Master thesis Real Estate Studies
Faculty of Spatial Sciences
University of Groningen

In cooperation with:
European Research Group – International Council of Shopping Centers

Success factors in shopping centre performance

To what extent is size explanatory?

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EuroProperty: “Larger shopping centres offer greater protection in value and income terms” says a new Macquarie Equities Research note. (21-12-2009)

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EXECUTIVE SUMMARY

This master thesis was conducted as the final part of the Master Real Estate Studies at the faculty of Spatial Sciences of the University of Groningen, Netherlands. This thesis examines the success factors in shopping centre performance. Of particular interest is the relative importance of shopping centre size. This topic is often addressed in discussions about investment strategy at research departments. Yet, this topic was not thoroughly studied while there is no consensus in the industry about the importance of shopping centre size. Therefore this study was aimed to gain insight in this question in order to deliver fresh knowledge to the retail real estate industry.

This research was conducted in close cooperation with the European Research Group (ERG) of the International Council of Shopping Centres (ICSC) in order to leverage on the data available at the various ERG members. This collaboration has put this research in the unique position to collect data from seven participants by means of a survey questionnaire, predominantly requesting data with a strong quantitative angle. Both performance figures and characteristics of shopping centres were requested and inferential statistical tests (T-test, F-test, correlation and regression analysis) have been performed on a set of twenty-five a priori formulated hypotheses.

The sample size consists of a set of seventy-two traditional shopping centres all having a performance track record of eight consecutive years (2002-2009) reflecting 576 observations over the years. The shopping centres are distributed over the Netherlands, France, Portugal, Spain and Italy. The average size of the shopping centres was 33,000 m² of gross lettable area (GLA), in total comprising 2,3 million m² GLA and €6,6 billion of capital value. The headline research question runs as follows:

What are the key determinants of shopping centre performance and to what extent is size explanatory?

The ICSC's pan-European definition of a shopping centre was used: *'A retail property that is planned, built and managed as a single entity, comprising units and 'communal' areas, with a minimum GLA of 5.000 square metre.'* In addition to this, only traditional shopping centres are taken into account being in operation since or before 2001. Therefore specialised formats like retail parks and factory outlet centres are excluded from this study.

Academic studies have extensively addressed the determinants of absolute sales and, if obtainable, rent levels (a picture measurement at a certain point in time). The vast majority of these studies were conducted in the US or Asia what makes the results not necessarily applicable for Europe. Conversely, only very limited research was done for explaining a compounded growth figure over time (a film over a certain time period) which was the basis of the chosen performance measurement in this study.

More precisely, shopping centre performance was defined and measured as the *compounded real average like-for-like rental growth per square metre*, frequently defined as a key performance indicator at REITs and real estate funds. As lease legislation and the corresponding rent indexation can differ considerably across countries, the nominal rental growth rates are corrected for the applied index in the different countries to work with rental growth figures in real terms. This makes performance over the countries better comparable. The like-for-like rental growth is also a cashflow return and hence a good reflection of the daily operation. Due to the recent severe crisis, amongst other reasons, a cashflow based performance gained momentum in the industry and focuses on real market fundamentals rather than capital market sentiments. To get an even more comprehensive view, the

capital value was requested as an additional performance measurement. Above mentioned reasons are the foundations to prefer these performance measurements over other possible measurements.

Besides the two performance variables (dependent), twenty-three explanatory variables (independent) were requested, reflecting direct or indirect shopping centre attributes or characteristics. The requested data is broken down into six main categories being: Catchment area (five variables), Location (four variables), Competitive position (two variables), Building aspects (seven variables), Tenant mix (four variables) and a Management aspect (one variable). The variables reflect important elements of the theories addressed in this study like homogeneous retailer agglomeration, retail demand externalities and the spatial interaction theory. After postulating the hypotheses they were tested for significance.

Size matters, especially for (sub)urban and out-of-town shopping centres
The explanatory power (r^2) of shopping centre size is 13% when predicting shopping centre performance for (sub)urban and out-of-town centres. When the full dataset including inner-city shopping centres are taken into account as well, however, the explanatory power of shopping centre size is only 6%. Apparently, inner-city shopping centres are less dependent on their size as compared to (sub)urban and out-of-town shopping centres. From a consumer perspective it is reasonable to assume that an embedded (inner)city shopping centre is seen as part of a greater city centre retail area and hence is judged on these additional retail area as well. This result points towards confirmation of both the homogeneous retailer agglomeration theory and the spatial interaction theory. Distinguished between size categories, however, no significant difference was found between small, medium and big shopping centres, reflecting the modest correlation between performance and size.

Out-of-town centres benefit from additional retail area
Another supporting result for the relevance of size and the spatial interaction theory, is the significant difference in performance between out-of-town shopping centres that benefit from additional leisure or other retail area versus out-of-town shopping centres that do not benefit from such additional functions. On average the difference in real net rental income growth between both categories is 1,72% per annum which is quite substantial. This is an indication that out-of-town centres need additional pulling power in order to be more successful in profiling as a real shopping destination.

Dynamics in unemployment most decisive factor
The most obvious and thought-provoking result of this study concerned the development of unemployment in the region and catchment area of the shopping centre. With an explanatory power of 29% on its own, the regional change in unemployment was by far the strongest predictor of shopping centre performance which a priori was not being expected so evident. More specifically, it means that in general a high growth (decrease) in unemployment level results in a decline (growth) of net rental income growth within the shopping centre. Besides choosing the right location, or better said the right region, there is also a more cyclical component in it as it is common sense that economic growth and decline impact unemployment rates as well. In this regard it is also reasonable to expect that people that become unemployed will reconsider their spending patterns when they have less disposable income. In an additional test it also appeared there is a clear divergence between the more north-western countries France and the Netherlands and the more south-western countries of Spain, Portugal and Italy. In the latter countries the explanatory power of unemployment growth was even 43%. Here it is argued that shopping centres are even more vulnerable for people becoming unemployed in the region or catchment area it draws its sales from. A likely explanation here is the less robust welfare

state facilities these countries serve when compared to more north-western countries, eventually resulting in even relatively harder spending cuts of shoppers.

Number of fashion anchors

'The value is in the mix' is a regular used phrase when tenant mix is being discussed. Well balanced and aligned with the demands of its catchment area are the usual suspects when determining the success of a shopping centre. Also the importance of anchor tenants is studied and confirmed extensively, supporting the retailer demand externalities theory. Also in this study it was tested whether anchor tenants could also demonstrate a relationship with net rental income growth in the long run. Again a significant result was found. Controlling for size, a relationship was found between the number of fashion anchors and its performance. With an explanatory power of 9% it seems that shopping centres benefit from accommodating multiple fashion anchors. Besides, many studies have argued the importance of anchor image and this image can be extrapolated to the image of the entire shopping centre. Accounting for this argument, it is also reasonable to anticipate that especially fashion anchors can rely on higher valued images compared to other anchor types and therefore especially these anchors can enhance performance.

Multiple regression analysis

Testing for relative importance, the results from the multiple regression analysis show that the dynamics in unemployment clearly outstrips the importance of size. As the difference is quite material it is reasonable to state that this socio-economic variable is of greater importance than the building attribute of size. The model in explaining real rental growth is not particularly strong, however, yielding an r^2 of 33% while the model explaining market value growth was capable of explaining 47% of all variance. Using the Ordinary Least Square (OLS) method in combination with stepwise variable selection, size was not even an significant variable in the multiple regression analysis, reflecting the modest importance of size. In the strongest model size was slightly outstripped in importance by numbers of fashion anchors.

Conclusions

As the results showed, the explanatory power of size (6%) was outstripped by a tenant mix variable (9%, number of fashion anchors) and by a regional/catchment area variable (29%, dynamics in unemployment). Combined in a multiple regression analysis model the relative importance (as reflected in the standardized beta coefficient) this sequence of importance remained the same. As socio-economic variables can differ significantly over countries and regions, a major conclusion is that choosing the right region and location is in general more important than making investment decisions based on shopping centre size. Distinguishing by location typology it was found that the link between size and location is strongest in (sub)urban or out-of-town shopping centres. This indicates that size becomes more important when a shopping centre derives its drawing power solely from itself, where on the other hand inner-city centres can more often capitalize on the adjacent high street retail area making them less vulnerable to (a lack of) critical mass. This was also confirmed by the result that solitarian out-of-town shopping centres significantly underperformed out-of-town shopping centres that benefit from other retail/leisure. To gain even more insights in future research, one should consider to apply panel analysis instead of squeezing a multi-period into a single compounded performance figure. Moreover, additional time could be allocated for examining the optimal time-delay between the rental growth and the explanatory variables like unemployment growth and retail sales growth, which in this study was set on one year delay.

PREFACE

It was 11.40 AM, Tuesday April 22th, 2009. Together with Sander Aarts, a student Real Estate & Housing from Delft University of Technology I set foot on the pleasantly warm soil of Barcelona. We decided to attend the ICSC European Conference 2009. Two months later, I was in a meeting in Utrecht with three members of the European Research Group of the ICSC drawing the first headlines for an ICSC ERG research proposal about the performance of shopping centres and the effect of their size.

To date it is 59 weeks later. It has been an extensive research, with a time-consuming process of data collection and having presented the results in Groningen, Utrecht, Lisbon, London and Paris. First a consultation within the ERG in order to partly outsource this research topic to a external university student. Not much later a trip to the ICSC Research Seminar to promote the research proposal, and afterwards getting feedback on the data request sheet. After a rather stiff first data request in November, a presentation was given about the status in Munich and it was officially adopted as an ICSC ERG project. Subsequently a confidentiality agreement was framed, the study was pitched again in Paris, the second data request was sent, the involvement of Ernst & Young as independent data collector was secured and last but not least all the contacts by telephone and email with all potential participants throughout Europe took place at a weekly basis between November and June. After the historical moment of receiving all data from Ernst & Young in the afternoon of June 4th 2010 the data entry could start and not much longer the analysis. One would almost forgot, but the research had still to be done and reported on this Master Thesis which took another ten weeks. All together it took a little more than a year to get the job done.

Was it all worth it? I can say it was! If only it could help to prevent me from showing symptoms of possible dementia at later age. At least if the study of Carol Brayne et al. (2010) is correct. Recently this study found that for each additional year of full-time education there is an 11% decrease in risk of developing dementia. That's what I call a pleasant prospect! But besides this illustrious side effect I feel very privileged having had the opportunity to get in touch with Europe's industry leading companies in the dynamic market of shopping centre real estate. Besides I was able to get acquainted with the best in class research minded professionals within the industry and ICSC ERG made it possible to collect highly confidential data that usually is utopian to collect. But moreover, it gave me an exceptional opportunity to thoroughly deepen my understanding of investing in international retail real estate and shopping centres in particular.

To express my gratitude, I would like to thank everyone for their assistance and cooperation in this study. Obviously, it was never been possible to conduct this study without! Unfortunately I cannot thank everyone by name, but some people can't remain unnamed. First of all I'd like to thank Christopher Wicker (Retail Consulting Group) for allowing me to visit the ERG meeting in Barcelona. This was the immediate cause for my involvement within the project and later he was very helpful with pitching the study within and outside the ERG. Besides I'd like to thank Ron de Prie (Ernst & Young) for the data collection and the ERG members Mahdi Mokrane (AEW Europe), Rafael Pelote (Sonae Sierra) and Josep Camacho (ECP). Also I'd like to thank a friend Sander van Welie (Syntrus Achmea Vastgoed) for his contribution to this study.
From the University of Groningen I'd like to thank my supervisor Henk Brouwer for his useful suggestions and his positive attitude towards this research. Moreover I'd like to thank Arno Ruigrok and Herman Kok (Multi Corporation), Francine Zijlstra (Corio) and Jasper Klapwijk (ING RED) for their supervision and their extensive cooperation from the ERG. Especially Jasper played a crucial role and was highly committed in taking this project to a next level. Without any reservations, Jasper was truly indispensable making this study possible. Thanks Jasper. Last but not least, I'd like to thank my parents for their boundless hospitality and both their patience and trust during this research.

Kind Regards,

Maarten Oosterveld

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1. INTRODUCTION AND RESEARCH DESIGN

In this first chapter the reader will be introduced to this study by the research design. This chapter comprises six distinctive paragraphs. After a brief introduction of the International Council of Shopping Centers (hereafter: ICSC) and the European Research Group (hereafter: ERG) an substantive elaboration is given on the approach of this dissertation. Starting with an introduction in the problem outline, the research objective plus research questions are described subsequently. This chapter continues with examining the methodology. Following, the formulated hypotheses will be addressed accompanied with the conceptual model while this chapter concludes with the further outline of this study.

1.1. The ICSC and ERG

This thesis finds its origin in the ERG of the ICSC. Founded in 1957, the ICSC is the global trade association of the retail real estate industry. ICSC was formed when seven businessmen in Chicago pooled $500 each to incorporate a professional organization for the retail real estate industry. As a not-for-profit, it provides today's professionals with a multitude of resources and services, including network opportunities, industry research, educational enrichment and advocacy.

Since 1957, retail real estate has experienced extraordinary growth and ICSC's membership is approaching 60,000 professionals in more than 80 countries worldwide. Members include shopping centre owners, developers, managers, marketing specialists, investors, lenders, retailers and other professionals as well as academics and public officials. As the global industry trade association, ICSC links with more than 25 national and regional shopping centre councils throughout the world. The principal aims of ICSC are to advance the development of the shopping centre industry and to establish the individual shopping centre as a major institution in the community (ICSC, 2010).

The ERG was founded in 1998 and is part of the global ICSC Research Department. Within the ERG about forty research minded experts are represented from various industry leading companies throughout the retail real estate industry. The main purposes of the ERG are identifying and participating in pan-European research projects, promote and guide research best practices and deliver content for the annual European Research Seminar (ICSC Global Research Network, 2009).

1.2. Problem outline

In the European retail real estate industry there is an ongoing discussion among investors about the major determinants of shopping centre performance and, in particular, to what extent shopping centre performance depends on its scale. Some argue the biggest shopping centres (in terms of GLA) excel in performance as they yield higher footfall which is a key sales driver for international retailers and offers greater retail mix adjustments for the owner. Others are not fully convinced of this statement and say medium or smaller sized centres do not yield a lower performance than the larger ones as performance is more about location, fitting within the catchment area and dominance.

Since the founding of the Investment Property Databank (IPD) in 1985, performance of real estate assets was measured and eventually benchmarked. Despite boosting transparancy and providing valuable insights, participants can merely measure their portfolio performance against the benchmark itself, rather than addressing the fundamentals of why they out- or underperform. Present study aims to go beyond by gaining insight in the underlying characteristics of the assets that yield explanatory power for its performance, with an emphasis on the relative eplanatory power of shopping centre size compared to other characteristics. This is carried out on a European basis.

Since the seminal work of Reilly (1931) with his Law of Retail Gravitation Model and the extension by Huff (1964), size has been addressed as an important performance determinant. They stated that shopping centre attractiveness was based on a trade-off between its utility (proxied by physical size) and its disutility (proxied by distance) hypothesizing that the magnetism of a shopping centre is a function of its physical size. Are there supporting studies for this hypothesis, what else does the literature tells us, and what exactly is the explanatory power of size compared to other relevant determinants? What are the other determinants that are associated with shopping centre performance? Is size the most decisive factor? This study aims at properly answering these questions.

Despite there is some preliminary research conducted on this topic, the results of these studies are not fully applicable for the European practice as the research was primarily conducted on the U.S. retail market (Gerbich, 1998) or in cities like Singapore or Hong Kong. Moreover, most of the preliminary research that intends to measure shopping centre performance is approached from a consumer point of view (non-financial) because rental or income return data (financial) is found to be challenging to obtain, often due to confidentiality reasons. In other studies the performance of a particular retailer has been investigated. In the latter case, the research entities (e.g. units of measurement) are particular chain store units instead of complete shopping centres. Furthermore performance is mostly measured as a 'photo' or 'snapshot' (a particular moment in time), e.g. when explaining rents, rather than as a 'film' or 'multiperiod' approach (an examination over a continuous period) like an average multiannual IPD performance record. In the former case one may dispute to what extent a static rent is a meaningful performance measurement for a long term investor. Thus, although the interest in this topic to investigate is evident, no publicly available studies have been carried out about shopping centre performance approached from an investor point of view in Europe. In short, either the perspective, the performance measurement or the geographical angle makes the results possibly less suitable for the pan-European practice of shopping centre investors.

Obviously, profound insight in the determinants of shopping centre performance, and their relative significance, are of major importance to developers and investors. Investors want to purchase the best patronized and performing centres with appealing growth prospects, given a certain risk/return profile. Simultaneously they have a keen interest in whether they should expand existing shopping centres or still invest in new or replacing existing schemes? Developers want to deliver the best possible product to the market as 'the proof of the pudding is in the eating'. This study hopes to improve the assessment of the ex-ante potential of shopping centre performance by capitalising on the insights provided by empirical ex-post benchmarking the shopping centre performance in this study. This clearly outlines the scientific relevance. The practical relevance is twofold, on the one hand performance measurement can show the efficiency of the portfolio and on the other hand it's a communication tool to inform the shareholders and sometimes other stakeholders to what extent the strategic investment policy plan is yielding the performance it demands (Van Gool et al., 2007). A sample of shopping centre characteristics and performance figures from European shopping centre investors can hopefully show significant empirical evidence and increase understanding of the drivers that affect shopping centre performance.

1.3. Research objective and research questions

Following the problem outline, the research objective can be described as follows:

What are the key determinants of shopping centre performance and to what extent is size explanatory?

To fulfil the main research objective, the following research questions need to be answered properly:

1. *How should a shopping centre be defined?*
2. *How should shopping centre performance be defined and measured?*
3. *How is shopping centre performance associated with investor returns?*
4. *What variables are anticipated to be associated with shopping centre performance?*
5. *What data do industry experts consider feasible, practically-seen, to request from investors?*
6. *What is the relative importance of the individual independent variables?*
7. *Does shopping centre performance differ significantly between different types of schemes? (categorized by size)*
8. *What model has the strongest explanatory power to estimate shopping centre performance?*

1.4. Methodology

1.4.1. Research typology

There are several types of research, briefly described below.

Descriptive research (i.e. describing, frequencies): no hypotheses are formulated and there is an open question phrase. It is about thoroughly describing and counting the characteristics or features of the research entities. Therefore there are no expectations and hypotheses formulated. Besides, the research type is not based on existing theories.

Explorative research (i.e. assume, examine variances, differences): here no suitable theories or sharply formulated hypotheses are applicable. The research objective is about examining whether there is a correlation (positive or negative) between variables, and is aimed at developing of a theory and/or formulating hypotheses. Explorative research is seen as a transitional form between descriptive and explanatory research. Here inductive (assume) hypotheses are formulated.

Explanatory research (i.e. expect, predict, explain): *a priori* hypotheses are formulated and will be empirically tested. The hypotheses are usually derived from one or more theories and can be seen as an (tentative) answer to a relevant research question. An hypothesis is related to an anticipated correlation between one or more characteristics of the research entities. Here deductive (expect) hypotheses are formulated and causality acts as the explanatory basis.

This study can at best be qualified as a combination of both, explorative and explanatory research. Though, the emphasis lies on explanatory research. For the majority of the factors, clear hypotheses can be formulated *a priori* based recognized theories. For others factors the expectations about their association with shopping centre performance are rather ambiguous and there is no clear expectation about the direction of the correlation. It is obvious this study intends to reach further than describing characteristics of shopping centres and therefore this study should not be qualified as a descriptive research.

1.4.2. Data gathering and confidentiality

The most appropriate research instrument by which the data can be gathered for this research project is a survey. A survey is a proper way to obtain a large number of qualities of a large number of cases (Baarda and De Goede, 2006). In this research project one case (i.e. unit of measurement) represents a shopping centre. By means of an excel questionnaire relevant characteristics of the shopping centres (i.e. unit of qualities) will be asked for from European investment managers.

The research design had to cope with a constant trade-off between the most desirable data to request on the one hand and the threshold to participate due to data availability and confidentiality on the other

hand. The challenge is to minimize the threshold to acceptable proportions while avoiding that the data eventually turns out inadequate or unqualified, resulting in poor analyses. However, lowering the threshold is leading over the ideal dataset.
To mitigate the confidentiality issues concerned within this study, it is a prerequisite not to request too many sensitive data from the participants. To enforce this, the author will sign a confidentiality agreement that the data will be treated confidentially (see appendix 9.10.). Besides, the data can be delivered anonymously by Ernst & Young Accountants LLP, functioning as a 'third party'. Likewise the shopping centres can remain anonymous, the only thing we do ask for is the country as well as the regional statistical NUTS 2 code the shopping centre is located in order to deskreasearch some marco-economic and other relevant fundamentals. Finally, absolute income streams and/or market values can eventually be deleted as the datasheet will be organised in such a way that the performance measurement (i.e. %) will be calculated automatically. Hence, the underlying vlaues can be deleted after the performance measurements are copied and pasted special as 'only value'.

As mentioned above, the units of measurement in this research project are shopping centres as a whole. Thus the aggregation level of the cases is higher in comparison to data at unit level, which is more deterministic. Moreover, no disaggregated analyses (i.e. shopping centre level) will be executed as only results aggregated by categories that embody enough cases will be exhibited.

1.4.3. Data analysis

The research objective is to examine the relative explanatory power of size, among other determinants, for shopping centre performance. To answer this objective, and the research questions derived from it, the squared correlation coefficient or explained variance (noted as r^2) between performance and the various determinants need to be examined. To test whether a significant difference exits between the performance of different types of schemes, the variance between the distinguished groups needs to be analyzed. Ultimately, a mathematical model has to be constructed that yields the strongest explanatory power for shopping centre performance. Here multiple determinants are simultaneously regressed on shopping centre performance. In the literature this is also referred to as performance attribtion analysis (Geltner et al., 2001). Two powerful and frequently used techniques to examine how strongly two variables are related are correlation and (single or multiple) regression analysis respectively. To test on variance between groups ANalysis Of VAriance (hereafter: ANOVA), which is also referred to as the F-test, is a suitable technique. Hence, these techniques are used in this research project.
In order to execute parametric tests like regression analysis, which can be seen as mathematical model building, it is compulsory to measure the variables on ratio or interval scale (De Vocht, 2005). An exception to the rule is made for dichotomies/dummy variables when building a multiple regression model. This variable is suitable for regression analysis but can only have two values (e.g. true/false or male/female). Generally speaking, it means that all factors included need to be quantified as far as possible in order to maximize the testing possibilities. As some factors are rather abstract and therefore hard to quantify, effort is put in finding an appropriate proxy/indicator for that factor. Eventually hypotheses will be formulated and empirically tested in SPSS.

1.4.4. Data reliability and validity

As this research project can be defined as an explorative and explanatory research, hypotheses will be empirically tested. To formulate these hypotheses, it is necessary to indicate relevant factors of shopping centre performance (i.e. units of quality). Hence, a proper way to measure performance is vital as well. In the theoretical framework the relevant terms and factors will be defined and will be

made operational. When this is done in a proper way, a factor emerges into a variable: an appropriate proxy or indicator to measure the factor (Baarda and De Goede, 2006).

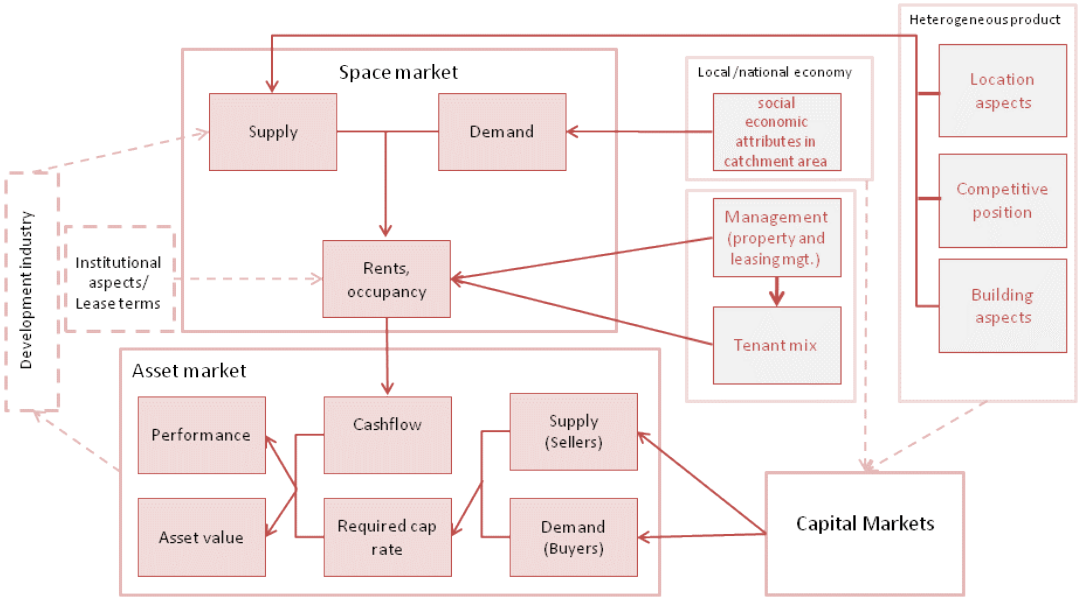
With respect to the proxies, it is important to secure the validity and reliability of the variables that need to be measured. Validity is about measuring what one really intends to measure. That means the variable is a proper indicator for the factor. It depends on the complexity and abstraction of the particular factor whether it's relatively hard or easy to find a good proxy. Besides, more abstract, heterogeneous factors are likely to have multiple dimensions. In order to execute a reliable measurement, it sometimes is necessary to formulate multiple indicators/proxies to cover the different dimensions of the factor (Baarda and De Goede, 2006). For example, compare factor 'size' with factor 'tenant mix'. Because there is a certain tension between the amount of data that is requested and the (non)response, it will be scrutinized in the theoretical framework what factors (and the accompanied proxies) are considered feasible to include and what factors are not.

1.4.5. Trackrecord

As most institutional real estate investors have a mid- of longterm investment scope (5 to 10 years), asset performance of a single year does not offer a comprehensive figure of the asset and therefore it is too limited. Institutional real estate investors are particularly interested in performance over multiple years. This is due in part to the relatively high transaction costs in buying and selling property. It is also due to the ability and desire of many direct real estate investors to earn investment returns through successful operational management of the properties they invest in, rather than simply from trading (that is, buying and selling assets). So in order to enhance the significance of the results, multi-year annual data of the past seven years (2002-2009) is requested. The analyses will predominantly take place cross-country rather than within a country. This is mainly due to the fragmented distribution of the shopping centres over the countries. Therefore some explanatory power will also be implied in the different lease terms and structures among various countries. With the robust track-record of seven years, the majority of an economic/property cycle is taken into account giving a comprehensive view of the performance of shopping centres over time. Ideally, a longer time-series of ten years or longer would be preferable to further improve robustness, but these data-series are challenging to obtain bearing in mind that only standing investments comply with the criteria and that would shrink the potential dataset too much.

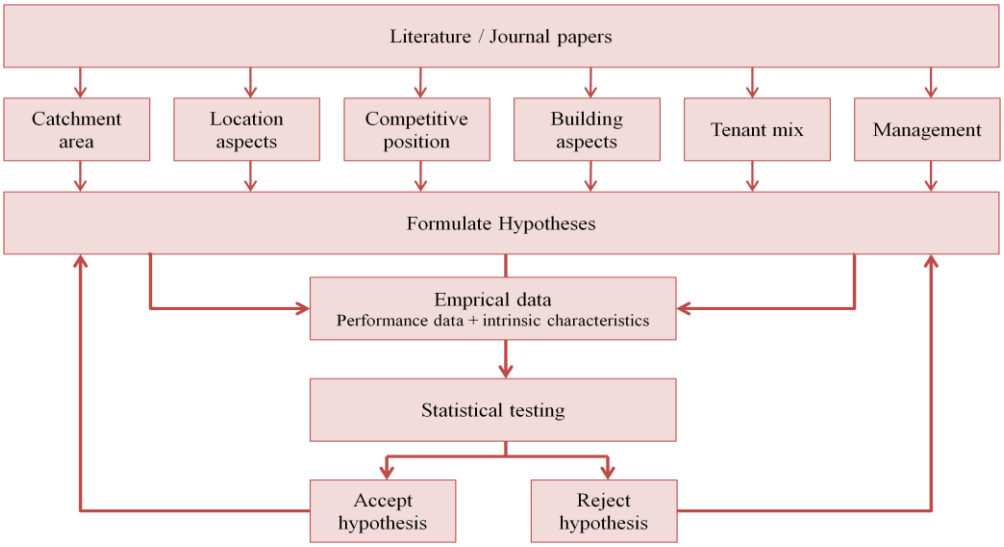
1.5. Conceptual model and research model

Figure 1: Conceptual model



Source 1: Oosterveld, 2010

Figure 2: Research model



Source 2: Oosterveld, 2010

1.6. Outline

The remainder of this thesis is as follows. This thesis includes seven chapters related to shopping centre performance, how performance is associated with investor returns and a predictive model to estimate shopping centre performance. One can subdivide this dissertation into three distinguishing parts: a theoretical framework, an empirical section and two chapters with conclusions and recommendations. The theoretical part will be considered in chapter two up to chapter four. Subsequently the empirical part will be discussed in chapter five and six. In chapter seven and eight this thesis will finish with conclusions and recommendations.

PART I: THEORETICAL FRAMEWORK

2. THE REAL ESTATE ASSET CLASS

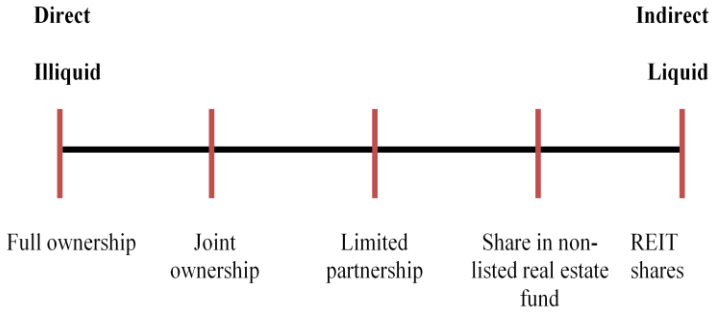
In this chapter the focus will narrow to real estate and its specific characteristics. First a brief introduction of various ways and products to invest in real estate is given. Subsequently the characteristics of direct real estate is elaborated on to continue directly with the specific characteristics of shopping centres and retail as compared to other real estate sectors.

2.1. Various ways to invest in real estate

Prior to narrowing our focus to shopping centres a brief overview is depicted below about the various investment possibilities in real estate equity. These products are traded in the capital market. Broadly speaking, the capital market can be divided into four categories; the industry distinguishes between equity and debt investments as well as between direct and indirect investments. Van Gool et al. (2007) define a direct investment as an investment with a direct legal ownership of the property or owning a share that entitles one to the revenues produced by the property and both, hold a majority stake in the property and is in control of the (asset)management of the property. An indirect investment is an investment where the investor isn't the direct owner of the property from a legal perspective, but is the owner from an economic perspective without having a majority stake nor being in control of the management. For example, this is the case when investing in listed or non-listed funds. Furthermore, only the listed funds are being considered as public real estate while the remaining are seen as private real estate.

Public markets are characterized by a relatively high degree of liquidity which is both a cause and effect of the fact that, in public markets, asset share prices can adjust rapidly to relevant news about the value of the funds' portfolio. For that reason public markets are considered as rather informational and efficient. In contrast, private markets are generally less liquid than public markets, as it usually takes longer for sellers to find buyers, and it is more difficult to ascertain a fair price. Transaction costs also tend to be higher in the private asset market resulting in private assets being traded less frequently (Geltner et al, 2001).

Figure 3: Real estate investment products



Source 3: Eurindustrial, 2006

Besides equity investments real estate also offers various opportunities for investing in the debt side of real estate. Given their capital intensive character, financing real estate investments with equity capital only is very exceptional. Debt assets are essentially the right to the future cash flow to be paid out by borrowers on loans they have taken and lenders have a preferred claim for obtaining the cash which the underlying asset generates (Geltner et al., 2001). Examples are bank loans and mortgages, or in

smaller pieces bonds and (commercial or residential) mortgage backed securities. Because the debt side lacks relevance for this research no further attention is paid to this matter. For the purpose of this research it's more important to focus on the underlying asset itself, rather than on the way the investment is structured (eventually, the performance of every property investment whether its public or private, direct or indirect, is greatly dependent on the functioning and performance of the underlying property itself). Therefore, here will be extensively elaborated on in the remainder of this chapter as well as in chapter 3 and 4.

2.2. Investing in direct real estate

A common definition of investing in real estate is: *the allocation of capital in real estate with the purpose of generating future cash flows by both operating and eventually selling the property* (Van Gool et al., 2007). This section will elaborate on a scheme which describes specific real estate characteristics. These characteristics determine to a great extent the pro's and con's of investing in direct real estate as compared to other assets like stocks and bonds. These characteristics give more insight in the asset class as a whole and it will intuitively make clear how real estate differs from other asset classes like stocks and bonds traded on the stock exchange.

Table 1: specific real estate characteristics

Characteristic	Description
Capital asset and production asset	An investor in real estate will need expertise of the capital markets but at least equally important are the asset market, space market and development industry that exert forces on the performance on the property. Hence real estate is a rather entrepreneurial asset class.
Immovable, fixed location	As real estate is fixed at a certain location it is rather impossible to adjust to a changing environment and market conditions with regard to socio-economic characteristics in a geographical area. Therefore the performance is dependent on future development of these variables.
Heterogeneous	Real estate is a very heterogeneous market. This is mainly due to specific characteristics like its location, in both the absolute and relative way, its state of maintenance, building typology, specific tenants and leasehold/freehold position of the land. This makes every property rather unique which makes the valuation an estimation.
Segmented submarkets	By definition, real estate is local. Hence, real estate markets are local. This is mainly due to its locational fixation and heterogeneity. Every geographical area has different characteristics and every real estate subcategory has its own market conditions and thus submarket.
Market imperfections	There is no such thing as an efficient market in real estate. There is no daily price-making process like in the stock market. Transactions take place on a irregular frequency and it's no seldom the deal details are not made public. This frustrates markets to become in equilibrium.
High unit prices and transaction costs	In comparison to stocks and bonds the unit prices for direct real estate are exceptionally high. Also the transaction costs/buyers costs are usually a substantial amount of money. This makes it hard to build up a vast direct real estate portfolio as a lot of capital is required. Broadly spoken only institutional investors are qualified to build well diversified real estate portfolios. The high unit prices is also an important reason for the use of leverage / debt financing. Simultaneously, the transaction costs make it challenging to quickly sell real estate in a profitable way after buying it.
Illiquidity	Stocks and bonds can be bought and sold at the stock exchange within seconds. Direct real estate is rather illiquid a transactions usually take place after time-consuming due diligence research and negotiations mostly between one single potential buyer and one potential seller. This is mainly due to its heterogeneity and relative market opacity.
Long life span	The life span of land is infinite, while real estate have a very long life span as well, especially from a technical perspective but also from an economic perspective a

	building can be functional for decades. This makes direct real estate a long-term investment class rather than a commodity, also with regard to recovering the transaction costs.
Production time	It usually takes years rather than months to initiate, develop and build properties before they can be used. This makes that the supply side is unable to respond instantly to changing market demands. This is another reason real estate markets are rarely in market equilibrium.
Institutional regulations	Extensive regulations, permits, spatial planning procedures and leasing contracts and various laws make real estate development and performance very dependent the pursued policy on these subjects.
Labour-intensive management	As mentioned before, real estate is a rather entrepreneurial asset class which makes the management of real estate very labour-intensive. To an important extent, the rental cash flows of real estate can be affected by the real estate manager. Some important areas that can significantly influence performance are leasing, rental collection, insurance issues, maintenance, renovations and redevelopment. Besides real estate is a local business, so that makes that real estate is hard to manage properly from long-distance. Regularities and the complex character of real estate markets are also relevant in this matter. Not every investor is able or willing to dedicate its human capital to the management of real estate.

Source 4: Van Gool et al., 2007

As described in the scheme, there are some inextricable characteristics about real estate, making real estate an appealing investment product. At the same time, however, real estate also has its limitations due to its specific character. More in detail about the pros and cons in the coming section.

2.2.1. Major (dis)advantages of direct real estate

Why do both institutional investors and wealthy individuals allocate a part of their capital to real estate? As mentioned before a potential investor has different ways of investing in real estate but, eventually, the achieved returns depend for the lion share on the actual performance of the underlying 'bricks and mortar', whether by means of direct or indirect positions. The specific characters of real estate make the asset class differ from other capital assets like stocks and bonds. From an investment perspective, this is favourable for the real estate asset class. More details about the relative attractiveness of real estate compared to stocks and bonds is further addressed in appendix 9.1 about investment decision-making. In the coming section both the biggest advantages and disadvantages of real estate will be addressed to increase the understanding why investors allocate capital to this extraordinary asset class. Van Gool et al. (2007) identified the following competitive advantages and disadvantages of real estate.

Stable income producing. Due to the long life span and usually mid- to long-term lease contracts the investor can benefit from a relatively stable rental cash flow for multiple years. Especially 'A-grade' locations and quality building have a relatively small risk for substantial vacancy as these properties are relatively easily marketable. Obviously of paramount importance in this regard is the solvency of the tenant or tenants (to gain insight in their risk of default) and the specifics of the lease contracts. Are there break-options, is the contract index-linked and to what particular index is it linked? A good location is relatively 'value-proof' due to the scarcity of land at certain locations and may benefit of capital growth on the longer-term. This relative stable income aspect evokes the character of a long-term bond, but then with additional rental and capital growth potential.

Appealing risk-return profile. Longitudinal data-series reveal that direct real estate has an attractive risk-return profile as compared to other capital assets. This is expressed by the a risk-adjusted return ratio, the Sharpe-ratio. In table 2 on the next page an overview is depicted of the risk-return characteristics of various important asset classes. There are a few plausible explanations stated by Van Gool et al. for this extraordinary appealing risk-return profile. In the first place to is due to the

specific characteristics of the real estate market where well-informed insiders can capitalize on acquiring 'bargains' what usually results in exceptional returns. But above that, an investor demands ample compensation for risks like illiquidity, relatively high transaction- and information costs, management costs and tax burdens. This leads to an favourable extra risk-premium over long-term treasury bonds which lead to outperforming returns. However, due to smoothing and lagging effects in the valuation process, the risk is somewhat underestimated what makes the risk-return profile flattered to some extent (for more information about smoothing and lagging see appendix *9.1.2.d.*).

Table 2: Risk and returns major capital asset classes (1980-2005)

Real estate (ROZ/IPD, NCREIF)	NL	UK	USA
mean return	8,4%	10,9%	8,6%
std. deviation	4,5%	8,4%	5,7%
sharpe-ratio*	1,20	0,94	0,98
Real estate stocks (GPR)	**NL**	**UK**	**USA**
mean return	8,7%	14,4%	14,7%
std. deviation	11,3%	18,8%	14,7%
sharpe-ratio	0,50	0,61	0,80
Stocks (MSCI-indices)	**NL**	**UK**	**USA**
mean return	16,5%	14,5%	14,3%
std. deviation	22,5%	16,8%	19,2%
sharpe-ratio	0,60	0,68	0,59
Bonds (t-bonds)	**NL**	**UK**	**USA**
mean return	8,4%	11,1%	9,6%
std. deviation	6,8%	9,4%	7,2%
sharpe-ratio	0,79	0,86	0,92

* risk-free return of 3% used to calculate sharpe-ratio
Source 5: Van Gool et al. (2007)

Diversification potential. A major advantage of real estate in a mixed-asset portfolio is the diversifying ability. This is because of the low or even negative correlation of real estate with other asset classes. In figure 21 in appendix 9.1. the low correlations are visualised by the more sharply bended curves than the stock-bonds curves and thus improves the efficient frontier. An important explanation for the low correlations can be found in the fact that the space- and asset market are not directly affected by the stock exchanges. The demand and supply at both markets lag economical developments which are instantly priced in the stock exchange. This is mainly because of the long-term lease contracts and long production time of new stock. Therefore real estate is 'late-cyclical' as compared to the other asset classes.

Fairly good inflation hedge. Institutional investors, like pension funds and insurance companies, put much effort in aligning their capital assets with their liabilities (like retirement and insurance payments) in such a way that their assets at least compensate for inflation as their liabilities are indexed at this rate as well. Because indexation of lease contracts is common practice in the real estate industry the returns of real estate correlates fairly well with the inflation rate in the same period. As stocks and bonds yield lower correlations with inflation than real estate this is an important benefit for the asset class.

Return enhancement through pro-active management. Different from stocks and bonds where the dividends depend on others and coupons are fixed, the return on real estate can be enhanced by pro-active professional real estate management. This mainly concerns leasing management, property management, decent maintenance and other operational expenses.

In addition, refurbishment/renovation or extension potential can significantly enhance returns.

Capitalize on specific opportunities in the real estate market. In efficient markets (like the stock exchange) where specific knowledge is equally available to everyone opportunities are rare and only occur for a very limited period to profit from. On real estate markets where information is asymmetric and often incomplete it is possible to create an long-term competitive advantage as compared to market competitors. Therefore it is possible to outperform in terms of return when successfully capitalizing on these market imperfections.

Fiscal benefits. A last advantages lies in the fact that real estate, seen as a production asset, is treated different than other asset classes like stocks and bonds from a fiscal perspective. In most countries it is allowed to write down on real estate which is tax-deductible an thus profitable, even when the appraised market value increases.

Concluding, real estate is particularly interesting because of its diversification abilities and fairly good hedge for inflation. Although the diversification abilities are sometimes overstated due to smoothing and lagging effects, real estate remains favourable from an diversification perspective after correcting for this. All the same, however, lagging and smoothing is one of the reasons that in reality the allocation to real estate is lower than one could expect based on the allocation mix within mixed-asset portfolio constructing (Geltner et al., 2001). The advantage for Asset-Liability driven investors like pension funds and insurance companies, is that real estate correlates fairly well with inflation, certainly as opposed to stocks and bonds.

The most well known disadvantages of investing in direct real estate can be mitigated to a great extent by investing in other real estate investment products. Below a brief description will be provided in order to show the reverse of the medal.

Knowledge- and labour-intense market. Due to its functioning in complicated local space and asset markets and its fixed location, it takes much effort to acquire and manage the real estate as compared to a stocks or bonds portfolio of equal value.

Another hurdle is the high unit prices which make it challenging to build up a decently diversified portfolio. Only a considerable portfolio of at least half a billion euro's could yield enough diversification and can make an acquisition and asset management department economically feasible (Van Gool et al., 2007).

The heterogeneous character makes real estate rather illiquid because of time-consuming due diligence and negotiations phases before a transaction takes place, making real estate portfolios rather rigid in the short-term. Besides, as real estate can be impressive architectural aesthetics, an emotional connection with a particular property can be developed, restraining investors to act purely rational.

Because real estate shapes the urban landscape, the municipality and other governmental organisations determine or at least are involved in the planning process and have to provide the building permits. Also legislation about rental contracts, taxes and other regulations makes it in both the development and operational phase significantly dependent upon the governmental organisations.

Another challenge is accurate performance measurement and benchmarking of real estate returns, especially regarding the market values based on appraisals. As appraisals are objectified estimations of potential prices done by human beings it is hard to know whether the value is correct. This could lead to the GIGO-effect while benchmarking or measuring performance which stands for Garbage In Garbage Out (Geltner et al., 2001).

Last but not least, the image of the industry can suffer for unethical behaviour due to the exciting and relatively opaque market. A potential risk is that this could make institutions turn their back to real estate.

