	World Fashion	94,935044*	,028
2008	South-Axis, WTC	>	Canal District	121,865613*	,000
2008	South-Axis, WTC	>	Wibaut/Weesper	131,791998*	,008
2008	South-Axis, WTC	>	Sloterdijk	229,475610*	,000
2008	South-Axis, WTC	>	World Fashion	172,929377*	,000
2009	South-Axis, WTC	>	Canal District	153,466284*	,035
2009	South-Axis, WTC	>	Sloterdijk	193,064910*	,013
2009	South-Axis, WTC	>	Arena/Bijlmerplein	152,356967*	,042
2009	South-Axis, WTC	>	Amstel III	205,881846*	,010

2005	Vondelpark	>	World Fashion	84,809557*	,034
2006	Canal District	>	Sloterdijk	76,982242*	,001
2006	Canal District	>	World Fashion	60,502076*	,003
2006	Vondelpark	>	Teleport	106,266789*	,045
2006	Vondelpark	>	Sloterdijk	128,971099*	,003
2006	Vondelpark	>	World Fashion	112,490934*	,009
2007	Canal District	>	Holendrecht	54,609334*	,032
2007	Canal District	>	Amstel III	52,804976*	,013
2007	Canal District	>	World Fashion	98,224136*	,004
2007	Vondelpark	>	Wibaut/Weesper	144,144912*	,009
2007	Vondelpark	>	Sloterdijk	116,827753*	,048
2007	Vondelpark	>	Holendrecht	114,480364*	,000
2007	Vondelpark	>	Amstel III	112,676006*	,000
2007	Vondelpark	>	World Fashion	158,095166*	,000
2009	South-Axis, WTC	>	World Fashion	158,369501*	,038
2010	Vondelpark	>	Canal District	72,176129*	,026
2010	Vondelpark	>	Sloterdijk	131,744429*	,026
2010	Vondelpark	>	Holendrecht	152,332094*	,019
2010	South-Axis, WTC	>	Canal District	122,936600*	,005
2010	South-Axis, WTC	>	Wibaut/Weesper	123,014081*	,021
2010	South-Axis, WTC	>	Sloterdijk	182,504900*	,005
2010	South-Axis, WTC	>	Holendrecht	203,092565*	,005
2011	Canal District	>	Arena/Bijlmerplein	53,823842*	,019
2011	Vondelpark	>	Arena/Bijlmerplein	133,474204*	,002
2012	Vondelpark	>	Amstel III	108,517727*	,017
2012	South-Axis, WTC	>	Canal District	136,676369*	,000
2012	South-Axis, WTC	>	Arena/Bijlmerplein	169,425611*	,000
2012	South-Axis, WTC	>	Amstel III	190,159129*	,000

The Post-Hoc procedure results are in line with the figure on the previous page, as the business districts Amsterdam South-Axis, WTC & RAI; Vondelpark and the Canal district are most of the time significantly higher compared to the other business districts in the period 2002-2012. The results also indicate that in the period 2003-2006 the rents in the South-Axis, WTC, RAI business district were not significantly higher compared to the other business districts in Amsterdam. This is in line with the figure on the previous page.

Correlations

Business Districts We're Amsterdam Real Effective Rent / m2		Canal District	Wibaut/ Weesper	Vondel-park	Teleport	Sloter-dijk	South-Axis	Arena/ Bijlmer-plein	Holen-drecht	Amstel III	World Fashion Centre
Amsterdam Canal District	Pearson	1	,017	,496	,733*	,484	,337	,614*	,441	,536	-,002
	Sig. (2-tailed)		,962	,121	,016	,132	,311	,044	,175	,089	,996
Wibautstraat/ Weesperstraat	Pearson	,017	1	-,447	,032	,330	,750*	,619	,285	,298	,562
	Sig. (2-tailed)	,962		,195	,935	,351	,013	,056	,424	,403	,091
Vondelpark	Pearson	,496	-,447	1	,180	-,030	-,046	,121	-,053	-,158	-,009
	Sig. (2-tailed)	,121	,195		,618	,930	,894	,724	,877	,642	,979
Teleport	Pearson	,733*	,032	,180	1	,459	,116	,568	,383	,574	-,072
	Sig. (2-tailed)	,016	,935	,618		,182	,749	,087	,275	,083	,844
Sloterdijk	Pearson	,484	,330	-,030	,459	1	,651*	,456	,550	,355	,430
	Sig. (2-tailed)	,132	,351	,930	,182		,030	,159	,080	,284	,187
South-Axis	Pearson	,337	,750*	-,046	,116	,651*	1	,510	,516	,279	,713*
	Sig. (2-tailed)	,311	,013	,894	,749	,030		,109	,104	,407	,014
Arena/ Bijlmerplein	Pearson	,614*	,619	,121	,568	,456	,510	1	,700*	,639*	,213
	Sig. (2-tailed)	,044	,056	,724	,087	,159	,109		,016	,034	,530
Holendrecht	Pearson	,441	,285	-,053	,383	,550	,516	,700*	1	,550	,129
	Sig. (2-tailed)	,175	,424	,877	,275	,080	,104	,016		,079	,707
Amsterdam III	Pearson	,536	,298	-,158	,574	,355	,279	,639*	,550	1	-,153
	Sig. (2-tailed)	,089	,403	,642	,083	,284	,407	,034	,079		,654
World Fashion Ctre	Pearson	-,002	,562	-,009	-,072	,430	,713*	,213	,129	-,153	1
	Sig. (2-tailed)	,996	,091	,979	,844	,187	,014	,530	,707	,654	

*. Correlation is significant at the 0.05 level (2-tailed).

The mutual correlation analysis shows that the real effective rental price development is in some cases, significantly correlated between several business districts. For instance, the real effective rental price development in the Amsterdam South-Axis is significantly correlated with the real effective rental price development in Sloterdijk, Wibaut/Weesperstraat, and World Fashion Centre. Other significant correlations are between Amsterdam Canal District and Teleport and Arena/Bijlmerplein.

In addition, the incentive development showed some significant correlations between surrounding business districts. The correlation table shows more or less similar outcomes, as all surrounding business districts located in City-District South-East are significantly correlated in real effective rental price development: Arena Bijlmerplein., Holendrecht and Amstel III.

6. Study 5| Individual transaction analysis - Difference face and effective rental prices

6.2.1. Introduction

This chapter tries to provide an overview of the overall transparency in the Amsterdam Office market, by means of researching the difference between 'Asked/face' rental prices and 'Effective' rental prices for all the transactions with an LFA above 500m2 in the sample, as asked/face rental prices are mostly available for these particular transactions in the market.

In order to test the difference the following databases are used:
- Face Rental Prices Colliers International 2001-2012
- Face Rental Prices Vastgoedmarkt 2001-2012
- Effective Rental Transactions Prices Municipal Tax Office.

The research is conducted by comparing the effective rental price of the particular transaction with the latest face rental price on the market.

From the 458 transactions with an LFA above 500m2; *238* transactions were eventually connected with an associated face rental price in the market.

6.2.2. Implications

While connecting the face rental prices with the effective rent transactions, the following implications occurred, which made it difficult to make an accurate comparison of the difference in rental price per transaction:

1. Most of the time more square meters are available for rent, but only a small amount is rented by the tenant, which most of the time changes the height of the rent level. For instance, it is difficult to compare an office which has 5000m2 available for a particular price, with the rental price when only 500m2 is rented by the tenant.
The other way around is also possible, for instance 2000 m2 is rented by the tenant, but only 500 m2 is available on the market.

2. No single/unambiguous price is available per square meter; as face rental prices are 'starting' prices / m2 (Dutch: huurprijzen zijn vanaf een bepaalde prijs/m2). For instance, the rental price is starting at 300 Euro/m2, but could also be higher/lower per m2 dependent on the space rented by the tenant.

(3. Rental price is 'on request' and unavailable in the market)

(4. The face rental price of the transaction is unknown in the market.)

6.2.3. Chosen Approach

In the previous paragraph, especially the first implication is the main reason why comparing the transactions is impossible and inaccurate. In order to provide an accurate conclusion of the overall difference between face rental prices and effective rental prices in the market, the following transactions are deleted from the sample:

Transactions with:

- LFA (m2) of Transaction Rent ≥ 25% LFA (m2) of Face Rent	(43 Transactions)
- LFA (m2) of Transaction Rent ≤ 100% LFA (m2) of Face Rent	(81 Transactions)
(- Transactions with an Effective rental price < 50 Euro / m2)	(7 Transactions)
(- Transactions with an Effective rental price > 600 Euro / m2)	(1 Transaction)

As a result, more than 50% of my transactions are deleted from the sample and only 106 accurate transactions are left in the final sample.

7.2.4. Table overview

On the next page, an overview is provided of the transactions in the sample, divided in percentage difference in rents and percentage difference in lettable floor area.

Year	Percentage Difference in Rents						
	Count	Minimum	Maximum	Mean	Standard Error of Mean	Median	Standard Deviation
2002	10	-59,0270	10,0000	-11,1493	6,0086	-7,5786	19,0007
2003	6	-66,7361	-8,6127	-28,9344	9,5252	-20,4297	23,3318
2004	9	-71,7408	-7,1723	-33,3462	6,6487	-31,5899	19,9461
2005	9	-56,2489	32,7014	-26,4167	9,6210	-30,3992	28,8631
2006	15	-72,9583	7,4185	-30,8414	6,2150	-33,1312	24,0706
2007	15	-58,4590	27,0144	-21,5277	7,1435	-18,5300	27,6668
2008	11	-51,4236	40,2254	-10,5148	9,0120	-8,4716	29,8893
2009	10	-63,5236	-4,2431	-26,5588	5,5426	-26,1654	17,5271
2010	8	-27,8683	3,3243	-15,4397	4,1726	-18,4975	11,8020
2011	10	-58,5006	13,7931	-20,9553	5,9760	-18,4849	18,8979
2012	3	-45,7869	-8,1550	-26,2910	10,8846	-24,9310	18,8528
Total	106	-72,9583	40,2254	-22,6575	2,2679	-20,4505	23,3492

Year	Percentage Difference in LFA						
	Count	Minimum	Maximum	Mean	Standard Error of Mean	Median	Standard Deviation
2002	10	-8,3086	61,0294	10,9359	7,5952	,1715	24,0181
2003	6	-,6359	61,0294	19,7729	10,1338	13,0402	24,8227
2004	9	-11,2293	50,4178	16,3075	7,7713	8,7549	23,3138
2005	9	-12,8065	71,4044	19,0031	9,7771	4,8760	29,3313
2006	15	-21,1938	85,4714	11,6171	7,7280	,1845	29,9304
2007	15	-7,7935	82,9746	28,1277	8,4901	15,9705	32,8820
2008	11	-1,4770	44,7665	9,2494	4,2719	1,5168	14,1684
2009	10	-21,8210	75,4163	24,2184	9,7621	20,8614	30,8704
2010	8	0,0000	79,2453	21,9303	10,4780	5,0432	29,6364
2011	10	-19,4946	22,1374	-3,1270	3,5387	-5,2185	11,1904
2012	3	-18,9627	2,5237	-7,6302	6,2305	-6,4516	10,7916
Total	106	-21,8210	85,4714	15,1620	2,5943	2,6123	26,7101

The table shows that only it is difficult to compare different years with each other as only a few transactions per year are available in the final sample. However the entire sample, will give an indication of the overall difference between face rental prices and effective rental prices over the last 10 years.

7.2.5. Frequency Histogram

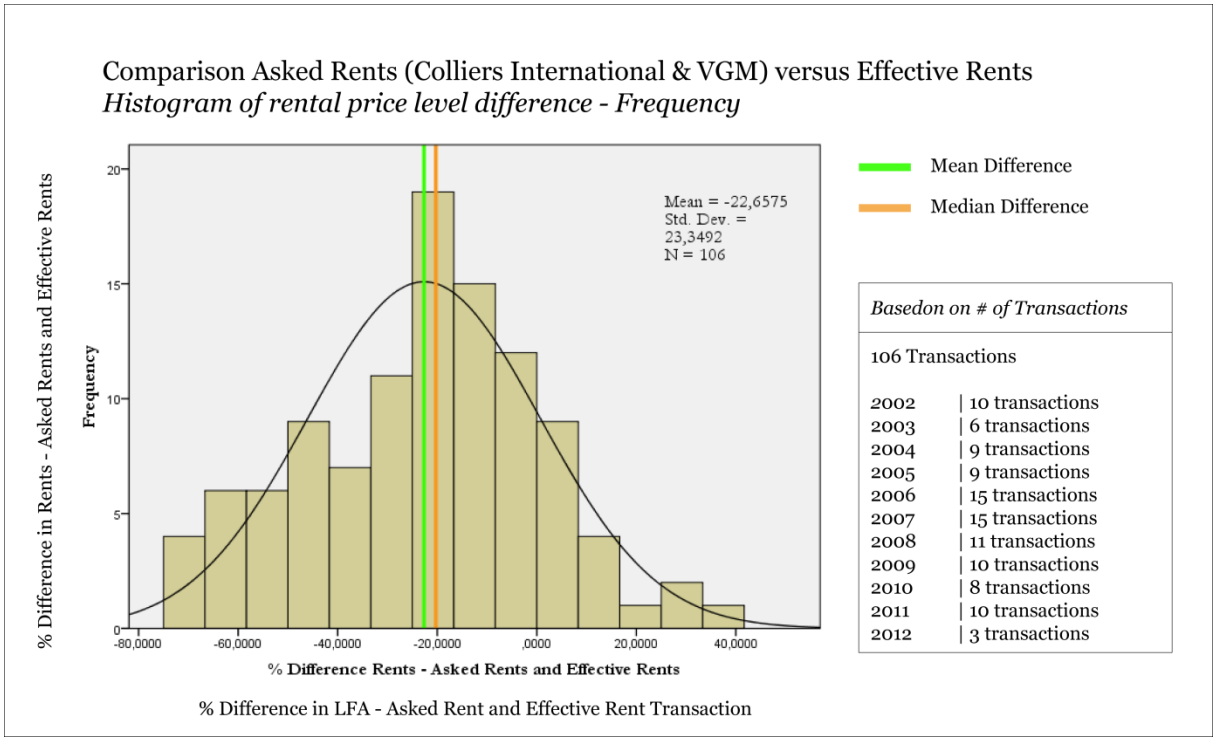


Figure 92. Frequency histogram: Comparison face – effective rents transactions

The histogram on the previous page shows that the difference between face rental prices and effective rental prices is on average around 20 per cent in this sample. The median and mean of the difference between face rental prices and effective rental prices, do not really differ from each other.

7.2.6. Overview Difference in Rents and Influence of the difference in LFA

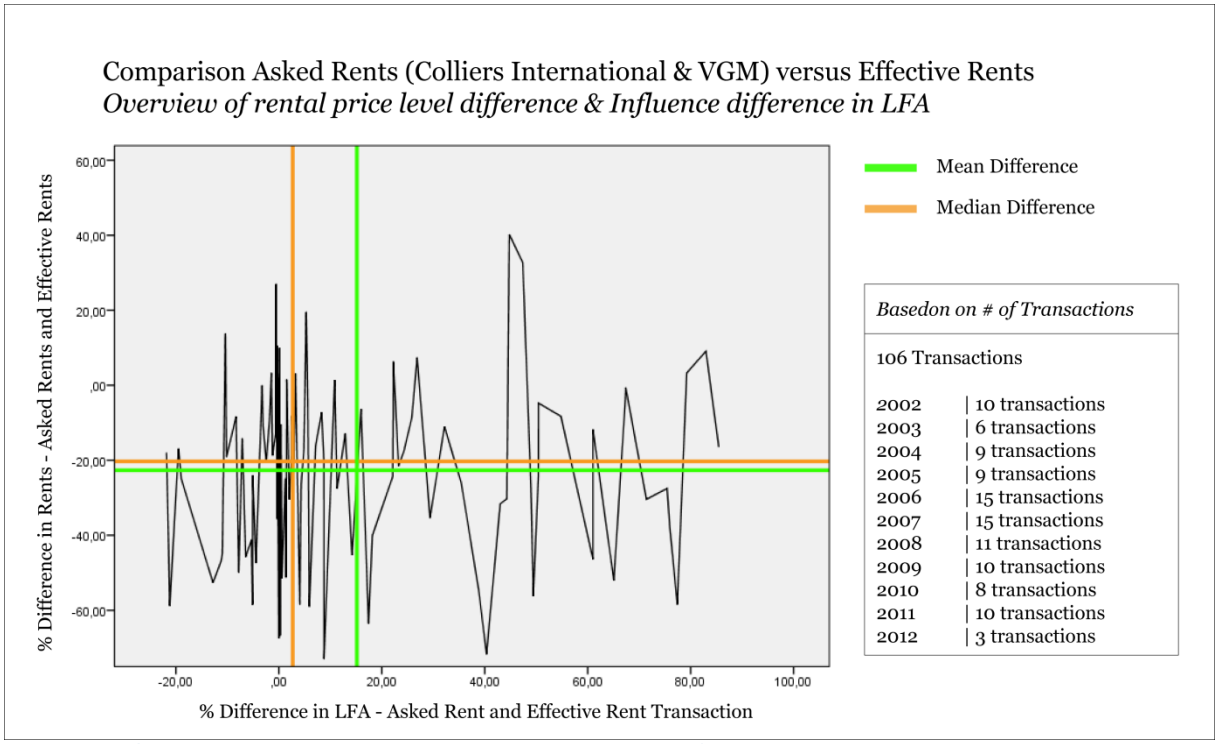


Figure 93. Comparison face – effective rent transactions – influence of LFA

The above figure shows the percentage difference in LFA compared to the percentage difference in Rents for all the transactions. In the sample, the percentage difference in LFA is around 15% (LFA Transaction is on average 15% lower than the associated LFA of the office on the market) compared to a lower median of around 3%.

7.2.7. Average Box plot and Box plots per year

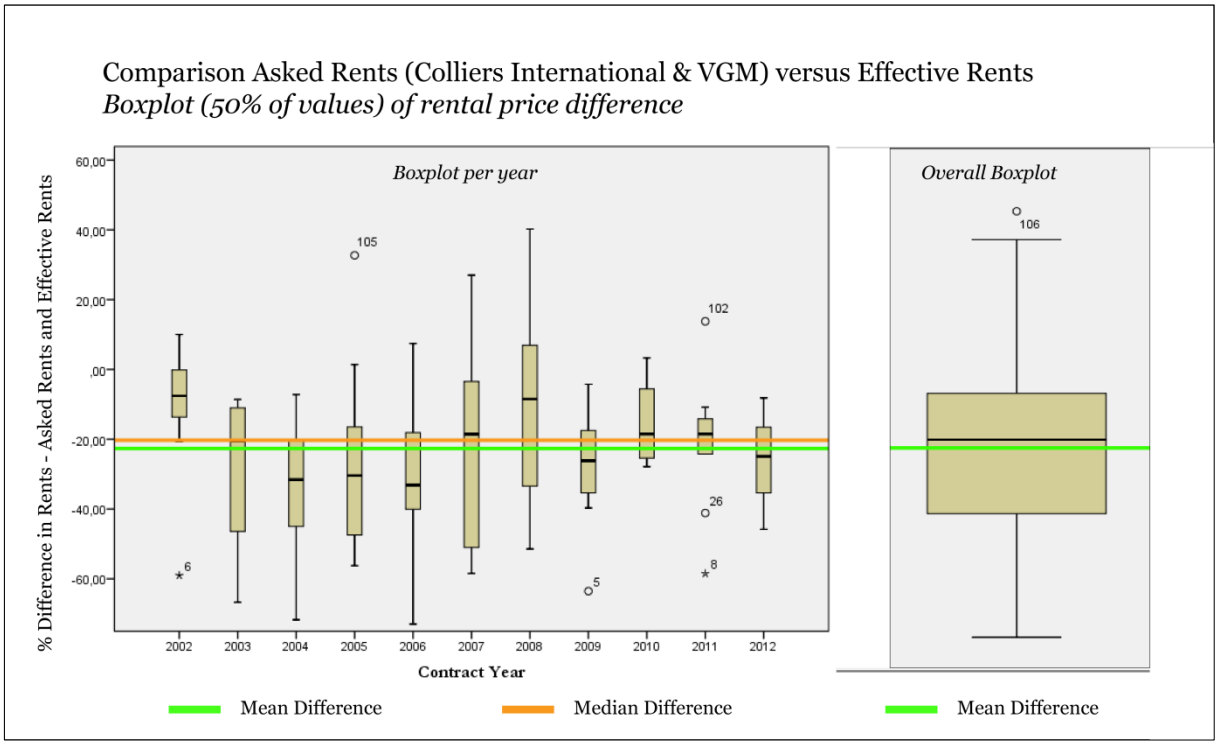


Figure 94. Comparison face – effective rent transactions – Box Plots

The overall box plot indicates that 50% of all the values are between a 5% difference and a 40% difference in rental prices, between face rental prices and effective rental prices. The yearly difference is difficult to interpret, as only a few transactions are available in the market per year.

7.2.8. Confidence intervals between asked rents and effective rents per year

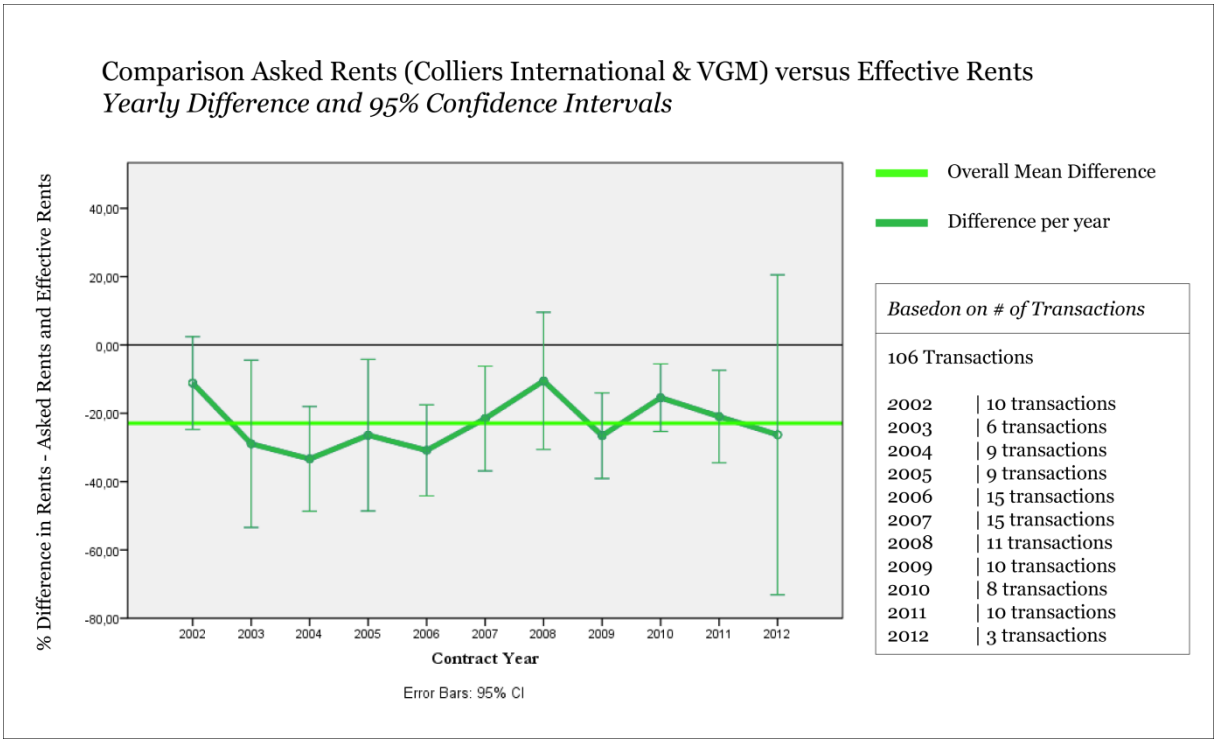


Figure 95. Comparison face – effective rent transactions – Yearly differences

The above figure shows that the mean percentage difference between face rental prices and effective rental prices is between 10% and 35% the last 10 years. The confidence intervals show that the range between the 95% confidence intervals is on average 25% per year in rental prices. As only a few transactions per year are available it is difficult to interpret the above numbers.

IV – Conclusions, Reflections & Recommendations

1. Conclusions

This chapter summarizes the most important conclusions of this research. In this chapter, the main and sub-research questions will be answered and the hypothesis will be tested per sub-question.

1.1. Answers on sub-questions and corresponding hypothesis

1.1.1. What is the effect of incentives on the working of the Dutch office market?

Hypothesis: "Incentives contribute to an in-transparent and in-efficient functioning office market"

Incentives contribute to an in-transparent and in-efficient functioning office market. Landlords are providing incentives, in order not to decrease their contract rent level. As a result, the contract rental prices in the Netherlands remains relatively stable. In addition, as reported rent levels by real estate agents are not corrected for these incentives, they create an unrealistic picture of the rental price development in the office market.

This has two important consequences for the office market: instead of a (nominal) rental price development, the underlying incentive development currently dictates the rental price development. In addition, the stable face rent levels in the market, indicate that the market is functioning stable, meaning the market might be a good investment opportunity. However, incentives are used as rent buffer.

As incentives and effective rental prices are not reported and/or published (deliberately) in the Dutch real estate market, the market becomes less transparent for third parties. Knowledge about incentives is now only available at the regular players in the real estate market. Others, less well-informed participants, may be disadvantaged. In addition, as incentives conceal the actual rental price, they prevent an efficient and competitive functioning office market.

1.1.2. How do incentives correlate with the vacancy rate, in the Amsterdam office market?

Hypothesis: "Incentives are influencing the vacancy rate without any time-lag, as incentives are used for short-time price adjustments. (Koppels & Keeris, 2006)"

The vacancy versus the incentive development shows in line with my hypothesis several significant positive correlations with the reported vacancy rates. In addition, the relation with the '*average vacancy rate from all market reports'* showed two significant positive correlations with the percentage incentives in the market, namely with a one-year lagged vacancy rate and a two-year lagged vacancy.

The relation with the percentage incentives is the strongest with a two-year lagged vacancy rate, in each vacancy rate researched. This is in contrast to the hypothesis and research of Koppels and Keeris (2006), which indicated that incentives are used for short-time price adjustments and therefore should correlate with the vacancy rate without any time-lag. In contrary to my results, they found a strong correlation between incentives and the vacancy rate without any time-lag. As their research only corrected for 2% incentives, the research outcomes of this study might provide a more accurate reflection of the market.

1.1.3. How does the effective rent level correlate with the vacancy rate, in the Amsterdam office market, compared to the contract rent level?

Hypothesis: "Effective rent levels are stronger correlated to the vacancy rate than contract rent levels"

The hypothesis is proven by this research. The '*average vacancy rate from all market reports'* showed a stronger negative correlation between the *nominal effective* rent level and the vacancy rate, compared to the nominal *contract* rent level and the vacancy rate. This is similar for the relation between the *real effective* rent level and the vacancy rate, compared to the *real contract* rent level and the vacancy rate. In addition, the relation with the real rent levels is stronger compared to the nominal rent levels. As a result, the relation between the vacancy rate and the real effective rental price shows the highest mutual correlation.

The 'average correlation' of all the individual vacancy rates with each rental price, showed a similar mutual relation.

The relation between vacancy and the rental price shows the highest correlation without a time-lag in each rent level. This is in contrary to the research of Koppels and Keeris in 2006, which found a two-year time-lag between the vacancy rates and rent adjustments. The explanation for this behavior was that landlords are reluctant to adjust their rental rates when there are fluctuations in the vacancy rate.

1.1.4. Spatial segmentation analysis: Do incentives and effective rental prices significantly differ in height and mutual development per sub-area?

Hypothesis: "Incentives and effective rental prices significantly differ in height and development per sub-area"
The spatial segmentation analysis showed that the incentives differ per city district, sub-office market or business district in *height*, but the yearly *development* is similar between each city district or sub-office market in the period 2002-2012, due to the significant mutual correlations between all city-districts and sub-office markets. In addition, the correlation analysis per business district showed that the incentive development is similar in several surrounding business districts, which indicates that the incentive development in surrounding areas are comparable.

The effective rental price analysis showed that the rental price levels significantly differ per city-district, per sub-office market and per business district in Amsterdam the last 10 years. The correlation analysis showed - in contrast to the incentive analysis – only some significant correlations in development between city-districts, sub-office markets and business districts in real effective rental price development, which is in line with theory as office markets are characterized by its spatial segmented behavior (Stevenson, 2007). The real effective rental price correlation analysis indicates that spatial market segments mostly differ in market dynamics in the Amsterdam office market over the period 2002-2012. In line with the incentive analysis, the business district analysis showed that the three surrounding business districts in City-District South-East are all significantly correlated in real effective rental price development.

1.1.5. Structural segmentation analysis: What is the relation between the use of incentives and the quality of a building or location? (Appendix)
Hypothesis: "Incentives have a stronger relation with a minor quality building or location instead of a high-quality building or location"

Building characteristics
The influence of the construction period on the percentage incentives (for transactions > 500 m2) shows that buildings constructed in the period 1980-1995 have an average more incentives compared to buildings constructed in the period < 1950 as well as the period 1950-1980. Other significant difference exists between buildings constructed in the period < 1950, which have on average less incentives compared to buildings constructed in the period 1980-1995 and after 1995.
The comparison with the age of the building showed a similar relation, namely that the incentives for buildings with an age lower than 10 years, or an age between 11 and 20 years, are significantly higher compared to buildings with an age between 50 and 100 years or buildings with an age higher than 100 years.
The above outcomes indicate that incentives are not higher in older buildings, and therefore not directly related to minor quality buildings (based on the assumption that in general older buildings have minor quality). The significantly lower incentives for buildings older than 50 years, might also indicate a possible vintage effect.

Location characteristics
The results show no significant differences between incentives and different distances to the highway or station for transactions above 500 m2. In distance to station analysis of transactions with an LFA below 500 m2, the incentives are significantly lower for buildings located more than 2000 meter from the station, compared to buildings with a distance of 1500-2000 meter.
The influence of the Walk scores compared to incentives in the Amsterdam office market shows that incentives are significantly lower in buildings with a high Walk score compared to a medium Walk score. This indicates a relation with a lower quality location. As there is no significantly difference with a low Walk score, it is not significant to conclude an overall relation between the quality of a location and the amount of incentives provided.

1.1.6. What is the influence of economic conditions on incentives and effective rent levels? (Appendix)
"Incentives are following the economic conditions, in which they are higher in a period of economic decline, instead of a period of economic growth."
The most important indicator of the economic conditions - the Real GDP Growth - shows no significant relationship with the incentive development over het period 2002-2012 (*Appendix A).* After 2007, both variables show a contradicting and more expected development, compared to the period before 2007.
The division in economic periods by van Eijk indicates that during a period of economic recovery (2005-2008), the incentives remain relatively stable in the market, which indicates a possible mutual relation.
The incentive development is sometimes in line with the Economic Leasing Cycle of Bond (1994). As the incentive development is most of the time rising in the market over the period 2002-2012, it is difficult to compare the ELC

with the incentive development. The upward incentive development and the comparison with the ELC, indicate that incentives were really a rising trend in the Amsterdam office market during the period 2002-2012, and not really related to different phases of the economy.

1.1.7. Cyclical behavior of the Amsterdam office market: Do several price index methods differ in cyclicality and market realistic reflection?

Hypothesis: "Quality-adjusted rental price indices are more cyclical and market realistic compared to non-adjusted rental price indices"

The literature review showed that a quality-adjusted rental price index should provide a more realistic reflection of the market situation, compared to a non-quality adjusted rental price index. The analysis of the average rental price index compared with the hedonic rental price index, showed that both rental price indices are really cyclical in its development, in which both rental price index techniques show a more or less similar 'overall' development.

Two contradictions exists between both real effective rental price developments, namely in the period 2003-2005 and in the period 2010-2012. In the latter period, the real effective rental price development in the 'average' rental price index is rather stable, while the 'hedonic' real effective rental price shows an extra cycle. In the period 2006-2008, the 'hedonic' real effective rental price index shows a small lag compared with the 'average' rental price index. In addition, the average rental price index shows a large deviation between real contract and real effective rental prices in 2011 and 2012; while the hedonic rental price rental price index shows a large deviation in 2010 and 2011.

The results show that it is difficult to evaluate the outcomes of the different rental price index techniques, based on its market realistic reflection.

1.1.8. How do asked /face rental prices differ from effective rental prices in the Amsterdam Office market in height and in development?

Hypothesis: "The effective rental price (development) is much lower (and cyclical) compared to the asked rental price (development)"

The individual transaction analysis showed that the effective rental price of a transaction, is on average *20%* lower compared to the corresponding face rental price. In addition, the comparison between the face and effective rental price development showed that the average effective rental price development is 23% lower compared to the face rental price development for existing offices.

The development analysis shows a less volatile *face* rental price development compared to the effective rental price development in the market. However, the *mutual development* itself is comparable between the face rental price development and the effective rental price development. This is confirmed by the significant correlation between the face rental price and effective rental price development. In contrast, the comparison with the *prime* rental price development showed no significant correlation in development with both the contract or the effective rental price development.

1.2. Answering the main research questions

1. "To what extend does a price index based on face rents, provide an accurate reflection of the market dynamics in the Amsterdam Office market over the period 2002 – 2012?

The literature review showed that an effective rental price index should provide a more market realistic reflection, compared to a rental price index based on face rents. This is more or less proved in this research due to the following reasons:

1. The comparison between face and effective rental price development in the Amsterdam office market showed that the average effective rental price development is about 23% lower compared to the face rental price development for existing offices (*Study 1*). This is in line with the individual transaction analysis (*Study 5*) which showed an average difference of 20% between both rental prices.

In contrast, the correlation analysis showed that the *development* itself is comparable, due to the significant correlation between the face rental price development and the contract or effective rental price development. In contrast, the comparison with the *prime* rental price development showed no significant correlations in development with both the contract or the effective rental price development. *(Study 1)*

2. The rental price indices constructed in this research *(Study 2)* showed that either a rental price index based on *prime* face rental prices published in the market, as well as rental price indices based on *average* face rental prices for *existing* offices differ from the more realistic contract and effective rental price developments in the Amsterdam office markets over the period 2002-2012. Both face rental price indices show a less volatile *face* rental price index compared to the contract or effective rental price index in the market. Furthermore, the rental prices indices based on contract or effective rents are more cyclical compared to the face rental price indices.

3. Testing the relation between vacancy and rents (*Study 3*) showed that the *real face rental price* is a significant indicator of the rental adjustments in the Amsterdam office market, due to high correlation with the average vacancy rate. In addition, the correlation between the contract or effective rental price and the average vacancy rate, showed that the *real effective rent level* is also a significant indicator for rental price adjustments in the Amsterdam office market due to the stronger mutual correlation. This is in line with the rental adjustment equation (Hendershott, 2004).
This research indicates that both the real face rental price as well as the real effective rental price are significant indicators for analyzing rental price adjustments in the Amsterdam office market.

As a result, their can be concluded that rental price indices based on face rents do not provide an accurate reflection of the market dynamics in the Amsterdam office market over the period 2002-2012. Although the development between face rental prices and effective rental prices is similar, and the relation between face rental prices and the vacancy rate is significant; this research showed that the (*real)effective rental price* is a better indicator of the market dynamics in the Amsterdam office market, especially due to the large difference between face and effective rental prices in the market.
The problem analysis showed that this difference is mainly caused by the in-transparency of the Amsterdam office market, due to the combination of providing lease incentives by landlords which leads to a stable contract rent level, as well as the associated publishing of *face* rental prices in the market, which are not corrected for these incentives.

2. Do spatial market segments differentiate in market dynamics in the Amsterdam office market over the period 2002-2012?

This research showed no unambiguous answer to this question. The spatial segmentation analysis *(Study 4)* showed that the *height* of incentives differs per city-district, sub-office market and business district the last years. However, the correlation analysis showed that the *development* of incentives over the entire period is very similar per city-district and sub-office markets. As a result, the incentive analysis indicates that spatial market segments do not differentiate in market dynamics in the Amsterdam office market over the period 2002-2012. This is proved by the business district analysis, as the incentive development in the South-Axis, WTC and RAI district is significantly correlated with other important business districts, namely Teleport, Arena/Bijlmerplein and the Canal District area.
In addition, the correlation analysis per business district showed that the incentive development is similar in several surrounding business districts, which indicates that market dynamics in surrounding areas are comparable.

The effective rental price analysis showed that the rental price levels significantly differ per city-district, per sub-office market and per business district in Amsterdam the last 10 years. The correlation analysis showed - in contrast to the incentive analysis – only some significant correlations in development between city-districts, sub-office markets and business districts in real effective rental price development. The real effective rental price correlation analysis indicates that spatial market segments mostly differ in market dynamics in the Amsterdam office market over the period 2002-2012. In line with the strong correlation between surrounding districts in the incentive analysis, the business district analysis showed that the three surrounding business districts in City-District South-East are all significantly correlated in real effective rental price development.

2. Reflection

2.1. Reflection on - and limitations of - research outcomes

2.1.1. Database

The main limitation of this research is the fact that the database used in this analysis only consists of 464 transactions with an LFA > 500 m2. As these transactions are most common for analyzing the working of the commercial real estate market, of which most theories and publications are based, the outcomes might be more accurate and reliable when more transactions were available in the sample.
Furthermore, from the database of the Municipal Tax Office only market conform accepted transactions (2957) are used in the analysis. As there is assumed that the evaluation of market conformity by the Municipal Tax Office is accurate and reliable, a limitation of this research is the fact that the used database is not a random sample of transactions.

2.1.2. Study 1: Incentive and effective rental price development

Incentives and effective rental price calculation

- In the calculation of the percentage incentives and effective rental price per transaction, several assumptions are made. As analyzing each transaction individually is a really intensive workload, the following general rules are set:
- Only two types of incentives are taken into account, namely one or more rent-free period(s) and rental discount(s). Other incentives are not included in the calculations. As a result, the overall percentage incentives might be higher compared to the current development. Especially investments by the tenant are not taken into account in the calculations as there is assumed the rental price is already agreed before the negotiations of investments by the tenant. Furthermore it is difficult to indicate the added value of the tenant investments for the landlord. It might be the case that the tenant agrees with the landlord to invest in the building in exchange for a lower contract rental price.
- There is also assumed that all the incentives are provided in the beginning of each rental contract. However, it might also be the case incentives are provided in the end of the rental period.
- In case both a rental discount and a rent-free period is provided by the landlord, there is assumed the rental discount is provided after the rent-free period.
- In the calculations of the nominal contract rent, the initial contract rent is first corrected for parking lots. After the initial contract rent is corrected for parking lots, the contract rent is corrected for incentives. As a result, there is assumed that incentives are provided only over the rental price excluded from parking lots. However it might also be the case that a rental discount is provided over the initial rental price including parking lots. This would change the percentage incentives and effective rental price in the entire transaction.
- In the calculation of the discount rate, no risk profile is taken into account, as there is assumed the only risk of the tenant is bankruptcy. In order to make the discount rate more reliable, a small risk profile could be added, for instance per tenant category.
- In the calculation of the inflation as part of a transaction in a specific year, the average inflation of the last five year is taken into account. However, the actual inflation over the contract period, might differ from the average inflation of the past five years.

Comparison with face rental price development

The comparison in development between the face rental price development and the effective rental price development, also has some limitations. For instance, the fact that the analysis of existing office buildings contains not many transactions. Furthermore, the division between New and Existing buildings is based on an assumption, instead of real market knowledge.
In addition, other *average face rental prices* or *prime face rental prices* might provide another relation with the contract and effective rent level development. This is similar for comparing with the face rental price indices in study 2.

2.1.3. Study 2: Hedonic regression model

The regression output shows an R of around 0,6 and an R^2 of around 0.3, which indicates that the independent variables in the model account for 30% of the variation in the dependent variable. Furthermore, the remaining 70% of the variation in the dependent variable cannot be explained by the current independent variables. The small R-Squared might be explained by the number of transactions with an LFA > 500 m2 in the hedonic price analysis, which might be too small, in order to set-up a well-functioning hedonic price model. As a result, the cyclicality, development and market realistic situation might change in a model with a higher R-Square.

2.1.4. Study 3: Vacancy- rent comparison: rental adjustment equation

As there are different vacancy rates in the market, other vacancy rates might provide different relations with the incentive development or the rental prices in the market. Furthermore, in the rental adjustment formula the actual vacancy rate is compared with the natural vacancy rate. This research only uses the actual vacancy rate in the calculations.

This research indicates that both the real face rental price as well as the real effective rental price are significant indicators for analyzing rental price adjustments in the Amsterdam office market. This is in contrast to the rental adjustment equation, which indicates a stronger relation with real effective rent levels in the market. This difference might be explained by the following aspects: the small amount of transactions with an LFA > 500 m2 in the database; the vacancy is compared with the average rental price development for existing offices insteadof the entire market; or the current scale level (city-wide) is not the most appropriate scale level for evaluating the relation between both variables.

2.1.5. Study 4: Spatial segmentation analysis

An implication of the analysis is that some samples only consists of a few transactions per year, which might bias the outcomes. In addition, no distinction is made in transactions with an LFA < 500 m2 and > 500 m2 in the analysis. Furthermore, it is difficult to interpret the results of the Post-Hoc procedures, as the results might indicate that the incentives differ per year between several districts. However, the results are only based on one particular relation (for instance incentives Amsterdam West vs. incentives Amsterdam South-Axis), which do not indicate whether the incentives are higher compared to all the other districts in Amsterdam.

2.1.6. Study 5 - Comparison face and effective rental price

As only 106 transactions are connected, the outcomes are not really significant and accurate to interpret. Furthermore, from the 106 transactions connected it is not totally sure whether the connected transactions are fully associated. As a result, the conclusions provide an indication of the difference between the face rental prices and the effective rental prices, but the amount of connected transactions is too small in order to provide an accurate conclusion. This is similar for all the other analysis made in this part of the report, like for instance the yearly differences between face rental prices and effective rental prices (study 2).

2.2. Reflection on research aim

Overall this research had two main goals:

1. *Set the next step in 'solving' the transparency problem in the Dutch real estate market, by giving openness about the underlying effective rental price and incentive development in the Amsterdam office (sub-)market(s), in order to make the office market more accessible and competitive for outsiders, entrants and non-experienced participants in the market*

The first aim of this research is more or less achieved. This research gives openness about the underlying price development in the entire Amsterdam Office market and of several Amsterdam office city districts, sub-markets and business districts. However, some results might be biased due to the small amount of transactions per sub-market.

Furthermore, the analysis of the face and effective rental prices, and the associated development provides an indication of the in-transparency in the Amsterdam and Dutch office market. The parties in the Dutch Real Estate market will not directly be triggered by this research in publishing effective rental prices instead of face rental prices. However, it could make outsiders, entrants and non-experienced participants aware of the real market value and the underlying effective rental price development, which might influence their investment behavior and the competitiveness of the Dutch office market. Furthermore, as the rental price currently exists of about 17%

incentives, this might provide outsiders, entrants and non-experienced participants aware of the negotiation possibilities during rental transactions in the market.

2. *Constructing a '(real) effective rental price index' in order to provide an as market conform reflection of the market dynamics in the Amsterdam office market over the period 2002-2012*

The second aim is partly achieved. An average rental price index and an hedonic rental price index technique are used to construct a (real) effective rental price index based on (nominal and real) effective rents. Both rental price index techniques show a really cyclical development of (real) effective rental price in the Amsterdam office market over the period 2002-2012.
Unfortunately the hedonic rental price index has a really low (adjusted) R-Squared., which influences the accuracy of the model. Based on theory, the hedonic real effective rental price index should provide the most realistic reflection of the market. However, it is difficult to evaluate the outcomes of the different rental price index techniques, as their is no unambiguous answer on which rental price index provides the most accurate reflection of the prevailing market circumstances.

2.3. Applicability in the industry

No quantitative research is earlier conducted and published based on incentives in the Dutch and Amsterdam office market. As a result, many parties are interested and curious about the development and amount of (market conform) incentives the last years.
Furthermore, no effective rental price developments are available for many parties in the Dutch real estate market. This research gives openness about the rental price development in Amsterdam, not only as a whole, but also for its sub-office markets, city-districts and business districts.
Furthermore, the indication of the difference between face rental prices and effective rental prices could make outsiders, entrants and non-experienced participants in the real estate market aware of the real market value, the in-transparency of the Dutch and Amsterdam office market and the underlying effective rental price development

2.4. Applicability in the society

When renting an office, almost 15% of the contract rental price consists of incentives the last years, for larger office transactions. If outsiders, entrants and non-experienced participants are not aware of this fact, they might pay a non market conform rental price. This is comparable to the difference between face rental prices and effective rental prices, in which face rental prices are on average 20% higher compared to effective rental prices. Both aspects in the market are really important for the society, in which the market conform rental price of the property is far lower compared to the published face rental price in the market.

2.5. Applicability in academic field

As most researches in the Netherlands and worldwide use contract and face rent levels in their research, they might be biased. This research uses market conform effective rent levels, which provides an accurate reflection of the true rental price in the office market. Furthermore, in this research an effective rental price index is conducted, which is internationally almost never conducted. In addition, the stronger relation between vacancy and effective rent levels compared to contract rent levels is an important conclusion in the research about vacancy rates.
This research also analyzed the spatial segmentation of office markets, which showed that office markets consist of several sub-office markets, with their own behavior. In contrast to the correlation outcomes between different sub-markets, this research also showed that the incentive development is comparable between almost all city-districts, sub-office markets and business districts.

2.6. Steps needed for further development of the results.

In my opinion the most important biases in this research, are related to the dataset, as the dataset of the Municipal Tax Office consists of only $1/6^{th}$ of transactions with an LFA > 500 m2. As most real estate theories are based on datasets for transactions with an LFA > 500 m2, this might be the reason some outcomes did not show the expected outcomes in this research. This is especially the case in the hedonic rental price analysis. In comparable hedonic rental price indices constructed, the R-Squared is about 0,8; with the same variables as this research included in the model. When more transactions with an LFA > 500 m2 could be added to the database, the results and accuracy of the outcomes might improve.

The rental price index technique could be improved by using a time-varying parameter technique, as this index construction method allows for the variation of parameters of rent are is therefore considered superior to the conventional hedonic technique.

In addition, this research could be improved by researching the relation between the (real) effective rental price and the vacancy rate per city-districts, sub-office markets and business districts in the Amsterdam sub-office markets.

2.7. Reflection on intended research and the performed execution

When I started with this graduation I really wanted to investigate a trend in the real estate market, which was never been researched before. As a result, the subject chosen was really in line with my motivation. When starting this research the biggest opportunity was obtaining the data. However, during the research some other important problems occurred, most of them by my own behavior.

As I managed to get access to the database of the Municipal Tax Office, which is one of the most interesting transaction databases in the Netherlands, I really wanted to explore all possibilities within the dataset, as this might be the only research conducted with this database in the upcoming years.

This has led to a research which sometimes felt like a PHD, or the work of a double thesis. As a result, my professors often implied that limiting the research to only one aspect might be better, although due to the promising dataset, I really wanted to explore all the possibilities within the dataset. This resulted in a research which took way longer than expected. Afterwards, a demarcation of the research might been better, although the outcomes of this research are really promising.

Another recommendation for the research process is to finalize the problem analysis, literature review and methods used in the research as early possible in the research. In the last weeks of my graduation, I was really busy with adjusting these aspects of my report, which led to enormous planning problems. Furthermore, a sound literature review provides several important insights which can be used in explaining the empirical part of the thesis.

Furthermore, in this research many work is conducted which is not used in the final report, especially in connecting all the different data sources. In addition, performing a quantitative study on this topic proved to be a challenging task, especially due to the problems which occurred during the development of the hedonic rental price index, and the analysis of all the different data sources.

Overall, I am really happy with the end result, in which I would recommend all fellow students to choose for a graduation subject which is in line with their own motivation and which might form an eye opener in the real estate market Furthermore, demarcation of the thesis is really important, in order not to extend the entire graduation year. It is most of the times better to really investigate one particular aspect of the real estate market, compared a broader and less in depth research. I hope this research triggered other fellow students in exploring an unknown area in the real estate market, as working on a new and exploring subject forms really a trigger during the graduation year.