2.3. Retail real estate

'Retail has been one of Europe's best performing and most in-demand real estate asset class throughout the 1990s and 2000s.' 'Prime shopping centres which dominate their catchment are one of institutional investor's blue ribbon asset classes'

These two quotes from Richard Bloxam, Director European Retail Capital Markets of Jones Lang LaSalle, aptly show the significance of retail real estate and shopping centres within the capital markets. Figure 28 in appendix 9.6. shows that about a quarter of the total investment volume in 2009 was allocated to the retail segment, only giving precedence to the office sector. In this section the characteristics of the retail and shopping centre investment class will be compared with the other asset classes like offices, residential and logistics. Table 2 has shown that the Sharpe-ratio, the risk-adjusted performance measurement, for real estate is very close to 1,0 or even 1,2 in case of the Netherlands. Within the real estate asset class one can conclude from figure 29 in appendix 9.6. the Sharpe-ratio is significantly higher for retail (incl. shopping centres) than for offices or residential in the long-term. In general, retail is considered as a relatively low-risk real estate segment. This is expressed aptly in the lower initial yield an investor requires on a retail investment compared to an office or industrial investment. This is shown in figure 30 in appendix 9.6. It seems that retail outperforms other asset classes in terms of risk-adjusted return series. This could foster the desire to know what makes this asset class so appealing in terms of risk and return. Below some important characteristics are provided which could increase ones understanding about retail and shopping centres as an asset class.

2.3.1. Differences retail versus other mainstream sectors

In the comprehensive work 'Onroerend Goed als Belegging' of Van Gool et al. published in 2007, an overview of the retail characteristics is provided in relation to the other mainstream real estate categories. The most important ones are stated below. Because of the specifically structured retail landscape in the Netherlands, some bullets may not fully apply to the West-European situation.

Location. The specific location of a retail shop is of greater importance for its performance than it is for the other property types. Predominantly this is because the turnover a retailer can make at a certain location determines the performance of a retailer. That makes that at hotspot locations the 'turnover' of retailers is relatively low as they want to cherish their location.

For solitary shops the investment to make is relatively lower as compared to offices or industrials. However residential can be considerably cheaper per unit, residential real estate is usually traded in blocks of multiple assets. It makes intuitive sense that this characteristic doesn't apply for complete shopping centres.

Property management expenses. Because of the lower investment per unit an investor can investment in extra units with the same budget. This provides extra diversification potential and thus risk reduction, but simultaneously it increases the management expenses regarding administrative costs, rent collection, insurances, rent negotiations and commercial expenses because of the relatively small but numerous accounts.

Specific knowledge about retail fundamentals required. An investor must have an thorough understanding of both what moves and affects consumers and retailers. This requires specific understanding of consumer behaviour, consumer spending, fashion trends, retail trends, new technologies and social media, successful unit configurations and rent level per city of location etc.

Limited facade and interior expenses for investor. A retailer formula usually pursues a distinguishing image to attract consumers and uses a specific 'branding' for its formula. Therefore the

facade and interior of the unit is usually designed at the expenses of the retailers. This lowers the demanded initial investment prior to occupation. In contrast, the investment on design and interior prior to occupation of offices and industrial properties are on the expenses of the landlord.

Operational expenses. A particular part of the maintenance, operational and renovation works are not of a clear constructional nature. This part is usually at expense of the retailer instead of the landlord. That is, a part of the operational expenses are recoverable for the landlord, the other part is non-recoverable and remains at expense of the landlord. This is different from other categories. All capital expenses usually are at expense of the landlord.

Institutional influence. The legislation about the lease terms can vary considerably among countries. In the Netherlands one can find procedures in the Civil Law Act about rent determination. These procedures causing a smoothing effect on rental development which obviously makes the income returns less volatile. For a more detailed elaboration on this matter see appendix 9.8. These procedures only exist for retail leases.

Spatial planning restrictions. In a country where land is scarce (like in the Netherlands) the distribution of land for real estate development is rather strict anyway, in comparison to offices the planning of retail area is even more constrained. These restrictions are mainly aimed at protecting the interests of the retailers that are already established. A local oversupply of retail space can jeopardize their interests. This created a relative scarcity in retail space. In recent years this policy has been beneficial to investors as the vacancy rates in retail are considerably lower than the office vacancy rates, at least in the Netherlands.

Liquidity and marketability. Solitary retail units at demanded (high street) locations are relatively liquid as compared to other assets both, because of their scarcity and the relatively limited investment volume per unit. Therefore retail property at prime locations is very in-demand from both perspectives retailers and investors. This makes it a very marketable asset class with relatively low vacancy risks.

Land value. The value of the land as compared to the value of the ‘bricks and mortar’ (the actual property) is usually higher for retail real estate. This can create redevelopment potential. For example, the value for industrial properties is relatively low so the incentive for redevelopment is lower as well.

2.3.2. Shopping centres within the retail real estate industry

Generally speaking, one can distinguish three subcategories within the retail real estate industry. Next to the solitary (high street) shops the segment encompasses shopping centres and retail parks/warehouses. Although, as table 23 in appendix 9.9. depicts, the latter segment could also be seen as a specific category within the shopping centre segment. In the course of the past years investors became increasingly interested in shopping centres in the Netherlands as shown in figure 31 in appendix 9.6. To comprehend what is meant by a shopping centre the ICSC has defined a shopping centre in a Pan-European context. The ICSC European definition of a shopping centre will be used in this research project. This definition encompasses the regular shopping centres. Besides, there will be some additional requirements/thresholds to exclude specific and rather uncommon types of centres. The ICSC definition of a shopping centre is as follows:

‘A retail property that is planned, built and managed as a single entity, comprising units and ‘communal’ areas, with a minimum GLA of 5.000 square metre.’

Althouh there are more definitions of a shopping centre, they do not vary significantly from one another. The Investment Property Databank (IPD) defined a shopping centre as:
"*A purpose-built centre of at least 5,000 square metres with 5 units or more. The property should have a public area for pedestrians and be managed as a single entity by a property team*".

In order to sharpen the definition of an eligible shopping centre type, some additional requirements are formulated. Hence, only the traditional schemes will contribute in this research project, which are open for at least seven consecutive years:

1.	The retail concentration needs to be managed as one entity by a property manager to exclude highstreet shops but include open-air centres;
2.	The scheme should in every case evoke the sense of a shopping centre (instead of e.g. hypermarket+);
3.	One anchor (e.g. Hypermarket) should not cover over 50% in terms of GLA of total shopping centre GLA, unless the *remaining* retail (≥ 5 units) are above 5,000 square metres in total;
4.	Specialised centres like Retail Warehouses, Retail Parks, Factory Outlet Centres, Lifestyle Centres and Theme-Oriented Centres are excluded;
5.	Seven consecutive years of performance track record is required to be eligible and consider the years 2002-2009;
6.	The shopping centre should have been opened in, or before, 2001 to avoid start-up problems bias results.

For a brief overview of shopping centre typologies recognized by the ICSC, see table 23 in appendices 9.9.

This section will continue with some distinguishing characteristics of shopping centres in general as described by Van Gool et al. (2007). At this stage there is no distinction made between the subcategories within the shopping centre segment as seen in table 23 in appendix 9.6.

High unit prices. As shopping centres comprise extensive amounts of lettable area (somewhere between 5,000 m² up to around 200,000 m² in West-European markets), the unit prices for complete shopping centres are among the highest within the real estate segment. This makes shopping centres usually only available for institutional investors with extensive amounts of capital. As a result, it is also more difficult to build up a well diversified portfolio of assets.

Complexity. Shopping centres can be seen as a sort of mini-economies with numerous endogenous and exogenous forces affecting the performance of shopping centres. As the dynamic environment both inside and outside the shopping centres instantly changes, the shopping centre should constantly try to align its offering to the needs of this environment and thus the needs of both the consumer and the retailer. Predominantly the main areas to focus on are atmosphere, the branch mix, the type of tenants (tenant mix) and routing of pedestrians. Atmosphere; The functional ageing of shopping centres runs at a higher pace than for solitary shops. This usually demands a refurbishment every decade. Branch mix; the more diverse and complete the branch mix the higher the drawing power of the shopping centre and synergy effects are likely to appear. Tenant mix; here the pricing and assortment/range of stock are assessed. Does the tenant composition fit the needs of the catchment area? Is there besides the (inter)national brands also room for the local entrepreneurs, or the so called 'couleur locale'. This can enhance the identity and distinguish a shopping centre from one another. As a result it can strengthen the ties with the catchment area and improve footfall. Routing: overall footfall, or at least the distribution of the visitors, can be improved by placing the key anchors/tenants

at strategic locations within the shopping centre. It is quite common that the key anchors are situated at the very edges of the shopping centre so the pedestrian flows in between is optimally stimulated.

Good comparison shopping opportunities. Stokvis and Cloar (1991) confirm that planned shopping centres, where e.g. tenant mix is better controlled as compared to high street areas, are better equipped to reduce search and uncertainty costs as introduced by Webber (1972) while supporting the retailer agglomeration theory introduced by Hotelling (1929). Citing numerous frictions, including lack of retail information, no centralized management, no controlled leasing and sparse parking, Stokvis and Cloar state that most downtown high street retailing is likely to be less successful because it lacks the consumer information and well-balanced comparison shopping opportunities that are frequently found in planned shopping centres.

Adding value through active management. It's quite obvious that the focal points stated above requires more management than most other real estate segments. A key advantage is that shopping centres are usually controlled by one of perhaps two (co-)investor(s). This provides extra possibilities to look at the shopping centre as a whole instead of just solitary shops. Because everything is intertwined with each other it is possible to achieve synergy effects that can significantly enhance the performance of a shopping centre.

Highly professionalised sector. Because of the possibility of adding extra value by pro-active management of the centres this also requires extensive knowledge. The institutional shopping centre investors that are well capitalised in order to build a sufficiently diversified portfolio have to deal with numerous challenges within the complex shopping centres. This demands sophisticated analysis and solutions as different factors are interdependent. This requires highly specialised knowledge at different levels. At the strategic level of asset selection and portfolio management as well as at tactical and operational level for asset and property management.

Illiquidity. With such high amounts of capital concerned with the purchase and selling of shopping centres, the actual number of companies who can allocate such amounts to one single account is limited. As a result in times of crises the average amount of money concerned with shopping centre drops dramatically. For example in current crisis the average sale price in the UK shrunk from 134 million GBP in 2007 Q2 to 42 million GBP in 2009 Q2, a decrease of 69 percent. Please see the overview in figure 32 in appendix 9.6. This shows that in times of downturn, smaller properties are more liquid, and this could be a potential risk for the shopping centre segment.

Better spread vacancy/default risk. Besides that retail space is more scarce than, for example, office space (which in general already dampens the vacancy rates for retail), shopping centres typically consist of, at least, 10 units rented to different tenants. But let's assume an average unit space of 200 m² than a shopping centre of 40,000 m² would contain 200 separate units, and probably 200 tenants. This really alleviate the vacancy risk if a tenant would default or would leave the shopping centre. This is also argued in the European Shopping Centre Digest, a research conducted by IPD and CB Richard Ellis (2005). Conversely, in the office market a regular office building will usually not accommodate that much tenants, and not uncommonly one tenant rents the entire building. Same story for industrials or hotels, but also solitary high street shops can only rent out to one single retailer. So the difference with shopping centres is that vacancy rates rise significantly if one tenants leaves or defaults while in shopping centres on tenant leaving won't cause immediate vacancy problems.

2.4. Conclusion

This chapter has demonstrated there are multitude ways to invest in real estate. In general one can choose between private or public real estate and take an equity position or a debt position. Depending whether an investor has specific real estate knowledge in-house or not, whether he has big or small

amounts to spend, wants to have influence on the management or not, wants to invest in numerous funds or in just one in order to diversify, and what his appetite for risk is the investor will choose what type of investment suits him best. Above all, the performance of any investment product or vehicle is determined for the lion share by the performance of the underlying properties themselves, so in the end the actual properties should be the focal point of any examination rather than the structure of the vehicle.

From a performance point of view we have learned that the Sharpe-ratio (albeit unsmoothed) for real estate has been considerably higher than for stocks and bonds. Besides considering this performance indicator at its own merits, the most significant advantages of real estate above all are the fairly good inflation hedge, the diversification potential it can bring at the macro portfolio level and the fact that real estate is considered as a relatively stable income producing asset class. The most common disadvantages of real estate are illiquidity, market imperfections, heterogeneity and a lack of transparency. These facts, together with the challenge to get accurate data, can hamper performance management and can suppress the appetite for real estate by institutional investors. A substantial part of these difficulties, however, can be relieved by the various ways of investing in real estate. This can limit an investors' exposure to most difficulties by outsourcing them to an, for example, specialised real estate fund.

The retail real estate segment can count on a significant interest from institutional investors. This is underpinned by an appealing performance track-record and favourable risk-adjusted returns. Partly due to government restrictions there is a relative scarcity of prime retail product which pushes up both prices and rents. Especially the interest in shopping centres increasingly expanded over recent years while performance figures also showing favourable results. One of the likely explanations for this are the possibilities to add extra value by an active management approach towards shopping centres. The counterpart is that shopping centres are sophisticated assets that instantly demand a lot of attention in order to successfully adapt to the ever-changing environment.

David Raven, Head of Shopping Centre Investment at Jones Lang LaSalle commented: 'During the first half of 2010, vendors began releasing stock onto the market to match the investor demand targeting the sector. Pricing has moved considerably with values jumping some 25% over the past year as a result of yield compression alone. Institutional investors have dominated purchasing over the first half of the year.
Source: PropertyEU, newsletter july 19, 2010

3. SHOPPING CENTRE PERFORMANCE

In chapter three attention will be paid to the real estate system in general, how different real estate markets interact and how this affects the value chain of retail real estate. This will provide sufficient understanding of what measurements of shopping centre performance can be taken into consideration. Eventually, the measurement that fits best in this research both from a theoretical perspective and a practical perspective is examined. In the empirical part, this performance measurement will be the dependent variable. In order to examine the dependent variable in the empirical part, the independent variables will be assessed later on in chapter four. Therefore in this chapter the relevant mechanisms are being addressed which determine both the functioning of the real estate markets and eventually affect real este performance. Subsequently the relevant variables that determine the supply and demand for retail space and are anticipated to be associated with performance are being discussed.

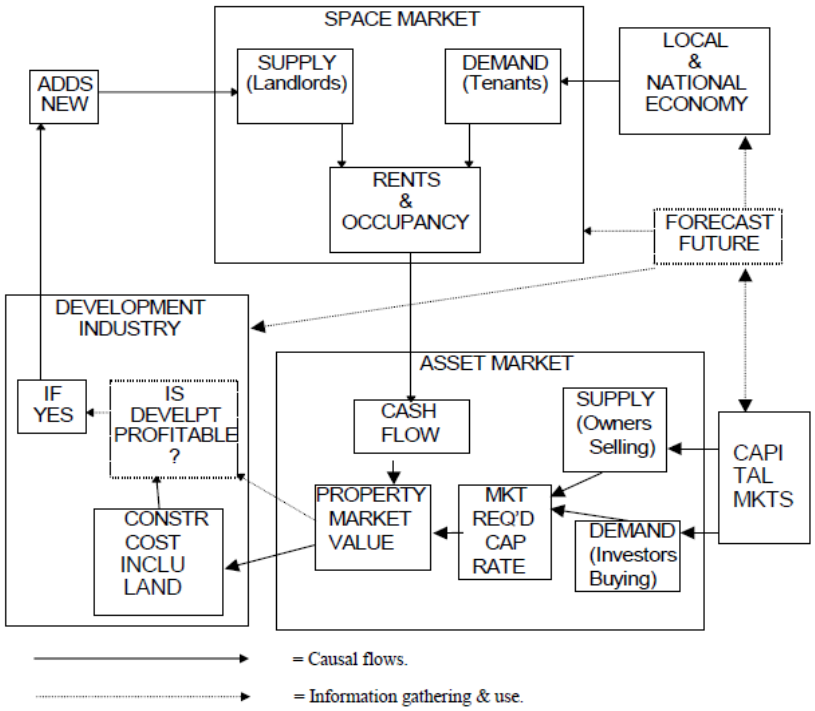
3.1. Real estate markets and fundamentals

A painful lesson of the credit crunch has been that one should have a rigorous understanding of the investment product one invests in. So firstly necessary insight will be provided in the coming two sections about the determinants of shopping centre performance, before we can focus on performance itself. In the next section the real estate system is briefly elaborated on. Here it will become clear there exist two distinct markets that affect and eventually determine the performance of a shopping centre. Subsequently attention will be paid to the retail real estate value chain. This is done because consumers and retailers play a essential role in the performance of shopping centres and it will justify the reasons why these stakeholders can also provide interesting proxies for shopping centre performance measurement.

3.1.1. The Real Estate System

As figure 4 about the real estate system presents, there are different distinctive markets within the system that interconnect with one another in order to make the system actually run. Markets are perhaps the most basic of all economic social phenomena and in essence, a market is a mechanism through which goods and services are voluntarily exchanged among different owners (Geltner et al., 2001). In this section the relevance of two major markets in commercial real estate is being described: the space market and the asset market. More detailed explanation about the functioning of these distinct markets will be linked to the shopping centre practice where reasonable and applicable. Because of the limited relevance to this research we won't go into detail with the third market, the development industry.

Figure 4: The real estate system : Interaction of the space market, asset market and development market



Source 6: Geltner et al. (2001)

The space market is the market for the usage, or right to use, of real property and is often also referred to as the rental market. Like every market there is a demand and supply side. On the demand side there are retailers that want to use space in a shopping centre to sell their products and/or services. On the supply side is the landlord, in this case the shopping centre owner, who offers space for rent to retailers. The rent payable in retail is usually quoted in annual terms and per square metre. It will make basic intuitive sense that the rental price is determined by the supply and demand on the space market. This gives a signal about the current value of the location and space and the current balance of supply and demand for that particular space. As already mentioned in chapter two, both supply and demand are location- and type-specific thus the real estate markets are highly segmented and space markets tend to be local rather than notional.

In chapter two it was stated that market equilibrium is harder to find in real estate markets as compared to more efficient markets like, for example, the stock market at the stock exchange. This is because the supply side cannot swiftly respond to the changes in the demand side of the real estate market. The demand side can change rapidly with changing economic conditions or other relevant macro-economic developments. The supply side, conversely, is often depicted as being 'kinked' instead of a downward sloping continuous line which reflects the demand side. See figure 33 in appendix 9.6. how demand, supply and rents interact. With the rent level at the vertical axis and supply level on the horizontal axis the demand line moves out and goes to the right when demand grows and supply is taken up. The fact the supply side is 'kinked' reflects the fact that the supply of real estate in general and shopping centre space in particular is rather inelastic; if demand falls, shopping centre space cannot be reduced. This is a consequence of the longevity of built space. But if demand rises, it is also harder to meet the extra demand with additional space because both the long productivity time of new space as well because of the restrictive planning of new retail area by municipalities.

One of the most basic and important things one must have in the real estate business is an intelligent idea about the future direction of rents in the space market. The shape of the supply

function is important, for it fundamentally determines the level of rents as demand changes over time. The inelastic supply curve is one reason real estate space markets have often tended to be cyclical, with periods of excess supply followed by periods of tight markets. If supply would grow at a pace that would be justified by the rise in demand, the rent wouldn't change much, if any, over time. This happens when a market is in (long-run) equilibrium. However, in real estate markets it is not uncommon that supply significantly exceeds demand. In figure 33, this is the case in situation D1 or D0 while supply is at S2. It was expected demand would grow to D2, but in fact it did not. As a result, this will cause market rents to plummet to a level that the market is willing to pay for (However, such reductions are first expressed in higher vacancy rates and rent-free periods or other incentives rather than in a real reduction in market rents). In that case rents are below their long-run equilibrium level and the rent level can't support profitable new development. After a period the rents will rise until rents rise back up to long-run equilibrium. Subsequently, at this stage inelastic supply will be in favour of landlords when demand growth outpaces the supply growth leading to a rise in rents above the long-run equilibrium again.

Moving down from the space market to the asset market, we see that the space market determines the current operating cash flows produced by the real estate assets, which are the fundamental subjects of the asset market. This operating cash flow interacts with the yields required by investors to determine current property market values in the asset market. These yields are determined in the capital markets. Both the supply and demand sides of the asset market consist of investors, those on the 'buy' side and those on the 'sell' side. As depicted in the equations below, asset value is a product of the rental income multiplied by the yield demanded by the investor, yields are of great importance as well. Besides, the yield is widely used to make individual properties more comparable that typically differ greatly in type, location, size etcetera. By what components yields are composed, is described below as well. The yield (or capitalization rate, in short: cap rate) is a popular way to describe property values which is simply the property earnings divided by the properties asset price or value. In a simplified it can be equated as:

$$Cap\ rate\ = \frac{Cash\ flow}{Value}$$

And;

$$Multiplier = \frac{1}{Cap\ rate}\ = \frac{1}{\left(\frac{Cash\ flow}{value}\right)}$$

And;

$$Value = Cash\ flow * Multiplier$$

Where:

$Value =$ Present value of the investment/property

$Cash\ flow =$ Net Rental Income

$Cap\ rate$ = current yield / required return

The yield is determined by capital investment supply and demand in the asset market, based on three major factors (Geltner et al., 2001). Factor one and three are built on the theory of investment decision-making at the macro-level as elaborated on in appendix 9.1.

1. Opportunity Cost of Capital;

Is determined in the capital market. An investor can only invest his Euro once. How much return can investors expect in other types of investments like stocks, bonds etc? Higher interest rates in other types of investments will require higher expected returns in real estate, and therefore higher yields,

other things being equal. That other considerations are relevant as well, however, is described in detail in appendix 9.1.

2. Growth expectations in the property's future cash flows;

Determined in the space market. How much can investor's expect that this property's net cash flow will be able to grow over the coming years? Higher (realistic) growth expectations will allow a lower yield, as investors will be willing to pay more as they anticipate to earn it back since the income is expected to grow.

3. Risk perceptions and preferences among investors, regarding the property;

Determined both in the space market and the capital market. How risky is an investment in property, and how much do investors care about the risk?

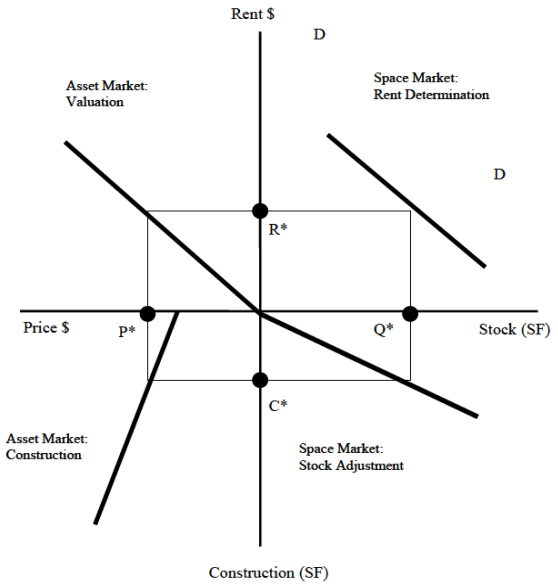
The above described showed that the space and asset markets (reflecting the underlying economic base and the capital markets) interact to produce current real estate asset market values. The more fundamental part lies in the space market where demand and supply of leasable property determine the rent level, the occupancy rates and the future growth or decline of both. Asset market participants are inherently forward looking. Investors make or lose money depending on how their investments perform subsequent to their purchase. Fundamentally, the present value of an asset depends ultimately on the entire future stream of cash flow the asset can generate into the infinite future (Geltner et al., 2001). To forecast future income streams investors must forecast both the local economic base underlying the demand side and the future new developments on the supply side of the market. In addition, an investor must attempt to forecast capital market and notional macroeconomic factors such as interest rates, inflation, and investor preferences, all of which affect the opportunity cost of capital and therefore the current yield and future values of assets.

3.1.2. Market equilibrium / 4-Quadrants model

A geographical representation of the real estate system described in the preceding section, has been developed by DiPasquale and Wheaton (1992). This model consists of a four-quadrant exhibit, as shown in figure 5. The four quadrants depict four binary relationships that together complete the linkages between the space and asset markets. The interesting about the model is to see how a movement in one quadrant will affect another quadrant and the model can show so called 'negative feedback loops'. This is a kind of self-regulating mechanism, preventing the markets from spiralling out of control (Geltner et al., 2001).

In figure 5 a rectangle is drawn over the four quadrants and this rectangle represents the equilibrium. The values where the rectangle crosses the vertical and horizontal axis represent the equilibrium stock of built space (Q*), rent (R*), asset prices (P*) and rate of new construction in the market (C*). Notice that the rent determination quadrant is similar to figure 33 that was referred to in the preceding chapter. If demand (D) rises like in 'D2' in figure 33 the rent will rise as the supply side is inelastic at the short term. In the asset valuation quadrant a higher rent, ceteris paribus, will cause higher asset prices. The line in the asset valuation quadrant represents the cap rate/current yield. The steeper the line (the closer towards the vertical axis) the higher the cap rate/current yield and thus the lower the prices. The more gentle the slope (the closer towards the horizontal axis) the lower the cap rate/current yield and thus the higher the prices. Higher prices (caused by higher rents or a lower yield, or a combination of both), will stimulate new profitable development in the construction market.

Figure 5: The DiPasquale-Wheaton four-quadrant diagram



Source 7 : Geltner et al. (2001)

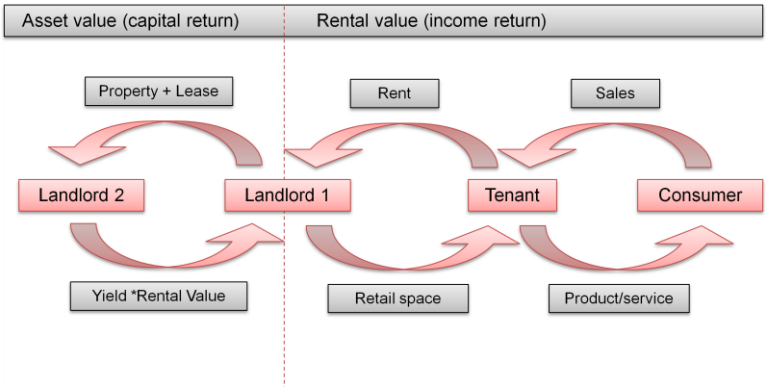
As a result, in the southeast quadrant extra construction will add new stock to the market, which eventually will rebalance the demand and supply in the space market. Hence, the rent will return to equilibrium. This is meant with the 'negative feedback loops'. The market is in the long term able to regulate and control itself.

The real estate system and the four-quadrant model has provided pedagogical tools to increase understanding of how several markets interact and together determine rents (which eventually become cash flows) and property values as a function of the cash flows and the cap rate/current yield which is determined by both the capital market and the space market. Besides the importance was stressed to have an intelligent idea about the future. Being successful in forecasting the development of both the capital market and yields for real estate as well as the more fundamental demand and supply side at the space market can create a competitive advance, eventually resulting in outperforming the benchmarks.

3.2. Retail value chain

Now we have a clear insight in how different markets in the real estate system operate and interact, insight in the retail real estate value chain is required before the aim will be pointed at performance measurement. Retailers and consumers play an important role in this chain. In figure 6 the basic operational processes and transfer of financial capital or goods is depicted. When we bring the real estate system into mind again, one could see they partly fit into one another. The rent is determined between tenant and landlord on the space market, while the consumer eventually represents the demand side of the space market, as they have to buy the goods. Socio-economical and demographical elements greatly affect and determine the consumer behaviour and activity. This part could be linked to the local and national economy. On the left side, where properties are valued and traded, the asset market is entered. The value is determined alike in the real estate system, where the yield is determined in both the capital market and the space market while trying to get a grip on current appetite for the type of real estate by investors and the future growth or decline expectations in the space market.

Figure 6: Cash flows relations within retail real estate



Source 8: Own revision of Janssen (2004)

The extraordinary element in retail real estate is the paramount importance of the consumer. Eventually, a consumer determines the success of a shopping centre. 'Consumers vote with their feet' is a well known statement in the industry. The consumer has become increasingly capricious. That emphasizes the dynamic environment retailers and shopping centre owners have to deal with.
As explained earlier, the fundamental performance for an investor is largely determined by the cash flow that originates from the rent payables by the tenant. What the figure above depicts as well is that the rents are basically determined by the potential sales a retailer expects to earn at a specific location or unit. These sales, for their part, originate from the consumers who buy goods or services from the retailer. To make an reliable estimation about the sales a retailer can make, one needs to know the amount of visitors in a shopping centre (or at a specific location) together with the average money spent per visit by a visitor. Of course, if this information was available during the negotiations about a new leasing contract, the process would be rather transparent. In some countries the landlord knows the turnover/sales of a retailer is making at a specific location. However, for example, in the Netherlands this information is kept confidential by the retailer and only at overall branch level the sales are available. This will make the negotiation process more dependent on persuasion power based on assumptions about turnover rather than facts. In general, there are some index numbers about the so called 'occupancy burden' or 'occupancy cost ratio' (OCR). This is usually the annual rent plus service charges expressed as a percentage of the total sales including VAT.

Based on the annual reports and a report of the Royal Bank of Scotland (RBS, 2009) the average OCR of four of the biggest European shopping centre investment specialists was calculated at 8.7 percent over the 2004-2008 period (see figure 34 in appendix 9.6.). The OCR increased in these year at 3.3 percent on average (this means that in general, renting a shop from these landlords has become more expensive recent years). The remarkable fact is that the rents grow at a higher pace than the turnover. One could ask the question whether this is a sustainable development, or are landlords creating their own 'bubble'. Fact is that retailers seem to accept the increased occupancy burden. An explanation could be that retailers have expanded considerably, profiting from economies of scale and thus being more cost efficient at the holding level. Another explanation could be that the growth for space outpaced the growth of supply in some markets, what leads to higher competition among retailers for the same spot. That could incentivise them to accept slightly higher occupancy burdens during recent years. Here the local entrepreneurs have less financial power than the international chain stores and the latter ones therefore fill up the prime locations. Nevertheless, an significantly over averaged OCR could be hard to maintain anyway. This possibly increases the risk on lower future rental growth, especially if demand fundamentals slow down. Another important comment is that the OCR can differ somewhat among countries (however not too much), and the companies taken into account are not all active in the same countries nor the allocations are comparable, this limits the value of these numbers to some extent.

3.3. Performance measurement: Return on Retail

Performance can be approached from different angles, as already indicated by the retail value chain. Hence, the performance measurement in this study has been scrutinized. After considerable research and inquiries with some retail real estate experts the most appealing measurements are assessed and discussed. Below in table 3 one can find a brief overview of the different performance indicators. In this section our attention will be limited to the performance measurement which is actually chosen, the rest will be described in the appendix 9.3. However, the performance measurement should at least meet the preconditions that are described below:

1. A general accepted and objective definition that is consistently measured (essential in benchmark studies);
2. Data available on Pan-European basis;
3. Performance expressed in relative terms (e.g. in ratio and per square meter);
4. At least seven year track-record of data.

The data for this research project were planned to be requested from several companies seated in the European Research Group (ERG) of the International Council of Shopping Centres (ICSC). In order to assess what performance measurement suits this research best four ERG-members from different companies have been approached to score a set of possible measurements on;

1. Desirability: strong, modest or weak performance measurement (weight 0,35) ;
2. Sensitivity: if the measurement feasible to request regarding confidentiality (weight 0,45);
3. Availability: does it take low/average/high effort does it take to deliver the data over the several years (weight 0,2).

The assessment results are used to compound a weighted average score per performance measurement in order to make a final and appropriate judgement over the best possible approach. As said, the considerations per measurement are described in appendix 9.3. The different assessed performance measurements in random order are:

Table 3: Performance measurements ranked by ERG

Performance measurement	D	S	A	Avg*
1. Turnover /m²;	2,8	2,4	2,0	2,5
2. Net Rental Income /m²;	3,0	2,3	2,8	2,6
3. Real Net Rental Income /m² growth rate like-for-like;	3,0	2,3	2,5	2,6
4. Direct return;	2,8	2,0	1,5	2,2
5. Total return;	2,5	2,3	2,0	2,3
6. Sharpe ratio;	1,8	1,5	1,5	1,6
7. Relative performance compared to IPD Benchmark;	2,0	2,3	2,0	2,1
8. Internal Rate of Return (IRR);	2,3	2,0	1,8	2,0
9. Occupancy Cost Ratio (OCR);	3,0	1,8	2,3	2,3
10. Market Value /m² (MV) growth rate;**	3,0	2,0	3,0	2,6
11. Footfall/Traffic.	2,3	2,5	2,0	2,3

*Weighted average score, **Assessed only once
Source 9: Oosterveld, 2010

As the table depicts, the measurements with the best scores are NRI, the NRI growth rate, and the Market Value (however MV is only considered once). Eventually the NRI growth rate was considered both, the most interesting and most appropriate measurement in this specific research.
An important approach to the performance measurement was the desire to stay close to an operational performance measurement, thus a performance that is linked directly to the shopping centre operations. Especially in current challenging times of crisis, investors learned once again to focus on managing their cashflows rather than speculating on capital growth, or better said, decline as the main performance driver. The yield (which drives capital growth) is partly dependend on overall investment

sentiment and the overall appetite of institutional investors to real estate in comparison to the other mainstream investment classes like stocks and bonds. Therefore it doesn't necessarily say anything about real estate and its fundamental outlook.

As discussed in the previous chapter and the retail value chain, rental cash flow are determined by fundamentals as supply and demand as well as the performance of the retailer. Partly due to the economical circumstances, it seems that a cashflow based performance has gained momentum and should be leading in this research. As mentioned before, capital growth (or decline) or estimated rental values (both determined by an appraiser) are rather potential performances 'on paper' than an actual cashflow performance as the value growth will only be materialised after the price-making process when leasing a unit or selling an asset. Moreover, it is quite common these prices differ significantly from the valuations. For example, Unibail-Rodamco reported a 9% price premium (on average) achieved on appraisal value on their disposals of €1,8 billion in first half of 2010 (PropertyEU, newsletter July 30th). Therefore it is more about the right timing and finding the right buyer willing to pay a premium. Another issue of relevance is that retailers are sometimes willing to pay key-money in order to get a desired location where multiple retailers compete for. On the other hand incentives offered to retailers by the owner can suppress the rental income. Such payments are accounted for with rental growth (it is rental income, eventually) while this is not the case when working with market rents. For this reason as well, actual rental income is preferred over market rents as it offers more detailed insight of the performance of the shopping centre.

Chosen as the leading performance measurement in numerous other studies (see for example ULI & ICSC (2008), Mejia & Benjamin (2002), Eppli & Shilling (1996)), sales/turnover is in theory an interesting measurement as well. It is the ultimate measurement from an operational point of view and it is less sensitive data (at least for a real estate investor) than actual rental cash flows. The only major drawback was the availability of the data. In the Netherlands it is completely unavailable (as retailers do not disclose their sales volumes to the landlord) and in the second place it could be problematic to acquire a seven year track-record of consolidated sales volumes on shopping centre level. The second best operational measurement is the net rental income and it fits the preconditions as well. Therefore it was chosen as the leading performance measurement in this study. Besides the operational performance (where space market fundamentals determine rent levels and rental growth), it was considered interesting to request the market value of the properties as well, to gain more insight on the effect that capital markets have had on the performance of shopping centres. Based on the results of table 3, both are anticipated feasible to request from, at least some, ERG-members given the ranking of both in the depicted schedule. The next section is aimed to provide a more thorough insight in the considerations for choosing these measurements and what corrections are being made in order to yield unbiased and pure results.

3.3.1. Net Rental Income growth

As described above, the purest performance measurement that meets the four prerequisites (a.o. available on a Pan-European basis) is the Net Rental Income growth rate. This measurement solely depends on the performance of the shopping centre itself and eliminates capital market influences. Moreover, in contrast to sales/turnover , the purest operational measure, rental income actually is in the end the only (operational) performance that really matters to an investor, as rent is an actual income, while sales is in the first place an income flow for retailers. A disadvantage is that rental growth in the short term is highly dependent on the institutional lease terms that can differ considerably among countries. In section *3.3.4.* this issue will be addressed more specifically. The net rental income will be calculated as follows:

Table 4: Net rental income calculation

Theoretical rent / Gross potential rent	
Sales based rent	+/-
Other rental income	+/-
Theoretical Rental Income	
Financial Vacancy	-/-
Lease incentives	-/-
Gross Rental Income	
Operating Expenses (OpEx)	-/-
Net Rental Income	
Administrative expenses (overhead)	-/-
Net Operating Income / EBIT	

Source 10: Corio, 2008

For the definitions of the above stated terms please see the definition list of appendix 9.4. As it is considered unfeasible to request from participants, the operational expenses are not specified.

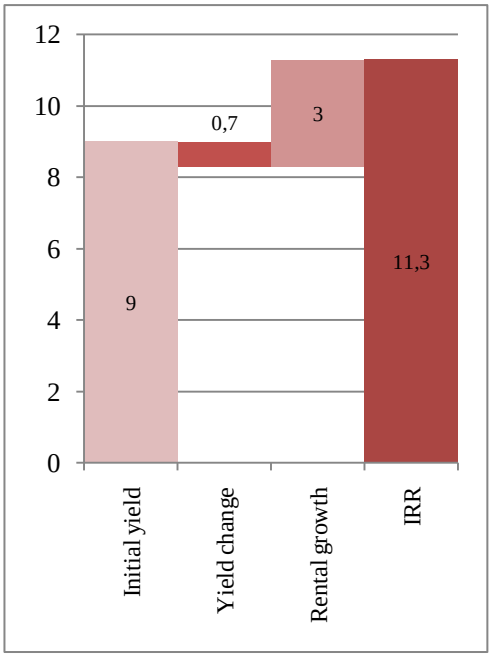
The next question to answer should be, what *exactly* would we like to measure. As we have learned from previous chapters, real estate has two typical characteristics. In the first place, individual assets are held for relatively long periods of, for example, five or ten years. This is due in part to the high transaction costs but also due to the desire to enhance investment returns through successful operational management of the properties, rather than simply from 'trading'. The second feature of real estate is that it tends to be 'cashcows' as they are income-based through the rental cash flow. For this reason, an investor is particularly interested in a multi-period performance, rather than a performance in a given year (Geltner et al., 2001). Hence, measuring and explaining multi-period rental *growth* is preferred over measuring and explaining a single-period rent level. An advantage of measuring growth, is that it makes different types of centres comparable. Generally speaking, the NRI/m² (and MV/m²) will be higher for prime centres than in less prime located centres. But the key question is, can a prime centre also yield a higher degree of rental *growth* as compared to the secondary centres? Is it true that the real prime shopping centres with correspondingly higher rental levels and lower yields (and hence higher prices) also have a higher potential for future growth in rents and value? In advance to the real questions in this study, a regression testing whether centres with higher average rent levels as well as higer value on a square metre basis do also yield higher rental growth rates could not be accepted in this study. There was really almost no correlation found between rental level and rental growth (r=-0,07) as for value psm and MV growth (r=0,06), both being insignificant. Even on a per country basis, none of the outcome could show a high or significant correlation between the absolute levels and growth figures.

Subsequently one has to decide whether to measure growth series or level series (i.e. the geometric mean of the real rental growth rate or the geometric mean of the actual rent level). A suggestion is proposed by Brooks and Tsolacos (2010) who argue that level series are more affected by smoothing and autocorrelation than growth rates. This makes growth rates more appealing as it is quite complex to transform autocorrelated data. Moreover, a growth rate would be less sensitive to request from participants than actual rent levels which can be confidential. In order to show a reliable insight in the performance over the mid- to long-term, a rather ambitious seven year track-record

was picked to collect data on.

It encompasses the consecutive years 2002-2009. It is ambitious because the data must be consolidated for the entire period. Potential mergers or gaps in the financial archives/registers can cause this data to be unavailable for the entire track-record. Besides, from an analysis perspective, the growth *over the years* can best be explained by the development of the explanatory variables *over the years*. As fundamentals may change, the growth of rents may change along. This makes the collection of the explanatory data more challenging as well, leaving aside what delay between the explained and explanatory variable would be optimal since rents do not move one on one with changes in explanatory variables.

Figure 7: IRR parsing



Source 11: Oosterveld. 2010

For three other reasons rental growth is a considered as a highly relevant performance measurement in the retail real estate industry. In the first place, rental growth is a major contributor to the IRR, one of the most widly used and appreciated performance measurements in the real estate industry (Geltner et al., 2001). A quick example is depicted in figure 7 above. For a numerical examination reflecting the impact of the rental growth on the IRR one is referred to appendix 9.7. In the second place, rental growth is a key performance indicator (KPI) for at least the most important European REITs that have a particular interest in investing in shopping centres. Rental growth is considered as an outstanding indicator that tells investors how the operational business is going. Therefore it is plausible to assume this performance measurement makes sense to investors, both to real estate professionals and to shareholders, but also to equity analysts of financial insitutions like banks. The data should be available since (at least) REITs report on this indicator every quater. And in the third place, which is more a practicle advantage, the NRI is both relatively easy and consistently computable, especially compared with other potential measurements like the Alpha-ratio or the ex post Internal Rate of Return. The only relevant question is, how to exactly calculate the best suitable multi-period average growth rate.

3.3.2. Time-weighted average return

As a multi-period time span is used with annual returns/growth figures it is necessary to compute the 'time-weighted' average of the annual returns across that span of time. Two different means can be computed, the arithmetic mean or the geometric mean (Geltner et al., 2001). There are some slight differences in both their calculations and their use:

Table 5: Arithmetic mean versus Geometric mean

Arithmetic mean	**Geometric mean**
Always greater than geometric mean	Reflects compounding (chain-linking) of returns;
Superior statistical properties: best estimator of true return	Mean return components do not sum to mean total return (cross product is left out)
Mean components sum to the mean total return	Most widely used in performance evaluation
Most widely used in forecasts & portfolio analysis	
Arithmetic average return over year 1-3: = (r1+ r2+ r3)/3	Geometric average return over year 1-3: = [(1+r1)(1+r2)(1+r3)]^(1/3) - 1

Source 12: Geltner et al., 2001

Because of the performance evaluation angle of the geometric mean, this will be the best suitable average time-weighted performance measurement.

3.3.3. Like-for-like rental growth

In the annual reports and press releases of shopping centre REITs one can distuinguish two types of rental growth. Only one of them is marked as a key performance indicator (KPI). One in absolute numbers and one in relative numbers, the so called 'like-for-like' rental growth. The latter is a leading KPI for many investment funds and REIT's in specific. Also the EPRA (European Public Real Estate Association) promotes in their best practices recommandations to report on like-for-like rental growth. In fact the NRI growth like-for-like makes two periods comparable with each other, as this figure is corrected for new acquisitions or sales which took place within both periods. Hence, it distuinguishes organic growth and growth or decline that was due to acquisitions or disposals, respectively. In this study only shopping centres are taking into account that are marked as standing investments for the entire period. Therefore, it is already like-for-like. Only when a shopping centres has expanded with additional leasable area within the time-span, it is necessary to express the NRI per square metre. This could also make it possible to assess whether an extension has any effect on the rental growth per square metre.

3.3.4. Components of like-for-like rental growth

Based on the annual reports and press releases of both Unibail-Rodamco and Corio, the like-for-like rental growth is a compounded figure of three different components. The major share of the annual like-for-like rental growth is determined by the indexation of leasing contracts. Together with the new and revised leases and the residual category 'other' they make up the lfl rental growth rate. Below follows a short description of the three separate parts.

Indexation. This part of the lfl growth rate is caused by the contractually agreed indexation. There are considerable differences in the indexation grades among countries. Most countries the indexation is directly linked to the inflation rate. But every country may deviate from this (also see appendix 9.8). For example in France, where indexation with ICC (construction costs) provides relatively high lfl rental growth. However, since 2008 a shift from ICC to ILC index took place which besides construction costs also incorporates CPI and retail turnover data (RBS, 2009). In Belgium the indexation is linked to a wider national 'health index' and in the UK no annual indexation exists (Real Estate Publishers & ICSC, 2009). Although deflation scenario's aren't inconceivable at this time, almost all leases can only be indexed upwards (RBS, 2009) so usually here no downside risk is involved. But indexation is an institutional characteristic rather than an actual performance the depends on the quality of the shopping centre and the successful management of the centre. Therefore indexation is not a performance based. In order to make shopping centres better comparable among different countries the *nominal* NRI rental growth lfl needs to be adjusted for the indexation rate. For every country the indexation rates are examined over the various years. Therefore the leading performance measurement is called the *real* NRI rental growth lfl.

New and revised leases. This part of the lfl rental growth we will focus on in this study as this can be seen as real performance determined by the quality of the shopping centre. This is realized through capitalizing on the 'reversionary potential'. This is the Estimated Rental Value (ERV) minus the Minimum Guaranteed Rent (MGR) expressed as a percentage of the MGR. The ERV is determined by a surveyor in the process of asset valuation. Thus when a lease contract expires and is up for a renewal then a new lease contract can be negotiated, usually around or at the prevailing market rent (RBS, 2009). However, here specific institutional characteristics regarding leasing

legislation play a decisive role. In some countries the legislation regarding leasing space to tenants is more in favour to the retailer while in other countries the legislation is more favourable to the landlord (Real Estate Publishers & ICSC, 2009). In the Netherlands, for example, contracts may have an appealing reversionary potential, but not very often a landlord can capitalize on it to the full extent. Same is when a unit has a negative reversionary potential, however. Thus in the Netherlands there is a certain smoothing effect in both ways. More detailed information about the Dutch practice and legislation in other major countries of interest can be found in appendix 9.8. Leases usually have a term of 3-5 up to 10 years, differing per country. As the reversionary potential can only be capitalized on when rents are renegotiated at expiry date, this draws another reason why it is essential to measure a track-record that is long enough. Based on the RBS (2009) report, it is a plausible assumption that every year around 8-10% of the leasing contracts at portfolio level will be renewed/relet. In this study eight consecutive years of track record are incorporated which means that between 64% and 80% of all leases are anticipated to be renewed once. Obviously, this will significantly increase the reliability of the real l-f-l rental growth rates. The next table depicts the average percentage of renewed contracts on an annual basis during the 2006-2009 period, plus the average increase in rents that were negotiated. As the table shows the l-f-l growth (excluding indexation) that has been realised is relatively limited.

Table 6: Average renewals/relettings and the rental increases.

Company	Renewals/Relettings (2006-2009)	Average rental increase of renewals/relettings (2006-2009)	l-f-l growth (without indexation)
Klépierre	8%	15,9%	1,27%
Corio	9,7%	14%	1,36%
Mercialys	7,8%	4,2%	0,33%
Unibail-Rodamco	15,9%	21,5%	3,42%

Source 13: RBS (2009), and Annual Reports

Other. This category mainly consists of financial implications of new vacancies and operating expenses(e.g. letting fees). Therefore this number is normally negative, although a decrease of non-recoverable property expenses can have a positive effect. In any case, this is also a result of the actual performance and thus relevant for this study. Therefore no further corrections are needed to execute on the real NRI growth rate like-for-like.

3.3.5. Market value growth rate

Market value (in this study also referred to as MV) represents an appraised value. The Redbook of the Royal Institute of Chartered Surveyors (RICS) defines it as follows: *'The estimated amount for which a property should exchange on the date of the valuation between willing buyer and a seller in an arm's length transaction after proper marketing wherein the parties had each acted knowledgably, prudently and without compulsion'.*

As explained in this chapter, market value is determined by the net rental income and the yield, estimated by the appraiser during the valuation procces of the property. This implies that in a revaluation, one can distinguish a rent-effect and a yield-effect. It would be interesting to deduce the seperate effects of both factors, however, this is really beyond the scope of this study, particularly because market value growth is not the leading performanc measurment.

The yield greatly depends on factors like investment sentiment in the capital markets and the demand and supply forecasts in the space market. Because of the involvement of the investment sentiment on the capital market, market value growth (and thus capital growth (CG)) isn't necessarily

a pure reflection of the intrinsic qualities and economic functioning of a shopping centre. Nevertheless, the market value growth embeds a mine of market information and is compounded in a different way than cashflow based measurements. Therefore it is possible that it will react differently on the independent variables in the statistical analysis.

From a research perspective the market value will enrich the analysis and therefore it is a desired measurement to request. Measuring both, a predominant operational measurment and a measurement that incoporates investment sentiment and future forecasts will together result in a more comprehensive picture of shopping centre performance. As investors regularly report on market values, at least on an annual basis, this data is considered available and therefore requested in addition to the NRI/m². The only limitation in our measurment of capital growth is that the market values aren't net of capital expenditures which is usally taken into account when measuring capital growth like the IPD. Likewise was done at NRI calculation where the operational expenses weren't requested. The hurdle to request capital expenditure was considered to be too high as it would be too much detailed information to request from the investors. The result of it is when a substantial amount of capital was spent on a property in a given year, which is subsequently reflected in an increase in value, this is not filtered out. Ideally, one would only like to measure the capital growth caused by rental growth or yield shift. The only way it will be filtered is when the capital expenditure was spent to additional GLA (in a sense of extension, rather than a renovation or refurbishments), as the extra value it will cause will be denominated by extra GLA. Although the Market Value growth is not the most accurate measurement imaginable, it is defensible to say that in a time span of seven years a considerable amount of the shopping centres would have some additional money invested so this could possibly alleviate a part is the 'noise'.

IPD measurement:

$$R_{cap\ return} = \frac{MV_t - MV_{t-1} - CExp + CReceipts}{MV_{t-1} + CReceipts}$$

Adjusted measurement:

$$R_{cap\ return} = \frac{MV_t - MV_{t-1}}{MV_{t-1}}$$

The RBS report stated that the difference in market value between purchase price and the value to date can be equated as:

$$Market\ Value\ to\ date = Acquisition\ price + Capital\ Expenses + Revaluations$$

3.4. Conclusion

Together, the space market, the asset market with the capital market linked to it, and the development industry form the real estate system as conceptualised by Geltner et al. (2001). The markets that directly affect real estate performance, are the former two, the space market and the asset market. Demand in the space market is rather dynamic and is instantly changing. In contrast, the supply side cannot swiftly respond to these changes as supply in the short-term is relatively fixed. This makes it harder for market equilibrium to establish. Together demand and supply in the space market determine the price tenants are willing to pay for renting a property at the asset market. In this proces rents and occupancy rates are determined. At the same time, the rental income is the fundamental income stream for an investor which is underwritten by a lease contract and therefore fully leased assets usually return relatively stable cash flows. Prospective tenants estimate their sales potential at a particular location and from there tenants derive the maximum rent they are willing to pay for that specific location while running a profitable business.

In the asset market properties are traded among investors. The two major factors in the asset market are the rental income, as determined in the space market, and the yield which is based firstly on investment sentiment in the capital market and secondly on the forecasts investors make about the economy and the space market. Due to the relatively long holding period an important factor in real estate performance is to have an intelligent idea about forecasting the future both regarding the space market/national economy and the asset market/capital market. Obviously this is very challenging. The four-quadrants model of DiPasquale & Wheaton (1992) has learned us that the real estate sector is cyclical and market equilibrium is a relative term as supply cannot swiftly adjust to changes in demand.

Within retail real estate, the retail value chain shows that both retailer and the consumer determines the performance of a shopping centre. Based on the specific characteristics of retail real estate a shortlist of possible performance measurements was constructed. After ranking the scores by various retail real estate professionals a performance measurement close to the operation was preferred as leading measurement rather than a performance partly based on overall investment sentiment and the appetite for real estate as compared to other asset classes. Hence, the Real Net Rental Income/m² rental growth on a like-for-like basis was chosen as the leading and best suitable performance measurement in this specific research. In addition the Market Value/m² growth rate was picked as secondary performance measurement in order to present a more comprehensive image of the performance of the particular assets. Also rent and value per square metre in absolute terms is taken into account as well, bearing in mind that these values are no performance measurements.

4. SUCCESS FACTORS FOR SHOPPING CENTRES

In this chapter an overview and examination is provided concerning the key theories that are connected with the origin and existence of shopping centres. This will increase the understanding of both retailer and consumer behaviour and what matters to both in order to successfully position a shopping centre. As the conceptual model depicted, some socio-economic variables have a certain effect on consumer and retailer behaviour (and therefore supply and demand), these variables are also taken into account. A shopping centre quality assessment model at Corio was used to square the theoretical frames provided in this chapter with this model in order to create a more conceptual view and to organise the variables in a reasonable way. The main categories derived from the model comprise catchment area, location aspects, competitive position, building aspects and tenant mix (stated as commercial quality in the assessment model). In addition to this, the category Management is added to make the categories complete. Although this is a business model characteristic rather than a shopping centre characteristic, it is of interest to test whether this is of significant influence. In the hypotheses section 4.5. this will be described in more detail.

First an overview of seminal location theories will be aleborated on. In the course of this chapter more recent studies and insights will be discussed regarding the interaction between the characteristics of shopping centres and their performance. Eventually hypotheses are being postulated and will be tested in the empirical section following as from the next chapter in part 2.

Obviously, retail and shopping centre research has evolved over the past eighty years. Likewise have shopping centres and paradigms. Eppli and Benjamin (1994) provide a comprehensive overview of the evolution of shopping centre research. To date, professionals still make use of the offspring's of these theories as they have been adjusted to contemporary circumstances. The framework and order of the theories used in this study is based on this comprehensive paper of Eppli and Benjamin and additionally two influential books in the Dutch retail real estate industry of Bolt (1995, 2003).

4.1. Central Place Theory

The Central Place Theory (hereafter CPT), models the relationship of retail trade between towns/central areas at various levels. CPT was first developed by the German geographer Walter Christaller in 1933. The theory examines two broad premises; range and threshold. Range is the maximum distance a consumer will travel to purchase a good, which for Christaller is equal to the distance to the nearest centre that carries the good. Threshold is the minimum demand necessary for a store to be economically viable. Together range and threshold create a market area with a hexagonal shape (see figure 35 in appendix 9.6). Low-order goods exhibit small hexagonal market areas while high-order goods display increasing market areas of the same hexagonal shape but they are overlaid onto the lower-order central places or shopping areas where shops with different (heterogeneous) goods are offered. CPT models that shoppers will patronize the nearest area that actually offers the desired good and its availability is based on the 'relative order' or 'minimum demand' for the good.

CPT is based upon some restrictive assumptions. Given the high cost of transportation when Christaller developed the CPT, the nearest centre hypothesis was reasonable though (Eppli and Benjamin, 1994) but to date the situation has changed as transportation costs are being replaced by the time constraint of consumers. Besides, Christaller assumes a highly simplistic isotropic and perfectly symmetric spatial structure. Another restrictive assumption of CPT is the 'single-purpose' shopping behaviour. In theory this suggests that every product is being purchased separately from any other product since every product has its specific minimum demand and is therefore offered at a different place. While some empirical support for the CPT was found by Berry (1967) and his various co-

authors in the late fifties and sixties, a lot more empirical studies support multi-purpose shopping behaviour and thus reject the single-purpose shopping trip within CPT. Four sets of empirical papers support the multi-purpose shopping trip. Golledge et al. (1966, 1967) revisit the study of Berry as they discover a wide dispersion of consumer travel distances and consumers do not always purchase a good or service at the nearest centre. Only 35% purchased goods from the nearest grocery store, implying 65% went beyond the most proximate centre while similar results were found by a.o. Clarck (1968). These studies tentatively demonstrate that consumers travel further than the distance to the nearest centre for some goods, implying potential for multi-purpose trips and purchasing goods of different orders in one combined shopping trip.

The literature of multi-purpose trips was extended by Hanson (1980) and O'Kelly (1981) and both reject the single-purpose/nearest centre shopping trip assumption. Were Hanson find that 61% of all shopping trips in his empirical study are multi-purpose, O'Kelly reports that 63% of grocery store shopping trips and 74% of non-grocery store shopping trips were multi-purpose. Another consideration for consumers to multipurpose shop are the lower travel costs. Several researchers like Eaton and Lipsey (1982) among others have addressed this feature together with the storage costs in multipurpose shopping trips.

Concluding, the central regularity within CPT is the importance of the relative location of retail products within a catchment area. However CTP is built on some simplistic assumptions which limit the utility and significance of the theory to date, distance obviously is still a major consideration for consumers when choosing where to shop for what product. A superior relative location can strengthen the competitive position of a retail trade area and in this case a shopping centre. Hence, connection are made with some categories used from the quality assessment model from Corio. Nonetheless it is important to distinguish between goods of different orders as for different product types the willingness to travel differs alike. Acknowledging that CPT establishes the theoretical foundations for the spatial organization of shopping centres and clustering of *heterogeneous* retailers of the same order, the model does not adequately capture the relevant aspects of consumer behaviour and the inter-relationships among *homogeneous* retailers in one central shopping area (Eppli and Benjamin, 1994). However CPT has been an inspiration for scientists to further develop relevant spatial theories and emphasizes the importance of location, the specific application of the original CPT has lost significant relevance mainly due to developments like online shopping, aging population, smaller households, higher mobility, preferring quality over price, fun shopping and shopping on a weekly basis rather than on a daily basis (Sijtsma, 2006).

4.2. Homogeneous retail agglomeration

In 1956, the first suburban enclosed shopping centre was opened near Minneapolis in the U.S. (Eppli and Benjamin, 1994). The centre was created because Dayton's Department store convinced its rival, Donaldson's, to jointly develop a shopping centre in order to reduce construction costs. Much to their surprise the two merchants discovered that placing two department stores with similar goods in one centre increased business for both stores. A major turning point in the retail industry was reached and over decades developers and landlords continued to agglomerate both heterogeneous and homogeneous retailers and refine tenant mix to enhance sales volumes of shopping centres.

Basically, retail agglomeration is based on a combination of both the CPT and the 'principle of minimum differentiation'. The latter concept explains why similar type of retailers agglomerate and was first addressed by Hotelling (1929). The basic concept of CPT with the extension of Hanson (1980) and Eaton and Lipsey (1982) can explain, through reduced travel costs and travel time of multi-purpose shopping, the clustering of heterogeneous retailers. Subsequently, the principle of minimum

differentiation can explain the phenomenon of clustered homogeneous retailers where maximizing consumer utility is at the heart of homogeneous retailer agglomeration. Different from earlier studies that postulated dispersed market equilibrium, Hotelling believed that price stability could be maintained when homogeneous products or services are slightly differentiated, also in price. Instead, according to his analysis, businesses compete on many non-price factors (e.g. quality) as well and these prevent a lower price competitor from becoming a monopolist. The literature following Hotelling's seminal work is extensive and often critical because various studies did not find a stable clustered equilibrium. Therefore many have stated that the clustering of homogeneous firms with homogeneous consumer tastes in the centre of a market is socially wasteful and economically unstable, as argued by, among others, Economides (1984) and Gabszewicz and Thisse (1986). See for an extensive list of criticasters Eppli and Benjamin (1994). On the other hand, Eaton and Lipsey (1979) partly agree with Hotelling as they find clustering socially useful since it acknowledges the consumer's desire to comparison shop (compare slightly different goods on various price/quality aspects before a well-thought of purchase decision is being made). Simultaneously, however, they also argue that positive agglomeration economies are exhausted when three (or more) homogeneous retailers cluster together. In fact they argue that the principle of minimum differentiation is limited.

Definitely, there are various supporting studies for Hotelling's concepts as well. Within the evolutionary approach which is one of the mainstream approaches in spatial economics, 'path dependency' is a key term. This approach supports the idea that patterns of regional economic development are historical in origin and cumulative in nature. It examines the relationship between present-day activities in a place and the past experiences of that place (Knox and Marston, 2007). Observations lead to an important principle of regional economic development; the principle of 'initial advantage'. Initial advantage highlights the importance of an early start in economic development and it tends to stimulate a self-propelling process of local economic development. Swedish Nobel prize winner Gunnar Myrdal (1974) was the first who recognized that any significant initial advance tends to be reinforced by agglomeration effects. He named this process 'cumulative causation' meaning the spiralling build-up of advantages that occurs in specific geographic settings as a result of the development of external economies, agglomeration effects and localization economies (Knox and Marston, 2007). This would stimulate retailers to cluster and agglomerate as well, in conformity with ideas of Hotelling. A good example here is the presence of department stores that attracts other retailers as department stores are considered anchor tenants or 'magnets' that are able to draw additional consumers. However, Myrdal mentioned that due to the limited supply of retail space in proximity to the anchors the clustering and agglomeration of retailers is limited as well. This caused that the best locations are usually being occupied by high-order branches and merchandise types that have a relative high sales productivity per square metre as they can afford and willing to pay higher rents that are demanded when demand outstrips supply (Bolt, 2003).

Contrary to the objectors of Hotelling's concept, Webber (1972) refined the theory by showing that a stable agglomerated central market equilibrium can be reached when 'uncertainty' is introduced to the model. However, the first researcher addressing this issue was Nelson (1958). When consumers are not certain that they will find the desired item at a particular retailer, they can reduce their 'search costs' and uncertainty by patronizing agglomerated retail sites where they can comparison shop, thus reducing the uncertainty of finding the desired item. Here, search costs show similarities with the travel costs as mentioned by Eaton and Lipsey (1982). In this respect of agglomeration of retailers they show in the same study that (planned) shopping centre developers restrict the entry of low-order, convenience retailers to one per merchandise type to prevent head-on competition as low-order retailers often sell the same merchandise instead of (slightly) different merchandise. At the same time

they report that developers enhance comparison shopping opportunities by including numerous homogeneous high-order retails in the shopping centre tenant mix. Highlighting the importance of tenant mix, West, Von Hohenbalken and Kroner (1985) and Brueckner (1993) argue that developers/owners of planned shopping centres optimize both the tenant mix of a centre as well as the location of the tenants within a centre to optimally exploit the agglomeration effects.

Another study, conducted by De Palma et al. (1985) reformulates Hotelling's model and shows that the principle of minimum differentiation is maintained when consumers and retailers are sufficiently heterogeneous. Therefore they are able to dominate the previously mentioned spatial models that lack equilibrium posted by criticasters. De Palma et al. replace homogeneous consumer taste by heterogeneous consumer taste and show that the greater the heterogeneity in consumer taste, the larger the demand for slightly differing retail products. In other words, consumers are not willing to travel beyond the nearest centre for a homogeneous product (supporting CPT and convenience shopping), but as a product becomes more heterogeneous relative to competing products, the utility of a particular product at a more distant location becomes worth the additional travel cost and travel time (supporting comparison shopping). This indicates that relative location with regard to the targeted catchment area is possibly of greater importance to convenience based shopping centres as compared to comparison based shopping centres. Moreover, the likely idea that extensive comparison shopping isn't necessary for homogeneous products could explain that convenience-based centres tend to be relatively smaller as compared to their comparison-based counterparts. In the case of convenience shopping the clustering of homogeneous retailers would be economically wasteful as two slightly different retailers would be no incentive for consumers to visit the centre more often and therefore stimulate sales volumes. Therefore one retailer in every category is usually sufficient to serve the consumer, resulting in smaller shopping centres as compared to comparison-based centres. In the latter category homogeneous retailers tend to cluster more to serve the consumer.

Stokvis and Cloar (1991) confirm the idea of reducing search costs and state that (suburban) comparison based shopping centres are in favour of downtown, inner-city high street areas because uncertainty can be better mitigated at planned, actively manageable shopping centres with controlled tenant mix centralised management, better accessibility, more consumer information and good comparison shopping opportunities.

Comparison shopping is found to be positively associated with retail sales of a shopping centre. Nevin and Houston (1980) find that the assortment variable can explain more than 50% of the variation in shopping centre sales. More support for homogeneous retail agglomeration is found by Ingene (1984) who found that retail assortment (out of thirteen independent variables) is the only variable that is positively and significantly correlated with retail sales over multiple merchandise categories (e.g. apparel, grocery, furniture, drugstore). Hence a finding that clearly reveals the importance of assortment of comparison shopping in the consumer's decision to select a shopping location. Weisbrod, Parcells and Kern (1984) also find the number of stores, and in particular the number of clothing stores, to be an important determinant in a shopping centre selection decision. In general, it was found that increased centralization of shopping opportunities in a clustered centre increases the drawing power of a shopping centre. Here the connection is made with the 'Spatial Interaction Theory'. In section 4.4 the evolution of his theory will be examined in more detail. A concluding statement can be made that tenant mix is highly relevant for the drawing power and functioning of shopping centres. Assuming a majority stake or full ownership at planned shopping centres, the shopping centre (and/or leasing) managers are sufficiently equipped to add value to the shopping centre through pro-active management of the tenant mix and the shopping centre in total. As consumer taste is heterogeneous rather than homogeneous, it is of paramount importance to square the

tenant mix with the profile of the catchment area the shopping centre serves. Summarizing it may be stated that homogeneous retailer agglomeration links with the categories catchment area characteristics (albeit indirectly), tenant mix and management.

4.3. Retail Demand Externalities

In the previous retail agglomeration section the example of a retailer that desires to locate next or close to an anchor tenant was depicted. Besides clustering of homogeneous retailers provide good opportunities to comparison shop and lower search costs and uncertainty (and thus is beneficial for both anchor and non-anchor stores as is attracts more consumers), locating close to an anchor tenant can exert another particular positive effect for the adjacent retailers. In the literature this is called *retail demand externalities*. It is proposed that smaller retailers can increase their sales volumes when an anchor tenant is in proximate presence. This is due to the additional traffic the smaller retailers enjoy that is generated by the anchor (Eppli and Benjamin, 1994). Different from homogeneous retailer agglomeration, where similar retailers benefit from the two-way flow of customers, retail demand externalities are a one-way customer draw from anchor tenants to non-anchor tenants (Ingene and Gosh, 1990). It was empirically demonstrated by Benjamin et al. (1992) that both anchor and non-anchor tenant externality generators pay reduced rents due to their strong bargaining power during lease negotiations for their ability to draw extra customers to the centre.

The subject of retail demand externalities is extensively studied and empirically confirmed over the years. An important determinant being addressed in the literature is the importance of the anchor's image. Nelson (1958), for example, argues that favourable retailer image, can draw customer from greater distances while Thompson (1967) stressed that superior image and tenant mix of a planned shopping centre provide a convenience that in a few year can upset long-established patterns of retail dominance. A study conducted by Stanley and Sewall (1976) that combines Huff's gravity model (see next section) with a supermarket image variable conclude that stores whose chains have strong favourable images can draw customers from longer distances than similar-sized stores can representing a chain that is perceived as mediocre. A customer survey of Nevin and Houston (1980) revealed that anchor department stores are an important shopping centre draw, and possibly the primary reason for choosing a shopping area. Extending to Nevin and Houston, Eppli (1991) indicates that centres with a high fashion image anchor, non-anchor tenant sales increase by $3,25 to $11,4 per square metre. Findings by Rich and Portis (1964) declare that although intangible aspects of retailer image clearly play an important role in attracting customers, no one particular image has an equal appeal to all types of customers thus the key challenge is to fit the type of tenant image to its catchment area is serves. In 1993, Eppli and Shilling find that regional shopping centres with greater quantities of space devoted to anchor tenants have higher non-anchor tenant sales for eight of the nine tested merchandise types, with an average increase in sales of $7,7 per square metre. Gatzlaff et al. (1994) quantified the impact of the loss of an anchor tenant on the rental rates of 36 (convenience based) neighbourhood and community shopping centres in Florida and Georgia. They find the aggregate rental level would reduce by approximately 25% due to the loss of an anchor tenant, stressing the importance of anchor tenants for the success of a shopping centre. Obviously, as anchor tenants are part of the tenant mix another connection is made with the quality assessment model used in this research study.

4.4. Spatial Interaction Theory

The Spatial Interaction Theory was first introduced by Reilly (1931) with his 'Law of Retail Gravitation' where parts of CPT and agglomeration economies are being combined. He models that

the drawing power of a shopping centre is determined by the trade-off between its utility (proxied by size) and its disutility (proxied by distance). Distance refers to the central place theory where consumer prefer to shop at the nearest centre that carries a desired good and size refers to the agglomeration theory where bigger centres imply a higher grade of clustering. Reilly considers distance as a more decisive factor than size as the gravitational pull of a centre exponentially decreases with an increase of distance to the centre (see for the model's equation Reilly (1931) or Bolt (1995)). Reilly was among the first to use retail gravity models to predict consumer patronage of shopping areas. Reilly's model had two major limitations. First, as suggested above, an exponentially increasing distance-decay parameter, which may overemphasize travel time i.e. distance, and a 'two-shopping centre specification', which limits store location analysis to two locations (Eppli and Shilling, 1996). A more flexible model that allows for a less steep distance-decay function and multiple competing shopping centres was proposed by Huff in 1964. Huff's model suggests that the market capture rate of a shopping centre is directly related to its mass and inversely related to distance (form the consumer to the centre). Additionally, Huff's model includes the possibility of having an unlimited number of competing centres in the market as well as allowing for a varying distance-decay parameter.

Using Huff's model to determine store patronage, Lakshmanan and Hansen (1965) constructed a retail expenditure model to estimate aggregate sales in shopping centres. Lakshmanan and Hansen also broadened Huff's model by allowing for the size of a retail centre to vary in importance. Historically, retail gravity models constrained the retail size parameter to one while the distance parameter was allowed to vary. By allowing the shopping centre size parameter to be nonlinear they permit researchers greater flexibility in assessing the consumer utility trade-off between distance and size when selecting which shopping centre to patronize.

Eppli and Shilling (1996) have used the Lakshmanan and Hansen retail gravity model to estimate sales for a sample of 38 regional shopping centres all over the U.S. based on their size and their distance to competing shopping centres within a 10 mile radius. Subsequently, they used these sales estimates as an explanatory variable in an ordinary least-squares regression to predict actual sales for each centre where the relative weighing of both the distance and size factor is possible. A high explained variance would indicate that centre size and proximity of competition are key determinants of the performance of these centres, while a low explained variance would indicate that other factors such as retailer mix are relatively more important in explaining aggregate sales. Their findings show the contrary of Reilly's model. The highest explained variance (R^2=73%) was found with a distance parameter of ^0.4 instead (of ^2 in Reilly's model) and a size parameter of ^2.0, revealing that consumer patronage decisions are affected more strongly by agglomeration economies (size) than the nearest centre hypothesis (travel distance). The study also reveals that a decrease in competitive shopping centre size of 20% increases centre sales by 30% to 40% depending on the size of the shopping centre. Conversely, an increase of competing shopping centres with 20% (in terms of sales) yields a sales decrease between 16% to 21%, depending on the size of the shopping centre. If the distance increases to the competing shopping centres, than the sales only increase 4% to 6% of the shopping centre and if the competing shopping centres come 20% closer the shopping centre it will decrease the sales with 5% to 7%. Additionally, an increase (decrease) in household income with 20% leads to an increase (decrease) of sales between 11% to 15% (-10% to -14%) depending on the size of the shopping centre. In summary, it is clear that distance had a surprisingly small impact on shopping centre sales, while the effect of the changing size had a large impact on the sales volume per square foot (or metre). It seems that consumers seems to care more about agglomerated, bigger centres where search costs and uncertainty risk are lower and assortment is more complete than the distance they have to travel towards a centre. The results of Eppli and Shilling, which have been rewarded the 'Best

paper, retail real estate' by the Journal of Real Estate Research in 1996, support the significance of agglomeration effects to the overall performance of shopping centres while it suggests that the 'distance/nearest centre'-principle which is at the heart of CPT is overstated, at least for regional shopping centres which usually tend to be comparison-based centres rather than convenience based. As the Spatial Interaction Theory and the Law of Retail Gravitation combines CPT and Agglomeration economies it recalls the importance of location and competitive position as well as catchment area, tenant mix and management. However, the major emphasis as demonstrated by Eppli and Shilling is at size and thus the building aspects category. Hence this completes the connection of the elaborated theories and the six categories as used from the quality assessment model.

4.4.1. To what extent size determines drawing power

As described above, shopping centre size is a dominant parameter within the Spatial Interaction Theory when predicting shopping centre sales volumes. Like many others, Oppewal (1995) and Van Lokven (2002) have also found supporting results for Reilly's and Huff's theory where size and distance are the most decisive factors for consumers when deciding where to shop. Both mentioned studies were conducted rather recently and took place in Europe, therefore indicating the relevance of Huff's theory is not necessarily limited to the U.S. and still seems applicable during an age of unbounded mobility where distances seem to decrease. An even more recent study by Ooi and Loo-Lee Sim (2006) on the magnetism of suburban shopping centres in Singapore was carried out through an extensive survey of 1,283 shoppers in nine suburban shopping centres. The results indicate that physical size matters to the attractiveness of a suburban shopping centre. Whilst mall size, in itself, is ranked 6th in terms of importance (see table 7), a large-size shopping centre can however facilitate a greater variety of shops and more anchor tenants, which is ranked as second most important to the shoppers, closely following proximity. A small-sized shopping centre could face more difficulties to facilitate a wide variety of tenants as well as complementary services expected by shoppers. Even if smaller shopping centres try to squeeze in more tenants this could evoke a cramped and congested atmosphere. In theory, size or number of units could be seen as a proxy for assortment/retailer variety. A large-sized shopping centre is less constrained by space availability to accommodate more tenants to achieve the optimal retail mix and right concept as discussed in paragraph 4.2 to attract and retain high traffic.

Table 7: Determinants of mall choice

Determining factors	**% of responses**	
Spatial factors	score	rank
Proximity	64.2	1
Mall size	26.5	6
Car park	8.6	9
Tenant mix		
Variety of tenants	62.7	2
Complementary services	30.9	4
Cineplex	29.3	5
Branding strategy		
Management and promotions	32.8	3
Reasonable prices	23.9	7
Quality and prestige	14.1	8

Source 14: Ooi and Loo-Lee Sim (2006)

Ooi and Loo-Lee Sim bring in another advantage. They argue that larger centres can provide wider atriums/common area and circulation networks within the shopping centre. This provides a pleasant

environment for shoppers, facilitates their social interaction and mingling, as well provides a venue where promotional events can be held to draw in more visitors. This means that the size of a shopping centre, is more a facilitating aspect to offer a favourite shopping destination rather than a success factor in its own. The survey results of Ooi and Loo-Lee Sim supports the hypothesis that size has a positive effect on the drawing power by firstly attracting people outside the primary shopping area (in the literature also referred to as 'outshoppers') and secondly holding the visitors longer within the shopping centre. However, besides the fact visitors seem to spent more time in larger shopping centres, the results could not find a significant association between size and amount spent at the shopping centre indicating that size would not necessarily lead directly to higher performance in terms of sales. Nevertheless, the simple fact that more people are attracted will imply higher sales for retailers in absolute terms and thus running a more profitable business.

Another study conducted by Sirmans and Guidry (1993) was aimed at the determinants of shopping centre rents. They built a model that could explain 85% of the variance in rents. Sirmans and Guidry measured drawing power, architectural design, location and market/economic conditions. Drawing power was proxied by size, age and type of anchor. In both the weighted- and ordinary-least-squares regression analysis the coefficient for size is positive and significant, indicating larger centres demand higher rents. In their study the r^2 in the multiple regression analysis is 6% and is thus not a particular strong predictor for the rent level, though.

4.5. Hypotheses

In the previous section a clear view emerged about the relevant theories and ideas that are closely linked with the functioning and, eventually, performance of shopping centres. Basically six relevant categories are distinguished; socio-economic characteristics within the catchment area, location aspects, building aspects, tenant mix, competitive position and the management. Based on the theories and studies mentioned above a set of variables was created that will be used as explanatory variables in the empirical part. The next challenge is to make appropriate translations from the conceptual categories to operational variables. Basically, the measurement level of the variables that will be statistically tested on their association with the performance measurements is decisive for the kind of statistical analysis that can be performed (Norušis, 2004). Obviously, the highest level of measurement, the ratio variables, offer the largest statistical possibilities. However, not every variable is measured at this level nor a reliable proxy at ratio level was found for every variable. This means that not every variable will be tested at the same statistical level as the (most concerned) ratio variable; the size of a shopping centre. Obviously, this has consequences for comparing variables on their relative explanatory power. Moreover, from a practical point of view, it was an absolute prerequisite not to request too much or too complicated data as that could make potential participants reluctant to participate. This issue was scrutinized thoroughly while determining the requested variables. The result of this assessment and hence the variables that were considered both reasonable to test and feasible to request are depicted in the table below. Please be advised to see appendix 9.4. for the definitions of the variables.

Table 8: Requested variables, organised by category

Variable	Category
Real Net Rental Income growth (like-for-like)	Performance measurement (primary)
Market Value growth rate	Performance measurement (secondary)
Rent per m², Value /m², Net Income Yield	Performance measurement (secondary)
Primary Catchment area	Catchment area
Demographic growth	Catchment area (nuts 2)
GDP growth	Catchment area (nuts 2)
Retail sales and growth	Catchment area (nuts 2)
Unemployment rate and growth	Catchment area (nuts 2)
Country	Location aspects
Geographical location	Location aspects
Standalone of benefiting adjacent area's	Location aspects
Parking spaces	Location aspects
Number of main competitors	Competitive position
Shopping centre stock	Competitive position
Average financial vacancy rate	Competitive position
GLA of shopping centre	Building aspects
Number of units total shopping centre	Building aspects
Year of opening	Building aspects
Year of refurbishment	Building aspects
Year of extension	Building aspects
Routing / pedestrian circuit	Building aspects
Tenant mix/Shopping centre profile	Tenant mix
Number, size, type of anchor tenants	Tenant mix
Property management in- or outsourced	Management

Source 15: Oosterveld, 2010

With having successfully collected a completely populated dataset of 72 shopping centres across Europe, the empirical tests are executed in the next chapter. In the now following section a short overview is provided of the null-hypotheses that are formulated based on the variables depicted in the table above. The definitions of all variables can be found in appendix 9.4. All hypotheses are tested against the performance of the shopping centres, that is, the 2002-2009 geometric mean (hereafter: average) real like-for-like rental growth rate. Additionally, the 2002-2009 geometric mean capital growth rate, average absolute rent & value per square metre and average Net Income Yield serve as secondary performance measurements. If '*average real rental growth rate*' is stated in the hypotheses this means that all performance measurements are tested.

As the independent variables are tested against a multi-period average (a 'film') performance measurement, the explanatory/independent variables would preferably be measured over the

corresponding time-span as well. For the socio-economic variables, that characterize the catchment area, it was considered useful and feasible to collect a multi-period measurement. This was done with one year delay. I.e. when shopping centre performance over the 2002-2009 period is regressed on relevant variables about the catchment area/region these figures were measured over the 2001-2008 period as it is anticipated that the relationship is stronger with one year delay, for example see RBS (2009) or Brooks and Tsolacos (2010). It makes intuitive sense that an increase in e.g. unemployment would probably not have immediate effect on rental growth, the more so since renewals or relettings usually only take place at definite times at lease expiry or leasing a vacant unit. Another point worth to mention is that the catchment area data is not measured at the direct catchment area (the area directly adjacent to the shopping centre), as this highly deterministic information is not feasible to request nor available at all. The most deterministic data could be collected at NUTS 2 level (see definition list for the scope of a NUTS 2 area).
In the next chapter more clarification will be provided on the exact proposition leading to these hypotheses. Moreover, here the results are being interpreted and commented on.

Table 9: Null-hypotheses

	Null-hypothesis	Cate-gory
1	The NUTS 2 average retail sales growth and average real rental growth rate one year ahead, are not significantly associated with each other.	Socio-economic profile of (NUTS 2) Catchment area
2	There is no significant relationship between the NUTS 2 average real GDP growth per capita and the average real rental growth rate one year ahead.	
3	There is no significant relationship between the NUTS 2 average change in unemployment rate and the average real rental growth rate on year ahead.	
4	There is no significant relationship between the NUTS 2 average demographic growth rate and the average real rental growth rate one year ahead.	
5	There is no significant relationship between the relative catchment area and the average real rental growth rate.	
6	No significant difference in the average real rental growth rate exists between shopping centres that benefit from functions that generate substantial pedestrian flows and shopping centres that do not benefit from these functions.(Separate tests were conducted for the distinguished categories)	Location aspects
7	The population mean of the average real rental growth rates does not significantly differ from zero across the distinguished countries within the sample.	
8	The population mean of the average real rental growth rates does not significantly differ from zero across the distinguished geographical locations within the sample.	
9	There is no significant relationship between the number of parking spaces/100m² and the real rental growth rate.	
10	There is no significant relationship between the shopping centre supply in m² per 1,000 inhabitants at NUTS2 level and the average real rental growth rate.	Competitive position
11	There is no significant relationship between the number of main competitors and the average rental growth rate.	
12	There is no significant relationship between the average financial vacancy rate between 2002-2009 and the average real rental growth rate.	
13	The mean difference in average real rental growth rate between the distinguished size categories does not differ significantly from zero in the population.	Building aspects
14	There is no significant relationship between size and the average real rental growth rate in the population.	
15	There is no significant relationship between size and average real rental growth rate for shopping	

	centres not being inner-city shopping centres.	
16	There is no difference between the average real rental growth rate before the extension and after the extension.	
17	The population mean of average real rental growth between the distinguished groups of shopping centre design does not significantly differ from zero.	
18	There is no significant relationship in the population between the year of opening of the shopping centre and the average real rental growth rate.	
19	The mean difference in the average real rental growth rate between shopping centres that were built before 1993 does not differ significantly from zero as compared to shopping centres that were built in or after 1993.	
20	There is no significant difference found in average real rental growth rate between convenience based shopping centres and comparison based shopping centres.	Tenant mix
21	Within the convenience based shopping centre category no significant relationship is found between relative catchment area and the average real rental growth rate.	
22	There is no significant relationship found between the number of shops within a shopping centre and the average real rental growth rate.	
23	There is no significant relationship between the number of anchors and the average real rental growth rate.	
24	There is no significant relationship between the diversity of anchors and the average real rental growth rate.	
25	The mean difference in average real rental growth rate between shopping centres that have their management in- or outsourced does not significantly differ from zero.	Mana-gement

Source 16: Oosterveld, 2010

4.6. Conclusion

Predominantly, the theories and models briefly described in the section above have a geographical angle. Striking examples are the Central Place Theory of Christaller and the Law of Retail Gravitiation as modelled by Reilly and extended by Huff. Important concepts that have been studied and tested in the literature are the agglomeration effects and principle of minimum differentiation. These concepts are associated with the clusertering of both homogeneous and heterogeneous retailer and reflecting the relevance of size and tenant mix. It was also found that consumers want to comparison shop for more high-order goods while convenience shopping is more relevant to low-order goods. In this regard several scientists have stressed that consumer tastes become more heterogeneous for high-order goods. The concepts of agglomeration effects and minimum differentiation can also reduce search costs and uncertainty of not finding the desired item. In this chapter also connections are made between the quality assessment model at Corio and the theories elaborated on. This can help placing hypothetical relationships in a more conceptual perspective. This was also visualised in the conceptual model at the end of the first chapter. The relevant categories that are touched upon served as a set of buckets to order the variables that were requested from the participating parties. As the shopping centres had to remain fully anonymous, too deterministic information was not feasible to request. Moreover, too much and too time consuming data would also make potential participants reluctant to participate. All these considerations were taken into account very seriously while setting up the data request sheet and resulted eventually in the data sheet in table 8 and hypotheses as depicted in table 9.

PART 2: EMPIRICISM

5. RESULTS

The findings from the theoretical framework are taken into account while proceeding with the empirical part. The results in this part provide insight in the performance of shopping centres and the attributes that show significant association with this performance. Eventually it will show the answers on the most pressing question in this study: to what extent is size explanatory for shopping centre performance. First a more descriptive part will be presented to get acquainted with the general characteristics of the data sample. Hereafter the results of the hypotheses, as postulated in last chapter, will be depicted and interpreted. Two powerful and frequently used techniques to examine how strongly two variables are related, are correlation and (single or multiple) regression analysis. To test on variance between two or more groups a T-test or F-test/ANalysis Of VAriance (hereafter: ANOVA) are being used, respectively. In case of a significant ANOVA test, the Bonferroni test will be used to see which distinguished groups differ significantly from each other. The tests are performed two-sided with an confidence interval of 95%. The data prerequisites with regard to the statistical techniques have been taken into account thouroughly. Conform statistical rules, statements based on significant results apply to the entire population rather than just the sample used in this study. The population comprises traditional shopping centres of at least 5,000 m² constructed before 2002 located in the Western part of continental Europe (as defined in appendix 9.2.). The statistical analyses are all performed in SPSS. All figures depicted in this chapter originate from this study and therefore no additional source caption is stated below the figures or tables in the empirical part.

5.1. Data description

The Excel data request sheet was distributed to all potential participants, predominantly ICSC ERG members. Eventually the data was collected for 86 shopping centres across Europe from in total seven participants, solely institutional investors. After checking for a full track-record of seven consecutive years of performance figures a dataset of 72 shopping centres remained eligible for the empirical tests. With the 2002-2009 performance series the centres together represent 576 observations. In total more than 2.300.000 m² of lettable shopping centre space was taken into account with an average size of 33,000 m² representing a total market value in 2009 of € 6,6 billion (2007: €7,3 billion). In the figures below the distribution of the shopping centres is showen in terms of country, location, typology and size categories. 60% of the shopping centres are located in the Netherlands or France. The remainder

Figure 8: country distribution

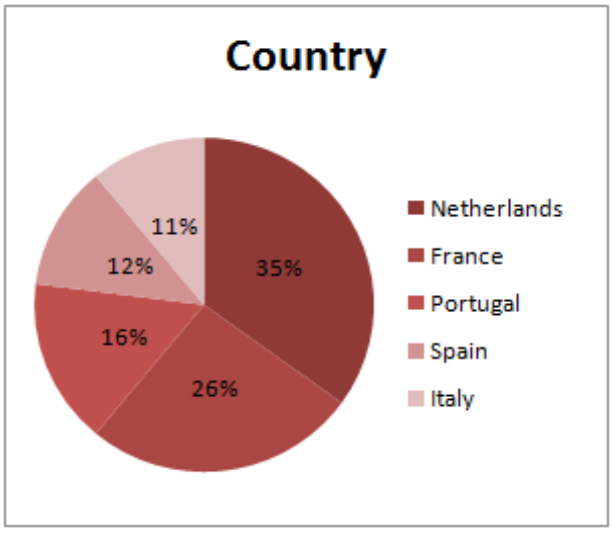
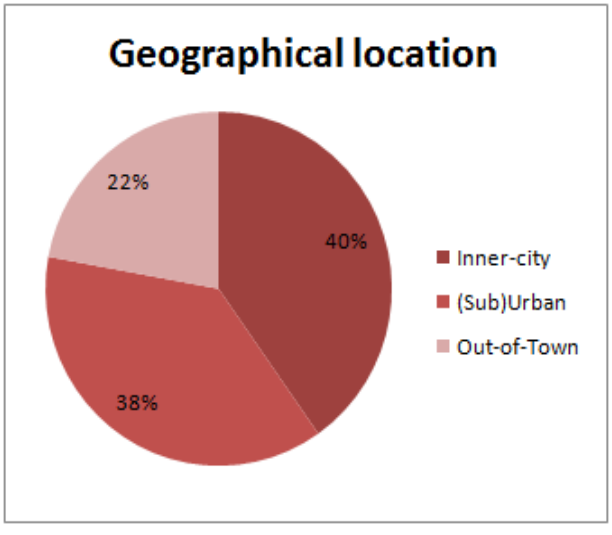


Figure 9: geograpiphical spread



part is located in Spain, Italy or Portugal. There is one centre located in Sweden, so no reasonable statements can be made on this country on its own and therefore is excluded in the analysis. The distribution of the inner-city, (sub)urban and out-of-town centres is 29, 27 and 16 for the respective categories.