3. Recommendations for further research and practice

Based upon the results of this study several recommendations can be made. This chapter will elaborate on both recommendations for further research as well as specific recommendations for the real estate market.

Further research
This research could be extended by researching the relation between the (real) effective rental price and the vacancy rate per city-districts, sub-office markets and business districts in the Amsterdam sub-office markets. In addition, the same research could be conducted for other areas in the real estate market. Especially a similar research could be conducted for the retail market. It is for instance really interesting to research the incentives and effective rental price development in the retail market.

In relation to this research, the difference between determinants in an effective rental price index could be compared with the determinants in a contract rental price index. Furthermore, in researching the office market behavior, the market cycles could be divided in several parts, to investigate whether for instance the relation between vacancy or economic indicators and the rental price differs in each moment of the cycle. In addition, more building and location variables could be compared to the incentive and the effective rental price development, which might lead to interesting research outcomes.

Practice
In order to increase the transparency in the Dutch real estate market, all regular players should publish effective rental prices in the market. A transparent real estate market will lead to a better functioning, and more competitive real estate market, which is also more attractive for foreign investors. Currently some institutions are publishing effective rental prices, although it could never be validated whether a rental price is an effective rental price or a face rental price in the market. As all regular players in the real estate market, have a knowledge advantage due to the in-transparency in the market, I expect that this is really difficult to implement.
As a result of the in-transparency in the market, I would recommend all Municipal Tax offices in the Netherlands, to publish their average calculated market conform effective rental prices per office building or per sub-area in the market. In my opinion, this is the ideal first step to make the office market more transparent. In my opinion, when the market conform rental prices of the Municipal Tax Offices are available for all actors in the market, this might trigger all other regular and private parties to publish effective rental prices (and market conform incentives) in the market. As a result, this will eventually led to a better functioning, more competitive and more transparent office market which is accessible for all actors with an interest in the Dutch real estate market.

V – References

V- References

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VI - Appendices

In-transparency of the Amsterdam office market - *The underlying incentive and effective rental price development*

A quantitative research into the market dynamics and spatial segmentation of the Amsterdam office market over the period 2002-2012

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Date: 14-05-2014

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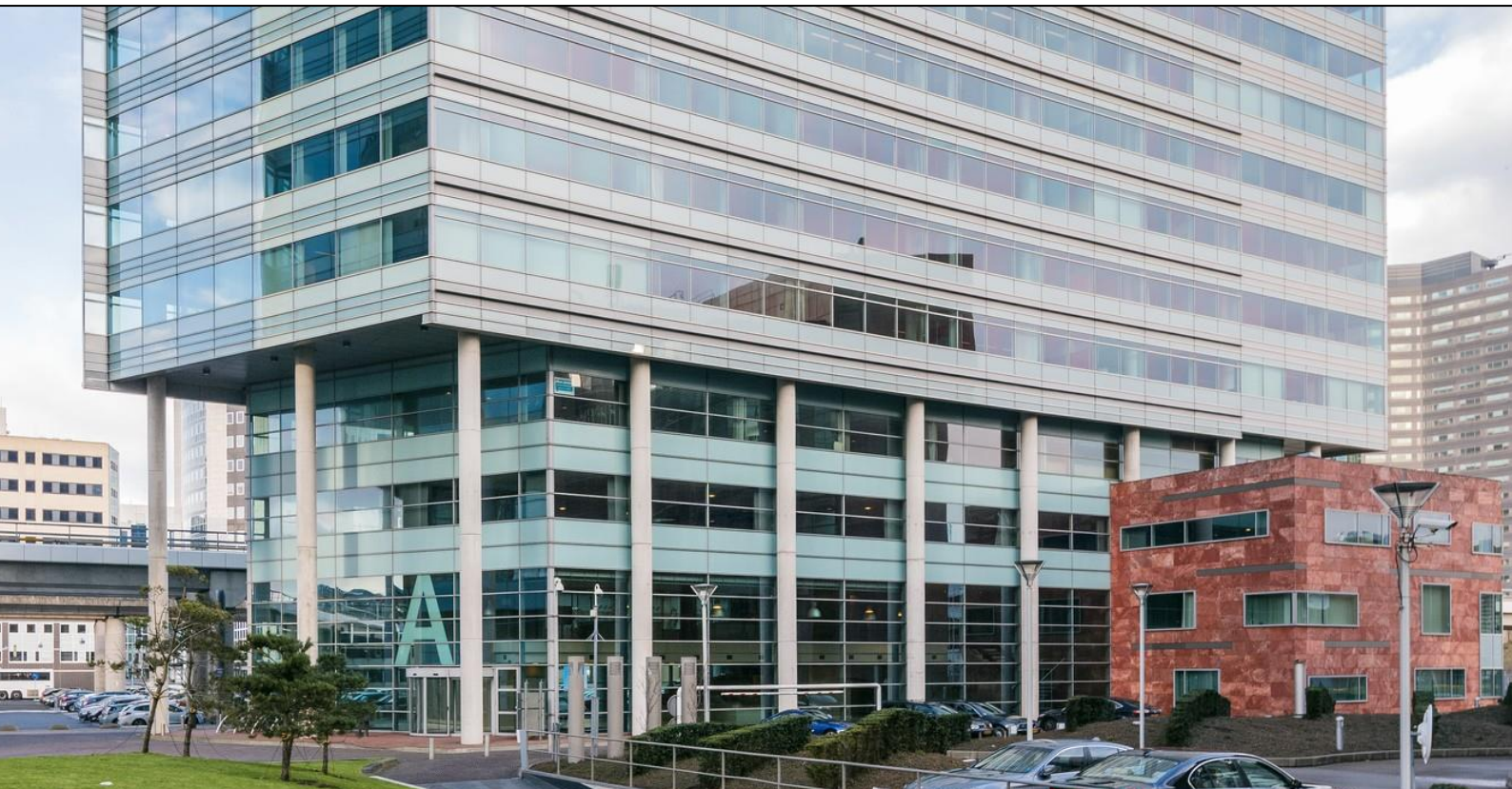
Appendix A

Study 3 |Testing relations between variables

- *Economic indicators and the incentive development (A1)*
- *Economic indicators and the rental price development (A2)*



A.1. The influence of economic conditions on the incentive development in the Amsterdam office market

A.1.1. Introduction

This paragraph describes the influence of the economic indicators on the incentives in the Amsterdam Office market. The following economic indicators will be compared with the incentives in the market:
- Real GDP Growth (Centraal Bureau Statistiek, CBS)
- Unemployment in Amsterdam (Centraal Bureau Statistiek, CBS)
- Consumer Spending (Centraal Plan Bureau, CPB)
- Consumer Confidence (Centraal Bureau Statistiek, CBS)

The comparison is done by means of a Cross-Correlation Analysis, which also tests whether the relation between both variables investigated might be lagged. The analysis will mainly focus on transactions with an LFA > 500 m2, as incentives especially occur at larger transactions.

A.1.2. Real GDP Growth

The Real GDP Growth shows at first sight a clear relation with the incentive development for transactions with an LFA > 500m2, as the incentives are more or less growing on a similar way as the Real GDP growth from 2002-2007. However after 2008-2009 a contradicting and more expected development is visible, the incentives are growing in the market while the real DGP Growth is negative.
In 2009-2010 the incentives were declining in the market, and the Real GDP Growth became positive. In 2010-2012 the incentives were rising significantly from 10% in 2010 till 16% of average in 2011 and 15% in 2012, while the Real GDP Growth became negative in 2012.

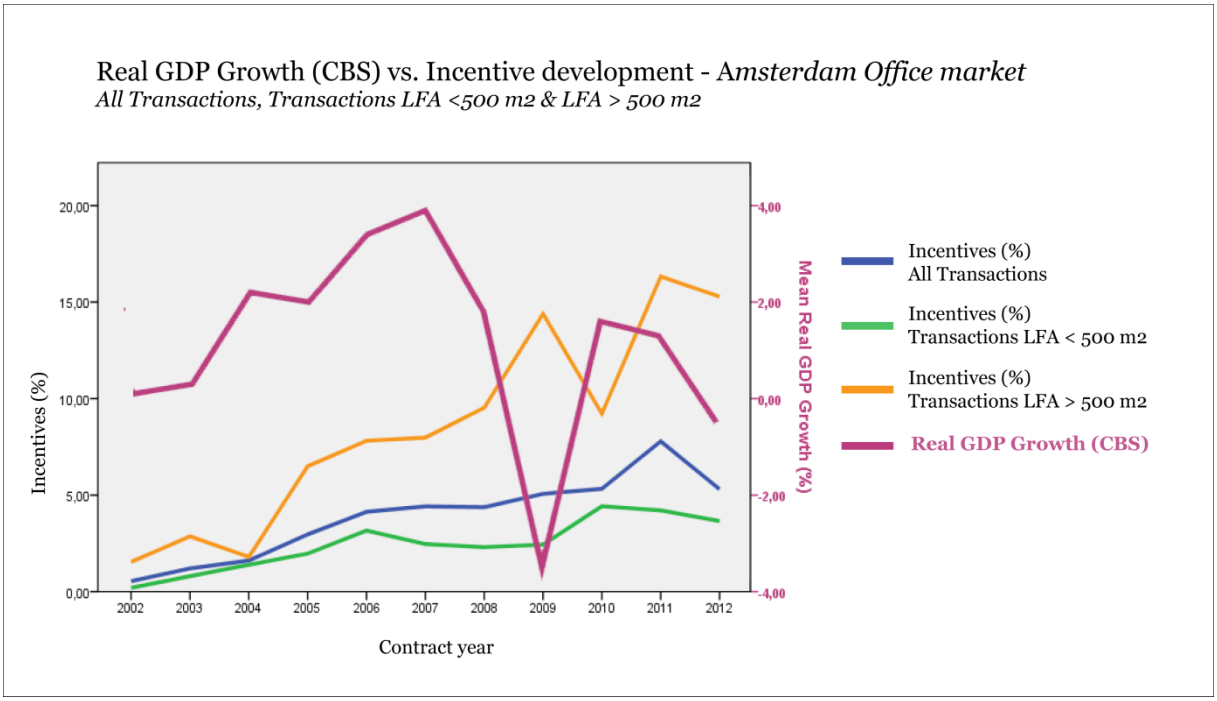


Figure 96. Real GDP Growth vs Incentive development – Amsterdam office market

The Cross-correlation analysis on the next page shows no significant correlations between incentives and the Real GDP Growth in the market. In the transactions with an LFA > 500 m2, the highest correlation (-0,339) occurs without a time lag. This might indicate that incentives are used for short-term price adjustments in the market. The small negative correlation gives a small indication that incentives are higher in periods of negative economic conditions and the other way around.

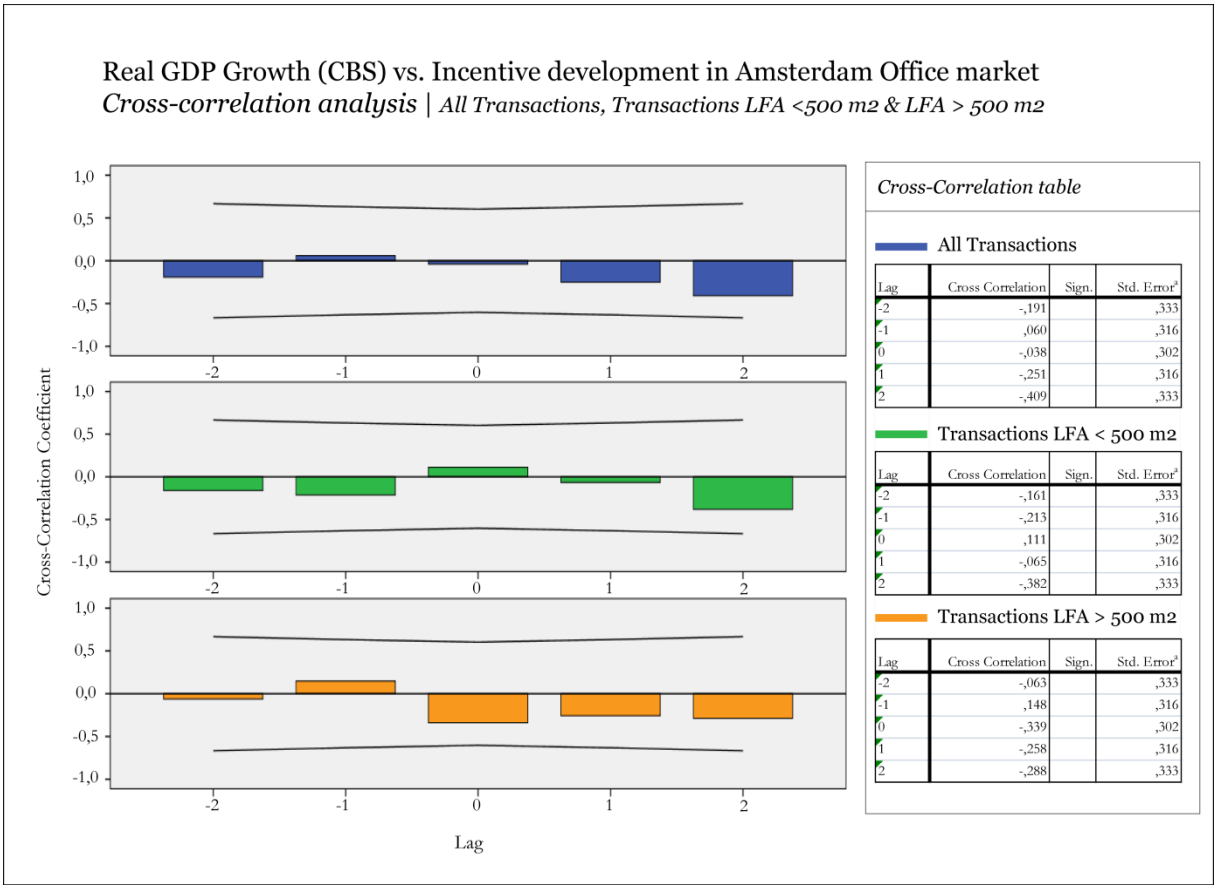


Figure 97. Real GDP Growth vs Incentive development – Amsterdam office market – Cross-correlation tables

A.1.3. Unemployment Rate in Amsterdam Office market

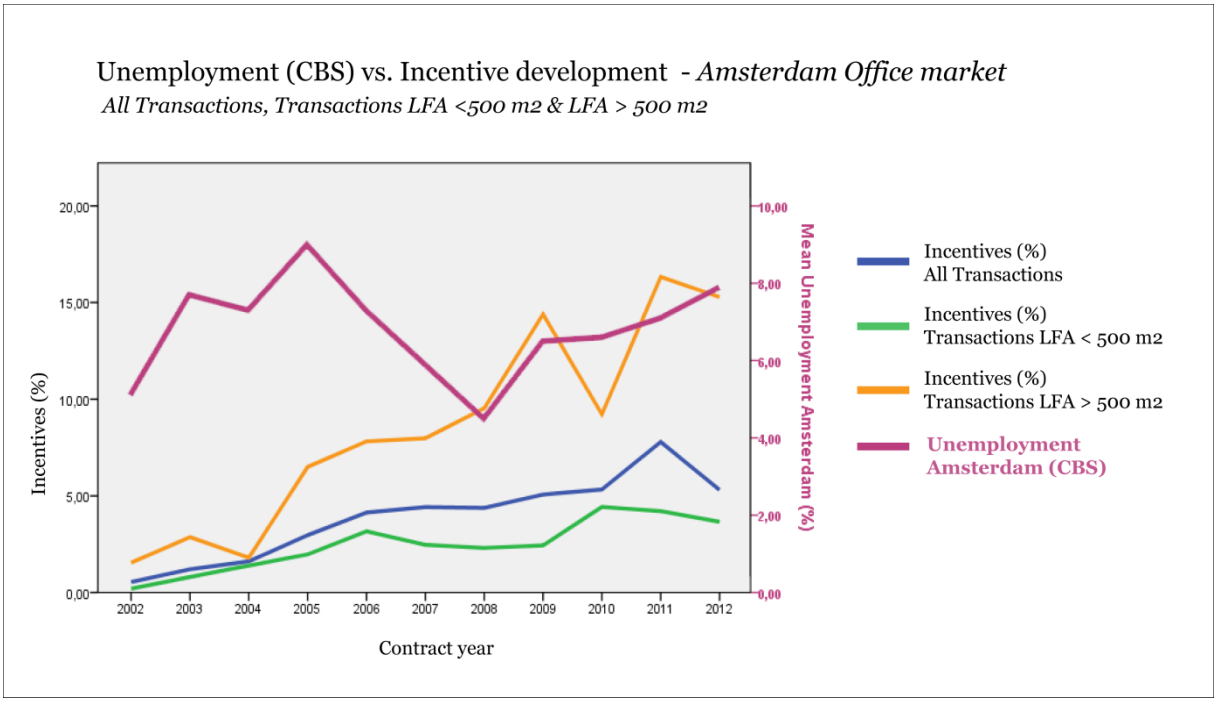


Figure 98. Unemployment vs Incentive development – Amsterdam office market

The relation between incentives and unemployment in Amsterdam shows no clear relation in the market. This is visible in the figure above and in the cross-correlation analysis below. There are no significant correlations between both variables. The highest correlation in the analysis of transactions with an LFA > 500 m2, is the correlation with a lag of + 1 of only 0,231.

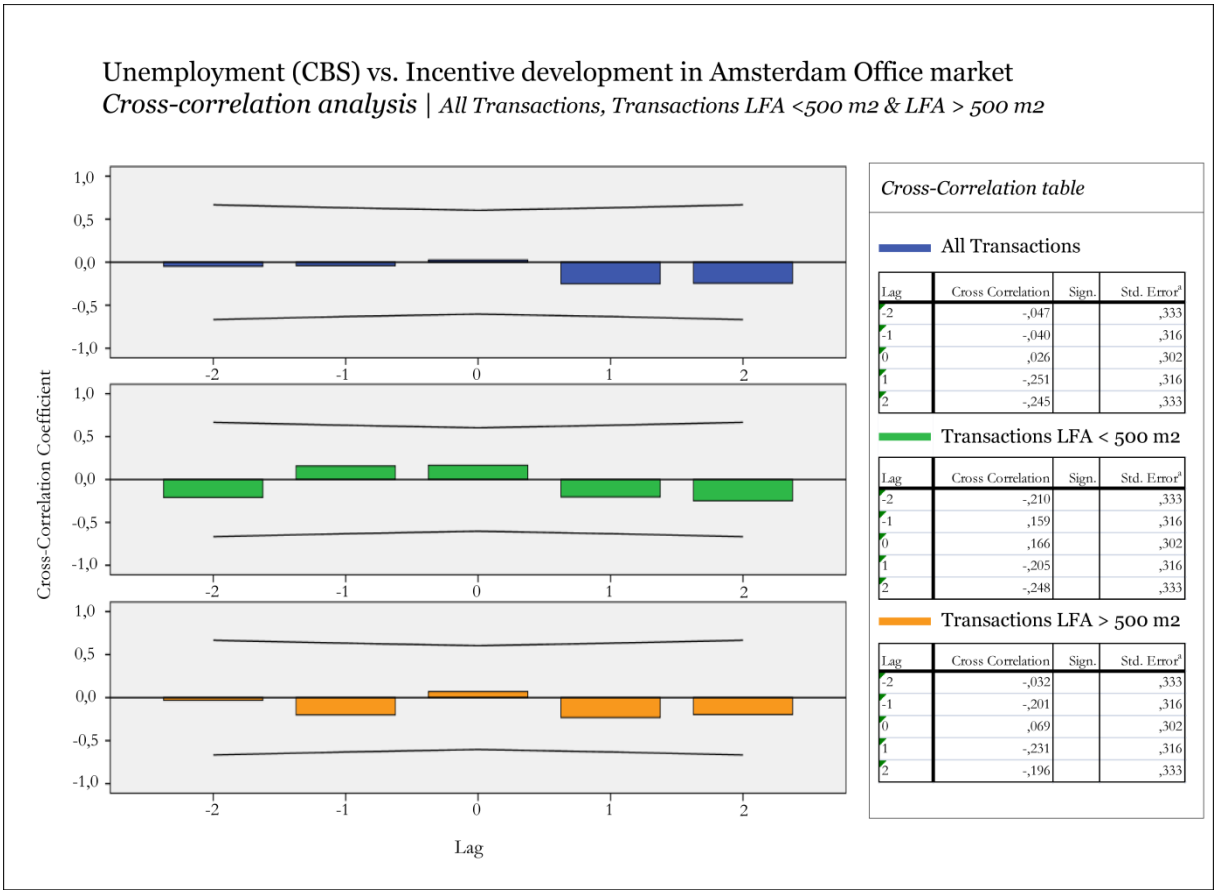


Figure 99. Unemployment vs. Incentive development – Amsterdam office market – Cross-correlation tables

A.1.4. Consumer Spending

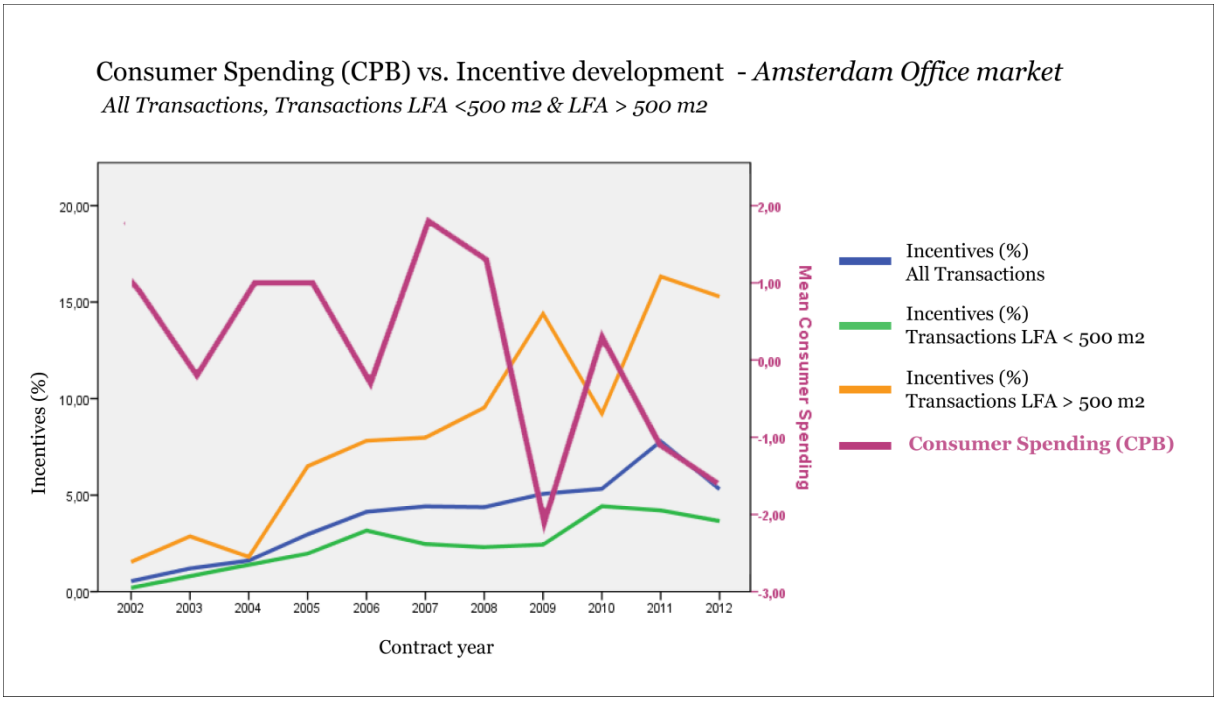


Figure 100. Consumer Spending vs. Incentive development – Amsterdam office market

The relation between the Consumer Spending and the incentive development (LFA > 500m2) shows especially from 2007-2011 a clear 'negative/contradicting' relation, as when incentives were rising, the consumer spending declined

and the other way around. More or less the same is visible in the preliminary period 2002-2006, but the range in incentive growth/decline is somewhat smaller.

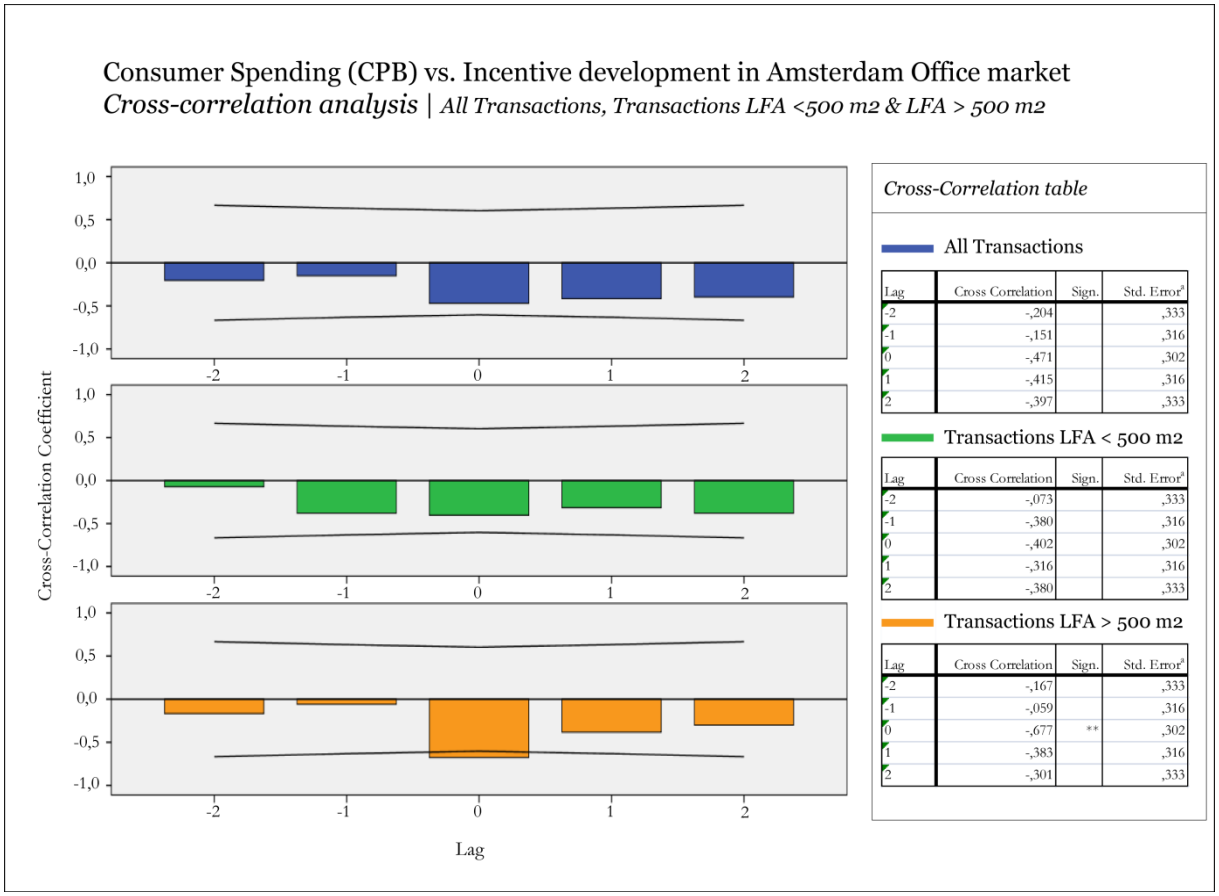


Figure 101. Consumer Spending vs. Incentive development – Amsterdam office market – Cross-correlation tables

The strong relation is also visible in the cross-correlation analysis, which shows a significant negative correlation between consumer spending and incentives (-0,677), without time-lag.

The relation between both variables might be explained by the fact that in periods when consumers have less to spend, or face financing problems, they might be happy to receive incentives by the landlord when renting an office. This is in line with the general theory about incentives, as incentives are used to simplify the negotiations between the potential tenant and the property owner. (Swagerman, 2010; van Gool, 2011). Offering incentives is used to facilitate the tenant to move to a particular building, in which transaction costs of a moving exercise are quite high and obtaining capital can be quite problematic. In periods when consumers have more to spend, and therefore spend more in the market, they do not really need incentives for renting an office. This is confirmed by the Economic Leasing Cycle of Bond (1994).

The negative correlation is also visible in transactions with an LFA < 500 m2 analysis (0,402, t = 0) and in the All-transaction analysis (0,471, t = 0). However, both correlations are not significant.

A.1.5. Consumer Confidence

The relation between Consumer Confidence and incentives in Amsterdam shows no clear mutual relation. This is visible in the figure above and in the associated cross-correlation analysis on the next page. There are no significant correlations between both variables. The highest correlation in the analysis of transactions with an LFA > 500 m2, is the correlation with a lag of - 2 of 0,345.

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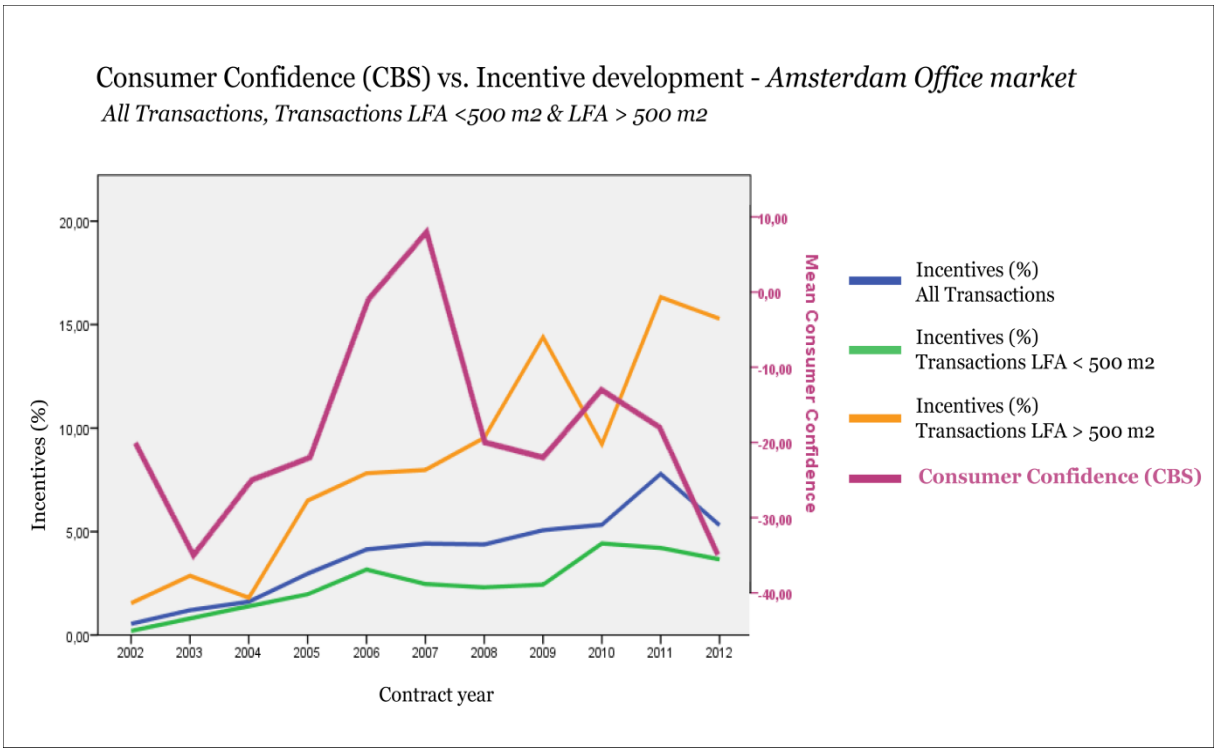


Figure 102. Consumer Confidence vs. Incentive development – Amsterdam office market – Cross-correlation tables

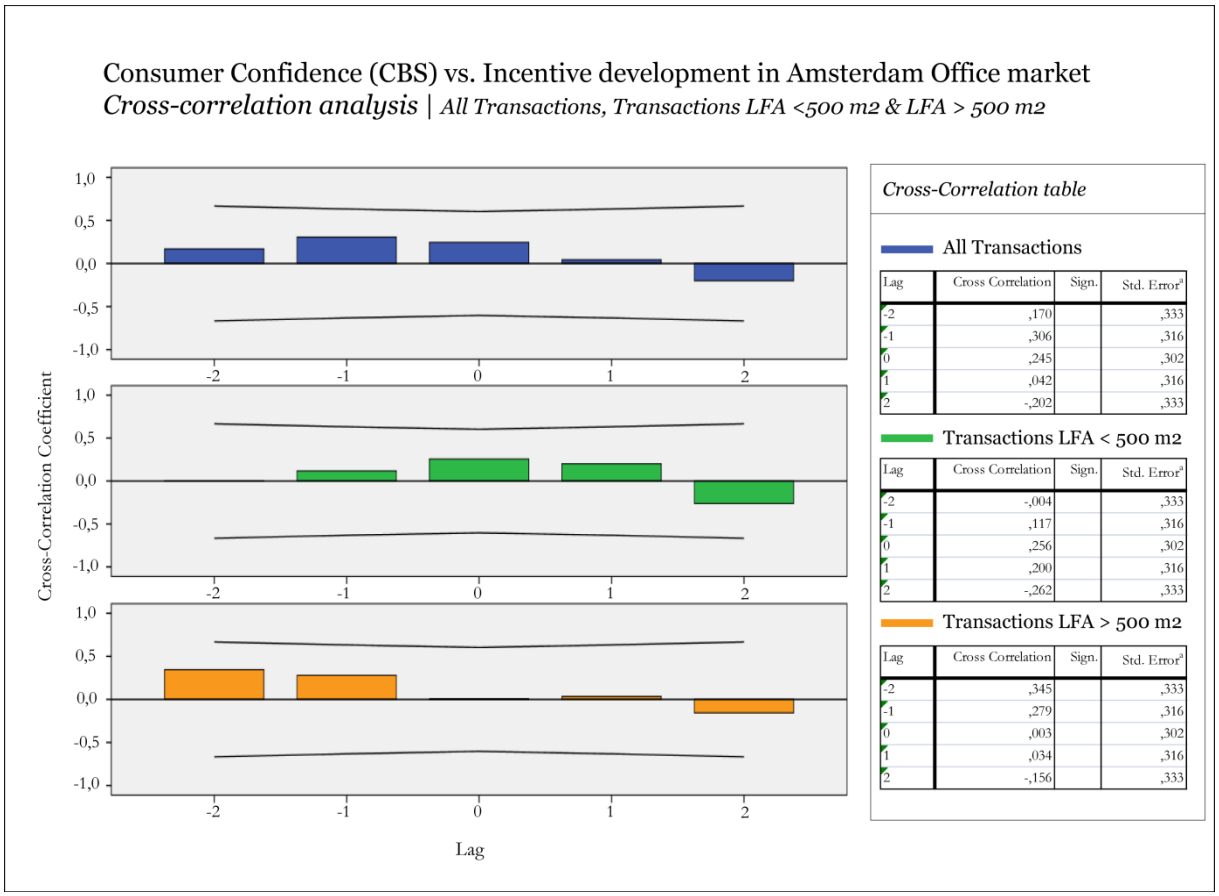


Figure 103. Consumer Confidence vs. Incentive development – Amsterdam office market – Cross-correlation tables

A.1.6. Conclusions

		All Transactions			***Transactions LFA > 500 m2***			***Transactions LFA < 500 m2***		
Variable 1	***Variable 2***	*Lag**	*Pearson Corr.*	*Sig. (Yes / No)*	*Lag**	*Pearson Corr.*	*Sig. (Yes / No)*	*Lag**	*Pearson Corr.*	*Sig. (Yes / No)*
Real GDP Growth	*Percentage Incentives*	+2	-0,409	No	0	-0,339	No	+2	-0,382	No
Unemploym. Amsterdam	*Percentage Incentives*	+1	-0,251	No	+1	-0,231	No	+2	-0,248	No
Consumer Spending	*Percentage Incentives*	0	-0,471	No	0	-0,677	Yes	0	-0,402	No
Consumer Confidence	*Percentage Incentives*	-1	0,306	No	-2	0,345	No	+2	-0,262	No

(= positive lag = variable 1 leads variable 2; negative lag = variable 1 follows variable 2)*

The summary table above shows the relation between the economic indicators and the incentive development. The only significant relation occurs between *consumer spending* and the *percentage incentives* in the analysis of transactions LFA > 500 m2. The relation between both variables might be explained by the fact that in periods when consumers have less to spend, or face financing problems, they might be happy to receive incentives by the landlord when renting an office, and the other way around. This is in line with the Economic Leasing Cycle and research of Swagerman (2010) and van Gool (2011).

The Real GDP Growth (Transactions LFA > 500 m2) compared to incentives showed a strong negative relation in the period 2007-2012. As the cross-correlation analysis is based on the entire period, only a small negative correlation is visible (-0,409, not significant).

A.2. The influence of economic conditions on the rental price development in the Amsterdam office market

A.2.1. Introduction and method used

This paragraph describes the influence of the economic indicators on both contract rents and effective rents in the Amsterdam Office market. The following economic indicators will be compared with both rent levels in the market:
- Real GDP Growth (Centraal Bureau Statistiek, CBS)
- Unemployment in Amsterdam (Centraal Bureau Statistiek, CBS)
- Consumer Spending (Centraal Plan Bureau, CPB)
- Consumer Confidence (Centraal Bureau Statistiek, CBS)

The comparison is made by means of a Cross-Correlation Analysis, which also tests whether the relation between the variables investigated might be lagged.

A.2.2. Real GDP Growth

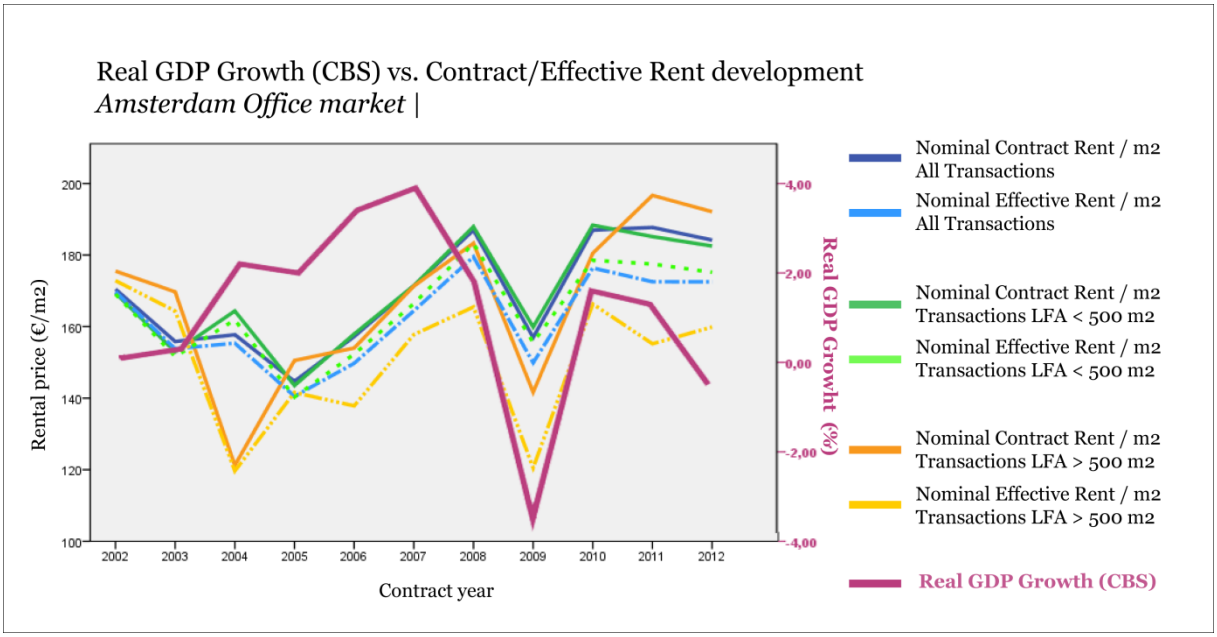


Figure 104. Real GDP Growth vs. Contract/Effective rent development – Amsterdam office market

The influence of the real GDP Growth on the rent development shows that there is a relation between both variables, although the relation seems lagged by 1 year. This is confirmed by the Cross-correlation analysis on the next page, which show a negative correlation with a positive lag of + 1. A positive lag indicates that the first variable leads the second variable, in which the Real GDP Growth leads the contract and effective rent development by one year. The negative lagged correlation indicates that when the Real GDP Growth declines in a particular year, the rents grow in the next year. This is in contrast to my expectations, as I expected a positive correlation between both variables.
The Cross-correlation analysis shows a higher correlation between the Real GDP Growth and the effective rent levels, compared to the contract rent levels. The relations between both variables are significant in the analysis of 'All transactions' and 'Transactions with an LFA < 500 m2'. The transactions with an LFA > 500 m2 show no significant correlations between both variables.
The figure indicates that the development of the Real GDP Growth in the period 2003-2008, is almost equal to the nominal effective rental price development (Transactions LFA > 500 m2) in the period 2004-2009. This indicates that both variables are strongly related, during a period of economic recovery.
Furthermore, the Real GDP Growth development from 2008-2010, is similar to all the rent developments (LFA > 500 m2, LFA < 500 m2, all transactions).

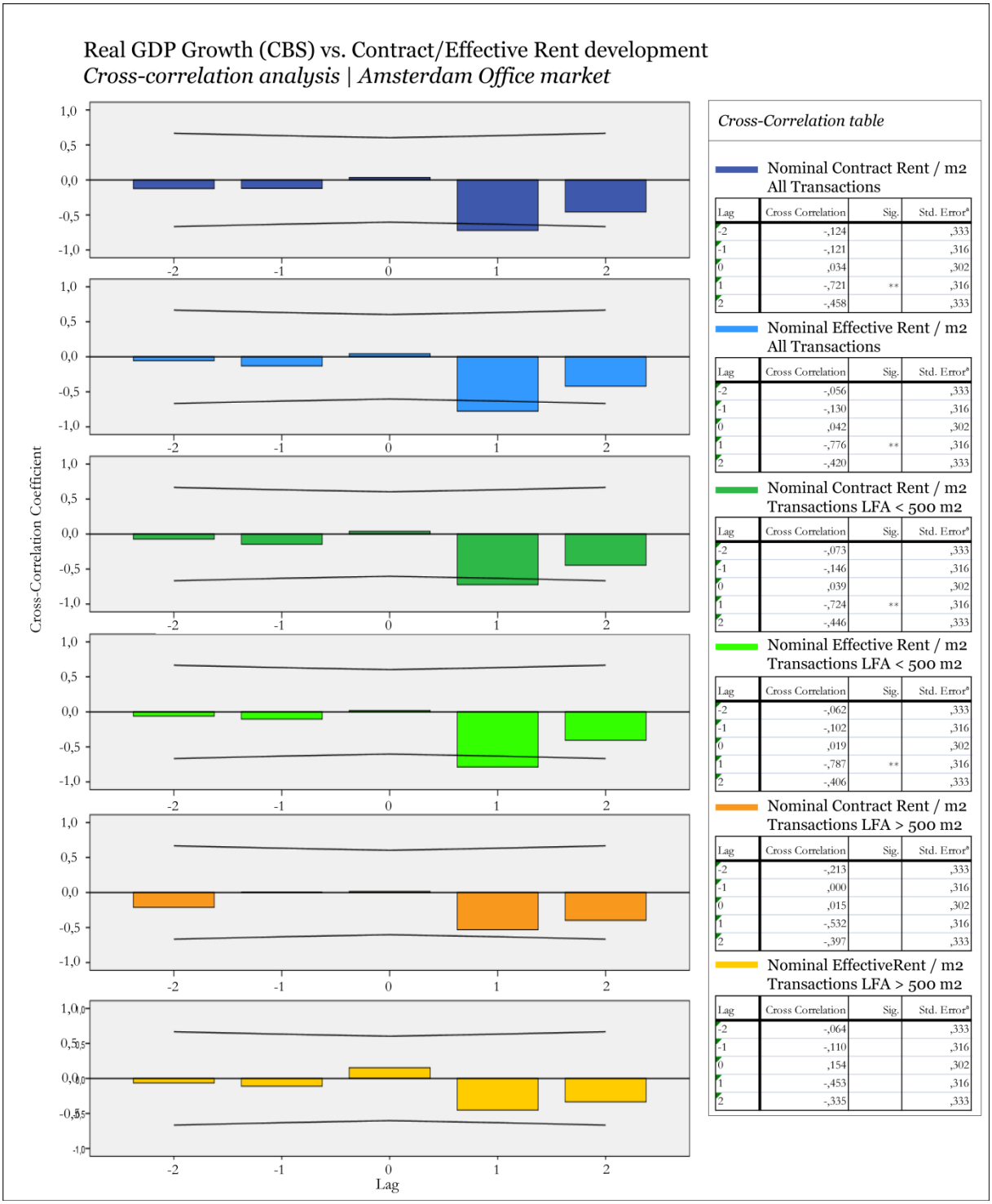


Figure 105. Real GDP Growth vs. Contract/Effective rent development – Amsterdam office market – Cross-correlation tables

A.2.3. Unemployment Rate in Amsterdam Office market

The relation between unemployment and the contract/effective rent levels in the Amsterdam office market shows a negative correlation without a time-lag between both variables. The negative correlation indicates that a decline in unemployment goes hand in hand with a rising rent level, and the other way around. In accordance to the outcomes of the relation of the rent levels with the GDP Growth, the effective rent levels show higher correlation compared to the contract rent levels. The analysis of 'Transactions with an LFA > 500 m2' shows no significant relation with the unemployment rate in Amsterdam. The results imply that the unemployment in Amsterdam only affects the rental prices of smaller offices.

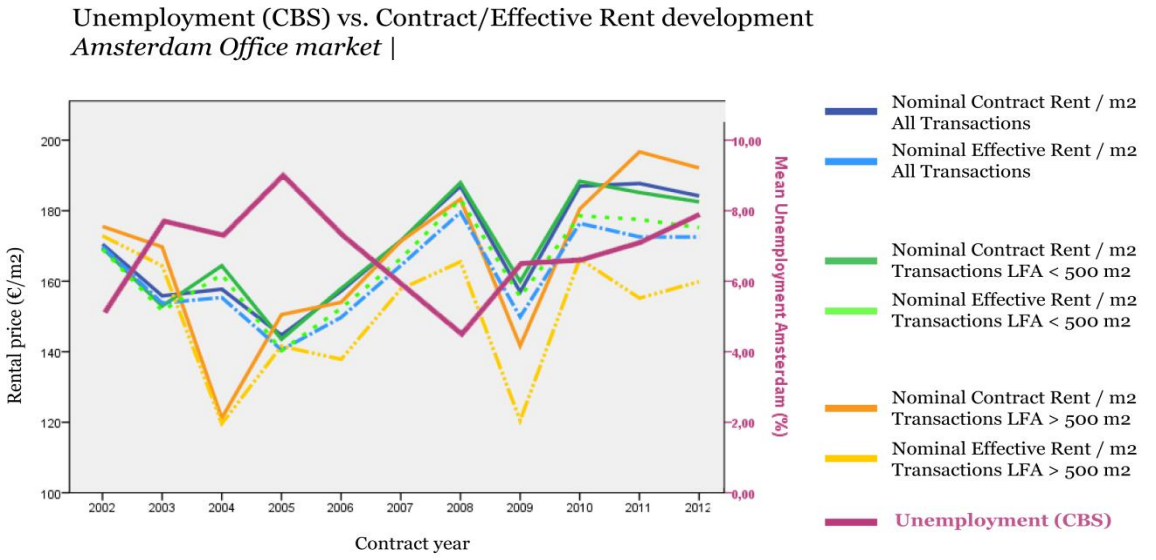
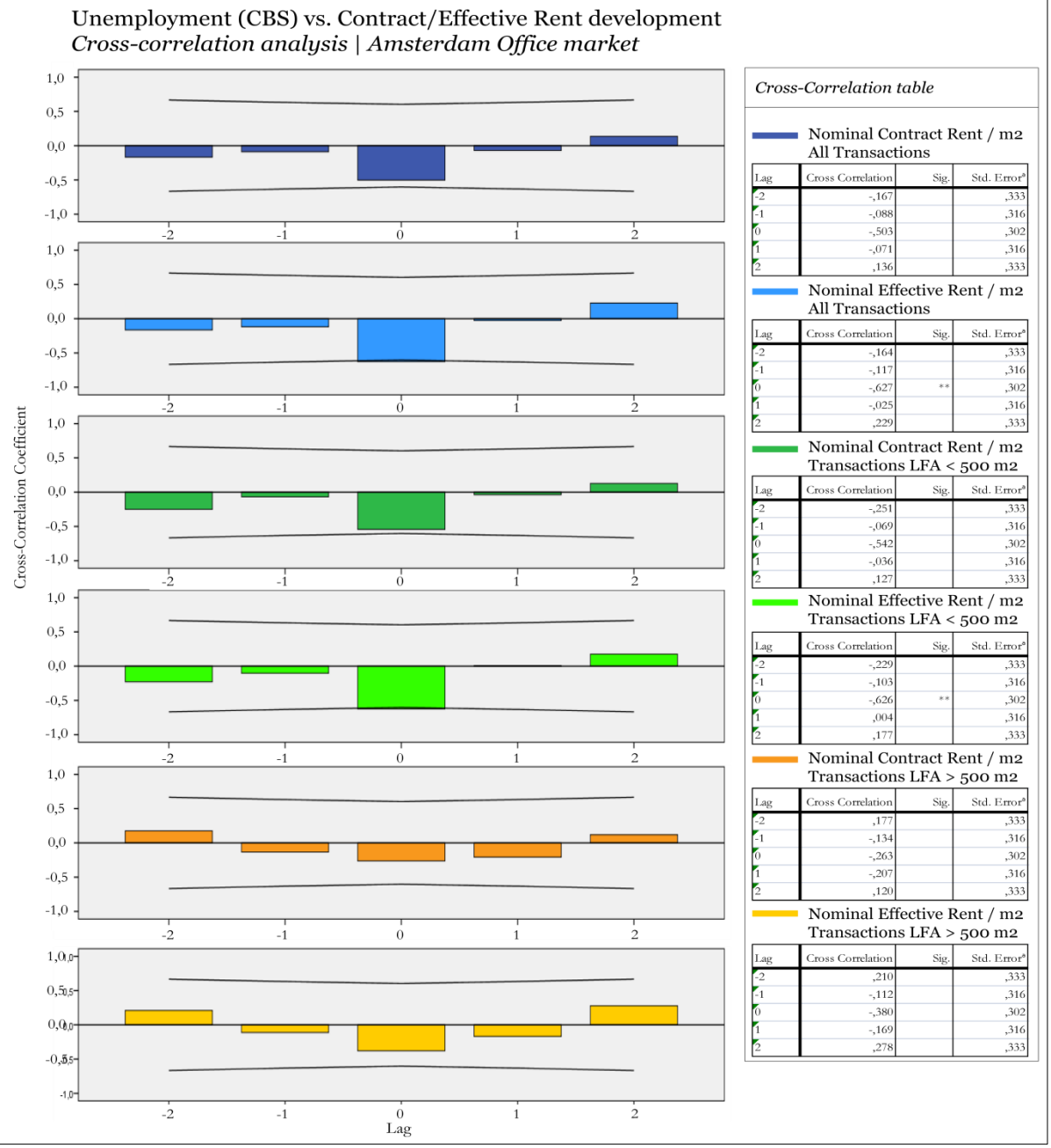


Figure 106. Unemployment vs. Contract/Effective rent development – Amsterdam office market



Nominal Contract Rent / m2 All Transactions

Lag	Cross Correlation	Sig.	Std. Error[a]
-2	-,167		,333
-1	-,088		,316
0	-,503		,302
1	-,071		,316
2	,136		,333

Nominal Effective Rent / m2 All Transactions

Lag	Cross Correlation	Sig.	Std. Error[a]
-2	-,164		,333
-1	-,117		,316
0	-,627	**	,302
1	-,025		,316
2	,229		,333

Nominal Contract Rent / m2 Transactions LFA < 500 m2

Lag	Cross Correlation	Sig.	Std. Error[a]
-2	-,251		,333
-1	-,069		,316
0	-,542		,302
1	-,036		,316
2	,127		,333

Nominal Effective Rent / m2 Transactions LFA < 500 m2

Lag	Cross Correlation	Sig.	Std. Error[a]
-2	-,229		,333
-1	-,103		,316
0	-,626	**	,302
1	,004		,316
2	,177		,333

Nominal Contract Rent / m2 Transactions LFA > 500 m2

Lag	Cross Correlation	Sig.	Std. Error[a]
-2	,177		,333
-1	-,134		,316
0	-,263		,302
1	-,207		,316
2	,120		,333

Nominal Effective Rent / m2 Transactions LFA > 500 m2

Lag	Cross Correlation	Sig.	Std. Error[a]
-2	,210		,333
-1	-,112		,316
0	-,380		,302
1	-,169		,316
2	,278		,333

Figure 107. Unemployment vs. Contract/Effective rent development — Cross-correlation tables

A.2.4. Consumer Spending

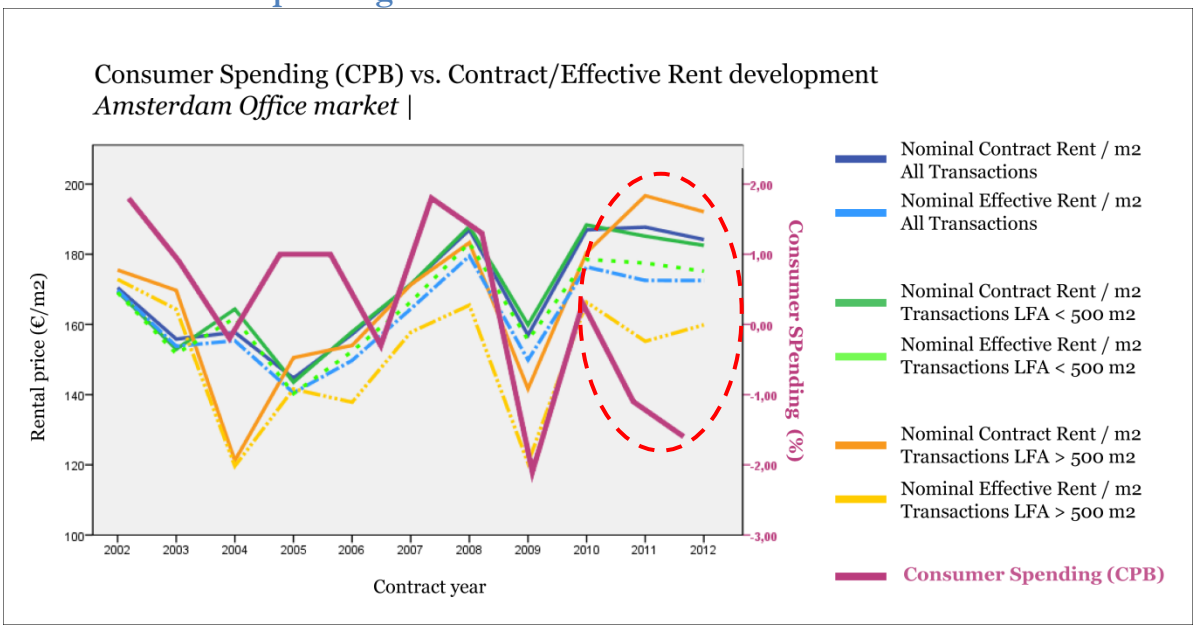
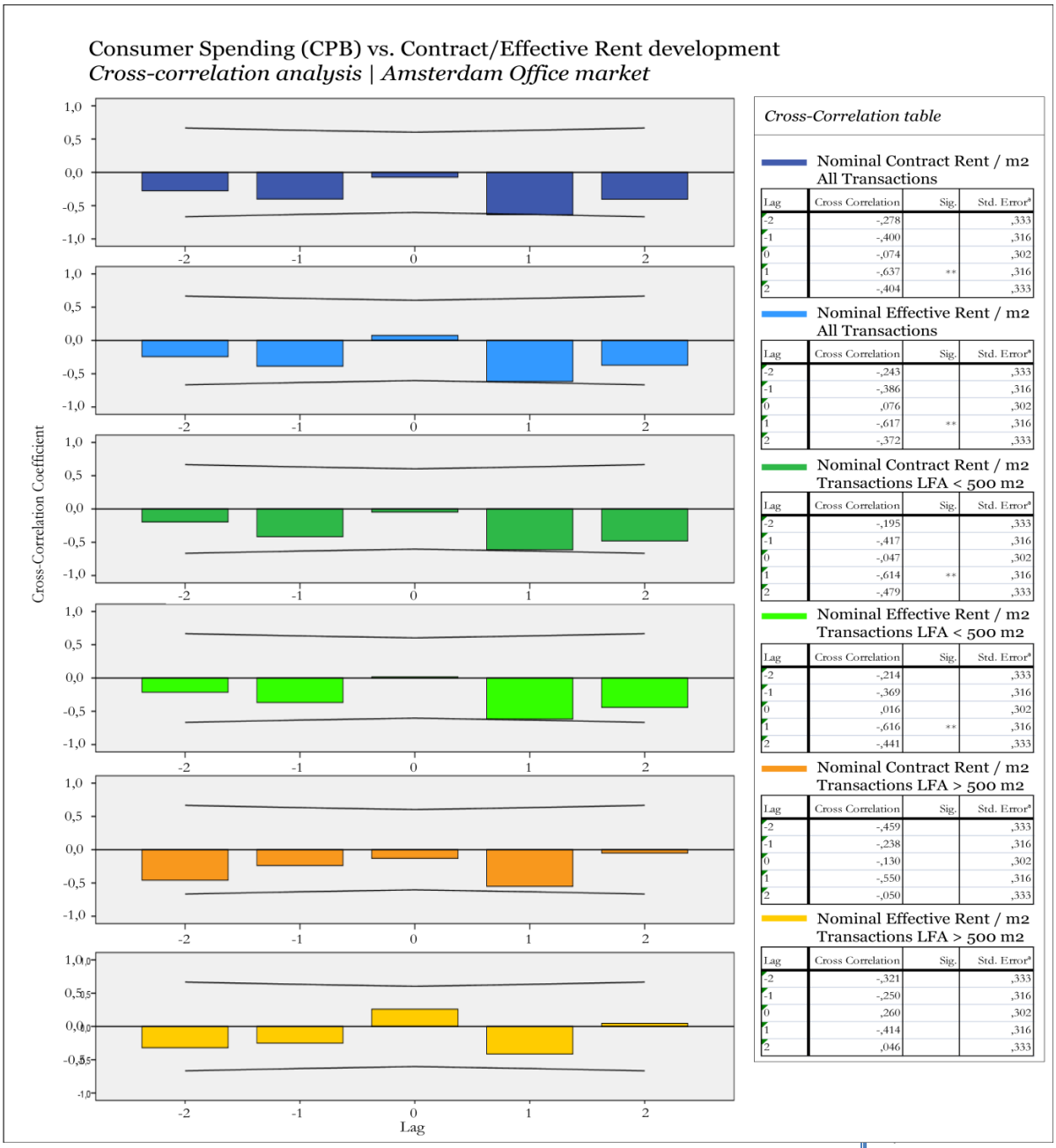


Figure 108. Consumer Spending vs. Contract/Effective rent development



Cross-Correlation table

Nominal Contract Rent / m2 All Transactions

Lag	Cross Correlation	Sig.	Std. Error[a]
-2	-,278		,333
-1	-,400		,316
0	-,074		,302
1	-,637	**	,316
2	-,404		,333

Nominal Effective Rent / m2 All Transactions

Lag	Cross Correlation	Sig.	Std. Error[a]
-2	-,243		,333
-1	-,386		,316
0	,076		,302
1	-,617	**	,316
2	-,372		,333

Nominal Contract Rent / m2 Transactions LFA < 500 m2

Lag	Cross Correlation	Sig.	Std. Error[a]
-2	-,195		,333
-1	-,417		,316
0	-,047		,302
1	-,614	**	,316
2	-,479		,333

Nominal Effective Rent / m2 Transactions LFA < 500 m2

Lag	Cross Correlation	Sig.	Std. Error[a]
-2	-,214		,333
-1	-,369		,316
0	,016		,302
1	-,616	**	,316
2	-,441		,333

Nominal Contract Rent / m2 Transactions LFA > 500 m2

Lag	Cross Correlation	Sig.	Std. Error[a]
-2	-,459		,333
-1	-,238		,316
0	-,130		,302
1	-,550		,316
2	-,050		,333

Nominal Effective Rent / m2 Transactions LFA > 500 m2

Lag	Cross Correlation	Sig.	Std. Error[a]
-2	-,321		,333
-1	-,250		,316
0	,260		,302
1	-,414		,316
2	,046		,333

Figure 109. Consumer Spending vs. Contract/Effective rent development — Cross-correlation tables

The influence of the consumer spending on the contract and effective rent levels shows a significant negative correlation with the strongest negative correlation with a + 1 lag. This indicates that the consumer spending negatively leads the rental prices by one year.

There are significant correlations in the 'All Transactions' analysis and in 'Transactions with an LFA < 500 m2'. The analysis of 'Transactions with an LFA > 500 m2' shows no 'significant' relation with consumer spending in Amsterdam, although the correlation is 0,55; which indicates that there is a relation between both variables.

The large difference between contract rents and effective rents in 2011 and 2012, might be explained by the fact that consumers have less to spend, or spend less in the market, in which they would like to receive a sufficient amount of incentives. This is explained in the previous paragraph, where incentives were compared to the general consumer spending in the market.

A.2 5. Consumer Confidence

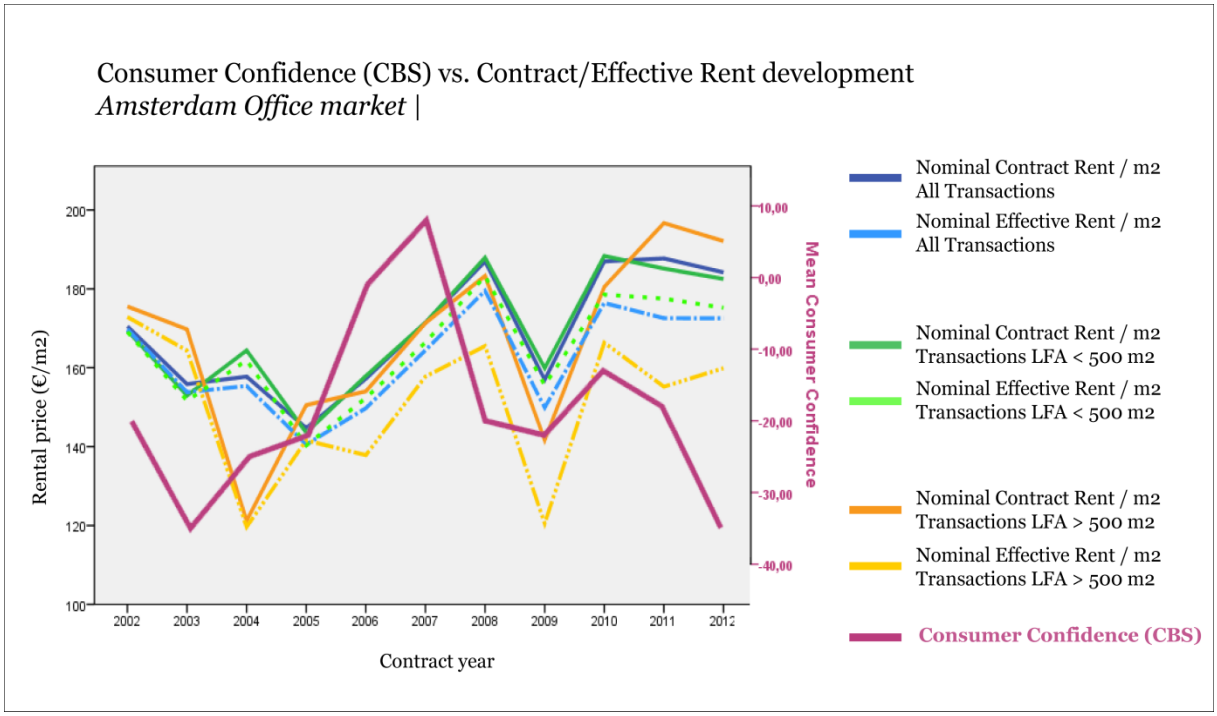


Figure 110. Consumer Confidence vs. Contract/Effective rent development

The correlation between the Consumer Confidence and the rental price development in the Amsterdam Office market is the strongest with a time lag of + 1 year, in which the relation is negatively correlated. The relation between both variables is stronger in the effective rent level analysis compared to the contract rent level analysis, in which the effective rent level correlations in the 'All Transactions' and the 'Transactions with an LFA < 500 m2' are both significant.
The analysis of 'Transactions with an LFA > 500 m2' shows no significant correlation, although the relation with the contract rent shows a medium positive correlation with a time lag of – 1 year.

The cross-correlation analysis is shown in the figure on the next page.

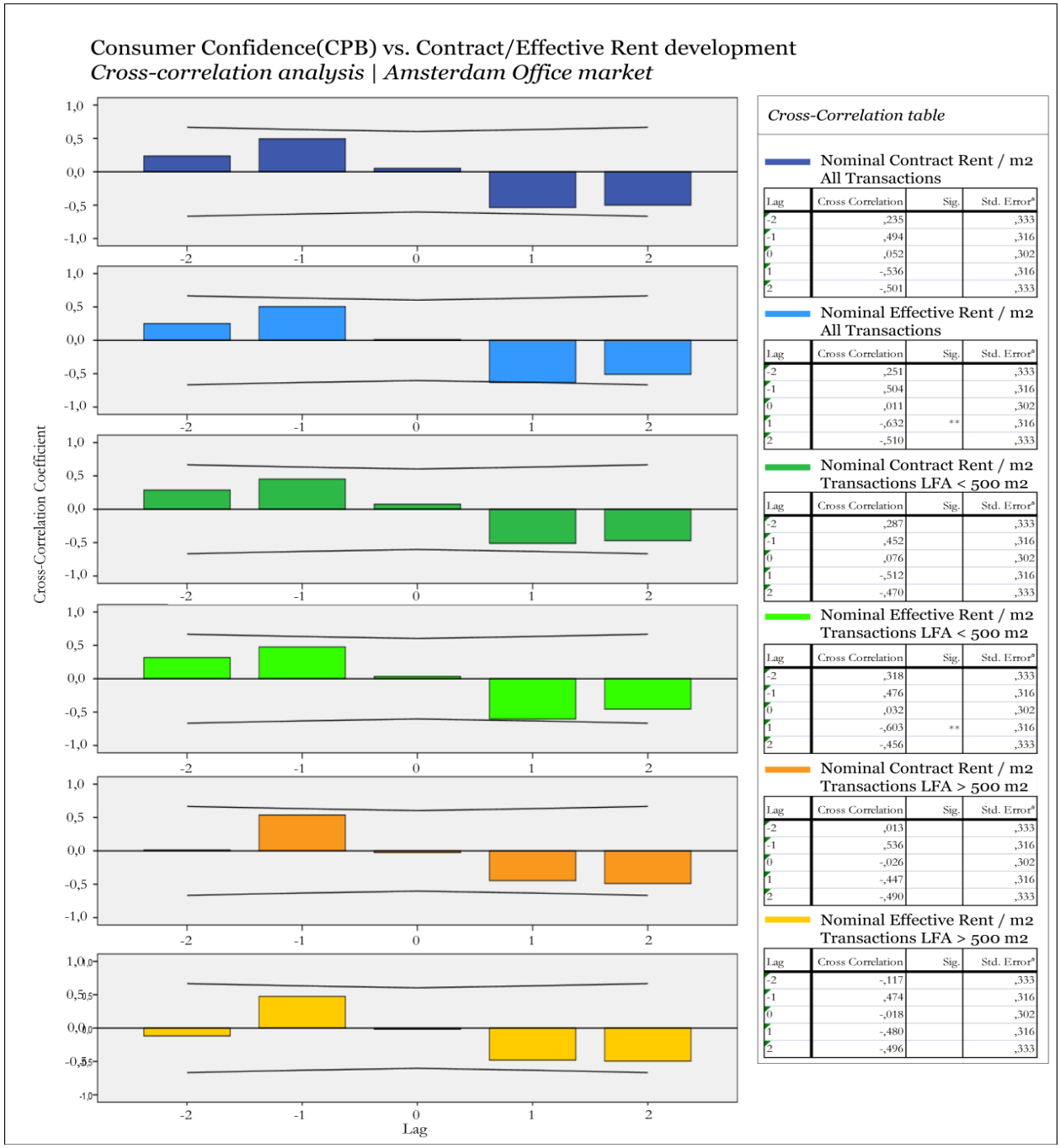


Figure 111. Consumer Confidence vs. Contract/Effective rent development — Cross-correlation tables

A.2.6. Conclusions

The summary correlation table shows the mutual relations between the economic indicators and the nominal contract and effective rent levels.

		All Transactions			***Transactions LFA > 500 m2***			***Transactions LFA < 500 m2***		
Variable 1	***Variable 2***	*Lag*	*Pearson Corr.*	*Sig. (Yes / No)*	*Lag*	*Pearson Corr.*	*Sig. (Yes / No)*	*Lag*	*Pearson Corr.*	*Sig. (Yes / No)*
Real GDP Growth	*Nominal Contract rent*	+1	-0,721	Yes	+1	-0,532	No	+1	-0,724	Yes
Real GDP Growth	*Nominal Effective rent*	+1	-0,776	Yes	+1	-0,453	No	+1	-0,787	Yes
Unemployment Adam	*Nominal Contract rent*	0	-0,503	No	0	-0,263	No	0	-0,542	No
Unemployment Adam	*Nominal Effective rent*	0	-0,627	Yes	0	-0,380	No	0	-0,626	Yes
Consumer Spending	*Nominal Contract rent*	+1	-0,637	Yes	+1	-0,550	No	+1	-0,614	Yes
Consumer Spending	*Nominal Effective rent*	+1	-0,617	Yes	+1	-0,414	No	+1	-0,616	Yes
Consumer Confidence	*Nominal Contract rent*	+1	-0,536	No	-1	0,536	No	+1	-0,512	No
Consumer Confidence	*Nominal Effective rent*	+1	-0,632	Yes	+2	-0,496	No	+1	-0,603	Yes

The table shows that there are strong significant negative correlations between all economic indicators and nominal effective rent levels for office transactions with an LFA < 500 m2. The contract and effective rent levels all lag the economic indicators by one-year, with the exception of the unemployment ratio in Amsterdam, which has a correlation without a time-lag.

In contrast to the strong correlation for transactions with an LFA < 500 m2, there are no significant correlations between the economic indicators and both the rent levels for office transactions with an LFA > 500 m2. As a result, this might indicate that economy in general, only influences the rental prices for smaller offices (with an LFA < 500 m2).

However, the development of the Real GDP Growth in 2003-2008, showed a lot similarities with the nominal effective rental price development in the period 2004-2009. This might indicate that both variables are strongly related, during a period of economic recovery. Furthermore, the relation with the Real GDP Growth development from 2008-2010, is similar in all the rent developments (LFA > 500 m2, LFA < 500 m2, all transactions).

Appendix B

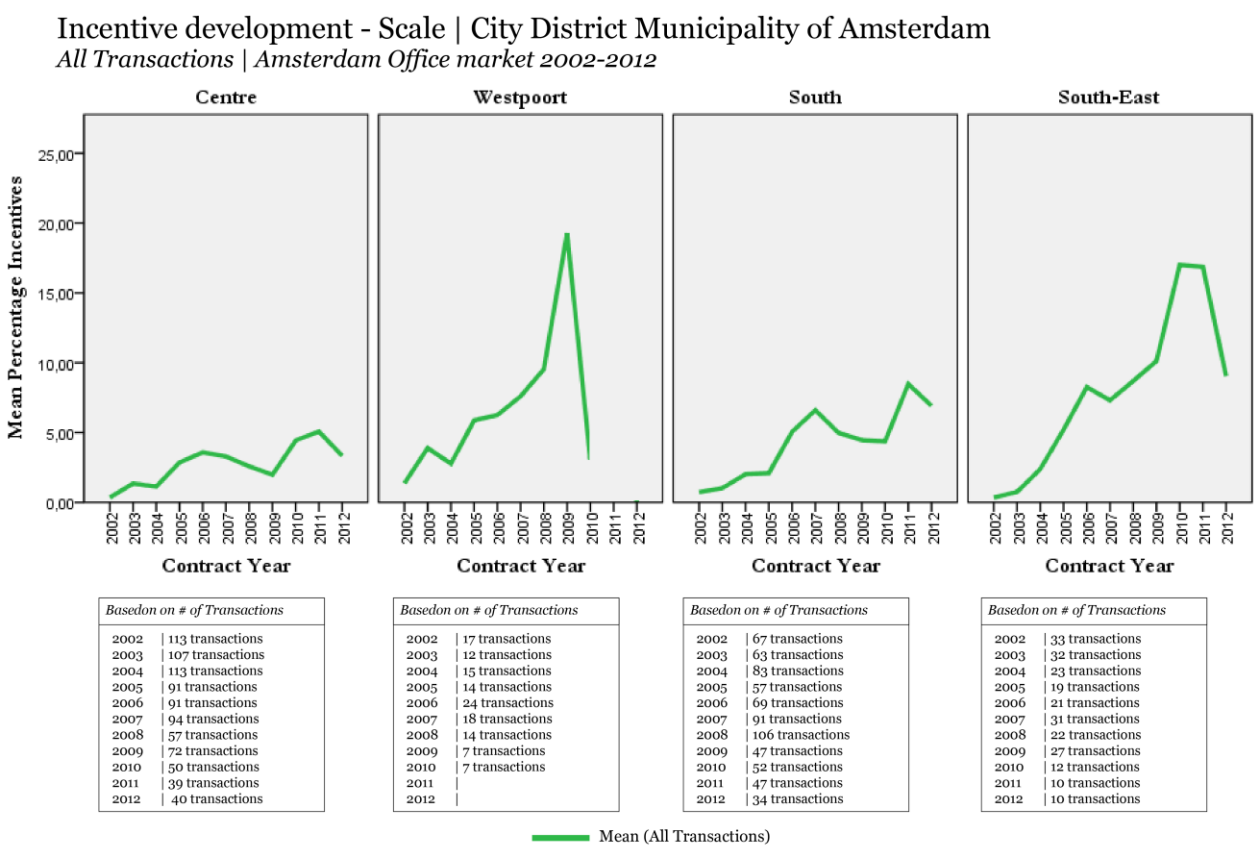
Study 4 | Spatial segmentation analysis

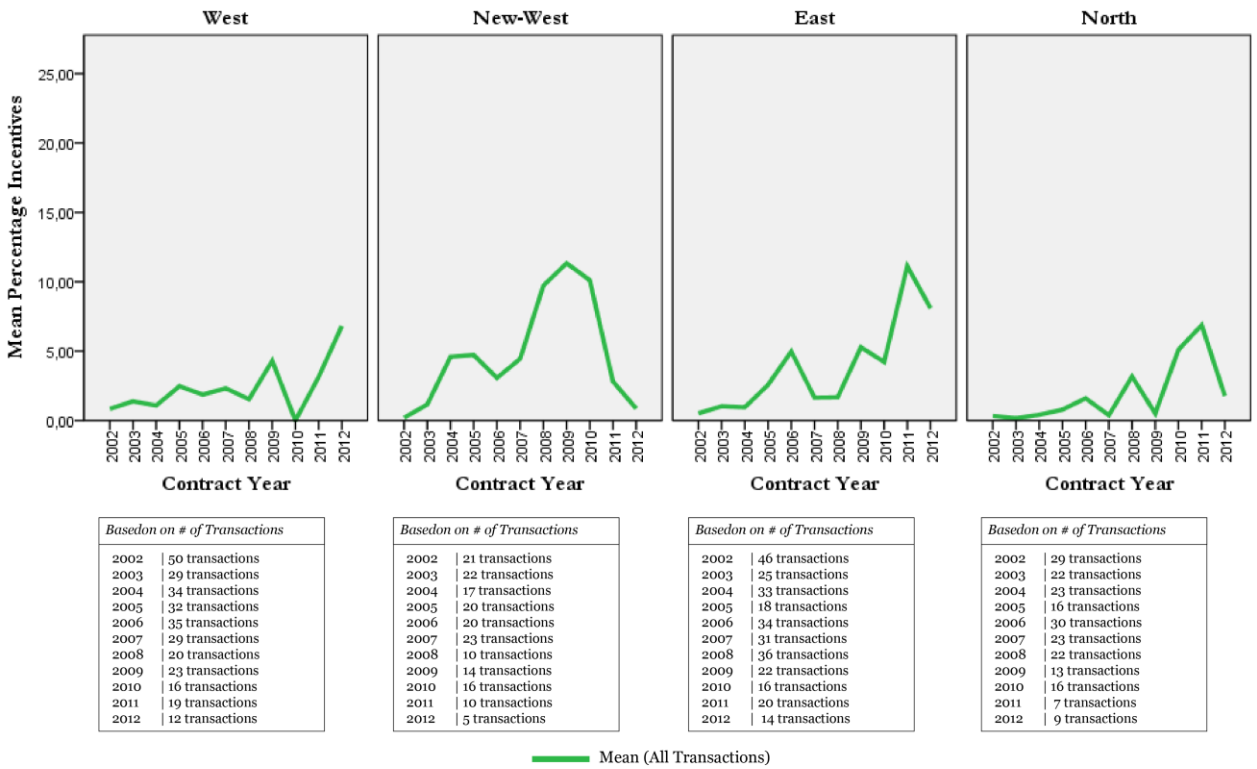
- *Incentive development per sample (B1)*
- *Real effective rental price development per sample (B2)*
- *Descriptive statistics per sample (B3)*
- *Outcomes One-way ANOVA test (B4)*
- *Outcomes Post-Hoc Procedures (B5)*

B1. Incentive development per sample

B1.1. Scale level | City District Municipality of Amsterdam

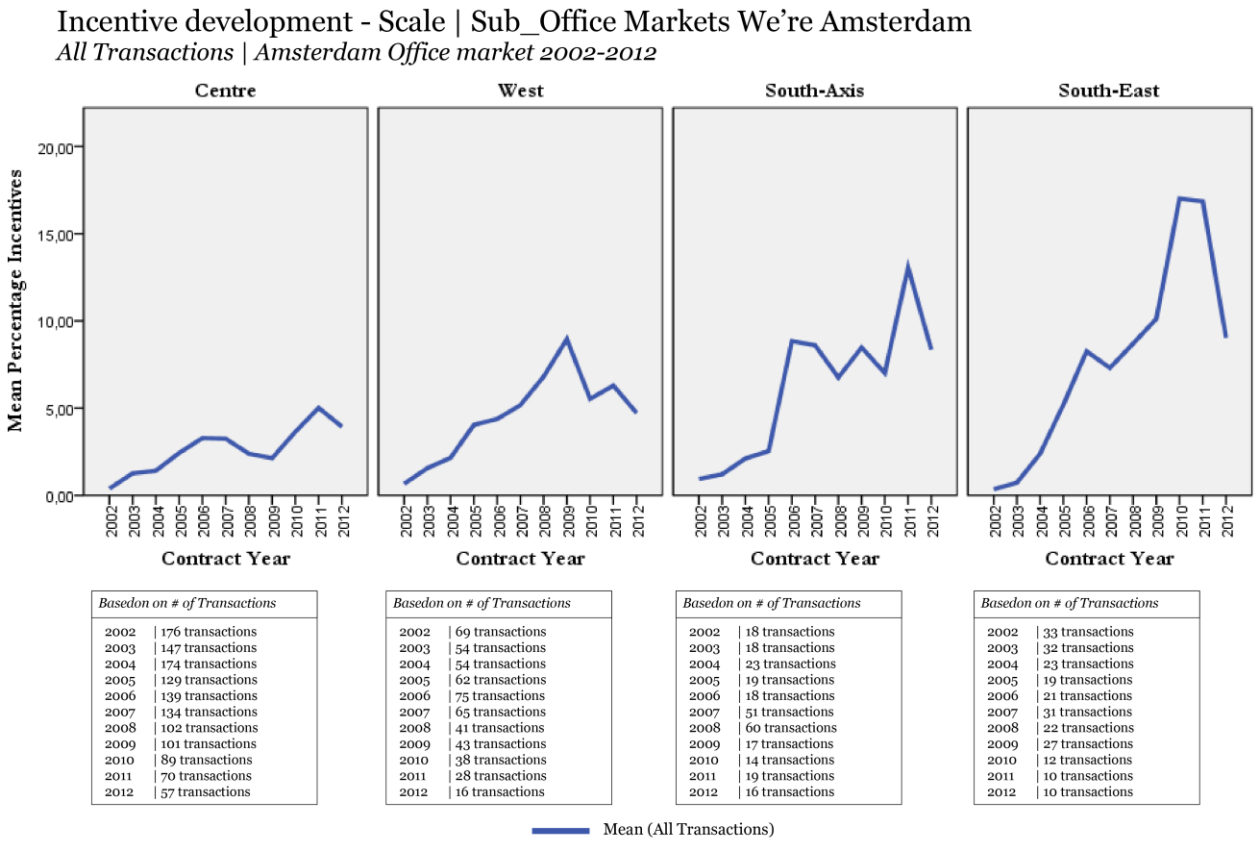
**Due to privacy reasons, years with less than 5 transactions per district are deleted from the figures*

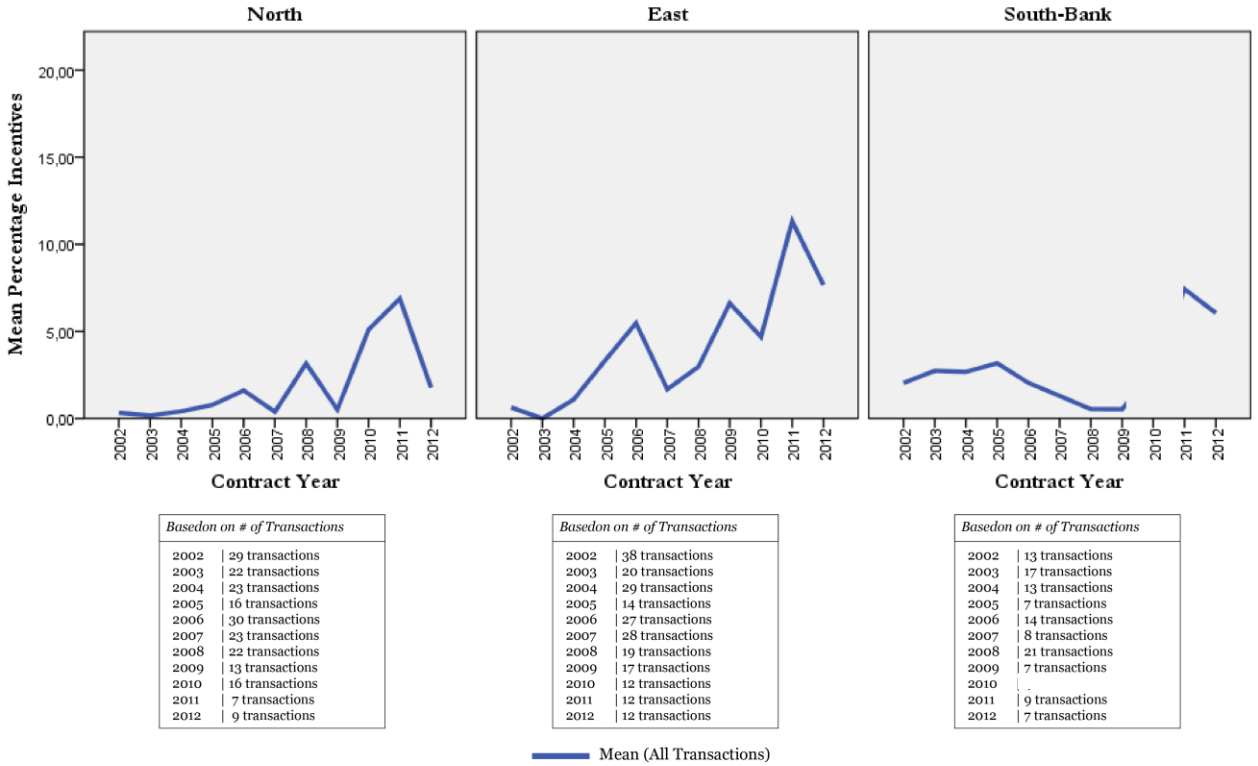




B.1.2. Scale level | Sub-Office markets We're Amsterdam

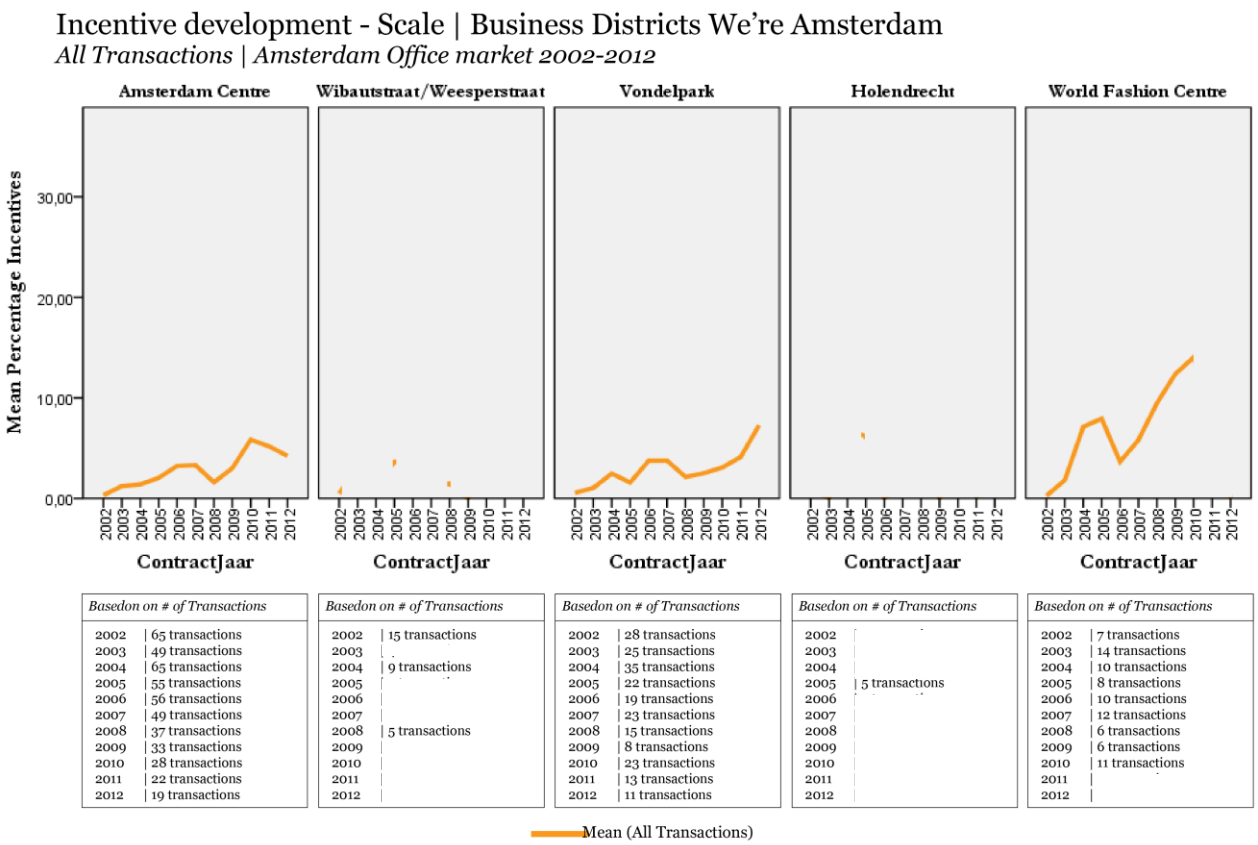
**Due to privacy reasons, years with less than 5 transactions per district are deleted from the figures*





B.1.3. Scale level | Business Districts We're Amsterdam

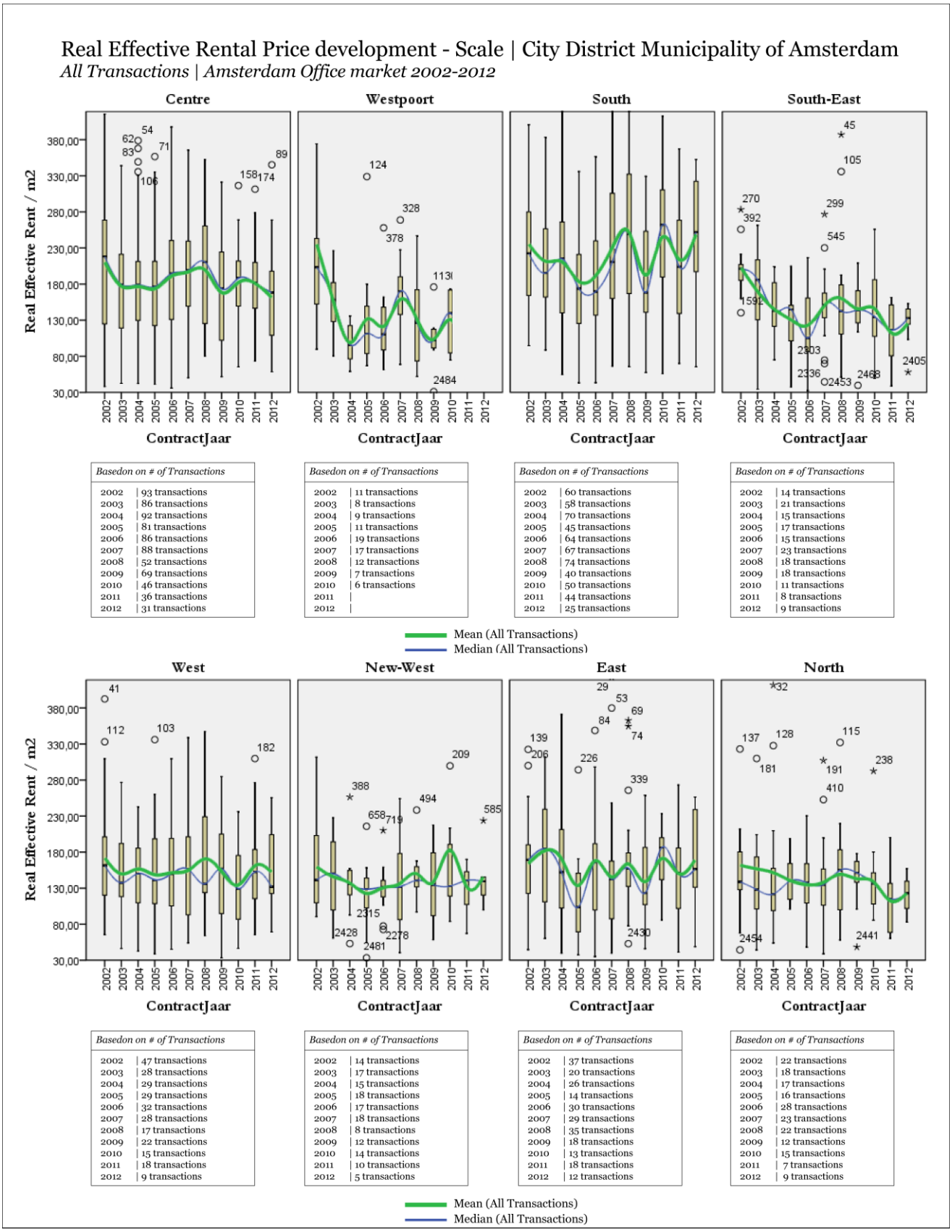
***Due to privacy reasons, years with less than 5 transactions per district are deleted from the figures*



B2. Real effective rental price development per sample.