With respect to tenant mix profile the lion share of the centres qualifies as comparison based shopping centres. That means that the tenant mix of the shopping centre is predominantly based on tenants offering slightly different products which consumers want to compare. Regarding the distribution in size categories, one can conclude that about 75% of the dataset is between 5,000 and 40,000 m² while 25% is above 40,000 m². Adjusting the size categories to alternative ranges results that 58% (or 41 in total) is up till 30,000 m², 27% (or 20) is between 30,000 and 60,000 m² and 15% (or 11) is above 60,000 m². The smallest centre is 5,700 m² while the biggest shopping centre in the dataset is about 111,000 m².

Figure 10: shopping centre type

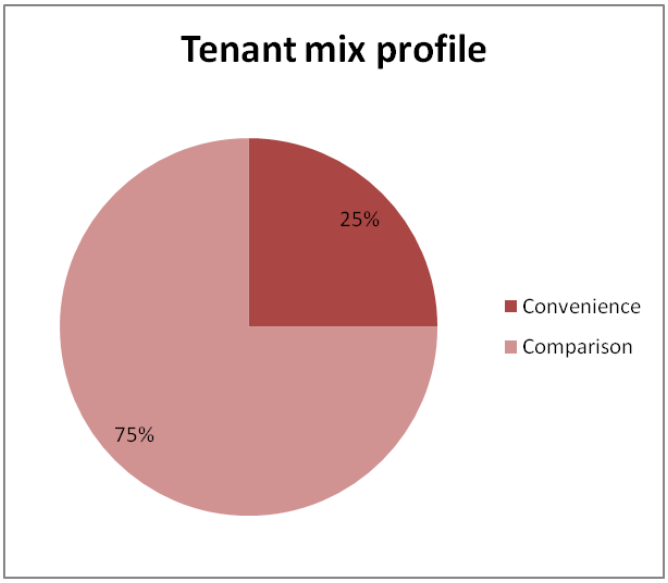
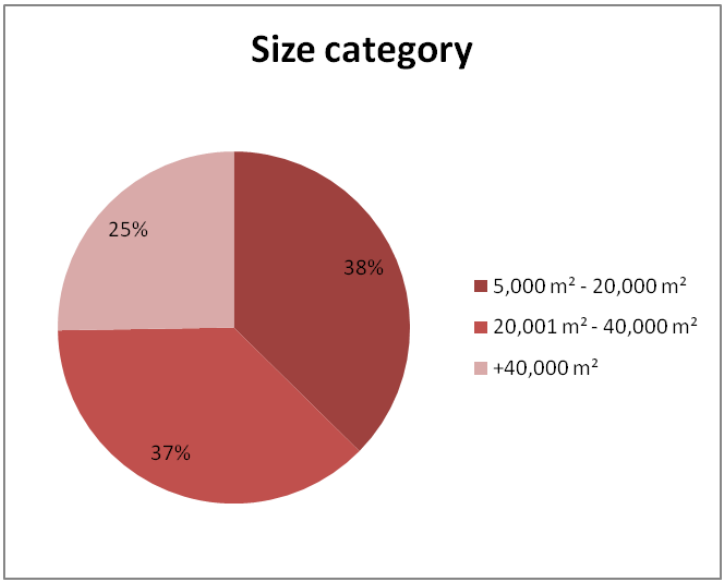


Figure 11: size categories



In figure 36 and 37 of appendix 9.9. one can recognize that the shopping centres distributed in the Netherlands are predominantly smaller centres, while the French shopping centres are predominantly medium sized shopping centres and the Portuguese centres are better represented in the biggest category.

Table 10 below illustrates that rental growth greatly depends on the indexation of the lease contracts. In general, the real net rental income growth is only 0,5% while it is 3,5% in nominal terms. Therefore the like-for-like rental growth performance is to a considerable extent dependent on the lease structures for shopping centres and the way of lease indexation.

Table 10: Performance measurement overview

2002-2009	w. avg
Real NRI l-f-l growth	0,5%
NRI l-f-l growth	3,5%
MV l-f-l growth	5,4%
Average rent psm	254
Average value psm	4,521

The primary performance measurement; Real NRI growth rate (like-for-like) and the secondary performance measurement; Market Value growth rate both follow a normal distribution within the dataset as depicted by both the histogram and the Kolmogorov-Smirnov normality test in figure 39,40 and table 27 of appendix 9.9. The other secondary performance measurements aren't normally distributed the normality tests indicate, therefore the test must be +30 cases when statements are being made about these performance measurements.

5.2. Testing hypotheses

All tests that are executed are checked on the prerequisites based on extensive exploration of the involved data for every hypothesis. Predominantly tests for normal distributions (Skewness, Kolmogorov-Smirnov), homogeneity of variance checks and corrections for outliers were made when necessary.

5.2.1. Catchment area

'*At least 80% of the revenue generated by our centres comes from the primary catchment area'* (Corio Annual Report, 2009). It is important that the quality of a shopping centre in terms of design, tenant mix and marketing is matched effectively to the primary catchment area that it serves. The characteristics of the population within the (primary) catchment area determine to an important extent the demand side for the type of retail goods and shopping area. Most important are the socio-economic characteristics of the catchment area. These factors are cyclical variables (thus linked to the wider economy) rather than shopping centre attributes. An overview of studies that examined these demand-side variables can be found in Mejia and Benjamin (2002). Besides, Van Gool et al (2007) sum up some important socio-economic variables in their work which encompasses the following:

Table 11: Relevant catchment area variables

Socio-economic variables	
GDP per capita	Retail sales
Unemployment	Consumer behaviour (lifestyle, spending patterns, taste, distance willing to bridge to visit a shopping centre and other behavioural preferences)
Consumer spending	Demographic growth

Source 17: Van Gool et al (2007)

As the shopping centres are anonymous in this study, it is impossible to measure the 'fit' between the socio-economic characteristics and the requirements a shopping centre should meet to match with the specific catchment area. Also consumer behaviour could not be incorporated. It is possible, however, to test whether a relationship exists between the catchment area characteristics and the performance of shopping centres in general, regardless of the characteristics/attributes of the shopping centres. Although NUTS 2 level is much greater than the catchment area of the specific shopping centre, it was the most deterministic data available in this study.

Hypothesis 1:

A seminal study of Eppli and Shilling (1996) has indicated that an increase in household income of 20% would increase sales in US regional shopping centres between 11 and 15%. More specifically, sales of larger US regional shopping centres increased even more than sales of medium and smaller regional shopping centres, relatively speaking. Obviously, the size of regional shopping centres in Europe is markedly smaller than their counterparts in the United States, but it would indicate that larger shopping centres could eventually show higher rental growth than smaller ones when household

income would increase over time. Relevant in the catchment area category is the anticipation that an increase in household income would generally lead to an increase in retail sales as well and would therefore be a fairly good proxy for rental growth. Therefore the following null-hypotheses are being proposed:

1. *The NUTS 2 average retail sales growth and average real rental growth rate one year ahead, are not significantly associated with each other.*
   ACCEPTED: p-value (hereafter: p)=0,6. Hence, the null-hypothesis for primary performance measurement is accepted.
   At secondary level, however, the MV growth rate is significantly and positively associated with retail sales growth, demonstrating a correlation r=0,31 (p=0,01). See table 29 in appendix 9.9.

A possible explanation for this result could be that surveyors as well as buyers and sellers at the capital markets determine the yields for shopping centres partly on the prospects of the future retail sales growth. This argument is associated with investment market perception. Surveyors and investors consider retail sales as a major indicator to assess attractiveness of regions, leading to higher demand given a relatively fixed supply market, leading to yield compression and ERV growth in areas where high retail sales growth is projected and hence higher market value growth can occur. For the lack of significance in the relationship between retail sales and real rental growth, the exact delay between retail sales and rental growth could be scrutinized some more. Perhaps no delay or two year delay would fit better than the one year delay that was used now.

Hypothesis 2:

In the European Shopping Centre Digest of IPD and CB Richard Ellis (2006) a relationship was found between real GDP growth and the total return of shopping centres a year ahead. A positive correlation was found of 0,28. As total return is the sum of income return and capital growth, it makes sense to expect that real rental growth, an important component for both income return and capital growth (IPD Index Guide, 2009), is associated with real GDP growth per capita as well. Other studies like Sirmans and Guidry (1993) have also found a significant relationship between GDP per capita and shopping centre rents. Hence, the following null-hypothesis is postulated:

2. *There is no significant relationship between the NUTS 2 average real GDP growth per capita and the average real rental growth rate one year ahead.*
   ACCEPTED. p=0,39. There is only a significant negative association with rent and value /m². See figure 28 in appendix 9.9.

There is no significant correlation found between real GDP growth and real rental growth rate one year ahead. On explanation could be that the applied time delay of one year is not appropriate enough. Besides, it could also be the NUTS 2 level data is not deterministic enough to measure adequately. Another explanation could be that when looking in the breakdown of the GDP growth one can roughly distinguish between; consumer spending, government spending, investment, exports, imports and inventories (Experian, 2010). Intuitively the consumer spending will have a more close relation with rental growth than for example exports. Hence, if a GDP figure is not materially driven by consumer spending it could lack correlation with rental growth. In some countries this relationship is not as strong as people tend to save more disposable income than they are likely to spend on retail products. At this point we enter the 'DNA' and culture of consumer behaviour within different countries. Markets can be generally distinguished between 'consumer-driven' and 'non consumer-driven'. Therefore consumption patterns and general economic performance can be poles apart and vary considerably. Where UK retail sales growth remained continuously positive the German showed small decreasing figures while both countries were in economic recession and thus suffered GDP decline

(King Sturge, 2010). Another meaningful ratio in this regard is the retail sales expressed as percentage of total consumer spending. In Germany or Italy for example this is historically much lower when compared to, for example, Sweden or France.

Hypothesis 3:

Although it makes intuitive sense to expect that the unemployment rate is associated with the real rental growth rate of a shopping centre, this relationship was also empirically demonstrated by the European Shopping Centre Digest study of IPD and CB Richard Ellis (2005), albeit at country-level. In the IPD/CBRE study a strong negative correlation of -0,65 was found in the UK over the last 24 years. In the same study the relationship was tested cross-sectional over countries with one year delay between both variables yielding a negative correlation of 0,51. In this study we test the average change in unemployment rate with a one year delay, and the average real rental growth rate over the 2002-2009 period. Hence the null-hypothesis is:

3. *There is no significant relationship between the average change in unemployment rate and the average real rental growth rate on year ahead.*
   REJECTED: Negative correlation of -0,54 (r^2=29%) significant at the 1% confidence level (p<0,0005). Nominal NRI even at -0,61 (r^2=37%) at the 1% confidence level. See table 12 below.

This result is very much in line with the IPD/CBRE results as mentioned above. However, that was on total return while in this study the negative correlation was significantly (except on the NIY, which is obvious) on both the primary real net rental income growth rate and the secondary performance measurements.

An explanation for the remarkably strong association of every performance measurement could be that the negative impact of becoming unemployed on disposable income it quite strong. As a result the prospects for turnover growth and hence rental growth get gloomier as well. This is apparently also taken into account at the capital markets where the yields are determined.

Table 12: Dynamics in unemployment

Correlations

		Unemployment growth	Real NRI growth rate like-for-like	MV growth rate	Rolling average Net Income Yield	NRI growth rate like-for-like
Unemployment growth	**Pearson Correlation**	**1**	**-,540****	**-,420****	**,405****	**-,614****
	Sig. (2-tailed)		**,000**	**,000**	**,000**	**,000**
	N	**72**	**72**	**72**	**72**	**72**
Real NRI growth rate like-for-like	Pearson Correlation	-,540**	1	,410**	-,100	,960**
	Sig. (2-tailed)	,000		,000	,405	,000
	N	72	72	72	72	72
MV growth rate	Pearson Correlation	-,420**	,410**	1	-,080	,500**
	Sig. (2-tailed)	,000	,000		,504	,000
	N	72	72	72	72	72
Rolling average Net Income Yield	Pearson Correlation	,405**	-,100	-,080	1	-,119
	Sig. (2-tailed)	,000	,405	,504		,320
	N	72	72	72	72	72
NRI growth rate like-for-like	Pearson Correlation	-,614**	,960**	,500**	-,119	1
	Sig. (2-tailed)	,000	,000	,000	,320	
	N	72	72	72	72	72

**. Correlation is significant at the 0.01 level (2-tailed).

From this perspective an additional correlation test was done to check for differences between countries. In the more Northern countries in this study (France and the Netherlands) the performance is possibly more resilient for such dynamics in unemployment due to the welfare state and more 'safety net' measures as compared to their Southern counterparts (Spain, Portugal and Italy). The results below in table 13 indeed support this hypothesis. As depicted below the more Southern European countries have an even stronger correlation with the unemployment growth. *(p<0,0005, correlation -0,66. r^2=43%)*

Table 13: Dynamics in unemployment in Spain, Portugal and Italy

Correlations

		Unemployment growth	NRI growth rate like-for-like	Real NRI growth rate like-for-like	MV growth rate
Unemployment growth	**Pearson Correlation**	**1**	**-,612****	**-,657****	**-,223**
	Sig. (2-tailed)		**,000**	**,000**	**,213**
	N	**33**	**33**	**33**	**33**
NRI growth rate like-for-like	Pearson Correlation	-,612**	1	,994**	,324
	Sig. (2-tailed)	,000		,000	,066
	N	33	33	33	33
Real NRI growth rate like-for-like	Pearson Correlation	-,657**	,994**	1	,326
	Sig. (2-tailed)	,000	,000		,064
	N	33	33	33	33
MV growth rate	Pearson Correlation	-,223	,324	,326	1
	Sig. (2-tailed)	,213	,066	,064	
	N	33	33	33	33

**. Correlation is significant at the 0.01 level (2-tailed).

It was hypothesized this even stronger correlation could be the result of a less extensive 'welfare state' in more Southern European countries. This could be a reasonable explanation since disposable income and consumer spending will be affected more severely when unemployment is growing. In Southern Europe loss of income due to becoming unemployed is less extensively compensated by government payments. Another explanation could be that, in contras the North-European countries, lease contracts in Southern Europe frequently have a turnover rent component. This construction directly affects the net rental income as turnover falls back. Hence the rental income falls back harder in the crisis years of 2008 and 2009.

Hypothesis 4:

Another rather straightforward expectation would be the relationship between demographic growth and real rental growth rate. As shopping centres generate their sales from the population within its catchment area one could imagine that a considerable population growth within a particular region, would have a positive influence on real rental growth rates. For example, Van Gool et al (2007) and Sirmans and Guidry (1993) address this relationship in their work as well. The null-hypothesis is:

4. *There is no significant relationship between the NUTS 2 average demographic growth rate and the average real rental growth rate one year ahead.*
   ACCEPTED: p=0,25. No significant association with any performance measurement. They are all highly insignificant.

A reasonable explanation for the lack of significance could be that demographic growth rates at NUTS 2 level is just not specific enough to really touch upon the differences that exist at shopping centre level and the catchment area it serves. Besides the optimal delay between performance and demographic development was not determined. Perhaps the effects of demographic growth only drive performance in the longer term instead of one year later. Moreover, demographic growth in the short term predominantly means more births, which will not give a direct impulse in consumer spent because they are not independent consumers directly from birth. Hence, growth of the labour force would probably a better indicator for rental growth.

Hypothesis 5:

The primary catchment area is very important for the shopping centre to draw its customers from. Therefore it is tested whether a significant relationship can be discovered between the primary catchment area relative to its size (thus number of inhabitants in catchment area per square metre shopping centre) and the real rental growth rate of a shopping centre. A more dominant shopping centre with a more central location within its catchment area, proxied by a greater relative catchment

area, would apparently attract more visitors and would make it interesting to test whether this affects their respective performance. Therefore the following null-hypothesis is postulated:

5. *There is no significant relationship between the relative catchment area and the average real rental growth rate.*

   ACCEPTED: p=0,11. No significant relationship was found between both variables in this study.

Although the catchment area is measured at shopping centre level (which make it a very deterministic measurement), it does not seem to have explanatory power on its own. It could indicate that a relative big catchment area on its own is no incentive for shopping centre owners and managers to sit back and see their centre perform well. Intuitively, it is an appealing feature to reach a big catchment area but an outperforming shopping centre demands more. Besides that a dynamic factor (rental growth) is challenging to explain by a stable factor (catchment area), it is also hard to get consistent data on catchment area as it calculated quite differently over countries and organisations.

5.2.2. Location

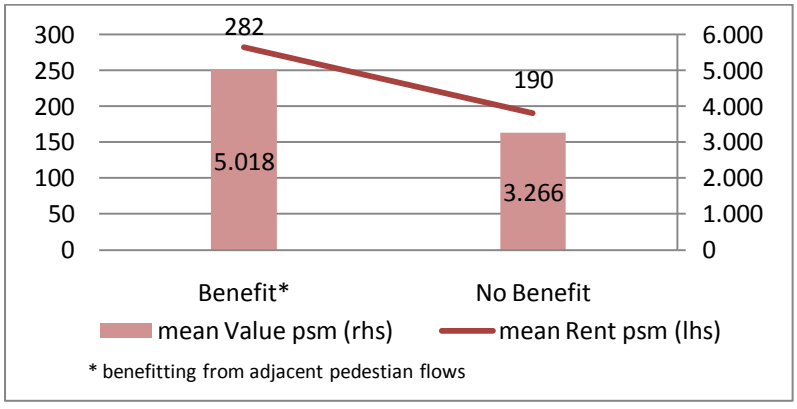
Hotelling, Myrdal and Nelson learned us that retailer agglomeration of slightly different retailers can be complementary to each other and favourable for consumers. This could indicate that shopping centres that are located within a greater dense shopping area or an area with complementary functions could be more attractive to consumers. Slightly different was a study on shopping centre rents by Sirmans and Guidry (1993) where a positive significant difference in rent level was found between shopping centres that were located in high traffic areas versus shopping centres that weren't. Therefore, it is useful to examine whether benefitting from adjacent areas like 'other retail' and 'city centre retail' yield higher rental growth rates than areas lacking the benefits of such functions. This proposition can be measured with the null-hypothesis:

Hypothesis 6a+b:

6. *A) No significant difference in the average real rental growth rate exists between shopping centres that benefit from functions that generate substantial pedestrian flows and shopping centres that do not benefit from such functions.*

   ACCEPTED: p=0,9. Despite that the mean of both the real NRI growth (0,5%) rate and MV growth (5,4%) rate are respectively 10 and 40 basis points higher if they benefit from footfall in adjacent areas, the differences are highly insignificant as the p-value reveals. However, the mean difference is significant at the 95% confidence interval level on the secondary performance measurements of rent per square metre and the value per square metre (both p<0,0005). In 95 out of 100 samples the average rent for non-benefitting centres will be lower between 48 and 135 euro psm and the value will be lower between 950 and 2550 euro psm.

Figure 12: Mean value and for (non)benefitting shopping centres



These results could in general support the argument that shopping centres in more crowded areas can rely on higher interest from both retailers and investors. Bearing in mind a fixed supply this will result in higher rent levels and values per square metre as the figure depicts.

Within the shopping centres that do benefit from adjacent pedestrian flows a more specific breakdown was made. The dataset distinguishes between the following pedestrian sources; public transport hub, city centre retail, other retail/leisure function and a dense office park. As multiple options can apply, for example the shopping centre benefits from both a public transport hub and city centre retail, all combinations have been tested. Also a correlation test was done for the number of benefitting sources (zero up to four). If the number of cases was below 30, a normality test was performed first to check whether it was allowed to perform the specific test. Although the normality tests were accepted, none of the tests performed showed significant results for the primary performance measurement, however.

Bringing into memory again the Law of Retail Gravitation (which adheres the principle of the increasing importance of size as travel distance increases in order to draw shoppers), the relevance of surrounding retail/leisure adjacent to out-of-town centres would be interesting to test whether support for this principle can be found. Therefore the 'benefitting from other retail/leisure' test was performed on the sixteen out-of-town centres only. The performance figures were found to be distributed normally, a Shapiro-Wilk normality test indicated and no outliers were found. Hence, the following null-hypothesis was postulated and tested:

6. *B) The mean difference in the average real rental growth rate between out-of-town shopping centres that do benefit from other retail/leisure and out-of-town shopping centres that do not benefit from other retail/leisure does not significantly differ from zero.*
   REJECTED: p=0,03. The mean difference for real NRI growth is 172 basis points between out-of-town centres that do benefit from other retail/leisure (mean rNRI=2,1%) versus out-of-town centres that do not benefit from this function (mean rNRI=0,3%). In 95 out of 100 samples the real NRI growth of out-of-town centres that benefit from other retail/leisure will be higher between 15 and 330 basis points.

The same test was also conducted for city centre and (sub)urban shopping centres only, but here the results were insignificant. See tables 30 and 31 in the appendix 9.9. for the group statistics and T-test results. This outcome is very much in line with the Law of Retail Gravitation. Apparently more real rental growth is anticipated for out-of-town shopping centres that benefit from a separated but adjacent leisure function or other retail (e.g. factory outlet centre, retail park or furniture department store) that draws substantial footfall. A reasonable explanation can be that customers see it together as one retail destination that enhances the opportunity for multipurpose shopping and alleviating uncertainty and search costs usually combined with good accessibility. The out-of-town centres were located in Spain, Italy, France and Portugal. None were located in the Netherlands, which is obvious as the planning authorities do not allow shopping centres to operate here.

Hypothesis 7:

As elaborated on in chapter *3.3.4.* rental growth is for a considerable extent influenced by international lease legislation that can differ per country (also see appendix 9.8). There will be a levelling-out effect, however, because the rental growth rates are being adjusted for annual inflation/indexation rates. Hence, the growth rates are in real terms instead of nominal terms. Nevertheless, specific regulations concerning reletting/renewal and break options can make obvious differences among countries. Due to these regulations it would be interesting to test whether any significant differences can be found cross-country. The null-hypothesis that is postulated runs as follows:

7. *The population mean of the average real rental growth rate does not significantly differ from zero across the distinguished countries within the sample.*
   REJECTED: p<0,0005. The mean difference of Italy and France significantly differs from Portugal. In 95 out of 100 samples, Italy will perform between 100 and 660 basis points better than Portugal in terms of real NRI growth. For France the performance in terms of real NRI growth will be between 130 and 570 basis points higher.
   In terms of MV growth France outstrips all other countries at the 1% confidence interval. In 95 out of 100 samples the mean of the Market Value growth rate of French shopping centres is will be higher between 130 and 820 basis points, depending of the country (NL, IT, ES or PT).

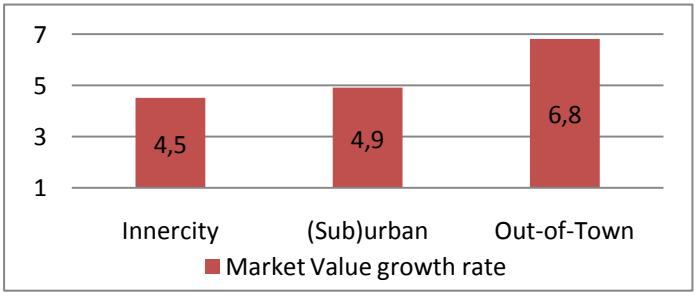
See tables 32 and 33 in appendix 9.9. for the statistical results. Though these results are probably not the most essential ones for this study, a useful explanation could be that rental and value growth among countries with their respective shopping/spending culture on the one hand and the institutional aspects like lease legislation on the other hand may in general lead to significant differences in performance over countries.

Hypothesis 8:

As indicated earlier, the extent to which a shopping centre is able to draw visitors to the shopping centre partly depends on its location. Shopping centres adjacent to low density areas (with regard to number of inhabitants/km²), have a smaller natural catchment area they can draw customers from. Compared to shopping centres located in the city centre, these shopping centres require a relatively bigger drawing power in order to seduce customers to bridge the travel distance and visit the shopping centre. Moreover, if city centre shopping centres are located adjacent to the mainstream pedestrian flows they can capitalise on the drawing power of the entire city centre. This distance decay is in conformity with the Law of Retail Gravitation as postulated by Reilly (1931), Huff (1964) and Eppli and Shilling (1996). Moreover, the industry in general is interested in whether any difference exists between the rental growth of the different categories of shopping centres. This results in the following null-hypothesis:

8. *The population mean of the average real rental growth rate does not significantly differ from zero across the distinguished geographical locations within the sample.*
   REJECTED: the p-values for real rental growth rate are slightly over 0,05. On another note, the MV growth for Out-of-Town centres is significantly higher than for Inner-city centres at the 5% confidence level. The mean difference between both is 2.3 %-point which is depicted in the figure below. In 95 out of 100 samples Out-of-Town centres would yield a higher MV growth rate between 8 and 460 basis points than inner-city shopping centres, see table 34 in appendix 9.9. However not significant, the mean real rental growth for inner-city shopping centres is also lower than for both (sub)urban and out-of-town shopping centres.

Figure 13: The mean MV growth p.a. by geographical location



A possible explanation for the significantly higher average Market Value growth rate of Out-of-Town centres could be due to their relatively younger age in this sample. They are on average 18 years old while inner-city shopping centres and (sub)urban centres are on average 22 and 23 years old, respectively. But these differences are not significant enough to argue that inner-city centres are more mature with probably less potential for rental growth and yield is decompressing when compared to the younger out-of-town centres. Moreover, in a multiple regression model that simultaneously regressed age and the out-of-town dummy variable in one model showed that both variables are significant when explaining MV growth rate and the collinearity statistics (VIF=1,029 and Tolerance=0,972) do not indicate problematic collinearity exists amongst both.

Another explanation could be that new housing area expansions at the city boundaries are planned (or have already been completed) where predominantly Out-of-Town centres benefit from. Planned housing area expansions are already taking into account by appraisers that base the property value on future cashflows that are expected to benefit from future planned additional households.

Finally, another explanation could be that it is technically spoken harder to invest in the improvement of inner-city shopping centres, and hence out-of-town shopping centres can more easily 'buy' value by more regular investing. As mentioned the market value growth is not corrected for capital expenses. On overview of the descriptive statistics are enclosed in the figures 42 – 44 in appendix 9.9. Note that since the outcomes in these figures are not significant so one should be careful with generalizing the outcomes to the wider industry. The outcomes are only relevant for this particular sample.

Hypothesis 9:

Janssen (2004) depicts in her paper about the influence of active management on retail performance that the number of parking spaces per 100m² GLA is positively associated with sales levels at a shopping centre, this could indicate higher rent levels and probably potential in rental growth. Also Mejia and Benjamin (2002) mention site accessibility (and visibility) in their seminal paper as determinants of retail success. Therefore the following null-hypothesis is postulated:

9. *There is no significant relationship between the number of parking spaces/100m² and the average real rental growth rate.*
   ACCEPTED: all highly insignificant. For real NRI growth p=0,58.

Despite the relevance of parking spaces, their association with shopping centre performance could not be found in this study. Other aspects of parking, like distance/proximity to the shopping area and tariffs of parking tickets, are not taken into account which in combination probably may have an effect on shopping centre performance.

5.2.3. Competitive position

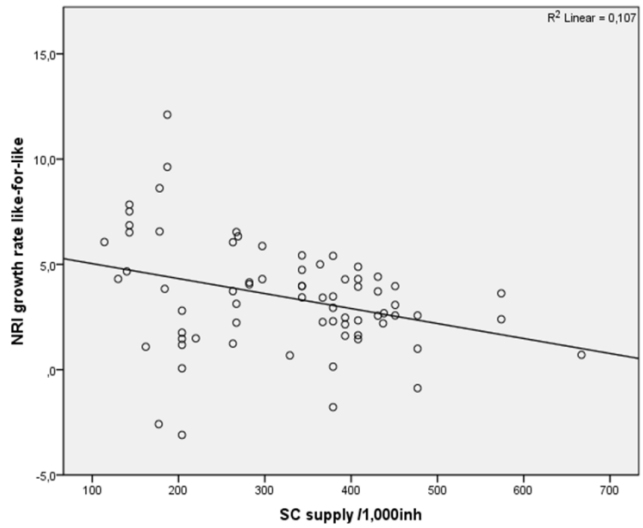
Van Gool et al. (2007) state in their book that competitive position of a shopping centre is of great importance for determining its success. Within this regard the authors refer to saturation grade in the wider retail market. This can be proxied by the total supply of retail area in square metres within a particular region divided by the number of inhabitants. Next to the wider market conditions, the local catchment area where the shopping centre is aimed at is at least of equal importance as the magnetism of competing shopping centres pull for the same consumer that can only spend his money once. Therefore the number of competitors whose catchment areas are overlaid onto the catchment area of the studied shopping centre could be a determinant for rental performance. Here it is important to scrutinize the exact definition of a competitor (see definition list). Shopping centres with a different

profile (e.g. comparison versus convenience shopping) do not necessarily have to be competitors. Having taken this into account, the following two null-hypothesis are being tested:

Hypothesis 10:

10. There is no significant relationship between the shopping centre supply in m² per 1,000 inhabitants at NUTS2 level and the average real rental growth rate.
ACCEPTED: For real NRI growth is p=0,14 (r²=3,2%) and thus insignificant. At nominal level, however, the NRI growth rate is significant with a correlation of -0,33 resulting in a r²=11% as depicted below in figure 14. Significant, but only at the 10% confidence interval (p<0,1), with a negative correlation of -0,23 is the MV growth rate (r²=5,3%). These results are stated in table 35 in appendix 9.9.

Figure 14: Scatter plot NRI growth and SC supply correlation



As the results reveal it seems reasonable to argue that in more saturated/mature markets (like the Netherlands) it becomes harder to keep showing high rental growth figures. Despite that supply per 1000 inhabitants can differ considerably at property level, generally speaking the potential in such markets will decrease. On the other side, an advantage of such more saturated markets is the limited risk for extra future competition due to new competitive developments. Such markets do more rely on redevelopment and extension projects. An explanation for the fact that no significant outcome was found on real rental growth rate could be related to the sample size. A more extensive dataset could be better equipped to identify limited/smaller correlations in a significant way.

Hypothesis 11:

11. There is no significant relationship between the number of main competitors and the average real rental growth rate.
ACCEPTED: all insignificant. For real NRI growth p=0,72.

The number of main competitors could not show any significant relationship with shopping centre performance. One explanation could be that the maximum number was limited to five main competitors. On the other hand, a shopping centre with more competitors is probably located in high-dense or tourist areas that generate income growth for all shopping centres. The retailer demand to have stores in that particular area could probably even outstrip the supply resulting in rising rents over time. The most likely explanation in this regard is that a shopping centre can be a ‘winner’ or a ‘loser’,

no matter there is fierce competition or not. If on the one hand some 'losing' centres are in the sample experiencing limited competition and on the other there are some 'winning' centres are in the sample despite they have plenty competitive centres, this will prevent the results to show a strong relationship between number of competitors and real net rental income growth. Hence this could be a possible explanation for the rather mixed result in this study.

Hypothesis 12:

A shopping centre is in real danger when the physical vacancy rises above 10% as then it is vulnerable of entering a vicious circle (RBS, 2009). Lower occupancy leads to lower footfall, leading to lower turnover for the remaining tenants, again leading to a reduced ability to pay rents. In worst-case scenario the anchor tenant leaves which can lead to a 25% decrease of rent levels (Gatzlaff et al. 1994). Obviously, it makes common sense to expect that (high) vacancy also tend to lead to lower rental growth and market values and thus affects performance. The EPRA-definition of financial vacancy is used here (see definition appendix 9.4.). EPRA stands for European Public Real Estate Association. Despite the recognition that it is challenging for participants to report on the financial vacancy rate as from 2002 until 2009, the average financial vacancy rate is being requested from investors. The null-hypothesis runs as follows:

12. *There is no significant relationship between the average financial vacancy rate between 2002-2009 and the average real rental growth rate.*

    ACCEPTED: insignificant. For real NRI growth p=0,14. Hard to get reliable data. This data is not always available on asset level, certainly not for the earlier years. However, there is a significant relationship found with MV growth rate (p=0,037). With r^2=6% the relationship is not particularly strong.

The best way to analyse this is to request the average (financial) vacancy rate for every consecutive year and calculate the dynamics within the vacancy rate over the full period. This is very challenging to request from different data suppliers, though it's the only way to get reliable numbers. This is the same calculation that was made for the unemployment dynamics at hypothesis 3. The fact a relationship was discovered for MV growth could indicate there was less yield compression for shopping centres dealing with relatively higher average vacancy rates as they are considered more risky.

5.2.4. Building

'Larger centres are more dominant in their catchment area and can therefore better facilitate expansion and adjustments in the retail mix, and trough that, enhancing performance' (Corio AR, 2009).

The most influential theories discussed earlier in this chapter could in particular encourage developers to construct larger shopping centres where possible. We learned that both consumers and retailers demand concentration to comparison shop, decrease search costs and uncertainty (Nelson, Hotelling) and to benefit from agglomeration effects (Hotelling and Myrdal), respectively.
Moreover, Eppli and Shilling showed that the drawing power of shopping centres is to a large extent determined by its size (and becoming increasingly important in their results) while the distance-decay within the Retail Gravitation Law of Huff is overstated, they argued. Alonso argues the bigger the shopping centre, the more competition among retailers is found to occupy the better places. Since the

supply of retail units is limited and inelastic the rental levels will rise, at least at the location with the highest footfall. As the rental level of the other units are usually derived from the top-rents, the rental levels (on average) will be higher in bigger centres than in smaller ones (Tay et al, 1991). Also Eaton and Lipsey (1979) find clustering socially useful since it acknowledges the consumer's desire to comparison shop. Simultaneously, however, they argue that positive agglomeration economies are exhausted when two or more homogeneous retailers cluster together. Could this probably indicate that the there could be an optimum size?

In the literature size is argued by many researchers to be a relevant factor when considering the rent or sales levels of shopping centres. Not solely for size as a factor on its own, but size also as a facilitator of creating a more balanced tenant-mix, creating beneficial agglomeration effects and decrease search costs and uncertainty for consumers. However, the key-question remains if bigger shopping centres can also demonstrate a higher rental growth rate over a longer (2002-2009) period. A growth rate that can outstrip the annual indexation of the contractual rents. A growth rate that is higher because the vacancy risk and thus the loss of rent is probably lower for bigger centres, resulting in a lower yield for these bigger centres. Or is it the opposite and do bigger centres get an extra illiquidity premium resulting in a higher yield? A study conducted by the IPD and CBRE in 2006, the European Shopping Centre Digest, reveals that in France and the UK the income return between 1999 and 2004 for smaller shopping centres was higher (and thus income yields are higher) while the opposite is true for the Netherlands and Spain. Here the largest shopping centres carry the highest yields(and hence income return) probably reflecting an illiquidity premium for large lot sizes. This indicates there is no one Pan-European answer or a 'one size fits all' solution. Below that null-hypotheses are stated focussed on size. First an F-test/ANOVA test is performed on the sample (hypothesis 13) while after this the correlation tests are performed (hypotheses 14-15).

Hypothesis 13:

13. *The mean difference in average real rental growth rate between the distinguished size categories does not differ significantly from zero in the population.*

    ACCEPTED: No significant difference, for both size categories considering the full dataset. Although in the left part of figure 15 and table 14 (the full dataset) there are certainly differences in favour of the bigger categories, none of the differences were found significant.
    But when the inner-city category is excluded (right part of figure 15 and table 14), a significant correlation is discovered in the second size category (5,000;30,000 versus +60,000 m²). Here, the 60,000 plus category performs significantly better than the category 5,000 -30,000 m² (with homogeneity of variance test accepted). The Bonferroni test showed that the mean difference of 297 basis points (i.e.≈3%) between the 5,000-30,000 m² category and the 60,000+ category is significant at the 1% confidence level (p=0,009). In 95 out of 100 samples from the same population the 60,000+ category would demonstrate a higher average real rental growth rate between 62 and 532 basis points over the 2002-2009 timeframe. The mean average real rental growth rates of the respective size categories are 0,2%, 1,3% and 3,2%. As depicted in the table, the nominal NRI growth is also significant between the both categories.

The results stated above indicate that size is a more important factor for (sub)urban and out-of-town shopping centres than inner-city shopping centres as the differences between the size bands become bigger when excluding inner-city shopping centres. Or, the other way around, inner-city shopping centres are apparently less dependent on their size as compared to (sub)urban or out-of-town shopping centres.

Figure 15: Average real rental growth by size category. Left figure is full sample, right figure is excluding inner-city SC.

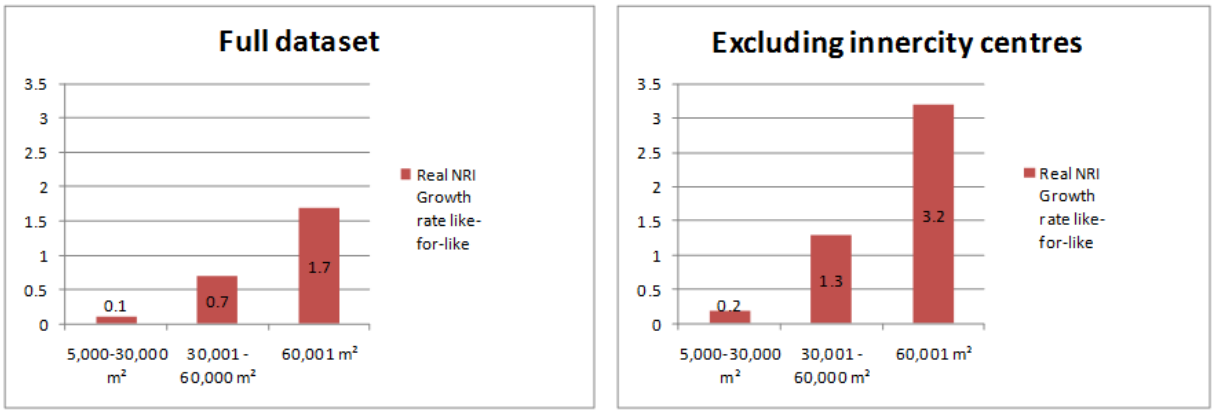


Table 14: ANOVA test results between size categories full dataset and excluding inner-city centres.

	full dataset						excl. Innercity centres						significant	
	category I			category II			category I			category II			mean	95% conf.
	5-20	20-40	>40	5-30	30-60	>60	5-20	20-40	>40	5-30	30-60	>60	difference	Int.
Real NRI growth	**0,2%**	**0,4%**	**1,3%**	**0,1%**	**0,7%**	**1,7%**	**Real NRI growth**	**0,5%**	**0,6%**	**2,1%**	**0,2%***	**1,2%**	**3,2%***	**3,0%**	**0,6%-5,3%**
NRI rental growth	3,0%	3,6%	4,1%	3,1%	3,6%	4,6%	NRI rental growth	3,3%	3,9%	4,9%	3,3%*	4,1%	6,3%*	2,9%	0,3%-5,6%
MV growth rate	4,8%	5,4%	5,4%	5,3%	5,5%	5,7%	MV growth rate	5,5%	5,4%	6,1%	5,4%	5,4%	6,7%		
Net Income Yield	6,3%	5,7%	5,6%	6,3%	5,3%	5,7%	Net Income Yield*	6,3%	5,5%	5,1%	6,2%	4,8%	5,3%		
Rent psm	227	245	305	249	229	322	Rent psm	210	228	279	238	191*	330*	138	3-273
Value psm	3.879	4.561	5.440	4.246	4.468	5.702	Value psm	3481*	4.396	5347*	3980*	4.198	6214*	2.234	233-4235
N=71	26	27	18	40	20	11	N=43	13	19	11	23	14	6		

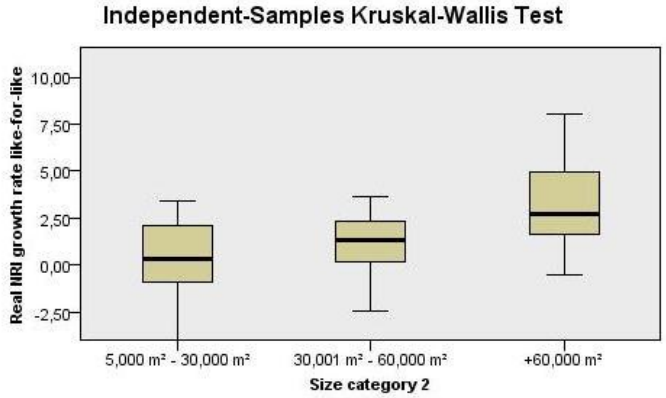
homogeneity of variances for all aspects

*heterogeneity of variances both categories

Why are inner-city shopping centres excluded? It was found in the data sample that almost 60% of the inner-city shopping centres indicated that they are located adjacent (walking distance) to the prime pitch city centre retail area. If consumers consider both the city centre and the shopping centre as one retail destination, the actual GLA that the inner-city shopping centres draws its customers from is actually bigger than measured in this research with Total GLA of shopping centre. That could mean that in this study at least in some cases the size of the inner-city shopping centre is larger than measured in the consumer's perception. This roused the curiosity to test this hypothesis excluding the inner-city centres.

Obviously, the normality test (Kolmogorov-Smirnov) have been performed on both the full dataset and the dataset excluding inner-city centres and both succeeded despite the limited distribution in the +60,000 m² category. Also the skewness was <1 in all categories and hence supporting normal/symmetric distribution. Despite the parametric F-test is legitimate, the non-parametric Kruskal-Wallis test was performed as well for the ANOVA test for real rental growth excluding the inner-city shopping centres. Also here the null-hypothesis was rejected with p=0,03, indicating a significant difference between groups. In figure 16 below the boxplot is stated of the test. No outliers are determined in the different size bands and both the median (bold black stripe) and mean (the middle of the box) real NRI growth is significantly higher in the +60,000 m² category. However, one should still bear in mind this is based on only six observations, meaning there is a reasonable chance that the values can be completely different when taking another sample. The dataset without inner-city centres comprises 43 cases reflecting 60% of the total dataset.

Figure 16: Real NRI growth per size category with non-parametric test



Looking at the full dataset in table 14 and figure 15, also here one can clearly observe that in this sample size drives performance. On average, also rent and value levels rise. However, as these results are not significant at the 95% confidence level, no general statement can be made that the differences found in this sample also apply for the population. When arguing that for (sub)urban and out-of-town centres the bigger centres of +60,000 outperform the smaller centres of 5,000-30,000 m² one should bear in mind the limited sample size of six observations for especially the +60,000 category.

Hypothesis 14:

After examining the differences between categories, the next two hypotheses will concentrate on correlation analysis.

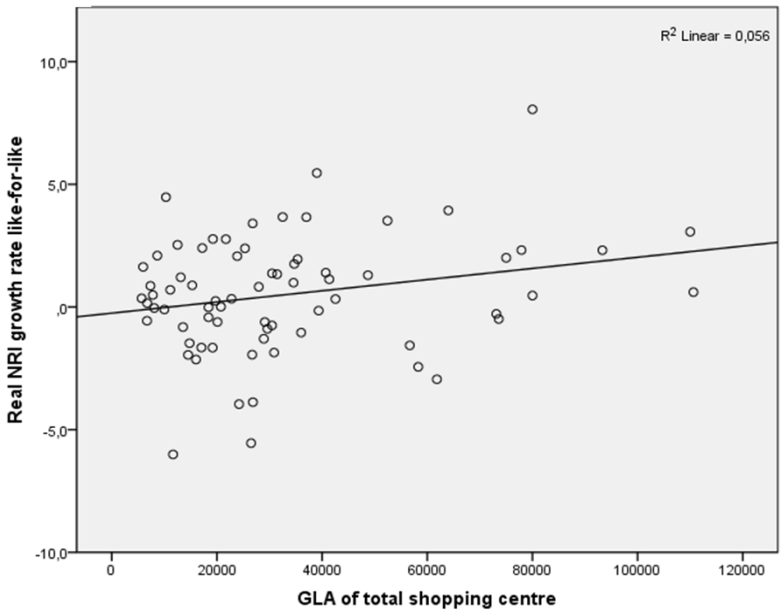
14. There is no significant relationship between size and the average real rental growth rate in the population.