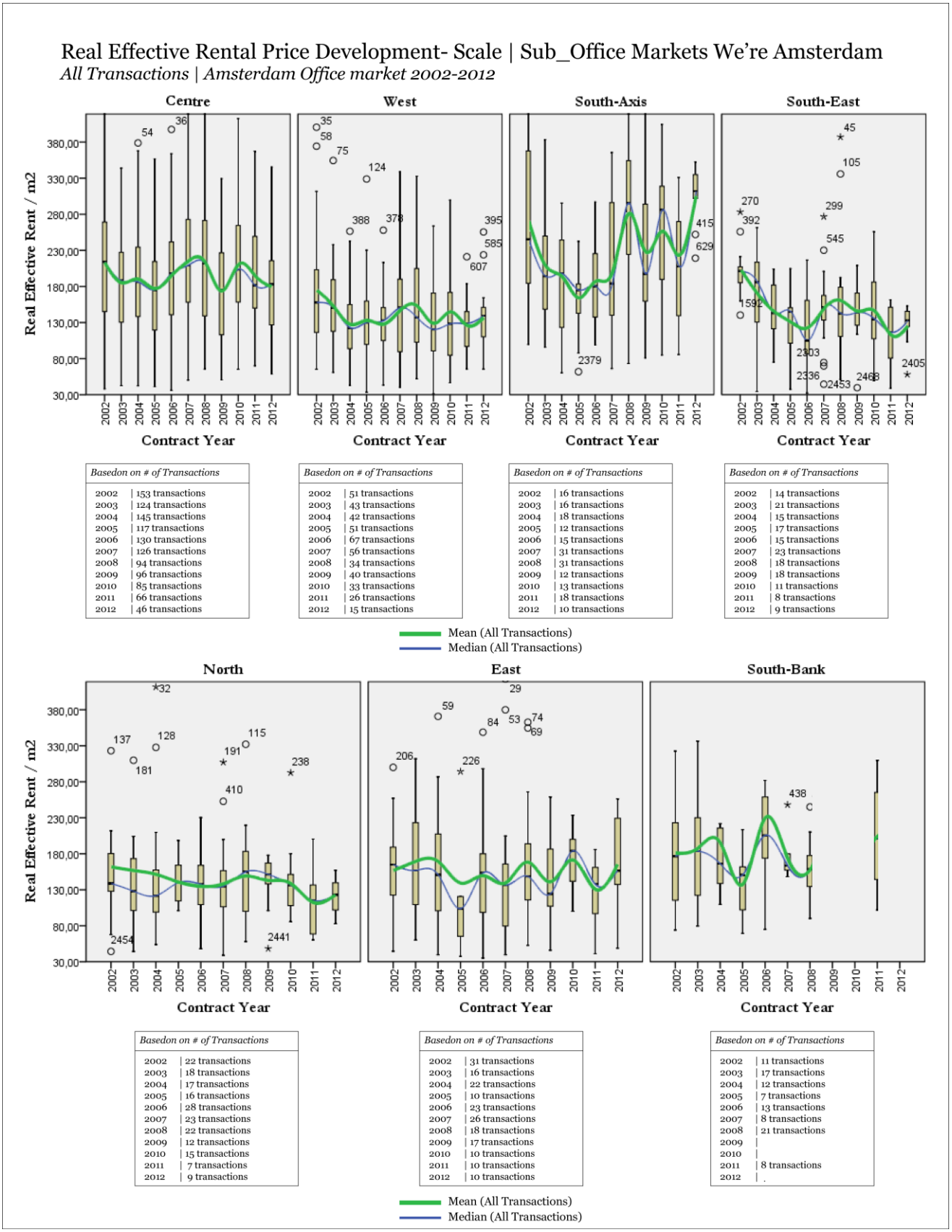
B.2.1. Scale level | City District Municipality of Amsterdam

**Due to privacy reasons, years with less than 5 transactions per district are deleted from the figures*



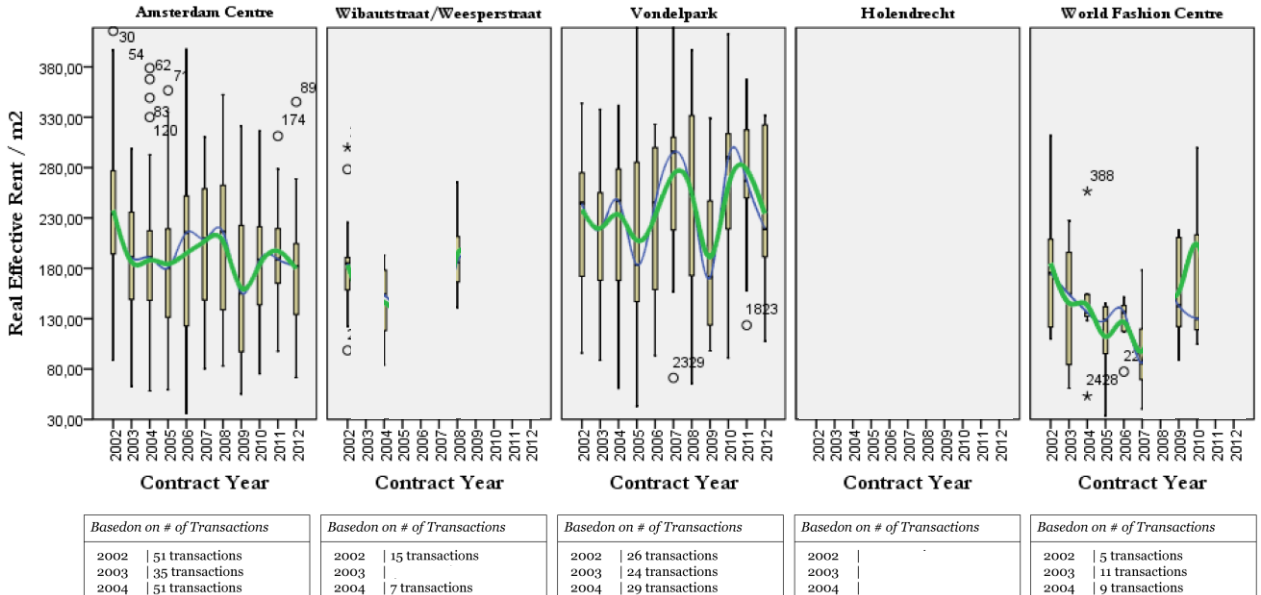
B.2.2. Scale level | Sub-Office markets We're Amsterdam

**Due to privacy reasons, years with less than 5 transactions per district are deleted from the figures*



B.2.3. Scale level | Business Districts We're Amsterdam

**Due to privacy reasons, years with less than 5 transactions per district are deleted from the figures*



B3. Descriptive statistics per sample

B.3.1. Sample: City-Districts

**Due to privacy reasons, years with less than 5 transactions per district are deleted from the figures*

		Percentage Incentives						Nominal effective rent / m2						Real effective rent / m2					
		Count	Mean	Minimum	Maximum	Median	Standard Deviation	Count	Mean	Minimum	Maximum	Median	Standard Deviation	Count	Mean	Minimum	Maximum	Median	Standard Deviation
Centre	2002	112	,353	0,000	6,027	0,000	1,151	92	177,418	32,333	462,040	183,859	79,330	92	144,168	26,546	376,101	149,929	64,518
	2003	106	1,364	0,000	21,745	0,000	3,753	85	151,243	36,302	291,297	153,676	59,634	85	125,688	30,167	243,600	127,704	49,566
	2004	113	1,139	0,000	12,875	0,000	3,002	92	152,454	36,585	325,410	155,311	60,684	92	128,441	30,805	272,043	131,070	51,075
	2005	91	2,865	0,000	38,838	0,000	7,057	81	151,877	35,648	384,834	155,074	66,678	81	130,338	30,158	331,727	133,674	57,407
	2006	91	3,587	0,000	46,371	0,000	7,282	86	169,208	31,960	405,972	173,113	70,747	86	147,658	27,997	353,196	151,559	61,896
	2007	94	3,292	0,000	21,650	0,000	5,515	88	176,624	45,399	526,907	179,442	72,629	88	156,451	40,587	462,098	157,905	64,292
	2008	57	2,580	0,000	40,306	0,000	6,316	52	182,660	74,418	325,027	193,585	66,896	52	165,879	68,613	297,725	176,162	60,337
	2009	72	1,985	0,000	32,164	0,000	5,087	69	156,552	48,000	300,000	161,109	69,256	69	145,013	44,256	279,300	148,543	64,353
	2010	50	4,440	0,000	64,233	0,000	10,447	46	171,355	61,938	300,000	178,520	51,356	46	160,765	58,469	283,500	168,701	48,361
	2011	39	5,078	0,000	39,218	0,000	9,234	36	174,307	71,034	296,290	176,087	52,985	36	167,708	68,690	281,179	170,462	50,951
	2012	40	3,339	0,000	21,189	0,000	6,465	31	158,239	56,719	342,857	167,323	63,719	31	155,380	54,847	340,457	163,152	62,823
Westpoort	2002	17	1,370	0,000	9,407	0,000	3,100	11	197,952	75,542	488,941	169,000	114,313	11	160,441	61,264	397,998	134,693	92,612
	2003	12	3,896	0,000	23,660	0,000	7,656	8	133,126	68,507	193,063	136,383	37,938	8	110,744	56,519	160,049	114,309	31,450
	2004	15	2,779	0,000	30,615	0,000	8,211	9	85,662	51,034	116,270	83,284	22,157	9	72,110	43,073	96,737	70,542	18,329
	2005	14	5,882	0,000	25,029	0,000	9,291	11	114,755	58,462	284,952	98,351	65,144	11	98,009	49,809	241,070	85,270	54,856
	2006	24	6,254	0,000	25,493	0,000	8,962	19	107,564	54,337	226,080	98,058	41,600	19	93,585	47,273	194,203	85,800	35,892
	2007	18	7,606	0,000	33,928	2,259	10,701	17	142,465	62,066	238,495	151,460	47,273	17	126,336	55,425	208,206	132,830	41,255
	2008	14	9,539	0,000	35,934	4,656	11,845	12	119,695	48,031	223,187	115,667	54,885	12	108,136	44,092	199,306	104,780	48,949
	2009	7	19,266	0,000	34,562	22,224	14,164	7	96,471	28,575	162,787	95,554	40,105	7	89,109	26,089	149,601	88,960	37,025
	2010	7	3,085	0,000	10,660	0,000	4,219	6	121,804	70,378	160,455	130,905	39,475	6	112,965	66,014	147,779	122,000	35,891
	2011																		
	2012																		
West	2002	50	,833	0,000	22,085	0,000	3,397	47	144,818	54,586	330,120	135,580	60,547	47	117,437	43,778	267,728	109,820	49,010
	2003	29	1,381	0,000	11,063	0,000	3,320	28	127,967	40,000	234,286	117,127	45,654	28	106,020	33,680	191,880	96,830	37,697
	2004	34	1,079	0,000	21,753	0,000	3,823	29	135,380	36,798	428,597	129,630	74,253	29	114,078	30,984	365,165	109,148	63,075
	2005	32	2,470	0,000	27,145	0,000	5,754	29	130,444	33,792	297,079	124,390	59,249	29	112,083	28,993	258,162	107,224	51,299
	2006	35	1,866	0,000	21,351	0,000	4,174	32	133,897	39,697	274,463	131,402	56,289	32	116,421	34,259	239,332	112,874	49,067
	2007	28	2,273	0,000	21,650	0,000	5,587	27	138,965	48,913	306,247	140,625	63,181	27	123,332	43,728	273,785	125,156	56,456
	2008	20	1,524	0,000	11,100	0,000	3,188	17	157,172	58,784	320,513	125,874	77,538	17	143,758	53,493	293,910	116,308	70,842
	2009	23	4,310	0,000	35,019	0,000	9,166	22	142,265	31,224	266,667	145,942	69,711	22	131,604	29,164	248,800	134,905	64,608
	2010	16	0,000	0,000	0,000	0,000	0,000	15	127,091	44,000	223,881	122,655	56,444	15	119,472	41,404	211,567	116,032	53,456
	2011	19	3,136	0,000	18,005	0,000	5,493	18	154,994	63,670	292,500	146,807	64,759	18	148,932	61,760	275,243	141,154	61,539
	2012	12	6,816	0,000	57,141	,894	16,118	9	149,873	67,011	247,318	130,183	61,136	9	147,639	64,800	239,157	128,361	59,525
New-West	2002	21	,193	0,000	2,140	0,000	,609	14	134,220	76,046	262,835	118,097	55,202	14	108,581	61,597	213,947	94,857	44,910
	2003	22	1,160	0,000	14,447	0,000	3,789	17	124,927	52,089	195,181	129,231	45,155	17	104,123	43,286	162,781	108,166	37,619
	2004	17	4,592	0,000	21,753	0,000	7,545	15	118,480	46,234	222,435	117,371	38,003	15	99,932	39,391	188,402	98,826	32,283
	2005	20	4,721	0,000	28,481	0,000	8,089	18	106,947	29,341	188,997	111,522	35,445	18	91,435	25,263	162,159	94,347	30,271
	2006	20	3,067	0,000	26,081	0,000	6,387	17	116,073	64,296	186,216	117,364	27,676	17	101,643	55,938	162,381	103,163	24,308
	2007	23	4,451	0,000	26,537	0,000	9,085	18	122,809	36,499	228,000	119,307	50,440	18	109,019	32,484	201,780	106,780	44,718
	2008	10	9,718	0,000	36,654	3,738	13,586	8	137,806	89,951	220,286	128,382	38,215	8	125,663	82,935	202,222	116,162	35,331
	2009	14	11,335	0,000	42,211	0,000	16,856	12	128,794	54,623	201,429	124,811	48,613	12	118,802	50,854	185,113	114,838	44,737
	2010	16	10,115	0,000	38,770	2,741	14,222	14	170,985	77,727	547,381	125,532	120,105	14	159,212	71,587	508,517	117,923	111,504
	2011	10	2,808	0,000	17,619	0,000	5,865	10	127,560	63,934	165,000	136,234	29,806	10	122,919	60,674	160,050	130,159	29,392
	2012	5	,861	0,000	4,303	0,000	1,924	5	142,771	99,130	216,667	135,000	44,615	5	139,742	98,437	209,517	130,545	42,135

		Percentage Incentives						Nominal effective rent / m2						Real effective rent / m2					
		Count	Mean	Minimum	Maximum	Median	Standard Deviation	Count	Mean	Minimum	Maximum	Median	Standard Deviation	Count	Mean	Minimum	Maximum	Median	Standard Deviation
South	2002	66	,750	0,000	16,720	0,000	2,660	59	198,183	78,641	410,262	187,879	81,352	59	160,716	62,677	335,592	153,121	66,087
	2003	63	1,024	0,000	12,870	0,000	2,631	58	181,205	76,087	444,444	166,569	69,694	58	150,753	63,457	373,333	138,670	58,186
	2004	81	2,080	0,000	35,808	0,000	5,297	68	181,863	47,368	392,857	185,442	76,790	68	153,400	39,979	331,571	156,699	64,723
	2005	56	2,129	0,000	17,997	0,000	4,215	44	161,121	37,879	371,901	151,610	67,963	44	138,544	32,652	316,860	129,341	58,334
	2006	68	5,127	0,000	42,004	0,000	8,883	63	169,744	38,357	312,500	150,000	65,541	63	147,729	33,371	268,438	130,500	57,022
	2007	91	6,610	0,000	35,326	3,698	8,379	67	207,600	58,782	469,845	189,961	88,668	67	183,929	51,316	410,174	169,635	78,387
	2008	106	4,975	0,000	59,842	,937	8,264	74	230,461	60,870	484,615	229,328	97,284	74	209,574	56,122	432,762	207,427	88,106
	2009	47	4,462	0,000	42,211	0,000	8,599	40	179,019	52,891	418,000	157,586	78,074	40	165,441	48,289	388,322	146,713	72,129
	2010	52	4,377	0,000	23,298	0,000	7,068	50	230,241	51,845	389,511	245,409	86,546	50	215,331	47,749	366,530	230,270	81,109
	2011	46	7,905	0,000	31,828	,909	10,489	43	206,437	68,357	556,212	196,658	101,065	43	198,688	66,580	527,845	190,365	96,296
	2012	34	6,917	0,000	22,770	7,262	6,219	25	246,299	65,000	350,107	243,974	81,754	25	243,835	64,415	347,656	235,923	81,602
East	2002	46	,519	0,000	23,895	0,000	3,523	37	137,583	37,929	271,264	140,646	52,358	37	111,556	31,215	219,995	112,509	42,287
	2003	25	1,028	0,000	16,451	0,000	3,707	20	155,501	51,660	268,475	157,424	66,054	20	129,125	43,033	226,056	130,185	55,107
	2004	33	,951	0,000	12,875	0,000	3,026	26	147,123	34,364	381,313	131,714	78,357	26	123,593	29,003	317,252	111,160	65,254
	2005	18	2,573	0,000	23,262	0,000	5,875	14	116,619	32,640	372,325	90,917	92,039	14	99,400	27,809	314,987	78,082	77,657
	2006	34	4,976	0,000	45,320	0,000	9,631	30	148,954	31,035	442,358	146,835	85,151	30	129,863	27,000	388,832	127,597	74,446
	2007	31	1,645	0,000	20,296	0,000	4,819	29	130,419	35,908	375,000	128,571	78,321	29	115,211	32,138	327,375	114,814	68,361
	2008	36	1,673	0,000	18,314	0,000	3,954	35	151,297	48,918	335,229	145,857	57,202	35	138,880	44,907	307,740	132,730	51,880
	2009	22	5,278	0,000	31,989	0,000	10,000	18	129,413	42,955	238,095	115,204	52,747	18	119,667	39,605	217,381	107,081	48,359
	2010	16	4,222	0,000	20,119	0,000	6,753	13	161,261	81,377	219,388	175,439	44,358	13	151,596	76,901	205,347	164,561	41,831
	2011	19	11,705	0,000	50,830	5,720	14,592	17	144,908	39,885	265,333	143,605	60,037	17	139,405	38,609	257,639	136,281	57,416
	2012	14	8,090	0,000	21,363	5,313	8,932	12	166,891	47,360	254,545	155,315	63,375	12	164,539	45,797	252,764	154,067	62,407
North	2002	29	,327	0,000	5,680	0,000	1,248	22	136,279	37,436	404,111	116,122	76,394	22	110,757	30,511	328,946	93,305	62,316
	2003	22	,170	0,000	1,871	0,000	,551	18	134,292	37,910	471,019	110,113	100,332	18	111,814	31,503	394,243	92,210	83,779
	2004	23	,406	0,000	3,733	0,000	,969	17	130,599	46,554	355,556	105,000	79,361	17	109,778	39,292	299,378	88,935	66,720
	2005	16	,782	0,000	8,842	0,000	2,337	16	123,463	88,462	173,605	123,252	25,389	16	106,260	75,900	148,780	105,268	22,034
	2006	30	1,603	0,000	16,868	0,000	3,843	28	119,466	42,667	204,849	122,217	41,455	28	104,262	37,120	179,448	106,602	36,426
	2007	23	,379	0,000	3,698	0,000	1,083	23	123,790	35,185	273,529	121,875	52,187	23	109,276	31,315	239,885	108,834	45,737
	2008	22	3,158	0,000	12,917	0,000	4,428	22	137,003	53,790	300,000	140,631	56,912	22	125,053	49,595	267,900	126,059	51,429
	2009	13	,509	0,000	3,661	0,000	1,250	12	132,745	45,052	164,234	140,339	33,862	12	122,433	41,809	151,095	129,181	31,043
	2010	16	5,104	0,000	30,391	0,000	8,653	15	130,526	80,488	275,000	128,007	48,146	15	122,100	75,337	257,400	119,495	45,181
	2011	7	6,877	0,000	25,526	5,435	9,107	7	107,374	58,478	189,130	111,712	48,281	7	102,378	56,548	177,972	108,137	45,202
	2012	9	1,771	0,000	12,376	0,000	4,148	9	121,697	80,881	156,874	122,093	24,745	9	120,378	78,940	156,717	121,238	24,906
South-East	2002	33	,352	0,000	5,680	0,000	1,214	14	170,528	118,000	238,235	169,627	29,589	14	138,188	95,698	193,209	137,991	23,886
	2003	32	,753	0,000	9,246	0,000	2,250	21	144,642	29,652	223,538	158,284	55,956	21	119,727	24,819	185,760	130,584	46,630
	2004	22	2,501	0,000	21,753	0,000	5,647	14	125,250	64,803	176,276	123,588	33,147	14	105,466	54,564	148,424	104,230	28,121
	2005	19	5,196	0,000	42,201	0,000	9,950	17	114,081	33,172	178,302	125,495	35,723	17	97,856	28,826	151,913	106,169	30,545
	2006	21	8,264	0,000	40,716	0,000	12,945	15	108,787	28,767	192,500	93,312	45,687	15	94,583	25,286	168,438	81,368	39,884
	2007	31	7,307	0,000	41,586	3,698	10,031	23	134,856	40,073	245,564	136,580	44,711	23	119,527	35,585	214,377	122,239	39,062
	2008	22	8,699	0,000	40,181	0,000	13,120	18	147,352	47,243	355,088	130,473	77,171	18	134,482	43,322	323,130	118,464	70,676
	2009	27	10,127	0,000	39,560	0,000	13,440	18	135,738	37,176	195,007	134,489	35,152	18	125,653	34,611	180,967	125,139	32,768
	2010	12	17,012	0,000	32,949	23,038	15,382	11	137,124	46,984	241,163	125,757	60,459	11	128,257	44,446	226,452	117,000	56,583
	2011	10	16,858	0,000	71,138	7,631	23,326	8	107,431	37,433	156,522	111,332	41,959	8	102,690	36,011	151,513	106,019	39,622
	2012	10	9,036	0,000	24,506	1,784	11,159	9	123,769	56,284	151,116	132,796	29,315	9	122,158	54,427	149,303	132,664	29,605

B.3.2. Sample: Sub-office markets

**Due to privacy reasons, years with less than 5 transactions per district are deleted from the figures*

		Percentage Incentives						Nominal effective rent / m2						Real effective rent / m2					
		Count	Mean	Minimum	Maximum	Median	Standard Deviation	Count	Mean	Minimum	Maximum	Median	Standard Deviation	Count	Mean	Minimum	Maximum	Median	Standard Deviation
Centre	2002	175	,392	0,000	7,549	0,000	1,304	152	179,592	32,333	462,040	179,823	76,229	152	145,813	26,546	376,101	145,797	62,054
	2003	146	1,279	0,000	21,745	0,000	3,579	123	158,373	36,302	444,444	160,000	63,496	123	131,656	30,167	373,333	132,960	52,956
	2004	172	1,433	0,000	14,672	0,000	3,396	143	164,484	36,585	392,857	160,510	67,166	143	138,628	30,805	331,571	134,898	56,608
	2005	129	2,435	0,000	38,838	0,000	6,136	117	155,203	35,648	384,834	153,192	69,290	117	133,307	30,158	331,727	131,286	59,661
	2006	138	3,310	0,000	46,371	0,000	6,505	129	172,612	31,960	353,398	175,500	67,210	129	150,487	27,997	309,223	153,036	58,684
	2007	133	3,251	0,000	21,650	0,000	5,389	125	193,153	45,399	526,907	187,539	81,259	125	171,115	40,587	462,098	164,455	71,761
	2008	102	2,387	0,000	40,306	0,000	5,382	94	196,269	60,870	400,000	195,789	78,127	94	178,491	56,122	366,800	178,725	70,906
	2009	101	2,138	0,000	32,164	0,000	5,153	96	161,579	47,200	307,932	163,249	69,084	96	149,619	43,943	286,684	150,558	64,036
	2010	89	3,647	0,000	64,233	0,000	8,717	85	197,786	61,938	389,511	190,000	70,569	85	185,259	58,469	366,530	178,790	66,206
	2011	70	5,021	0,000	39,218	0,000	8,013	66	188,123	68,357	450,000	176,087	72,457	66	181,311	66,580	423,450	170,462	69,639
	2012	57	3,939	0,000	21,189	0,000	5,937	46	176,562	56,719	342,857	179,630	71,294	46	173,772	54,847	340,457	174,941	70,605
North	2002	29	,327	0,000	5,680	0,000	1,248	22	136,279	37,436	404,111	116,122	76,394	22	110,757	30,511	328,946	93,305	62,316
	2003	22	,170	0,000	1,871	0,000	,551	18	134,292	37,910	471,019	110,113	100,332	18	111,814	31,503	394,243	92,210	83,779
	2004	23	,406	0,000	3,733	0,000	,969	17	130,599	46,554	355,556	105,000	79,361	17	109,778	39,292	299,378	88,935	66,720
	2005	16	,782	0,000	8,842	0,000	2,337	16	123,463	88,462	173,605	123,252	25,389	16	106,260	75,900	148,780	105,268	22,034
	2006	30	1,603	0,000	16,868	0,000	3,843	28	119,466	42,667	204,849	122,217	41,455	28	104,262	37,120	179,448	106,602	36,426
	2007	23	,379	0,000	3,698	0,000	1,083	23	123,790	35,185	273,529	121,875	52,187	23	109,276	31,315	239,885	108,834	45,737
	2008	22	3,158	0,000	12,917	0,000	4,428	22	137,003	53,790	300,000	140,631	56,912	22	125,053	49,595	267,900	126,059	51,429
	2009	13	,509	0,000	3,661	0,000	1,250	12	132,745	45,052	164,234	140,339	33,862	12	122,433	41,809	151,095	129,181	31,043
	2010	16	5,104	0,000	30,391	0,000	8,653	15	130,526	80,488	275,000	128,007	48,146	15	122,100	75,337	257,400	119,495	45,181
	2011	7	6,877	0,000	25,526	5,435	9,107	7	107,374	58,478	189,130	111,712	48,281	7	102,378	56,548	177,972	108,137	45,202
	2012	9	1,771	0,000	12,376	0,000	4,148	9	121,697	80,881	156,874	122,093	24,745	9	120,378	78,940	156,717	121,238	24,906
East	2002	38	,629	0,000	23,895	0,000	3,876	31	131,534	37,929	250,429	138,400	48,750	31	106,558	31,215	200,844	111,802	39,269
	2003	20	0,000	0,000	0,000	0,000	0,000	16	145,013	51,660	268,475	133,139	68,676	16	120,667	43,033	226,056	109,415	57,512
	2004	29	1,083	0,000	12,875	0,000	3,213	22	146,029	34,364	381,313	130,745	84,151	22	122,676	29,003	317,252	110,472	70,109
	2005	14	3,308	0,000	23,262	0,000	6,520	10	121,382	32,640	372,325	90,917	107,459	10	103,341	27,809	314,987	78,082	90,599
	2006	27	5,476	0,000	45,320	0,000	10,072	23	132,280	31,035	308,681	135,967	65,285	23	115,222	27,000	268,553	118,563	56,691
	2007	28	1,674	0,000	20,296	0,000	5,037	26	125,170	35,908	375,000	121,667	80,458	26	110,716	32,138	327,375	106,702	70,306
	2008	19	2,973	0,000	18,314	0,000	5,089	18	155,189	48,918	335,229	137,356	77,102	18	141,962	44,907	307,740	126,086	69,921
	2009	17	6,616	0,000	31,989	0,000	11,055	17	131,143	42,955	238,095	115,862	53,842	17	121,294	39,605	217,381	107,520	49,336
	2010	12	4,684	0,000	20,119	0,000	7,637	10	161,581	93,370	219,388	173,633	38,871	10	151,795	86,741	205,347	163,383	36,843
	2011	11	12,357	0,000	50,830	5,720	17,337	9	125,926	39,885	175,473	133,845	43,557	9	121,266	38,609	165,120	129,562	41,460
	2012	12	7,658	0,000	21,027	5,313	8,492	10	163,686	47,360	254,545	155,315	64,000	10	161,672	45,797	252,764	154,067	63,703
West	2002	69	,666	0,000	16,720	0,000	2,562	51	147,179	54,586	488,941	131,324	76,135	51	119,517	43,778	397,998	106,898	61,970
	2003	54	1,567	0,000	23,660	0,000	4,583	43	130,873	52,089	306,122	129,231	48,536	43	108,992	43,286	257,755	108,166	40,700
	2004	54	2,160	0,000	30,615	0,000	6,200	42	110,508	36,798	222,435	106,092	48,375	42	93,225	30,984	188,402	89,435	40,976
	2005	62	4,050	0,000	28,481	0,000	7,521	51	116,429	29,341	284,952	112,559	49,169	51	99,821	25,263	241,070	95,225	42,045
	2006	75	4,381	0,000	34,447	0,000	7,726	67	113,028	38,357	226,080	117,642	36,914	67	98,409	33,371	194,203	103,163	31,995
	2007	65	5,177	0,000	33,928	0,000	9,069	56	132,065	36,499	306,247	134,786	54,731	56	117,256	32,484	273,785	118,971	48,588
	2008	41	6,808	0,000	36,654	0,000	10,464	34	140,506	48,031	305,335	126,109	62,519	34	127,949	44,092	277,854	116,083	57,006
	2009	43	8,957	0,000	42,211	0,000	13,890	40	119,716	28,575	244,186	111,729	51,239	40	110,564	26,089	224,651	102,897	47,299
	2010	38	5,533	0,000	38,770	0,000	10,675	33	135,658	44,000	547,381	119,705	90,406	33	126,502	41,404	508,517	113,122	84,040
	2011	28	6,294	0,000	49,779	0,000	12,143	26	121,208	63,670	208,814	123,244	36,563	26	116,546	60,674	196,494	118,187	34,934
	2012	16	4,725	0,000	57,141	0,000	14,215	15	134,395	65,000	247,318	135,000	50,039	15	131,839	64,415	239,157	130,545	48,190

		Percentage Incentives						Nominal effective rent / m2						Real effective rent / m2					
		Count	Mean	Minimum	Maximum	Median	Standard Deviation	Count	Mean	Minimum	Maximum	Median	Standard Deviation	Count	Mean	Minimum	Maximum	Median	Standard Deviation
South-Axis	2002	17	,997	0,000	11,253	0,000	2,826	15	227,410	84,565	410,262	204,762	92,104	15	183,808	69,428	326,979	164,219	73,585
	2003	18	1,210	0,000	7,419	0,000	2,406	16	178,336	82,065	324,694	166,367	70,976	16	147,724	68,360	265,925	138,505	58,329
	2004	23	2,119	0,000	35,808	0,000	7,702	18	166,557	52,554	370,000	169,283	80,490	18	140,150	44,671	311,540	140,843	67,717
	2005	18	2,680	0,000	17,997	0,000	5,404	11	143,326	53,659	211,220	151,705	48,485	11	122,615	45,396	179,959	128,343	41,225
	2006	18	8,845	0,000	42,004	1,822	12,959	15	165,998	87,971	264,917	159,601	54,644	15	144,784	76,975	232,862	138,853	47,920
	2007	51	8,604	0,000	35,326	5,756	9,305	31	179,786	58,782	328,436	163,178	81,738	31	159,123	51,316	291,323	142,454	72,931
	2008	60	6,760	0,000	59,842	5,592	9,910	31	257,311	67,612	484,615	272,727	105,770	31	233,558	62,000	432,762	250,091	95,455
	2009	17	8,480	0,000	42,211	0,000	11,553	12	211,439	74,487	418,000	183,099	94,009	12	195,071	68,006	388,322	168,624	87,260
	2010	14	7,011	0,000	23,298	3,652	7,764	13	241,293	80,294	374,911	270,255	90,485	13	226,079	75,556	345,293	254,310	83,909
	2011	18	11,854	0,000	31,828	6,333	13,153	17	214,737	82,589	556,212	198,020	110,976	17	205,913	79,450	527,845	192,079	104,983
	2012	16	8,354	0,000	22,770	8,638	6,362	10	303,404	217,673	350,107	309,087	41,662	10	301,169	216,150	347,656	306,462	42,530
South-Bank	2002	13	2,039	0,000	22,085	0,000	6,146	11	152,371	61,856	271,264	150,000	66,838	11	123,492	49,609	219,995	123,450	54,437
	2003	17	2,739	0,000	16,451	0,000	5,000	17	160,162	68,182	290,000	156,250	59,153	17	132,750	56,659	243,600	128,906	49,039
	2004	13	2,677	0,000	21,753	0,000	6,049	12	168,871	95,517	428,597	142,826	88,112	12	142,371	81,381	365,165	119,489	75,156
	2005	7	3,170	0,000	16,239	0,000	6,175	7	120,070	60,500	187,627	130,625	43,800	7	102,788	51,546	161,734	110,509	37,936
	2006	14	2,043	0,000	21,351	0,000	5,884	13	203,370	66,667	442,358	180,000	112,817	13	177,290	58,400	388,832	154,620	98,748
	2007	8	1,294	0,000	6,212	0,000	2,459	8	156,399	132,955	220,150	146,871	27,443	8	138,116	117,665	192,191	130,199	23,269
	2008	21	,534	0,000	3,738	0,000	1,340	21	145,812	83,333	226,448	146,297	33,285	21	134,182	76,500	207,879	135,178	30,646
	2009	7	,523	0,000	3,661	0,000	1,384	3	191,990	100,000	266,667	209,302	84,671						
	2010																		
	2011	9	7,428	0,000	26,607	3,631	10,424	8	195,690	98,590	292,500	194,587	68,336	8	187,318	95,336	275,243	188,165	64,397
	2012	7	6,056	0,000	21,363	0,000	10,343												
South-East	2002	33	,352	0,000	5,680	0,000	1,214	14	170,528	118,000	238,235	169,627	29,589	14	138,188	95,698	193,209	137,991	23,886
	2003	33	,730	0,000	9,246	0,000	2,218	21	144,642	29,652	223,538	158,284	55,956	21	119,727	24,819	185,760	130,584	46,630
	2004	22	2,501	0,000	21,753	0,000	5,647	14	125,250	64,803	176,276	123,588	33,147	14	105,466	54,564	148,424	104,230	28,121
	2005	19	5,196	0,000	42,201	0,000	9,950	17	114,081	33,172	178,302	125,495	35,723	17	97,856	28,826	151,913	106,169	30,545
	2006	21	8,264	0,000	40,716	0,000	12,945	15	108,787	28,767	192,500	93,312	45,687	15	94,583	25,286	168,438	81,368	39,884
	2007	31	7,307	0,000	41,586	3,698	10,031	23	134,856	40,073	245,564	136,580	44,711	23	119,527	35,585	214,377	122,239	39,062
	2008	22	8,699	0,000	40,181	0,000	13,120	18	147,352	47,243	355,088	130,473	77,171	18	134,482	43,322	323,130	118,464	70,676
	2009	27	10,127	0,000	39,560	0,000	13,440	18	135,738	37,176	195,007	134,489	35,152	18	125,653	34,611	180,967	125,139	32,768
	2010	12	17,012	0,000	32,949	23,038	15,382	11	137,124	46,984	241,163	125,757	60,459	11	128,257	44,446	226,452	117,000	56,583
	2011	10	16,858	0,000	71,138	7,631	23,326	8	107,431	37,433	156,522	111,332	41,959	8	102,690	36,011	151,513	106,019	39,622
	2012	10	9,036	0,000	24,506	1,784	11,159	9	123,769	56,284	151,116	132,796	29,315	9	122,158	54,427	149,303	132,664	29,605

B.3.3. Sample Business Districts

**Due to privacy reasons, years with less than 5 transactions per district are deleted from the figures*

		Percentage Incentives						Nominal effective rent / m2						Real effective rent / m2					
		Count	Mean	Minimum	Maximum	Median	Standard Deviation	Count	Mean	Minimum	Maximum	Median	Standard Deviation	Count	Mean	Minimum	Maximum	Median	Standard Deviation
Amsterdam Centre	2002	64	,335	0,000	6,027	0,000	1,131	50	200,637	74,065	462,040	198,039	74,601	50	163,197	59,400	376,101	161,204	60,923
	2003	49	1,221	0,000	15,503	0,000	3,540	35	159,261	53,500	257,143	162,353	58,523	35	132,425	44,459	215,229	133,941	48,613
	2004	65	1,396	0,000	12,875	0,000	3,442	51	162,434	50,336	325,410	165,957	64,186	51	136,885	42,383	272,043	141,064	53,814
	2005	55	2,051	0,000	23,262	0,000	5,377	47	161,639	52,109	384,834	158,669	67,608	47	138,768	44,814	331,727	136,773	58,274
	2006	56	3,235	0,000	46,371	0,000	7,799	52	172,999	31,960	353,398	190,008	72,770	52	151,049	27,997	309,223	164,254	63,741
	2007	49	3,317	0,000	21,650	0,000	5,651	45	185,724	72,329	526,907	188,679	78,254	45	164,560	64,373	462,098	167,925	68,863
	2008	37	1,606	0,000	11,100	0,000	3,126	33	189,013	77,206	325,027	200,000	68,349	33	171,646	71,338	297,725	183,600	61,608
	2009	33	3,016	0,000	32,164	0,000	6,936	31	149,612	51,064	300,000	145,000	69,631	31	138,656	46,979	278,700	134,560	64,703
	2010	28	5,838	0,000	64,233	0,000	13,357	26	172,542	69,745	300,000	178,520	58,698	26	161,897	64,235	283,500	168,701	55,380
	2011	22	5,182	0,000	39,218	0,000	10,112	21	189,496	94,817	296,290	181,818	52,965	21	181,790	91,972	281,179	174,727	51,222
	2012	19	4,226	0,000	21,189	0,000	7,481	14	176,253	69,362	342,857	178,496	69,681	14	173,179	67,073	340,457	175,084	69,300
Wibautstraat/Weesperstraat	2002	15	,486	0,000	4,097	0,000	1,295	15	153,938	83,736	250,429	154,287	44,811	15	124,423	68,914	200,844	123,738	35,806
	2003																		
	2004	9	1,230	0,000	11,068	0,000	3,689	7	125,773	72,764	165,273	133,429	37,539	7	105,272	61,267	137,507	113,147	31,161
	2005																		
	2006																		
	2007																		
	2008	5	1,488	0,000	7,438	0,000	3,326	5	179,086	130,512	245,902	171,084	44,617	5	163,894	119,940	225,984	155,686	41,639
	2009																		
	2010																		
	2011																		
	2012																		
Vondelpark	2002	28	,566	0,000	6,338	0,000	1,536	26	200,501	80,906	407,767	204,658	79,219	26	162,705	65,777	335,592	164,531	65,121
	2003	25	1,044	0,000	8,762	0,000	2,612	24	188,431	76,087	444,444	186,956	76,498	24	156,989	63,457	373,333	154,425	64,174
	2004	35	2,477	0,000	12,875	0,000	4,139	29	201,819	51,946	392,857	214,236	72,582	29	170,325	43,219	331,571	181,458	61,320
	2005	22	1,580	0,000	10,910	0,000	2,942	20	182,510	37,879	371,901	161,035	82,198	20	157,126	32,652	316,860	138,624	70,486
	2006	18	3,960	0,000	12,605	0,000	4,918	18	205,116	81,776	287,327	216,781	66,982	18	178,610	70,245	251,698	188,023	58,681
	2007	23	3,760	0,000	17,081	3,698	4,939	21	245,595	63,985	379,147	265,330	78,195	21	217,691	56,627	330,995	235,348	68,519
	2008	15	2,146	0,000	20,094	0,000	5,354	15	232,884	60,870	368,571	229,318	91,488	15	211,033	56,122	340,560	204,781	83,052
	2009	8	2,512	0,000	5,888	1,831	2,776	7	178,758	91,650	307,932	160,000	84,457	7	166,191	85,327	286,684	148,960	78,915
	2010	23	3,078	0,000	22,159	0,000	6,397	23	244,718	84,343	389,511	271,605	83,152	23	228,297	77,679	366,530	256,938	78,233
	2011	13	4,110	0,000	16,109	0,000	5,347	13	269,146	117,527	450,000	259,215	83,735	13	259,829	111,533	423,450	251,698	79,288
	2012	11	7,288	0,000	18,827	6,829	6,616	10	231,288	106,801	329,796	219,126	79,317	10	228,514	106,053	327,817	218,907	78,429
Teleport	2002																		
	2003	6	3,849	0,000	12,030	0,000	5,970												
	2004	8	3,827	0,000	30,615	0,000	10,824												
	2005	5	,735	0,000	3,675	0,000	1,643												
	2006	5	13,639	0,000	25,493	21,351	12,565	5	118,721	56,905	143,564	134,113	36,020	5	103,897	49,792	125,188	117,886	31,598
	2007	6	12,359	0,000	33,928	10,914	13,531	5	154,934	88,688	201,793	159,388	41,699	5	136,706	79,198	176,165	141,059	36,079
	2008																		
	2009																		
	2010																		
	2011																		
	2012																		
Sloterdijk	2002	7	,905	0,000	6,338	0,000	2,396	5	172,327	75,542	311,112	163,596	88,195	5	139,302	61,264	247,956	133,821	69,769
	2003																		
	2004	6	1,845	0,000	11,068	0,000	4,519	6	79,441	51,034	106,230	74,805	23,058	6	67,151	43,073	89,446	63,359	19,347
	2005																		
	2006	10	7,643	0,000	19,619	5,313	8,325	8	96,016	57,585	132,686	97,438	29,313	8	83,490	50,214	113,977	84,484	25,409
	2007	6	8,784	0,000	26,964	3,805	11,408	6	128,768	74,765	238,495	125,580	59,299	6	113,892	66,840	208,206	111,160	51,209
	2008	7	12,615	0,000	24,677	13,262	10,279	5	81,403	48,031	124,118	65,843	32,522	5	73,962	44,092	113,817	59,917	29,437
	2009																		
	2010																		
	2011																		
	2012																		

		Percentage Incentives						Nominal effective rent / m2						Real effective rent / m2					
		Count	Mean	Minimum	Maximum	Median	Standard Deviation	Count	Mean	Minimum	Maximum	Median	Standard Deviation	Count	Mean	Minimum	Maximum	Median	Standard Deviation
South-Axis, WTC, RAI	2002																		
	2003	6	,732	0,000	4,394	0,000	1,794	5	237,413	144,068	324,694	202,312	80,777	5	196,051	120,008	265,925	168,526	66,102
	2004																		
	2005	6	2,412	0,000	14,472	0,000	5,908												
	2006	5	19,448	0,000	42,004	22,743	16,837												
	2007	32	9,964	0,000	35,326	9,579	9,159	13	238,010	69,739	328,436	274,347	80,762	13	211,531	60,882	291,323	241,186	72,114
	2008	45	6,141	0,000	39,493	5,592	7,434	19	310,878	210,590	484,615	295,775	73,975	19	281,580	188,057	432,762	271,522	66,260
	2009	10	10,821	0,000	42,211	10,765	12,979	5	303,078	261,547	418,000	273,910	65,246	5	279,834	243,500	388,322	252,545	61,447
	2010	8	9,890	0,000	23,298	10,862	9,383	8	295,478	176,886	374,911	298,430	60,533	8	276,212	167,334	345,293	278,433	55,817
	2011	10	19,534	0,000	31,828	24,569	12,848	9	247,681	124,513	556,212	233,038	126,455	9	237,070	117,167	527,845	225,581	119,847
	2012	13	7,362	0,000	22,770	8,591	6,453	9	312,929	243,974	350,107	309,507	30,527	9	310,615	235,923	347,656	307,341	32,109
Arena/Bijlmerplein	2002	12	,473	0,000	5,680	0,000	1,640												
	2003	8	,927	0,000	7,419	0,000	2,623	7	160,129	44,727	223,538	170,000	58,318	7	132,549	36,632	185,760	139,230	48,782
	2004																		
	2005																		
	2006																		
	2007	9	11,433	0,000	31,349	10,985	10,994	6	171,157	130,787	245,564	162,295	40,639	6	150,960	116,793	214,377	143,301	34,707
	2008	5	8,056	0,000	20,094	1,874	10,224												
	2009	12	7,945	0,000	32,497	0,000	12,023	9	150,721	105,274	195,007	157,034	26,614	9	139,583	96,853	180,967	143,372	24,638
	2010																		
	2011																		
	2012																		
Holendrecht	2002																		
	2003	5	0,000	0,000	0,000	0,000	0,000												
	2004																		
	2005	5	6,187	0,000	10,910	9,115	5,695												
	2006																		
	2007																		
	2008																		
	2009																		
	2010																		
	2011																		
	2012																		
Amstel III	2002	5	0,000	0,000	0,000	0,000	0,000												
	2003	9	1,852	0,000	9,246	0,000	3,338												
	2004	5	2,214	0,000	11,068	0,000	4,950												
	2005	7	8,373	0,000	42,201	0,000	15,489	6	108,934	33,172	178,302	111,972	48,526	6	93,167	28,826	151,913	95,914	41,250
	2006																		
	2007	10	10,182	0,000	41,586	8,192	12,279	7	132,919	111,949	165,307	124,107	18,783	7	118,269	100,194	147,619	110,827	17,003
	2008	8	17,064	0,000	40,181	15,515	17,302	6	176,923	47,243	355,088	170,934	100,155	6	161,611	43,322	323,130	156,841	91,153
	2009	8	17,315	0,000	30,977	21,207	12,842												
	2010																		
	2011																		
	2012																		
World Fashion Centre	2002	7	,272	0,000	1,905	0,000	,720	5	156,198	92,189	262,835	146,000	68,740	5	127,040	74,673	213,947	117,092	56,240
	2003	14	1,822	0,000	14,447	0,000	4,679	11	124,536	52,089	195,181	131,868	52,717	11	103,673	43,286	162,781	109,319	43,753
	2004	10	7,123	0,000	21,753	2,792	8,915	9	123,965	46,234	222,435	117,371	45,303	9	104,527	39,391	188,402	98,826	38,529
	2005	8	7,949	0,000	28,481	3,101	10,604	6	97,701	29,341	127,527	111,522	36,853	6	83,179	25,263	109,673	94,347	31,240
	2006	10	3,651	0,000	26,081	0,000	8,230	7	112,497	68,108	135,044	121,310	22,823	7	98,423	58,777	118,704	106,268	20,299
	2007	12	5,820	0,000	26,537	0,000	10,597	7	87,500	36,499	157,989	77,991	40,605	7	77,362	32,484	137,925	69,724	35,372
	2008	6	9,465	0,000	28,085	4,022	11,922												
	2009	6	12,377	0,000	32,478	10,145	14,208	5	144,709	81,818	201,429	131,522	52,603	5	132,950	74,700	185,113	120,080	49,083
	2010	11	14,048	0,000	38,770	10,862	15,726	9	190,429	98,901	547,381	122,564	146,035	9	176,885	93,066	508,517	114,965	135,622
	2011																		
	2012																		

B4. Outcomes One-Way ANOVA test

B.4.1. Sample City Districts

B.4.1.1. Year 2002

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	2,639	7	366	,011
Effective Rent / m2	3,231	7	288	,003

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	27,869	7	3,981	,735	,642
	Within Groups	1982,756	366	5,417		
	Total	2010,625	373			
Effective Rent / m2	Between Groups	168999,094	7	24142,728	4,550	,000
	Within Groups	1528082,520	288	5305,842		
	Total	1697081,614	295			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	,807	7	105,356	,584
	Brown-Forsythe	,698	7	150,531	,674
Effective Rent / m2	Welch	4,751	7	67,677	,000
	Brown-Forsythe	4,587	7	71,509	,000

a. Asymptotically F distributed.

B.4.1.2. Year 2003

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	5,519	7	303	,000
Effective Rent / m2	1,389	7	247	,049

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	123,479	7	17,640	1,462	,180
	Within Groups	3656,096	303	12,066		
	Total	3779,575	310			
Effective Rent / m2	Between Groups	88013,360	7	12573,337	3,133	,003
	Within Groups	991209,020	247	4012,992		
	Total	1079222,380	254			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	2,941	7	79,354	,009
	Brown-Forsythe	1,103	7	40,513	,380
Effective Rent / m2	Welch	3,350	7	58,369	,005
	Brown-Forsythe	3,197	7	102,970	,004

a. Asymptotically F distributed.

B.4.1.3. Year 2004

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	6,609	7	330	,000
Effective Rent / m2	2,980	7	262	,005

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	289,212	7	41,316	2,074	,046
	Within Groups	6574,889	330	19,924		
	Total	6864,101	337			

Effective Rent / m2	Between Groups	143035,987	7	20433,712	4,548	,000
	Within Groups	1177266,779	262	4493,385		
	Total	1320302,766	269			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	2,352	7	81,083	,031
	Brown-Forsythe	1,461	7	73,234	,195
Effective Rent / m2	Welch	10,998	7	62,521	,000
	Brown-Forsythe	5,482	7	139,697	,000

a. Asymptotically F distributed.

B.4.1.4. Year 2005

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	3,407	7	258	,002
Effective Rent / m2	2,616	7	222	,013

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	402,082	7	57,440	1,311	,245
	Within Groups	11301,668	258	43,805		
	Total	11703,750	265			
Effective Rent / m2	Between Groups	83459,378	7	11922,768	3,090	,004
	Within Groups	856597,147	222	3858,546		
	Total	940056,525	229			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	1,709	7	68,599	,121
	Brown-Forsythe	1,157	7	94,149	,335
Effective Rent / m2	Welch	4,132	7	60,215	,001
	Brown-Forsythe	3,390	7	81,294	,003

a. Asymptotically F distributed.

B.4.1.5. Year 2006

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	5,657	7	315	,000
Effective Rent / m2	3,959	7	282	,000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	979,375	7	139,911	2,191	,035
	Within Groups	20115,169	315	63,858		
	Total	21094,543	322			
Effective Rent / m2	Between Groups	169101,147	7	24157,307	6,086	,000
	Within Groups	1119283,806	282	3969,092		
	Total	1288384,953	289			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	2,621	7	96,967	,016
	Brown-Forsythe	2,034	7	126,000	,056
Effective Rent / m2	Welch	8,690	7	84,427	,000
	Brown-Forsythe	7,661	7	188,216	,000

a. Asymptotically F distributed.

B.4.1.6. Year 2007

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	10,916	7	331	,000

Effective Rent / m2	4,266	7	284	,000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	1740,295	7	248,614	4,704	,000
	Within Groups	17492,328	331	52,847		
	Total	19232,623	338			
Effective Rent / m2	Between Groups	285806,245	7	40829,464	8,073	,000
	Within Groups	1436263,017	284	5057,264		
	Total	1722069,262	291			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	11,867	7	94,658	,000
	Brown-Forsythe	4,341	7	121,883	,000
Effective Rent / m2	Welch	7,727	7	85,346	,000
	Brown-Forsythe	10,305	7	228,946	,000

a. Asymptotically F distributed.

B.4.1.7. Year 2008

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	9,348	7	279	,000
Effective Rent / m2	4,604	7	230	,000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	1750,057	7	250,008	3,950	,000
	Within Groups	17656,856	279	63,286		
	Total	19406,913	286			
Effective Rent / m2	Between Groups	344176,350	7	49168,050	8,444	,000
	Within Groups	1339183,122	230	5822,535		
	Total	1683359,472	237			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	3,393	7	63,091	,004
	Brown-Forsythe	2,982	7	55,894	,010
Effective Rent / m2	Welch	7,704	7	55,766	,000
	Brown-Forsythe	11,064	7	155,539	,000

a. Asymptotically F distributed.

B.4.1.8. Year 2009

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	14,907	7	217	,000
Effective Rent / m2	3,970	7	190	,000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	3637,949	7	519,707	5,999	,000
	Within Groups	18799,501	217	86,634		
	Total	22437,450	224			
Effective Rent / m2	Between Groups	78277,702	7	11182,529	2,715	,010
	Within Groups	782491,306	190	4118,375		
	Total	860769,008	197			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	6,169	7	51,683	,000
	Brown-Forsythe	4,216	7	55,354	,001
Effective Rent / m2	Welch	3,207	7	47,452	,007
	Brown-Forsythe	3,762	7	142,261	,001

B.4.1.9. Year 2010

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	7,776	7	177	,000
Effective Rent / m2	3,672	7	162	,001

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	2601,057	7	371,580	4,258	,000
	Within Groups	15446,157	177	87,266		
	Total	18047,215	184			
Effective Rent / m2	Between Groups	252393,054	7	36056,151	7,139	,000
	Within Groups	818241,252	162	5050,872		
	Total	1070634,306	169			

Robust Tests of Equality of Means[b]

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch				
	Brown-Forsythe				
Effective Rent / m2	Welch	6,863	7	39,446	,000
	Brown-Forsythe	7,837	7	61,195	,000

a. Asymptotically F distributed.

b. Robust tests of equality of means cannot be performed for Percentage Incentives because at least one group has 0 variance.

B.4.1.10. Year 2011

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	6,195	7	146	,000
Effective Rent / m2	3,533	7	134	,002

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	2982,211	7	426,030	3,152	,004
	Within Groups	19732,866	146	135,157		
	Total	22715,077	153			
Effective Rent / m2	Between Groups	162795,205	7	23256,458	4,498	,000
	Within Groups	692818,069	134	5170,284		
	Total	855613,274	141			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	2,051	7	26,926	,085
	Brown-Forsythe	2,059	7	19,574	,098
Effective Rent / m2	Welch	5,740	7	23,113	,001
	Brown-Forsythe	7,440	7	102,455	,000

a. Asymptotically F distributed.

B.4.1.11. Year 2012

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	3,502	7	119	,002
Effective Rent / m2	4,086	7	95	,001

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	813,737	7	116,248	1,713	,112
	Within Groups	8074,343	119	67,852		
	Total	8888,080	126			
Effective Rent / m2	Between Groups	198963,650	7	28423,379	7,179	,000
	Within Groups	376144,099	95	3959,412		
	Total	575107,749	102			

Robust Tests of Equality of Means[b]					
		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch				
	Brown-Forsythe				
Effective Rent / m2	Welch	6,684	7	26,144	,000
	Brown-Forsythe	10,961	7	66,575	,000

a. Asymptotically F distributed.

b. Robust tests of equality of means cannot be performed for Percentage Incentives because at least one group has 0 variance.

B.4.1. Sample: Sub-office markets

B.4.2.1. Year 2002

Test of Homogeneity of Variances				
	Levene Statistic	df1	df2	Sig.
Percentage Incentives	4,607	6	367	,000
Effective Rent / m2	2,973	6	289	,008

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	40,477	6	6,746	1,257	,277
	Within Groups	1970,149	367	5,368		
	Total	2010,625	373			
Effective Rent / m2	Between Groups	161140,778	6	26856,796	5,053	,000
	Within Groups	1535940,836	289	5314,674		
	Total	1697081,614	295			

Robust Tests of Equality of Means					
		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	,428	6	68,233	,858
	Brown-Forsythe	,608	6	37,022	,723
Effective Rent / m2	Welch	5,269	6	54,985	,000
	Brown-Forsythe	5,685	6	93,520	,000

a. Asymptotically F distributed.

B.4.2.2. Year 2003

Test of Homogeneity of Variances				
	Levene Statistic	df1	df2	Sig.
Percentage Incentives	5,819	6	303	,000
Effective Rent / m2	1,157	6	247	,330

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	107,797	6	17,966	1,498	,178
	Within Groups	3633,050	303	11,990		
	Total	3740,847	309			
Effective Rent / m2	Between Groups	43892,950	6	7315,492	1,760	,108
	Within Groups	1026857,542	247	4157,318		
	Total	1070750,492	253			

Robust Tests of Equality of Means[b]					
		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch				
	Brown-Forsythe				
Effective Rent / m2	Welch	1,977	6	55,800	,084
	Brown-Forsythe	1,531	6	89,920	,177

a. Asymptotically F distributed.

b. Robust tests of equality of means cannot be performed for Percentage Incentives because at least one group has 0 variance.

B.4.2.3. Year 2004

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	3,332	6	329	,003
Effective Rent / m2	1,797	6	261	,100

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	101,312	6	16,885	,825	,551
	Within Groups	6732,964	329	20,465		
	Total	6834,275	335			
Effective Rent / m2	Between Groups	119918,728	6	19986,455	4,362	,000
	Within Groups	1195839,602	261	4581,761		
	Total	1315758,331	267			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	2,542	6	68,358	,028
	Brown-Forsythe	,602	6	92,342	,728
Effective Rent / m2	Welch	6,352	6	51,390	,000
	Brown-Forsythe	3,871	6	83,121	,002

a. Asymptotically F distributed.

B.4.2.4. Year 2005

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	2,563	6	258	,020
Effective Rent / m2	3,871	6	222	,001

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	283,207	6	47,201	1,067	,383
	Within Groups	11411,616	258	44,231		
	Total	11694,823	264			
Effective Rent / m2	Between Groups	76780,938	6	12796,823	3,355	,003
	Within Groups	846837,599	222	3814,584		
	Total	923618,537	228			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	1,895	6	42,100	,104
	Brown-Forsythe	1,072	6	77,381	,387
Effective Rent / m2	Welch	3,816	6	35,455	,005
	Brown-Forsythe	3,630	6	30,107	,008

a. Asymptotically F distributed.

B.4.2.5. Year 2006

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	7,464	6	316	,000
Effective Rent / m2	6,642	6	283	,000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	1157,728	6	192,955	3,058	,006
	Within Groups	19936,815	316	63,091		
	Total	21094,543	322			
Effective Rent / m2	Between Groups	256329,371	6	42721,562	11,715	,000
	Within Groups	1032055,582	283	3646,840		

	Total	1288384,953	289			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	2,463	6	66,685	,033
	Brown-Forsythe	2,206	6	87,096	,050
Effective Rent / m2	Welch	12,919	6	55,729	,000
	Brown-Forsythe	9,859	6	48,205	,000

a. Asymptotically F distributed.

B.4.2.6. Year 2007

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	13,427	6	332	,000
Effective Rent / m2	3,803	6	285	,001

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	2034,907	6	339,151	6,547	,000
	Within Groups	17197,716	332	51,800		
	Total	19232,623	338			
Effective Rent / m2	Between Groups	267110,838	6	44518,473	8,720	,000
	Within Groups	1454958,424	285	5105,117		
	Total	1722069,262	291			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	14,066	6	66,617	,000
	Brown-Forsythe	7,284	6	161,492	,000
Effective Rent / m2	Welch	8,902	6	62,665	,000
	Brown-Forsythe	11,539	6	161,496	,000

a. Asymptotically F distributed.

B.4.2.7. Year 2008

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	10,749	6	280	,000
Effective Rent / m2	4,618	6	231	,000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	1778,041	6	296,340	4,707	,000
	Within Groups	17628,872	280	62,960		
	Total	19406,913	286			
Effective Rent / m2	Between Groups	358623,246	6	59770,541	10,422	,000
	Within Groups	1324736,226	231	5734,789		
	Total	1683359,472	237			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	8,395	6	83,050	,000
	Brown-Forsythe	4,523	6	97,977	,000
Effective Rent / m2	Welch	9,109	6	71,410	,000
	Brown-Forsythe	11,305	6	131,310	,000

a. Asymptotically F distributed.

B.4.2.8. Year 2009

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	22,759	6	218	,000
Effective Rent / m2	4,811	6	191	,000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	2861,781	6	476,963	5,312	,000
	Within Groups	19575,669	218	89,797		
	Total	22437,450	224			
Effective Rent / m2	Between Groups	113418,938	6	18903,156	4,831	,000
	Within Groups	747350,071	191	3912,828		
	Total	860769,008	197			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	7,068	6	51,479	,000
	Brown-Forsythe	5,026	6	98,112	,000
Effective Rent / m2	Welch	3,590	6	21,179	,013
	Brown-Forsythe	4,579	6	19,177	,005

a. Asymptotically F distributed.

B.4.2.9. Year 2010

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	3,823	6	178	,001
Effective Rent / m2	1,467	6	163	,192

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	1961,501	6	326,917	3,618	,002
	Within Groups	16085,714	178	90,369		
	Total	18047,215	184			
Effective Rent / m2	Between Groups	199916,522	6	33319,420	6,237	,000
	Within Groups	870717,783	163	5341,827		
	Total	1070634,306	169			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	1,752	6	28,979	,145
	Brown-Forsythe	3,630	6	52,639	,004
Effective Rent / m2	Welch	5,689	6	19,932	,001
	Brown-Forsythe	7,013	6	40,657	,000

a. Asymptotically F distributed.

B.4.2.10. Year 2011

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	5,784	6	146	,000
Effective Rent / m2	2,653	6	134	,018

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	1949,005	6	324,834	2,300	,038
	Within Groups	20622,440	146	141,250		
	Total	22571,445	152			
Effective Rent / m2	Between Groups	197749,102	6	32958,184	6,838	,000
	Within Groups	645895,677	134	4820,117		

	Total	843644,778	140			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	1,268	6	29,204	,302
	Brown-Forsythe	1,526	6	39,966	,195
Effective Rent / m2	Welch	8,573	6	27,678	,000
	Brown-Forsythe	7,983	6	51,661	,000

a. Asymptotically F distributed.

B.4.2.11. Year 2012

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	2,788	6	120	,014
Effective Rent / m2	2,494	6	96	,028

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	582,424	6	97,071	1,402	,219
	Within Groups	8305,656	120	69,214		
	Total	8888,080	126			
Effective Rent / m2	Between Groups	240192,390	6	40032,065	11,475	,000
	Within Groups	334915,359	96	3488,702		
	Total	575107,749	102			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	2,055	6	29,297	,090
	Brown-Forsythe	1,102	6	48,541	,375
Effective Rent / m2	Welch	23,450	6	22,561	,000
	Brown-Forsythe	17,453	6	47,034	,000

a. Asymptotically F distributed.

B.4.3. Sample: Business Districts

B.4.3.1. Year 2002

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	5,344	9	137	,000
Effective Rent / m2	1,273	9	104	,260

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	27,414	9	3,046	1,256	,266
	Within Groups	332,162	137	2,425		
	Total	359,576	146			
Effective Rent / m2	Between Groups	84622,864	9	9402,540	1,908	,059
	Within Groups	512420,765	104	4927,123		
	Total	597043,629	113			

Robust Tests of Equality of Means[b]

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch				
	Brown-Forsythe				
Effective Rent / m2	Welch	23,935	9	9,537	,000
	Brown-Forsythe	3,435	9	26,908	,006

a. Asymptotically F distributed.

b. Robust tests of equality of means cannot be performed for Percentage Incentives because at least one group has 0 variance.

B.4.3.2. Year 2003

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	4,726	9	120	,000
Effective Rent / m2	1,119	9	90	,358

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	151,683	9	16,854	1,050	,405
	Within Groups	1925,685	120	16,047		
	Total	2077,368	129			
Effective Rent / m2	Between Groups	80129,492	9	8903,277	2,295	,023
	Within Groups	349100,489	90	3878,894		
	Total	429229,981	99			

Robust Tests of Equality of Means[b]

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch				
	Brown-Forsythe				
Effective Rent / m2	Welch	1,929	9	15,177	,124
	Brown-Forsythe	3,000	9	33,777	,010

a. Asymptotically F distributed.

b. Robust tests of equality of means cannot be performed for Percentage Incentives because at least one group has 0 variance.

B.4.3.3. Year 2004

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	4,844	9	138	,000
Effective Rent / m2	2,037	8	103	,049

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	466,187	9	51,799	1,965	,048
	Within Groups	3637,986	138	26,362		
	Total	4104,173	147			
Effective Rent / m2	Between Groups	143377,202	9	15930,800	3,785	,000
	Within Groups	433531,015	103	4209,039		
	Total	576908,217	112			

Robust Tests of Equality of Means[b]

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	,737	9	15,602	,671
	Brown-Forsythe	,997	9	16,022	,479
Effective Rent / m2	Welch				
	Brown-Forsythe				

a. Asymptotically F distributed.

b. Robust tests of equality of means cannot be performed for Effective Rent / m2 because at least one group has the sum of case

B.4.3.4. Year 2005

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	3,934	8	106	,000
Effective Rent / m2	1,483	6	83	,194

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	1200,781	9	133,420	2,997	,003
	Within Groups	4719,099	106	44,520		
	Total	5919,881	115			

Effective Rent / m2	Between Groups	86458,721	8	10807,340	2,363	,024
	Within Groups	379665,833	83	4574,287		
	Total	466124,554	91			

Robust Tests of Equality of Means[b,c]

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch				
	Brown-Forsythe				
Effective Rent / m2	Welch				
	Brown-Forsythe				

a. Asymptotically F distributed.

b. Robust tests of equality of means cannot be performed for Percentage Incentives because at least one group has the sum of

c. Robust tests of equality of means cannot be performed for Effective Rent / m2 because at least one group has the sum of case

B.4.3.5. Year 2006

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	5,008	9	105	,000
Effective Rent / m2	2,611	9	92	,010

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	3156,172	9	350,686	4,499	,000
	Within Groups	8184,508	105	77,948		
	Total	11340,680	114			
Effective Rent / m2	Between Groups	162424,257	9	18047,140	4,406	,000
	Within Groups	376829,469	92	4095,972		
	Total	539253,726	101			

Robust Tests of Equality of Means[b]

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch				
	Brown-Forsythe				
Effective Rent / m2	Welch	5,979	9	7,819	,010
	Brown-Forsythe	8,636	9	20,007	,000

a. Asymptotically F distributed.

b. Robust tests of equality of means cannot be performed for Percentage Incentives because at least one group has 0 variance.

B.4.3.6. Year 2007

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	4,114	9	144	,000
Effective Rent / m2	1,717	9	106	,094

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	1836,522	9	204,058	2,991	,003
	Within Groups	9825,507	144	68,233		
	Total	11662,029	153			
Effective Rent / m2	Between Groups	257526,664	9	28614,074	5,838	,000
	Within Groups	519559,082	106	4901,501		
	Total	777085,746	115			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	3,315	9	23,573	,009
	Brown-Forsythe	2,350	9	42,583	,030
Effective Rent / m2	Welch	8,074	9	18,765	,000
	Brown-Forsythe	10,475	9	67,521	,000

a. Asymptotically F distributed.

B.4.3.7. Year 2008

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	13,566	9	122	,000
Effective Rent / m2	1,858	8	84	,078

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	2704,038	9	300,449	4,731	,000
	Within Groups	7748,200	122	63,510		
	Total	10452,239	131			
Effective Rent / m2	Between Groups	349633,811	9	38848,201	7,236	,000
	Within Groups	450960,855	84	5368,582		
	Total	800594,665	93			

Robust Tests of Equality of Means[b]

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch	2,321	9	11,013	,095
	Brown-Forsythe	2,006	9	4,289	,252
Effective Rent / m2	Welch				
	Brown-Forsythe				

a. Asymptotically F distributed.

b. Robust tests of equality of means cannot be performed for Effective Rent / m2 because at least one group has the sum of case

B.4.3.8. Year 2009

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	3,886	7	75	,001
Effective Rent / m2	2,604	7	59	,021

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	3552,171	9	394,686	3,972	,000
	Within Groups	7451,635	75	99,355		
	Total	11003,805	84			
Effective Rent / m2	Between Groups	153016,989	9	17001,888	4,168	,000
	Within Groups	240670,559	59	4079,162		
	Total	393687,548	68			

Robust Tests of Equality of Means[b,c]

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch				
	Brown-Forsythe				
Effective Rent / m2	Welch				
	Brown-Forsythe				

a. Asymptotically F distributed.

b. Robust tests of equality of means cannot be performed for Percentage Incentives because at least one group has the sum of

c. Robust tests of equality of means cannot be performed for Effective Rent / m2 because at least one group has the sum of case

B.4.3.9. Year 2010

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	1,833	8	78	,083
Effective Rent / m2	2,087	7	72	,056

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	3319,184	9	368,798	2,758	,007
	Within Groups	10430,791	78	133,728		

	Total	13749,974	87			
Effective Rent / m2	Between Groups	239191,117	9	26576,791	4,213	,000
	Within Groups	454226,808	72	6308,706		
	Total	693417,925	81			

Robust Tests of Equality of Means[b,c]

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch				
	Brown-Forsythe				
Effective Rent / m2	Welch				
	Brown-Forsythe				

a. Asymptotically F distributed.

b. Robust tests of equality of means cannot be performed for Percentage Incentives because at least one group has the sum of

c. Robust tests of equality of means cannot be performed for Effective Rent / m2 because at least one group has the sum of case

B.4.3.10. Year 2011

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	4,607	9	50	,000
Effective Rent / m2	,803	7	45	,589

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	3543,644	9	393,738	2,950	,007
	Within Groups	6673,066	50	133,461		
	Total	10216,710	59			
Effective Rent / m2	Between Groups	198829,036	9	22092,115	3,630	,002
	Within Groups	273860,510	45	6085,789		
	Total	472689,546	54			

Robust Tests of Equality of Means[b,c]

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch				
	Brown-Forsythe				
Effective Rent / m2	Welch				
	Brown-Forsythe				

a. Asymptotically F distributed.

b. Robust tests of equality of means cannot be performed for Percentage Incentives because at least one group has 0 variance.

c. Robust tests of equality of means cannot be performed for Effective Rent / m2 because at least one group has the sum of case

B.4.3.11. Year 2012

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Percentage Incentives	1,120	5	44	,364
Effective Rent / m2	2,321	5	33	,065

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Percentage Incentives	Between Groups	1258,051	8	157,256	3,491	,003
	Within Groups	1981,884	44	45,043		
	Total	3239,934	52			
Effective Rent / m2	Between Groups	164138,642	8	20517,330	5,182	,000
	Within Groups	130656,948	33	3959,301		
	Total	294795,590	41			

Robust Tests of Equality of Means[b,c]

		Statistic[a]	df1	df2	Sig.
Percentage Incentives	Welch				
	Brown-Forsythe				
Effective Rent / m2	Welch				

Brown-Forsythe				

a. Asymptotically F distributed.

b. Robust tests of equality of means cannot be performed for Percentage Incentives because at least one group has the sum of

c. Robust tests of equality of means cannot be performed for Effective Rent / m2 because at least one group has the sum of case

C.5. Outcomes Post-Hoc tests

B.5.1. Significant differences in incentives per year – Sample: City District analysis

**Due to privacy reasons, years with less than 5 transactions per district are deleted from the figures*

Multiple Comparisons

Dependent Variable:		2002			2003			2004			2005			2006			2007		
(I) District		Mean Diff.(I-J)	Std. Error	Sig.	Mean Diff.(I-J)	Std. Error	Sig.	Mean Diff.(I-J)	Std. Error	Sig.	Mean Diff.(I-J)	Std. Error	Sig.	Mean Diff.(I-J)	Std. Error	Sig.	Mean Diff.(I-J)	Std. Error	Sig.
Centre	Westpoort	-1,020247	,759481	,869	-2,544936	2,239401	,935	-1,640341	2,138854	,992	-3,017073	2,590892	,931	-2,667236	1,982320	,874	-4,314029	2,585528	,706
	West	-,482860	,492381	,975	-,029650	,714565	1,000	,059251	,713925	1,000	,394487	1,257731	1,000	1,720939	1,039464	,715	,969547	1,167852	,990
	New-West	,157375	,171210	,983	,191533	,885013	1,000	-3,453265	1,851591	,589	-1,856186	1,954138	,978	,519132	1,619301	1,000	-1,158823	1,977824	,999
	South	-,389074	,340176	,945	,327393	,490365	,998	-,891177	,640967	,860	,772766	,924537	,991	-1,466248	1,309608	,951	-3,317805*	1,046414	,038
	East	-,169476	,530536	1,000	,323220	,824671	1,000	,187051	,597744	1,000	,291372	1,569957	1,000	-1,389574	1,819640	,994	1,646917	1,035640	,754
	North	,023143	,255560	1,000	1,181024*	,379911	,047	,732056	,347218	,416	2,082211	,942611	,359	1,983256	1,036830	,546	2,912680*	,612001	,000
	South-East	-,002073	,237279	1,000	,598353	,537360	,952	-1,253300	1,189590	,961	-2,331152	2,399662	,974	-4,677850	2,926100	,746	-4,014781	1,889229	,419
Westpoort	Centre	1,020247	,759481	,869	2,544936	2,239401	,935	1,640341	2,138854	,992	3,017073	2,590892	,931	2,667236	1,982320	,874	4,314029	2,585528	,706
	West	,537387	,892188	,999	2,515285	2,294430	,946	1,699591	2,219206	,993	3,411560	2,683292	,898	4,388175	1,960751	,359	5,283576	2,720611	,539
	New-West	1,177623	,763461	,775	2,736468	2,353094	,930	-1,812925	2,800639	,998	1,160887	3,071942	1,000	3,186368	2,320818	,864	3,155206	3,154304	,971
	South	,631173	,818095	,993	2,872329	2,234785	,887	,749164	2,196822	1,000	3,789839	2,544197	,801	1,200988	2,116397	,999	,996224	2,670735	1,000
	East	,850771	,913799	,981	2,868156	2,331070	,909	1,827392	2,184602	,988	3,308445	2,843050	,934	1,277662	2,464782	1,000	5,960946	2,666532	,371
	North	1,043390	,786683	,878	3,725960	2,213173	,697	2,372397	2,129730	,943	5,099284	2,550820	,514	4,650492	1,959357	,290	7,226710	2,532270	,144
	South-East	1,018174	,780936	,886	3,143289	2,245565	,841	,387040	2,414604	1,000	,685921	3,372914	1,000	-2,010613	3,365430	,999	,299248	3,099521	1,000
West	Centre	,482860	,492381	,975	,029650	,714565	1,000	-,059251	,713925	1,000	-,394487	1,257731	1,000	-1,720939	1,039464	,715	-,969547	1,167852	,990
	Westpoort	-,537387	,892188	,999	-2,515285	2,294430	,946	-1,699591	2,219206	,993	-3,411560	2,683292	,898	-4,388175	1,960751	,359	-5,283576	2,720611	,539
	New-West	,640236	,498499	,901	,221183	1,016238	1,000	-3,512516	1,943855	,623	-2,250673	2,075089	,955	-1,201807	1,592825	,994	-2,128370	2,151408	,973
	South	,093787	,578712	1,000	,357043	,699963	1,000	-,950427	,872365	,957	,378279	1,158493	1,000	-3,187187	1,276726	,209	-4,287352*	1,346013	,042
	East	,313384	,707571	1,000	,352870	,964144	1,000	,127801	,841118	1,000	-,103115	1,718168	1,000	-3,110513	1,796119	,667	,677370	1,337654	1,000
	North	,506004	,533384	,980	1,210675	,627553	,543	,672806	,686106	,975	1,687724	1,172967	,834	,262317	,994973	1,000	1,943134	1,044661	,587
	South-East	,480787	,524871	,983	,628003	,733653	,989	-1,312551	1,328648	,973	-2,725639	2,499143	,953	-6,398789	2,911531	,389	-4,984328	2,070255	,262
New-West	Centre	-,157375	,171210	,983	-,191533	,885013	1,000	3,453265	1,851591	,589	1,856186	1,954138	,978	-,519132	1,619301	1,000	1,158823	1,977824	,999
	Westpoort	-1,177623	,763461	,775	-2,736468	2,353094	,930	1,812925	2,800639	,998	-1,160887	3,071942	1,000	-3,186368	2,320818	,864	-3,155206	3,154304	,971
	West	-,640236	,498499	,901	-,221183	1,016238	1,000	3,512516	1,943855	,623	2,250673	2,075089	,955	1,201807	1,592825	,994	2,128370	2,151408	,973
	South	-,546449	,348973	,769	,135860	,873266	1,000	2,562089	1,918260	,874	2,628952	1,891791	,853	-1,985381	1,780921	,950	-2,158983	2,087980	,965
	East	-,326852	,536219	,999	,131687	1,096457	1,000	3,640317	1,904253	,560	2,147558	2,277909	,979	-1,908706	2,183505	,987	2,805740	2,082601	,873
	North	-,134232	,267157	1,000	,989492	,816375	,920	4,185322	1,841044	,362	3,938397	1,900689	,460	1,464124	1,591107	,981	4,071503	1,907675	,424
	South-East	-,159449	,249727	,998	,406820	,900495	1,000	2,199965	2,164257	,968	-,474966	2,912470	1,000	-5,196982	3,165227	,722	-2,855958	2,614166	,955
South	Centre	,389074	,340176	,945	-,327393	,490365	,998	,891177	,640967	,860	-,772766	,924537	,991	1,466248	1,309608	,951	3,317805*	1,046414	,038
	Westpoort	-,631173	,818095	,993	-2,872329	2,234785	,887	-,749164	2,196822	1,000	-3,789839	2,544197	,801	-1,200988	2,116397	,999	-,996224	2,670735	1,000
	West	-,093787	,578712	1,000	-,357043	,699963	1,000	,950427	,872365	,957	-,378279	1,158493	1,000	3,187187	1,276726	,209	4,287352*	1,346013	,042
	New-West	,546449	,348973	,769	-,135860	,873266	1,000	-2,562089	1,918260	,874	-2,628952	1,891791	,853	1,985381	1,780921	,950	2,158983	2,087980	,965
	East	,219597	,611504	1,000	-,004173	,812052	1,000	1,078228	,780147	,863	-,481394	1,491638	1,000	,076674	1,964849	1,000	4,964722*	1,233054	,003
	North	,412217	,397215	,967	,853631	,351679	,244	1,623233	,609830	,147	1,309445	,805439	,733	3,449504	1,274582	,133	6,230486*	,906874	,000
	South-East	,387000	,385708	,973	,270960	,517785	,999	-,362124	1,290913	1,000	-3,103918	2,349169	,880	-3,211601	3,018543	,959	-,696975	2,004261	1,000
East	Centre	,169476	,530536	1,000	-,323220	,824671	1,000	-,187051	,597744	1,000	-,291372	1,569957	1,000	1,389574	1,819640	,994	-1,646917	1,035640	,754
	Westpoort	-,850771	,913799	,981	-2,868156	2,331070	,909	-1,827392	2,184602	,988	-3,308445	2,843050	,934	-1,277662	2,464782	1,000	-5,960946	2,666532	,371
	West	-,313384	,707571	1,000	-,352870	,964144	1,000	-,127801	,841118	1,000	,103115	1,718168	1,000	3,110513	1,796119	,667	-,677370	1,337654	1,000
	New-West	,326852	,536219	,999	-,131687	1,096457	1,000	-3,640317	1,904253	,560	-2,147558	2,277909	,979	1,908706	2,183505	,987	-2,805740	2,082601	,873
	South	-,219597	,611504	1,000	,004173	,812052	1,000	-1,078228	,780147	,863	,481394	1,491638	1,000	-,076674	1,964849	1,000	-4,964722*	1,233054	,003
	North	,192620	,568796	1,000	,857805	,750535	,940	,545005	,564226	,977	1,790839	1,502907	,926	3,372830	1,794596	,572	1,265763	,894420	,844
	South-East	,167403	,560820	1,000	,275133	,841265	1,000	-1,440352	1,270006	,944	-2,622524	2,669942	,974	-3,288275	3,272250	,970	-5,661698	1,998657	,113
North	Centre	-,023143	,255560	1,000	-1,181024*	,379911	,047	-,732056	,347218	,416	-2,082211	,942611	,359	-1,983256	1,036830	,546	-2,912680*	,612001	,000
	Westpoort	-1,043390	,786683	,878	-3,725960	2,213173	,697	-2,372397	2,129730	,943	-5,099284	2,550820	,514	-4,650492	1,959357	,290	-7,226710	2,532270	,144
	West	-,506004	,533384	,980	-1,210675	,627553	,543	-,672806	,686106	,975	-1,687724	1,172967	,834	-,262317	,994973	1,000	-1,943134	1,044661	,587
	New-West	,134232	,267157	1,000	-,989492	,816375	,920	-4,185322	1,841044	,362	-3,938397	1,900689	,460	-1,464124	1,591107	,981	-4,071503	1,907675	,424
	South	-,412217	,397215	,967	-,853631	,351679	,244	-1,623233	,609830	,147	-1,309445	,805439	,733	-3,449504	1,274582	,133	-6,230486*	,906874	,000
	East	-,192620	,568796	1,000	-,857805	,750535	,940	-,545005	,564226	,977	-1,790839	1,502907	,926	-3,372830	1,794596	,572	-1,265763	,894420	,844
	South-East	-,025217	,313626	1,000	-,582671	,414700	,849	-1,985357	1,173106	,692	-4,413363	2,356341	,582	-6,661106	2,910592	,342	-6,927461*	1,815661	,012
South-East	Centre	,002073	,237279	1,000	-,598353	,537360	,952	1,253300	1,189590	,961	2,331152	2,399662	,974	4,677850	2,926100	,746	4,014781	1,889229	,419
	Westpoort	-1,018174	,780936	,886	-3,143289	2,245565	,841	-,387040	2,414604	1,000	-,685921	3,372914	1,000	2,010613	3,365430	,999	-,299248	3,099521	1,000
	West	-,480787	,524871	,983	-,628003	,733653	,989	1,312551	1,328648	,973	2,725639	2,499143	,953	6,398789	2,911531	,389	4,984328	2,070255	,262
	New-West	,159449	,249727	,998	-,406820	,900495	1,000	-2,199965	2,164257	,968	,474966	2,912470	1,000	5,196982	3,165227	,722	2,855958	2,614166	,955
	South	-,387000	,385708	,973	-,270960	,517785	,999	,362124	1,290913	1,000	3,103918	2,349169	,880	3,211601	3,018543	,959	,696975	2,004261	1,000
	East	-,167403	,560820	1,000	-,275133	,841265	1,000	1,440352	1,270006	,944	2,622524	2,669942	,974	3,288275	3,272250	,970	5,661698	1,998657	,113
	North	,025217	,313626	1,000	,582671	,414700	,849	1,985357	1,173106	,692	4,413363	2,356341	,582	6,661106	2,910592	,342	6,927461*	1,815661	,012

Multiple Comparisons

Dependent Variable:		2008			2009			2010			2011			2012		
(I) District		Mean Diff.(I-J)	Std. Error	Sig.	Mean Diff.(I-J)	Std. Error	Sig.	Mean Diff.(I-J)	Std. Error	Sig.	Mean Diff.(I-J)	Std. Error	Sig.	Mean Diff.(I-J)	Std. Error	Sig.
Centre	Westpoort	-6,959298	3,274370	,443	-17,281204	5,386771	,158	1,354830	2,173840	,998						
	West	1,055942	1,099101	,978	-2,325545	2,003088	,936	4,439535	1,477435	,074	1,941461	1,942731	,973	-3,476765	4,763808	,994
	New-West	-7,138249	4,376941	,726	-9,349727	4,544564	,483	-5,675002	3,850138	,812	2,269572	2,371994	,976	2,478125	1,336292	,594
	South	-2,395500	1,159333	,442	-2,476734	1,390215	,634	,062867	1,772989	1,000	-3,403586	2,192844	,777	-3,578438	1,477346	,247
	East	,906816	1,064953	,989	-3,293651	2,214605	,807	,217247	2,243473	1,000	-6,041819	3,551750	,687	-4,751241	2,596731	,610
	North	-,578405	1,261346	1,000	1,476164	,692528	,405	-,664304	2,619615	1,000	-1,799654	3,746247	,999	1,567274	1,719504	,981
	South-East	-6,119281	2,919646	,444	-8,141946	2,655161	,077	-12,572361	4,679842	,207	-11,780360	7,523190	,759	-5,697113	3,673801	,768
Westpoort	Centre	6,959298	3,274370	,443	17,281204	5,386771	,158	-1,354830	2,173840	,998						
	West	8,015241	3,244994	,281	14,955659	5,684263	,272	3,084705	1,594605	,576						
	New-West	-,178951	5,336626	1,000	7,931477	6,996538	,938	-7,029832	3,896603	,625						
	South	4,563798	3,265887	,845	14,804470	5,498289	,266	-1,291963	1,871748	,996						
	East	7,866114	3,233587	,297	13,987553	5,762201	,339	-1,137583	2,322310	1,000						
	North	6,380893	3,303476	,551	18,757368	5,364520	,117	-2,019134	2,687440	,994						
	South-East	,840017	4,224487	1,000	9,139258	5,945449	,773	-13,927191	4,718143	,136						
West	Centre	-1,055942	1,099101	,978	2,325545	2,003088	,936	-4,439535	1,477435	,074	-1,941461	1,942731	,973	3,476765	4,763808	,994
	Westpoort	-8,015241	3,244994	,281	-14,955659	5,684263	,272	-3,084705	1,594605	,576						
	New-West	-8,194191	4,355009	,590	-7,024182	4,893527	,830	-10,114536	3,555383	,155	,328111	2,242277	1,000	5,954890	4,731766	,897
	South	-3,451442*	1,073566	,038	-,151189	2,286098	1,000	-4,376667*	,980141	,001	-5,345047	2,051832	,174	-,101673	4,773519	1,000
	East	-,149126	,970884	1,000	-,968106	2,863218	1,000	-4,222287	1,688300	,266	-7,983279	3,466464	,331	-1,274477	5,229431	1,000
	North	-1,634347	1,182998	,860	3,801709	1,942457	,529	-5,103839	2,163231	,326	-3,741115	3,665490	,957	5,044039	4,853929	,959
	South-East	-7,175223	2,886663	,249	-5,816401	3,216119	,618	-17,011896*	4,440508	,039	-13,721821	7,483304	,616	-2,220348	5,839585	1,000
New-West	Centre	7,138249	4,376941	,726	9,349727	4,544564	,483	5,675002	3,850138	,812	-2,269572	2,371994	,976	-2,478125	1,336292	,594
	Westpoort	,178951	5,336626	1,000	-7,931477	6,996538	,938	7,029832	3,896603	,625						
	West	8,194191	4,355009	,590	7,024182	4,893527	,830	10,114536	3,555383	,155	-,328111	2,242277	1,000	-5,954890	4,731766	,897
	South	4,742749	4,370599	,946	6,872993	4,676211	,811	5,737869	3,688011	,769	-5,673159	2,462146	,330	-6,056563*	1,370510	,005
	East	8,045065	4,346516	,606	6,056076	4,983846	,917	5,892249	3,935874	,801	-8,311391	3,724047	,365	-7,229367	2,537471	,151
	North	6,559844	4,398758	,797	10,825891	4,518168	,317	5,010697	4,161768	,923	-4,069226	3,909983	,956	-,910852	1,628632	,999
	South-East	1,018968	5,126637	1,000	1,207781	5,194625	1,000	-6,897360	5,688485	,920	-14,049932	7,606050	,607	-8,175238	3,632157	,398
South	Centre	2,395500	1,159333	,442	2,476734	1,390215	,634	-,062867	1,772989	1,000	3,403586	2,192844	,777	3,578438	1,477346	,247
	Westpoort	-4,563798	3,265887	,845	-14,804470	5,498289	,266	1,291963	1,871748	,996						
	West	3,451442*	1,073566	,038	,151189	2,286098	1,000	4,376667*	,980141	,001	5,345047	2,051832	,174	,101673	4,773519	1,000
	New-West	-4,742749	4,370599	,946	-6,872993	4,676211	,811	-5,737869	3,688011	,769	5,673159	2,462146	,330	6,056563*	1,370510	,005
	East	3,302316*	1,038579	,038	-,816917	2,473531	1,000	,154380	1,952187	1,000	-2,638232	3,612580	,995	-1,172804	2,614505	1,000
	North	1,817095	1,239159	,822	3,952898	1,301337	,067	-,727172	2,374919	1,000	1,603932	3,803968	1,000	5,145712	1,746230	,118
	South-East	-3,723781	2,910129	,898	-5,665212	2,874676	,514	-12,635229	4,547393	,188	-8,376774	7,552099	,940	-2,118675	3,686385	,999
East	Centre	-,906816	1,064953	,989	3,293651	2,214605	,807	-,217247	2,243473	1,000	6,041819	3,551750	,687	4,751241	2,596731	,610
	Westpoort	-7,866114	3,233587	,297	-13,987553	5,762201	,339	1,137583	2,322310	1,000						
	West	,149126	,970884	1,000	,968106	2,863218	1,000	4,222287	1,688300	,266	7,983279	3,466464	,331	1,274477	5,229431	1,000
	New-West	-8,045065	4,346516	,606	-6,056076	4,983846	,917	-5,892249	3,935874	,801	8,311391	3,724047	,365	7,229367	2,537471	,151
	South	-3,302316*	1,038579	,038	,816917	2,473531	1,000	-,154380	1,952187	1,000	2,638232	3,612580	,995	1,172804	2,614505	1,000
	North	-1,485221	1,151341	,897	4,769815	2,159920	,384	-,881552	2,744071	1,000	4,242164	4,719803	,982	6,318515	2,758583	,346
	South-East	-7,026097	2,873834	,267	-4,848295	3,351945	,831	-12,789609	4,750628	,202	-5,738541	8,052364	,995	-,945871	4,260270	1,000
North	Centre	,578405	1,261346	1,000	-1,476164	,692528	,405	,664304	2,619615	1,000	1,799654	3,746247	,999	-1,567274	1,719504	,981
	Westpoort	-6,380893	3,303476	,551	-18,757368	5,364520	,117	2,019134	2,687440	,994						
	West	1,634347	1,182998	,860	-3,801709	1,942457	,529	5,103839	2,163231	,326	3,741115	3,665490	,957	-5,044039	4,853929	,959
	New-West	-6,559844	4,398758	,797	-10,825891	4,518168	,317	-5,010697	4,161768	,923	4,069226	3,909983	,956	,910852	1,628632	,999
	South	-1,817095	1,239159	,822	-3,952898	1,301337	,067	,727172	2,374919	1,000	-1,603932	3,803968	1,000	-5,145712	1,746230	,118
	East	1,485221	1,151341	,897	-4,769815	2,159920	,384	,881552	2,744071	1,000	-4,242164	4,719803	,982	-6,318515	2,758583	,346
	South-East	-5,540876	2,952252	,577	-9,618110*	2,609723	,020	-11,908057	4,939401	,299	-9,980706	8,140025	,909	-7,264387	3,789931	,566
South-East	Centre	6,119281	2,919646	,444	8,141946	2,655161	,077	12,572361	4,679842	,207	11,780360	7,523190	,759	5,697113	3,673801	,768
	Westpoort	-,840017	4,224487	1,000	-9,139258	5,945449	,773	13,927191	4,718143	,136						
	West	7,175223	2,886663	,249	5,816401	3,216119	,618	17,011896*	4,440508	,039	13,721821	7,483304	,616	2,220348	5,839585	1,000
	New-West	-1,018968	5,126637	1,000	-1,207781	5,194625	1,000	6,897360	5,688485	,920	14,049932	7,606050	,607	8,175238	3,632157	,398
	South	3,723781	2,910129	,898	5,665212	2,874676	,514	12,635229	4,547393	,188	8,376774	7,552099	,940	2,118675	3,686385	,999
	East	7,026097	2,873834	,267	4,848295	3,351945	,831	12,789609	4,750628	,202	5,738541	8,052364	,995	,945871	4,260270	1,000
	North	5,540876	2,952252	,577	9,618110*	2,609723	,020	11,908057	4,939401	,299	9,980706	8,140025	,909	7,264387	3,789931	,566

B.5.2. Significant differences in incentives per year – Sample: Sub-office market analysis

**Due to privacy reasons, years with less than 5 transactions per district are deleted from the figures*

Multiple Comparisons

Dependent Variable: Percentage Incentives - Games-Howell		2002			2003			2004			2005			2006			2007		
(I) AreasWereadam		Mean Diff. (I-J)	Std. Error	Sig.	Mean Diff. (I-J)	Std. Error	Sig.	Mean Diff. (I-J)	Std. Error	Sig.	Mean Diff. (I-J)	Std. Error	Sig.	Mean Diff. (I-J)	Std. Error	Sig.	Mean Diff. (I-J)	Std. Error	Sig.
Centre	North	,063032	,251595	1,000	1,099963*	,316852	,012	1,010314*	,326288	,039	1,652909	,795676	,382	1,682751	,891663	,495	2,874950*	,515861	,000
	East	-,238949	,636424	1,000	1,270052*	,294311	,001	,334070	,649250	,998	-,873116	1,824466	,999	-2,189418	2,015011	,927	1,580680	1,058821	,747
	West	-,276273	,323669	,978	-,296589	,689679	,999	-,743436	,881766	,979	-1,615170	1,097343	,761	-1,094446	1,048162	,943	-1,922628	1,216709	,695
	South-Axis	-,552153	,655916	,977	,059668	,638945	1,000	-,702707	1,626201	,999	-,103780	1,327981	1,000	-5,558586	3,103660	,570	-5,349384*	1,383039	,005
	South-Bank	-1,649195	1,707339	,952	-1,469038	1,247824	,894	-1,260264	1,697085	,987	-,734873	2,395646	1,000	1,242825	1,666022	,987	1,960651	,985226	,468
	South-East	,037815	,233003	1,000	,540103	,485542	,922	-,975043	1,183650	,980	-2,760454	2,345839	,895	-4,978355	2,877865	,605	-4,052511	1,860310	,333
North	Centre	-,063032	,251595	1,000	-1,099963*	,316852	,012	-1,010314*	,326288	,039	-1,652909	,795676	,382	-1,682751	,891663	,495	-2,874950*	,515861	,000
	East	-,301981	,670154	,999	,170089	,117372	,770	-,676244	,629822	,932	-2,526024	1,837949	,807	-3,872169	2,061482	,508	-1,294271	,978250	,836
	West	-,339305	,385788	,975	-1,396552	,634677	,312	-1,753750	,867561	,413	-3,268079	1,119617	,067	-2,777197	1,134938	,191	-4,797579*	1,147281	,002
	South-Axis	-,615185	,688692	,970	-1,040295	,579145	,566	-1,713021	1,618542	,934	-1,756689	1,346444	,844	-7,241337	3,134031	,289	-8,224335*	1,322372	,000
	South-Bank	-1,712227	1,720196	,946	-2,569001	1,218286	,392	-2,270578	1,689748	,820	-2,387782	2,405930	,940	-,439926	1,721938	1,000	-,914300	,898077	,936
	South-East	-,025217	,313626	1,000	-,559860	,403619	,805	-1,985357	1,173106	,627	-4,413363	2,356341	,518	-6,661106	2,910592	,292	-6,927461*	1,815661	,010
East	Centre	,238949	,636424	1,000	-1,270052*	,294311	,001	-,334070	,649250	,998	,873116	1,824466	,999	2,189418	2,015011	,927	-1,580680	1,058821	,747
	North	,301981	,670154	,999	-,170089	,117372	,770	,676244	,629822	,932	2,526024	1,837949	,807	3,872169	2,061482	,508	1,294271	,978250	,836
	West	-,037324	,700406	1,000	-1,566640	,623730	,176	-1,077506	1,033307	,942	-,742055	1,987239	1,000	1,094972	2,133843	,999	-3,503308	1,473513	,221
	South-Axis	-,313204	,903345	1,000	-1,210383	,567126	,377	-1,036777	1,713108	,996	,769336	2,123320	1,000	-3,369168	3,617645	,964	-6,930064*	1,613585	,001
	South-Bank	-1,410246	1,816814	,984	-2,739090	1,212619	,320	-1,594334	1,780536	,968	,138242	2,912743	1,000	3,432243	2,496052	,811	,379971	1,289004	1,000
	South-East	,276764	,663398	1,000	-,729949	,386176	,501	-1,309113	1,300476	,949	-1,887338	2,871919	,994	-2,788936	3,425894	,982	-5,633190	2,037551	,106
West	Centre	,276273	,323669	,978	,296589	,689679	,999	,743436	,881766	,979	1,615170	1,097343	,761	1,094446	1,048162	,943	1,922628	1,216709	,695
	North	,339305	,385788	,975	1,396552	,634677	,312	1,753750	,867561	,413	3,268079	1,119617	,067	2,777197	1,134938	,191	4,797579*	1,147281	,002
	East	,037324	,700406	1,000	1,566640	,623730	,176	1,077506	1,033307	,942	,742055	1,987239	1,000	-1,094972	2,133843	,999	3,503308	1,473513	,221
	South-Axis	-,275880	,718163	1,000	,356257	,843013	1,000	,040729	1,814036	1,000	1,511390	1,544012	,956	-4,464140	3,182095	,794	-3,426756	1,721318	,427
	South-Bank	-1,372922	1,732206	,982	-1,172449	1,363629	,975	-,516828	1,877843	1,000	,880297	2,521817	1,000	2,337271	1,807940	,848	3,883279	1,421552	,118
	South-East	,314089	,373929	,980	,836691	,733601	,914	-,231607	1,430813	1,000	-1,145284	2,474551	,999	-3,883909	2,962284	,840	-2,129882	2,123887	,951
South-Axis	Centre	,552153	,655916	,977	-,059668	,638945	1,000	,702707	1,626201	,999	,103780	1,327981	1,000	5,558586	3,103660	,570	5,349384*	1,383039	,005
	North	,615185	,688692	,970	1,040295	,579145	,566	1,713021	1,618542	,934	1,756689	1,346444	,844	7,241337	3,134031	,289	8,224335*	1,322372	,000
	East	,313204	,903345	1,000	1,210383	,567126	,377	1,036777	1,713108	,996	-,769336	2,123320	1,000	3,369168	3,617645	,964	6,930064*	1,613585	,001
	West	,275880	,718163	1,000	-,356257	,843013	1,000	-,040729	1,814036	1,000	-1,511390	1,544012	,956	4,464140	3,182095	,794	3,426756	1,721318	,427
	South-Bank	-1,097042	1,823733	,996	-1,528706	1,338685	,908	-,557557	2,322351	1,000	-,631093	2,630386	1,000	6,801411	3,435508	,451	7,310035*	1,566277	,001
	South-East	,589968	,682119	,974	,480434	,686123	,992	-,272336	1,978444	1,000	-2,656674	2,585106	,943	,580231	4,160431	1,000	1,296874	2,223355	,997
South-Bank	Centre	1,649195	1,707339	,952	1,469038	1,247824	,894	1,260264	1,697085	,987	,734873	2,395646	1,000	-1,242825	1,666022	,987	-1,960651	,985226	,468
	North	1,712227	1,720196	,946	2,569001	1,218286	,392	2,270578	1,689748	,820	2,387782	2,405930	,940	,439926	1,721938	1,000	,914300	,898077	,936
	East	1,410246	1,816814	,984	2,739090	1,212619	,320	1,594334	1,780536	,968	-,138242	2,912743	1,000	-3,432243	2,496052	,811	-,379971	1,289004	1,000
	West	1,372922	1,732206	,982	1,172449	1,363629	,975	,516828	1,877843	1,000	-,880297	2,521817	1,000	-2,337271	1,807940	,848	-3,883279	1,421552	,118
	South-Axis	1,097042	1,823733	,996	1,528706	1,338685	,908	,557557	2,322351	1,000	,631093	2,630386	1,000	-6,801411	3,435508	,451	-7,310035*	1,566277	,001
	South-East	1,687010	1,717576	,949	2,009141	1,272626	,696	,285222	2,037108	1,000	-2,025581	3,264714	,995	-6,221180	3,232972	,481	-6,013161	2,000296	,065
South-East	Centre	,037815	,233003	1,000	-,540103	,485542	,922	,975043	1,183650	,980	2,760454	2,345839	,895	4,978355	2,877865	,605	4,052511	1,860310	,333
	North	,025217	,313626	1,000	,559860	,403619	,805	1,985357	1,173106	,627	4,413363	2,356341	,518	6,661106	2,910592	,292	6,927461*	1,815661	,010
	East	-,276764	,663398	1,000	,729949	,386176	,501	1,309113	1,300476	,949	1,887338	2,871919	,994	2,788936	3,425894	,982	5,633190	2,037551	,106
	West	-,314089	,373929	,980	-,836691	,733601	,914	,231607	1,430813	1,000	1,145284	2,474551	,999	3,883909	2,962284	,840	2,129882	2,123887	,951
	South-Axis	-,589968	,682119	,974	-,480434	,686123	,992	,272336	1,978444	1,000	2,656674	2,585106	,943	-,580231	4,160431	1,000	-1,296874	2,223355	,997
	South-Bank	-1,687010	1,717576	,949	-2,009141	1,272626	,696	-,285222	2,037108	1,000	2,025581	3,264714	,995	6,221180	3,232972	,481	6,013161	2,000296	,065