REJECTED: p=0,046. Size is significantly associated with real NRI with a correlation of 0,23 (r^2=6%) as figure 17 depicts. Rents and value show similar significant association with size as figure 17 depicts. Distinguished between countries, the correlation between size and performance is the strongest in France (r^2=21%) at a significant level. Except for Spain, the other countries also indicate (given the relatively high r^2) there could be a significant relation when a bigger sample per country is available. However, with this dataset this could not be discovered.

Figure 17: Correlation performance - size

		GLA of total shopping centre
GLA of total shopping centre	Pearson Correlation	1
	Sig. (2-tailed)	
	N	71
NRI growth rate like-for-like	Pearson Correlation	,225
	Sig. (2-tailed)	,059
	N	71
Real NRI growth rate like-for-like	Pearson Correlation	,238*
	Sig. (2-tailed)	,046
	N	71
MV growth rate	Pearson Correlation	,130
	Sig. (2-tailed)	,279
	N	71
Rolling average Net Income Yield	Pearson Correlation	-,180
	Sig. (2-tailed)	,132
	N	71
Rent per m²	Pearson Correlation	,241*
	Sig. (2-tailed)	,043
	N	71
Value per m²	Pearson Correlation	,260*
	Sig. (2-tailed)	,029
	N	71

*. Correlation is significant at the 0.05 level (2-tailed).



Although the results reveal a significant correlation between size and performance, the explained variance (6%) is rather low, however. So generally speaking, size does matters, but only to a limited extent (remember the r^2 of 29% for unemployment dynamics for instance). This indicates there is no support for a vast general statement 'one size fits all', which is line with the IPD/CBRE (2006). An explanation for the rather weak correlation could be that size is more a facilitating attribute than a guarantee for success on its own. If the tenant mix is not fitted well with the catchment area it serves it can suffer falling footfall and eventually rental decline. If the centre is not at a favourable location it will be harder to draw consumers as well. The difference among countries can partly be explained by differences within the retail landscape. For example, in France or Portugal shopping centres play a more dominant role in the retail landscape than in the Netherlands, where planning authorities prohibit big shopping centres at the city edge and the inhabitants rather tend to go to the vibrant (historical) city centres.

Figure 18: differences per country

	real NRI growth		
	p-value	r^2	N
Full dataset	**0,05**	**6%**	**71**
Netherlands	0,18	8,5%	23
France	**0,05**	**21%**	**18**
Portugal	0,07	26%	13
Spain	0,84	0,6%	9
Italy	0,4	16%	7

Hypothesis 15:

Once more a distinction will be made between inner-city and non inner-city centres. As mentioned at the previous hypothesis the total GLA of a inner-city shopping centre is not optimally accounted for. Moreover, from a more theoretical point of view, out-of-town centres, and to a lesser extent (sub)urban centres, do not always have a sufficiently big catchment area adjacent to the shopping centre to draw sufficient customers from. Therefore it is expected that the Law of Retail Gravitation (Huff, 1964) is more applicable for these centre types than for inner-city shopping centres. If that is the case, their drawing power (and eventually performance) would rely to a greater extent on their size as compared to inner-city. To test the correlation between size and real NRI growth on the various location categories (inner-city, (sub)urban, out-of-town), separate correlation tests were executed. Combining size distinguished by location as explanatory variable for real rental growth rate resulted in the following null-hypotheses:

15. There is no significant relationship between size and average real rental growth rate for shopping centres, not being inner-city shopping centres.

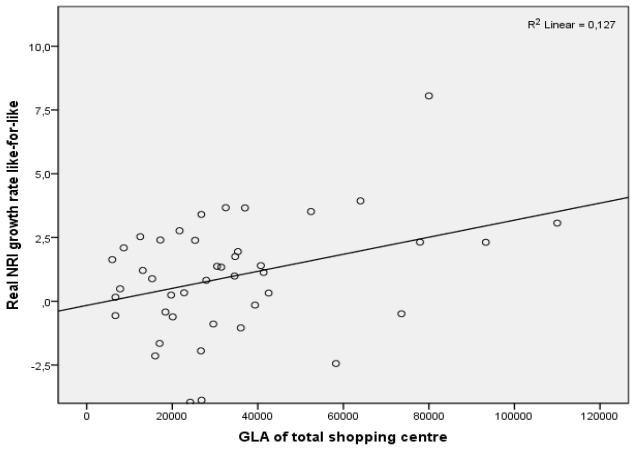
REJECTED: significant at the 5% level, p=0,02. Correlation of r=0,36 was found reflecting that size can explain r^2=13% for (sub)urban and out-of-town shopping centres. Similar results are found for nominal rental growth (p=0,026, r=0,34, r^2=12%).

Figure 19: Correlation performance-size for non inner-city centres

Correlation

		GLA of total shopping centre
GLA of total shopping centre	Pearson Correlation	1
	Sig. (2-tailed)	
	N	43
Real NRI growth rate like-for-like	Pearson Correlation	,356*
	Sig. (2-tailed)	,019
	N	43
MV growth rate	Pearson Correlation	,150
	Sig. (2-tailed)	,337
	N	43
NRI growth rate like-for-like	Pearson Correlation	,339*
	Sig. (2-tailed)	,026
	N	43

*. Correlation is significant at the 0.05 level (2-tailed).



It's obvious that the argument of 'size matters' gains significant power when inner-city shopping centres are excluded. As a standard procedure, that data was explored in advance and no outliers were found and the cases were normally distributed for the stated performance measurements as the Kolmogorov-Smirnov test of normal distribution was accepted. In line with the results of hypothesis 13, the inner-city shopping centres are less dependent on their size when compared to (sub)urban and out-of-town centres. 13% of all variance in shopping centre performance (real NRI growth) for non-inner-city centres can be explained solely by size.

Hypothesis 16:

Eppli and Shilling (1996) revealed in their study that a decrease in size of competing shopping centres with 20% would significantly boost the sales of the shopping centre in question with between 30% and 40%. This indicates an increase of reversionary potential and thus future rental growth. It is not possible to simulate a decrease of competing shopping centres in this study but it is possible to test shopping centres that have been extended within the time span of this study. It would be interesting to measure whether we can find supporting results for Eppli and Shilling. With a paired sample test the rental growth before and after the extension could be compared. This proposition would be translated in the following null-hypothesis:'

16. There is no difference between the average real rental growth rate before the extension and after the extension.

NOT MEASUREABLE: only ten extension projects, with no clear completion year.

Another complication here is that extending the shopping centre with GLA with a lower rent per square metres would result in a decline of average rent for the entire shopping centre (for example adding a supermarket, and extra shops at the edge). If this extra surface is included in the rental growth calculation directly after completion this would have a negative effect on the like-for-like real rental growth. Only after being for five quarters in operation one can include the extra surface on a comparable like-for-like basis. Thirdly, it is quite common that in the first year after completion the per square metre net rental income declines, for example due to one-offs, resulting in higher operational expenses. So in order to give a balanced view between the situation before and after the extension, a track-record of multiple years for both before and after the completion of the extension is required. Only then a decent analysis on this hypothesis can be conducted. There was clearly insufficient data that complied with these requirements so no reliable testing was possible.

Hypothesis 17:

Shopping centre design is incorporated and tested in several studies, see for example Eppli and Shilling (1996), Guidry and Sirmans (1993) who have proxied shopping centre design with characters like L, 8, X, T, U (outlining the pedestrian routing). The main difference that could matter is expected to be a fully enclosed routing versus an strip design / semi enclosed design. The former design could be more successful in directing the visitors across all the shops. Therefore we test the following null-hypothesis:

17. The population mean of average real rental growth rate between the distinguished groups of shopping centre design does not significantly differ from zero.

ACCEPTED: For real NRI growth p=0,85. On average the enclosed circuit showed 0,1% point higher real NRI growth, but this difference is highly insignificant and hence only applicable for this sample and not very material either. The NIY and value per square metre do significantly differ

between both categories, this is not the case for real NRI or MV growth.

As depicted in the table 15 the mean difference for the Net Income Yield is 0,7% point and for the value variable the mean difference is 1,009 euro per square metre. However, in this study these aspects are not considered performance measurements.

Table 15: Design

	Design	
	Enclosed circuit	stripdesign /semi-closed
real NRI growth	0,60%	0,50%
MV growth	5,70%	5,10%
NIY	5,6%*	6,3%*
Rent	275	227
Value	4938*	3929*
N	41	30

* significant at 5% level

Hypothesis 18:

Tay, Leu and Leung (1991) investigated nine high-rise shopping centres in Hong Kong. In contrast to the majority of the literature, their study reveals that rent level is positively related to the age of a shopping due to both customers' fidelity, which tends to grow over time as the shopping centre establishes, and continuous improvements to buildings. Despite the rental growth rate (instead of rental level) is tested here, the importance of two-sided testing is emphasized again (Two-sided testing is important because intuitively one would expect the relationship between age and rental level to be negative rather than positive. But this example shows it can be the other way around as well and only two-sided testing accounts for that). The null-hypotheses here is:

18. *There is no significant relationship in the population between the year of opening of the shopping centre and the average real rental growth rate.*

    ACCEPTED: year of opening does not significantly affect the real NRI (p=0,3) or MV growth rate (p=0,13). Regarding rent and value, there is a significant correlation with year of opening. Correlations of r=0,35 and r=0,41 were found at the 1% confidence interval.

These result do not comply with the findings of Tay, Leu and Leung that customers fidelity will keep the value up. There clearly seems to be an aging-component reflected in the rental levels and value per square metre. Probably if the sample is composed of shopping centres that are between just completed and 5 years old, it would be more likely to see supporting results for Tay, Leu and Leung as brand new shopping centres do need some time to establish in its catchment area in terms of leasing up space and see positive renewal and relettings affecting real NRI growth. Also the year of refurbishment was tested on real NRI growth. After correcting for outliers, in order to have the normal distribution test accepted (Shapiro-Wilk, N=23), the correlation was not significant (p=0,08, r= -0,37).

Hypothesis 19:

19. *The mean difference in the average real rental growth rate between shopping centres that were built before 1993 does not differ significantly from zero as compared to shopping centres that were built in or after 1993.*

    ACCEPTED: Here, the real NRI growth is even 0,5%-point higher (p=0,35) for shopping centres that were built before 1993 and the MV growth is even 1,4%-point higher (p=0,06) and almost significant. This actually doesn't reject the consumers fidelity argument of Tay, Leu and Leung. The value per square metre of centres that were built in or after 1993 is significantly higher than centres that were built before 1994. On average the difference is 1,277 euro per square metre and in 95 out of 100 samples the difference between them will lie between the 303 and 2,250 euro's per square metre.

5.2.5. Tenant mix

As argued by De Palma et al. (1985) in their extension of Hotelling's 'principle of minimum differentiation', consumers are not willing to travel beyond the nearest centre for a homogeneous product (supporting CPT and convenience shopping), but as a product becomes more heterogeneous relative to competing products, the utility of a particular product at a more distant location becomes worth the additional travel cost and travel time (supporting comparison shopping). Therefore it would be interesting to test whether a significant difference exists between the convenience based shopping centres and comparison based shopping centres. Hence, the following postulation is tested:

Hypothesis 20:

20. There is no significant difference found in average real rental growth rate between convenience based shopping centres and comparison based shopping centres.

ACCEPTED: All growth rates are insignificant. However the mean NIY, rent and value do significantly differ between both categories. A separate test was done for the Dutch shopping centres. Here also no significant differences were found. However, remarkably the convenience based shopping centres (real NRI growth=0,6%; N=9) showed higher real rental growth rate than comparison shopping centres (real NRI growth=0,3%; N=14). Because this result is not statistically significant it only applies for the current sample and not for the population.

Nevertheless, this result carefully indicates the success of the (smaller) convenience based shopping centres in the Netherlands. The finely-woven retail structure that is in place for many decades due to strict planning rules could be partially explanatory for their decent performance in the Netherlands. In this sample, the average size of convenience based shopping centres in the Netherlands is 10,600 m² and the average size of comparison based shopping centres in the Netherlands is 33,900 m².

Hypothesis 21:

Besides, since consumers are reluctant to travel long for convenience goods, this indicates that relative location with regard to the targeted catchment area, is possibly of greater importance to convenience based shopping centres as compared to comparison based shopping centres which is also consistent with studies like Oppewal (1995) and Van Lokven (2002). These studies are based on the Spatial Interaction Theory. This could indicate that more dominant convenience based centres, with a corresponding larger catchment area, could possibly out-perform less dominant convenience centres, leading to the following null-hypothesis:

21. Within the convenience based shopping centre category no significant relationship is found between catchment area and average real rental growth rate.

ACCEPTED: All insignificant and low correlation. Real NRI growth p=0,13. With the limited sample size (N=20) no significant correlation could be discovered.

Hypothesis 22:

Much support was found for the postulation that anchor size and (in particular) anchor image draws away customers from other centres and creates demand externalities for the smaller non-anchor stores and that a favourable tenant mix can upset long-established patterns of retail dominance. See for example, Nelson (1958), Thompson (1967), Eppli and Shilling (1993) Gatzlaff et al. (1994). However, Rich and Portis (1964) have found that no one particular image has an equal appeal to all types of customers thus the key challenge is to fit the type of tenant image to its catchment area is serves.

Combined, it would be extremely challenging, if not impossible, to find a brief reliable proxy to measure the variables in a quantitative way without requesting too much information from other participants. As a substitute to proxy tenant mix and anchor image these variables are requested:

- the number of shops, assuming that more shops will provide more flexibility in shaping the right tenant mix (simultaneously number of shops is a proxy for size) ;
- the number, type and size of anchor tenants that were present during the entire time-period.

From the propositions mentioned above the following null-hypotheses are formulated:

22. *There is no significant relationship found between the number of shops within a shopping centre and the average real rental growth rate.*

    ACCEPTED: except for rent (r=0,37; p=0,001) and value (r=0,28; p=0,02) all measurements are insignificant and show weak correlations (p=0,9 for real NRI growth). After controlling for GLA the 'value per square metre' has become insignificant as well. Hence, only rent per square metre is significantly associated (r=0,35) with the number of shops.

Hypothesis 23:

The theory of Retail Demand Externalities, as elaborated on in the previous chapter, emphasizes the importance of anchor tenants in shopping centres. Nevin and Houston (1980) revealed that anchor department stores are an important shopping centre draw and possibly the primary reason for choosing a shopping area. Besides, Eppli (1991) indicates that centres with a high fashion image anchor, non-anchor tenant sales increase by $3,25 to $11,4 per square metre. Hence it is interesting what this study can learn us when it comes to anchor tenants and shopping centre performance with the following two hypotheses:

23. *There is no significant relationship between the number of anchors and the average real rental growth rate.*

    ACCEPTED: no significant correlations (p=0,23). However, when executing the same test for the different types of anchors a positive and significant correlation was found between the number of fashion anchors and the average real rental growth rate (r=0,3; p=0,013). Also when controlled for size the number of fashion tenants was found statistically significant (by univariate analysis of variance).

As no other anchor type could demonstrate a significant relationship with real rental growth, this result could indicate that fashion anchors are very important tenants for shopping centres. Another relevant question could be whether it is just the number, or also the image and strength of the brand like Eppli showed in his research. Having multiple fashion anchors present in a shopping centre can probably draw more visitors and create extra retailer demand which eventually can drive up rents.

Hypothesis 24:

24. *There is no significant relationship between the diversity of anchors and the average real rental growth rate.*

    ACCEPTED: highly insignificant correlation. p=0,9. The rent (r=0,33) and the value (r=0,30) are significantly associated with the diversity of anchors at the 1% and 5% confidence interval, however.

Many separate tests are executed to examine the relationship between anchor presence in terms of type, size, number and diversity. Except from the number of fashion anchors, none of the tests succeeded in revealing significant results for real NRI growth. Apparently this dataset was not very capable of revealing the effect of anchors on real NRI. Alternatively, some significant results were found on rent level and value per square metre though that is not considered as a real performance measurement. Below in the table an overview of some descriptive results is shown together with the number of cases and p-values. Also in the table the fashion anchor results together with the sport anchors differ the most between true and false. On the other hand, in this sample it seems that leisure anchors are not a distinct success factor for shopping centres are they on average perform 100 basis point weaker than centres without a leisure anchor.

Table 16: real NRI growth versus anchor presence

	real NRI growth				
anchor presence	**True**	**N**	**False**	**N**	**p-value**
hyper/supermarket	0,56%	60	0,42%	11	0,86
department store	0,24%	14	0,61%	57	0,60
fashion	0,90%	39	0,13%	32	0,18
electronic	0,16%	26	0,75%	45	0,30
leisure	-0,20%	21	0,80%	50	0,08
sport	1,10%	19	0,30%	52	0,20
10,000+ m² anchor	0,68%	31	0,42%	40	0,64

5.2.6. Management

'The quality of a shopping centre, as reflected in the cash flow, is determined by the quality of local management' (Corio Annual Report, 2009).

Fisher and Lentz (1990) compare the renewal rents of *existing* tenants with the rent paid by *new* tenants (reletting). They hypothesize that if existing tenants (renewals) are willing to pay more rent than new tenants (relettings), then the rent premium existing tenants are willing to pay over new tenants rents is a rent premium for a well-managed centre, and is attributable to management expertise, not to the location. Their results reveal that existing tenants pay 13,6% higher rents than new tenants. This supports the idea of 'intangible' business value that is briefly addressed by Eppli and Benjamin (1994) in their literature overview. Moreover, it thus indicates that well-managed centres create more business value and eventually can show higher rental growth than poorly managed centres.
Additionally, studies conducted by Alonso (Bolt, 1993), West, Von Hohenbalken and Kroner (1985) and Brueckner (1993) argue that the specific location of stores within the shopping centre can improve agglomeration benefits and demand externalities among shops. In-house management could probably better anticipate on opportunities that can optimize tenant allocation based on direct and unfiltered information from shopping centre and/or leasing managers monitoring the daily operation.
The RBS report in 2009 states that local knowledge and contacts are of key importance in keeping shopping centres dominant in their catchment areas. This includes the centre management, the property management and leasing management. It can be interesting to test whether it makes a difference if the active management by the landlord is in- or outsourced. It is hypothesized that retailers more appreciate it when they have direct contact with the owner instead of a third party and local in-house management could be more cost effective, offer more opportunities to take advantage from and thus to add more value to the centres by getting unfiltered information out of first hand. This proposition leads to the following null-hypothesis:

Hypothesis 25:

25. *The mean difference in average real rental growth rate between shopping centres that have their management in- or outsourced does not significantly differ from zero.*

REJECTED: Interestingly, the external managed centres yield a significantly better performance than internal managed centres in terms of real NRI growth. With a p-value=0,05 the mean difference is 1% -point (0,3 versus 1,3) in favour of shopping centres with outsourced management. However, some reservations have to be made here. The question was asked only for the actual situation while the centres are being judged on the full 2002-2009 track-record. It is not uncommon that a shopping centre management contract keeps in place also when a shopping centre is transferred to another owner. Acquiring a shopping centre for an investor which incorporates the centre management could have to cope with a external management contract for a definite period that has to expire before that management can be organised in-house. Besides, there is an the definition of insourced management comprised all management: administrative, technical, promotional and leasing/commercial management.

From a different angle, the consideration of in- or outsourcing centre management is also fuelled by admin related costs. External management can be relatively more expensive as there is a profit share within the invoiced amounts. When sufficient scale in terms of invested capital and/or number of assets under management it can a corporate administrative decision to in-source the centre management and to enhance the knowledge of your employees and assets.

5.2.7. Multiple regression analysis

Now the 25 hypotheses have been tested, econometric models will be built using multiple regression analysis. The goal is to construct a model with the highest explanatory power for shopping centre performance. Simultaneously these models can learn us what the relative importance is of different variables when explaining shopping centre performance. In particular, that helps answering the research questions 6 and 8. The ordinary least square (OLS) method was used in combination with the stepwise variable selection to construct the models. The standard criteria for entering and removing variables from the model are used. Probability of p=/< 0,05 to enter and p=/> 0,1 to remove.

The tables give a summarizing overview of the models with the highest explanatory power for the performance variables of real NRI growth and Market Value growth. Obviously, the model with real NRI growth the most important one. Both models are statistically significant.

As depicted in table 17, the explanatory power of the model for real NRI growth is not particularly strong. As a result of stepwise entering and removing of variables the strongest significant model found can explain one third (33%) of all variance measured within the real NRI growth. The two factors included are dynamics in the unemployment growth (regional based socio-economical variable) and the number of fashion anchors (a tenant mix variable). Actually, it is not that surprising that these two variables represent the most powerful model as they also were the most powerful on their own, as was learned from the results in the former paragraph. GLA is not included, meaning that this variable was not significant anymore after including dynamics of unemployment growth and number of fashion tenants. This doesn't mean that GLA is not significant on its own, however it has no additional value in combination with the two other and stronger variables.

With 47% of all variance explained, the model for Market Value growth is significantly stronger. It also includes 3 variables instead of 2: dynamics in unemployment growth (socio-economic variable), retail sales growth p.c. (socio-economic variable) and GLA total shopping centre (building aspect).

Table 18: MRA model real NRI growth

real NRI growth		r^2=33%
	significant variables	beta
1	dynamics in unemployment	-0,49
2	number of fashion anchors	0,26

Table 17: MRA model MV growth

MV growth		r^2=47%
	significant variables	beta
1	dynamics in unemployment	-0,51
2	Retail Sales growth p.c.	0,42
3	GLA total SC	0,21

More important for this research, however, is what is the relative explanatory power of the different variables, the is expressed with the standardized coefficient of beta. The higher the beta the higher the explanatory power is. Looking at the real NRI model one can see the dynamics in unemployment is clearly more important than the number of fashion anchors. This is also the case for the MV growth model, where dynamics in unemployment is obviously stronger than retail sales growth p.c. and total GLA. It is important to take notice that the beta only applies to the particular model itself. In another model the beta can be different. This will be the case when building a model based only on dynamics of unemployment and GLA of total SC. This was done to answer the question to what extent GLA is explanatory in relation to other variables. In table 19 one can see that the beta of dynamics in unemployment changed from -0,49 to -0,53. Hence the importance has increased within that specific model. More important, it shows that the dynamics in unemployment clearly outstrips the importance of size. As the difference is quite material it is reasonable to state that the socio-economic variable is more important than size. The MRA was only conducted on the full dataset. If the dataset would only consist of non-inner-city shopping centres, the explanatory power of size is expected to be higher as the results have learned us.

Table 19: MRA model real NRI growth for unemployment and size only

real NRI growth		r^2=33%
	significant variables	beta
1	dynamics in unemployment	-0,53
2	GLA total SC	0,21

For real NRI growth still two third (67%) of the variance is not explained by the model. Although the MV growth model is stronger, still more than the half is not explained by this model either. A rule of thumb is that every factor in such a model needs around 25 cases in order to be successfully included (of course only when significant). With 72 cases one would not expect more than 3 different variables in any of the constructed models, which actually is the case as the tables point out.

6. CONCLUSIONS

In this chapter the main research question is answered. Unless stated differently, all conclusions drawn up in this chapter are statistically significant. Because of the vast number of hypothesis and results, only the most important conclusions will be stated here. For additional results one is referred to the previous chapter 'Results'.

The headline research question in this study was: ***What are the key determinants of shopping centre performance and to what extent is size explanatory?***

In short, this study has shown that Real Net Rental Income growth like-for-like is significantly associated with dynamics in unemployment growth, size of the total shopping centre and number of fashion anchors. In this study the dynamics in unemployment rate is by far the strongest predictor of shopping centre performance. This is depicted in the table below.

Table 20: Explanatory power by argument

Type of argument	Aspect	r^2
Cyclical	change in unemployment	29%
Building aspect	GLA	6%
Tenant mix	number of fashion anchors	9%

In addition some other significant results were found. It was found that inner-city shopping centres are less dependent on their size when compared to (sub)urban and out-of-town shopping centres. Out-of-Town centres that benefitted from adjacent leisure/other retail functions also outperformed their counterparts that didn't benefit from adjacent leisure/other retail. In terms of unemployment growth the Southern-European countries in this study are found to be more vulnerable to the growth and decline of the unemployment rate than compared to the more North-European countries in this study. In general one can state that in this study the cyclical / catchment area argument (unemployment dynamics) was obviously more important than the shopping centre characteristics (size). Besides, a tenant mix argument (number of fashion tenants) was also found more explanatory for performance than the most shopping centre characteristic (size). However, when inner-city centres are excluded, the argument of size become obviously more important. All together geographically angled arguments (i.e. region, catchment area, location) were found more important than shopping centre attributable arguments (building aspects, tenant mix). Nevertheless, size was still found significant does really drives performance as the results depict. Therefore size should not be underestimated, especially when dealing with (sub)urban and out-of-town shopping centres.
Below a more detailed description about the main conclusions is drawn up.

Size matters, especially for (sub)urban and out-of-town shopping centres.
Correlation tests showed that the explanatory power of size is 6% when predicting real NRI growth rate. Although the test was statistically significant at the 5% confidence level, still 94% is could not be explained by size. As it was impossible for inner-city shopping centres to account for the additional highstreet GLA they benefit from, the same test was done for (sub)urban and out-of-town shopping centres only. Now the explanatory power of size grew to 13%. Hence, it seems that inner-city shopping centres are less dependent on their size than (sub)urban and out-of-town centres. This result could indicate that from a consumer perception the inner-city centre is not seen solely judged on its own, but rather the whole city centre is taken into account by the consumer. This would fit well with the homogeneous retailer agglomeration theory as clustering decreases search costs and uncertainty of not finding the desired good. Ooi and Loo-Lee Sim (2006) state that size on its own is not that

decisive, but that size predominantly is a facilitating attribute of a shopping centre. They argue that larger centres can provide wider atriums/common area and circulation networks within the shopping centre. This provides a pleasant environment for shoppers, facilitate their social interaction and mingling. It also provides a decent area where promotional events can be held to draw in more visitors. Also they can better accommodate multiple (fashion) anchors what also drives performance up. Thus, once again, this means that the size of a shopping centre is more a facilitating aspect to offer a favourite shopping destination rather than a success factor in its own.

In terms of size-bands the category no significant differences were found between the different size categories. However the differences are quite obvious in the dataset meaning that where larger shopping centres (1,3% real NRI growth; +40,000 m²) outperform medium (0,4%) and small (0,2%; <20,000 m²) shopping centres. Although the results only apply to this sample, the results are not useless either. The only significant difference found within the different size-bands was the difference between +60,000 m² shopping centres (3,2%) versus <30,000 m² (0,2%). However, these results only apply for the (sub)urban and out-of-town shopping centres as the inner-city centres were excluded here. Moreover, the +60,000 m² category only comprised of 6 shopping centres, considerably affecting the robustness of the outcome.

Benefitting from adjacent leisure and other retail functions matters for out-of-town centres.
However based on a small number of cases (N=16), out-of-town centres that benefit from adjacent leisure/other retail (2,1%) do significantly outperform their counterparts that qualify as stand-alone out-of-town centres (0,3%). On average they outperform 172 basis points of real NRI growth. This also indirectly supports the argument of size matters as it is reasonable to expect these leisure/other retail functions comprise substantial GLA which is not explicitly accounted for in the shopping centre GLA. This would also fit particularly well with the Law of Retail Gravitation where size and distance are each other's opposites in the gravitation equation. In this Law the drawing power/gravitation of a shopping centre is a result of its utility (size) and its disutility (travel distance). As it makes intuitive sense that the distance of out-of-town shopping centres is relatively greater in relation to its targeted catchment area, it will need additional size in order to outstrip the negative effects of travel distance.

Dynamics in unemployment yield highest explanatory power.
With an explanatory power of 29% on its own, this factor was by far the strongest predictor for shopping centre performance in this survey. For Market Value growth the explanatory power was 18%, also the strongest predictor in this category. From here the conclusion can be drawn that the importance of building attributes like size and an attractive tenant mix (for example number of fashion anchors) are significantly being outstripped by the explanatory power of a region-based cyclical/socio-economic argument. Digging deeper into the analysis it was discovered that the explanatory power in Southern-Europe was even stronger (r^2=43%). Possibly the shopping centres here are more vulnerable for people becoming unemployed as the welfare regulations are less extensive when compared to more Northern-European countries.

Retail demand externalities proxied by number of fashion anchors (re)confirmed.
With an explained variance of 9% the number of fashion anchors are an important determinant in explaining shopping centre performance. This is completely in line with the vast body of research conducted about Retail Demand Externalities, where it is argued that anchor tenants and their image are successful in drawing substantial footfall in a shopping area and could even be their primary

reason to choose for a certain shopping venue or centre (Nevin and Houston, 1980). Even more specifically, Eppli (1991) indicated that centres with a high fashion image anchor increase sales significantly. It's not unreasonable to assume that in terms of image the anchor tenants and especially fashion anchors, have the higher valued images. Hence, this conclusion supports the theory of retail demand externalities and more specifically the importance of anchors with an admired image such as fashion anchors.

Higher absolute rent and/or value level does not necessarily return higher growth rates.
In the literature 'performance' something is a confusing term. Higher rent level and higher value per square metre in absolute terms is sometimes stated as proxy for performance. However, as concluded in chapter three, a high rental level or a high value per square metre (in absolute terms) do not necessarily result in a higher rental growth or market value growth. There was barely any correlation found for both (r=-0,07 for rent and r=0,07 for value). The same low and insignificant correlation was found over all the different countries in order to control for rent and value levels over different countries. However, this result actually supports that apparently low risk investments will be more stable and less-volatile investments. Meaning they do not show high growth, however in times of a gloomy economic environment they are expected to be more resilient as well. Mostly the real rental growth is realised in emerging and growth markets where risks are higher accordingly. In order to test this hypothesis, data from 2010-2012 should be incorporated.

Key components of like-for-like rental growth barely researched.
Based on the literature study, practically no peer-reviewed scientific work was found on explaining shopping centre like-for-like rental growth. This while REITs regularly qualify it as a key performance indicator. For that reason there were very limited possibilities to take into account the 'lessons learned' from other studies. A vast body of research was conducted on absolute sales and rent level per square metre, but these figures are no risk-adjusted returns and thus no real performance proxies. With most data not resulting in statistically significant outcomes it was experienced quite a challenge to decompose the key components of real rental growth. Obviously, this was also confirmed while building the econometric model.

7. RECOMMENDATIONS

In this final chapter all experiences gained from this study are assessed and, based on these findings, recommandations will be described. The recommendations can vary in angle from research methodology, research process, performance measurement, future research topics and variables. The recommandations are stated in random order.

Extending the track-record with crisis years.
Especially in a period of severe economic downturn, the backbone of an investment is thoroughly tested. To further investigate the determinants of like-for-like rental growth and other performance measurements it is highly recommended to study this subject with the inclusion of the economically challenging years of, at least, 2010 and 2011. With a 2002-2011 trackrecord the highest peak and the deepest trough can be taken into account. This would obviously further enhance the insights of the analyses as only 2009 and the latter half of 2008 can be characterised as crisis years in this study. This could be highly valuable for the entire industry. As the real economy (which predominantly determines rental growth) lags the financial markets and leases are usually fixed until expiration, the impact ot the economic downturn isn't incorporated in the data to their full extent.

NUTS 3 level.
As this study confirms, the variables that proxy the demand and supply for shopping centre space have an important impact on their performance. In this study these variables were measured at NUTS 2 level, which equates to, for example, Languedoc-Roussillon in France or Zuid-Holland in The Netherlands. For most variables it is possible to go beyond to a more deterministic level (NUTS 3) which equates to e.g. Paris or Groot-Amsterdam. At this level the analyses can better distinguish significant differences which exists among regions which probably lead to better results and models.
Obviously, the reliability of the NUTS 3 data should be covered in a decent way.

Performance measurement: ERV or Sales instead of actual rental cash flows.
The Estimated Rental Value (ERV) changes smoothly in correspondence with the relevant development within the real estate space and asset market while acutal cash flow only repond to market conditions while renegotiating rents and otherwise they just receive indexation. This could possible yield higher correlations with the anticipated explanatroy variables. Besides that ERV could also give insight in the reversionary potential (difference between conractual rent and market rent). For some centres there could still be significant upward potential, but here was not accounted for when taking the real rental income into account. A major drawback is, however, that ERV is only a potential performance and not yet materialised, which is one of the key challenges for real estate investors. Besides, ERV does not account for potential vacancy or incentives and therefore it is not the most reliable performance measurement for an investor that is particularly interested in real cash flows. Also key-money (both payables and receivebles) may affect acutal cashflows and performence, are not taken into account. Nevertheless, this could be an interesting topic to investigate.
Another performance measurement could be the sales per m². This is probably the most operational performance measureable for a shopping centre. The challenging part is the availability of the sales data. At least in the Netherlands it is unavailable. However, sales data truly reflect the operational performance of a shopping centre by providing an unbiased insight of the real performance of the retailers within a shopping centre.

Operationalisation of 'dominance' .
Shopping centres that are 'dominant' are in most reports and analysis considered as the strongest shopping centres. However, no clear industry standard is defined yet for this 'dominant' shopping centre. It would be interesting to operationalise this term and measure the dominance of shopping centres. Subsequently shopping centre dominance should be regressed against performance to examine whether the operationalisation/model fits well enough.

Optimal lag-lead analysis.
Examine whether there is an optimal delay/lag length between two associated variables that are both measured over time. This is also referred to as lag-lead analysis (Brooks and Tsolacos, 2010). This question is addressed in their recent but seminal work 'Real Estate Modelling and Forecasting'. For example, in the RBS (2009) report it was stated that the highest regression coefficient between consumer confidence and retail spending was found at a delay of 7 months between both variables. At this point, explained variance (r^2) was 65% while this was around 43% when no delay was applied. Obviously, stronger models can be built with stronger relationships between dependent and independent variables.

Panel data analysis.
From a methodological point of view, it is recommanded to use panel data analysis when track-record data is available for both the independent and the dependent variable. In this study this was the case for the socio-economic data like retail sales, gdp and unemployment data. With panel data analysis more information is captured opposed to sqeeuzing the track record data into a track record average. In that case one has only two obversations instead of sixteen (2002-2009 for both variables). More information about panel data analysis can be found in Brooks and Tsolacos (2010).

Narrow scope.
It is advisible to further investigate the determinants of like-for-like rental growth with a more narrow focus on a certain shopping centre subtype and geographical area (country). In this study that covers 72 shopping centres throughout Europe mixes up strip centres, small neighborhood centres, community centres, regional and district shopping malls located at different location types. The aggregation of shopping centre subtypes and the broad geographical base with differing institutional frameworks on countrylevel can lead to limitations of the the external validity of the results.

Efficiency ratio between retail REITs.
It would be an interesting topic to study the difference between Net Rental Income and Net Operating Income, also in relation to size of the assets. RBS analysts have argued in their report that a comparative advantage of a more concentrated portfolio, meaning a portfolio of fewer but larger accounts (shopping centres), is they tend to have a lower relative management burden. Thus, a higher average size of shopping centres can be more cost efficient than a lower average unit size. However this differences will usually only become apparent when subtracting the administrative expenses from the net rental income to calculate the net operational income. Administrative costs encompass a.o. pay roll, overhead costs, advice, valuation and audit fees, listing and promotional costs and is usually expressed as a percentage of the Gross theoretical rental income/Gross potential rent. As our performance measurement focuses on rental income administrative costs are not requested. For that reason the management burden is beyond the scope of this research.

Dummy variable Sunday opening.

Another appealing hypothesis to test would be whether the mean difference between the real rental growth of shopping centres that are open six days a week and shopping centres that are open seven days a week would differs significantly from zero. Unfortunately, the seven day opening of shopping centres in most countries is a relative new development which was not common practice back in 2002. Therefore this information was not requested or tested. This could be interesting hypothesis to test in future research, however.

Variety in assortment.

Nevin and Houston (1980) and Ingene (1984) tested a significant positive association between retail sales and the assortment variable, while Weisbrod, Parcells and Kern (1984) found significant relationships with the number/percentage of clothing/apparel stores. Eaton & Lipsey (1982) and West et al. (1985) show that comparison shopping is enhanced when shopping centres accommodate an optimal mix of low-order and high-order retailers. Although it was considered unfeasible to request such detailed information (in addition to what was already requested), it would still be an interesting hypothesis to test for a relationship between tenant mix/variety in assortment and the performance of a shopping centre. By requesting such detailed information it is advised to organise the research in-house, otherwise there is a high risk at comparing inconsistent information across different participants.

8. LITERATURE

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9. APPENDICES

9.1. Investment decision-making

In this appendix the field of investment decision-making will be explored and in particular investing in real estate. It was considered too extensive to treat this content within the body of this thesis, however these fundamental theories will give insight in what considerations institutional investors continuously deal with before any capital is invested in real estate.

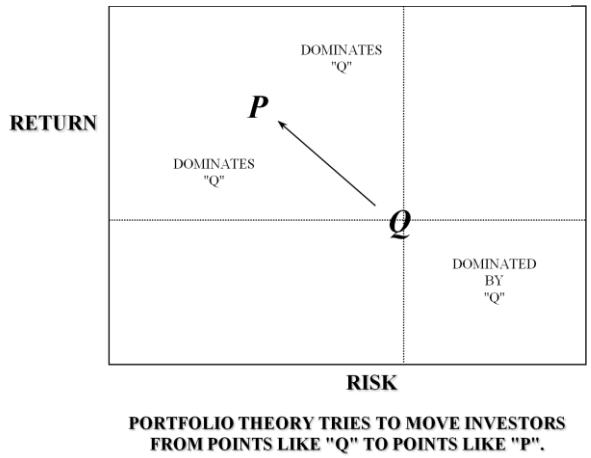
9.1.1. Macro-level real estate investment dicision-making process

a. Modern Portfolio Theory and Diversification

In this part a brief conceptual introduction of the macro-level investment allocation framework will be given. This Nobelprize-winning framework was introduced by Harry Markowitz in 1952. This well known body of principles and techniques is called the Modern Portfolio Theory (abbreviated as MPT) or mean-variance portfolio theory. MPT is not yet focused on real estate in particular as MPT deals with the strategic decision of how to best allocate the investor's capital across a range of assets and asset classes. Therefore MPT is about the overall wealth of the investor in a mixed-asset portfolio. The more conventional asset classes allocated within a mixed-asset portfolio are stocks, bonds and real estate. The aim of this part is to give a general understanding of the strategic investment considerations while constructing a well diversified mixed-asset portfolio rather than providing a detailed and comprehensive elaboration about the MPT. However, it does contribute to the understanding why large institutional investors allocate a considerable share of their funds to real estate. More detail will given when the scope narrows to real estate and shopping.

The very heart of the MPT is at treating *risk* and *return* together in a comprehensive and integrated manner; it quantifies the investment decision-relevant implications of risk and return; and it makes both of these contributions at the portfolio level; the level of the investor's overall wealth (Geltner et al., 2001). In this theory, the objective of the macro-level investment decision maker is taken to be the minimization of portfolio volatility (or variance) subject to an expected return target. Or its inversed equivalent; the maximization of portfolio expected return, subject to a volatility constraint. As depicted in the figure below, a rationale investor is assumed to search for such a portfolio and is called an efficient or dominant portfolio (for clarity reasons: here the term dominance has nothing to do with individual assets but with aggregated portfolio's).

Figure 20: Dominant and dominated portfolio's



Source 18: Geltner et al. (2001)

Although Keeris and Langbroek[1] (2009) argue that it is an incomplete and inaccurate picture, the conventional measurement of risk in the investment industry is the standard deviation. Standard deviation is the root of the variance while the variance is a distribution measure based on the average squared deviation against the average of a particular series of return figures. The formula's are stated below:

$$S_i^2 = \frac{\sum_{t=1}^{n}(r_{i,t} - \bar{r}_i)^2}{n-1} \qquad \text{Variance}$$

$$COV_{ij} = \frac{\sum_{t=1}^{n}(r_{i,t} - \bar{r}_i)(r_{j,t} - \bar{r}_j)}{n-1} \qquad \text{Covariance}$$

$$C_{ij} = \frac{COV_{ij}}{S_i S_j} \qquad \text{Correlation}$$

Where:

VAR_P = variance of a portfolio with N assets,
w_J = Weight (portfolio value share) in asset "j",
COV_{ij} = Covariance between the returns to assets "i" and "j".
Note that:
$COV_{ij} = s_i s_j C_{ij}$, *where* s_i *is STDev of i and* C_{ij} *is Correlation Coefficient between i and j.*
$COV_{ii} = VAR_I = s_i^2$.

According to MPT, a rationale investor is assumed to seek for a dominant portfolio and hence prefers to maximise return given a certain risk, or minimise its risk given a certain expected return. This is a universal principle also commonly used for asset selection in real estate. In addition to the solitary risk-return profiles of asset classes, MPT takes the covariance of multiple associated assets into account as well. The core of MPT is that combining two or more assets within one portfolio can diversify the risk and thus lead to a more risk-return efficient portfolio (Geltner et al., 2001). The standardized measure of the covariance between two separate assets (or asset categories) is the correlation, as shown in the formula above. Therefore correlation tests of long term ex post return figures among various asset classes are examined. Two examples are shown in the tables below.

Table 21: Correlation matrix asset classes

	US			UK			Canada		
	Equities	Bonds	Public RE	Equities	Bonds	Public RE	Equities	Bonds	Public RE
Equities	1			1			1		
Bonds	0.16	1		0.36	1		-0.2	1	
Public RE	0.21	0.07	1	0.37	0.02	1	0.29	-0.09	1
Private RE	0.07	-0.32	-0.02	0.19	-0.25	0.55	0.18	-0.28	0.65

[1] Although their opinion gains support it is beyond the scope of this research to further elaborate on their objections.