Multiple Comparisons

Dependent Variable: Percentage Incentives - Games-Howell		2008			2009			2010			2011			2012		
(I) AreasWereadam		Mean Diff. (I-J)	Std. Error	Sig.	Mean Diff. (I-J)	Std. Error	Sig.	Mean Diff. (I-J)	Std. Error	Sig.	Mean Diff. (I-J)	Std. Error	Sig.	Mean Diff. (I-J)	Std. Error	Sig.
Centre	North	-,771238	1,084089	,991	1,629584	,618923	,130	-1,456827	2,352297	,995	-1,856167	3,572843	,998	2,167698	1,590644	,812
	East	-,586301	1,283329	,999	-4,477329	2,729784	,661	-1,037268	2,390433	,999	-6,306234	4,974733	,854	-3,718931	2,574388	,770
	West	-4,420962	1,718872	,157	-6,819180*	2,179323	,044	-1,885980	1,962731	,960	-1,272688	2,486722	,999	-,785671	3,639799	1,000
	South-Axis	-4,372448*	1,385963	,035	-6,341346	2,848530	,332	-3,363792	2,271316	,752	-8,051001	3,316687	,235	-4,414945	1,774394	,210
	South-Bank	1,853149*	,607910	,044	1,615131	,732448	,333				-2,406799	3,604160	,992	-2,116521	3,987434	,997
	South-East	-6,312114	2,847558	,326	-7,988526	2,636920	,068	-13,364884	4,535620	,123	-11,836873	7,438362	,691	-5,096688	3,615283	,786
North	Centre	,771238	1,084089	,991	-1,629584	,618923	,130	1,456827	2,352297	,995	1,856167	3,572843	,998	-2,167698	1,590644	,812
	East	,184937	1,501379	1,000	-6,106913	2,703522	,318	,419560	3,088689	1,000	-4,450067	5,973168	,987	-5,886629	2,814389	,400
	West	-3,649723	1,887254	,467	-8,448764*	2,146336	,005	-,429152	2,770946	1,000	,583479	4,136974	1,000	-2,953369	3,813325	,985
	South-Axis	-3,601209	1,590000	,274	-7,970929	2,823372	,129	-1,906965	2,997450	,995	-6,194834	4,683074	,832	-6,582643	2,107555	,063
	South-Bank	2,624388	,988312	,152	-,014453	,627526	1,000				-,550632	4,890883	1,000	-4,284219	4,146438	,931
	South-East	-5,540876	2,952252	,512	-9,618110*	2,609723	,015	-11,908057	4,939401	,255	-9,980706	8,140025	,872	-7,264387	3,789931	,507
East	Centre	,586301	1,283329	,999	4,477329	2,729784	,661	1,037268	2,390433	,999	6,306234	4,974733	,854	3,718931	2,574388	,770
	North	-,184937	1,501379	1,000	6,106913	2,703522	,318	-,419560	3,088689	1,000	4,450067	5,973168	,987	5,886629	2,814389	,400
	West	-3,834660	2,008336	,483	-2,341851	3,416930	,993	-,848712	2,803392	1,000	5,033546	5,394192	,961	2,933260	4,317264	,993
	South-Axis	-3,786146	1,731989	,318	-1,864016	3,878155	,999	-2,326525	3,027470	,986	-1,744767	5,823567	1,000	-,696014	2,922176	1,000
	South-Bank	2,439451	1,203514	,429	6,092460	2,731748	,330				3,899435	5,991953	,994	1,602410	4,614138	1,000
	South-East	-5,725813	3,031085	,504	-3,511197	3,725495	,963	-12,327617	4,957675	,227	-5,530639	8,845494	,995	-1,377758	4,296615	1,000
West	Centre	4,420962	1,718872	,157	6,819180*	2,179323	,044	1,885980	1,962731	,960	1,272688	2,486722	,999	,785671	3,639799	1,000
	North	3,649723	1,887254	,467	8,448764*	2,146336	,005	,429152	2,770946	1,000	-,583479	4,136974	1,000	2,953369	3,813325	,985
	East	3,834660	2,008336	,483	2,341851	3,416930	,993	,848712	2,803392	1,000	-5,033546	5,394192	,961	-2,933260	4,317264	,993
	South-Axis	,048514	2,075421	1,000	,477834	3,512522	1,000	-1,477813	2,702539	,998	-6,778313	3,917876	,601	-3,629274	3,893555	,963
	South-Bank	6,274111*	1,660131	,008	8,434311*	2,181782	,006				-1,134111	4,164050	1,000	-1,330850	5,283080	1,000
	South-East	-1,891152	3,239609	,997	-1,169346	3,343208	1,000	-11,478905	4,766203	,262	-10,564185	7,725191	,807	-4,311017	5,008150	,975
South-Axis	Centre	4,372448*	1,385963	,035	6,341346	2,848530	,332	3,363792	2,271316	,752	8,051001	3,316687	,235	4,414945	1,774394	,210
	North	3,601209	1,590000	,274	7,970929	2,823372	,129	1,906965	2,997450	,995	6,194834	4,683074	,832	6,582643	2,107555	,063
	East	3,786146	1,731989	,318	1,864016	3,878155	,999	2,326525	3,027470	,986	1,744767	5,823567	1,000	,696014	2,922176	1,000
	West	-,048514	2,075421	1,000	-,477834	3,512522	1,000	1,477813	2,702539	,998	6,778313	3,917876	,601	3,629274	3,893555	,963
	South-Bank	6,225597*	1,312405	,000	7,956477	2,850411	,134				5,644202	4,707010	,887	2,298424	4,220340	,997
	South-East	-1,939666	3,075945	,995	-1,647180	3,813360	,999	-10,001092	4,901352	,429	-3,785872	8,030891	,999	-,681743	3,870647	1,000
South-Bank	Centre	-1,853149*	,607910	,044	-1,615131	,732448	,333				2,406799	3,604160	,992	2,116521	3,987434	,997
	North	-2,624388	,988312	,152	,014453	,627526	1,000				,550632	4,890883	1,000	4,284219	4,146438	,931
	East	-2,439451	1,203514	,429	-6,092460	2,731748	,330				-3,899435	5,991953	,994	-1,602410	4,614138	1,000
	West	-6,274111*	1,660131	,008	-8,434311*	2,181782	,006				1,134111	4,164050	1,000	1,330850	5,283080	1,000
	South-Axis	-6,225597*	1,312405	,000	-7,956477	2,850411	,134				-5,644202	4,707010	,887	-2,298424	4,220340	,997
	South-East	-8,165263	2,812490	,099	-9,603657*	2,638953	,017				-9,430074	8,153819	,898	-2,980167	5,266219	,997
South-East	Centre	6,312114	2,847558	,326	7,988526	2,636920	,068	13,364884	4,535620	,123	11,836873	7,438362	,691	5,096688	3,615283	,786
	North	5,540876	2,952252	,512	9,618110*	2,609723	,015	11,908057	4,939401	,255	9,980706	8,140025	,872	7,264387	3,789931	,507
	East	5,725813	3,031085	,504	3,511197	3,725495	,963	12,327617	4,957675	,227	5,530639	8,845494	,995	1,377758	4,296615	1,000
	West	1,891152	3,239609	,997	1,169346	3,343208	1,000	11,478905	4,766203	,262	10,564185	7,725191	,807	4,311017	5,008150	,975
	South-Axis	1,939666	3,075945	,995	1,647180	3,813360	,999	10,001092	4,901352	,429	3,785872	8,030891	,999	,681743	3,870647	1,000
	South-Bank	8,165263	2,812490	,099	9,603657*	2,638953	,017				9,430074	8,153819	,898	2,980167	5,266219	,997

B.5.3. Significant differences in incentives per year – Sample: Business District analysis

**Due to privacy reasons, years with less than 5 transactions per district are deleted from the figures*

Multiple Comparisons

Dependent Variable: Percentage Incentives - Games-Howell

(I) Business Districts		2002 Mean Difference (I-J)	2002 Std. Error	2002 Sig.	2003 Mean Difference (I-J)	2003 Std. Error	2003 Sig.	2004 Mean Difference (I-J)	2004 Std. Error	2004 Sig.	2005 Mean Difference (I-J)	2005 Std. Error	2005 Sig.	2006 Mean Difference (I-J)	2006 Std. Error	2006 Sig.
Amsterdam Centre	Wibautstraat/Weesperstraat	-,156135	,362182	1,000				,166245	1,301823	1,000						
	Vondelpark	-,235453	,321967	,999	,177039	,727075	1,000	-1,080674	,819562	,945	,471099	,958726	1,000	-,516572	1,527081	1,000
	Teleport				-2,627529	2,489334	,972	-2,430769	3,850580	,999	1,315838	1,032343	,924	-10,404139	5,715019	,713
	Sloterdijk	-,575139	,916072	,999				-,448667	1,893496	1,000				-4,407755	2,831443	,845
	South-Axis, WTC, RAI				,488971	,890014	1,000				-,016680	2,190879	1,000	-16,212880	7,601503	,580
	Arena/Bijlmerplein	-,143046	,493399	1,000	,293976	1,056291	1,000									
	Holendrecht				1,221306	,505775	,340				-4,136455	2,648260	,794			
	Amstel III	,330278	,139311	,360	-,630880	1,222324	1,000	-,448667	1,893496	1,000	-6,321997	5,899084	,960			
	World Fashion Centre	,058088	,305769	1,000	-,600891	1,348986	1,000	-5,726450	2,851213	,613	-5,897982	3,818541	,809	-,416098	2,803509	1,000
Wibautstraat/Weesperstraat	Amsterdam Centre	,156135	,362182	1,000				-,166245	1,301823	1,000						
	Vondelpark	-,079318	,442745	1,000				-1,246919	1,414876	,995						
	Teleport							-2,597014	4,019597	,999						
	Sloterdijk	-,419004	,965168	1,000				-,614912	2,217097	1,000						
	South-Axis, WTC, RAI															
	Arena/Bijlmerplein	,013089	,579486	1,000												
	Holendrecht															
	Amstel III	,486413	,334318	,889				-,614912	2,217097	1,000						
	World Fashion Centre	,214223	,431110	1,000				-5,892696	3,075647	,661						
Vondelpark	Amsterdam Centre	,235453	,321967	,999	-,177039	,727075	1,000	1,080674	,819562	,945	-,471099	,958726	1,000	,516572	1,527081	1,000
	Wibautstraat/Weesperstraat	,079318	,442745	1,000				1,246919	1,414876	,995						
	Teleport				-2,804567	2,492751	,961	-1,350095	3,890257	1,000	,844738	,966263	,990	-9,887566	5,728964	,754
	Sloterdijk	-,339687	,950808	1,000				,632008	1,972931	1,000				-3,891182	2,859484	,919
	South-Axis, WTC, RAI				,311932	,899525	1,000				-,487780	2,160528	1,000	-15,696307	7,611992	,609
	Arena/Bijlmerplein	,092407	,555239	1,000	,116937	1,064317	1,000									
	Holendrecht				1,044267	,522331	,607				-4,607555	2,623206	,708			
	Amstel III	,565730	,290267	,638	-,807919	1,229267	,999	,632008	1,972931	1,000	-6,793097	5,887879	,942			
	World Fashion Centre	,293540	,397923	,999	-,777930	1,355281	1,000	-4,645776	2,904573	,823	-6,369082	3,801208	,747	,100474	2,831827	1,000
Teleport	Amsterdam Centre				2,627529	2,489334	,972	2,430769	3,850580	,999	-1,315838	1,032343	,924	10,404139	5,715019	,713
	Wibautstraat/Weesperstraat							2,597014	4,019597	,999						
	Vondelpark				2,804567	2,492751	,961	1,350095	3,890257	1,000	-,844738	,966263	,990	9,887566	5,728964	,754
	Sloterdijk							1,982102	4,248263	1,000				5,996384	6,205330	,984
	South-Axis, WTC, RAI				3,116499	2,545052	,941				-1,332518	2,194187	,999	-5,808741	9,395313	,999
	Arena/Bijlmerplein				2,921505	2,607857	,964									
	Holendrecht				3,848835	2,437412	,818				-5,452293	2,650997	,572			
	Amstel III				1,996648	2,679411	,998	1,982102	4,248263	1,000	-7,637835	5,900314	,903			
	World Fashion Centre				2,026637	2,739513	,998	-3,295681	4,753086	,999	-7,213820	3,820440	,638	9,988041	6,192634	,807
Sloterdijk	Amsterdam Centre	,575139	,916072	,999				,448667	1,893496	1,000				4,407755	2,831443	,845
	Wibautstraat/Weesperstraat	,419004	,965168	1,000				,614912	2,217097	1,000						
	Vondelpark	,339687	,950808	1,000				-,632008	1,972931	1,000				3,891182	2,859484	,919
	Teleport							-1,982102	4,248263	1,000				-5,996384	6,205330	,984
	South-Axis, WTC, RAI													-11,805125	7,976686	,857
	Arena/Bijlmerplein	,432093	1,021673	1,000												
	Holendrecht															
	Amstel III	,905417	,905417	,981				,000000	2,608851	1,000						
	World Fashion Centre	,633227	,945446	,999				-5,277784	3,369004	,843				3,991657	3,701937	,981

Multiple Comparisons

Dependent Variable: Percentage Incentives - Games-Howell		2002			2003			2004			2005			2006		
(I) Business Districts		Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.
South-Axis, WTC, RAI	Amsterdam Centre				-,488971	,890014	1,000				,016680	2,190879	1,000	16,212880	7,601503	,580
	Wibautstraat/Weesperstraat															
	Vondelpark				-,311932	,899525	1,000				,487780	2,160528	1,000	15,696307	7,611992	,609
	Teleport				-3,116499	2,545052	,941				1,332518	2,194187	,999	5,808741	9,395313	,999
	Sloterdijk													11,805125	7,976686	,857
	Arena/Bijlmerplein				-,194995	1,181633	1,000									
	Holendrecht				,732336	,732336	,978				-4,119775	3,280549	,921			
	Amstel III				-1,119851	1,332134	,996				-6,305317	6,208697	,972			
	World Fashion Centre				-1,089862	1,449231	,999				-5,881302	4,281352	,886	15,796782	7,966813	,638
Arena/Bijlmerplein	Amsterdam Centre	,143046	,493399	1,000	-,293976	1,056291	1,000									
	Wibautstraat/Weesperstraat	-,013089	,579486	1,000												
	Vondelpark	-,092407	,555239	1,000	-,116937	1,064317	1,000									
	Teleport				-2,921505	2,607857	,964									
	Sloterdijk	-,432093	1,021673	1,000												
	South-Axis, WTC, RAI				,194995	1,181633	1,000									
	Holendrecht				,927330	,927330	,982									
	Amstel III	,473324	,473324	,986	-,924856	1,448519	1,000									
	World Fashion Centre	,201134	,546006	1,000	-,894867	1,556887	1,000									
Holendrecht	Amsterdam Centre				-1,221306	,505775	,340				4,136455	2,648260	,794			
	Wibautstraat/Weesperstraat															
	Vondelpark				-1,044267	,522331	,607				4,607555	2,623206	,708			
	Teleport				-3,848835	2,437412	,818				5,452293	2,650997	,572			
	Sloterdijk															
	South-Axis, WTC, RAI				-,732336	,732336	,978				4,119775	3,280549	,921			
	Arena/Bijlmerplein				-,927330	,927330	,982									
	Amstel III				-1,852186	1,112774	,789				-2,185542	6,384454	1,000			
	World Fashion Centre				-1,822197	1,250582	,887				-1,761527	4,532473	1,000			
Amstel III	Amsterdam Centre	-,330278	,139311	,360	,630880	1,222324	1,000	,448667	1,893496	1,000	6,321997	5,899084	,960			
	Wibautstraat/Weesperstraat	-,486413	,334318	,889				,614912	2,217097	1,000						
	Vondelpark	-,565730	,290267	,638	,807919	1,229267	,999	-,632008	1,972931	1,000	6,793097	5,887879	,942			
	Teleport				-1,996648	2,679411	,998	-1,982102	4,248263	1,000	7,637835	5,900314	,903			
	Sloterdijk	-,905417	,905417	,981				,000000	2,608851	1,000						
	South-Axis, WTC, RAI				1,119851	1,332134	,996				6,305317	6,208697	,972			
	Arena/Bijlmerplein	-,473324	,473324	,986	,924856	1,448519	1,000									
	Holendrecht				1,852186	1,112774	,789				2,185542	6,384454	1,000			
	World Fashion Centre	-,272190	,272190	,981	,029989	1,673984	1,000	-5,277784	3,369004	,843	,424015	6,951922	1,000			
World Fashion Centre	Amsterdam Centre	-,058088	,305769	1,000	,600891	1,348986	1,000	5,726450	2,851213	,613	5,897982	3,818541	,809	,416098	2,803509	1,000
	Wibautstraat/Weesperstraat	-,214223	,431110	1,000				5,892696	3,075647	,661						
	Vondelpark	-,293540	,397923	,999	,777930	1,355281	1,000	4,645776	2,904573	,823	6,369082	3,801208	,747	-,100474	2,831827	1,000
	Teleport				-2,026637	2,739513	,998	3,295681	4,753086	,999	7,213820	3,820440	,638	-9,988041	6,192634	,807
	Sloterdijk	-,633227	,945446	,999				5,277784	3,369004	,843				-3,991657	3,701937	,981
	South-Axis, WTC, RAI				1,089862	1,449231	,999				5,881302	4,281352	,886	-15,796782	7,966813	,638
	Arena/Bijlmerplein	-,201134	,546006	1,000	,894867	1,556887	1,000									
	Holendrecht				1,822197	1,250582	,887				1,761527	4,532473	1,000			
	Amstel III	,272190	,272190	,981	-,029989	1,673984	1,000	5,277784	3,369004	,843	-,424015	6,951922	1,000			

Multiple Comparisons

Dependent Variable: Percentage Incentives - Games-Howell		2007			2008			2009			2010			2011			2012		
(I) Business Districts		Mean Difference (I-J)	Std. Error	Sig.	Difference (I-	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.
Amsterdam Centre	Wibautstraat/Weesperstraat				,118603	1,573794	1,000												
	Vondelpark	-,443481	1,308550	1,000	-,540154	1,474794	1,000	,503930	1,556106	1,000	2,759697	2,855040	,987	1,072370	2,616806	1,000	-3,062787	2,631478	,849
	Teleport	-9,041596	5,582726	,802															
	Sloterdijk	-5,466978	4,726684	,954	-11,008783	3,918771	,297												
	South-Axis, WTC, RAI	-6,647228*	1,809131	,020	-4,534872*	1,221518	,015	-7,804913	4,278377	,619	-4,051581	4,168578	,983	-15,757344	4,486674	,063	-3,135892	2,479673	,801
	Arena/Bijlmerplein	-8,115639	3,752399	,533	-6,450162	4,601297	,880	-4,929230	3,674868	,868									
	Holendrecht																		
	Amstel III	-6,865104	3,965955	,760	-15,457565	6,138763	,385	-14,299833	4,698124	,160									
	World Fashion Centre	-2,502671	3,163718	,997	-7,858876	4,894013	,808	-9,361059	5,924714	,749	-8,210085	5,371692	,827						
Wibautstraat/Weesperstraat	Amsterdam Centre				-,118603	1,573794	1,000												
	Vondelpark				-,658756	2,030653	1,000												
	Teleport																		
	Sloterdijk				-11,127386	4,159964	,319												
	South-Axis, WTC, RAI				-4,653475	1,854896	,366												
	Arena/Bijlmerplein				-6,568765	4,808374	,896												
	Holendrecht																		
	Amstel III				-15,576167	6,295470	,395												
	World Fashion Centre				-7,977479	5,089194	,827												
Vondelpark	Amsterdam Centre	,443481	1,308550	1,000	,540154	1,474794	1,000	-,503930	1,556106	1,000	-2,759697	2,855040	,987	-1,072370	2,616806	1,000			
	Wibautstraat/Weesperstraat				,658756	2,030653	1,000												
	Teleport	-8,598115	5,619247	,840															
	Sloterdijk	-5,023497	4,769764	,973	-10,468630	4,123528	,371												
	South-Axis, WTC, RAI	-6,203747	1,918869	,061	-3,994719	1,771675	,442	-8,308843	4,220187	,541	-6,811278	3,575525	,626	-16,829714*	4,204948	,034	-,073105	2,679934	1,000
	Arena/Bijlmerplein	-7,672159	3,806521	,609	-5,910009	4,776888	,933												
	Holendrecht																		
	Amstel III	-6,421623	4,017200	,824	-14,917411	6,271454	,437	-14,803763	4,645196	,138									
	World Fashion Centre	-2,059190	3,227725	1,000	-7,318723	5,059455	,873	-9,864989	5,882832	,703	-10,969783	4,925689	,447						
Teleport	Amsterdam Centre	9,041596	5,582726	,802															
	Wibautstraat/Weesperstraat																		
	Vondelpark	8,598115	5,619247	,840															
	Sloterdijk	3,574618	7,225315	1,000															
	South-Axis, WTC, RAI	2,394368	5,756439	1,000															
	Arena/Bijlmerplein	,925956	6,629037	1,000															
	Holendrecht																		
	Amstel III	2,176492	6,752216	1,000															
	World Fashion Centre	6,538925	6,314486	,980															
Sloterdijk	Amsterdam Centre	5,466978	4,726684	,954	11,008783	3,918771	,297												
	Wibautstraat/Weesperstraat				11,127386	4,159964	,319												
	Vondelpark	5,023497	4,769764	,973	10,468630	4,123528	,371												
	Teleport	-3,574618	7,225315	1,000															
	South-Axis, WTC, RAI	-1,180250	4,930649	1,000	6,473911	4,039873	,815												
	Arena/Bijlmerplein	-2,648661	5,926116	1,000	4,558621	6,000033	,998												
	Holendrecht																		
	Amstel III	-1,398126	6,063591	1,000	-4,448781	7,246577	1,000												
	World Fashion Centre	2,964307	5,572024	1,000	3,149907	6,227346	1,000												

Multiple Comparisons

Dependent Variable: Percentage Incentives - Games-Howell		2007			2008			2009			2010			2011			2012		
(I) Business Districts		Mean Difference (I-J)	Std. Error	Sig.	Difference (I-	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.
South-Axis, WTC, RAI	Amsterdam Centre	6,647228*	1,809131	,020	4,534872*	1,221518	,015	7,804913	4,278377	,619	4,051581	4,168578	,983	15,757344	4,486674	,063	3,135892	2,479673	,801
	Wibautstraat/Weesperstraat				4,653475	1,854896	,366												
	Vondelpark	6,203747	1,918869	,061	3,994719	1,771675	,442	8,308843	4,220187	,541	6,811278	3,575525	,626	16,829714*	4,204948	,034	,073105	2,679934	1,000
	Teleport	-2,394368	5,756439	1,000															
	Sloterdijk	1,180250	4,930649	1,000	-6,473911	4,039873	,815												
	Arena/Bijlmerplein	-1,468411	4,006277	1,000	-1,915290	4,704864	1,000												
	Holendrecht																		
	Amstel III	-,217876	4,206965	1,000	-10,922692	6,216770	,744	-6,494920	6,120530	,956									
	World Fashion Centre	4,144557	3,461049	,963	-3,324004	4,991511	,999	-1,556146	7,105684	1,000	-4,158504	5,786899	,998						
Arena/Bijlmerplein	Amsterdam Centre	8,115639	3,752399	,533	6,450162	4,601297	,880	4,929230	3,674868	,868									
	Wibautstraat/Weesperstraat				6,568765	4,808374	,896												
	Vondelpark	7,672159	3,806521	,609	5,910009	4,776888	,933	5,433160	3,606956	,792									
	Teleport	-,925956	6,629037	1,000															
	Sloterdijk	2,648661	5,926116	1,000	-4,558621	6,000033	,998												
	South-Axis, WTC, RAI	1,468411	4,006277	1,000	1,915290	4,704864	1,000	-2,875683	5,375237	,999									
	Holendrecht																		
	Amstel III	1,250535	5,339110	1,000	-9,007402	7,637280	,961	-9,370603	5,714983	,722									
	World Fashion Centre	5,612969	4,773511	,967	-1,408714	6,677949	1,000	-4,431829	6,759504	,996									
Holendrecht	Amsterdam Centre																		
	Wibautstraat/Weesperstraat																		
	Vondelpark																		
	Teleport																		
	Sloterdijk																		
	South-Axis, WTC, RAI																		
	Arena/Bijlmerplein																		
	Amstel III																		
	World Fashion Centre																		
Amstel III	Amsterdam Centre	6,865104	3,965955	,760	15,457565	6,138763	,385	14,299833	4,698124	,160									
	Wibautstraat/Weesperstraat				15,576167	6,295470	,395												
	Vondelpark	6,421623	4,017200	,824	14,917411	6,271454	,437	14,803763	4,645196	,138									
	Teleport	-2,176492	6,752216	1,000															
	Sloterdijk	1,398126	6,063591	1,000	4,448781	7,246577	1,000												
	South-Axis, WTC, RAI	,217876	4,206965	1,000	10,922692	6,216770	,744	6,494920	6,120530	,956									
	Arena/Bijlmerplein	-1,250535	5,339110	1,000	9,007402	7,637280	,961	9,370603	5,714983	,722									
	Holendrecht																		
	World Fashion Centre	4,362433	4,943147	,995	7,598689	7,817128	,989	4,938774	7,366044	,996									
World Fashion Centre	Amsterdam Centre	2,502671	3,163718	,997	7,858876	4,894013	,808	9,361059	5,924714	,749	8,210085	5,371692	,827						
	Wibautstraat/Weesperstraat				7,977479	5,089194	,827												
	Vondelpark	2,059190	3,227725	1,000	7,318723	5,059455	,873	9,864989	5,882832	,703	10,969783	4,925689	,447						
	Teleport	-6,538925	6,314486	,980															
	Sloterdijk	-2,964307	5,572024	1,000	-3,149907	6,227346	1,000												
	South-Axis, WTC, RAI	-4,144557	3,461049	,963	3,324004	4,991511	,999	1,556146	7,105684	1,000	4,158504	5,786899	,998						
	Arena/Bijlmerplein	-5,612969	4,773511	,967	1,408714	6,677949	1,000	4,431829	6,759504	,996									
	Holendrecht																		
	Amstel III	-4,362433	4,943147	,995	-7,598689	7,817128	,989	-4,938774	7,366044	,996									

B.5.4. Significant differences in nominal effective rental prices per year – Sample: City District analysis

**Due to privacy reasons, years with less than 5 transactions per district are deleted from the figures*

Multiple Comparisons

Dependent Variable: Effective rent		2002			2003			2004			2005			2006			2007		
(I) District		Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.
Centre	Westpoort	-16,667692	35,634628	1,000	24,182691	16,048949	,792	66,791916*	9,724951	,000	37,121794	20,992394	,649	34,158770	13,834631	,244	62,965591*	18,359844	,046
	West	36,466073	12,644209	,085	29,341634	12,332640	,265	17,074325	15,170677	,947	21,433287	13,264216	,739	20,806104	21,936936	,979	25,488498	20,969430	,919
	New-West	47,063443	17,307105	,164	32,381585	14,056815	,317	33,974173	11,675165	,109	44,930642*	11,166297	,005	53,814886*	14,187646	,012	44,854555	16,389184	,186
	South	-25,107108	16,052469	,770	-23,896092	12,704372	,566	-40,539710	13,555349	,066	-17,924696	15,184378	,935	-30,975987	13,314866	,288	-47,800918*	14,627143	,030
	East	43,701378*	12,488772	,015	1,807673	17,199281	1,000	5,330865	16,618435	1,000	35,258100	25,689990	,856	46,204524	16,476272	,120	31,362998	13,399511	,285
	North	45,004658	18,631989	,265	23,016538	25,236990	,982	21,855199	20,261015	,954	28,414607	9,755901	,087	52,833823*	13,354954	,006	45,657262	15,273691	,078
	South-East	10,755457	12,017230	,985	12,666784	15,058326	,990	-5,077000	33,913700	1,000	37,796128*	11,399843	,036	41,767284*	12,118635	,022	35,307924	20,418494	,669
Westpoort	Centre	16,667692	35,634628	1,000	-24,182691	16,048949	,792	-66,791916*	9,724951	,000	-37,121794	20,992394	,649	-34,158770	13,834631	,244	-62,965591*	18,359844	,046
	West	53,133765	35,580152	,797	5,158943	15,948378	1,000	-49,717591	15,641907	,055	-15,688507	22,513167	,996	-13,352666	23,510413	,999	-37,477093	24,590344	,788
	New-West	63,731134	37,491427	,688	8,198894	17,316201	1,000	-32,817744	12,281258	,184	7,808848	21,344542	1,000	19,656116	16,516648	,929	-18,111037	20,822425	,985
	South	-8,439416	36,929026	1,000	-48,078782	16,237543	,129	-107,331626*	14,080743	,000	-55,046490	23,695329	,329	-65,134757*	15,773269	,003	-110,766509*	19,465901	,000
	East	60,369069	35,525211	,689	-22,375017	19,951742	,945	-61,461052*	17,049698	,020	-1,863694	31,478228	1,000	12,045754	18,519663	,998	-31,602593	18,561113	,686
	North	61,672349	38,121152	,734	-1,166152	27,187542	1,000	-44,936717	20,616220	,403	-8,707187	20,641726	1,000	18,675053	15,807124	,932	-17,308330	19,956294	,986
	South-East	27,423149	35,362198	,991	-11,515906	18,138631	,998	-71,868917	34,127099	,452	,674333	21,467643	1,000	7,608514	14,777404	,999	-27,657667	24,122249	,940
West	Centre	-36,466073	12,644209	,085	-29,341634	12,332640	,265	-17,074325	15,170677	,947	-21,433287	13,264216	,739	-20,806104	21,936936	,979	-25,488498	20,969430	,919
	Westpoort	-53,133765	35,580152	,797	-5,158943	15,948378	1,000	49,717591	15,641907	,055	15,688507	22,513167	,996	13,352666	23,510413	,999	37,477093	24,590344	,788
	New-West	10,597369	17,194662	,998	3,039951	13,941882	1,000	16,899848	16,923477	,972	23,497355	13,814785	,687	33,008782	23,719861	,856	19,366057	23,156134	,989
	South	-61,573181*	15,931174	,005	-53,237725*	12,577085	,002	-57,614035*	18,271346	,046	-39,357983	17,225778	,316	-51,782091	23,208364	,354	-73,289416*	21,944350	,042
	East	7,235304	12,332476	,999	-27,533960	17,105475	,741	-11,743461	20,646234	,999	13,824813	26,946942	,999	25,398420	25,155716	,971	5,874500	21,145876	1,000
	North	8,538584	18,527589	1,000	-6,325095	25,173154	1,000	4,780874	23,677063	1,000	6,981320	12,701956	,999	32,027719	23,231386	,861	20,168764	22,380501	,984
	South-East	-25,710616	11,854718	,389	-16,674849	14,951093	,949	-22,151325	36,058753	,998	16,362840	14,004232	,937	20,961180	22,543376	,981	9,819426	26,163258	1,000
New-West	Centre	-47,063443	17,307105	,164	-32,381585	14,056815	,317	-33,974173	11,675165	,109	-44,930642*	11,166297	,005	-53,814886*	14,187646	,012	-44,854555	16,389184	,186
	Westpoort	-63,731134	37,491427	,688	-8,198894	17,316201	1,000	32,817744	12,281258	,184	-7,808848	21,344542	1,000	-19,656116	16,516648	,929	18,111037	20,822425	,985
	West	-10,597369	17,194662	,998	-3,039951	13,941882	1,000	-16,899848	16,923477	,972	-23,497355	13,814785	,687	-33,008782	23,719861	,856	-19,366057	23,156134	,989
	South	-72,170550*	19,835881	,017	-56,277676*	14,271760	,007	-74,513883*	15,492002	,000	-62,855338*	15,667617	,004	-84,790873*	16,083789	,000	-92,655472*	17,619388	,001
	East	-3,362065	17,080686	1,000	-30,573911	18,387423	,710	-28,643308	18,232581	,764	-9,672543	25,978538	1,000	-7,610362	18,784839	1,000	-13,491557	16,614343	,990
	North	-2,058785	21,975700	1,000	-9,365046	26,061231	1,000	-12,118974	21,604706	,999	-16,516035	10,492209	,761	-,981063	16,116992	1,000	,802707	18,159713	1,000
	South-East	-36,307986	16,739003	,409	-19,714800	16,402294	,926	-39,051173	34,733178	,942	-7,134515	12,036000	,999	-12,047603	15,108406	,992	-9,546631	22,658429	1,000
South	Centre	25,107108	16,052469	,770	23,896092	12,704372	,566	40,539710	13,555349	,066	17,924696	15,184378	,935	30,975987	13,314866	,288	47,800918*	14,627143	,030
	Westpoort	8,439416	36,929026	1,000	48,078782	16,237543	,129	107,331626*	14,080743	,000	55,046490	23,695329	,329	65,134757*	15,773269	,003	110,766509*	19,465901	,000
	West	61,573181*	15,931174	,005	53,237725*	12,577085	,002	57,614035*	18,271346	,046	39,357983	17,225778	,316	51,782091	23,208364	,354	73,289416*	21,944350	,042
	New-West	72,170550*	19,835881	,017	56,277676*	14,271760	,007	74,513883*	15,492002	,000	62,855338*	15,667617	,004	84,790873*	16,083789	,000	92,655472*	17,619388	,001
	East	68,808485*	15,808090	,001	25,703765	17,375394	,813	45,870575	19,490126	,284	53,182796	27,942147	,563	77,180511*	18,134678	,002	79,163916*	14,878990	,000
	North	70,111765*	21,001840	,032	46,912630	25,357341	,595	62,394909	22,676008	,147	46,339303*	14,695768	,049	83,809810*	15,354276	,000	93,458179*	16,586835	,000
	South-East	35,862565	15,438267	,296	36,562876	15,259169	,269	35,462710	35,409486	,968	55,720823*	15,834912	,018	72,743270*	14,291967	,000	83,108842*	21,418505	,010
East	Centre	-43,701378*	12,488772	,015	-1,807673	17,199281	1,000	-5,330865	16,618435	1,000	-35,258100	25,689990	,856	-46,204524	16,476272	,120	-31,362998	13,399511	,285
	Westpoort	-60,369069	35,525211	,689	22,375017	19,951742	,945	61,461052*	17,049698	,020	1,863694	31,478228	1,000	-12,045754	18,519663	,998	31,602593	18,561113	,686
	West	-7,235304	12,332476	,999	27,533960	17,105475	,741	11,743461	20,646234	,999	-13,824813	26,946942	,999	-25,398420	25,155716	,971	-5,874500	21,145876	1,000
	New-West	3,362065	17,080686	1,000	30,573911	18,387423	,710	28,643308	18,232581	,764	9,672543	25,978538	1,000	7,610362	18,784839	1,000	13,491557	16,614343	,990
	South	-68,808485*	15,808090	,001	-25,703765	17,375394	,813	-45,870575	19,490126	,284	-53,182796	27,942147	,563	-77,180511*	18,134678	,002	-79,163916*	14,878990	,000
	North	1,303280	18,421861	1,000	21,208865	27,882054	,994	16,524335	24,629784	,997	-6,843493	25,404249	1,000	6,629299	18,164132	1,000	14,294264	15,515047	,982
	South-East	-32,945920	11,688788	,118	10,859111	19,163936	,999	-10,407865	36,691369	1,000	2,538028	26,079775	1,000	-4,437240	17,275480	1,000	3,944926	20,599659	1,000
North	Centre	-45,004658	18,631989	,265	-23,016538	25,236990	,982	-21,855199	20,261015	,954	-28,414607	9,755901	,087	-52,833823*	13,354954	,006	-45,657262	15,273691	,078
	Westpoort	-61,672349	38,121152	,734	1,166152	27,187542	1,000	44,936717	20,616220	,403	8,707187	20,641726	1,000	-18,675053	15,807124	,932	17,308330	19,956294	,986
	West	-8,538584	18,527589	1,000	6,325095	25,173154	1,000	-4,780874	23,677063	1,000	-6,981320	12,701956	,999	-32,027719	23,231386	,861	-20,168764	22,380501	,984
	New-West	2,058785	21,975700	1,000	9,365046	26,061231	1,000	12,118974	21,604706	,999	16,516035	10,492209	,761	,981063	16,116992	1,000	-,802707	18,159713	1,000
	South	-70,111765*	21,001840	,032	-46,912630	25,357341	,595	-62,394909	22,676008	,147	-46,339303*	14,695768	,049	-83,809810*	15,354276	,000	-93,458179*	16,586835	,000
	East	-1,303280	18,421861	1,000	-21,208865	27,882054	,994	-16,524335	24,629784	,997	6,843493	25,404249	1,000	-6,629299	18,164132	1,000	-14,294264	15,515047	,982
	South-East	-34,249201	18,105506	,567	-10,349754	26,614787	1,000	-26,932199	38,478473	,996	9,381520	10,740423	,986	-11,066539	14,329321	,994	-10,349338	21,865148	1,000
South-East	Centre	-10,755457	12,017230	,985	-12,666784	15,058326	,990	5,077000	33,913700	1,000	-37,796128*	11,399843	,036	-41,767284*	12,118635	,022	-35,307924	20,418494	,669
	Westpoort	-27,423149	35,362198	,991	11,515906	18,138631	,998	71,868917	34,127099	,452	-,674333	21,467643	1,000	-7,608514	14,777404	,999	27,657667	24,122249	,940
	West	25,710616	11,854718	,389	16,674849	14,951093	,949	22,151325	36,058753	,998	-16,362840	14,004232	,937	-20,961180	22,543376	,981	-9,819426	26,163258	1,000
	New-West	36,307986	16,739003	,409	19,714800	16,402294	,926	39,051173	34,733178	,942	7,134515	12,036000	,999	12,047603	15,108406	,992	9,546631	22,658429	1,000
	South	-35,862565	15,438267	,296	-36,562876	15,259169	,269	-35,462710	35,409486	,968	-55,720823*	15,834912	,018	-72,743270*	14,291967	,000	-83,108842*	21,418505	,010
	East	32,945920	11,688788	,118	-10,859111	19,163936	,999	10,407865	36,691369	1,000	-2,538028	26,079775	1,000	4,437240	17,275480	1,000	-3,944926	20,599659	1,000
	North	34,249201	18,105506	,567	10,349754	26,614787	1,000	26,932199	38,478473	,996	-9,381520	10,740423	,986	11,066539	14,329321	,994	10,349338	21,865148	1,000

Multiple Comparisons

Dependent Variable: Effective rent		2008			2009			2010			2011			2012		
(I) District		Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.
Centre	Westpoort	60,081567	17,299771	,075	49,551561	17,805683	,230	76,566001	21,4						253104	,928
	West	14,287463	17,041303	,989	44,264407	16,423467	,176	19,312709	17,634240	,953	35,311349	12,538475	,108	8,365885	23,372237	1,000
	New-West	27,757893	16,323262	,687	,369962	32,980297	1,000	46,746910*	12,916131	,023	53,135639*	10,161571	,000	15,468165	23,001362	,995
	South	-22,466882	14,896282	,801	-58,885752*	14,392352	,002	-41,947534	20,027452	,430	-6,987734	12,879444	,999	-88,059578*	19,957961	,002
	East	27,139159	14,969401	,616	10,094283	14,446071	,996	2,872153	31,147023	1,000	20,253956	17,317287	,936	-8,651396	21,579384	1,000
	North	23,807499	12,847783	,591	40,828999	14,555719	,138	66,933260	20,272790	,105	49,742190*	10,934983	,000	36,542572	14,106936	,194
	South-East	20,814245	11,754088	,642	34,230863	19,739023	,668	66,875902*	17,264114	,031	60,421574*	14,048205	,004	34,470516	15,048527	,331
Westpoort	Centre	-60,081567	17,299771	,075	-49,551561	17,805683	,230	-76,566001	21,4						253104	,928
	West	-45,794104	21,228843	,418	-5,287154	21,727912	1,000	-57,253292	24,8						443641	1,000
	New-West	-32,323674	20,656879	,763	-49,181599	35,917571	,859	-29,819092	21,7						26908	1,000
	South	-82,548449*	19,548837	,012	-108,437313*	20,236395	,003	-118,513535*	26,5						26788	,000
	East	-32,942408	19,604610	,699	-39,457278	20,274636	,551	-73,693848	35,7						811319	,906
	North	-36,274068	18,036722	,515	-8,722562	20,352908	1,000	-9,632742	26,7						338179	,354
	South-East	-39,267321	17,274732	,389	-15,320698	24,331069	,998	-9,690100	24,5						07665	,602
West	Centre	-14,287463	17,041303	,989	-44,264407	16,423467	,176	-19,312709	17,634240	,953	-35,311349	12,538475	,108	-8,365885	23,372237	1,000
	Westpoort	45,794104	21,228843	,418	5,287154	21,727912	1,000	57,253292	24,8						443641	1,000
	New-West	13,470430	20,440904	,997	-43,894445	35,252798	,907	27,434201	17,939472	,785	17,824290	12,002982	,811	7,102280	28,519843	1,000
	South	-36,754345	19,320480	,556	-103,150159*	19,031542	,000	-61,260243	23,581710	,179	-42,299083	14,376861	,077	-96,425462*	26,127361	,027
	East	12,851696	19,376911	,997	-34,170124	19,072199	,631	-16,440556	33,543036	1,000	-15,057393	18,458128	,991	-17,017281	27,385920	,998
	North	9,520036	17,788964	,999	-3,435408	19,155385	1,000	47,620551	23,790423	,512	14,430841	12,664434	,945	28,176688	21,984642	,888
	South-East	6,526783	17,015883	1,000	-10,033544	23,338570	1,000	47,563192	21,284921	,373	25,110225	15,432631	,731	26,104631	22,600376	,930
New-West	Centre	-27,757893	16,323262	,687	-,369962	32,980297	1,000	-46,746910*	12,916131	,023	-53,135639*	10,161571	,000	-15,468165	23,001362	,995
	Westpoort	32,323674	20,656879	,763	49,181599	35,917571	,859	29,819092	21,7						26908	1,000
	West	-13,470430	20,440904	,997	43,894445	35,252798	,907	-27,434201	17,939472	,785	-17,824290	12,002982	,811	-7,102280	28,519843	1,000
	South	-50,224776	18,690206	,166	-59,255714	34,353593	,673	-88,694444*	20,296726	,001	-60,123373*	12,358734	,000	-103,527742*	25,796128	,032
	East	-,618734	18,748534	1,000	9,724321	34,376133	1,000	-43,874756	31,320844	,847	-32,881682	16,933596	,532	-24,119561	27,070091	,981
	North	-3,950394	17,102342	1,000	40,459037	34,422354	,928	20,186350	20,538848	,966	-3,393448	10,316592	1,000	21,074408	21,589944	,961
	South-East	-6,943648	16,296722	1,000	33,860901	36,914205	,981	20,128992	17,575775	,933	7,285935	13,572409	,999	19,002351	22,216619	,981
South	Centre	22,466882	14,896282	,801	58,885752*	14,392352	,002	41,947534	20,027452	,430	6,987734	12,879444	,999	88,059578*	19,957961	,002
	Westpoort	82,548449*	19,548837	,012	108,437313*	20,236395	,003	118,513535*	26,5						26788	,000
	West	36,754345	19,320480	,556	103,150159*	19,031542	,000	61,260243	23,581710	,179	42,299083	14,376861	,077	96,425462*	26,127361	,027
	New-West	50,224776	18,690206	,166	59,255714	34,353593	,673	88,694444*	20,296726	,001	60,123373*	12,358734	,000	103,527742*	25,796128	,032
	East	49,606042	17,520214	,112	68,980035*	17,353913	,007	44,819687	34,860690	,897	27,241691	18,691421	,826	79,408182	24,536654	,054
	North	46,274381	15,746125	,089	99,714751*	17,445295	,000	108,880794*	25,614775	,007	56,729925*	13,002101	,001	124,602150*	18,313471	,000
	South-East	43,281128	14,867196	,090	93,116615*	21,956739	,008	108,823435*	23,306229	,001	67,409309*	15,710915	,003	122,530093*	19,048247	,000
East	Centre	-27,139159	14,969401	,616	-10,094283	14,446071	,996	-2,872153	31,147023	1,000	-20,253956	17,317287	,936	8,651396	21,579384	1,000
	Westpoort	32,942408	19,604610	,699	39,457278	20,274636	,551	73,693848	35,7						811319	,906
	West	-12,851696	19,376911	,997	34,170124	19,072199	,631	16,440556	33,543036	1,000	15,057393	18,458128	,991	17,017281	27,385920	,998
	New-West	,618734	18,748534	1,000	-9,724321	34,376133	1,000	43,874756	31,320844	,847	32,881682	16,933596	,532	24,119561	27,070091	,981
	South	-49,606042	17,520214	,112	-68,980035*	17,353913	,007	-44,819687	34,860690	,897	-27,241691	18,691421	,826	-79,408182	24,536654	,054
	North	-3,331660	15,815315	1,000	30,734716	17,489639	,652	64,061106	35,002212	,608	29,488234	17,408704	,691	45,193968	20,068204	,376
	South-East	-6,324914	14,940457	1,000	24,136580	21,991988	,949	64,003748	33,349940	,552	40,167618	19,515153	,457	43,121912	20,740910	,465
North	Centre	-23,807499	12,847783	,591	-40,828999	14,555719	,138	-66,933260	20,272790	,105	-49,742190*	10,934983	,000	-36,542572	14,106936	,194
	Westpoort	36,274068	18,036722	,515	8,722562	20,352908	1,000	9,632742	26,7						338179	,354
	West	-9,520036	17,788964	,999	3,435408	19,155385	1,000	-47,620551	23,790423	,512	-14,430841	12,664434	,945	-28,176688	21,984642	,888
	New-West	3,950394	17,102342	1,000	-40,459037	34,422354	,928	-20,186350	20,538848	,966	3,393448	10,316592	1,000	-21,074408	21,589944	,961
	South	-46,274381	15,746125	,089	-99,714751*	17,445295	,000	-108,880794*	25,614775	,007	-56,729925*	13,002101	,001	-124,602150*	18,313471	,000
	East	3,331660	15,815315	1,000	-30,734716	17,489639	,652	-64,061106	35,002212	,608	-29,488234	17,408704	,691	-45,193968	20,068204	,376
	South-East	-2,993254	12,814048	1,000	-6,598136	22,064169	1,000	-,057358	23,517386	1,000	10,679384	14,160742	,994	-2,072057	12,787540	1,000
South-East	Centre	-20,814245	11,754088	,642	-34,230863	19,739023	,668	-66,875902*	17,264114	,031	-60,421574*	14,048205	,004	-34,470516	15,048527	,331
	Westpoort	39,267321	17,274732	,389	15,320698	24,331069	,998	9,690100	24,5						07665	,602
	West	-6,526783	17,015883	1,000	10,033544	23,338570	1,000	-47,563192	21,284921	,373	-25,110225	15,432631	,731	-26,104631	22,600376	,930
	New-West	6,943648	16,296722	1,000	-33,860901	36,914205	,981	-20,128992	17,575775	,933	-7,285935	13,572409	,999	-19,002351	22,216619	,981
	South	-43,281128	14,867196	,090	-93,116615*	21,956739	,008	-108,823435*	23,306229	,001	-67,409309*	15,710915	,003	-122,530093*	19,048247	,000
	East	6,324914	14,940457	1,000	-24,136580	21,991988	,949	-64,003748	33,349940	,552	-40,167618	19,515153	,457	-43,121912	20,740910	,465
	North	2,993254	12,814048	1,000	6,598136	22,064169	1,000	,057358	23,517386	1,000	-10,679384	14,160742	,994	2,072057	12,787540	1,000

*. The mean difference is significant at the 0.05 level.