	Australia			Netherlands					
	Equities	Bonds	Public RE	Equities	Bonds	Public RE			
Equities	1			1					
Bonds	0.22	1		0.07	1				
Public RE	0.46	0.37	1	0.43	0.02	1			
Private RE	**-0.11**	**-0.31**	**-0.05**	**0.19**	**-0.03**	**0.13**			

Source 19: Data stream, IPD, NCREIF, PCA, ICREAM/IPD

Table 22: Correlation of direct real estate returns with stocks and bonds

Country	Period	Source	Stocks	Bonds
US	1978-2002	NCREIF	-0,07	-0,15
US	1970-1995	Z&Z	-0,07	-0,21
UK	1971-2002	IPD	0,19	0,06
UK	1972-1993	B&L	0,17	0,04
NL	1947-1991	E&T	-0,04	0,07
NL	1977-2002	ROZ/IPD	-0,07	-0,27
SWE	1984-2002	SFI/IPD	0,18	-0,18
CAN	1988-2002	ICREIM/IPD	0,12	-0,18
FR	1988-2002	BD2i/IPD	-0,18	-0,36
IRL	1988-2002	SCS/IPD	0,35	-0,23

Source 20: University of Groningen, real estate investments course

As the above tables depict, real estate has a relatively low or even negative correlation with the other mainstream asset classes equities and bonds. Two assets (or asset categories) can have a perfect positive correlation (c=+1), have no correlation at all (c=0) or a perfect negative correlation (-1). The lower the correlation between two assets, the higher the diversification potential. In fact, two perfectly correlated assets (c=+1) mean that both assets react perfectly similar in various circumstances while two non-correlated assets (c=0) react completely random to each other in changing circumstances. Finally, a perfectly negative correlation (c=-1) means two assets react in the complete opposite way in changing circumstances. Because real estate is only has a limited correlation with other asset classes, real estate is commonly known as a good diversifier in a well spread portfolio. Therefore mainstream portfolio's usually have exposure to real estate (Van Gool et al., 2007). In this regard of diversifying risk, one can distinguish the 'idiosyncratic' risk (or unique risk) and 'systematic risk' (market risk). Unique risk can be mitigated by diversification, while systematic risk, or market risk, cannot. Later on in this chapter, it is shown how this is relevant in equilibrium asset pricing theory.

b. Efficient frontier

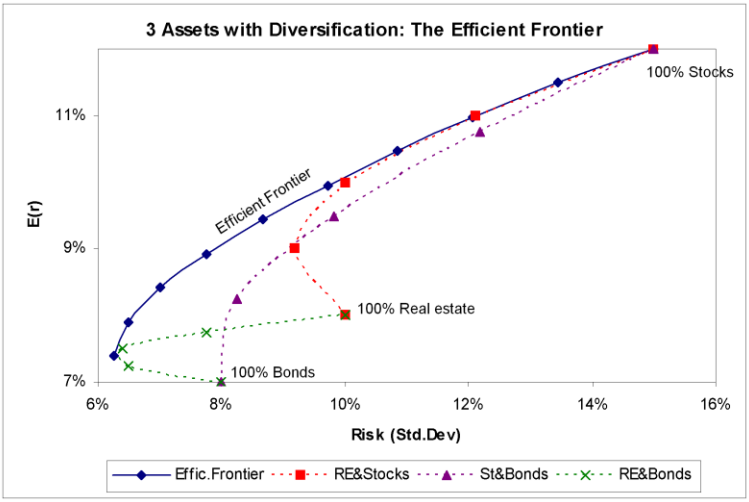
The synthesis of the general point about risk diversification is one of the most important ideas in portfolio theory; the efficient frontier. When investing all capital into one 'pure' portfolio, either in stocks, bonds or real estate, one has no possibility to diversify across different asset classes. Unsurprisingly, the three possible risk/return combinations would correspond to the original risk/return profiles of these asset categories and they will all lie generally in a south-westerly/north-easterly relation to one another. Not one portfolio particular is clearly dominated by any other. This is typical of the risk/return relationships we would expect among asset classes (that is, investments with higher risks wants to be compensated with higher expected returns). But these possibilities are highly constrained, not allowing for diversification across asset classes.

To improve the risk/return profile, the allocation can be mixed between two or three asset categories that are not perfectly positively correlated and thus allowing for risk diversification. The red, green and purple curved line in the figure depicted below, represent the risk/return combinations of a portfolio consisting of two asset classes; real estate and stocks, bonds and real estate, and bonds

and stocks respectively. As the figure shows, certain portfolio's are dominated by others in terms in risk and return. The favourable 'bending' of the risk/return possibility curves are a mathematical result between any two assets or asset classes that are no perfectly positively correlated. In that case a straight line would be drawn between the three 'pure' portfolio's (in the figure the 100% positions).

Also note that the curves involving real estate combinations (both, bonds and real estate and stocks and real estate) are more sharply bent than the curve that represents stock and bond combinations. This is the effect of real estate's relatively low correlation with the other two asset classes as shown before.

Figure 21: Risk diversification with the Efficient Frontier

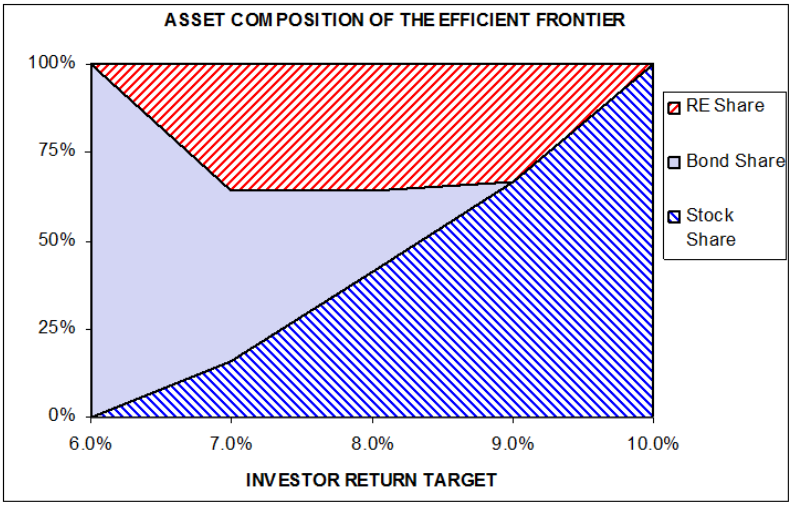


Source 21: Giambona (2008), Real estate finance and portfolio management course, University of Amsterdam

With the possibility to invest across all three asset classes, even more favourable possibilities show up. The efficient frontier in the figure above is the blue curve which represents the different combinations of a portfolio of three asset classes. As one can see that this curve lies even more to the north-west (that is, higher return combined with lower risk), which means that no portfolio dominates a portfolio on the efficient frontier. In other words the efficient frontier exists of all asset combinations that maximize return and minimize risk. Or more precisely, for a given volatility, the efficient frontier maximizes the expected return, and for a given expected return the efficient frontier minimizes the volatility. Points farther to the north (more return) or west (less risk) of the efficient frontier are not feasible.

Each point on the efficient frontier represents a unique combination of its possible constituent assets. In what portfolio an investor should invest depends on the appetite for risk and/or return (in the literature this is visualised with an 'indifference curve'). In order to comprehend the spread in asset categories for a preferred portfolio the efficient frontier can be presented in another way. The figure below depicts the different compositions of all possible portfolio's on that lie on the efficient frontier.

Figure 22: possible compositions of efficient portfolio's



Source 22: Giambona (2008), Real estate finance and portfolio management course, University of Amsterdam

As the exhibit above depicts, the share of real estate in an efficient portfolio is the highest for portfolio's with a modest appetite for return. For the more conservative portfolio's the bond share is dominant, while for more aggressive portfolio's the bond share diminishes and the stock share becomes increasingly dominant. This all makes intuitive sense, as real estate has a slightly higher expected return than bonds and a slightly lower expected return than stocks, and the correlation between real estate and stocks is lower than that between stocks and bonds.

The real estate investment industry warmly welcomed the modern portfolio theory in the early 1970s (Geltner et al., 2001). For the first time, real estate was (conceptually) included as a vital part among the traditional asset classes (stocks & bonds) in a leading strategic investment allocation concept. In the 1980s, Miles and McCue (1984) argued that MPT could and should be applied within the real estate allocation, for example, to find the optimal mixture among different property types or regions. The proposition was first to determine the allocation for real estate as a whole and subsequent the allocation within the real estate asset class. However this approach makes sense from an institutional management perspective for implementing strategic investment policy, it has never become common practice. There are a couple of problems in trying to apply MPT below the overall wealth level for institutional investors. In the first place, a key tenet of MPT is that the investor cares about the risk and return in the *entire* portfolio, rather than at any component of the portfolio in isolation. For example, suppose a property segment has little correlation with other property segments, but high correlation with stocks and bonds. It would be favourable to incorporate it in the real estate portfolio, but would at the same time lower the risk diversification at the overall wealth level. The second issue is the inevitable local expertise that is crucial to posses when investing in specific properties and property markets (especially smaller investors have insufficient capacity to have this expertise in-house). The third problem is the difficulty of obtaining reliable risk and return data by property segment. However, this problem is slowly but surely diminishing thanks to performance benchmark institutions like the Investment Property Databank (IPD) which was found in 1985 in the UK. The IPD even has a pan-European coverage nowadays. Historical period returns data in the property market was just not good enough, nor the knowledge of the determinants of future real estate returns to permit very useful analysis at this level of detail. Nevertheless, the concept of diversification is highly relevant on the asset category level as well and therefore it is useful for e.g. specialised real estate funds to understand the potential role a new type of real estate investment could play within the real estate portfolio.

c. Extending the MPT: Two-Fund Theorem and the Sharpe Ratio

As discussed above, the framework of MPT provides a rigorous framework for thinking about the strategic asset allocation of the investor's overall wealth over more risky or less risky assets. However, an important consideration for many investors has not been included yet: investing in both, risky and risk*less* (or risk-free) assets. In principle, a riskless asset's return is known in advance for certain and therefore the volatility is zero for such assets. The credit crunch and the public budget deficiencies has learned that in reality there is no such thing as a completely riskless asset. However, the concept of the riskless asset is a useful construct because it provides an interesting extension of the MPT. The inclusion of a riskless asset can be useful in several ways Geltner et al., 2001):

- It allows an alternative, intuitively appealing definition of the optimal risky asset portfolio, the one with the maximum Sharpe ratio;
- It avoids conservative target return investors putting too little weight in high-return assets;
- It provides a useful framework for accommodating the possible use of leverage or short-term debt holdings in the portfolio.

If an investor has the possibility to invest in a riskless asset as well, this can be done by borrowing (leveraging) or lending. When an investor borrows money, he is obliged to pay back the loan plus interest (this is usually assured when the investor doesn't default). On the other hand, the investor can lend money by allocating money to government bonds (e.g. T-Bonds) and hold it to maturity. Both are considered reliable proxies for risk-free investments by practitioners. However, there is another use as well, the so called 'Two-Fund Theorem' (Geltner et al., 2001). This is a mathematical technique to simplify the portfolio allocation problem. The main question here is how should an efficient portfolio, combined with a riskless asset, ideally look like?
The basic principle of the two-fund theorem is that all investors, irrespective to their risk preferences, will prefer combinations of the riskless asset and a single risky asset portfolio. A risk-averse investor will allocate a part of its wealth on a riskless deposit or government bonds in combination with an efficient portfolio, while a riskier investor will borrow extra capital and invest it in an efficient portfolio. Finally the investor can decide to invest 100% in the efficient portfolio.

As learned from the MPT, all portfolios that lie on the efficient frontier are efficient portfolios, at least, in the absence of the possibility of investing in a riskless asset. Combined with a riskless asset, the dominant portfolio is the portfolio with the highest Sharpe-Ratio (Sharpe, 1964). This ratio divides the excessive return over a risk-free asset with the standard deviation of a portfolio. In other words, the Sharpe-ratio is the risk-premium per unit risk in a risky portfolio combined with a riskless asset. This makes sense since every investor intuitively wants to optimize the risk-premium per unit risk he/she takes. Actually, this is nothing different from moving up as far as possible to the upper-left (or northwest) in a standard risk/return diagram which is at the heart of MPT, but now combined with a riskless asset. Because of its simplicity and intuitive appeal it is widely used by practitioners. As the Sharpe-ratio is just the risk-premium dived by the risk (volatility), it is a natural measure of risk-adjusted return. The equation runs as follows:

$$Sharpe-ratio = \frac{Risk-premium}{Stddev} = \frac{R_p - R_f}{S_p}$$

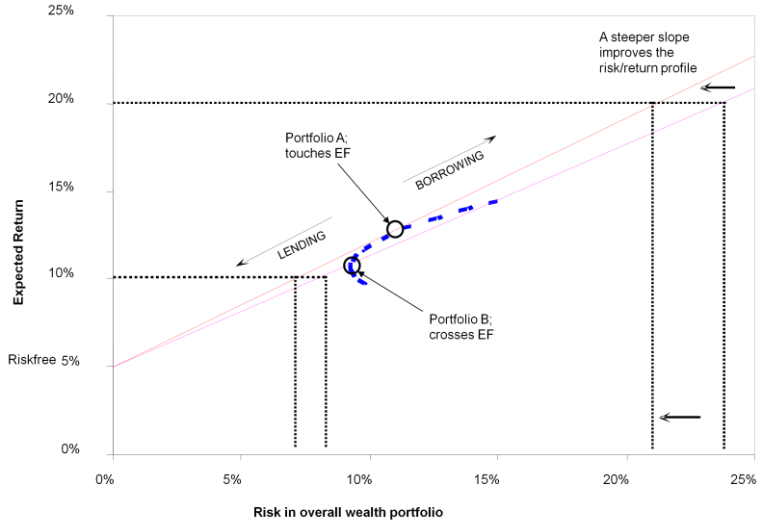
Where:

$R_p = total\ return\ portfolio\ p$

$$R_f = riskfree\ rate$$
$$S_p = standard\ deviation\ of\ portfolio\ p\ including\ riskfree\ asset$$

To get the highest Sharpe-ratio possible, a straight line is drawn in the risk-return diagram from the y-axis at a risk-free rate and it proceeds in the direction of the efficient frontier. This straight line is called the Capital Market Line (Sharpe, 1964). In order to find the Sharpe-maximized portfolio one seeks for the steepest slope of the line that connects with the efficient frontier. Because the steeper the slope, the higher the risk-premium per unit risk. Hence, bearing this in mind the only dominant portfolio left is the portfolio on the efficient frontier that is just tangent to the Capital Market Line. In the figure below this is visualised in the risk-return diagram. Two different portfolio compositions combined with a risk-free asset that connect with the Capital Market Line are depicted.

Figure 23: Sharpe-maximzed portfolio



Source 23: Giambona (2008)

As the figures clearly shows, Portfolio A in combination with the riskless asset (5% expected return, 0% standard deviation) dominates Portfolio B in terms of risk-return profile. If the investor would borrow extra money to invest in Portfolio A to get a 20% expected return, the risk associated with that return is considerably lower in Portfolio A (approx. 21%) in comparison to Portfolio B (approx. 24%), simply because the slope is steeper. As the Capital Market Line depicts, the relationship between risk and return has become linear, irrespective to the investors' appetite for risk. More risk-averse investors will lend money in combination with Portfolio A (leftwing of the CML relative to the '100% Portfolio A' position) while more progressive return portfolio's will borrow money and invest it in Portfolio A (rightwing of the CML). A last remark that is of relevance is that, in general, the Sharpe-maximizing risky asset al.location tends to place lower weights in low-return asset classes (i.e. on the leftwing of Portfolio A), as compared to the modern mean-variance portfolio theory. Where MPT always invests 100% in risky assets on the efficient frontier, more conservative Sharpe-maximized portfolio's invest a considerable part in (riskless) cash or T-bills which have a disproportionate impact on the impact on the bond and real estate allocation in the remaining share. For an extensive numerical example of both the MPT and Sharpe-maximizing concept see, for example, Geltner & Miller (2001).

9.1.2. CAPM: from strategic to tactical investment decision making

The previous chapter introduced the MPT, a fundamental tool for strategic investment decision making at the macro-level. This chapter will build on the MPT but will cover both the strategic and tactical investment decision making. It is called the Capital Asset Pricing Model (CAPM) and was introduced by William F. Sharpe (1964) and Lintner (1965) according the Geltner et al. (2001). CAPM is a equilibrium asset pricing model that goes beyond MPT and will provide a simplified representation on how the capital market perceives and quantifies risk in the assets that are traded in the market. Here, the practical utility of CAPM in the broader investment industry and the real estate industry in particular is elaborated on. Overall, this chapter will increase the understanding of how risk is priced at the capital markets and how it affects the valuation and performance of real estate.

a. Practical contribution of CAPM

The practical utility of the Capital Asset Price Theory mainly contributes to the following macro-level investment considerations (Geltner et al., 2001):

1. Equilibrium pricing models can help investors understand what are reasonable expected returns, going forward into the future, on investments in different asset classes or types of investment products;
2. Such models can help to identify specific types of assets or investment products (or 'sectors' in the asset market) that are currently mispriced, relative to long-run equilibrium;
3. By quantifying how the capital market prices risk, asset pricing models can be used to adjust portfolio returns to reflect the amount of risk in the portfolio, thereby helping to control for risk when evaluating portfolio returns or investment performance.

The first of these applications is just another way of saying what these models do. Despite asset prices are codetermined by the expected return required by investors (that works as a multiplier in asset valuation) and the expected future operating cash flow, the asset pricing theory focuses generally on the denominator side of the equation and leaves the numerator side aside as this is determined by the space market of supply and demand. A simplified equation[2] of a Discount Cashflow (DCF) model, which is widely used in the real estate industry for investment proposals or valuations, could run as follows:

$$PV = \sum_{t=1}^{n} \frac{Cashflow_t}{(1+r)^t}$$

Where:

$PV =$ Present Value of the investment
$Cashflow =$ Net Rental Income
r = discount rate / required return

The asset pricing models can help investors determine the required return and thus help understand what are reasonable returns.

Secondly, if the risk premium in reality differs from what the risk premium would be according to the asset pricing model in market equilibrium they asset can be mispriced. In theory, if the risk premium is higher the asset would be underpriced while if the risk premium in the market is

[2] Assuming a(n) (perpetuate) exploitation of about 50 years, future cashflows of the property will become almost zero due to the exponential function and therefore no exit/residual value nihil is incorporated in this equation.

lower than one may expect (based on asset price model), then the asset would be overpriced. Both, successfully selling an overpriced asset or buying underpriced asset could lead to an extra profit as (at least) in the long-run the risk premium is expected to return to equilibrium. Therefore, this use of capital asset pricing theory relates to tactical investment decision making and timing issues as well.

The third use is about controlling for risk when comparing the investment performance of different portfolios. In order to do so it must quantify risk as it matters in the capital market and it must assess the expected return premium per unit risk.

b. The main point in the Basic CAPM

In accordance with the Two-Fund Theorem in the preceding section, all investors should want to hold the same portfolio of risky assets (Portfolio A), as long as those investors have the same risk and return expectations. Asset markets (especially securities markets such as the stock market) are known to be pretty efficient, hence, asset prices are pretty good at reflecting all publicly available information relevant to their values. As inherent to scientific models, they are based on assumptions and they are a simplification of what exactly is found in empiricism. The CAPM is no exception to this and is based on the assumption that investors are equivalent to the 'homo-economicus'. This is an analogy with the neo-classical approach within the discipline of Economic Geography. Famous geographers like Christaller, Von Thünen and Weber argued that an entrepreneur (e.g. an investor) is an 'homo-economicus' (Pellenbarg, 2006). More precisely, this assumption implies the following behaviour (Van Gool, 2007):

1. Investors' actions are merely based on rational considerations;
2. Investors are always in full control of their feelings and have no doubts;
3. An investor acts purely selfish.

This combined with the Two-Fund Theorem and the assumption that investors are perfectly and similarly informed in an efficient market, would make every investor eager to only hold the same efficient portfolio (Portfolio A). Depending on their risk-return preferences they would lend or borrow money to invest in the same Portfolio A. As every investor should only want this dominant Portfolio A, it is empirically observable as the 'market portfolio'. This market portfolio thus reflects the overall wealth portfolios of all investors. The variance in this portfolio quantifies the risk that all investors are exposed to, also referred to as 'market risk' or 'systematic risk'.

In this case, and here we arrive at the heart of the basic CAPM, the only risk of an asset that matters to the investor is how the asset is correlated to the market portfolio as a whole. To briefly bring back in remembrance; correlation is a standardized measure of covariance. In the Sharpe-Litner CAPM this risk is measured as 'Beta'. Beta simply normalizes the assets covariance with the market as a fraction of the variance in the market as a whole. Beta is thus a relative and intuitive measure of risk, quantifying the asset's risk as a fraction of the risk faced by investors in their overall wealth portfolios. As stated before, the required return of an investment is the sum of the risk-free rate and the risk-premium. The equations to calculate the required return as well as the beta of a particular asset *i* run as follows:

$$E\{R_i\} = R_f + RP_i = R_f + Beta_i\,(E\{R_M\} - R_f)$$

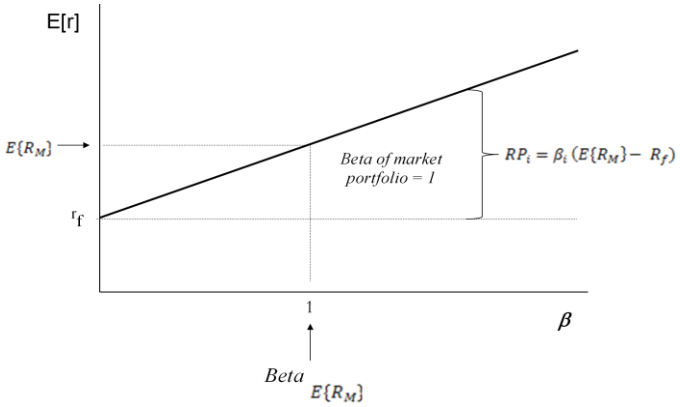
$$Beta_i = \frac{COV_{i,M}}{S_M^2}$$

Where;

$E\{R_i\}$ = market's equilibrium required expected return to asset *i*
R_f = Risk-free rate
RP_i = Risk premium to asset *i*
$E\{R_M\}$ = market's equilibrium required expected return to the market portfolio as a while
$COV_{i,M}$ = covariance between asset *i* and the market portfolio
S_M^2 = variance (volatility squared) of the market portfolio.

The above stated equations learn that an asset's expected return risk premium is directly proportional to its beta and the risk premium equals its 'beta-times' the market price of risk, which is observable as the expected return on the market portfolio. This concept is visualized in the famous Security Market Line (SML) which actually depicts the CAPM in a graphical form.

Figure 24: Security Market Line (SML)



Source 24: Giambona (2008)

If $\beta =$ 1, then asset *i* has exactly the same risk profile as the market portfolio
i.e. 1*(market risk premium) = market risk premium.
If $\beta <$ 1, then asset *i* has a less risky profile than the market portfolio.
If $\beta >$ 1, then asset *i* has a riskier profile than the market portfolio.
An investor who is in possession of the beta, the risk-free return rate as well as the market return can determine what would be his required expected return on a particular investment. Subsequently this required return can be brought into the investment analysis model like the Discounted Cash Flow (DCF) model, as briefly discussed earlier, to assess what would be the Present Value the investor is willing to pay for the asset.

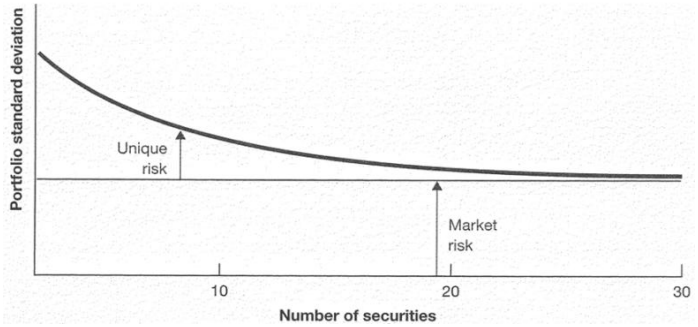
c. Strengths and weaknesses in the basic CAPM

As briefly mentioned earlier, the main investment insight provided by CAPM is the irrelevance of, and therefore lack of compensation for, diversifiable risk (Geltner et al., 2001). CAPM suggests that, as covariance with market portfolio is the only risk that matters to the capital market, it is therefore the only risk that will be priced in equilibrium. In the section about MPT and diversification we already distinguished unique risk (or specific, idiosyncratic risk) and systematic risk (or market risk). The figure below depicts that unique risk can be diversified away and therefore only the market risk remains for which investors demand compensation in terms of expected return.

Under the reasonable assumption that all investors can diversify away risk that is very specific to any one asset or group of assets, it therefore follows that specific risk will not be priced. An important investment strategy is implied by the fact they won't receive compensation by the market

for exposing themselves to specific risk: investors should generally not hold undiversified portfolios and therefore should hold the market portfolio and nothing but the market portfolio (Obviously with the distinction of a portfolio that is scaled down to the investor's wealth and levered up or down at the CML depending on the risk preferences).

Figure 25: Risk diversification and compensation



Source 25: University of Groningen, Real Estate Finance lecture (2009)

Although the CAPM is based on assumptions, and hence is a simplification of reality, they are not terribly far from the truth (Geltner et al., 2001). Asset markets are not perfectly efficient, but they are reasonably efficient (especially the stock market). Not all investors hold the same expectations nor the same portfolios but, surprisingly, it seems that most investors hold fairly similar expectations and fairly similar portfolios (especially institutional investors). Moreover, the aggregate stock market (i.e. the stock exchange) is seen as an easily observable and measureable proxy for the theoretical market portfolio. The facts that not all investors hold the same expectations about the future mean that in fact they fail as an 'homo-economicus'. In the economic geography, in the 1960's, the paradigm changed from an neo-classical approach towards an behavioural approach (Pellenbarg, 2006). Within this approach Simon (1957) argued that human beings, and thus investors/entrepreneurs as well, aren't 'homo-economicus' but 'homo-psychologists' and their choices are based on limited knowledge and capability. Instead of 'optimizing behaviour' he introduced 'satisficing behaviour'. In essence this implied that it's practically impossible to always and only choose an optimal allocation but a satisfying allocation that will hopefully is an optimal allocation though he isn't 100% sure. Simon reflected these characteristics by the term of 'bounded rationality' and the researcher argues that, at least at conceptual level, it is justifiable to draw a parallel to the CAPM in this matter.

Apart from that, a substantial part of the expected returns across assets within the stock market are not well explained by the beta, computed with respect to the stock market portfolio. For example, Fama and French (1992) and Chui, Titman and Wei (2003) find factors like firm size, book-to-market value and momentum (the rate of acceleration of a security's price or volume[3]) also show explanatory power for predicting expected returns of Real Estate Investment Trusts (publicly traded real estate stocks, in short: REITs), apart from its beta with respect to the market portfolio. Small firms (the product of the share price and amount of outstanding shares determines firm size[4]) and firms with high book-to-market ratios (book-value of equity as a fraction of the market-value of equity[5]) are more prone to failure in the event of market downturns as Chui, Titman and Wei (2003) demonstrate. This risk is not measurable by the covariance with the stock market and this risk cannot be diversified away because downside outcomes are correlated with the overall economy and the capital market, so investors need to be compensated for this risk while the beta does not account for this. Therefore,

3, 4, 5: Investopedia.org

these factors can also be seen as market risk rather than idiosyncratic risk. Hence, as this squares with the principle of market risk compensation, these factors refine the concept of CAPM rather than negate it.

d. CAPM and the application across asset classes in a mixed-asset portfolio

As the preceding section has learned about the principles of CAPM and how it works in general, it is now time to zoom in to the application specifically for real estate. As already partly indicated in the preceding section the CAPM has relevant application to real estate investment in two different contexts. The most obvious application is to publicly traded real estate stocks, listed on the stock exchange; REITs. Here, CAPM is applied to REITs in a similar way as it is applied to most other sectors of the stock market in general. However, the CAPM tends to under-predict the average returns to REITs as they are, in general, small stocks and low-beta stocks (Giambona, 2008), but still it works fairly good. The more challenging application of CAPM is to the private (or direct), non listed, property market (Geltner et al., 2001). Obviously, in this thesis the focus will lie on the latter application; to private real estate.

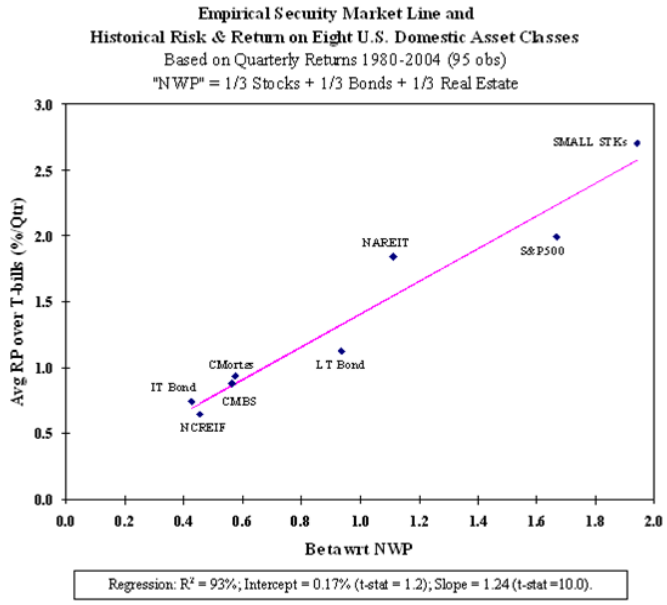
Even within this focus of privately traded real estate, however, two further levels are being distinguished. At a macro/strategic level, CAPM can be applied broadly to the mixed-asset portfolio as a whole, encompassing private real estate among one the major asset classes. At the other level, this section will elaborate about the application of CAPM *within* the private property market, thus on a more tactical/sectoral level. This part will focus on the question whether CAPM is capable to predict and quantify risk and expected return differences between different types of property in different locations.

When in the 1970s the CAPM was so popular and widely used in the investment industry many began to wonder why it was not being applied to real estate investment decision making as real estate was a 'risky asset' that should apply in the same manner as it did to, for example, stocks.
The problem that occurred as described by Geltner et al. (2001), was that when analysts calculated the beta for commercial properties, they typically came up with almost zero or even negative numbers. That would indicate that real estate should require very little or even a negative risk premium in market equilibrium. One could argue that real estate was a real 'bargain', providing supernormal expected returns after adjusting for risk, but the crisis in the beginning in the 1980s painfully made clear that real estate was not as riskless as CAPM indicated. To date, with the advantage of a few more decades of full market cycles and investment performance data, it appears to be possible to apply the basic Sharpe-Linter CAPM to private real estate after all. The solution for the problems described above was to be more careful in how to approximate the market portfolio in practice, and how to compute real estate periodic return statistics.

As Geltner et al. (2001) neatly describe, the stock market alone as a reliable proxy for a overall wealth portfolio or risk benchmark is not useful if, next to stocks, other asset classes, such as private real estate, are part of the mixed-asset portfolio. Another problem is about the type of data that is being used to calculate the real estate beta. In rather efficient and liquid markets like the stock exchange (with an continuous price-making process) it is reliable to calculate the necessary correlations and beta's. However, in privately traded real estate periodic returns data is based on appraised values which are estimates of property values typically derived by appraisers who are trained to look backwards in time to find prices of comparable properties that were sold in the (recent) past. Furthermore, properties are not valued at a daily basis like stocks, thus many valuations in the index or portfolio are 'stale'. The result is that real estate periodic return indices, compared with more liquid contemporaneous markets like the stock market, tend to be 'lagged' and 'smoothed' across time. In

other words, the asset valuations are correlated with themselves over time. As a result, the covariance (and thus correlation) between real state and indices such as the stock market tend to be underestimated. Real estate is subject to 'positive autocorrelation' which indicates a sluggish asset market that lacks perfect informational efficiency and therefore prices only gradually incorporate new information. The appraisal practice in the real estate industry seems to be a plausible explanation for this 'smoothing' effect. Initially, this would make it impossible to appropriately apply the CAPM to real estate. However, Van Gool et al. (2007) note that real estate return series can be 'unsmoothed' by filter techniques as developed by, for example, Stevenson (2000) or Geltner (1993) which has resulted in an increased variance of 25% on average in real estate returns. Besides, a standard stock exchange as a benchmark does not seem to work either. To overcome this hurdle a market portfolio has to be defined that includes real estate as well. Geltner et al. (2001) proposed a stylized 'National Wealth Portfolio' consisting of one-third equally of stocks, bonds and real estate. Taking these corrections into account, CAPM seems to work pretty well for real estate and is still considered as a competitive asset class in terms of risk-return profile. The figure below shows that the beta can explain 93% of the variance of the unsmoothed risk-premium of eight asset classes in the US with relation to the National Wealth Portfolio (NWP). The NCREIF (National Committee for Real Estate Investment Fiduciaries) represents the non-listed, private real estate index and NAREIT (National Association for Real Estate Investment Trusts) represents the listed, public real estate index in the United States.

Figure 26: Security Market Line with unsmooted returns and NWP



Source 26: University of Amsterdam, Real estate finance and portfolio management lecture

e. Application of CAPM within Private RE at sectoral level

As this study merely addresses real estate, and more specific shopping centres, the most interesting question would be whether CAPM can quantify risk and model the market's ex ante risk premiums within the private property market (e.g. within different property types and locations).

Actually, the answer to this question is as disappointing as short: no, it cannot. If the CAPM worked well, then a scatter-plot would show a clear relationship between excess return and beta like it showed in figure 7, with a positive linear relationship between risk (beta) and return. Geltner et al. (2001) have regressed ex post average excess returns (over T-Bills) of a number of NCREIF commercial property portfolios against the unsmoothed betas with respect to the National Wealth

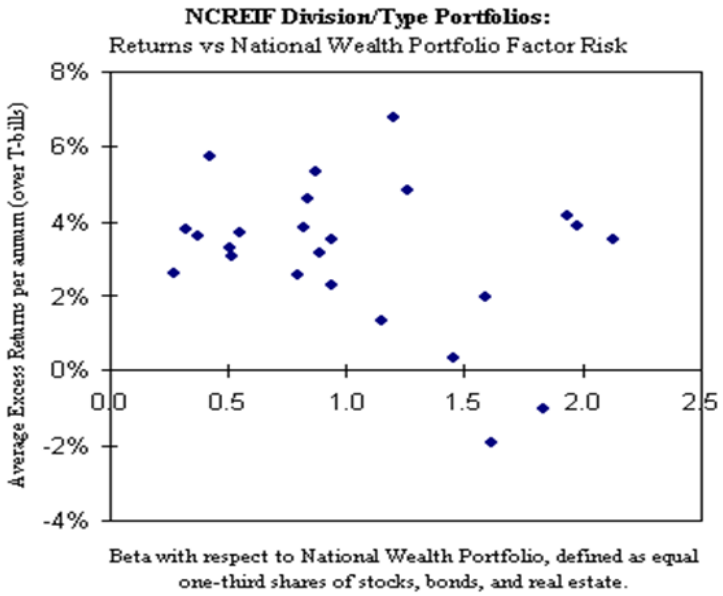
Portfolio (NWP), both estimated using quarterly historical periodic returns data over the 1981-1998 period. The results in figure 8 show that no such relationship is apparent. This in spite of;

- a rather broad spread in beta's and excess return rates in the scatter-plot;
- the large period examined (1981-1998);
- and the extensive NCREIF subindices (three property type subindices within each of eight geographical indices) with a large number of properties to diversify away most idiosyncratic risk at the individual property level;
- various ways of defining and measuring beta (e.g. with respect to stock market, the aggregated NCREIF index or national consumption), the results remain similar.

In contrast to the SML in figure 7 , the SML in figure 8 would be flat, implying that, within the real estate asset class, beta has no explanatory power with respect to the dispersion in long-run average excess returns and hence there is no (linear) relationship between both. In other words, within the private real estate asset class beta cannot be seen as a reliable proxy for property performance.

Subsequently, the question rises how the CAPM does work across asset classes as described in the preceding section (r^2 = 93%), but fails at the sector level within the private real estate class? Why doesn't CAPM captures the risk that matters within the property market while it can measure the risk that matters to the capital market across asset classes?

Figure 27: Dispersion excess return versus beta



Source 27: University of Amsterdam, Real estate finance and portfolio management lecture

One plausible answer Geltner et al. (2001) give is that the property market cannot distinguish, ex ante, between the *relative* amount of risk in one property type or location and that in another, and therefore yielding a generally flat Security Market Line in the scatter-plot. They argue this may be because the data is 'noisy' or information is poor. But, perhaps even more likely, it could be because betas truly are not stable, relatively speaking, across property types and regions. Not enough is known about location values, space markets, property asset markets and the interaction among these determinants of value and future return. The NCREIF (sub)indices are, unsurprisingly, aggregated. Cannon, Miller and Pandher (2006) find that total risk (volatility), systematic risk (beta) and idiosyncratic risk (the residual standard deviation from CAPM) actually are all priced into the U.S. housing market when

disaggregated return data at the zip code level is used. They argue that similar evidence is harder to find for aggregated datasets because with the aggregation process the data variation might be lost necessary for the pricing theory to hold. Probably this is another explanation that CAPM fails to predict the excess risk premiums within the private real estate asset class.

One result of the difficulty of distinguishing risk differences across sectors within the private property market is the focus of macro-level tactical investment analysis on the numerator in the asset valuation equation, that is, the future operating cash flow potential in different sectors. As already mentioned earlier, CAPM is focussed on the capital market rather than at the space market. This can also be an reasonable explanation for as the cash flow part is associated with the space market instead of the capital market. This hold implications for tactical portfolio investment policy within the private real estate asset class. The focus on the operating cash flow in private real estate requires broad analysis of the space market. In essence, investment analysts look for property types and locations that will provide higher than average rental growth (Geltner et al., 2001). In the next chapter attention will be paid to the broader real estate system and the space market in particular. Among other things it will be addressed that both the supply and demand must be considered in predicting rental growth. In short, identification of tactical investment opportunities in the private real estate asset class requires the application of urban economics and real estate market analysis. Accordingly, many institutional real estate investors devote considerable time and resources to this type of research. Investors must also integrate the space market forecast with an analysis of current asset prices to examine where the best investment opportunities are located. The distinction between the capital markets and the fundamental space market of demand and supply, both linked to the asset market, will remain of paramount importance which will be addressed in more detail in chapter three about performance.

9.1.3. Conclusion

This chapter has provided a rigorous insight of how institutional investors build up their mixed-asset portfolios at the macro-level. The framework of Modern Portfolio Theory shows how investors allocate their own overall wealth across a range of assets (stocks, bonds, real estate, human capital etc.) to minimize volatility for a given level of expected return or how to maximize the expected return for a given level of volatility and resulting, eventually, in efficient portfolios. The main point about MPT is diversification and thus reducing (specific) risk in order to prevent investors of investing in dominated portfolios and to seek for dominant portfolios in terms of risk and return to invest in.

Real estate has proven to be an interesting asset class as it has shown to be a good diversifier in combination with, for example, stocks and bonds. By combining a risk-free asset with a risky but dominant portfolio the Sharpe-optimized Efficient Frontier can be drawn and investors can lend or borrow money, depending on the risk-return preferences, and invest it in the Sharpe-maximized portfolio. Combining a riskless asset with an risky portfolio is also known as the Two-Fund Theorem.

The CAPM, as an important extension of the MPT, has learned that specific or diversifiable risk is irrelevant to the capital markets and that only market/systematic risk will be compensated for in the capital markets. Furthermore, the rather specific characteristics of the real estate asset class with regard to the valuation process and the accompanied smoothing and lagging phenomena was briefly described. This is considered as one of the explanations for the lower allocation of real estate within a mixed-asset portfolio than the theory would justify from a normative perspective. Besides, it seems challenging to square the information asymmetry prevailing between parties in the private real estate industry with the assumption of the efficient market hypothesis in CAPM, relatively speaking. These

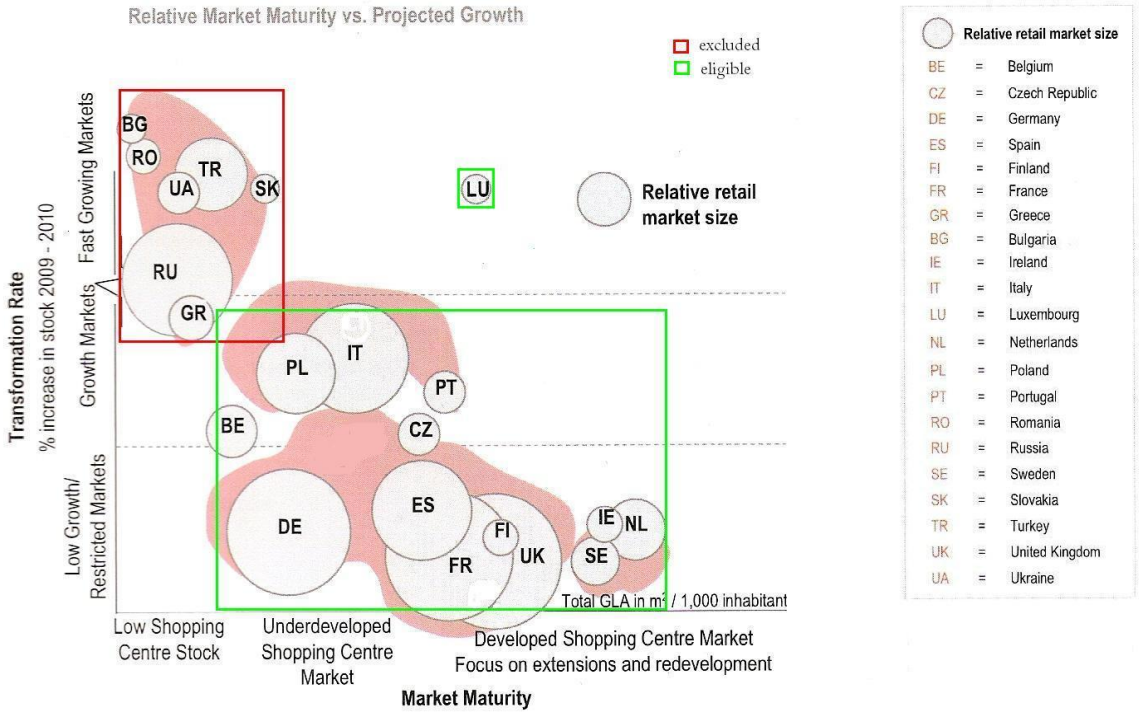
market imperfections often make it frankly impossible for property markets to be in full market equilibrium.

Subsequently it was described that CAPM does work pretty well *across* various asset classes for both REITs and private (non-listed) real estate, at least, if the periodic returns data is unsmoothed and a decent benchmark as proxy for the market portfolio is used. The CAPM lacks consolation, however, *within* the different asset classes (and real estate as well) in predicting the ex ante risk premiums. CAPM is predominantly aimed at the capital markets while for the performance of real estate two different areas are of paramount importance. The first one is, indeed, aimed at the capital markets where the discount rate or required (initial) return is determined and represents the denominator in the DCF asset valuation model for direct real estate. The other area, however, is aimed at the space market of supply and demand within a specific real estate type and market/location. Here the expectations about the current and future cash flows are determined which represents the numerator in the DCF asset valuation model. As CAPM does not address this area, it is not sophisticated enough to explain, ex post, real estate returns nor it can predict, ex ante, future risk premiums and real estate returns. Hence, beta is found to be a rather unreliable proxy for explaining and predicting ex post or ex ante property performance. To increase the understanding of real estate performance it is essential to address the specific characteristics of real estate and the spatial markets real estate is located in.

With regard to this research, the most important insights are the necessity for diversification both within MPT as CAPM in order to create dominant portfolio's rather than dominated portfolio's. The second insight that was offered is the fact that real estate is a fairly good diversifier in the spectrum of various investment asset classes, even after unsmoothing and delagging. Furthermore, it is more important to diversify *across* asset classes rather than *within* an asset-class because, in the end, an institutional investor with a mixed-asset portfolio is only interested in the best risk diversification within its overall wealth rather than within a particular asset class.

Another major insight is that these models and theories are predominantly aimed at the capital markets, while within the private real estate asset class the ex ante return expectations are for an important part determined by the space market of demand and supply. Subsequently, the space market determines the cash flow of a real estate asset and hence the value and periodic returns. While the basic CAPM can draw a reliable SML based on the beta across asset classes, it fails to distinguish, ex ante, risk differences between one property type or location and another while, actually, these differences do exist in reality.

9.2. Geographical demarcation



Source 28: Source Jones Lang LaSalle (2009)

9.3. Performance measurements

Ad 1. Turnover /m²

Turnover is in the first place a performance measurement for a retailer. Nevertheless, turnover is a fairly good indicator for rental growth potential (especially with turnover-rent) and eventually an indicator/proxy for cashflow return. Therefore turnover is certainly a meaningful figure for an investor as well. Turnover touches the very essence of the shopping centre operations; to what extent do people visit and buy in the shopping centre. Another benefit is the sensitivity of the data, which is limited. However, turnover/m² on its own is not the most comprehensive measurment of actual performance of a shopping centre to an investor as it is a retailer's income stream.

In spite of this, the major drawback is still that turnover data of a shopping centre is not always available. In the Netherlands, for instance, landlords do not have any access to sales information. But also in countries where it is common to have insight in the sales volumes, it is no seldom that an investor misses a considerable number of sales figures from his tenants in a shopping centre, and probably misses a few years of sales data. Therefore salesdata have strong limitations, which not comply with all preconditions.