B.5.5. Significant differences in nominal effective rental prices per year – Sample: Sub-office market analysis

**Due to privacy reasons, years with less than 5 transactions per district are deleted from the figures*

Multiple Comparisons

Dependent Variable: Effective rent - GH test		2002			2003			2004			2005			2006			2007		
(I) AreasWereadam		Mean Diff. (I-J)	Std. Error	Sig.	Mean Diff. (I-J)	Std. Error	Sig.	Mean Diff. (I-J)	Std. Error	Sig.	Mean Diff. (I-J)	Std. Error	Sig.	Mean Diff. (I-J)	Std. Error	Sig.	Mean Diff. (I-J)	Std. Error	Sig.
Centre	North	45,647841	17,562963	,164	28,230122	24,672158	,906	39,498087	20,420765	,482	31,740744*	9,017969	,015	56,300390*	10,285987	,000	72,678161*	13,467942	,000
	East	50,393116*	10,947505	,000	17,509105	18,553811	,960	24,068258	19,193882	,866	33,821263	34,579907	,948	43,486089	15,157167	,091	71,297826*	17,662207	,004
	West	34,748484	12,523689	,092	31,649065*	10,210362	,038	59,588515*	10,111537	,000	38,774041*	9,404193	,001	62,738671*	8,047697	,000	64,403382*	10,791861	,000
	South-Axis	-74,436537	37,099128	,447	-15,814358	19,087137	,979	3,540391	20,160695	1,000	-22,160373	37,117390	,996	9,768399	15,604229	,995	16,681965	16,688097	,952
	South-Bank	29,555709	21,196820	,795	2,360547	15,977907	1,000	1,225572	26,334326	1,000	35,133257	17,750840	,489	-27,602973	31,991935	,972	40,069467	12,534485	,060
	South-East	11,398640	10,282046	,921	17,880368	14,091234	,861	12,565887	34,009381	1,000	41,122264*	10,775092	,008	66,979774*	13,549160	,001	61,611622*	12,243039	,000
North	Centre	-45,647841	17,562963	,164	-28,230122	24,672158	,906	-39,498087	20,420765	,482	-31,740744*	9,017969	,015	-56,300390*	10,285987	,000	-72,678161*	13,467942	,000
	East	4,745275	18,491532	1,000	-10,721016	29,223756	1,000	-15,429828	26,312736	,997	2,080518	34,569120	1,000	-12,814301	15,706259	,982	-1,380336	19,167447	1,000
	West	-10,899357	19,466167	,998	3,418943	24,779740	1,000	20,090429	20,644566	,954	7,033297	9,364451	,988	6,438281	9,039485	,991	-8,274779	13,111130	,995
	South-Axis	-120,084378	39,980422	,083	-44,044480	29,565229	,748	-35,957695	27,026072	,833	-53,901117	37,107341	,765	-46,531991	16,138117	,101	-55,996196	18,273753	,051
	South-Bank	-16,092132	25,911273	,995	-25,869575	27,660035	,963	-38,272515	31,897518	,887	3,392513	17,729817	1,000	-83,903363	32,255709	,200	-32,608694	14,579121	,314
	South-East	-34,249201	18,105506	,501	-10,349754	26,614787	1,000	-26,932199	38,478473	,991	9,381520	10,740423	,974	10,679384	14,160742	,987	-11,066539	14,329321	,986
East	Centre	-50,393116*	10,947505	,000	-17,509105	18,553811	,960	-24,068258	19,193882	,866	-33,821263	34,579907	,948	-43,486089	15,157167	,091	-71,297826*	17,662207	,004
	North	-4,745275	18,491532	1,000	10,721016	29,223756	1,000	15,429828	26,312736	,997	-2,080518	34,569120	1,000	12,814301	15,706259	,982	1,380336	19,167447	1,000
	West	-15,644632	13,795719	,916	14,139960	18,696631	,987	35,520257	19,431819	,541	4,952779	34,671878	1,000	19,252582	14,340518	,826	-6,894444	17,391660	1,000
	South-Axis	-124,829653	37,547628	,051	-33,323463	24,690713	,823	-20,527867	26,111416	,985	-55,981636	49,913936	,914	-33,717690	19,605535	,608	-54,615861	21,552219	,168
	South-Bank	-20,837407	21,972352	,957	-15,148558	22,374227	,993	-22,842687	31,126342	,989	1,311995	37,799373	1,000	-71,089062	34,122850	,405	-31,228358	18,523468	,630
	South-East	-38,994476*	11,798286	,031	,371263	21,068350	1,000	-11,502371	37,841649	1,000	7,301002	35,068546	1,000	23,493684	18,012906	,845	-9,686204	18,327508	,998
West	Centre	-34,748484	12,523689	,092	-31,649065*	10,210362	,038	-59,588515*	10,111537	,000	-38,774041*	9,404193	,001	-62,738671*	8,047697	,000	-64,403382*	10,791861	,000
	North	10,899357	19,466167	,998	-3,418943	24,779740	1,000	-20,090429	20,644566	,954	-7,033297	9,364451	,988	-6,438281	9,039485	,991	8,274779	13,111130	,995
	East	15,644632	13,795719	,916	-14,139960	18,696631	,987	-35,520257	19,431819	,541	-4,952779	34,671878	1,000	-19,252582	14,340518	,826	6,894444	17,391660	1,000
	South-Axis	-109,185021	38,037078	,115	-47,463423	19,225996	,222	-56,048124	20,387352	,131	-60,934414	37,203089	,664	-52,970272*	14,812249	,031	-47,721417	16,401489	,076
	South-Bank	-5,192775	22,798666	1,000	-29,288518	16,143533	,551	-58,362943	26,508248	,357	-3,640784	17,929347	1,000	-90,341644	31,613204	,138	-24,333915	12,150291	,448
	South-East	-23,349844	13,273826	,580	-13,768697	14,278760	,958	-47,022628	34,144230	,805	2,348223	11,066696	1,000	4,241102	12,628955	1,000	-2,791760	11,849399	1,000
South-Axis	Centre	74,436537	37,099128	,447	15,814358	19,087137	,979	-3,540391	20,160695	1,000	22,160373	37,117390	,996	-9,768399	15,604229	,995	-16,681965	16,688097	,952
	North	120,084378	39,980422	,083	44,044480	29,565229	,748	35,957695	27,026072	,833	53,901117	37,107341	,765	46,531991	16,138117	,101	55,996196	18,273753	,051
	East	124,829653	37,547628	,051	33,323463	24,690713	,823	20,527867	26,111416	,985	55,981636	49,913936	,914	33,717690	19,605535	,608	54,615861	21,552219	,168
	West	109,185021	38,037078	,115	47,463423	19,225996	,222	56,048124	20,387352	,131	60,934414	37,203089	,664	52,970272*	14,812249	,031	47,721417	16,401489	,076
	South-Bank	103,992246	41,704696	,209	18,174905	22,818434	,983	-2,314819	31,731650	1,000	57,293630	40,133818	,780	-37,371372	34,323770	,923	23,387503	17,597098	,834
	South-East	85,835177	37,359028	,301	33,694726	21,539505	,705	9,025496	38,341086	1,000	63,282637	37,573043	,637	57,211375	18,390678	,058	44,929657	17,390703	,154
South-Bank	Centre	-29,555709	21,196820	,795	-2,360547	15,977907	1,000	-1,225572	26,334326	1,000	-35,133257	17,750840	,489	27,602973	31,991935	,972	-40,069467	12,534485	,060
	North	16,092132	25,911273	,995	25,869575	27,660035	,963	38,272515	31,897518	,887	-3,392513	17,729817	1,000	83,903363	32,255709	,200	32,608694	14,579121	,314
	East	20,837407	21,972352	,957	15,148558	22,374227	,993	22,842687	31,126342	,989	-1,311995	37,799373	1,000	71,089062	34,122850	,405	31,228358	18,523468	,630
	West	5,192775	22,798666	1,000	29,288518	16,143533	,551	58,362943	26,508248	,357	3,640784	17,929347	1,000	90,341644	31,613204	,138	24,333915	12,150291	,448
	South-Axis	-103,992246	41,704696	,209	-18,174905	22,818434	,983	2,314819	31,731650	1,000	-57,293630	40,133818	,780	37,371372	34,323770	,923	-23,387503	17,597098	,834
	South-East	-18,157069	21,648484	,976	15,519821	18,839453	,981	11,340316	41,917562	1,000	5,989007	18,684893	1,000	94,582747	33,439632	,132	21,542154	13,455753	,683
South-East	Centre	-11,398640	10,282046	,921	-17,880368	14,091234	,861	-12,565887	34,009381	1,000	-41,122264*	10,775092	,008	-66,979774*	13,549160	,001	-61,611622*	12,243039	,000
	North	34,249201	18,105506	,501	10,349754	26,614787	1,000	26,932199	38,478473	,991	-9,381520	10,740423	,974	-10,679384	14,160742	,987	11,066539	14,329321	,986
	East	38,994476*	11,798286	,031	-,371263	21,068350	1,000	11,502371	37,841649	1,000	-7,301002	35,068546	1,000	-23,493684	18,012906	,845	9,686204	18,327508	,998
	West	23,349844	13,273826	,580	13,768697	14,278760	,958	47,022628	34,144230	,805	-2,348223	11,066696	1,000	-4,241102	12,628955	1,000	2,791760	11,849399	1,000
	South-Axis	-85,835177	37,359028	,301	-33,694726	21,539505	,705	-9,025496	38,341086	1,000	-63,282637	37,573043	,637	-57,211375	18,390678	,058	-44,929657	17,390703	,154
	South-Bank	18,157069	21,648484	,976	-15,519821	18,839453	,981	-11,340316	41,917562	1,000	-5,989007	18,684893	1,000	-94,582747	33,439632	,132	-21,542154	13,455753	,683

Multiple Comparisons																
Dependent Variable: Effective rent - GH test		2008			2009			2010			2011			2012		
(I) AreasWereadam		Mean Difference (I-	Std. Error	Sig.	Mean Difference (I-	Std. Error	Sig.	Mean Difference (I-	Std. Error	Sig.	Mean Difference (I-	Std. Error	Sig.	Mean Difference (I-	Std. Error	Sig.
Centre	North	59,265698*	14,565757	,004	28,834663	12,052742	,243	67,260077*	14,598664	,002	80,749679*	20,311255	,034	54,864920*	13,361576	,004
	East	41,079378	19,879602	,402	30,436149	14,840474	,409	36,204934	14,480329	,219	12,550255	52,086546	1,000	12,875324	22,805675	,997
	West	55,762249*	13,412429	,002	41,862898*	10,740207	,003	62,128155*	17,500297	,014	66,915423*	11,443907	,000	42,166561	16,656105	,180
	South-Axis	-6,041974	20,635334	,070	-49,859693	28,038988	,583	-43,506966	26,237379	,651	-50,149861	35,741495	,794	-126,842136*	16,854434	,000
	South-Bank	50,456728*	10,848551	,000				37,593451	41,553011	,942						
	South-East	48,916360	19,894485	,218	25,841410	10,879413	,232	60,661941	19,770712	,093	80,692320*	17,309266	,006	52,792863*	14,352150	,014
North	Centre	-59,265698*	14,565757	,004	-28,834663	12,052742	,243	-67,260077*	14,598664	,002	-80,749679*	20,311255	,034	-54,864920*	13,361576	,004
	East	-18,186320	21,851607	,979	1,601486	16,311893	1,000	-31,055143	17,482174	,576	-68,199424	54,465265	,860	-41,989595	21,854880	,504
	West	-3,503449	16,192202	1,000	13,028235	12,696072	,943	-5,131922	20,055096	1,000	-13,834256	19,606626	,988	-12,698359	15,328496	,979
	South-Axis	-120,307672*	22,541321	,000	-78,694356	28,844809	,162	-110,767043*	28,006187	,014	-130,899539*	39,126861	,039	-181,707056*	15,543774	,000
	South-Bank	-8,808970	14,141613	,996				-29,666626	42,691910	,981						
	South-East	-10,349338	21,865148	,999	-2,993254	12,814048	1,000	-6,598136	22,064169	1,000	-,057358	23,517386	1,000	-2,072057	12,787540	1,000
East	Centre	-41,079378	19,879602	,402	-30,436149	14,840474	,409	-36,204934	14,480329	,219	-12,550255	52,086546	1,000	-12,875324	22,805675	,997
	North	18,186320	21,851607	,979	-1,601486	16,311893	1,000	31,055143	17,482174	,576	68,199424	54,465265	,860	41,989595	21,854880	,504
	West	14,682871	21,100348	,992	11,426749	15,367541	,988	25,923221	19,969122	,848	54,365168	51,815837	,929	29,291236	24,011038	,877
	South-Axis	-102,121352*	26,289702	,006	-80,295842	30,116343	,170	-79,711900	27,944686	,120	-62,700116	61,898081	,944	-139,717460*	24,149038	,001
	South-Bank	9,377350	19,570961	,999				1,388517	42,651590	1,000						
	South-East	7,836982	25,712292	1,000	-4,594740	15,465152	1,000	24,457007	21,986052	,916	68,142065	53,418430	,849	39,917539	22,474170	,584
West	Centre	-55,762249*	13,412429	,002	-41,862898*	10,740207	,003	-62,128155*	17,500297	,014	-66,915423*	11,443907	,000	-42,166561	16,656105	,180
	North	3,503449	16,192202	1,000	-13,028235	12,696072	,943	5,131922	20,055096	1,000	13,834256	19,606626	,988	12,698359	15,328496	,979
	East	-14,682871	21,100348	,992	-11,426749	15,367541	,988	-25,923221	19,969122	,848	-54,365168	51,815837	,929	-29,291236	24,011038	,877
	South-Axis	-116,804223*	21,813829	,000	-91,722591	28,321485	,072	-105,635121	29,622389	,025	-117,065283*	35,345823	,048	-169,008697*	18,452725	,000
	South-Bank	-5,305521	12,950567	1,000				-24,534704	43,769151	,994						
	South-East	-6,845889	21,114371	1,000	-16,021488	11,588067	,808	-1,466214	24,082503	1,000	13,776898	16,476754	,975	10,626303	16,199238	,994
South-Axis	Centre	6,041974	20,635334	,070	49,859693	28,038988	,583	43,506966	26,237379	,651	50,149861	35,741495	,794	126,842136*	16,854434	,000
	North	120,307672*	22,541321	,000	78,694356	28,844809	,162	110,767043*	28,006187	,014	130,899539*	39,126861	,039	181,707056*	15,543774	,000
	East	102,121352*	26,289702	,006	80,295842	30,116343	,170	79,711900	27,944686	,120	62,700116	61,898081	,944	139,717460*	24,149038	,001
	West	116,804223*	21,813829	,000	91,722591	28,321485	,072	105,635121	29,622389	,025	117,065283*	35,345823	,048	169,008697*	18,452725	,000
	South-Bank	111,498702*	20,338165	,000				81,100417	47,936189	,655						
	South-East	109,958334*	26,300958	,002	75,701102	28,374568	,182	104,168907*	31,017843	,040	130,842181	37,656007	,030	179,634999*	16,403092	,000
South-Bank	Centre	-50,456728*	10,848551	,000				-37,593451	41,553011	,942						
	North	8,808970	14,141613	,996				29,666626	42,691910	,981						
	East	-9,377350	19,570961	,999				-1,388517	42,651590	1,000						
	West	5,305521	12,950567	1,000				24,534704	43,769151	,994						
	South-Axis	-111,498702*	20,338165	,000				-81,100417	47,936189	,655						
	South-East	-1,540368	19,586079	1,000				23,068490	44,725376	,996						
South-East	Centre	-48,916360	19,894485	,218	-25,841410	10,879413	,232	-60,661941	19,770712	,093	-80,692320*	17,309266	,006	-52,792863*	14,352150	,014
	North	10,349338	21,865148	,999	2,993254	12,814048	1,000	6,598136	22,064169	1,000	,057358	23,517386	1,000	2,072057	12,787540	1,000
	East	-7,836982	25,712292	1,000	4,594740	15,465152	1,000	-24,457007	21,986052	,916	-68,142065	53,418430	,849	-39,917539	22,474170	,584
	West	6,845889	21,114371	1,000	16,021488	11,588067	,808	1,466214	24,082503	1,000	-13,776898	16,476754	,975	-10,626303	16,199238	,994
	South-Axis	-109,958334*	26,300958	,002	-75,701102	28,374568	,182	-104,168907*	31,017843	,040	-130,842181	37,656007	,030	-179,634999*	16,403092	,000
	South-Bank	1,540368	19,586079	1,000				-23,068490	44,725376	,996						

B.5.6. Significant differences in effective rental prices per year – Sample: Business District analysis

**Due to privacy reasons, years with less than 5 transactions per district are deleted from the figures*

Multiple Comparisons																
Dependent Variable: Nominal Effective rental price - Games-Howell test		2002			2003			2004			2005			2006		
(I) Business Districts		Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.
Amsterdam Centre	Wibautstraat/Weesperstraat	53,292719	16,860877	,074				36,660538	16,795489	,471						
	Vondelpark	6,730171	19,793712	1,000	-29,170147	18,484670	,851	-39,385063	16,200050	,289	-20,871809	20,858516	,971	-51,988857	26,827434	,646
	Teleport													54,277931	19,008587	,260
	Sloterdijk	34,903741	41,304745	,992				82,993152*	13,015279	,000				76,982242*	14,465196	,001
	South-Axis, WTC, RAI				-78,152555	37,454518	,595									
	Arena/Bijlmerplein				-,868596	24,160111	1,000									
	Holendrecht				25,047622	33,816080	,996				63,368609	16,977327	,081			
	Amstel III										52,704664	22,129391	,360			
	World Fashion Centre	51,033191	33,097665	,835	34,724423	18,721515	,696	38,468518	17,573394	,459	63,937748	17,989004	,067	60,502076*	13,275859	,003
Wibautstraat/Weesperstraat	Amsterdam Centre	-53,292719	16,860877	,074				-36,660538	16,795489	,471						
	Vondelpark	-46,562547	19,371040	,351				-76,045601*	19,569524	,023						
	Teleport															
	Sloterdijk	-18,388977	41,103869	1,000				46,332614	17,027099	,249						
	South-Axis, WTC, RAI															
	Arena/Bijlmerplein															
	Holendrecht															
	Amstel III															
	World Fashion Centre	-2,259527	32,846637	1,000				1,807980	20,720734	1,000						
Vondelpark	Amsterdam Centre	-6,730171	19,793712	1,000	29,170147	18,484670	,851	39,385063	16,200050	,289	20,871809	20,858516	,971	51,988857	26,827434	,646
	Wibautstraat/Weesperstraat	46,562547	19,371040	,351				76,045601*	19,569524	,023						
	Teleport													106,266789*	29,620344	,045
	Sloterdijk	28,173570	42,391390	,999				122,378214*	16,440051	,000				128,971099*	26,931028	,003
	South-Axis, WTC, RAI				-48,982407	39,354983	,935									
	Arena/Bijlmerplein				28,301551	27,012677	,982									
	Holendrecht				54,217770	35,909623	,843				84,240419*	22,995736	,036			
	Amstel III										73,576474	27,023772	,191			
	World Fashion Centre	44,303020	34,444208	,926	63,894571	22,281582	,163	77,853581*	20,241097	,020	84,809557*	23,752442	,034	112,490934*	26,311344	,009
Teleport	Amsterdam Centre													-54,277931	19,008587	,260
	Wibautstraat/Weesperstraat															
	Vondelpark													-106,266789*	29,620344	,045
	Sloterdijk													22,704311	19,154515	,954
	South-Axis, WTC, RAI															
	Arena/Bijlmerplein															
	Holendrecht															
	Amstel III															
	World Fashion Centre													6,224145	18,272986	1,000
Sloterdijk	Amsterdam Centre	-34,903741	41,304745	,992				-82,993152*	13,015279	,000				-76,982242*	14,465196	,001
	Wibautstraat/Weesperstraat	18,388977	41,103869	1,000				-46,332614	17,027099	,249						
	Vondelpark	-28,173570	42,391390	,999				-122,378214*	16,440051	,000				-128,971099*	26,931028	,003
	Teleport							-9,582832	11,280015	,988				-22,704311	19,154515	,954
	South-Axis, WTC, RAI															
	Arena/Bijlmerplein															
	Holendrecht															
	Amstel III															
	World Fashion Centre	16,129450	50,006943	1,000				-44,524634	17,794882	,315				-16,480166	13,483972	,955

Multiple Comparisons

Dependent Variable: Nominal Effective rental price - Games-Howell test		2002			2003			2004			2005			2006		
(I) Business Districts		Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.
South-Axis, WTC, RAI	Amsterdam Centre				78,152555	37,454518	,595									
	Wibautstraat/Weesperstraat															
	Vondelpark				17,605898	59,053360	1,000									
	Teleport															
	Sloterdijk															
	Arena/Bijlmerplein				77,283958	42,318348	,710									
	Holendrecht				103,200177	48,483594	,559									
	Amstel III															
	World Fashion Centre				112,876978	39,466780	,293									
Arena/Bijlmerplein	Amsterdam Centre				,868596	24,160111	1,000									
	Wibautstraat/Weesperstraat															
	Vondelpark				-28,301551	27,012677	,982									
	Teleport															
	Sloterdijk															
	South-Axis, WTC, RAI				-77,283958	42,318348	,710									
	Holendrecht				25,916218	39,134754	,999									
	Amstel III															
	World Fashion Centre				35,593019	27,175298	,933									
Holendrecht	Amsterdam Centre															
	Wibautstraat/Weesperstraat															
	Vondelpark															
	Teleport															
	Sloterdijk															
	South-Axis, WTC, RAI															
	Arena/Bijlmerplein															
	Amstel III															
	World Fashion Centre															
Amstel III	Amsterdam Centre										-52,704664	22,129391	,360			
	Wibautstraat/Weesperstraat															
	Vondelpark										-73,576474	27,023772	,191			
	Teleport															
	Sloterdijk															
	South-Axis, WTC, RAI															
	Arena/Bijlmerplein															
	Holendrecht										10,663945	24,154424	1,000			
	World Fashion Centre										11,233084	24,875908	1,000			
World Fashion Centre	Amsterdam Centre	-51,033191	33,097665	,835	-34,724423	18,721515	,696	-38,468518	17,573394	,459	-63,937748	17,989004	,067	-60,502076*	13,275859	,003
	Wibautstraat/Weesperstraat	2,259527	32,846637	1,000				-1,807980	20,720734	1,000						
	Vondelpark	-44,303020	34,444208	,926	-63,894571	22,281582	,163	-77,853581*	20,241097	,020	-84,809557*	23,752442	,034	-112,490934*	26,311344	,009
	Teleport													-6,224145	18,272986	1,000
	Sloterdijk	-16,129450	50,006943	1,000				44,524634	17,794882	,315				16,480166	13,483972	,955
	South-Axis, WTC, RAI				-112,876978	39,466780	,293									
	Arena/Bijlmerplein				-35,593019	27,175298	,933									
	Holendrecht				-9,676801	36,032112	1,000				-,569139	20,428668	1,000			
	Amstel III										-11,233084	24,875908	1,000			

Multiple Comparisons

Dependent Variable: Nominal Effective rental price - Games-Howell test		2007			2008			2009			2010			2011			2012		
(I) Business Districts		Mean Difference (I-J)	Std. Error	Sig.	Difference (I-	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.
Amsterdam Centre	Wibautstraat/Weesperstraat				9,926385	23,231549	1,000												
	Vondelpark	-59,871030	20,670011	,141	-43,871280	26,449235	,763	-29,145698	34,284217	,983	-72,176129*	20,811982	,026	-79,650362	25,941094	,096	-55,034967	31,239871	,512
	Teleport	30,789911	21,996287	,896															
	Sloterdijk	56,956723	26,872698	,561	107,609997*	18,791004	,003												
	South-Axis, WTC, RAI	-52,285731	25,254960	,566	-121,865613*	20,726259	,000	-153,466284*	31,746027	,035	-122,936600*	24,301067	,005	-97,256260	55,511556	,660	-136,676369*	21,221825	,000
	Arena/Bijlmerplein	14,567450	20,281597	,999				-1,109317	15,333010	1,000									
	Holendrecht																		
	Amstel III	52,804976*	13,655758	,013	12,090040	42,583995	1,000												
	World Fashion Centre	98,224136*	19,277328	,004				4,903218	26,642563	1,000	-17,887193	50,020807	1,000						
Wibautstraat/Weesperstraat	Amsterdam Centre				-9,926385	23,231549	1,000												
	Vondelpark				-53,797666	30,921538	,716												
	Teleport																		
	Sloterdijk				97,683612	24,691726	,065												
	South-Axis, WTC, RAI				-131,791998*	26,194605	,008												
	Arena/Bijlmerplein																		
	Holendrecht																		
	Amstel III				2,163655	45,496991	1,000												
	World Fashion Centre																		
Vondelpark	Amsterdam Centre	59,871030	20,670011	,141	43,871280	26,449235	,763	29,145698	34,284217	,983	72,176129*	20,811982	,026	79,650362	25,941094	,096	55,034967	31,239871	,512
	Wibautstraat/Weesperstraat				53,797666	30,921538	,716												
	Teleport	90,660941	25,276916	,073															
	Sloterdijk	116,827753*	29,618031	,048	151,481277*	27,740556	,001												
	South-Axis, WTC, RAI	7,585299	28,158460	1,000	-77,994333	29,086328	,202	-124,320586	43,248304	,179	-50,760471	27,543563	,603	-17,605898	59,053360	1,000	-81,641402	27,067652	,089
	Arena/Bijlmerplein	74,438480	23,799769	,123															
	Holendrecht																		
	Amstel III	112,676006*	18,481493	,000	55,961321	47,221111	,940												
	World Fashion Centre	158,095166*	22,949973	,000				34,048916	39,653898	,984	54,288936	51,673854	,954						
Teleport	Amsterdam Centre	-30,789911	21,996287	,896															
	Wibautstraat/Weesperstraat																		
	Vondelpark	-90,660941	25,276916	,073															
	Sloterdijk	26,166812	30,558387	,994															
	South-Axis, WTC, RAI	-83,075642	29,145946	,208															
	Arena/Bijlmerplein	-16,222461	24,960294	,999															
	Holendrecht																		
	Amstel III	22,015066	19,953768	,964															
	World Fashion Centre	67,434225	24,151367	,268															
Sloterdijk	Amsterdam Centre	-56,956723	26,872698	,561	-107,609997*	18,791004	,003												
	Wibautstraat/Weesperstraat				-97,683612	24,691726	,065												
	Vondelpark	-116,827753*	29,618031	,048	-151,481277*	27,740556	,001												
	Teleport	-26,166812	30,558387	,994															
	South-Axis, WTC, RAI	-109,242454	32,981684	,104	-229,475610*	22,350711	,000												
	Arena/Bijlmerplein	-42,389273	29,348281	,884															
	Holendrecht																		
	Amstel III	-4,151747	25,228122	1,000	-95,519957	43,397847	,493												
	World Fashion Centre	41,267413	28,663458	,885															

Multiple Comparisons

Dependent Variable: Nominal Effective rental price - Games-Howell test		2007			2008			2009			2010			2011			2012		
(I) Business Districts		Mean Difference (I-J)	Std. Error	Sig.	Difference (I-	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.
South-Axis, WTC, RAI	Amsterdam Centre	52,285731	25,254960	,566	121,865613*	20,726259	,000	153,466284*	31,746027	,035	122,936600*	24,301067	,005	97,256260	55,511556	,660	136,676369*	21,221825	,000
	Wibautstraat/Weesperstraat				131,791998*	26,194605	,008												
	Vondelpark	17,605898	59,053360	1,000	77,994333	29,086328	,202	124,320586	43,248304	,179	50,760471	27,543563	,603	17,605898	59,053360	1,000	81,641402	27,067652	,089
	Teleport	83,075642	29,145946	,208															
	Sloterdijk	109,242454	32,981684	,104	229,475610*	22,350711	,000												
	Arena/Bijlmerplein	66,853181	27,874589	,384	118,326116	43,404052	,342												
	Holendrecht																		
	Amstel III	105,090707*	23,497431	,013															
	World Fashion Centre	150,509867*	27,152623	,001	172,929377*	18,119725	,000	158,369501*	37,481120	,038	105,049407	53,175092	,535						
Arena/Bijlmerplein	Amsterdam Centre	-14,567450	20,281597	,999				1,109317	15,333010	1,000									
	Wibautstraat/Weesperstraat																		
	Vondelpark	-74,438480	23,799769	,123				-28,036381	33,131657	,983									
	Teleport	16,222461	24,960294	,999															
	Sloterdijk	42,389273	29,348281	,884															
	South-Axis, WTC, RAI	-66,853181	27,874589	,384				-152,356967*	30,497695	,042									
	Holendrecht																		
	Amstel III	38,237526	18,046035	,565															
	World Fashion Centre	83,656686	22,600776	,067				6,012535	25,142102	1,000									
Holendrecht	Amsterdam Centre																		
	Wibautstraat/Weesperstraat																		
	Vondelpark																		
	Teleport																		
	Sloterdijk																		
	South-Axis, WTC, RAI																		
	Arena/Bijlmerplein																		
	Amstel III																		
	World Fashion Centre																		
Amstel III	Amsterdam Centre	-52,804976*	13,655758	,013	-12,090040	42,583995	1,000												
	Wibautstraat/Weesperstraat				-2,163655	45,496991	1,000												
	Vondelpark	-112,676006*	18,481493	,000	-55,961321	47,221111	,940												
	Teleport	-22,015066	19,953768	,964															
	Sloterdijk	4,151747	25,228122	1,000	95,519957	43,397847	,493												
	South-Axis, WTC, RAI	-105,090707*	23,497431	,013	-133,955653	44,270183	,204												
	Arena/Bijlmerplein	-38,237526	18,046035	,565															
	Holendrecht																		
	World Fashion Centre	45,419159	16,909513	,306															
World Fashion Centre	Amsterdam Centre	-98,224136*	19,277328	,004				-4,903218	26,642563	1,000	17,887193	50,020807	1,000						
	Wibautstraat/Weesperstraat																		
	Vondelpark	-158,095166*	22,949973	,000				-34,048916	39,653898	,984	-54,288936	51,673854	,954						
	Teleport	-67,434225	24,151367	,268															
	Sloterdijk	-41,267413	28,663458	,885															
	South-Axis, WTC, RAI	-150,509867*	27,152623	,001				-158,369501*	37,481120	,038	-105,049407	53,175092	,535						
	Arena/Bijlmerplein	-83,656686	22,600776	,067				-6,012535	25,142102	1,000									
	Holendrecht																		
	Amstel III	-45,419159	16,909513	,306															

Appendix C

Study 6 | Structural segmentation analysis

- *Descriptive statistics per sample (C1)*
- *Outcomes One-way ANOVA test (C2)*
- *Outcomes Post-Hoc Procedures (C3)*

Appendix C1. | Structural segmentation analysis

C.1.1. Introduction and method used

This chapter researches the structural segmentation in the Amsterdam office market. This will be performed by investigating the influence of several building, location and user characteristics on the amount of incentives provided and the real effective rental price in the Amsterdam Office market.

The influence of the following variables will be discussed in this chapter:

Building characteristics
- Several construction periods
- The age of a building
- The floor area

Location characteristics:
- (Google) Walkscore
- Distance to station
- Distance to highway

User characteristics:
- Several contract types

The influence of the above variables will be tested by means of a One-Way ANOVA test, in which multiple means per variable will be compared by means of a Post-Hoc test. The Games-Howell test is conducted when the variances show to be significantly different by the Levene's test; the Hochberg's GT2 test is used when the variances are similar, as explained in the methods part of this report.

The descriptive statistics per building, location or user characteristics, together with the outcomes of the Levene's test and ANOVA / Robust Test of Equality of means; are added as Appendix (C2) and (C3) to this research.

C.1.2. Building characteristics | Construction period, Age & Lettable floor area

C.1.2.1. Construction period

The building years are divided in several construction period categories. The following construction period categories are researched:
- Construction period < 1950
- Construction period < 1950-1980
- Construction period < 1980-1995
- Construction period > 1995

The influence of the construction period on the rental price shows that the construction period 1950-1980 has a significant negative influence on the rental price. The rental prices in this period are on average € 50 / m2 lower compared to buildings constructed in the period <1950 or in the period >1995. The difference with the buildings constructed in the period 1980-1995 is even higher, almost € 60 / m2. The other construction periods don't significantly influence the rental prices.

For transactions with an LFA < 500 m2, more or less the same occurs, as the rental price of buildings constructed in the period 1950-1980 is on average € 25-30 / m2 lower compared to buildings in the constructed in the period < 1950 and buildings constructed in the period 1980-1995. There are no significant differences with buildings > 1995.
In addition, buildings constructed after 1995 have on average a € 20 /m2 lower rental price compared to buildings in the period < 1950 and in the period 1980-1995. The higher rental prices for buildings before 1950, might be explained by the so-called 'vintage effect'.

Multiple Comparisons		Games-Howell / Hochberg GT2	TRANSACTIONS LFA > 500 m2			TRANSACTIONS LFA < 500 m2		
Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.
Real Effective Rent / m2	Construction Period < 1950	Construction Period 1950-1980	52,36505*	9,53141	,000	27,29528*	4,97653	,000
		Construction Period 1980-1995	-4,97789	11,86093	,975	-2,02026	6,44675	,989
		Construction Period > 1995	3,36385	11,03149	,990	19,16981*	4,65685	,000
	Construction Period 1950-1980	Construction Period < 1950	-52,36505*	9,53141	,000	-27,29528*	4,97653	,000
		Construction Period 1980-1995	-57,34294*	10,42921	,000	-29,31554*	7,34778	,000
		Construction Period > 1995	-49,00119*	9,47526	,000	-8,12547	5,84085	,505
	Construction Period 1980-1995	Construction Period < 1950	4,97789	11,86093	,975	2,02026	6,44675	,989
		Construction Period 1950-1980	57,34294*	10,42921	,000	29,31554*	7,34778	,000
		Construction Period > 1995	8,34174	11,81585	,895	21,19006*	7,13515	,017
	Construction Period > 1995	Construction Period < 1950	-3,36385	11,03149	,990	-19,16981*	4,65685	,000
		Construction Period 1950-1980	49,00119*	9,47526	,000	8,12547	5,84085	,505
		Construction Period 1980-1995	-8,34174	11,81585	,895	-21,19006*	7,13515	,017
Percentage Incentives	Construction Period < 1950	Construction Period 1950-1980	-3,442312	1,475621	,096	-,320430	,415838	,868
		Construction Period 1980-1995	-3,115838*	1,186319	,045	-2,082268*	,502951	,000
		Construction Period > 1995	-5,629580*	1,336449	,000	-1,662167*	,482386	,004
	Construction Period 1950-1980	Construction Period < 1950	3,442312	1,475621	,096	,320430	,415838	,868
		Construction Period 1980-1995	,326474	1,644559	,997	-1,761838*	,618194	,024
		Construction Period > 1995	-2,187268	1,755938	,599	-1,341737	,601581	,116
	Construction Period 1980-1995	Construction Period < 1950	3,115838*	1,186319	,045	2,082268*	,502951	,000
		Construction Period 1950-1980	-,326474	1,644559	,997	1,761838*	,618194	,024
		Construction Period > 1995	-2,513742	1,520925	,351	,420101	,664784	,922
	Construction Period > 1995	Construction Period < 1950	5,629580*	1,336449	,000	1,662167*	,482386	,004
		Construction Period 1950-1980	2,187268	1,755938	,599	1,341737	,601581	,116
		Construction Period 1980-1995	2,513742	1,520925	,351	-,420101	,664784	,922

*. The mean difference is significant at the 0.05 level.

The influence of the construction period on the percentage incentives is different from the influence on the rental price. The analysis of transactions with an LFA<500 m2, shows that buildings constructed in the period 1980-1995 have an average 2% more incentives compared to buildings constructed in the period < 1950, and in the period 1950-1980. Other significant difference exists between buildings constructed in the period < 1950, which have an average 1,5-2% less incentives compared to buildings constructed in the period 1980-1995 and after 1995.

In line with the results of transactions with an LFA < 500 m2, the table shows that significant differences exists between buildings constructed in the period < 1950, which have an average 3% less incentives compared to buildings constructed in the period 1980-1995 and 6% less incentives compared to buildings constructed after 1995. This might also be explained by the earlier mentioned vintage effect.

C.1.2.2. Building Age analysis

The second building characteristic analyzed in this research is the influence of the age of the building. In calculation the age of each building, the following assumptions are made:

- The age of the building is calculated by deducting the construction year from the basic year 2013
- If the building is renovated, the difference is calculated between the renovation year and the basic year 2013.

The analysis of transactions with an LFA above 500 m2, shows that the rental price for buildings with an age < 10 year is significantly higher (€ 33 / m2) compared to buildings with an age between 21-50 years. There are no other significant differences due to the age of the building.

The analysis of smaller transactions (< 500 m2), shows that the rental price of buildings older than 100 year, is significantly higher compared to buildings with an age between 51-100 years (namely € 15 /m2) and buildings with an age between 11-20 years (€ 23 / m2).

Multiple Comparisons		Games-Howell / Hochberg GT2	TRANSACTIONS LFA > 500 m2			TRANSACTIONS LFA < 500 m2		
Dependent variable			Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.
Real Effective rent / m2	Age < 10 year	Age 11-20 year	11,40158	13,02862	,906	25,73433*	6,80408	,002
		Age 21-50 year	33,43366*	11,80585	,041	11,75922	7,21243	,479
		51-100 year	19,30547	14,93005	,696	18,57168	6,91983	,058
		Age >100 year	17,07761	15,07787	,789	2,84609	6,17237	,991
	Age 11-20 year	Age < 10 year	-11,40158	13,02862	,906	-25,73433*	6,80408	,002
		Age 21-50 year	22,03208	10,59871	,233	-13,97511	6,30001	,175
		51-100 year	7,90389	13,99503	,980	-7,16266	5,96281	,751
		Age >100 year	5,67603	14,15262	,994	-22,88824*	5,07634	,000
	Age 21-50 year	Age < 10 year	-33,43366*	11,80585	,041	-11,75922	7,21243	,479
		Age 11-20 year	-22,03208	10,59871	,233	13,97511	6,30001	,175
		51-100 year	-14,12819	12,86445	,807	6,81246	6,42485	,827
		Age >100 year	-16,35605	13,03571	,719	-8,91313	5,61184	,506
	51-100 year	Age < 10 year	-19,30547	14,93005	,696	-18,57168	6,91983	,058
		Age 11-20 year	-7,90389	13,99503	,980	7,16266	5,96281	,751
		Age 21-50 year	14,12819	12,86445	,807	-6,81246	6,42485	,827
		Age >100 year	-2,22786	15,92037	1,000	-15,72559*	5,23046	,023
	Age >100 year	Age < 10 year	-17,07761	15,07787	,789	-2,84609	6,17237	,991
		Age 11-20 year	-5,67603	14,15262	,994	22,88824*	5,07634	,000
		Age 21-50 year	16,35605	13,03571	,719	8,91313	5,61184	,506
		51-100 year	2,22786	15,92037	1,000	15,72559*	5,23046	,023
Percentage incentives	Age < 10 year	Age 11-20 year	-,270140	1,633257	1,000	,057227	,669617	1,000
		Age 21-50 year	2,906677	1,522195	,316	,289392	,645714	,992
		51-100 year	4,745965*	1,496152	,016	1,724127*	,497262	,005
		Age >100 year	6,399839*	1,375949	,000	2,244788*	,472196	,000
	Age 11-20 year	Age < 10 year	,270140	1,633257	1,000	-,057227	,669617	1,000
		Age 21-50 year	3,176816	1,541677	,241	,232165	,683969	,997
		51-100 year	5,016105*	1,515970	,010	1,666900*	,546019	,021
		Age >100 year	6,669979*	1,397471	,000	2,187561*	,523294	,000
	Age 21-50 year	Age < 10 year	-2,906677	1,522195	,316	-,289392	,645714	,992
		Age 11-20 year	-3,176816	1,541677	,241	-,232165	,683969	,997
		51-100 year	1,839289	1,395605	,681	1,434735*	,516427	,045
		Age >100 year	3,493162*	1,265889	,049	1,955396*	,492337	,001
	51-100 year	Age < 10 year	-4,745965*	1,496152	,016	-1,724127*	,497262	,005
		Age 11-20 year	-5,016105*	1,515970	,010	-1,666900*	,546019	,021
		Age 21-50 year	-1,839289	1,395605	,681	-1,434735*	,516427	,045
		Age >100 year	1,653873	1,234451	,667	,520661	,269664	,302
	Age >100 year	Age < 10 year	-6,399839*	1,375949	,000	-2,244788*	,472196	,000
		Age 11-20 year	-6,669979*	1,397471	,000	-2,187561*	,523294	,000
		Age 21-50 year	-3,493162*	1,265889	,049	-1,955396*	,492337	,001
		51-100 year	-1,653873	1,234451	,667	-,520661	,269664	,302

The incentives analysis shows a lot of significant differences between several age groups. In general, the incentives are significantly lower in buildings with an age above 50 years (51-100 and buildings >100 years) compared to buildings below 50 years (< 10 years; 11-20 years; 21-50 years).

C.1.2.3. Lettable Floor Area analysis

The Lettable floor area analysis, shows one significant difference in real effective rents, namely between transactions below 250 m2 which are significantly higher compared to transactions with an LFA between 2000-5000 m2.

The incentive analysis shows more significant relations. In general, the amount of incentives is significantly lower for transactions with an LFA < 250 m2, compared to all the other transactions. Furthermore, the incentives for transactions between 250-500 m2 are significantly lower compared to transactions between 750-1000 m2 and 1000-2000 m2.

Multiple Comparisons	Games-Howell /	Real effective rent / m2			Percentage incentives		
		Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.
LFA < 250 m2	LFA 250-500 m2	9,52880	4,73316	,407	-2,625898*	,436007	,000
	LFA 500-750 m2	15,66426	6,45482	,193	-3,958528*	,672751	,000
	LFA 750-1000 m2	3,20137	9,91182	1,000	-7,154491*	1,200717	,000
	LFA 1000-2000 m2	19,42855	10,17745	,479	-6,945322*	1,163921	,000
	LFA 2000-5000 m2	34,16395*	8,70274	,004	-7,051391*	1,553855	,000
	LFA >5000 m2	6,60781	15,89572	,999	-7,011513	2,606666	,152
LFA 250-500 m2	LFA < 250 m2	-9,52880	4,73316	,407	2,625898*	,436007	,000
	LFA 500-750 m2	6,13546	7,50394	,983	-1,332630	,783402	,616
	LFA 750-1000 m2	-6,32743	10,62491	,997	-4,528593*	1,266035	,009
	LFA 1000-2000 m2	9,89974	10,87313	,970	-4,319424*	1,231193	,011
	LFA 2000-5000 m2	24,63515	9,50695	,140	-4,425493	1,604865	,099
	LFA >5000 m2	-2,92099	16,34988	1,000	-4,385615	2,637392	,646
LFA 500-750 m2	LFA < 250 m2	-15,66426	6,45482	,193	3,958528*	,672751	,000
	LFA 250-500 m2	-6,13546	7,50394	,983	1,332630	,783402	,616
	LFA 750-1000 m2	-12,46289	11,49567	,932	-3,195963	1,365773	,232
	LFA 1000-2000 m2	3,76429	11,72548	1,000	-2,986794	1,333539	,280
	LFA 2000-5000 m2	18,49969	10,47110	,573	-3,092863	1,684661	,528
	LFA >5000 m2	-9,05645	16,92868	,998	-3,052986	2,686694	,910
LFA 750-1000 m2	LFA < 250 m2	-3,20137	9,91182	1,000	7,154491*	1,200717	,000
	LFA 250-500 m2	6,32743	10,62491	,997	4,528593*	1,266035	,009
	LFA 500-750 m2	12,46289	11,49567	,932	3,195963	1,365773	,232
	LFA 1000-2000 m2	16,22717	13,93077	,906	,209169	1,663567	1,000
	LFA 2000-5000 m2	30,96258	12,89277	,205	,103100	1,956325	1,000
	LFA >5000 m2	3,40644	18,52457	1,000	,142977	2,864865	1,000
LFA 1000-2000 m2	LFA < 250 m2	-19,42855	10,17745	,479	6,945322*	1,163921	,000
	LFA 250-500 m2	-9,89974	10,87313	,970	4,319424*	1,231193	,011
	LFA 500-750 m2	-3,76429	11,72548	1,000	2,986794	1,333539	,280
	LFA 750-1000 m2	-16,22717	13,93077	,906	-,209169	1,663567	1,000
	LFA 2000-5000 m2	14,73541	13,09809	,920	-,106069	1,933960	1,000
	LFA >5000 m2	-12,82073	18,66805	,993	-,066192	2,849639	1,000
LFA 2000-5000 m2	LFA < 250 m2	-34,16395*	8,70274	,004	7,051391*	1,553855	,000
	LFA 250-500 m2	-24,63515	9,50695	,140	4,425493	1,604865	,099
	LFA 500-750 m2	-18,49969	10,47110	,573	3,092863	1,684661	,528
	LFA 750-1000 m2	-30,96258	12,89277	,205	-,103100	1,956325	1,000
	LFA 1000-2000 m2	-14,73541	13,09809	,920	,106069	1,933960	1,000
	LFA >5000 m2	-27,55614	17,90680	,720	,039878	3,029884	1,000
LFA >5000 m2	LFA < 250 m2	-6,60781	15,89572	,999	7,011513	2,606666	,152
	LFA 250-500 m2	2,92099	16,34988	1,000	4,385615	2,637392	,646
	LFA 500-750 m2	9,05645	16,92868	,998	3,052986	2,686694	,910
	LFA 750-1000 m2	-3,40644	18,52457	1,000	-,142977	2,864865	1,000
	LFA 1000-2000 m2	12,82073	18,66805	,993	,066192	2,849639	1,000
	LFA 2000-5000 m2	27,55614	17,90680	,720	-,039878	3,029884	1,000

C.1.3. Location characteristics | Walkscore, Distance to station/highway

C.1.3.1. Walk score analysis

The (Google) Walk score provide an indication of the amount of amenities around a location. The Walk scores analysis is divided in three main groups:

- Low walk score: < 59
- Medium/normal walk score: 60-79
- High walk scores: 80-100

The Walk score analysis shows that the rental price of buildings with a high walk score (80-100), are much higher compared to buildings a medium of low Walkscore. This occurs for transactions with an LFA below and above 500 m2.

For smaller transactions (LFA < 500 m2), the rental price is €31/m2 higher compared to a medium walkscore, and €64/m2 higher compared to a low Walkscore.
For larger transactions (LFA > 500 m2), the rental price is €25/m2 higher compared to a medium walkscore, and €33/m2 higher compared to a low Walkscore.

There are no significant differences between low and medium Walkscores in both analysis.

Multiple Comparisons		Games-Howell / Hochberg GT2	TRANSACTIONS LFA > 500 m2			TRANSACTIONS LFA < 500 m2		
Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.
Real Effective Rent / m2	Walkscore High: 80-100	Walkscore medium 60-79	25,41654*	8,94142	,013	31,96909*	8,74857	,001
		Walkscore low: <59	33,72180*	10,88353	,007	64,04454*	15,92893	,000
	Walkscore medium 60-79	Walkscore High: 80-100	-25,41654*	8,94142	,013	-31,96909*	8,74857	,001
		Walkscore low: <59	8,30526	10,83552	,724	32,07545	16,73559	,158
	Walkscore low: <59	Walkscore High: 80-100	-33,72180*	10,88353	,007	-64,04454*	15,92893	,000
		Walkscore medium 60-79	-8,30526	10,83552	,724	-32,07545	16,73559	,158
Percentage Incentives	Walkscore High: 80-100	Walkscore medium 60-79	-3,251041*	1,167877	,016	-2,573381*	,920700	,016
		Walkscore low: <59	-1,501632	1,279433	,472	-2,770042	1,732042	,258
	Walkscore medium 60-79	Walkscore High: 80-100	3,251041*	1,167877	,016	2,573381*	,920700	,016
		Walkscore low: <59	1,749409	1,493610	,472	-,196661	1,899938	,994
	Walkscore low: <59	Walkscore High: 80-100	1,501632	1,279433	,472	2,770042	1,732042	,258
		Walkscore medium 60-79	-1,749409	1,493610	,472	,196661	1,899938	,994

*. The mean difference is significant at the 0.05 level.

The influence of the walk scores compared to incentives in the Amsterdam office market shows that incentives are significantly lower (2,5% for transactions with an LFA < 500 m2; 3,5% for transactions with an LFA > 500 m2) in buildings with a high walk score compared to a medium walk score. There are no other significant differences between other walk scores.

C.1.3.2. Distance to station analysis

In the distance to station analysis, several distance parameters are mutually compared in relation to the incentive and the real effective rental price.
The real effective rental price analysis shows only one significant relation (for transactions with an LFA above 500 m2), namely a significantly lower real effective rental price for buildings located more than 2000 meter from the station, compared to buildings with a distance of 1500-2000 meter.

Multiple Comparisons		Games-Howell / Hochberg GT2	TRANSACTIONS LFA > 500 m2			TRANSACTIONS LFA < 500 m2		
Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.
Real Effective Rent / m2	Distance station < 1000 m	Distance station 1000-1500 m	-4,64432	15,63911	,991	11,34250	13,88224	,846
		Distance station 1500-2000 m	-19,74705	14,64384	,534	7,74148	13,32988	,938
		Distance station > 2000 m	15,89559	13,19464	,625	26,91008	12,84292	,159
	Distance station 1000-1500 m	Distance station < 1000 m	4,64432	15,63911	,991	-11,34250	13,88224	,846
		Distance station 1500-2000 m	-15,10273	14,40234	,721	-3,60102	11,00394	,988
		Distance station > 2000 m	20,53991	12,92611	,389	15,56758	10,40873	,442
	Distance station 1500-2000 m	Distance station < 1000 m	19,74705	14,64384	,534	-7,74148	13,32988	,938
		Distance station 1000-1500 m	15,10273	14,40234	,721	3,60102	11,00394	,988
		Distance station > 2000 m	35,64264*	11,70233	,014	19,16860	9,65975	,196
	Distance station > 2000 m	Distance station < 1000 m	-15,89559	13,19464	,625	-26,91008	12,84292	,159
		Distance station 1000-1500 m	-20,53991	12,92611	,389	-15,56758	10,40873	,442
		Distance station 1500-2000 m	-35,64264*	11,70233	,014	-19,16860	9,65975	,196

Percentage Incentives	Distance station < 1000 m	Distance station 1000-1500 m	2,230546	1,885421	,639	-,443802	1,335200	,987
		Distance station 1500-2000 m	3,487705	1,739059	,192	-,695853	1,080447	,918
		Distance station > 2000 m	1,582874	1,814284	,819	1,587001	,934332	,328
	Distance station 1000-1500 m	Distance station < 1000 m	-2,230546	1,885421	,639	,443802	1,335200	,987
		Distance station 1500-2000 m	1,257159	1,544379	,848	-,252051	1,281870	,997
		Distance station > 2000 m	-,647673	1,628621	,979	2,030803	1,161378	,304
	Distance station 1500-2000 m	Distance station < 1000 m	-3,487705	1,739059	,192	,695853	1,080447	,918
		Distance station 1000-1500 m	-1,257159	1,544379	,848	,252051	1,281870	,997
		Distance station > 2000 m	-1,904831	1,456680	,559	2,282854*	,856393	,040
	Distance station > 2000 m	Distance station < 1000 m	-1,582874	1,814284	,819	-1,587001	,934332	,328
		Distance station 1000-1500 m	,647673	1,628621	,979	-2,030803	1,161378	,304
		Distance station 1500-2000 m	1,904831	1,456680	,559	-2,282854*	,856393	,040

*. The mean difference is significant at the 0.05 level.

The incentive analysis no significant differences between different distance paratemers, for transactions with an LFA above 500 m2. In the analysis of transactions with an LFA below 500 m2, there is one significant relation which is coincidental similar to the relation with the real effective rental price, as incentives are significantly lower for buildings located more than 2000 meter from the station, compared to buildings with a distance of 1500-2000 meter.

C.1.3.3. Distance to highway analysis

In the distance to highway analysis, several distance parameters are mutually compared in relation to the incentive and the real effective rental price. The post-hoc procedure shows that the real effective rental price for buildings located between 1000-2500 from the highway; is significantly higher compared to buildings located between 500-1000 m from the highway (€52/m2) or buildings located more than 2500 m from the highway ((€39/m2).
There are no significant differences between incentives and the distance to highway.

Multiple Comparisons		**Games-Howell / Hochberg GT2**	TRANSACTIONS LFA > 500 m2			TRANSACTIONS LFA < 500 m2		
Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.
Real Effective Rent / m2	Distance highway <500	Distance highway 500-1000	34,33007	18,29898	,316	-18,16114	16,25612	,680
		Distance highway 1000-250	-18,00573	17,30865	,880	-37,22312	15,31492	,079
		Distance highway >2500	20,98511	17,00876	,770	-21,45436	14,01979	,426
	Distance highway 500-1000	Distance highway <500	-34,33007	18,29898	,316	18,16114	16,25612	,680
		Distance highway 1000-250	-52,33581*	12,79293	,000	-19,06198	12,81080	,447
		Distance highway >2500	-13,34497	12,38417	,862	-3,29322	11,23051	,991
	Distance highway 1000-2500	Distance highway <500	18,00573	17,30865	,880	37,22312	15,31492	,079
		Distance highway 500-1000	52,33581*	12,79293	,000	19,06198	12,81080	,447
		Distance highway >2500	38,99084*	10,86757	,002	15,76876	9,81884	,377
	Distance highway >2500	Distance highway <500	-20,98511	17,00876	,770	21,45436	14,01979	,426
		Distance highway 500-1000	13,34497	12,38417	,862	3,29322	11,23051	,991
		Distance highway 1000-250	-38,99084*	10,86757	,002	-15,76876	9,81884	,377
Percentage Incentives	Distance highway <500	Distance highway 500-1000	2,803374	2,353618	,797	,810584	2,097526	,980
		Distance highway 1000-250	2,170722	2,226240	,909	3,301442	1,868657	,300
		Distance highway >2500	2,692581	2,187669	,772	2,907413	1,864854	,410
	Distance highway 500-1000	Distance highway <500	-2,803374	2,353618	,797	-,810584	2,097526	,980
		Distance highway 1000-250	-,632652	1,645428	,999	2,490858	1,189311	,161
		Distance highway >2500	-,110793	1,592854	1,000	2,096829	1,183327	,292
	Distance highway 1000-250	Distance highway <500	-2,170722	2,226240	,909	-3,301442	1,868657	,300
		Distance highway 500-1000	,632652	1,645428	,999	-2,490858	1,189311	,161
		Distance highway >2500	,521859	1,397789	,999	-,394029	,701802	,943
	Distance highway >2500	Distance highway <500	-2,692581	2,187669	,772	-2,907413	1,864854	,410
		Distance highway 500-1000	,110793	1,592854	1,000	-2,096829	1,183327	,292
		Distance highway 1000-250	-,521859	1,397789	,999	,394029	,701802	,943

*. The mean difference is significant at the 0.05 level.

C.1.4. User characteristics

C.1.4.1. Contract term

In order to test the influence of the contract term on the incentives and rental prices, the contract terms are divided in the following contract types:
- Short contracts: ≤ 3 year
- Normal/medium contracts: 4-7
- Long contracts: ≥ 8 year

The influence of the contract term on the rent levels in the Amsterdam Office market, show that the rental price / m2 of short-term contracts are significantly lower compared to medium-term contracts (4-7 year), and long-term contracts(>8 years). In transactions with an LFA> 500m2, the difference is around €40/m2 compared to medium contracts and around € 60/m2 compared to long-term contracts. The rental prices /m2 are not significantly different between medium and long-term contracts for transactions with an LFA > 500 m2.

The analysis of transactions with an LFA< 500 m2 shows a similar trend, as the rental price/m2 of short term contracts is on average €10/m2 lower compared to medium term contracts and €40/m2 lower compared to long-term contracts. Furthermore, long term rental contracts are normally about €30/m2 higher compared to medium term contracts.

Multiple Comparisons		**Games-Howell / Hochberg GT2**	TRANSACTIONS LFA > 500 m2			TRANSACTIONS LFA < 500 m2		
Dependent Variable			Mean Difference (I-J)	Std. Error	Sig.	Mean Difference (I-J)	Std. Error	Sig.
Real Effective Rent / m2	Contract term short: <3 year	Contract term medium: 4-7	-41,83782*	11,28147	,001	-10,83324*	3,84855	,015
		Contract term long: >8 year	-59,83259*	13,93159	,000	-40,44085*	13,14675	,006
	Contract term medium: 4-7 year	Contract term short: <3 year	41,83782*	11,28147	,001	10,83324*	3,84855	,015
		Contract term long: >8 year	-17,99477	10,69263	,254	-29,60761	12,95417	,066
	Contract term long: >8 year	Contract term short: <3 year	59,83259*	13,93159	,000	40,44085*	13,14675	,006
		Contract term medium: 4-7	17,99477	10,69263	,254	29,60761	12,95417	,066
Percentage Incentives	Contract term short <3 year	Contract term medium: 4-7	-3,440906*	1,270555	,021	-,284989	,278680	,666
		Contract term long: >8 year	-3,613751	1,600056	,065	,200535	,904983	,995
	Contract term medium: 4-7 year	Contract term short: <3 year	3,440906*	1,270555	,021	,284989	,278680	,666
		Contract term long: >8 year	-,172845	1,330524	,991	,485524	,890334	,929
	Contract term long: >8 year	Contract term short: <3 year	3,613751	1,600056	,065	-,200535	,904983	,995
		Contract term medium: 4-7	,172845	1,330524	,991	-,485524	,890334	,929

*. The mean difference is significant at the 0.05 level.

The influence of the contract types on incentives in the analysis of transactions with an LFA< 500m2 no significant difference between contract types. The analysis of transactions with an LFA> 500m2 show that the incentives differ per contract type, in which the short-term contracts have on average 3,5% less incentives compared to medium contracts. There is no significant difference in incentives between medium and long-term contracts and between short and long-term contracts.

C.1.5. Conclusions

This chapter researched the structural segmentation of the Amsterdam office market. It shows that incentives and the real effective rental price mutually differ per building, location or user characteristic, which indicates the structural segmentation of the office market.

C.1.5.1. Structural segmentation: incentives

The following main conclusions can be provided about the significant difference in incentives in the Amsterdam office market:

Building characteristics

The influence of the construction period on the percentage incentives (for transactions > 500 m2) shows that buildings constructed in the period 1980-1995 have an average more incentives compared to buildings constructed in the period < 1950, and in the period 1950-1980. Other significant difference exists between buildings constructed in the period < 1950, which have an average less incentives compared to buildings constructed in the period 1980-1995

and after 1995. This might be explained a possible vintage effect. The latter relation is similar for transactions with an LFA below 500 m2.
The age of a building, has a significant influence on the incentives provided. Overall, the incentives are significantly lower in buildings with an age above 50 years (compared to buildings below 50 years, for transactions below or above 500 m2.
The floor space, has also a lot of influence on the incentives provided. In general, the amount of incentives is significantly lower for smaller transactions (LFA < 250; LFA 250-500) compared to the larger transactions.

Location characteristics
The influence of the Walk scores compared to incentives in the Amsterdam office market shows that incentives are significantly lower in buildings with a high walk score compared to a medium walk score. There are no other significant differences between other walk scores.
The incentive analysis no significant differences between different distance to station parameters, for transactions with an LFA above 500 m2. In the analysis of transactions with an LFA below 500 m2, the incentives are significantly lower for buildings located more than 2000 meter from the station, compared to buildings with a distance of 1500-2000 meter.
There are no significant differences between incentives and the distance to highway.

User characteristics
The influence of the contract types on incentives in the analysis of transactions with an LFA< 500m2 no significant difference between contract types. The analysis of transactions with an LFA> 500m2 show that the incentives differ per contract type, in which the short-term contracts have on average less incentives compared to medium contracts. There is no significant difference in incentives between medium and long-term contracts and between short and long-term contracts.

C.1.5.2. Structural segmentation: real effective rental prices
The following main conclusions can be provided about the significant difference in real effective rental price in the Amsterdam office market:

Building characteristics
The influence of the construction period on the rental price shows (transaction > 500 m2) that the construction period 1950-1980 has a significant negative influence on the rental price. The rental prices in this period are significantly lower compared to buildings constructed in the period <1950 or in the period >1995. The other construction periods don't significantly influence the rental prices. For transactions with an LFA < 500 m2, more or less the same occurs, as the rental price of buildings constructed in the period 1950-1980 is signficantly lower compared to buildings in the constructed in the period < 1950 and buildings constructed in the period 1980-1995. In addition, buildings constructed after 1995 have on average a significant lower rental price compared to buildings in the period < 1950 and in the period 1980-1995. The higher rental prices for buildings before 1950, might be explained by a possible 'vintage effect'.
The age analysis of transactions with an LFA above 500 m2, shows that the rental price for buildings with an age below 10 year is significantly higher compared to buildings with an age between 21-50 years. The analysis of smaller transactions, shows that the rental price of buildings older than 100 year, is significantly higher compared to buildings with an age between 51-100 years and buildings with an age between 11-20 years.
The Lettable floor area analysis, shows one significant difference in rental price, namely between transactions below 250 m2 which are significantly higher compared to transactions with an LFA between 2000-5000 m2.

Location characteristics
The Walk score analysis shows that the rental price of buildings with a high walk score, are significantly higher compared to buildings with a medium of low Walkscore. This occurs for transactions with an LFA below and above 500 m2. There are no significant differences between low and medium Walkscores in both analysis.
The rental price of buildings located more than 2000 meter from the station is significantly lower compared to buildings with a distance of 1500-2000 meter. The rental price for buildings located between 1000-2500 from the highway; is significantly higher compared to buildings located between 500-1000 m from the highway or buildings located more than 2500 m from the highway.

User characteristics

The influence of the contract term on the rent levels in the Amsterdam Office market, show that the rental price of short-term contracts are significantly lower compared to medium-term contracts, and long-term contracts. The rental prices are not significantly different between medium and long-term contracts for transactions with an LFA > 500 m2.

The analysis of transactions with an LFA< 500 m2 shows a similar trend, as the rental price/m2 of short term contracts is on average lower compared to medium term contracts and long-term contracts. Furthermore, long term rental contracts are significantly higher compared to medium term contracts.

Appendix C2. Descriptive statistics - Structural segmentation analysis

C.2.1. Building characteristics

C.2.1.1. Building Age

Transactions LFA > 500 m2		N	Mean	Std. Deviation	Std. Error	Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Real Effective Rent / m2	Age < 10 year	93	182,6514	95,65958	9,91944	162,9505	202,3523	39,68	495,88
	Age 11-20 year	114	171,2498	90,18799	8,44688	154,5150	187,9846	31,06	429,66
	Age 21-50 year	121	149,2177	70,41964	6,40179	136,5426	161,8928	35,92	387,05
	51-100 year	54	163,3459	81,99760	11,15846	140,9649	185,7270	40,51	529,52
	Age >100 year	70	165,5738	95,00673	11,35548	142,9202	188,2273	39,73	437,94
	Total	452	165,8744	86,80872	4,08314	157,8501	173,8988	31,06	529,52
Percentage Incentives	Age < 10 year	93	9,70801	11,012014	1,141893	7,44011	11,97590	0,000	35,326
	Age 11-20 year	114	9,97814	12,468022	1,167737	7,66465	12,29164	0,000	49,779
	Age 21-50 year	121	6,80133	11,072137	1,006558	4,80841	8,79424	0,000	57,141
	51-100 year	54	4,96204	7,103935	,966723	3,02304	6,90104	0,000	32,164
	Age >100 year	70	3,30817	6,422782	,767669	1,77671	4,83962	0,000	23,262
	Total	452	7,43990	10,711214	,503813	6,44979	8,43001	0,000	57,141

Descriptives

Transactions LFA < 500 m2		N	Mean	Std. Deviation	Std. Error	Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Real Effective Rent / m2	Age < 10 year	280	189,1538	90,59482	5,41408	178,4961	199,8114	38,59	591,72
	Age 11-20 year	237	163,4194	63,44323	4,12108	155,3006	171,5382	46,04	445,37
	Age 21-50 year	291	177,3945	81,28776	4,76517	168,0158	186,7733	32,25	586,25
	51-100 year	380	170,5821	84,00760	4,30950	162,1086	179,0556	33,28	492,03
	Age >100 year	669	186,3077	76,66661	2,96410	180,4876	192,1278	38,12	515,56
	Total	1857	179,2010	80,09558	1,85867	175,5557	182,8463	32,25	591,72
Percentage Incentives	Age < 10 year	285	3,56733	7,526397	,445825	2,68979	4,44487	0,000	50,830
	Age 11-20 year	237	3,51010	7,691663	,499627	2,52580	4,49440	0,000	40,306
	Age 21-50 year	294	3,27794	8,009179	,467105	2,35863	4,19724	0,000	71,138
	51-100 year	387	1,84320	4,332811	,220249	1,41016	2,27624	0,000	28,481
	Age >100 year	678	1,32254	4,051397	,155593	1,01704	1,62804	0,000	64,233
	Total	1881	2,35104	6,058803	,139699	2,07706	2,62502	0,000	71,138

C.2.1.2. Lettable floor area

Descriptives

All transactions		N	Mean	Std. Deviation	Std. Error	Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Real Effective Rent / m2	LFA < 250 m2	1619	182,3504	79,24929	1,96957	178,4872	186,2136	32,25	586,25
	LFA 250-500 m2	410	172,8216	87,14750	4,30391	164,3610	181,2821	38,86	591,72
	LFA 500-750 m2	172	166,6861	80,61701	6,14699	154,5524	178,8199	35,92	437,94
	LFA 750-1000 m2	99	179,1490	96,65474	9,71417	159,8716	198,4265	39,06	412,49
	LFA 1000-2000 m2	98	162,9218	98,84702	9,98506	143,1043	182,7394	35,07	529,52
	LFA 2000-5000 m2	65	148,1864	68,34327	8,47694	131,2518	165,1211	37,52	293,49
	LFA >5000 m2	21	175,7426	72,28203	15,77323	142,8402	208,6450	31,06	295,28
	Total	2484	177,8490	82,23114	1,64991	174,6137	181,0844	31,06	591,72
Percentage Incentives	LFA < 250 m2	1643	1,69792	4,879094	,120371	1,46182	1,93401	0,000	59,842
	LFA 250-500 m2	410	4,32381	8,485367	,419062	3,50003	5,14760	0,000	71,138
	LFA 500-750 m2	172	5,65644	8,680673	,661895	4,34991	6,96298	0,000	35,934
	LFA 750-1000 m2	99	8,85241	11,886794	1,194668	6,48163	11,22319	0,000	57,141
	LFA 1000-2000 m2	98	8,64324	11,460445	1,157680	6,34556	10,94091	0,000	45,320
	LFA 2000-5000 m2	65	8,74931	12,489937	1,549186	5,65445	11,84416	0,000	49,779
	LFA >5000 m2	21	8,70943	11,932504	2,603886	3,27782	14,14104	0,000	39,560
	Total	2508	3,19393	7,333037	,146427	2,90680	3,48106	0,000	71,138

C.2.1.3. Construction period

Descriptives

Transactions LFA > 500 m2		N	Mean	Std. Deviation	Std. Error	Mean Lower Bound	Mean Upper Bound	Minimum	Maximum
Real Effective Rent / m2	Construction period < 1950	140	175,9522	92,69994	7,83457	160,4618	191,4425	39,68	529,52
	Construction period 1950-1980	87	123,5871	50,63252	5,42838	112,7959	134,3784	35,07	257,96
	Construction period 1980-1995	115	180,9301	95,49674	8,90512	163,2891	198,5710	35,92	429,66
	Construction period > 1995	113	172,5883	82,55545	7,76616	157,2007	187,9760	31,06	495,88
	Total	455	166,3622	86,77720	4,06818	158,3674	174,3570	31,06	529,52
Percentage Incentives	Construction period < 1950	140	4,73405	7,849620	,663414	3,42236	6,04574	0,000	42,004
	Construction period 1950-1980	87	8,17636	12,294252	1,318082	5,55610	10,79662	0,000	57,141
	Construction period 1980-1995	115	7,84989	10,546659	,983481	5,90162	9,79815	0,000	39,560
	Construction period > 1995	113	10,36363	12,332694	1,160162	8,06492	12,66234	0,000	49,779
	Total	455	7,57788	10,837957	,508091	6,57938	8,57639	0,000	57,141

Descriptives

Transactions LFA < 500 m2		N	Mean	Std. Deviation	Std. Error	Mean Lower Bound	Mean Upper Bound	Minimum	Maximum
Real Effective Rent / m2	Construction period < 1950	1070	185,2027	81,24053	2,48360	180,3295	190,0760	33,28	591,72
	Construction period 1950-1980	234	157,9075	65,96840	4,31249	149,4110	166,4039	33,42	493,55
	Construction period 1980-1995	257	187,2230	95,37212	5,94915	175,5075	198,9385	32,25	586,25
	Construction period > 1995	287	166,0329	66,73577	3,93929	158,2792	173,7866	44,36	584,58
	Total	1848	179,0503	80,20881	1,86583	175,3910	182,7097	32,25	591,72
Percentage Incentives	Construction period < 1950	1082	1,76226	4,863288	,147848	1,47216	2,05236	0,000	64,233
	Construction period 1950-1980	239	2,08269	6,008651	,388667	1,31702	2,84836	0,000	59,842
	Construction period 1980-1995	259	3,84453	7,736611	,480730	2,89787	4,79118	0,000	71,138
	Construction period > 1995	292	3,42443	7,846303	,459170	2,52071	4,32814	0,000	50,830
	Total	1872	2,35053	6,065049	,140178	2,07561	2,62545	0,000	71,138

C.1.2. Location characteristics

C.2.2.1. Distance to station

Descriptives

Transactions LFA > 500 m2		N	Mean	Std. Deviation	Std. Error	Mean Lower Bound	Mean Upper Bound	Minimum	Maximum
Real Effective Rent / m2	Distance station < 1000 m	63	172,1641	89,02403	11,21597	149,7437	194,5845	37,52	437,94
	Distance station 1000-1500 m	63	176,8084	86,50647	10,89879	155,0221	198,5948	35,07	401,95
	Distance station 1500-2000 m	98	191,9112	93,20461	9,41509	173,2248	210,5975	35,92	429,66
	Distance station > 2000 m	118	156,2685	75,49483	6,94986	142,5047	170,0324	31,06	529,52
	Total	342	173,1937	86,20117	4,66123	164,0254	182,3621	31,06	529,52
Percentage Incentives	Distance station < 1000 m	63	9,70916	11,494002	1,448108	6,81444	12,60389	0,000	42,201
	Distance station 1000-1500 m	63	7,47862	9,583381	1,207393	5,06507	9,89216	0,000	45,320
	Distance station 1500-2000 m	98	6,22146	9,532905	,962969	4,31023	8,13268	0,000	39,560
	Distance station > 2000 m	118	8,12629	11,872818	1,092981	5,96170	10,29088	0,000	49,779
	Total	342	7,75273	10,787877	,583342	6,60533	8,90013	0,000	49,779

Descriptives

Transactions LFA < 500 m2		N	Mean	Std. Deviation	Std. Error	Mean Lower Bound	Mean Upper Bound	Minimum	Maximum
Real Effective Rent / m2	Distance station < 1000 m	95	211,0514	108,82316	11,16502	188,8830	233,2198	32,25	591,72
	Distance station 1000-1500 m	79	199,7089	73,32564	8,24978	183,2848	216,1329	90,67	547,98
	Distance station 1500-2000 m	170	203,3099	94,94601	7,28203	188,9345	217,6854	38,86	536,47
	Distance station > 2000 m	189	184,1413	87,25511	6,34688	171,6211	196,6616	44,36	579,88
	Total	533	197,3589	92,42636	4,00343	189,4944	205,2233	32,25	591,72
Percentage Incentives	Distance station < 1000 m	95	4,24432	7,879049	,808373	2,63928	5,84937	0,000	32,949
	Distance station 1000-1500 m	79	4,68812	9,445314	1,062681	2,57249	6,80376	0,000	40,306
	Distance station 1500-2000 m	170	4,94017	9,346807	,716867	3,52501	6,35534	0,000	71,138
	Distance station > 2000 m	189	2,65732	6,441061	,468518	1,73309	3,58155	0,000	46,371
	Total	533	3,96930	8,213738	,355777	3,27040	4,66820	0,000	71,138

C.2.2.2. Distance to highway

Descriptives

Transactions LFA > 500 m2		N	Mean	Std. Deviation	Std. Error	Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Real Effective Rent / m2	Distance highway <500	30	182,5676	85,56083	15,62120	150,6186	214,5165	57,37	380,05
	Distance highway 500-1000	71	148,2375	83,59433	9,92082	128,4510	168,0239	35,07	412,49
	Distance highway 1000-250	110	200,5733	94,70841	9,03009	182,6759	218,4707	31,06	529,52
	Distance highway >2500	131	161,5825	73,78322	6,44647	148,8289	174,3360	35,92	437,94
	Total	342	173,1937	86,20117	4,66123	164,0254	182,3621	31,06	529,52
Percentage Incentives	Distance highway <500	30	10,06427	11,138133	2,033536	5,90523	14,22332	0,000	39,560
	Distance highway 500-1000	71	7,26090	10,736509	1,274189	4,71961	9,80219	0,000	45,320
	Distance highway 1000-250	110	7,89355	11,207197	1,068564	5,77569	10,01141	0,000	49,779
	Distance highway >2500	131	7,37169	10,425199	,910854	5,56968	9,17371	0,000	42,201
	Total	342	7,75273	10,787877	,583342	6,60533	8,90013	0,000	49,779

Descriptives

Transactions LFA < 500 m2		N	Mean	Std. Deviation	Std. Error	Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Real Effective Rent / m2	Distance highway <500	48	173,4494	89,62477	12,93622	147,4251	199,4737	32,25	427,30
	Distance highway 500-1000	80	191,6105	88,05259	9,84458	172,0154	211,2057	43,11	586,25
	Distance highway 1000-250	165	210,6725	105,30032	8,19762	194,4860	226,8590	44,36	536,47
	Distance highway >2500	240	194,9038	83,72614	5,40450	184,2572	205,5503	55,15	591,72
	Total	533	197,3589	92,42636	4,00343	189,4944	205,2233	32,25	591,72
Percentage Incentives	Distance highway <500	48	6,42214	12,467909	1,799588	2,80183	10,04244	0,000	71,138
	Distance highway 500-1000	80	5,61155	9,637835	1,077543	3,46676	7,75635	0,000	38,770
	Distance highway 1000-250	165	3,12070	6,465663	,503351	2,12681	4,11458	0,000	40,716
	Distance highway >2500	240	3,51472	7,576241	,489044	2,55134	4,47811	0,000	59,842
	Total	533	3,96930	8,213738	,355777	3,27040	4,66820	0,000	71,138

C.2.2.3. Google Walk score

Transactions LFA > 500 m2		N	Mean	Std. Deviation	Std. Error	Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Real Effective Rent / m2	Walkscore High: 80-100	223	180,3893	95,02935	6,36364	167,8484	192,9302	35,07	529,52
	Walkscore medium 60-79	162	154,9727	79,94622	6,28117	142,5686	167,3768	31,06	404,53
	Walkscore low: <59	60	146,6675	68,39095	8,82923	129,0002	164,3347	59,00	401,95
	Total	445	166,5898	87,48111	4,14700	158,4396	174,7400	31,06	529,52
Percentage Incentives	Walkscore High: 80-100	223	6,02941	9,265874	,620489	4,80661	7,25221	0,000	45,320
	Walkscore medium 60-79	162	9,28045	12,593116	,989409	7,32656	11,23434	0,000	49,779
	Walkscore low: <59	60	7,53104	8,666976	1,118902	5,29212	9,76996	0,000	26,964
	Total	445	7,41540	10,613725	,503139	6,42657	8,40423	0,000	49,779

Descriptives

Transactions LFA < 500 m2		N	Mean	Std. Deviation	Std. Error	Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Real Effective Rent / m2	Walkscore High: 80-100	328	211,8214	91,33002	5,04286	201,9009	221,7419	43,11	591,72
	Walkscore medium 60-79	160	179,8523	90,02970	7,11747	165,7953	193,9093	38,86	536,47
	Walkscore low: <59	36	147,7769	88,15503	14,69251	117,9495	177,6042	32,25	579,88
	Total	524	197,6598	92,70120	4,04967	189,7042	205,6155	32,25	591,72
Percentage Incentives	Walkscore High: 80-100	328	3,05301	6,246138	,344885	2,37454	3,73149	0,000	46,371
	Walkscore medium 60-79	160	5,62639	10,798099	,853665	3,94041	7,31238	0,000	71,138
	Walkscore low: <59	36	5,82306	10,184145	1,697357	2,37724	9,26887	0,000	40,716
	Total	524	4,02909	8,269314	,361247	3,31941	4,73876	0,000	71,138

C.2.3. User Characteristics

C.2.3.1. Contract term

Descriptives

Transactions LFA > 500 m2		N	Mean	Std. Deviation	Std. Error	Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Real Effective Rent / m2	Contract term short: <3 year	70	127,7971	68,23726	8,15591	111,5265	144,0677	35,92	293,06
	Contract term medium: 4-7 year	305	169,6349	89,12808	5,10346	159,5923	179,6775	31,06	529,52
	Contract term long: >8 year	80	187,6297	82,59881	9,23483	169,2482	206,0111	39,74	404,53
	Total	455	166,3622	86,77720	4,06818	158,3674	174,3570	31,06	529,52
Percentage Incentives	Contract term short: <3 year	70	4,63596	9,173156	1,096402	2,44870	6,82322	0,000	34,562
	Contract term medium: 4-7 year	305	8,07686	11,212708	,642038	6,81346	9,34026	0,000	57,141
	Contract term long: >8 year	80	8,24971	10,423364	1,165367	5,93010	10,56931	0,000	49,779
	Total	455	7,57788	10,837957	,508091	6,57938	8,57639	0,000	57,141

Descriptives

Transactions LFA < 500 m2		N	Mean	Std. Deviation	Std. Error	Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Real Effective Rent / m2	Contract term short: <3 year	657	172,5158	76,67289	2,99129	166,6422	178,3895	33,28	476,55
	Contract term medium: 4-7 year	1332	183,3491	82,62340	2,26387	178,9079	187,7902	32,25	591,72
	Contract term long: >8 year	40	212,9567	81,67985	12,91472	186,8342	239,0792	74,22	433,20
	Total	2029	180,4249	80,97562	1,79768	176,8994	183,9504	32,25	591,72
Percentage Incentives	Contract term short: <3 year	664	2,04016	5,996199	,232698	1,58324	2,49707	0,000	64,233
	Contract term medium: 4-7 year	1344	2,32514	5,875849	,160277	2,01072	2,63957	0,000	71,138
	Contract term long: >8 year	45	1,83962	3,539810	,527684	,77614	2,90310	0,000	13,731
	Total	2053	2,22233	5,873912	,129638	1,96809	2,47656	0,000	71,138

C3: Outcomes One-Way ANOVA test per characteristic

C.3.1. Building characteristics

C.3.1.1. Construction period (LFA > 500 m2)

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Real Effective Rent / m2	9,532	3	451	,000
Percentage Incentives	12,558	3	451	,000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Real Effective Rent / m2	Between Groups	200845,974	3	66948,658	9,383	,000
	Within Groups	3217902,307	451	7135,038		
	Total	3418748,281	454			
Percentage Incentives	Between Groups	2048,828	3	682,943	6,007	,001
	Within Groups	51278,611	451	113,700		
	Total	53327,439	454			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Real Effective Rent / m2	Welch	17,939	3	248,063	,000
	Brown-Forsythe	10,062	3	421,017	,000
Percentage Incentives	Welch	7,077	3	223,679	,000
	Brown-Forsythe	5,654	3	360,542	,001

a. Asymptotically F distributed.

C.3.1.2. Construction period (LFA < 500 m2)

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Real Effective Rent / m2	16,246	3	1844	,000
Percentage Incentives	27,907	3	1868	,000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Real Effective Rent / m2	Between Groups	210903,234	3	70301,078	11,107	,000
	Within Groups	11671684,820	1844	6329,547		
	Total	11882588,054	1847			
Percentage Incentives	Between Groups	1306,430	3	435,477	12,048	,000
	Within Groups	67517,959	1868	36,145		
	Total	68824,389	1871			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Real Effective Rent / m2	Welch	13,692	3	584,827	,000
	Brown-Forsythe	11,606	3	921,791	,000
Percentage Incentives	Welch	8,864	3	516,482	,000
	Brown-Forsythe	9,009	3	881,770	,000

a. Asymptotically F distributed.

C.3.1.3. Building Age (LFA > 500 m2)

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Real Effective Rent / m2	3,851	4	447	,004
Percentage Incentives	13,119	4	447	,000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Real Effective Rent / m2	Between Groups	63392,872	4	15848,218	2,124	,077
	Within Groups	3335232,401	447	7461,370		
	Total	3398625,272	451			
Percentage Incentives	Between Groups	2788,761	4	697,190	6,366	,000
	Within Groups	48954,513	447	109,518		
	Total	51743,274	451			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Real Effective Rent / m2	Welch	2,367	4	190,477	,054
	Brown-Forsythe	2,076	4	370,452	,083
Percentage Incentives	Welch	8,936	4	207,335	,000
	Brown-Forsythe	7,307	4	425,303	,000

a. Asymptotically F distributed.

C.3.1.4. Building Age (LFA < 500 m2)

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Real Effective Rent / m2	6,690	4	1852	,000
Percentage Incentives	32,566	4	1876	,000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Real Effective Rent / m2	Between Groups	149728,731	4	37432,183	5,896	,000
	Within Groups	11757071,334	1852	6348,311		
	Total	11906800,065	1856			
Percentage Incentives	Between Groups	1809,598	4	452,399	12,629	,000
	Within Groups	67203,495	1876	35,823		
	Total	69013,093	1880			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Real Effective Rent / m2	Welch	6,880	4	763,080	,000
	Brown-Forsythe	5,889	4	1476,990	,000
Percentage Incentives	Welch	11,645	4	692,524	,000
	Brown-Forsythe	10,093	4	1064,563	,000

a. Asymptotically F distributed.

C.3.1.5. LFA Category All transactions

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Real Effective Rent / m2	4,651	6	2477	,000
Percentage Incentives	94,995	6	2501	,000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Real Effective Rent / m2	Between Groups	143888,808	6	23981,468	3,569	,002
	Within Groups	16646056,895	2477	6720,249		
	Total	16789945,702	2483			
Percentage Incentives	Between Groups	13968,357	6	2328,060	48,183	,000
	Within Groups	120841,624	2501	48,317		
	Total	134809,981	2507			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Real Effective Rent / m2	Welch	3,992	6	178,276	,001
	Brown-Forsythe	3,373	6	490,633	,003
Percentage Incentives	Welch	25,576	6	171,963	,000
	Brown-Forsythe	20,136	6	275,388	,000

a. Asymptotically F distributed.

C.3.2. Location characteristics

C.3.2.1. Walk score (LFA > 500 m2)

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Real Effective Rent / m2	7,407	2	442	,001
Percentage Incentives	13,558	2	442	,000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Real Effective Rent / m2	Between Groups	88141,744	2	44070,872	5,885	,003
	Within Groups	3309765,353	442	7488,157		
	Total	3397907,097	444			
Percentage Incentives	Between Groups	992,682	2	496,341	4,475	,012
	Within Groups	49024,436	442	110,915		
	Total	50017,118	444			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Real Effective Rent / m2	Welch	6,236	2	182,506	,002
	Brown-Forsythe	6,986	2	337,526	,001
Percentage Incentives	Welch	3,970	2	168,673	,021
	Brown-Forsythe	4,757	2	304,455	,009

a. Asymptotically F distributed.

C.3.2.2. Walk score (LFA < 500 m2)

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Real Effective Rent / m2	1,621	2	521	,199
Percentage Incentives	14,013	2	521	,000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Real Effective Rent / m2	Between Groups	206096,861	2	103048,431	12,520	,000
	Within Groups	4288309,684	521	8230,921		
	Total	4494406,545	523			
Percentage Incentives	Between Groups	836,574	2	418,287	6,240	,002
	Within Groups	34926,975	521	67,038		
	Total	35763,549	523			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Real Effective Rent / m2	Welch	12,742	2	95,206	,000
	Brown-Forsythe	12,891	2	148,118	,000
Percentage Incentives	Welch	4,841	2	84,832	,010
	Brown-Forsythe	4,353	2	119,727	,015

C.3.2.3. Distance to highway (LFA > 500 m2)

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Real Effective Rent / m2	2,472	3	338	,062
Percentage Incentives	,579	3	338	,629

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Real Effective Rent / m2	Between Groups	146977,970	3	48992,657	6,938	,000
	Within Groups	2386870,605	338	7061,747		
	Total	2533848,575	341			
Percentage Incentives	Between Groups	198,673	3	66,224	,567	,637
	Within Groups	39486,325	338	116,823		
	Total	39684,998	341			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Real Effective Rent / m2	Welch	6,134	3	109,589	,001
	Brown-Forsythe	6,786	3	195,266	,000
Percentage Incentives	Welch	,537	3	110,707	,658
	Brown-Forsythe	,557	3	192,261	,644

a. Asymptotically F distributed.

C.3.2.4. Distance to highway (LFA > 500 m2)

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Real Effective Rent / m2	7,133	3	529	,000
Percentage Incentives	6,471	3	529	,000

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Real Effective Rent / m2	Between Groups	60776,675	3	20258,892	2,390	,068
	Within Groups	4483903,424	529	8476,188		
	Total	4544680,099	532			
Percentage Incentives	Between Groups	672,962	3	224,321	3,369	,018
	Within Groups	35218,683	529	66,576		
	Total	35891,645	532			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Real Effective Rent / m2	Welch	2,143	3	160,588	,097
	Brown-Forsythe	2,392	3	306,558	,069
Percentage Incentives	Welch	2,269	3	148,829	,083
	Brown-Forsythe	2,396	3	153,464	,070

a. Asymptotically F distributed.

C.3.2.5. Distance to station (LFA > 500 m2)

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Real Effective Rent / m2	2,885	3	338	,036
Percentage Incentives	3,052	3	338	,029

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Real Effective Rent / m2	Between Groups	69026,084	3	23008,695	3,155	,025
	Within Groups	2464822,491	338	7292,374		
	Total	2533848,575	341			
Percentage Incentives	Between Groups	492,131	3	164,044	1,415	,238
	Within Groups	39192,867	338	115,955		
	Total	39684,998	341			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Real Effective Rent / m2	Welch	3,213	3	160,679	,025
	Brown-Forsythe	3,068	3	282,778	,028
Percentage Incentives	Welch	1,458	3	165,878	,228
	Brown-Forsythe	1,448	3	293,101	,229

a. Asymptotically F distributed.

C.3.2.6. Distance to station (LFA < 500 m2)

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Real Effective Rent / m2	4,063	3	529	,007
Percentage Incentives	3,601	3	529	,013

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Real Effective Rent / m2	Between Groups	57286,942	3	19095,647	2,251	,081
	Within Groups	4487393,157	529	8482,785		
	Total	4544680,099	532			
Percentage Incentives	Between Groups	533,571	3	177,857	2,661	,047
	Within Groups	35358,074	529	66,839		
	Total	35891,645	532			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Real Effective Rent / m2	Welch	2,159	3	236,789	,094
	Brown-Forsythe	2,259	3	395,218	,081
Percentage Incentives	Welch	3,055	3	221,336	,029
	Brown-Forsythe	2,502	3	359,648	,059

a. Asymptotically F distributed.

C.3.3. User characteristics

C.3.3.1. Contract term (LFA > 500 m2)

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Real Effective Rent / m2	1,427	2	452	,241
Percentage Incentives	3,645	2	452	,027

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Real Effective Rent / m2	Between Groups	143559,941	2	71779,970	9,906	,000
	Within Groups	3275188,340	452	7245,992		
	Total	3418748,281	454			
Percentage Incentives	Between Groups	717,892	2	358,946	3,084	,047
	Within Groups	52609,547	452	116,393		
	Total	53327,439	454			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Real Effective Rent / m2	Welch	13,655	2	151,144	,000
	Brown-Forsythe	11,785	2	229,090	,000
Percentage Incentives	Welch	3,981	2	148,043	,021
	Brown-Forsythe	3,551	2	226,344	,030

a. Asymptotically F distributed.

C.3.3.2. Contract term (LFA < 500 m2)

Test of Homogeneity of Variances

	Levene Statistic	df1	df2	Sig.
Real Effective Rent / m2	,301	2	2026	,740
Percentage Incentives	1,121	2	2050	,326

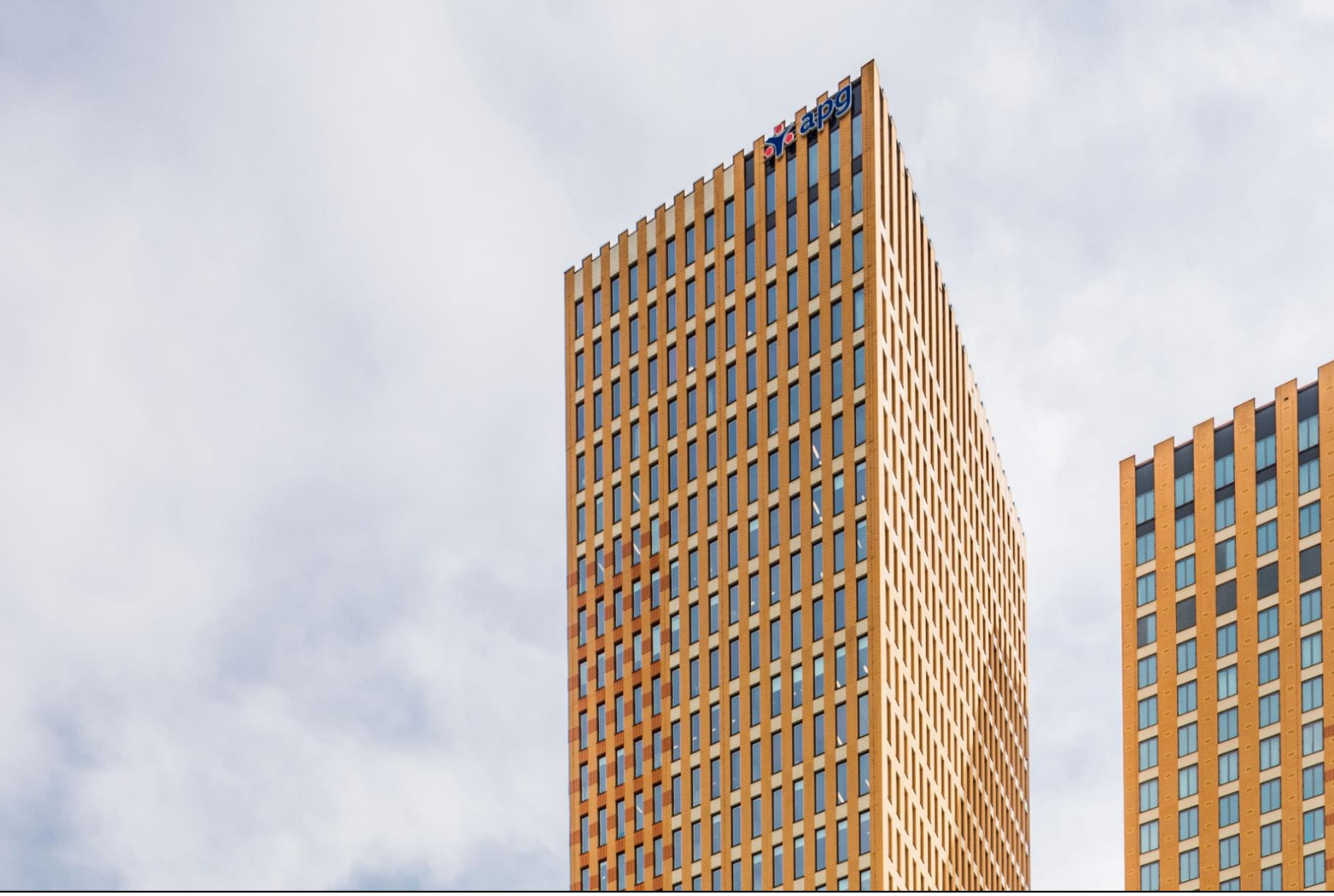
ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
Real Effective Rent / m2	Between Groups	94819,883	2	47409,942	7,275	,001
	Within Groups	13202879,296	2026	6516,722		
	Total	13297699,179	2028			
Percentage Incentives	Between Groups	42,835	2	21,417	,621	,538
	Within Groups	70756,989	2050	34,516		
	Total	70799,824	2052			

Robust Tests of Equality of Means

		Statistic[a]	df1	df2	Sig.
Real Effective Rent / m2	Welch	7,433	2	104,970	,001
	Brown-Forsythe	7,373	2	147,018	,001
Percentage Incentives	Welch	,767	2	127,227	,467
	Brown-Forsythe	,883	2	533,250	,414

a. Asymptotically F distributed.



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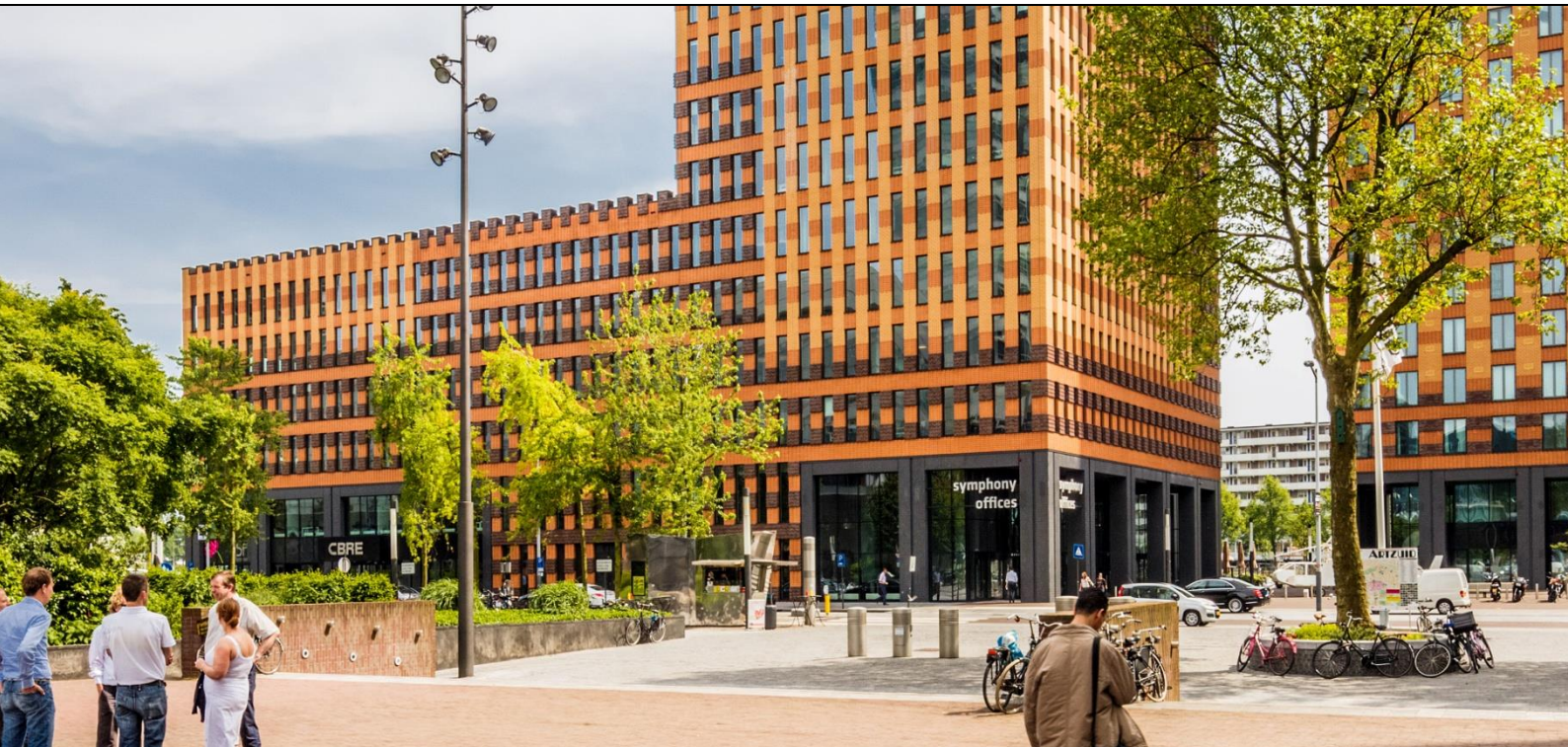

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