Definition or formula:

Also known as sales. The measurement of productivity of a retail business as reported to the landlord defined in the lease contract. Most commonly requested on a monthly basis inclusive of VAT as a total volume figure. To calculate this figure a store's reported sales are divided by the Gross Lettable Area in m2 as defined in the lease contract. This Lettable Area includes sales and storage area. The general market refers to sales on an rolling annualised per m2.

Ad 2. Net Rental Income (NRI)

It is anticipated that investors are familiar with this term and this information is available. NRI complies with the preconditions as well. The drawback of NRI is that it still does not say anything about actual performance as performance is usually expressed as a percentage and therefore NRI should be divided by a denominator. Otherwise one could expect when asset A yields an NRI of 10 outperforms asset B that yields NRI = 8 while asset A is valued at 200 while asset B is valued 160. In this case their actual performance is equal (10/200=0,05 and 8/160=0,05). Therefore NRI does not tell the full story and is not suitable as performance measurement.

Definition or formula:

Or Net Operating Income. Calculated as Gross Rental Income minus total Operating Expenses expressed per m² GLA, per annum.

Where;

GRI: Theoretical Gross Rental Income minus Loss of Rent plus/minus any Key Money

OE: Property taxes, insurances, utilities, management fees and service costs.

Ad 3. Real Net Rental Income growth rate like-for-like (Real NRI growth rate)

The NRI growth rate measures the change of the NRI of two different periods expressed as an percentage of a standing investment and is adjusted for any acquisitions/dispositions on shopping centre level which in/decreased rental income. If a shopping centre is properly functioning and managed, it is anticipated that this would result in upward rent potential and eventually in increasing rental income. Because lease contracts are indexed for inflation, the inflation rate should be the

reference point/benchmark in order to calculate an actual rate instead of nominal rate. With this measurement the fluctuations in Net Asset Value (NAV)/Capital Value (CV) are excluded which are caused by, among others factors, developments in the capital markets, changing interest rates and subjective valuation. Additionally, it meets all preconditions and is relatively easy to assess. However, a major drawback is this measurement has to cope with very different leasing structures. The great variety in the leasing structures and the prevailing legal aspects among different countries makes it challenging to compare rental growth on a European basis, a fact that is not applicable when taking turnover as the main performance measurment. Moreover, some countries make use of multiple leasing contracts that affect rental growth differently. To properly account for this, analyses on leasecontract level would be inevitable, something that is far beyond the scope of this study. In order to level out the differences in indexation it is essential to have a sufficient track-record. For instance, some countries do not enforce a yearly indexation and are usually only adjusted once in a few years. Despite the complicated pan-European comparison, there is sufficient information available to make fairly meaningful international comparisons while comparison within a country is always approriate.

Real NRI growth rate has to be calculated by the following formula;

Definition or formula:

$$Real\ lfl\ NRI\ growth\ rate = \frac{1 + \frac{NRI_t - NRI_{t-1}}{NRI_{t-1}}}{1 + \text{inflation}_{t-1}}$$

Where;

Inflation* = Consumer Price Index (CPI)

* Indexation method can significantly vary among countries. France for instance uses a compounded number since august 2008 that consists of 50% CPI, 25% Building cost index and 25% Trade turnover index. Before august 2008, they followed the relatively capricious Building cost index on a quarter-to-quarter basis.

Ad 4. Direct Return (IR)

Direct Return is also referred to as Income Return (IR), indicating it is based on cash flows. IR is the NRI expressed as a percentage of the Capital Employed. This is the sum of the initial gross purchase price or beginning of the periode (t-1) plus the Capital Expenses (CExp) over the year. Within the IPD benchmark IR is measured per month, but it can also be measured on an annual basis.

A major drawback of this measurement is the availability of the data. A participant that does not report to the IPD is probably not in the possession of this specific data as from 2002. That would create an undesirable threshold for participation in this research. Therefore it is not considered a feasible measurement to request. Moreover the exact definition of Capital expenses could probably be rather problematic if recoverable at all.

IR has to be calculated by the following formula;

Definition or formula (IPD):

$$Direct\ Return = IR = \frac{(NRI_{\ t})}{(CE_t)} = \frac{(NRI_t)}{(CV_{t-1} + CExp_t)}$$

Where;

t = Month
CE = Capital employed
NRI = Net Rental Income
CV = Capital Value (at t-1)
CExp = Capital Expenditure

Ad 5. Total Return (TR)

On a monthly basis Total Return (TR) is the sum Income Return (IR) and Capital Growth (CG) over the month (TR can also be calculated on an annual basis). TR covers the complete or, better said, the total return of an asset as it covers both the cashflow return as well as the return caused by capital growth or decline. TR is also mainstream data used by the IPD for benchmark purposes. TR is a leading indicator for shareholders and stakeholders. An advantage is that IPD participants are familiair with the definition and have the data instantly available, at least since the data they have enrolled for IPD participation. Obviously, this is not the case for companies that do not participate in the IPD, so here the same counter-argument prevails of data availability, or better said unavailabilty. The equation for TR over a month is;

Definition or formula (IPD):

$$Total\ Return = IR + CG = \frac{(CV_{t-1} - CExp_t + CRpt_t + NRI_t)}{(CE_t)}$$

Where;

t = Month
CE = Capital employed
NRI = Net Rental Income
CV = Capital Value
CRpt = Capital Receipts
CExp = Capital Expenditure

Ad 6. Sharpe Ratio (SR)

The SR links return to its associated risk and makes it possible to draw a risk/return profile for a certain asset. As a return cannot be seen completely separated from the associated risk, SR puts an apparent high return into perspective as it anticipated that it would also br exposef to a high(er) risk. The outcome of dividing the return by its risk can be seen as the return per unit risk. In this manner one can better compare different styles in the investment spectrum like opportunistic (risky), value added and core (risk averse) investment styles. Although this figure would provide valuable insights in shopping centre performance, SR is a challenging measurement and has some serious disadvantages. To calculate the risk of an asset the standard deviation of the performance needs to be calculated. To calculate a standard deviation that provides a reliable image, long time-series of the assets return are necessary. The longer the track-record, the better the outcomes are. A standard deviation calculated on one (or more) complete economic cycle(s) (10 years) is a requisite, but also unfeasible as it is too ambitious in the context of this research. Besides, all properties with a shorter track-record than 10 years would be excluded which will lead to a poor dataset in terms of amount of cases.

But perhaps even more important, within the SR no real estate information is embedded anymore as it only represents the expected return per unit risk. Therefore, it is expected that the independent variables won't yield sensible explanatory power anymore for the SR. Likewise, using this ratio will level out the differences in performance among shopping centres and will hinder obtaining results that are significant at a 95%-confidence interval. To avoid this, it would be prudent to purely focus on explaining the risk premium. Another challenge would be to correctly assess the return rate of a risk-free asset as it can differ per country and per year.

Definition or formula:

$$Sharpe-ratio = \frac{Risk-premium}{Stddev} = \frac{R_p - R_f}{S_p}$$

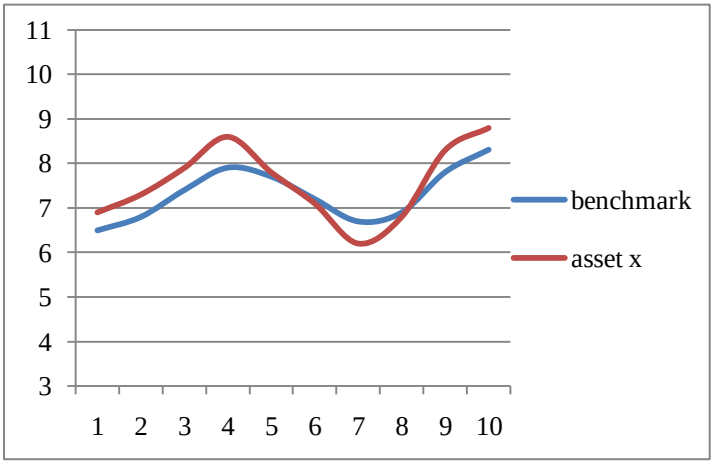
Where:

$R_p = total\ return\ portfolio\ p$

$R_f = riskfree\ rate$

$S_p = standard\ deviation\ of\ portfolio\ p\ including\ riskfree\ asset$

Ad 7. Relative performance compared to IPD benchmark



This measurement is based upon the Capital Asset Pricing Model (CAPM) and aims to explain the relative out- or underperformance of a particular asset compared to the 'marketportfolio' which the benchmark pretends to be. The most suitable marketportfolio is the IPD Shopping Centre benchmark. The advantage is that if the market has performed very well due to any positive valuation, than this effect on the performance of one single asset is partly filtered because it is compared with the performance of the market. The risk of an asset compared with the marketportfolio now is solely determined by the covariance between the market and the asset. In this way the risk of an individual asset is measured in comparison with the market, or more technically spoken, the covariance between asset x and the marketportfolio is compared with the variance of the marketportfolio. The standard to measure risk here is the beta (β). Another consideration could be to measure the alpha-potential ratio, which means as much as the extent of outperforming the benchmark (Keeris et al., 2009). Outperforming the benchmark can be seen as creating additional value compared to the peers within the benchmark. A disadvantage is that in certain countries (Belgium, Luxembourg, Austria, Poland and Czech Republic) there is no seven-year IPD benchmark for shopping centres available yet and therefore hampers reliable measurements in case of relative performance compared to the benchmark. All other eligible countries do have a seven-year track record at least. And similair to the SR in the preceding section, it is challenging to obtain the right return rate of an risk free asset. Another issue originates from appedix *9.1.2.e.*, where it was found that it is challenging to apply CAPM within the real estate asst class because of its heterogenity. This could cause uncertainty about the explanatory power. Finally, being in disposal of IPD benchmark data is essential.

The beta (β) can be defined as follows;

Definition or formula:

$$\beta = \frac{Cov(R_i, R_m)}{S^2(R_m)}$$

$$R = R_f + risk\ premium$$

And thus:

$$R = R_f + \beta(R_m - R_f)$$

Where;
$Cov(R_i, R_{m)}$= covariance between the return of a asset i, and the return of the marketportfolio
$S^2(R_{m)}$ = variance of the marketportfolio (the benchmark)
R_f= Risk free rate
R_m= Risk marketportfolio

If β =1 asset x has exactly the same risk profile as the marketportfolio.
If $\beta < 1$ asset x has a less risky profile than the marketportfolio.
If $\beta > 1$ asset x has a riskier profile than the marketportfolio.
And α is defined as follows:

$$\alpha - ratio = \left[\sum_{Rm}^{+\infty}\{(R_t - R_{Rm}) * (1/n)\}/\delta_{Rm}\right]$$

Ad 8. Internal Rate of Return (IRR)
IRR is a long term return measurement and therefore gives an reliable insight in the performance. To long-term investors the IRR is a quite meaningful figure. A major drawback of IRR is that it is measured inconsistently as the holding period is arbitrary and usually varies between 10 and 20 years. Also the exit yield which determines the future asset value is subjective. An historic IRR is also possible to compound, but are still based on above mentioned arbitrary aspects. The historic TR's can be summed and be the divided by the years of measurement. Also here the principle counts that the more data is available the more reliable the results will be. Besides it is questionable if all this data is available and as the Discount CashFlow (DCF) method is an extensive assessment that creates a undesirable threshold if the information is not available up front. Therefore it is anticipated that enforcing a consistent but blueprint definition to the participants requesting to calcultate new IRR's on all shopping centres over the years in a consistent measurement is completely unfeasible.

Definition or formula;
The Internal Rate of Return (IRR) is the discount rate which equates the present value of the cash outflows to the present value of the cash inflows of a property or portfolio during the considered holding period.
The considered period can be either a historic or a future holding period and therefore the Internal Rate of Return is the return on the initial Gross (Pipeline/ Investment) Commitment or return on the Net Market Value at a certain moment in time.
The Discount Rate that equates the present value of the Net Cash Flow of a project with the present value of the capital investment is the rate at which the NPV equals zero. The IRR reflects both the return on the invested capital and the return of the original investment.

Ad 9. Occupancy Cost Ratio (OCR)
The OCR or Rent to Sales ratio or Occupancy burden, is the cost for a tentant to rent in a particular retail destination. It is the total rent a tenant has to pay for a retailunit expressed as a percentage of the total sales of that unit. An investor does not want the ratio to be unsustainably high, as that will hamper future rental growth. As lease contract are asually signed for multiple years, these ratio's affect future performance rather than current performance. Therefore this measurement is more a potential figure, instead of an historic performance measurement. Since this study aims to explain historic performance, OCR is not considered the best possible measurement. Practically, OCR is only possible

to measure if both, the sales plus rent data is known over the years. As stated before, sales are limited available and therefore the OCR as well. Besides, turnover-rent contracts hold a special place in this respect, although it only encompasses a very limited share of the total rental income of most portfolio's. Six of the biggest retail REIT's report percentages only between 1%-2,5%. (RBS, 2009).

Ad 10. Market Value (MV)

MV represents an appriased value. The Royal Institute of Chartered Surveyors (RICS) defines it as follows: *'The estimated amount for which a property should exchange on the date of the valuation between willing buyer and a seller in an arm's length transaction after proper marketing wherein the parties had each acted knowledgably, prudently and without compulsion'.*

An appraiser makes his valuation based upon a yield that embeds market fundamentals as well as the risk perception for the particular asset. Therefore the value embeds a wealth of information. Besides, most professional retail investors appraise their assets on a regular basis and therefore it is anticipated that the availability is sufficient. Expressed as per m² the value of a shopping centre is noted in a relative way, what makes it comparable with each other. Instead of a 'snapshot' of the Market Value at a certain moment in time, the average growth rate of the Market Value is even more valuable to use as performance measurement. As it is not feasible to request the Market Values corrected for Capital expenses (investments) that affect the MV, the somewhat simplified measurement of MV growth rate is:

$$MV\ growth\ rate = \frac{MV_t - MV_{t-1}}{MV_{t-1}}$$

Ad 11. Footfall

'Shoppers vote with their feet' is a famous statement in the retail real estate industry. It a shopping centres can draw higher numbers of footfall, relatively speaking, this could indicate how the shopping centres performs. Footfall would be an interesting replaced if an financial performance measurement would be considered unfeasible. This not seems to be the case. As it is common sense to assume footfal as an performance proxy, but of course it has is limitations since it is a non-financial measurement. Predominantly the bigger shopping centres will have yearly traffic counts, but at lot of the smaller centres do not have a yearly traffic count. Some only measure it only once in three years, some none. Moreover, very little, if any, would have footfall numbers as from 2002. Thus concessions would be necessary regarding the used track-record. The shortcomings make this performance measurement is considered the strongest nor the best available measurement.

9.4. Definitions

Anchor store
Number of anchors in the total shopping centre, also occupier-owned anchors as long as they are not stand-alone/separated from the shopping centre. As there is no unequivocal industry standard, this definition should rather be read to the spirit than to the exact letter of it. Though, an anchor tenant is defined in a rather traditional sense which only encompasses real key anchors. Usually they are well-known (inter)national brands and the upper limit per centre is 5 anchors: 1. It should be evident that it draws substantial visitors to the shopping centre and it should rather draw multi-purpose shoppers than single-purpose shoppers. Single-purpose shoppers only visit and spend on one single store (thus smaller retailers should significantly benefit from the anchor in terms of footfall and eventually sales); 2. An anchor tenant occupies a large surface, and at least 750 m²; 3. External / standalone anchors are excluded as these anchors are taken into account as 'Significantly benefitting from adjacent pedestrian flows'.

Benefitting from adjacent pedestrian flow
Without this function, the number of yearly visitors would be significantly lower. Irrespective to the adjacent function, they should in any case meet these two requirements: 1. The adjacent (but separated) function draws substantial footfall from which the shopping centre significantly benefits (and thus both have similar opening hours). And; 2. The function should be within walking distance (usually ≤ 250 metres) from the shopping centre entrance. It is allowed to choose multiple options:
Public transportation hub: interconnects multiple modes of transportation like train, bus, metro, tram. The transportation hub should be considered as (one of) the major transport facility (facilities) in the city. The number of visitors would be significantly lower without the transportation hub. City centre retail: dominant high street shopping streets are directly (or at least within 250 metres) connected to the shopping centre's entrance. The area including the shopping centre can be seen as one retail destination. An adjacent (within 250 metres) DIY or Retail warehouse location etc. belongs to 'Other retail/leisure'. Other retail/leisure: this can be an adjacent retail park/warehouse, factory outlet centre or theme-oriented centre (both, leisure-based and non-leisure based) or a dense tourist area like a (sea)boulevard or hotel district. It can also be an IKEA or hypermarket that is separated from the shopping centre. Dense office park: high dense office park or business district is directly surrounded by the shopping centre. A striking example of this is 'Les Quatre Temps' in 'La Defence' in Paris.

Competitor
The two main criteria here are: 1. The (full) catchment area of a shopping centre extends over an adjacent catchment area from another retail destination, and; 2. They experience substantial competition from each other for the same shopping trip from the inhabitants within the catchment area. This implies that they are rather subsidiary than complementary to each other (thus for one shopping trip, people visit either SC 1 or SC 2, instead of both SC 1 and SC 2). Also the inner-city highstreet retail destination can be a competitor, but when an shopping centre is integrated within the inner-city highstreet retail they are mainly complementary instead of competitive, so in that case it should not be seen as an competitor. Future competitors are irrelevant and should not be taken into account.

Estimated Rental Value (ERV)
The estimated amount for which a property, or space within a property, should lease on the date of valuation between a willing lessor and a willing lessee on appropriate lease terms, in an arm's-length

transaction, after proper marketing wherein the parties had each acted knowledgably, prudently and without compulsion.

Extension completed
The year that the latest (if any) extension was fully completed. In essence this is the year the new units were available for rent (and thus possibly affect performance). An extension is a real physical extension of the shopping centre, not an increase in ownership stake.

Financial Vacancy (FVAC)
Financial impact of the vacant unit valued against its Estimated Rental Value being the sum of lost income **over time**. A Vacant Unit is a unit, which is available for leasing and which is at that moment in time non-income producing (no rent is invoiced). This should not include units, which have been transferred to Refurbishment Project Works projects or units identified as non-lettable.

Financial Vacancy Rate
Financial Vacancy noted as a percentage of the asset's total Theoretical Rent.

Geographical Location
An inner-city shopping centre is integrated within the city centre of a, usually, major city. In this study a (sub)urban shopping centre is every shopping centre that cannot be qualified as inner-city nor as an out-of-town shopping centre. Generally speaking it is located either in a less-dense city or town without a real inner-city high street destination that surrounds a major city, or either it is located in the suburbs of a major city. An out-of-town shopping centre is by definition located at the very edge or beyond the edge of an urban area. Therefore these centres in some cases hardly have a natural catchment area, and visitors are attracted by particular pull-factors such as one or more specific anchors. Additionally, out-of-town shopping centres are known for their excellent accessibility by car.

GLA in ownership
This only concerns the GLA that is officially reported on over the years with regard to the NRI + MV. So it only concerns the m² that generates the actual rent or value to be able to calculate the like-for-like NRI or MV per square metre.

Gross Lettable Area (GLA) of Total Shopping Centre
The Gross Lettable Area of the complete shopping centre in 2009, irrespective to the ownership structure. The GLA should only concern retail + storage area (the lettable area that is used for retail operations only) and is noted in square metres. Office or communal area should be excluded. In addition the total GLA of the shopping centre should be managed (by a property manager for instance) as one connected retail destination. Occupier-owned units that are incorporated within the shopping centre should be included. But a separated/stand-alone retailpark or retailbox next to the shopping centre like an IKEA should be excluded from the shopping centre GLA. In this scenario the IKEA is taken into account by 'Benefitting from adjacent pedestrian flows'.

Gross Rental Income (GRI)
Theoretical Gross Rental Income minus Loss of Rent (Minimum Guaranteed Rent plus Financial Vacancy plus Sales Based Rent plus Other Rental Income) minus (Loss of Rent).

Incentive
Rent free period or rental discount. As IFRS rules prescribes, the rental discount shouldn't be allocated to one single period but it should be straightlined over the entire lease term.

Loss of Rent
The total amount of rent not received due to Financial Vacancy and income related Lease Incentives.

Management
Concerns both the property & leasing management.

Minimum Guaranteed Rent (MGR)
This is the nominal contracted base rent or contract rent before any contractually agreed Lease Incentives such as: Discount, Rent Free Period, Sales Based Rent, etc. It should be regarded as the dominant rental value established to in- and external parties if it were to be without any rebates. Usually the MGR is expressed as price per m².

Net Rental Income (NRI)
Total Gross Rental Income minus total Operating Expenses.

Net Rental Income (NRI) like for like
The change in NRI over two periods is made comparable by eliminating acquisition and sales. To do this, the previous year's actuals are adjusted to simulate what would have been the case, in relation to the actuals or the budget.

NUTS (Eurostat)
Stand for Nomenclature of Territorial Units for Statistics (NUTS) and refers with a specific code to various European Regions. Three levels are used; NUTS 1: major socio-economic regions; NUTS 2: basic regions for the application of regional policies; NUTS 3: as small regions for specific diagnoses.
This category refers to regions belonging to the third level (NUTS 3, also known as NUTS III), which is largely used by Eurostat and other European Union bodies. The thresholds in the table below are used as guidelines for establishing the regions, but they are not applied rigidly. For example, both Cornwall, population 531,600 in 2007, and Lombardy, with a population of nearly ten million, are NUTS 2 regions.

Level	Minimum	Maximum
NUTS 1	3 million	7 million
NUTS 2	800 000	3 million
NUTS 3	150 000	800 000

Source 29: http://ec.europa.eu

Market Value (MV)
This is defined by the RICS and agreed by the IVSC as '*The estimated amount for which a property should exchange on the date of the valuation between willing buyer and a seller in an arm's length transaction after proper marketing wherein the parties had each acted knowledgably, prudently and without compulsion*'. It is the same and synonymous with (Net) Open Market Value.

Operating Expenses (OE) (EPRA)
The expenses directly relating to a property for a certain period of time for the account of the landlord including service charges not recoverable for example because of vacancy. Includes taxes, insurances, property management expenses, maintenance, letting fees + net service charges (non recoverable).

Other Rental Income
This includes all income from a building, which is not related to any standard lettable unit:
Specialty Leasing Income, Parking tickets, Ground rent received.

Occupancy Cost Ratio (OCR)
Also known as rent to sales ratio. Total Minimum Guaranteed Rent of all tenants that report Sales incl. VAT divided by the total reported sales for those same tenants over the same period of time (see also the alternative measure of occupancy burden).

Primary Catchment Area
As there is no European standard for primary catchment area and measurements differ among countries, we ask for your commonly used appliance/definition. Please only provide the primary catchment area (thus secondary or tertiary is excluded) and choose the most appropriate measurement in your local practice. The exact percentage or driving minutes depend on the shopping centre's size, dominance, profile, competition and geographical obstacles etc so one can account for that. 1. Sales/Visitors based: The estimated number of inhabitants living in the area from which ca. 70% of the centre's sales originate; 2. Driving minutes based: The estimated number of inhabitants living within a driving radius between 10 to 30 minutes.

Sales Based Rent
Rent based on tenant sakes over a 12 month period in addition to his Minimum Guaranteed Rent.

Shopping Centre
A retail property that is planned, built and managed as a single entity, comprising units and 'communal' areas, with a minimum GLA of 5,000 square metre. In addition: Seven years of performance track record is required to be eligible 2002-2009 (2004-2009 for CEE countries); The shopping centre should have been opened in, or before, 2001 (2003 for CEE) to avoid start-up problems bias results; If one anchor (e.g. a Hypermarket) covers over 50% in terms of GLA of the total shopping centre GLA, unless the remaining GLA is over 5,000 square metres in total; The scheme should in every case evoke the sense of a shopping centre. If it rather qualifies as a +10,000 m² Hypermarket with a minor gallery it can be excluded; Specialised centres like Retail Warehouses, Retail Parks, Factory Outlet Centres, Lifestyle Centres and Theme-Oriented Centres are excluded; The retail concentration needs to be managed as one entity by a property manager to exclude highstreet shops but include open-air centres.

Tenant mix profile
Comparison-based centres include retailers typically selling fashion apparel and shoes, home furnishings, electronics, general merchandise, toys, luxury goods, gifts and other discretionary goods. Convenience-based centres include retailers that sell essential goods (those items consumers buy on a regular basis) and are typically anchored by a grocery store (supermarket or hypermarket). Additional

stores usually found in convenience-based centres include chemist (drug stores), convenience stores and retailers selling household goods, basic apparel, flowers and pet supplies.

Theoretical Gross Rental Income
Theoretical Rent plus Sales Based Rent and Other Rental Income. This is only used over a period not at status date, it is the maximum income a building can proceed.

Theoretical Rent / Gross Potential Rent
This is the annualised rent receivable (ignoring the effect of future CPI-indexation) if the building were to be fully income producing. It is therefore the sum of Minimum Guaranteed Rent (MGR), plus Financial Vacancy (FVAC) obtaining on non-rent producing rental units, which are available for leasing, but not leased.

9.5. Investors

Retail investors/investment managers within ERG:

Company name	Country of origin
AEW Europe	France
Allianz Real Estate GMBH	Germany
Commerz Real AG	Germany
Corio	The Netherlands
EuroCommercial Properties	United Kingdom
Hammerson Plc	United Kingdom
Henderson Global Investors	United Kingdom
ING REIM	The Netherlands
RREEF Alternative Investments	United Kingdom
Redevco Europe	The Netherlands
Sonae Sierra	Portugal
Spar European Shopping Centres	Austria

Contacted retail investors/investment managers outside the ERG trough ICSC network:

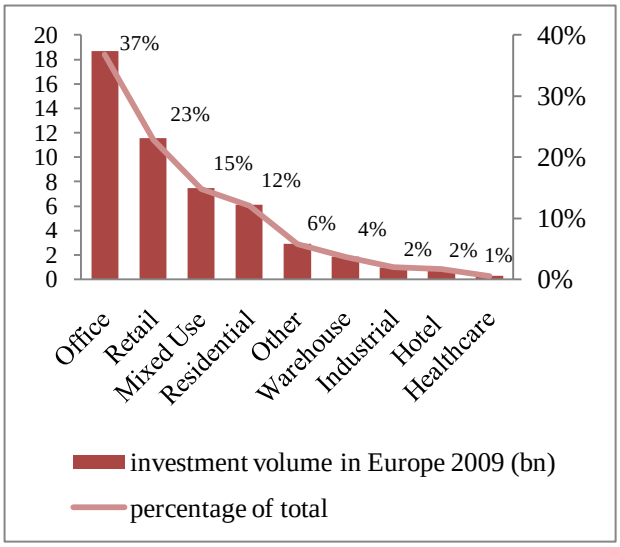
Company name	Country of origin
Unibail-Rodamco	France-Netherlands
Klépierre	France

Besides, other predefined parties can be approached if it is advisable to further increase the amount of data.
Consulting ERG member for support research approach:

Copmany name	Country of origin
IPD London	United Kingdom

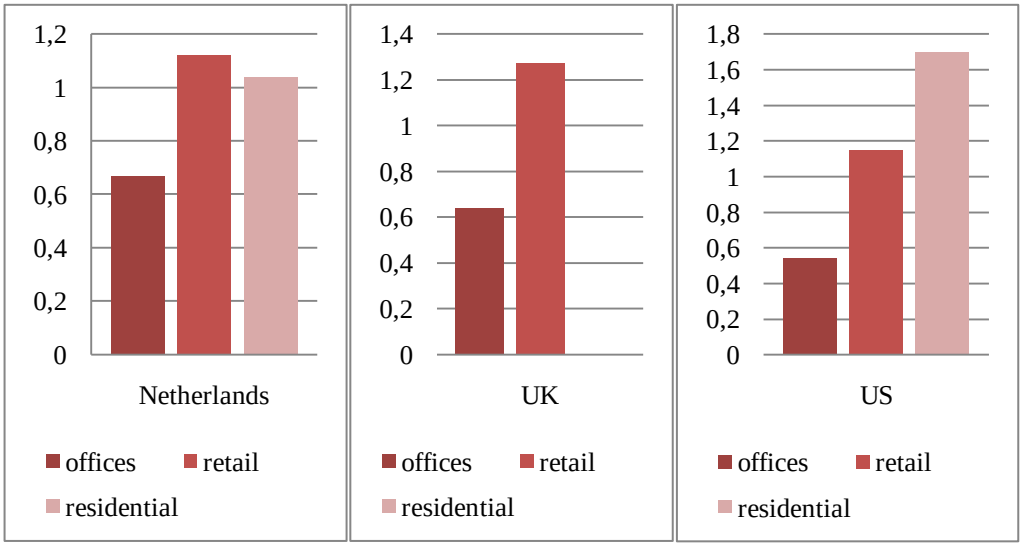
9.6. Figures, exhibits and tables

Figure 28: Investment volume per asset class in Europe in 2009 (bn)



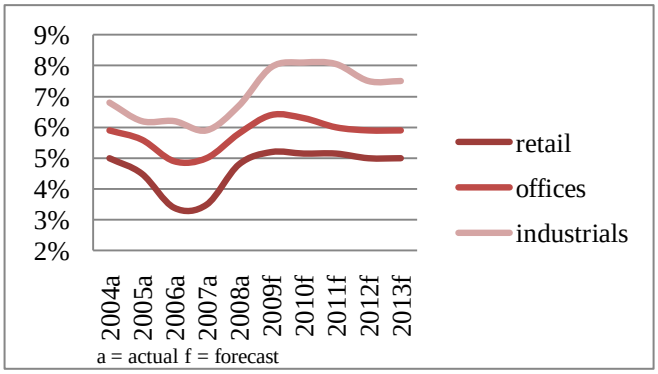
Source 30: Property EU, 2010

Figure 29: Sharpe-ratios over 1980-2005 time-series



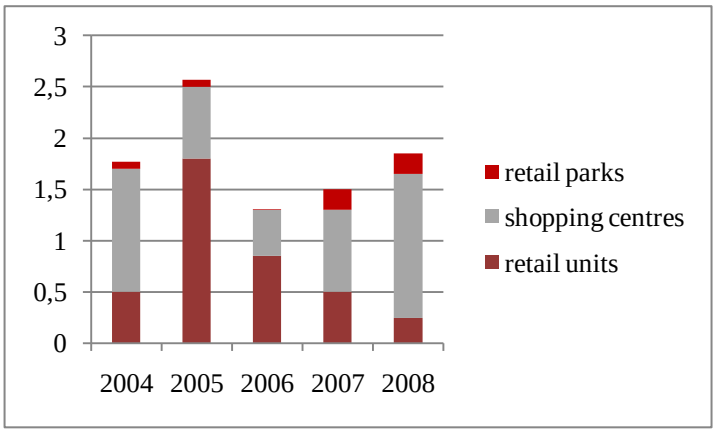
Source 31: Van Gool et al., 2007

Figure 30: Prime gross initial yield per segment



Source 32: Jones Lang LaSalle, Dutch retail market bulletin, 2009

Figure 31: investment volumes in retail per category (€ bn)



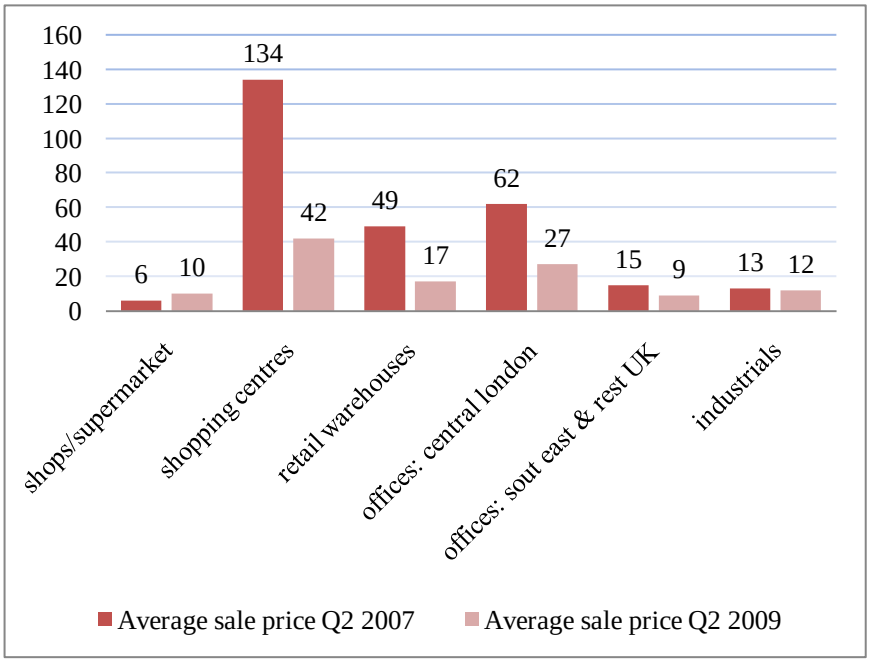
Source 33: Jones Lang LaSalle, Dutch retail market bulletin, 2009

Table 23: European shopping centre types

Format	Type of scheme		Gross Lettable Area (GLA)
Traditional	very large		80,000 m² and above
	large		40,000 - 79,999 m²
	medium		20,000 - 39,999 m²
	small	comparison-based	5,000 - 19,999 m²
		convenience-based	5,000 - 19,999 m²
Specialised	retail parks	large	20,000 m² and above
		medium	10,000 - 19,999 m²
		small	5,000 - 9,999 m²
	factory outlet centre		5,000 m² and above
	theme-oriented centre	leisure-based	5,000 m² and above
		non-leisure-based	5,000 m² and above

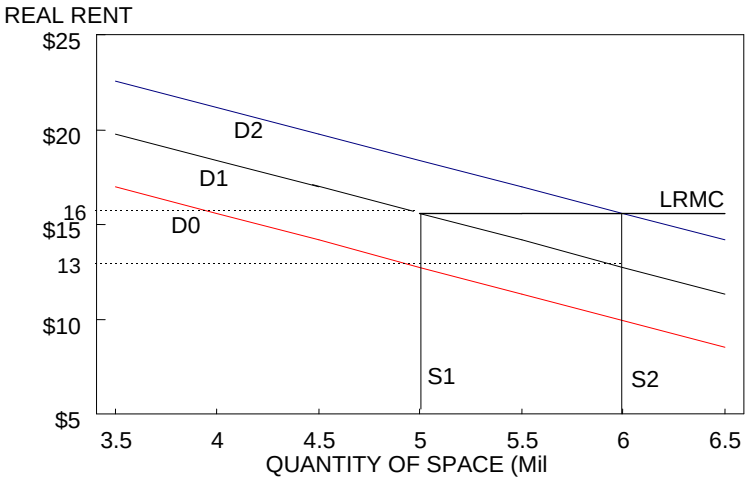
Source 34: Shopping Centre Types (ICSC, 2005)

Figure 32: Smaller properties are more liquid in a downturn



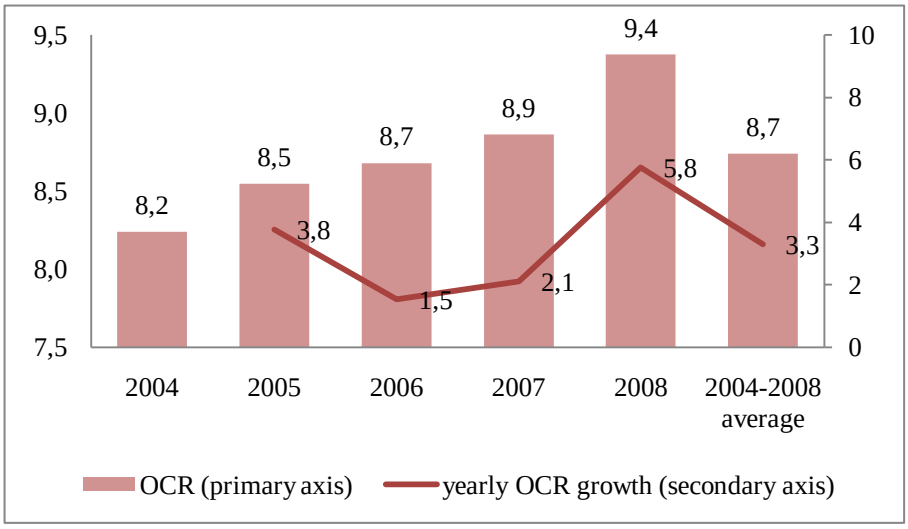
Source 35: IPD UK Quarterly Index, Property Databank, Schroders, May2010

Figure 33: Change in demand, supply and rent over time



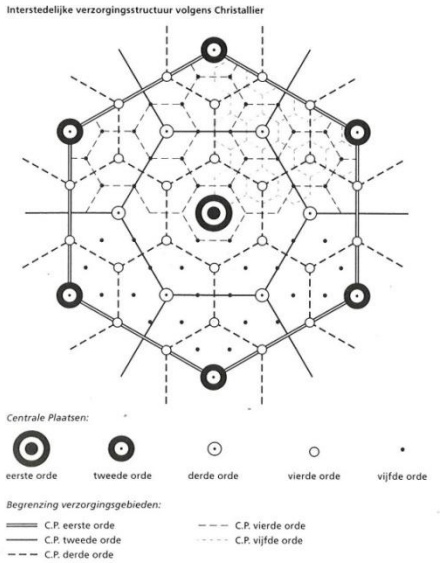
Source 36: Geltner et al. (2001)

Figure 34: Occupancy Cost Ratio



Source 37: RBS (2009), Annual Reports Corio, Unibail-Rodamco, Klépierre and Mercialys

Figure 35:Hexagonal spatial structure of CPT



Source 38: Bolt (1995)

Table 24: specific factors that affect performance indicators

	Significantly affects returns	Significantly affects sales level	Significantly affects rent level
Characteristics related to catchment area			
Geographic location	*x*		*x*
Shopping centre type	*x*		
Catchment area		*x*	*x*
Shopping centre size		*x*	*x*
Footfall / traffic count			*x*
Characteristics shopping centre			
Parking fee		*x*	
Parking convenience		*x*	
Parking facilities		*x*	
Degree of enclosing / open-air		*x*	
Attractiveness windows		*x*	
Price/quality of stock		*x*	
Cleanliness public space		*x*	
Atmosphere		*x*	
Characteristics store unit			
Gross/Net route	*x*		
Unit order/class/quality	*x*		*x*
- tenant mix		*x*	
- relative location in shopping centre		*x*	
- unit accessibility		*x*	
Unit size		*x*	*x*
Unit shape		*x*	*x*
Retailer branch		*x*	*x*

Source 39: Janssen, I.I. (2004)

9.7. Contribution of rental growth within IRR

In order to deepen the understanding of the relevance of Rental growth, it is useful to emphasize its role within an IRR calculation.

Real estate has two typical characteristics that make the Internal Rate of Return (IRR) an interesting and broadly used investment performance measure. In the first place, individual assets are typically held for relatively long periods of, for example, five or ten years. This is due in part to the high transaction costs but also due to the desire to enhance investment returns through successful operational management of the properties, rather than simply from 'trading'. The second feature of real estate is that they tend to be 'cashcows' as they are income-based through the rental cash flow. Usually, the IRR is the return over whole (multiyear) holding period and therefore it provides a meaningful quantification of the investment performance. To increase our understanding of the IRR it is useful to break the IRR down into components. This process may be viewed as a type of micro level performance attribution, because it attributes the overall investment performance to the components that make up the IRR (Geltner et al., 2001). The IRR is usually broken down into three components:

1. Initial cash flow yield;
2. Subsequent cash flow growth;
3. Yield change between beginning and end of holding period.

A simplified numerical example can be useful to increase the understanding. We buy a property at an initial yield of 9%, with a net cashflow (net of capital expenditures) in year 1 of 1,000, a annual rental growth rate of 3% and an exit yield of 10% and the holding period is 10 years. Using the Discount Cash Flow method will learn that the IRR of this property will yield 11,3% (see table 25). The IRR (internal rate of return) is that single rate that discounts all the net cash flows obtained from the

investment to a present value equal to what you paid for the investment at the beginning (Net Present Value, or NPV) and is calculated as follows:

$$NPV = 0 = Inv_{t0} + \frac{Balance_{t1}}{(1+IRR)} + \frac{Balance_{t2}}{(1+IRR)^2} + \cdots + \frac{Balance_N}{(1+IRR)^N}$$

The (net) initial yield is defined by the initial net cash flow (or net rental income in year 1) expressed as a percentage of the purchasing price in year 0. In the case that there would be no rental growth and the exit yield would be 9% as well, than the IRR would equal the Initial yield; 9%. The Yield change component is based on both the initial yield and the exit yield. In a DCF model without rental growth but with an exit yield of 10% instead of 9%, ceteris paribus, the IRR would yield 8,3%. Hence, the difference (i.e. yield change) between initial and exit yield has suppressed the IRR with 9%-8,3% = 0,7%. Obviously, in times of economic prosperity it can be more likely the yield change is positive. Together with the rental growth component of 3%, one can clearly see that the IRR is a composition of these three factors. Thus;

$$IRR\ (11{,}3) = \ Initial\ yield\ (9) + rental\ growth(3) + yield\ change\ (-0{,}7)$$

In advance to an investment, an investor requires a certain return during the period he expects to keep it in his portfolio. For example, if an investor requires an IRR of 11,3 percent over the holding period and he predicts only an average rental growth of 2 percent (instead of 3) , ceteris paribus, the equation above learned us that he won't make his required return, but only a 10,3 percent IRR. If he wants to make his 11,3 percent IRR with a 10 percent exit yield and 2 percent rental growth, he should require a 10% initial yield and hence an investment of €10,000 instead of €11,111 (see table 25). Theoretically speaking, if we assume that most investors will require similar IRR's on shopping centres and they use similar exit yields, then an investment with a lower initial yield would require a higher future rental growth in order to achieve the required internal rate of return. However, too little is known about the other variables like IRR goals and exit yields to reliably test such relationships in empiricism.

Table 25: IRR calculation with DCF-method

Year	Inv.	NRI	Exit Value	Balance	PV
0	-11.111			-11.111	-11.111
1		1.000		1.000	899
2		1.030		1.030	832
3		1.061		1.061	770
4		1.093		1.093	712
5		1.126		1.126	659
6		1.159		1.159	610
7		1.194		1.194	565
8		1.230		1.230	523
9		1.267		1.267	484
10		1.305	13.439	14.744	5.058
11		1.344		1.344	
				NPV	0
Initial yield			9,0%		
Exit yield			10,0%		
Yield change component			-0,7%		
Rental growth			3,0%		
Internal Rate of Return			**11,3%**		

Source 40: Oosterveld, (2010)

9.8. Lease legislation

Over the countries in Europe there are several legislation frameworks regarding rental leases. Below an overview is presented of some important countries that are represented in the sample. These institutional characteristics affect the like for like rental growth in shopping centres and should therefore be addressed briefly.

An important explanation for the relatively limited lfl rental growth in the Netherlands is the specific leasing legislation. At the rent review date, that is at the expiration date of after every five years after the first expiration date, both the tenant and landlord can request for a so-called rent review procedure (huurherzieningsprocedure) as stated in the Dutch civil law (article 7:303 BW). Here the new contract rent is determined by five reference transactions (that is, a similar property with a tenants of a similar sector) that were concluded until five years back. These references are adjusted for inflation and after that the average rent is determined as the new rent to agree on. This mechanism is unique in Europe and only takes place in the Netherlands. In times of economic growth it is plausible to assume that the actual market rents will increase at a higher pace than inflation so that will limit the reversionary potential of a lease contract. In economic downturn, however, where market rents are decreasing it is likely that reference transaction could be concluded at a higher rent. In that case it could protect the landlord from negative rental growth. Whatever the case, it is reasonable to stat this mechanism will tend to limit both growth and decline in rental rates and it show similarities with the lagging and smoothing effect as discussed earlier. If the landlord will relet an empty unit, the 'normal' market rent can be targeted in lease negotiations.

Table 26: cross-country lease legislation

Netherlands		
Tenor of rental agreement	Typical 10 years	Usually structured as 5+5 years
Tenants right to renewal	Yes	At the end of the initial 5 year term
Right to terminate	Yes	Either party subject to 12 months advance notice by one of the parties though there is mandatory recourse to the courts if the tenant objects
Rent reviews	Yes	After the first lease term (usually 5 years) both parties have the right to seek a rental adjustment to bring the rent in to line with markets rates (up or down)
Rent structures	Mostly fixed	To date almost all fixed annual rents but where possible moving towards turnover linked rents with high floors
Monitoring of turnover	No	Not available on the Dutch Market
Indexation	Yes	Annualy linked to CPI
Sale of tenancy	Yes	Permitted by existing tenant to new tenant during lease term with no rental uplift (indeplaats stelling). Assuming the new tenant has the same scope of retail activity and is considered solvent the landlord cannot object
France		
Tenor of rental agreement	Typically 10 years	Usually with break options for the tenant at 3 / 6 / 9 years
Tenants right to renewal	Yes	But at a market rent
Rent reviews	Yes	At lease end (market rent)
Right to terminate	Yes	At lease end against indemnity payment

Rent structures	Fixed	Minimum guaranteed rent + additional turnover rent if exceeding threshold
Monitoring of turnover	Yes	Monthly declaration + annual audited validation
Indexation	Yes	Annually based on the ILC index (based on the CPI, Construction Index & Retail turnover)
Sale of tenancy	Yes	Permitted by existing tenant to new tenant during lease term with no rental uplift assuming the new tenant has the same scope of retail activity and is considered solvent.
Italy		
Tenor of rental agreement	Typically 5 years	Some leases eg for restaurants can be up to 10 years
Tenants right to renewal	No	No automatic right to renewal at the end of the lease
Right to terminate	No	Neither party can terminate the contract as long as the rent is being paid on time
Rent structures	Essentially fixed rents	There is a turnover linked element to rental income but the contribution from turnover linked rents is very limited (less than 2% in 2008)
Monitoring of turnover	Yes	
Indexation	Yes	Linked to CPI
Sale of tenancy by tenant	No	In exceptional circumstances a sale may be allowed but landlord must consent - typically this is only done when the tenant is experiencing operating difficulties and the landlord has been able to line up a replacement
Spain		
Tenor of rental agreement	Typically 5 years	Medium sized units 10 years (inc 5 year break) and restaurants 15 years (10 year break)
Tenants right to renewal	No	In general tenants have no right to renew on expiry
Right to terminate	No	Neither party can terminate the contract as long as the rent is being paid on time
Rent structures	Mostly fixed	Turnover linked rent is set to generate between 5-10% of additional rent
Monitoring of turnover	Yes	
Indexation	Yes	Annually linked to inflation rate
Portugal		
Tenor of rental agreement	Typically 6 years	Generally 6 years for regular units and between 10 to 20 years for anchor tenants
Right to terminate	No	The only break option for tenants can be executed at the end of the lease term, not during the lease
Indexation	Yes	Annually linked to inflation rate (100% CPI)

9.9. Results

Figure 36: distribution over countries per size category

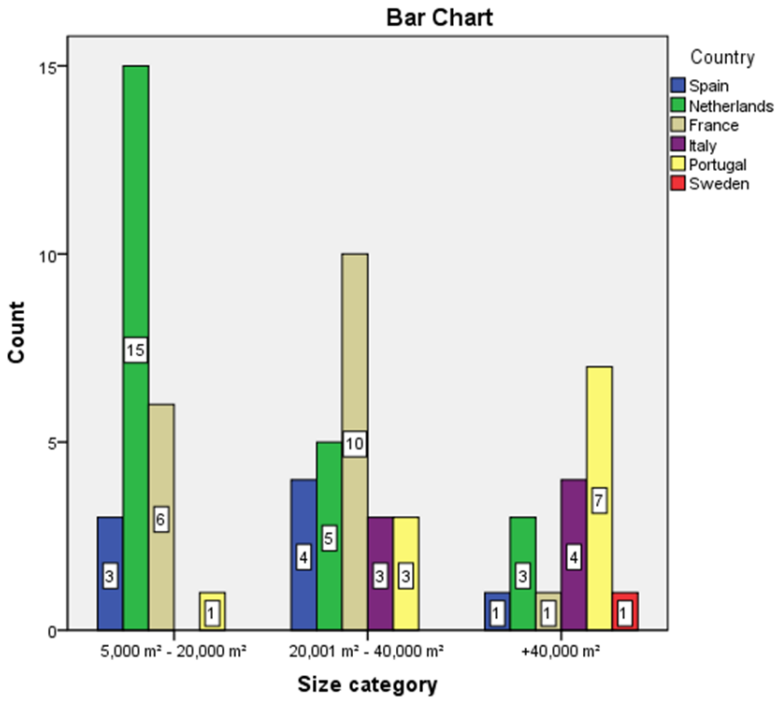


Figure 37: distribution over countries per size category

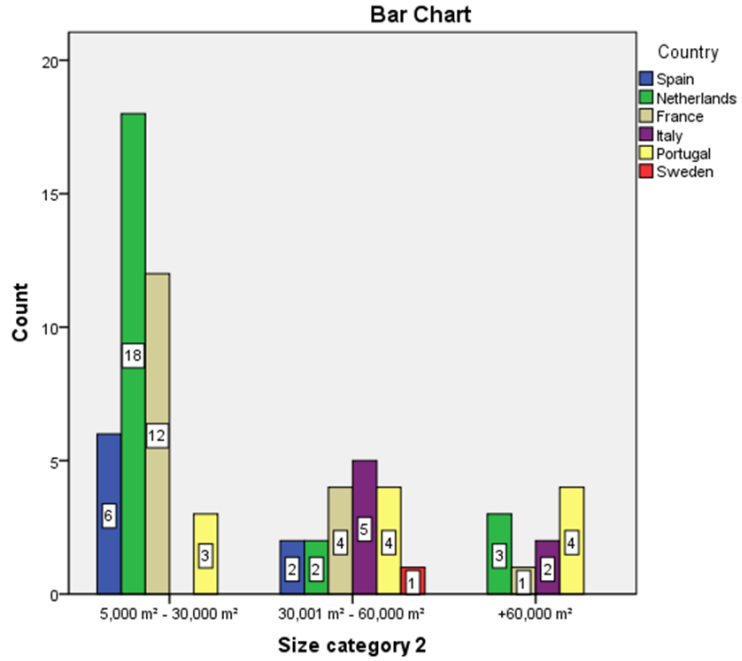


Figure 38: shopping centre size category per geographical location

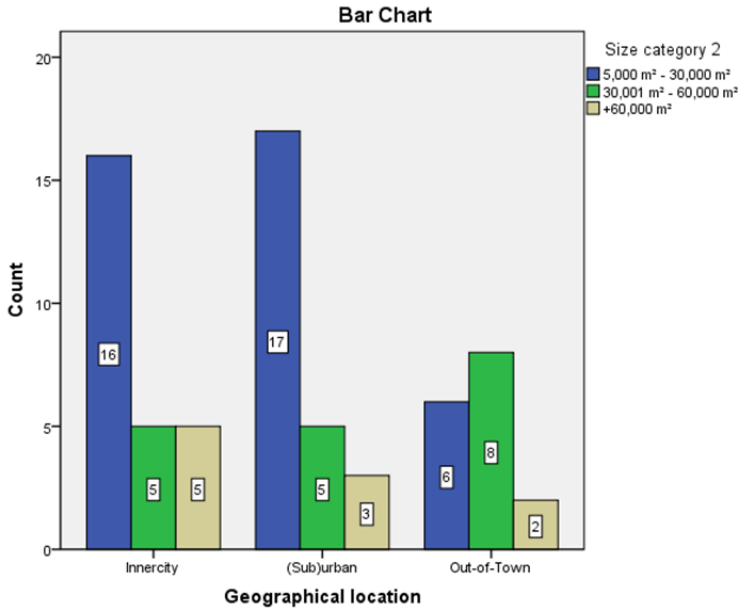


Figure 39: normal distribution

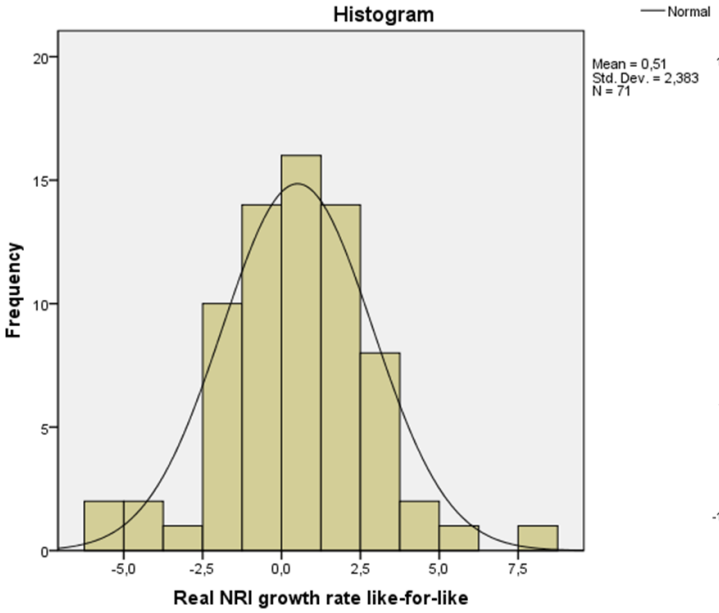


Figure 40: boxplot

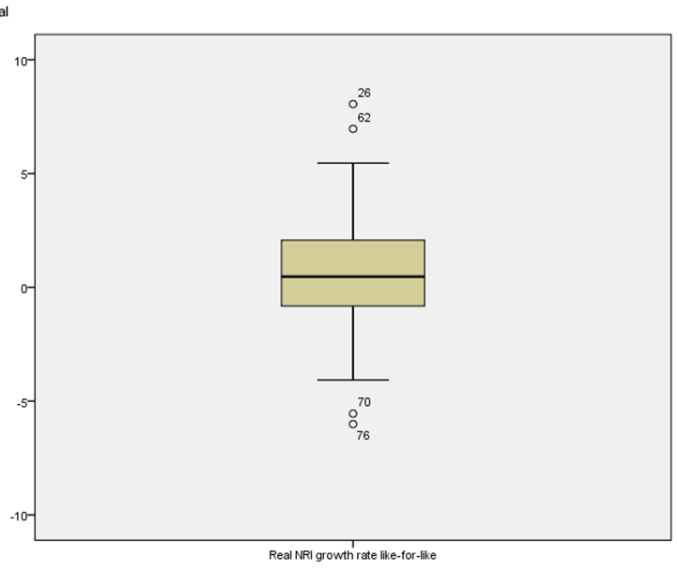


Table 27: normality test

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
NRI growth rate like-for-like	,091	71	,200*	,977	71	,209
Real NRI growth rate like-for-like	,053	71	,200*	,983	71	,456
MV growth rate	,086	71	,200*	,981	71	,343
Rolling average Net Income Yield	,225	71	,000	,821	71	,000
Rent per m²	,126	71	,007	,944	71	,003
Value per m²	,116	71	,019	,913	71	,000

a. Lilliefors Significance Correction

*. This is a lower bound of the true significance.

Table 28: correlation GDP growth

Correlations

		GDP growth /pc	Real NRI growth rate like-for-like	Rent per m²	Value per m²
GDP growth /pc	Pearson Correlation	1	,102	-,354**	-,342**
	Sig. (2-tailed)		,395	,002	,003
	N	72	72	72	72
Real NRI growth rate like-for-like	Pearson Correlation	,102	1	-,097	-,009
	Sig. (2-tailed)	,395		,416	,940
	N	72	72	72	72
Rent per m²	Pearson Correlation	-,354**	-,097	1	,784**
	Sig. (2-tailed)	,002	,416		,000
	N	72	72	72	72
Value per m²	Pearson Correlation	-,342**	-,009	,784**	1
	Sig. (2-tailed)	,003	,940	,000	
	N	72	72	72	72

**. Correlation is significant at the 0.01 level (2-tailed).

Table 29: correlation retail sales growth

Correlations

		Retail sales growth /pc	Real NRI growth rate like-for-like	MV growth rate	NRI growth rate like-for-like
Retail sales growth /pc	Pearson Correlation	1	,063	,312**	,203
	Sig. (2-tailed)		,599	,008	,088
	N	72	72	72	72
Real NRI growth rate like-for-like	Pearson Correlation	,063	1	,410**	,960**
	Sig. (2-tailed)	,599		,000	,000
	N	72	72	72	72
MV growth rate	Pearson Correlation	,312**	,410**	1	,500**
	Sig. (2-tailed)	,008	,000		,000
	N	72	72	72	72
NRI growth rate like-for-like	Pearson Correlation	,203	,960**	,500**	1
	Sig. (2-tailed)	,088	,000	,000	
	N	72	72	72	72

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 41: scatter plot unemployment growth

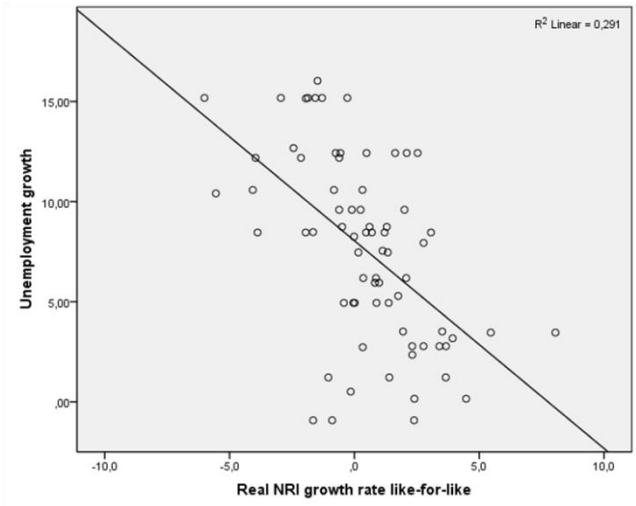


Table 30: group statistics benefit from other retail/leisure for Out-of-Town shopping centres

Group Statistics

	Other retail / leisure	N	Mean	Std. Deviation	Std. Error Mean
NRI growth rate like-for-like	False	7	3,509	1,7770	,6717
	True	9	5,171	1,2152	,4051
Real NRI growth rate like-for-like	False	7	,327	1,6508	,6239
	True	9	2,050	1,2899	,4300
MV growth rate	False	7	6,502	3,4033	1,2863
	True	9	7,104	2,3151	,7717
Rolling average Net Income Yield	False	7	4,842	1,4504	,5482
	True	9	4,806	1,7535	,5845
Rent per m²	False	7	207,14	87,654	33,130
	True	9	238,44	120,409	40,136
Value per m²	False	7	4419,57	1464,889	553,676
	True	9	4996,11	1395,614	465,205

Table 31: test results benefit from other retail/leisure for Out-of-Town shopping centres

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
NRI growth rate like-for-like	Equal variances assumed	,521	,482	-2,225	14	,043	-1,6618	,7470	-3,2640	-,0597
	Equal variances not assumed			-2,119	10,151	,060	-1,6618	,7843	-3,4059	,0823
Real NRI growth rate like-for-like	Equal variances assumed	,527	,480	-2,349	14	,034	-1,7229	,7335	-3,2962	-,1496
	Equal variances not assumed			-2,274	11,163	,044	-1,7229	,7577	-3,3877	-,0581
MV growth rate	Equal variances assumed	4,243	,059	-,422	14	,679	-,6027	1,4277	-3,6649	2,4595
	Equal variances not assumed			-,402	10,114	,696	-,6027	1,5000	-3,9389	2,7345
Rolling average Net Income Yield	Equal variances assumed	1,989	,180	,044	14	,965	,0365	,8217	-1,7259	1,7989
	Equal variances not assumed			,046	13,912	,964	,0365	,8014	-1,6833	1,7563
Rent per m²	Equal variances assumed	3,160	,097	-,577	14	,573	-31,302	54,225	-147,602	84,999
	Equal variances not assumed			-,601	13,969	,557	-31,302	52,043	-142,947	80,344
Value per m²	Equal variances assumed	,115	,739	-,802	14	,436	-576,540	718,493	-2117,554	964,475
	Equal variances not assumed			-,797	12,711	,440	-576,540	723,168	-2142,473	989,393

Table 32: benferroni-test ANOVA performance by country

Multiple Comparisons

Real NRI growth rate like-for-like

Bonferroni

(I) Country	(J) Country	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Spain	Netherlands	-,9264	,8084	1,000	-3,276	1,423
	France	-2,4069	,8394	,056	-4,846	,032
	Italy	-2,7444	1,0361	,101	-5,755	,267
	Portugal	1,0824	,8915	1,000	-1,508	3,673
Netherlands	Spain	,9264	,8084	1,000	-1,423	3,276
	France	-1,4805	,6470	,254	-3,361	,400
	Italy	-1,8180	,8875	,446	-4,397	,761
	Portugal	2,0088	,7134	,064	-,064	4,082
France	Spain	2,4069	,8394	,056	-,032	4,846
	Netherlands	1,4805	,6470	,254	-,400	3,361
	Italy	-,3375	,9158	1,000	-2,999	2,324
	Portugal	3,4893*	,7483	,000	1,315	5,664
Italy	Spain	2,7444	1,0361	,101	-,267	5,755
	Netherlands	1,8180	,8875	,446	-,761	4,397
	France	,3375	,9158	1,000	-2,324	2,999
	Portugal	3,8268*	,9639	,002	1,026	6,628
Portugal	Spain	-1,0824	,8915	1,000	-3,673	1,508
	Netherlands	-2,0088	,7134	,064	-4,082	,064
	France	-3,4893*	,7483	,000	-5,664	-1,315
	Italy	-3,8268*	,9639	,002	-6,628	-1,026

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

Table 33: benferroni-test ANOVA performance by country

Multiple Comparisons

MV growth rate

Bonferroni

(I) Country	(J) Country	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Spain	Netherlands	-,6384	,8646	1,000	-3,151	1,874
	France	-4,9073*	,8977	,000	-7,516	-2,299
	Italy	-,8036	1,1082	1,000	-4,024	2,417
	Portugal	,9703	,9535	1,000	-1,801	3,741
Netherlands	Spain	,6384	,8646	1,000	-1,874	3,151
	France	-4,2689*	,6920	,000	-6,280	-2,258
	Italy	-,1652	,9492	1,000	-2,924	2,593
	Portugal	1,6087	,7630	,389	-,609	3,826
France	Spain	4,9073*	,8977	,000	2,299	7,516
	Netherlands	4,2689*	,6920	,000	2,258	6,280
	Italy	4,1036*	,9795	,001	1,257	6,950
	Portugal	5,8776*	,8004	,000	3,552	8,203
Italy	Spain	,8036	1,1082	1,000	-2,417	4,024
	Netherlands	,1652	,9492	1,000	-2,593	2,924
	France	-4,1036*	,9795	,001	-6,950	-1,257
	Portugal	1,7740	1,0309	,900	-1,222	4,770
Portugal	Spain	-,9703	,9535	1,000	-3,741	1,801
	Netherlands	-1,6087	,7630	,389	-3,826	,609
	France	-5,8776*	,8004	,000	-8,203	-3,552
	Italy	-1,7740	1,0309	,900	-4,770	1,222

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

Table 34: benferroni-test ANOVA performance by geographical location

Multiple Comparisons

Bonferroni

Dependent Variable	(I) Geographical location	(J) Geographical location	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Real NRI growth rate like-for-like	Innercity	(Sub)urban	-,9950	,6302	,357	-2,542	,552
		Out-of-Town	-1,5052	,7322	,131	-3,302	,292
	(Sub)urban	Innercity	,9950	,6302	,357	-,552	2,542
		Out-of-Town	-,5103	,7371	1,000	-2,320	1,299
	Out-of-Town	Innercity	1,5052	,7322	,131	-,292	3,302
		(Sub)urban	,5103	,7371	1,000	-1,299	2,320
MV growth rate	**Innercity**	(Sub)urban	-,3976	,8004	1,000	-2,362	1,567
		Out-of-Town	**-2,3628***	**,9300**	**,040**	**-4,646**	**-,080**
	(Sub)urban	Innercity	,3976	,8004	1,000	-1,567	2,362
		Out-of-Town	-1,9652	,9363	,119	-4,263	,333
	Out-of-Town	**Innercity**	**2,3628***	**,9300**	**,040**	**,080**	**4,646**
		(Sub)urban	1,9652	,9363	,119	-,333	4,263
NRI growth rate like-for-like	Innercity	(Sub)urban	-1,1355	,6922	,317	-2,835	,564
		Out-of-Town	-1,8319	,8043	,078	-3,806	,142
	(Sub)urban	Innercity	1,1355	,6922	,317	-,564	2,835
		Out-of-Town	-,6965	,8097	1,000	-2,684	1,291
	Out-of-Town	Innercity	1,8319	,8043	,078	-,142	3,806
		(Sub)urban	,6965	,8097	1,000	-1,291	2,684

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

Figure 42: descriptive performance by geographical location

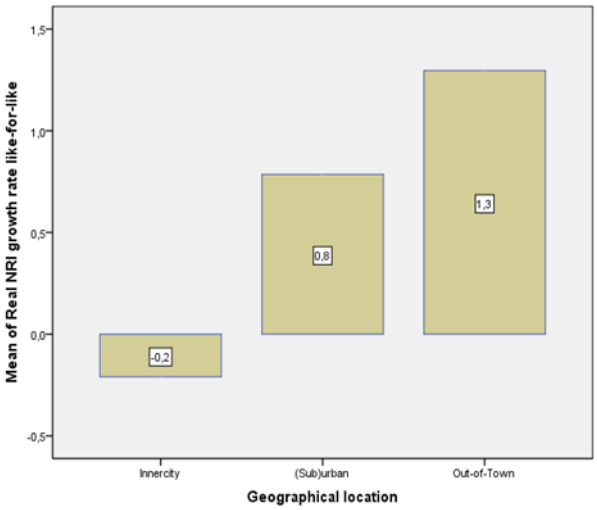


Figure 43: descriptive performance by geographical location

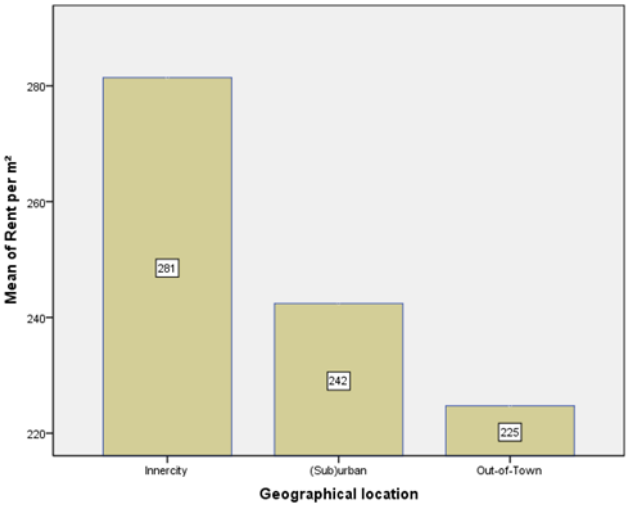


Figure 44: descriptive performance by geographical location

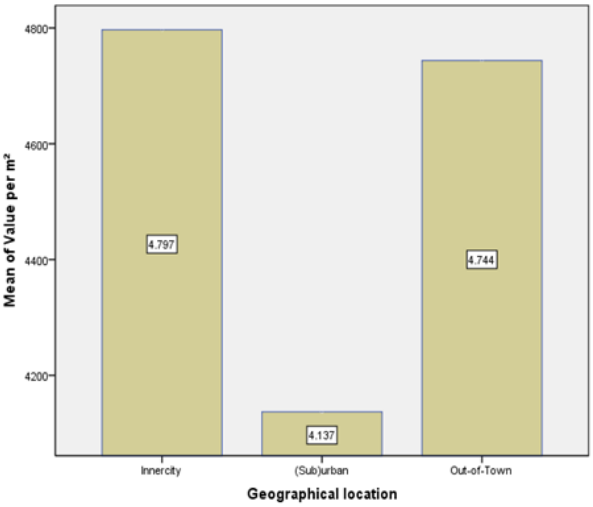


Table 35: correlation results relative level of shopping centre supply

Correlations

		SC supply /1,000inh
Real NRI growth rate like-for-like	Pearson Correlation	-,178
	Sig. (2-tailed)	,138
	N	71
MV growth rate	Pearson Correlation	-,232
	Sig. (2-tailed)	,052
	N	71
NRI growth rate like-for-like	**Pearson Correlation**	**-,327****
	Sig. (2-tailed)	**,005**
	N	71
SC supply /1,000inh	Pearson Correlation	1
	Sig. (2-tailed)	
	N	71

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 45: descriptive performance by size category

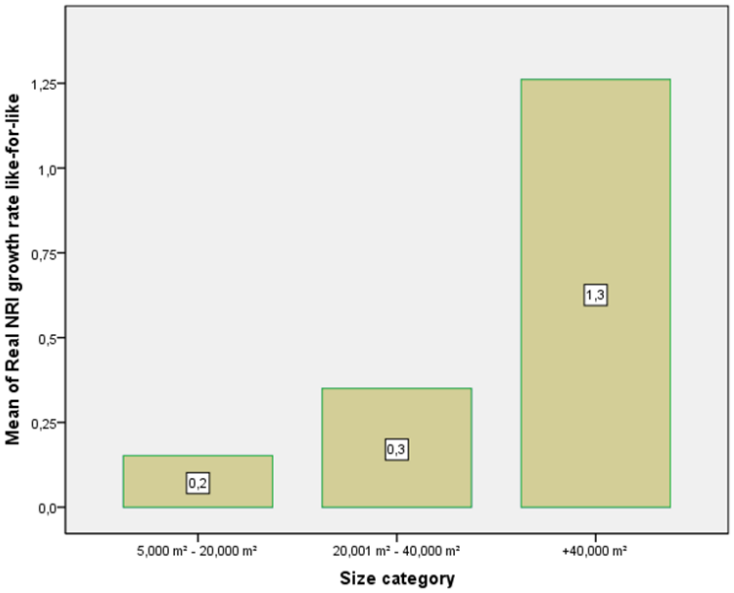


Figure 46: descriptive performance by size category

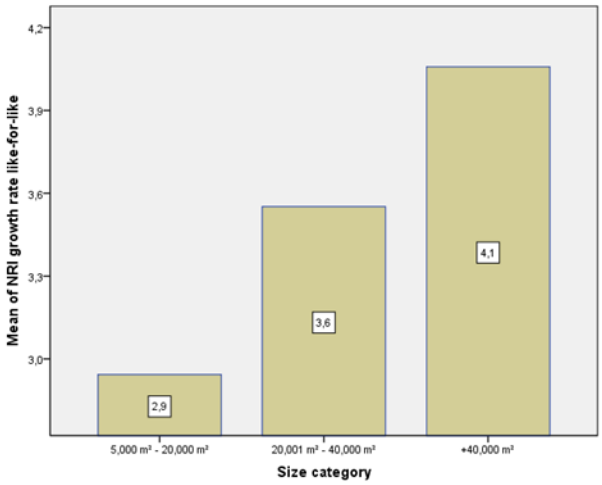


Figure 47: descriptive performance by size category

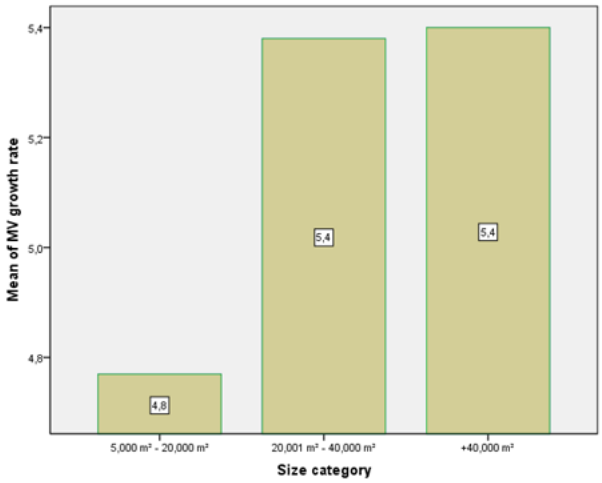


Figure 48: descriptive performance by size category

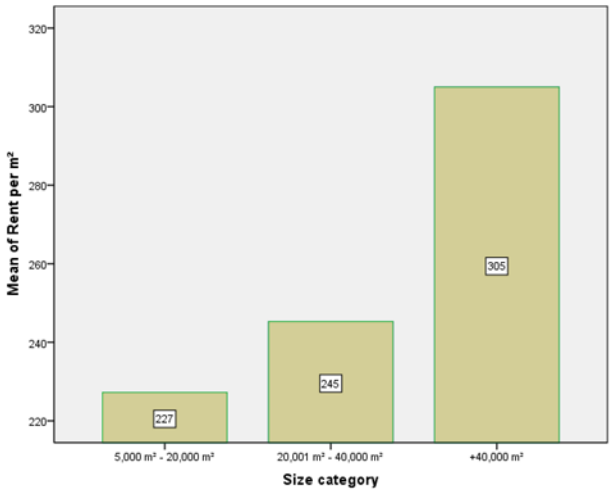


Figure 49: descriptive performance by size category

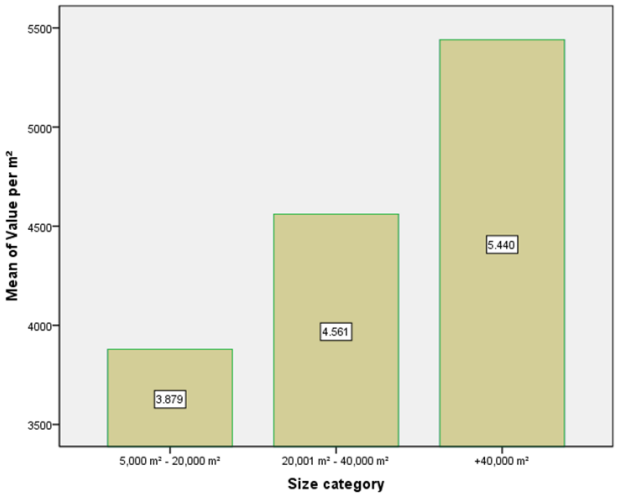


Figure 50: descriptive performance by size category

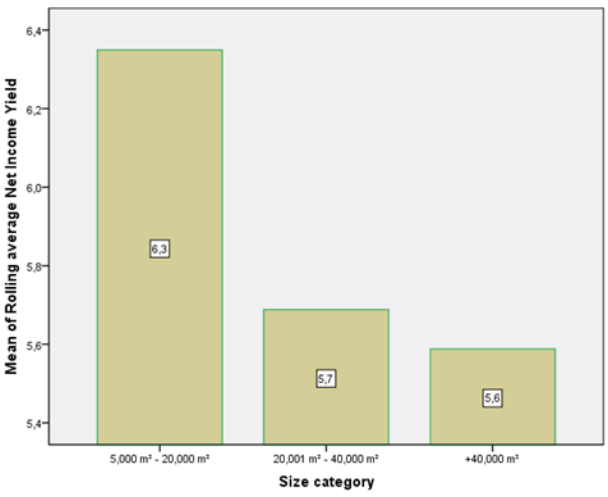


Figure 51: descriptive performance by size category 2

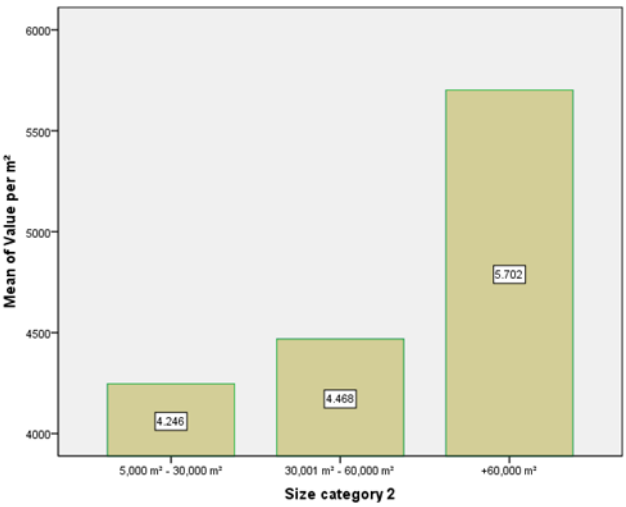


Figure 52: descriptive performance by size category 2

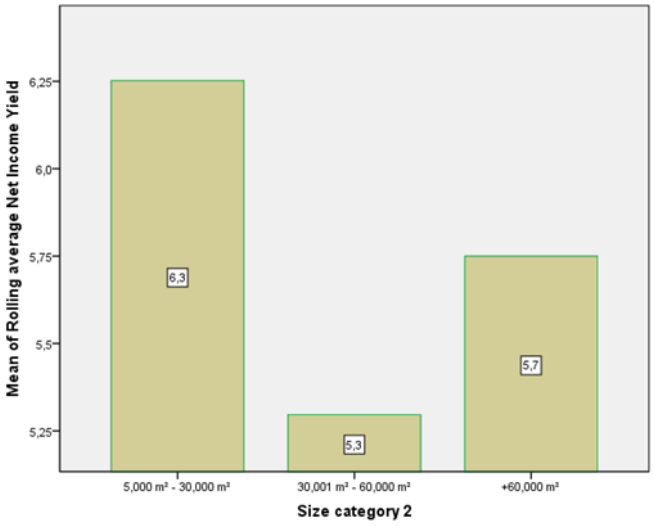


Table 36: descriptive & ANOVA performance results (sub)urban and out-of-town centres only

Descriptives

Real NRI growth rate like-for-like

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
5,000 m² - 20,000 m²	13	**,528**	1,4715	,4081	-,361	1,417	-2,1	2,5
20,001 m² - 40,000 m²	19	**,630**	2,2773	,5224	-,468	1,727	-4,0	3,7
+40,000 m²	11	**2,102**	2,7158	,8188	,277	3,926	-2,4	8,1
Total	43	**,976**	2,2462	,3425	,284	1,667	-4,0	8,1

Descriptives

Real NRI growth rate like-for-like

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
5,000 m² - 30,000 m²	23	**,230**	2,0204	,4213	-,643	1,104	-4,0	3,4
30,001 m² - 60,000 m²	14	**1,247**	1,7399	,4650	,242	2,252	-2,4	3,7
+60,000 m²	6	**3,199**	2,8032	1,1444	,257	6,141	-,5	8,1
Total	43	**,976**	2,2462	,3425	,284	1,667	-4,0	8,1

Descriptives

NRI growth rate like-for-like

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
5,000 m² - 30,000 m²	23	**3,340**	2,3310	,4860	2,332	4,348	-1,8	7,5
30,001 m² - 60,000 m²	14	**4,133**	1,8886	,5047	3,043	5,223	,7	7,8
+60,000 m²	6	**6,267**	3,2005	1,3066	2,908	9,626	2,6	12,1
Total	43	**4,007**	2,4795	,3781	3,244	4,770	-1,8	12,1

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
NRI growth rate like-for-like	Between Groups	41,089	2	20,544	3,785	**,031**
	Within Groups	217,117	40	5,428		
	Total	258,205	42			
Real NRI growth rate like-for-like	Between Groups	43,472	2	21,736	5,162	**,010**
	Within Groups	168,443	40	4,211		
	Total	211,915	42			

Table 37: correlation performance by size in France (normally distributed)

Correlations

		GLA of total shopping centre
GLA of total shopping centre	Pearson Correlation	1
	Sig. (2-tailed)	
	N	18
NRI growth rate like-for-like	Pearson Correlation	,470*
	Sig. (2-tailed)	,049
	N	18
Real NRI growth rate like-for-like	Pearson Correlation	,466
	Sig. (2-tailed)	,051
	N	18
MV growth rate	Pearson Correlation	,474*
	Sig. (2-tailed)	,047
	N	18

*. Correlation is significant at the 0.05 level (2-tailed).

Figure 53: correlation performance by size in France

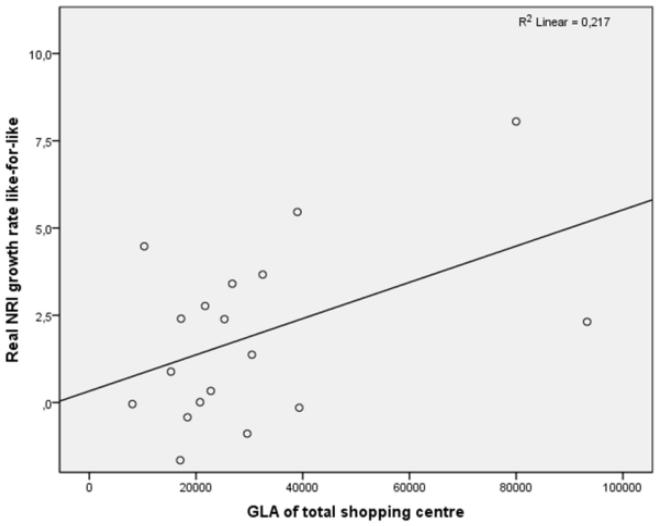


Figure 54: correlation performance by size in France

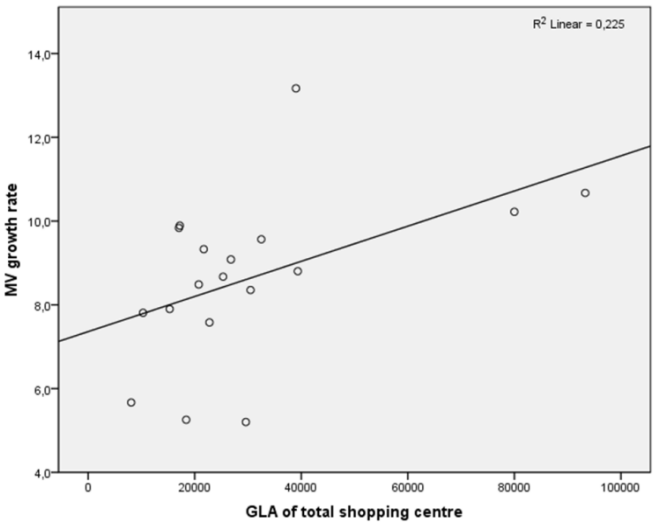


Table 38: correlation performance by size in Portugal (normally distributed)

Correlations

		GLA of total shopping centre
GLA of total shopping centre	Pearson Correlation	1
	Sig. (2-tailed)	
	N	13
NRI growth rate like-for-like	Pearson Correlation	,535
	Sig. (2-tailed)	,060
	N	13
Real NRI growth rate like-for-like	Pearson Correlation	,535
	Sig. (2-tailed)	,059
	N	13
MV growth rate	Pearson Correlation	,622*
	Sig. (2-tailed)	,023
	N	13

*. Correlation is significant at the 0.05 level (2-tailed).

Figure 55: correlation performance by size in Portugal

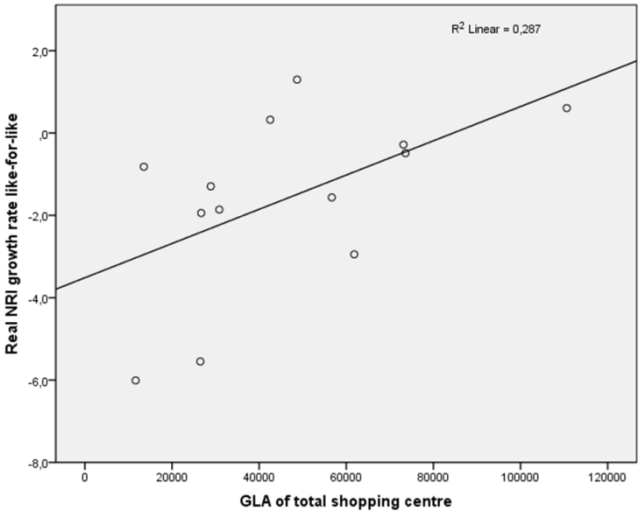
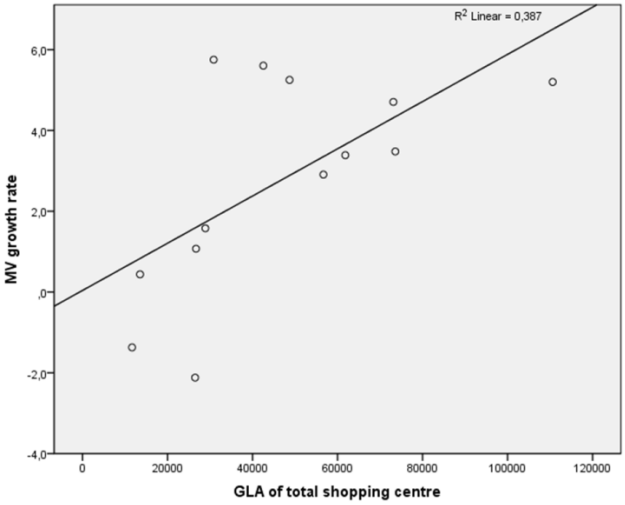


Figure 56: correlation performance by size in Portugal



9.10. Confidentiality Agreement

CONFIDENTIALITY AGREEMENT

THE UNDERSIGNED PARTIES

I. **Maarten Oosterveld**, born on 10-04-1984 (dd/mm/yy) in Breda (The Netherlands) (the "**Researcher**"); and

II. _____, a company incorporated under the laws of _____ with registered seat in _____ (the "Company")

Hereinafter each referred to as a "Party" and together as "**Parties**";

WHEREAS

A. Researcher is doing a performance analysis on European shopping centres (the "Research") and the Company is willing to provide Researcher with information to perform said analysis in order to obtain his Master of Science degree at the University of Groningen (the "Purpose").
B. In this respect, the Company intends to disclose to Researcher Confidential Information (as defined hereinafter).
C. To safeguard the Confidential Information, the Parties enter into this Agreement.

HEREWITH AGREE as follows:

1. "Confidential Information" means any information of any kind whatsoever (whether written, oral, visual, electronic or of another type) furnished in connection with the Purpose by the Company ("the Disclosing Party") to Researcher ("the Recipient") at any time whatsoever (whether before or after execution of this Agreement).

2. The Recipient shall:
   a. use Confidential Information solely for the Purpose;
   b. hold Confidential Information in strictest confidence;
   c. not use any Confidential Information in order to obtain any commercial advantage over the Disclosing Party or its affiliates;
   d. not disclose, distribute, reproduce or pass Confidential Information to any person;
   e. not use the analyses that are performed with the Confidential Information to compare different portfolios;
   f. aggregate the analyses obtained through the Confidential Information on either Pan-European level, country level, or categorical level;
   g. disclose the results on an aggregated level to all companies, including the Company, that participate in the Research;
   h. disclose to the European Research Group a limited publication in which the chapters with the most valuable data and/or insights are deleted or cannot be fully accessed.

3. The obligation to keep the Confidential Information strictly confidential will last for five (5) years from the date hereof and will survive the completion or termination of the negotiations and discussions relating to the Purpose.

4. At the written request of the Disclosing Party, the Recipient shall immediately return to the Disclosing Party all Confidential Information, as well as all copies thereof, or certify in writing to the Disclosing Party that it has destroyed all Confidential Information.

5. Confidential Information obtained under this Agreement is and shall remain the exclusive property of the Disclosing Party (or, as applicable, its affiliates), and except as specifically provided hereunder, nothing contained in this Agreement shall give, or shall be construed as giving, to the Recipient any right, title, ownership, interest, licence or any other right in or to any Confidential Information.

6. This Agreement is governed by and shall be construed in accordance with the laws of the Netherlands.

7. All disputes arising between the Parties in connection with this Agreement shall be subject to the exclusive jurisdiction of the competent court in Utrecht, the Netherlands.

IN WITNESS WHEREOF the Parties have executed this Agreement in twofold as of the date of the latest signature of this Agreement.

_____	_____
Researcher	**Company**
Name:	Name:
Title:	Title:
Date:	Date: