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Differing Methods of Compiling Property Market Data in Office Submarkets

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Abstract

Relatively low market transparency characterises many real estate markets and, in that regard, the Helsinki Metropolitan Area office market makes no exception. It has not gone unnoticed that the locally operating real estate service companies publish differing market information for the HMA office submarkets. The purpose of this thesis is to study the interorganisational differences in property stock, vacancy rate and market rent determination and provide reference for the standardization of office market information in the HMA.

The two research questions of this qualitative study are: 1) What kind of interorganisational differences exist regarding the determination of the HMA office submarket information, and do they affect the computed benchmarks? 2) How do the practitioner methods delineate from the theories and methods present in academic literature and appropriate standards? The literature review focuses on the essential definitions and concepts for the analysis of office submarket data. Furthermore, the relationships between market transparency, investment allocations and market information are discussed. The empirical section aims to answer the research questions by surveying the interorganizational differences in property stock, vacancy rate and market rent determination with a questionnaire. The questionnaire results are then reviewed in comparison with the office submarket information published by the respondent organizations to see if the possible differences in practices have affected the market data. To answer the second research question academic literature, appropriate standards and industry guidelines are compared to practitioner methods when possible.

According to the research results, multiple interorganisational differences exists in the practices for the stock, vacancy rate and market rent determination. The constrained availability of primary property data has driven the organisations to utilize secondary sources to various degrees. Consequently, differing practices have been developed. Furthermore, some differences in practices are related to various professional preferences and subjective concepts such as prime, submarket and structural vacancy. Moreover, the results indicate that the differences in practices have in some cases significant effects on the published submarket data. For example, a significant difference was recorded in the vacancy rate estimates between companies that use either samples or the total submarket stock in their calculations. More importantly, however, it is shown that the different practices and constrained availability of primary data have significant adverse effects on the quality and quantity of the HMA office market information.

Keywords Real estate market information, Property stock, Vacancy rate, Market rent, Office submarket

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Tiivistelmä

Markkinoiden matala läpinäkyvyys on ominaista monille kiinteistömarkkinoille ja Helsingin seudun toimistomarkkina ei tee tässä asiassa poikkeusta. On huomattu, että paikallisesti toimivat kiinteistöalan konsulttiyritykset julkaisevat Helsingin seudun toimisto-osamarkkinoista tunnuslukuja, jotka poikkeavat toisistaan. Tämän diplomityön tarkoituksena on tutkia yritysten välisiä eroja tilakantojen, vajaakäyttöasteiden ja markkinavuokrien määrittämisessä ja rakentaa viitekehystä Helsingin seudun toimistomarkkinatiedon standardisointia varten.

Tämän kvalitatiivisen tutkimuksen kaksi tutkimuskysymystä ovat: 1) Millaisia eroja Helsingin seudun toimisto-osamarkkinatiedon tuottamisessa on eri yritysten välillä ja vaikuttavatko eroavaisuudet tuotettuihin tunnuslukuihin? 2) Kuinka ammatinharjoittajien käyttämät menetelmät eroavat akateemisessa kirjallisuudessa ja soveltuvissa standardeissa esiintyvistä teorioista ja menetelmistä? Työn kirjallisuuskatsaus keskittyy toimisto-osamarkkinadatan analysoinnin kannalta välttämättömiin määritelmiin ja konsepteihin sekä markkinan läpinäkyvyyden, sijoitusallokaatioiden ja markkinatiedon välisiin suhteisiin. Työn empiirinen osuus pyrkii vastaamaan ensimmäiseen tutkimuskysymykseen selvittämällä tilakannan, vajaakäyttöasteen ja markkinavuokran määrittämisessä käytettyjen menetelmien eroavaisuudet eri yritysten välillä. Selvityksessä käytetään kyselyä. Kyselyn tuloksia käsitellään vastaaja yritysten julkaiseman markkinainformaation rinnalla, jotta voitaisiin tutkia ovatko käytettyjen menetelmien mahdolliset eroavaisuudet vaikuttaneet markkinadataan. Toiseen tutkimuskysymykseen pyritään vastaamaan vertaamalla ammatinharjoittajien käyttämiä menetelmiä akateemiseen kirjallisuuteen, soveltuviin standardeihin ja toimialalla käytettyihin ohjeisiin.

Tutkimustulosten mukaan tilakannan, vajaakäyttöasteen ja markkinavuokran määrittämisessä käytetyissä menetelmissä on useita eroja eri yritysten välillä. Ensisijaisen kiinteistödatan rajoittunut saatavuus on saanut yritykset turvautumaan toissijaiseen dataan eriävissä määrin, jonka seurauksena on kehittynyt erilaisia toimintamalleja. Tämän lisäksi jotkin menetelmä eroavaisuudet liittyvät erinäisiin ammatillisiin näkemyseroihin ja subjektiivisiin konsepteihin, kuten prime, osamarkkina ja rakenteellinen vajaakäyttö. Tulosten mukaan menetelmä eroavaisuuksilla on joissain tapauksissa merkittäviä vaikutuksia julkaistuun osamarkkinadataan. Esimerkiksi julkaistuissa vajaakäyttöasteissa on selkeä ero niiden yritysten välillä, jotka käyttävät laskennassa osamarkkinan koko tilakantaa tai näytettä. Edellä mainittua tärkeämpää on kuitenkin se, että ensisijaisen datan rajoittunut saatavuus ja eriävät menetelmät vaikuttavat heikentävästi Helsingin seudun toimistomarkkinainformaation laatuun ja saatavuuteen.

Avainsanat Kiinteistömarkkinainformaatio, Tilakanta, Vajaakäyttöaste, Markkinavuokra, Toimisto-osamarkkina

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This master's thesis has been written for the Department of Built Environment at the Aalto University School of Engineering. This thesis is motivated by the growing efforts of real estate service companies, which are working to improve levels of trustworthiness, transparency and accuracy of market information regarding Helsinki metropolitan area. Differences exist between the methods and practices that professionals use to compile and calculate market information. Thus, by agreeing on systematic solutions, we can work towards greater efficiency and consistent reporting. The purpose of this thesis is to survey the existing market practices and methods regarding property stock, vacancy rate and market rent determination. The ramifications of the interorganisational differences in practices will also be discussed. I hope this work to bring clarity to the ongoing discussions about market practices.

I have deep gratitude towards the assistant professor in real estate economics, D. Sc. Heidi Falkenbach. Your professionalism and encouragement have greatly motivated many to master the fine trade of real estate. I would also like to present my humble thanks to Vesa Kiviluoto for providing the topic and kindly instructing me in the process of writing this thesis. Credit is due towards CBRE Finland Ltd for financing this thesis and providing me with a global and truly professional setting. I must also thank the researchers at the locally operating real estate service companies for revealing some of their practices regarding submarket data. I would also like to thank the management, namely Olli Kantanen and Colin Waddell for enabling this work.

Special thanks to my dear wife. I would have never made it here without you.

Helsinki 20.4.2020

Hannu Ylipaavalniemi

Contents

1 Introduction

1.1 Background

Market information plays a significant role in real estate investing. Real estate market information includes, for example, information on vacancy rates, yields, rent levels, take-up, net absorption and building stock. However, compiling reliable real estate market information is quite laborious, because real estate is an asset class in which markets are generally opaque and inefficient (Pyhrr et al. 1989, p. 9-10). In addition to the constrained availability of market information, real estate investors can expect to encounter large lot sizes, high transactions costs and relatively low liquidity compared to other asset classes. The combined effect of these attributes is that real estate investments tie a lot of capital for long periods of time, as premature and frequent divestments could lead to lower returns. Long term commitments are common in real estate investing and that is particularly true in core strategies, which normally comprise long investment periods. Due to the large commitments, market participants need to make careful assumptions on vacancies, rental levels and yields when they operate in the real estate market. Nevertheless, investors must sometimes rely on sub-optimal market information. For these reasons, good quality market information is in high demand.

In the process of obtaining market information, the investors often ease their time and budget constraints by utilizing existing publications and local real estate service companies (Pyhrr et al. 1989, p. 410). The owned or targeted property is also an important source of information for these assumptions. However, information on the surrounding marketplace is at least equally important, because the rental levels and vacancies of the subject property are also dependent on the competing properties (Frew and Jud 1988, p. 2). This is particularly true within submarkets of multi-tenanted offices where substitutability can be relatively high (Frew and Jud 1988, p.8; Pyhrr et al. 1989, p. 413; Ceh et al. 2011, p. 470). Determining the current vacancy rate and rent level of a single building is quite straightforward but expanding the research to submarkets introduces complexities. Choices need to be made on what counts as office space, which buildings comprise the submarket, which buildings to exclude from the calculations and on what basis, how to estimate unknown figures, what frequency and depth should be used in updating the information, what information sources are preferred and what shortcuts to take. The choices in the above matters have the potential to affect the calculation outcomes. Real estate service companies might make different choices in those matters, which could result in non-comparable market information, which in turn can create discomfort among real estate investors and owners. In addition, individually performed analysis also often relies on a smaller supply of primary property data, because each operator has only partial coverage in the market.

It has been generally acknowledged within the industry, that the locally operating real estate service companies publish differing vacancy rate and market rent figures fairly regularly for the office submarkets in Helsinki metropolitan area. There are also traces of different practices being used for the determination of market information. The intention of this thesis is to research if there are fundamental differences in the methods locally operating real estate service companies' source, handle and produce HMA office submarket information. If differences are found, their possible effects on the published data are assessed.

1.2 Research questions and limitations

The purpose of this thesis is to study the interorganisational differences in the practices that are used to determine Helsinki metropolitan area office submarket information. Differences in practices regarding office stock, vacancy rate and market rent determination will be discussed in comparison with the associated submarket data and academic literature. In addition, the joint effects of the differences in practices on the commercial real estate market will be discussed.

The two research questions answered in this thesis are:

1) What kind of interorganisational differences exists regarding the determination of the HMA office submarket information, and do they affect the computed benchmarks?
2) How do the practitioner methods delineate from the theories and methods present in academic literature and appropriate standards?

The reasons why practitioner methods are only studied regarding office submarket data are, first the lack of consistent and overlapping follow-up of other property types in the HMA by the real estate service companies. Second, the existing literature regarding market information is mostly focused on studying office markets over other property types, and third, office properties tend to be geographically more centralized than other property types, and they form relatively clear submarkets.

The largest limitation of this research is that the effects of different methods on the submarket data are not quantified. This is so, mainly because no reliable baseline is available. Different real estate service companies have access to different property data, and they perform their analyses at different times. Consequently, some of the differences in the published data result from other factors than the used methods. Instead, the focus is on the logical consequences different methods should have on the submarket data. If claims for certain effects are made, support is sought in the patterns, similarities and differences in the submarket data the same companies have provided. The research design mainly serves the purposes of discovering the interorganisational differences in practices regarding the HMA office submarkets and the consequent effects on the data and commercial real estate market. The results are not directly globally applicable as the methods of local real estate service companies have chosen are largely dependent on the Finnish institutional environment and industry culture. However, real estate professionals in other markets can probably assimilate with the problems originating from the imperfect availability of property data and subjective concepts such as submarkets, prime, submarket's market rent and structural vacancy.

1.3 Research methodology

This qualitative research was designed to reveal the differences that real estate service companies might have in their practices in determining submarket information in the Helsinki metropolitan area and if those differences in practices affect the computed benchmarks. The empirical section has two components, a questionnaire and the submarket data. Locally operating real estate service companies were first approached with a questionnaire, which consisted of a set of open and more specified questions. The questions were divided into three main categories, which were oriented to survey the practices regarding office stock, vacancy rate and market rent determination in different HMA office submarkets. Then the HMA office submarkets stock, vacancy rate and market rent data were sourced from the market reports of the same locally operating real estate service companies that were respondents to the questionnaire.

The questionnaire results were then analysed and significant interorganisational differences reported individually for the stock, vacancy rate and market rent determination. The questionnaire alone provided a partial answer to the first research question by revealing differences in the practitioner methodologies. In addition, the found differences in practices were then viewed along with the submarket data in order to observe if different practices have affected the data. The effects of different practices to the submarket data were then sought to be discovered through similar practices resulting in analogous data and on the contrary different practices affecting the data in a logical manner either positively or negatively in comparison. To answer the second research question, the found practices were viewed in comparison with academic literature, appropriate standards and guidelines from more mature markets.

1.4 Research structure

The research comprises of five chapters. The chapters cover the research from introduction to the theoretical review and furthermore to the empirical section and concluding remarks.

The first chapter introduces the background and purpose of this research. Research questions, limitations and methodology are discussed to provide clarity regarding the topic and the following chapters.

The second chapter discusses the definitions and concepts essential for the analysis of office submarket data by extracting the relevant information from existing research. This information is problematized specifically from the aspect of submarket analysis. Drawing from academic literature, market transparency and investors allocation decisions are discussed in connection with the availability and quality of submarket information. General industry standards and guidelines from more mature real estate markets are utilized to provide benchmarks and tested solutions regarding the determination of the studied components of submarket analysis.

The third chapter presents the questionnaire and the associated submarket data. The questionnaire is designed to reveal the differences in practices regarding stock, vacancy rate and market rent determination in HMA office submarkets. The found differences are then discussed along with the associated submarket data, in order to asses if the different practices have affected the data. Each of the three studied components of submarket data will be discussed individually. First the determination of the office stock, then the vacancy rate and finally the market rent.

The fourth chapter answers the research questions by combining findings from the second and third chapter. The interorganisational differences in the practices used to compile and determine HMA office submarket information are discussed with the help of the questionnaire results and the submarket data. In addition, by finding support from the submarket data presented in chapter three, the effects of the differences in practitioner methodologies on the submarket data are discussed. The results are presented individually for office stock, vacancy rate and market rent determination. When possible, the differences between practitioner methods are discussed and compared to academic literature, industry standards and guidelines from mature markets. In addition, the reliability of the findings is assessed. In the fifth chapter, conclusions are made regarding the findings presented in chapter four.

2 Market information in office submarkets

Multiple benchmarks are used to pass information about real estate markets. For example, property stock, vacancy rate, market rent, take-up, net absorption and yield are used very frequently to measure the developments in the real estate markets. These components will be described in this chapter. It is necessary to understand first, what information is needed to calculate figures for those components, and secondly what factors might influence the calculation outcomes before one can assess the role of interorganisational differences in practices in the determination of those same components.

Instead of trying to survey all the interorganisational differences in practices for all the used market information components. This thesis focuses on the determination of property stock, vacancy rate and market rent, which are the most commonly tracked market information components by the locally operating real estate service companies. Delineating the research into those three components helps to provide answers to the two research questions. The overlapping and regular follow-up of those three components by the real estate service companies enables this research in two ways. First, the organisations must have developed practices for the determination of those components in order to publish figures of them, which makes interorganisational comparison possible. Secondly, the availability of the figures makes it possible to observe if the differing practices have affected the data. Thirdly, because it has been initially noted that the published figures have significant differences, it is also more likely that some practice related differences exist. By confirming and surveying those differences and their possible effects on the submarket data, this thesis attempts to provide future references for the standardization of office market information in HMA.

Because the market information components are often published submarket specifically, the submarket concept is discussed in detail in this chapter. Furthermore, because the availability and quality of market information are related to market efficiency, the relevancy of office submarket information for market transparency and investor allocation decisions are also discussed in this chapter (Fama 1970). Understanding the role of office submarket information in market transparency helps to understand its value to investors and to the locally operating real estate service companies.

In this chapter, market transparency and investor allocation decision are discussed first. After that, the concept of office submarket will be explained. Finally, the components of office market information are described and defined.

2.1 Market transparency and investors allocation decisions

Real estate service companies have great incentives to strive for better availability and quality of market information, but does the academic literature support that claim? This section aims to uncover that by discussing the role of market information in the transparency of real estate markets and investors allocation decisions.

Lieser and Groh (2011) identified six dimensions from the existing literature that are thought to determine the attractiveness of real estate markets: economic activity, real estate investment opportunities, depth and sophistication of capital markets, investor protection and legal framework, administrative burdens and regulatory limitations, and socio-cultural and political environment. The research combined Cushman & Wakefield's international capital flow data with the above dimensions, which were each represented

by numerous data sets. Their regressions results indicate that real estate investment opportunities, depth and sophistication of capital markets, administrative burdens and regulatory limitations and investor protection and legal framework are the most important dimensions out of the six. The fourth most important dimension included a variable that represented the transparency of transactions, which was seen to be the most important variable right after property rights in that category. In their own words: "– countries with strong property rights and high transparency of transactions have an active real estate investment environment" (Lieser and Groh 2011, p. 18). However, Lieser and Groh's (2011) results only highlighted the importance of transaction transparency instead of the overall transparency of property market data. Nevertheless, it seems clear that increased market transparency, in general, has a positive effect on investment volume (Lieser and Groh 2011; Yun & Chau 2013; JLL 2018). (Figure 1) below describes the relationship between transaction volume and the JLL transparency index scores.

Figure 1 Relationship of market transparency and investment volume (Source: JLL Global Real Estate Transparency Index 2018)

Previous research indicates, that in terms of allocation decision making, investors might prefer transparency in transactions and transaction processes over other market information, but by how much remains very unclear (Lieser and Groh 2011; Yun & Chau 2013; Ho et al. 2005). However, market participants can hold different opinions towards increases in market transparency. For example, some large and established investors that are informationally in an advantageous position might enjoy competitive advantages due to the general opaqueness in the real estate market (Bragge 2015, p. 38; Yun & Chau 2013, p. 4). Nevertheless, if the improvement of general market transparency is seen as a goal worthy of pursuit, general property market data would be one of the best places to start, regardless of the importance of transaction transparency, because real estate service companies have little to no control over it. That leaves the general property market data as one of the only relevant fields for improvement. Moreover, because real estate market information is more useful in a structured form, the efforts to improve information transparency should be directed towards advantageous sections of the market. In the Finnish context, for example, the HMA office market offers clearer submarkets in comparison to many other property types due to the relatively dense and substitutable property landscape, which eases the assembly and refining of meaningful property data. In addition,

office properties have been the most sought-after property type in Finland for many years now, see (Figure 2) below. This means that the office market is relatively active and offers real estate service companies many opportunities to capitalize on their market information.

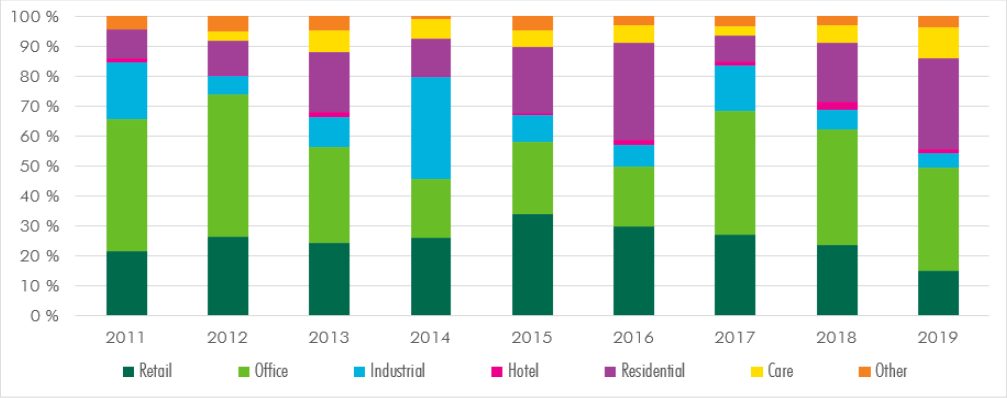


Figure 2 Transaction volume by sector (Source: CBRE Finland Oy, 2019)

In addition, the share of foreign investors in the Finnish property markets has been relatively high in recent years (Figure 3). Foreign investors are usually thought to suffer the most from information asymmetries that good quality submarket information could potentially alleviate (Geltner et al. 2007, p. 647-649; Sperling 2017, p. 47).

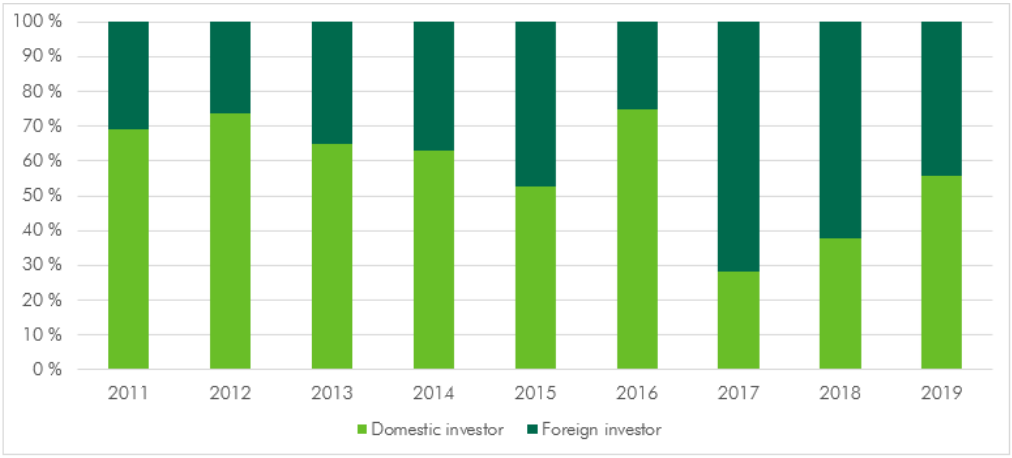


Figure 3 Investment share by nationality (Source: CBRE Finland Oy, 2019)

A study by Falkenbach (2009) on market selection for international real estate investments found that professional real estate investors consider the availability of market information and benchmarks an important factor of market attractiveness. However, according to the study, factors such as expected return on property investments, expected economic growth in the country/area, the safety of title/property rights, availability of professional services in the real estate sector, taxation, liquidity of property markets and market size were seen to be more important. Moreover, more than half the respondents in the study also considered the availability of market information and benchmarks a threshold factor, meaning that investors would avoid a country were expectations regarding such factors were not fulfilled (Falkenbach 2009). Other academics have also arrived at similar results. For example, Chin et al. (2006) found that the availability and standardization of market information is perceived as a trait of mature markets. According to Chin et al., the factors that made a clear distinction between markets that were considered either mature or emergent were market openness, market information standardization, market

information availability and development stability (Chin et al. 2006, p. 52, 56). A study on asset allocation determinants in office markets by Ho et al. found that economic growth prospects were preferred over office market liquidity as the allocation determinant. Market liquidity, in turn, was preferred over office market information and the office vacancy rate (Ho et al. 2005, p.332). In addition, a study by Worzala found that lack of local expertise was one of the largest problems that drives away foreign investors (Worzala 1994, p.40). In turn, Eichholtz et al. (2011, p.168) concluded that larger investors can overcome informational disadvantages more easily than their smaller counterparts. Indeed, if different research results are combined, it seems that small foreign investors without locally residing personnel are most sensitive to the lack of market information (Sperling 2017; Eichholtz et al. 2011, p.168; Geltner et al. 2007, p.647-649).

Adair et al. (2005) found that the availability of timely and accurate market data and the ability to interpret that data is a key issue in the development of land and property markets. The study also claimed that cities in possession of such data enjoyed a competitive advantage and were more likely to attract private investments. Furthermore, McGreal et al. (2001) found that investors perceived data accuracy as the most significant risk in Central and Eastern European countries second to the relative thinness of those markets (Budapest, Prague and Warsaw). Moreover, Adair et al. (2005) observed that those same markets had formed co-operative research forums after foreign agencies entered the market and that those forums have played an essential role in the improvement of market information. Those forums have agreed on market boundaries and the associated definitions in order to produce meaningful stock, take-up and vacancy information. This development was particularly strong in the region's office markets, where it was encouraged by a lower level of leasing-data privacy relative to Western markets. The authors even speculated that if the development continued the same trajectory, that Western markets might even grow envious of their Eastern competitors regarding the level of accurate property data. However, the authors admitted that the compact nature of the Eastern-European property markets and the comparatively homogeneous office stock have also contributed to the level of data accuracy in those markets. To be specific, modern investment grade office stock started to be available in the region only after the collapse of the Soviet Union, resulting in a relatively homogeneous investment grade stock from the same time period. Furthermore, Adair et al. (2005) saw foreign direct investment to be the main driver for local market participants to improve availability and accuracy of property data in the eastern markets. To conclude, given that liquidity and the availability of market information were both found to be important determinants of foreign investments by Falkenbach (2009) and Ho et al. (2005, p.332), and the fact that market transparency has a positive relationship with investment volume (Lieser and Groh 2011; Yun & Chau 2013; JLL 2018), a positive feedback loop might exist in the relation between market activity and property market data.

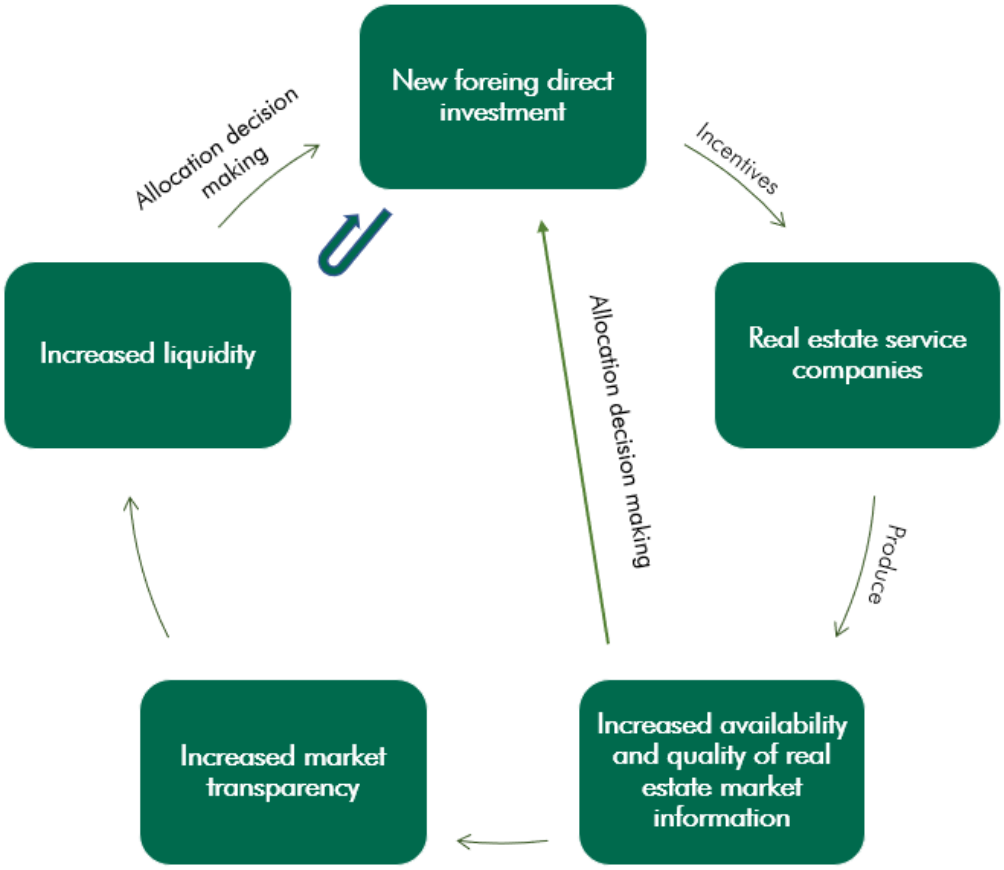


Figure 4 Relationship between market activity and property market data

In theory, the increased availability and quality of real estate market information should have a positive influence on market transparency, which has been shown to have a positive relationship with investment volume. This relationship was described by Yun and Chau (2013, p.2) in the following manner: "As the increased transparency reduces the risk premium demanded by investors to compensate for asymmetric information, it encourages more investors to join in the market. With greater participation, the market liquidity in turn increases and stimulates more trade in the market, which helps enhance the market efficiency." These relationships are visualized in (Figure 4) above. Real estate service companies are well-positioned to respond to the demand for market information as they are both the passthrough point of such information and a direct beneficiary of its monetization. The relationships described in (Figure 4) are also supported by the fact that the roles of property market information and liquidity as determinants of real estate investment are well recorded by multiple authors (see e.g. Falkenbach 2009; Ho et al. 2005; Lieser and Groh 2011). However, one should not forget that the market's liquidity and transparency are only two of many investment determinants in international real estate markets. In addition, non-transaction-related property-market information is far from being a dominant component of market transparency. Consequently, a slight increase in the availability of market information should not have a large impact on overall market transparency, mitigating the possible increases in volume and liquidity. These two mitigating realities are described in (Figure 5) below. Outer circles can be considered more important, though the figure is only illustrative.

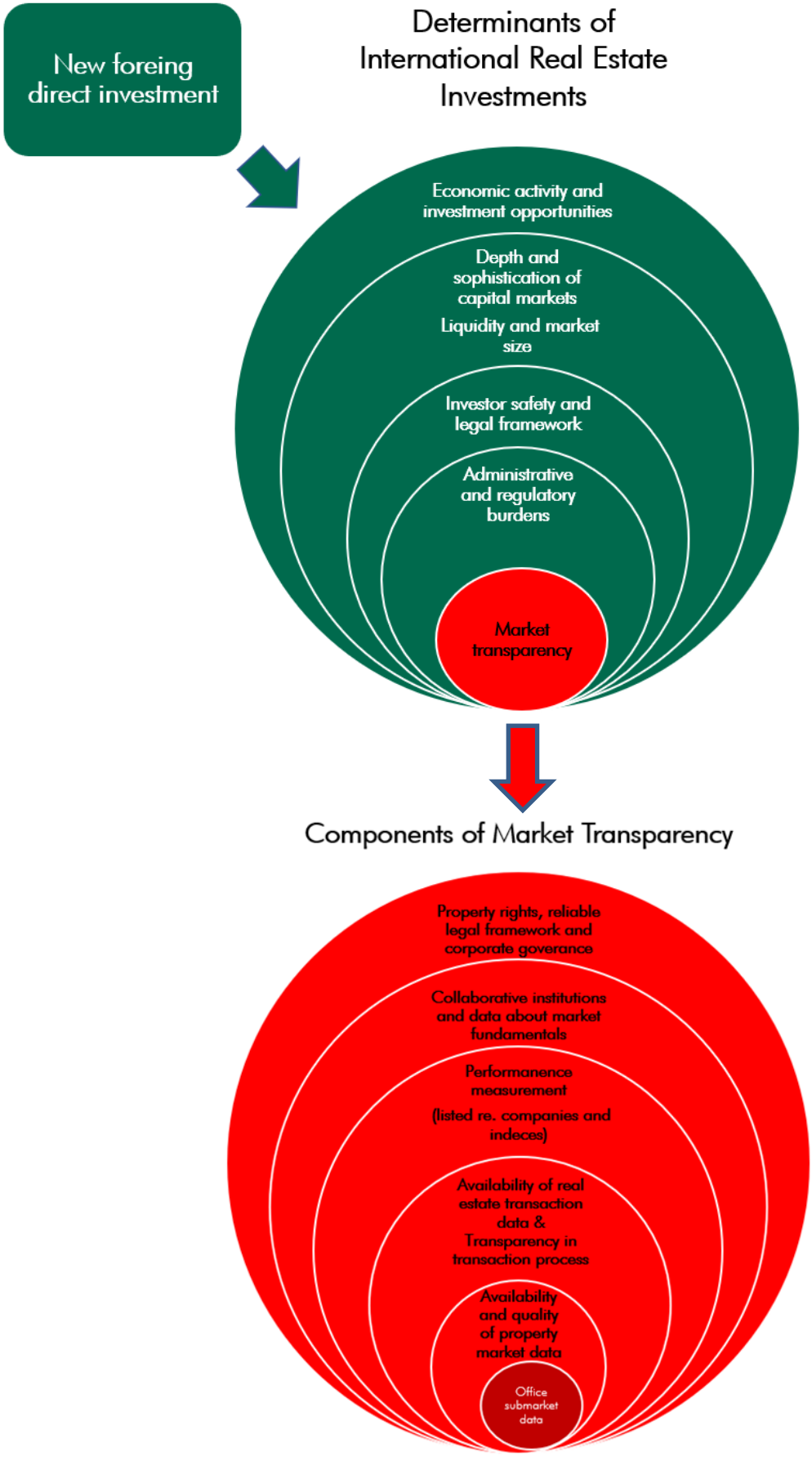


Figure 5 Market transparency as an allocation determinant (Based on: Falkenbach 2009; Ho et al. 2005; Lieser and Groh 2011

(Figure 5) above illustrates that the improved availability and quality of office submarket data plays only a limited role in the overall market transparency, which in turn is not among the most important investment determinants. Thus, the theoretical impact of improved office submarket information on market liquidity should not be overstated. Subsequently, this slightly increased liquidity would only have a limited ability to attract additional investments.

The positive relationship between market transparency and real estate investment volume enjoys wide support in the academic literature, and investors view market transparency as a very important allocation determinant. However, they typically consider factors like a country's economic growth, market size and liquidity to be more important. Small foreign investors without existing local connections are typically most sensitive to opaque markets, and investors are likely to prefer transaction transparency over other property data, but submarket data and benchmarks are also desired. Increasing the quality and availability of non-transaction-related property data is currently one of the best ways for real estate service companies to improve overall market transparency in HMA. Regardless of the positive relationship between investment volume and market transparency, it is likely that for real estate service companies the most important benefit of the increased availability of quality data is its potential to bind investors, especially small foreign investors who have yet to develop solid local presence.

2.2 Office submarkets

When real estate market analysts report market information either on a country or city level, they typically divide the market into smaller segments i.e. submarkets. Many factors constrain the overall real estate market from reacting identically or even similarly to prevailing market conditions. For example, different property types are often considered to be their own submarkets as their market drivers have notable differences (Fanning et al. 1994, p. 120-121; Day 2003, p. 1; McDonald 2000, p. 56). Depending on the amount, density and distribution of the property stock, the meaningful scale of observation can be different. For example, in smaller cities, the distinctions between different office buildings can be so small that dividing the local office market to multiple small submarkets would be pointless. Similarly, medium-sized cities might only have one geographically dispersed market for logistic properties whereas large metropolitan areas can have many competing hubs that serve different needs in the occupier markets. Some properties can also compete in larger national- or even international markets rather than only within the neighbourhood's or city's real estate market (Fanning et al. 1994, p. 120).

In relatively dense office markets, real estate market analysts often divide the office stock into multiple submarkets. This is done because some attributes of offices in certain areas can prevent the realization of perfect price arbitrage, such as the smooth bid rent curve derived from Alonso's hypothetical city model (Alonso 1964). For example, certain attributes can be priced differently in different areas. Furthermore, areas can also differ in supply and demand elasticities. In short, the differences in physical and spatial attributes result in different market dynamics within the stock of properties, thus creating submarkets. Consequently, clear differences in the trends and levels regarding rents, vacancies, yields and changes in building stock can emerge and call for segregated analysis. The usefulness of this approach is widely acknowledged in the academic literature (see e.g. Evans 1995; Fuerts 2007; Jones 2013, p. 47-71).

The superficial differences like the location and architecture of buildings are easily identifiable but do not capture the whole concept of a submarket. Instead, a submarket is in

theory connected to the degree of substitutability that can be observed through occupier actions in the market (Dunse et al. 2001, p. 238). In practice, this leads to difficulties in identifying and separating submarkets from one another as degrees in substitutability are not clear cut.

Various attributes, both property and location-specific, segment the market further within the office property segment. Those attributes can be legal/regulatory, design, amenity, occupier group, accessibility, demographic or location related factors, and those attributes always constitute a unique property. Consequently, occupiers must make complex decisions when seeking premises in the heterogeneous real estate markets, and therefore recognizing clear patterns or rules in that collective decision-making is difficult. As an example, some occupiers would only consider locating in a specific area, while other occupiers in the same industry might only have a partial preference for the same area. Thus, both inelastic demand and floating demand exist in the occupier market. To complicate matters even further, the city structure and occupier preferences are in constant change, and the delineation of submarket areas can subsequently change (Fuerts 2007). It is perhaps necessary for analysts to accept that submarkets are in a constant state of flux, though changes might be very gradual and slow (Archer 1997). In some cases, it is also difficult to make definite distinctions between different submarkets in their peripheral areas, where office building attributes and position in the market often start to resemble the neighbouring buildings in the adjacent submarket more than the central parts of their "own submarket". Indeed, the strict and simplified geographical division might not always be the ideal way to define submarkets, because the location is only one of the factors that are considered in the occupier markets. Submarkets can also consist of geographically scattered properties, as in Figure 6 below. (Figure 6) describes two different residential submarkets, located over two city districts in Glasgow. The black dots present properties in the two submarkets, which are partially overlapping, location wise. For example, most of submarket one's properties in the southern district are located in the same areas as submarket two's properties, yet Day's (2003) model delineated the properties in that area into two separate submarkets because of their "spatial, structural and socioeconomic characteristics" (Day 2003, p. 46).

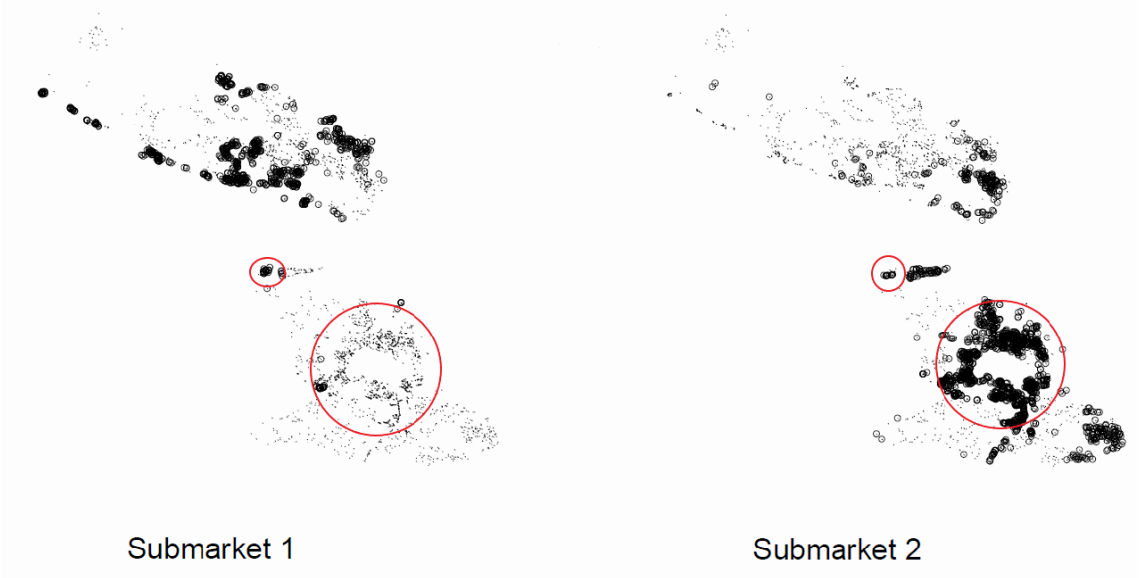


Figure 6 Results of a data based submarket determination (Modified from: Day 2003)

However, in real estate industry it is more common to come across more simplified and geographically delineated practices for market segmentation, see for example (Figures 7-8) below.

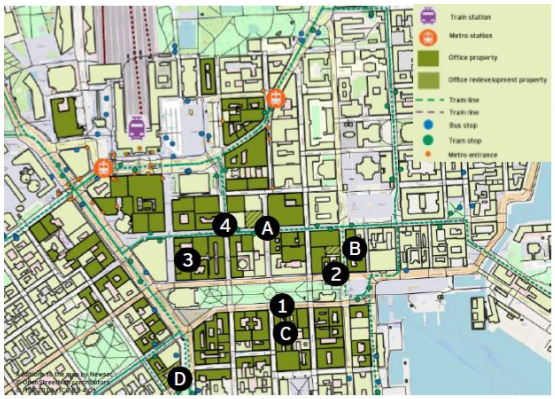


Figure 7 Newsec CBD submarket area

Figure 8 KTI CBD submarket area

(Source 7: Newsec, Office Market Report, Helsinki Metropolitan Area, Sep. 2019)
(Source 8: Helsingin kaupunki: Toimitilamarkkinat Helsingissä ja pk-seudulla syksyllä 2018, KTI)

Submarkets are understood, defined and determined in many different and sometimes contradictory ways. Despite the disputed and relatively subjective nature of the topic, the existence of submarkets is rarely denied, and real estate professionals around the world are accustomed to identifying these distinctive office areas in their own cities. (Jones 2013, p. 47-71)

Market analysts usually have uniform opinions about the central areas of submarkets but for the purposes of comparable market information, it is necessary to agree also on the extent and inclusiveness of the submarkets (Adair et al. 2005, p. 216). In practice, submarkets are often defined by either choosing a set of buildings or by defining distinct borders, as in (Figures 7 and 8). Both methods contribute to the short and long-term consistency of submarket analysis. Compared to only defining distinct borders, choosing a set of buildings is a more effective way to leave out individual buildings from the analysis. That method would make it unnecessary to pick-out undesirable observations, on a case-by-case basis. However, by initially choosing too few properties, the market analyst would constrain the number of extractable observations and possibly compromise the sample's ability to represent the submarket, which in turn might compromise future analyses. If not done prudently at first, choosing a set of buildings would prolong the decision to include or exclude the properties in the outskirts of the submarket. By contrast, defining the borders of the submarket will prevent overlapping analysis and ease the decision making in the future if previously ignored properties or new developments enter the occupier market. However, including all office space within the submarket's borders into the analysis can also be a sub-optimal solution, because similar location alone does not guarantee any level of substitutability.

Due to the dilemma of substitutability in heterogeneous office markets, multiple definitions for submarket exist. For example, submarkets are: "divisions of the primary market that are generally recognizable to the real estate industry and the business community by the names given to the areas. Submarkets are defined by specific geographic boundaries that serve to delineate core areas that are competitive with each other and constitute a generally accepted primary competitive set of areas. Submarkets are building type-specific and are non-overlapping, contiguous geographic designations having a cumulative sum that matches the boundaries of the entire market. They contain a number of properties

sufficient to provide meaningful information for aggregate statistics." (Costar 2019). However, the following definition differs significantly from the previous one: "An office submarket is defined as a group of offices where, although the characteristics of each office are different, offices serve as substitutes for one another" (Ceh et al. 2011, p. 470). Furthermore, Bourassa, Hoesli and Peng stated, that the "appropriate definition of submarkets depends on the use to which they will be put" in a paper studying the housing market (Bourassa et al. 2003, p. 1-2). These definitions rely on three different perceptions. The first definition refers to factors like geographical location, recognition from the industry, competition between submarkets and sufficient size. The second definition relies on the enduring elements of substitutability within heterogeneous property markets. The third statement refers to the flexibility of the submarket concept by claiming that the desired use of the analyses results should influence the way submarkets are defined.

The submarket areas recognized and defined by different real estate service companies often rely on industry perspective, but methods exist that can help to identify submarkets without the use of prior knowledge, and some authors prefer their use over possibly biased practitioner views. Numerous academics have used methods that allow the property data by itself to dictate the pattern of market segmentation (Day 2003, p. 46; Ceh et al. 2011; Dunse et al 2001). Nevertheless, the inherent difficulties in defining and segmenting submarkets have highlighted the relative accuracy of local real estate professionals' perceptions, which is also recognized in the academic literature (Bourassa et al. 2003; Jones 2013). In fact, the real estate industry is known to segregate cities into various submarkets, both for the purposes of conversation and statistical analysis. However, the industry has not survived the subjective nature of submarkets unscathed, because market analysts can hold differing opinions on the amount, extent and content of submarkets. Subsequently, the different views can contribute to differences in computed market benchmarks and will therefore ultimately result in incomparable time series. This will be discussed in greater detail in the later parts of this thesis.

2.3 Property stock and vacancy rate determination

The vacancy rate is one of the most popular economic indicators in the real estate industry, and it is used for various purposes. For example, it can be used as a performance indicator when property owners perform improvements on their properties or start to market them more actively. A vacancy rate can also be used as a performance benchmark between the properties of interest and their competing counterparts, and it can inform investors about the overall strength and status of a real estate market. Furthermore, advanced economic projections and models can be built by combining vacancy data with data on rental levels, development activity and the chosen fundamental market drivers. A vacancy rate describes the level of underutilization of a given property or market. A vacancy rate can be presented as the share of uncollected rent from the total potential rental income i.e. financial vacancy rate, the share of vacant units from the total amount of units, or the share of vacant square meters of the leasable area i.e. technical vacancy rate (McDonald 2000, p. 58). Because the vacancy rate is such a central and common piece of market information, its determination is discussed in detail in this thesis. Based on the initial review of the locally published market outlooks, it seems that the locally operating real estate service companies report technical vacancy rates for the HMA office submarkets, thus this thesis focuses in the determination of technical vacancy rate. The determination of technical vacancy rate and property stock are procedurally closely related, as the total stock of an office submarket is used as the denominator in vacancy rate calculations if vacancy information is available for all the buildings in the submarket. Hence, the stock determination is discussed along with the vacancy rate in this chapter. Because

stock and vacancy rate figures are based on information on square meters of vacant and existing space, the terms used to describe different areas are defined in section 2.3.1.

2.3.1 Area definitions

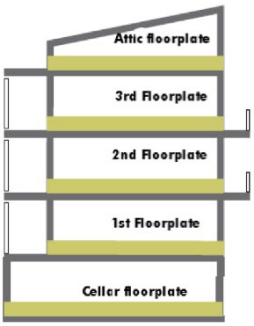
Building related areas are described with multiple terms. Moreover, the terms are also understood differently in different markets. This thesis will use the Finnish terms presented below. All the terms are defined and used in the Finnish context, even though the translations are provided, one should not assume that the terms are understood similarly in different markets.

Kerrosala	Floor area
Bruttoala	Gross area, gross building area
Kerrostasoala	Floorplate
Huoneistoala	Net floor area, useful floor area
Huoneala	Living area/space

(Source: Viitanen and Huuhtanen 2007)

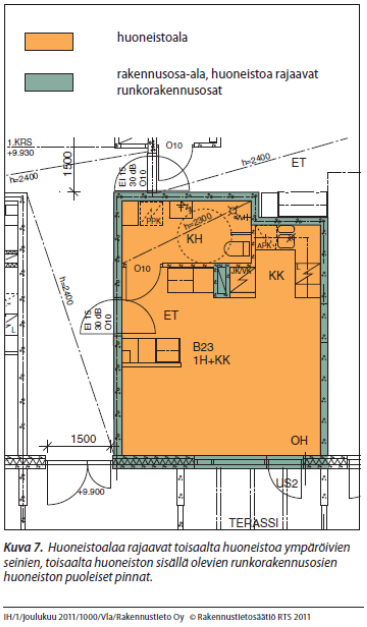
All the standardized building area terms used in this thesis, except floor area are defined in the Rakennustieto -standards, which is widely adopted in the Finnish real estate industry (RT 2011).

A building's gross area is the sum of its floorplate areas, and floorplate is defined as the area delineated by the outer surface of external walls or the thought extension of such surface in opening or decorative sections (RT 2011, Unofficial translation). The RT-standard includes additional guidance about measuring the floorplate area. For example, pillars, chimneys and flues that are outside the external wall are not part of the floorplate area. Balconies, recesses in the external wall and significant gaps in the intermediate floor are also excluded from the floorplate area. See (Picture 1).



Picture.1 Floorplates (Modified from: RT 2011)

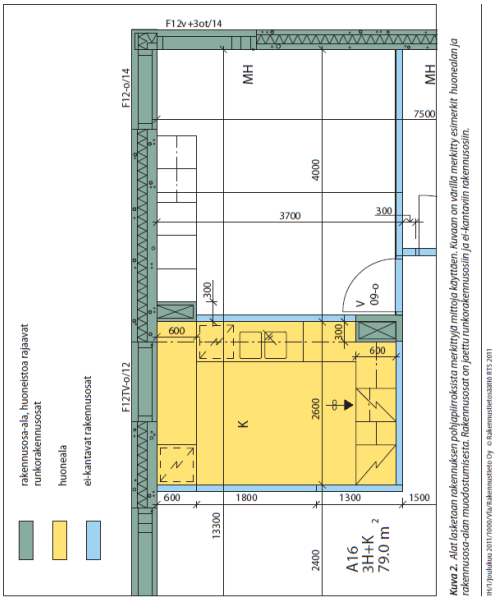
Net floor area is the area delineated by the surrounding walls of an accommodation unit, the load-carrying structures within the accommodation unit and the main structures that are indispensable to the whole building. The delineating surface is the surface facing the accommodation unit (Unofficial translation) (RT 2011). The orange area in the (Picture 2) below describes the net floor area.



Kuva 7. Huoneistoalaa rajaavat toisaalta huoneistoa ympäröivien seinien, toisaalta huoneiston sisällä olevien runkorakennusosien huoneiston puoleiset pinnat.

IH/1/joulukuu 2011/1000/Vla/Rakennustieto Oy © Rakennustietosäätiö RTS 2011

Picture 2 Net floor area
(Source: RT 2011)



Kuva 2. Alat lasketaan rakennuksen pohjapiirroksista merkittyjä mittoja käyttäen. Kuvaan on värillä merkitty esimerkit huonealan ja rakennusosa-alan muodostumisesta. Rakennusosat on jaettu runkorakennusosiin ja ei-kantaviin rakennusosiin.

Picture 3 Living area
(Source: RT 2011)

The main difference between net floor area and living area is that net floor area includes the areas covered by non-load carrying structures, unlike the living area. In other words, the sum of the accommodation unit's living areas and the areas covered by non-load carrying structures is the net floor area. The yellow area in (Picture 3) above describes the living area and the blue area describes the non-load carrying structures. The area descriptions and definitions in this thesis are not comprehensive and readers are instructed to review the sources for more accurate descriptions when necessary (RT 2011).

Another commonly used term is "leasable area". The leasable area is not defined nor standardized in the Finnish real estate markets; hence one can't always be sure what is exactly meant with the leasable area. A buildings total leasable area intends to describe the buildings capacity to house tenants. Subsequently, a leasable area intends to describe a tenant's share of the total. The leasable area is sometimes further described either in net or gross terms, the distinction is the size of common areas that do not directly benefit the tenants (Colliers 2014, p. 2). Furthermore, what is considered as such common area must always be checked on a case by case basis. Occupiers are most commonly provided with only leasable areas that might further be in gross or net terms. However, in some cases, occupiers are provided with indicative net floor areas, living areas or even with gross areas in the case of single tenanted properties, but the responsibility of the accuracy of any presented figure is rarely taken. In fact, a disclaimer stating that the rental payment is not dependent on the size of the premises is often included in lease contracts (Kivekäs 2020). To conclude, In Finnish real estate markets office spaces are often described in leasable area terms but depending on the situation, the leasable area could mean the same with the net floor area, living area, gross area or it could be a combination of them.

Floor area is defined in the Finnish Land Use and Building Act (§ 115, mom. 1-3). “When applied to a plot or building site, floor area means the total floor area of the buildings for which permission is granted.” The floor area of a building includes the floor areas of each floor measured to the outer face of the exterior walls, and the area of the basement floor, attic or loft in which premises for the building's principal intended use are located, or in which such premises could be located on the basis of position, access, size, available light and other attributes. If the thickness of the external wall exceeds 250 mm or 200mm in the case of the internal wall surrounding an accommodation area, the permitted floor area can be exceeded by the area that is due to the excess thickness. The permitted floor area can also be exceeded by the area used by an air-raid shelter, HVAC shaft, flue or a technical space in conjunction with the common spaces. In practice, even when an attic is in the principal intended use of the building, the spaces under 1600mm in height are not considered floor area. Apart from the stipulations regarding the basement and attic functions, floor area and the gross area should in principle be the same. (Unofficial translation) (Land use and building act § 115)

Floor area is mainly used in city zoning to describe the maximum size of the building for a plot. Because of this legal obligation, floor area information is delivered to the local authorities for each building in the urban areas. This data is publicly available in geographic information databases; therefore, floor area data is widely used as a secondary or primary source in stock calculations by the locally operating real estate service companies. However, using this public data directly to calculate an area’s office stock in floor area terms has some problems. Buildings in those databases are categorized by their main use. Due to that, buildings that have less than 50% of office space are not categorized as such and buildings that are categorized as offices might still include other functions. However, areas in different uses within the buildings are sometimes available, though they are usually only listed in net floor area terms. Real estate service companies might also use the available net floor area data to compile property stock information. Furthermore, the public databases are known to have mistakenly reported or inputted areas (Haataja 2018, p. 34). That can be confirmed for example, from the final page of any Helsinki city’s building information extract (Rakennus- ja huoneistorekisteriote), where the inaccuracy of the data is stated. The suboptimal condition of the Finnish building registers is also officially acknowledged in the report prepared by the Ministry of Finance (2019). The Ministry list some of the data inaccuracies and deficiencies to result from the following reasons: different officials handle the data in separate registries based on their own particular obligations, there is no “master database” with up to date information, the flow of building information is not clearly regulated and the obligation to update the data is not sufficiently stated in the law (Ministry of Finance 2019).

Because of the prevailing way of drafting lease contracts, there might be less need to confirm the exact size of the owned and leased office premises (Kivekäs 2020). Consequently, the vacancy information found from sources like web-based listing services, rent rolls, and property owners is often in undefined leasable area terms. Dictated by the available source data, the vacancy rate calculations might also be conducted in leasable area terms. Assuming that the vacancy rate calculations are conducted in leasable area terms it seems problematic, that based on the initial preview of the market outlooks, the locally operating real estate service companies sometimes use public registries to source property stock information for vacancy rate calculations, since the area information in those registries is mostly in net floor area of floor area terms and the registries are known to include mistakenly inputted data. Moreover, it is relatively clear that in an ideal situation the stock

and vacant space information should be recorded in the same format. For example, according to CBRE's ERIX guidelines total stock should be calculated from "net rentable areas" and that vacancy rate is calculated as "Vacant Space expressed as a percentage of Total Stock or Total Competitive Stock" (CBRE 2019, p. 9-10).

2.3.2 Vacancy rate in submarkets

Calculating vacancy rates for submarkets is complicated by the variable reasons behind individual vacancies. More specifically, some spaces have such attributes that they are either impossible to lease or will not be leased before significant renovations are completed. Furthermore, some spaces might be under renovations, leased in advance, or be part of extension options, making them effectively unavailable to other occupiers. Some spaces might also be available for subleases but initially seem to be occupied because of the primary lease contract. Consequently, market analysts might hold different opinions of whether and when to calculate such spaces towards vacant office space in the submarket. Moreover, the reason behind the vacancy is rarely available to the analyst who might be dealing with hundreds of buildings at a time. (Rabianski 2002)

According to Rabianski (2002), different forms of vacancy exist. He named three types of vacancies: frictional, cyclical and structural. The idea of multiple types of vacancies is widespread in the academic literature (see e.g. Sivitanides 1997; Rabianski 2002; Remøy and Koppels 2012; Muldoon-Smith and Greenhalgh 2017).

Rabianski (2002, p. 195) suggest the following definition for frictional vacancy: "Frictional vacancy is the excess supply that allows the market to work efficiently—allows easy movement of space users from one place or space to another." However, Appraisal Institute (2002, p. 10) provided this slightly different definition: "–Vacancy unrelated to disequilibria in supply and demand… a typical vacancy rate in a given market operating in equilibrium". The first definition refers to vacancies during the normal rotation of tenants and the second definition refers to the remaining available space after the demand is saturated and prices have stabilized. However, the definitions are not contradictory. Searching suitable premises, negotiating contracts and moving businesses take time. Thus, it is understandable that even in an equilibrium state, real estate markets have vacant premises. Inefficient markets have friction.

Feasible office space can be intentionally vacant, and according to Rabianski it can sometimes be considered frictional vacancy. For example, when an office space is intentionally vacant due to the owner's expectation of leasing the space at a higher rate later (Grenadier 1993, p. 58). The owner might also consider it more profitable to keep the excess space vacant in order to serve the existing tenants better in the case of extension needs. It may seem that such space will not be leased because the possible occupiers of such space are not willing to accept the terms that a prudent landlord would require to compensate for the increase in exit risk with existing tenants or foregoing the expected increases in rents. However, such space remains available to the market, just not at the current rates. Thus, such space is vacant space just like any other, just for different reasons. (Rabianski 2002)

Concept of frictional vacancy also includes space that is contractually reserved as an extension option. That kind of space can be effectively off the market. Even though physically vacant, the option might effectively rule out the possibility of other tenants occupying the space. Options are also always priced-in in the lease contracts. Due to its unavail-

ability and the presence of a ”rental payment” this type of space should ideally be considered occupied until the option is resolved. On the contrary, contractually occupied space that is available to subleases and is not occupied by the main tenant should be considered vacant space as it remains available to the occupier market. However, trying to account for both such situations remains laborious as their identification requires detailed knowledge of the associated lease contracts. Though it would be theoretically wrong, the appealing decision would perhaps be to ignore such possibilities in submarket analysis, as it might be too laborious to identify such spaces, not to mention the difficulty of doing it repeatedly in a consistent manner. (Rabianski 2002)

According to Fanning and Jorgensen (2013) when market vacancy rate falls below its frictional vacancy rate, new construction typically accelerates. They also suggested that market analysts can estimate a particular market's frictional vacancy rate by studying past market cycles, more specifically by looking at the market vacancy rates at times when new construction became feasible and new project were announced or on the contrary when rent discounts and concessions began to appear. However, Sivitanides (1997) suggested that frictional vacancy rate can change intertemporally, which would make its accurate determination even more challenging. (Rabianski 2002; Fanning and Jorgensen 2013, p. 10)

Another vacancy related term often present in academic literature is natural vacancy (see e.g. Frew and Jud 1988; Frew and Jud 1990; Benjamin and Sirmans 1991; Grenadier 1995). The theory behind natural vacancy is that, when the vacancy level in the market is lower than its natural vacancy, rents should rise and vice versa (Frew and Jud 1990). Natural vacancy does not, therefore, describe the actual amount of vacant space in the market but the equilibrium level between rents and vacancies. Thus, natural vacancy seems to be understood in the same way as frictional vacancy (Fanning and Jorgensen 2013, p. 10). The two terms are interpreted as synonyms in this thesis. The level of natural vacancy i.e. frictional vacancy for a submarket would be beneficial to know along with the current vacancy rate, but their separation remains challenging. Sivitanides (1997) showed that natural vacancy rates vary not only between different office markets but also intertemporally. Additionally, some office markets were seen to have significantly greater volatility in their natural vacancy rate than others and that the variable that best captured the changes in the natural vacancy rate was different across markets. Sivitanides (1997) used for example the following variables: employment growth, absorption, change in vacancy and completions. His findings highlight the difficulties in determining natural vacancy rate and point out the “-complexity of the office rent adjustment process as well as the considerable variations in this process across metropolitan markets.” (Sivitanides 1997, p. 207). To conclude, quantifying the frictional vacancy in any real estate market is quite challenging, and even more so in submarket level, because there exists no way to infallibly separate frictionally vacant spaces from cyclically vacant spaces in the real estate markets. The frictional vacancy is a market-wide phenomenon rather than a type of vacancy always identifiable at the level of individual spaces. To be more specific, “the pool of frictional vacancy” consists of a rotation of spaces, which remain mostly unidentifiable because they, in fact, are available to the market and get easily absorbed under current or different market conditions or after tenant changes in the properties. However, for submarket vacancy rate calculations such separation between cyclically and frictionally vacant spaces remains unnecessary because both types are available to the occupier market. Thus, the concept of frictional vacancy does not pose any major problems for vacancy rate determination processes.

Unlike frictional vacancy, the concept of structural vacancy is very relevant for submarket vacancy rate calculations. Rabianski (2002, p. 195) suggest the following definition: "Structural vacancy is the excess supply in the market that does not meet the needs of space users —a mismatch between the attributes of the space and the needs of the space user. Unlike cyclically vacant space, this structurally vacant space will not be absorbed until it is rehabilitated and renovated. The process of rehabilitation and renovation changes the classification of the space. For example, in the office market, the rehabilitation changes the C space that is structurally vacant to B space that can be taken directly from the market by a space user." Remøy (2010, p. 12) used the following definition for structural vacancy: "the vacancy of the same square meters of office space over a period of three years or longer, with no perspective on future tenancy." Some practitioners in Amsterdam office markets are known to utilize that same definition. However, distinguishing if a vacancy is structural or cyclical in nature is in some cases very difficult and no indisputable definition for structural vacancy exists.

The decisive question regarding assumedly structurally vacant space is: is it part of the market? This, of course, depends on who is answering the question. While supply-side actors in the occupier market might not consider such space to compete with their products and occupiers would not even consider leasing such space, the real estate developers might be highly interested to know the amount of potential new competition their projects could face in the area if market conditions were to improve and such idle space subsequently improved. Some tenants might still reside in such troubled properties and some properties might also require smaller investments to enter the occupier market than others (Remøy 2010, p. 30; Rabianski 2002). However, for vacancy rate calculations it remains infinitely unproductive to evaluate every vacant space individually to determine if it is so far beyond recovery that it does not "belong to the market anymore" without applying a simple criterion. Because structurally vacant spaces are by definition not substitutable to cyclically or frictionally vacant spaces, they should ideally be excluded from submarket analysis, as office spaces within submarkets are supposedly highly substitutable to one another (Dunse et al. 2001, p. 238; Ceh et al. 2011, p. 470). In addition (Koppels and Keeris 2006) showed that correlation between vacancy rate and market rent development improved when the structural vacancy was excluded from the equation, meaning that the removal of the structural vacancy from office submarket's analysis enables more meaningful analyses. Market analysts might try to deal with the challenge of distinguishing structural vacancy from other types of vacancy by either including all structurally vacant properties in the analysis or by narrowing the submarket definition so much that most properties with such spaces are not part of the analysis. This can be done by handpicking the properties that represent the submarket more "cohesively" or by narrowing the submarket area by so much that most of the "unwanted" properties are left outside the submarket area. Some analysts might also resort to excluding properties from the analysis on a case by case basis. (Rabianski 2002)

The concept of structural vacancy seems to resemble the problems that were described in the section discussing submarkets. It is inherently subjective to decide if some spaces are substitutable to others or if their vacancy is structural or not. Including high amounts of undesirable and mostly vacant buildings to a submarket that otherwise aims to capture market information from higher-quality properties might not be ideal, but it would depend on what the market analyst wants to measure, this reflects the more flexible view towards submarket definition by Bourassa et al. (2003). Regarding the consistency of the data, it remains imperative that the exclusion decision of structurally vacant buildings is done

with same criteria time after time. That highlights the difficulty of excluding such assumedly structurally vacant properties from the analysis that might be renovated and achieve higher occupancy rates in the future. Regarding structural vacancy, the major problem is to identify if a space in need of some level of renovation should be considered cyclically or structurally vacant. Obviously, there exists no infallible way to do this, except when a building is facing demolition or property type conversion, which would effectively remove the space from the submarket. Two options remain, real estate service companies can either include all structurally vacant buildings in the submarket analysis or a standardized solution is needed to do sort out such properties consistently to the extent that it is possible.

The problem of identifying structurally vacant spaces is apparent also in the definition of cyclical vacancy. Rabianski (2002, p. 195) suggest the following definition: "cyclical vacancy is the excess supply that occurs as demand for space declines due to economic and financial factors. Once demand for space increases, cyclically vacant space will be taken directly from the market." But what is considered direct absorption of such space? Where to draw the line between normal tenant improvements and more extensive renovations? The extreme cases of structural and cyclical vacancy are perhaps clearly defined but the grey area in between remains problematic. (Rabianski 2002)

Hilde Remøy identified some traits of structurally vacant properties in the Amsterdam office markets. According to Remøy the location characteristics that most increase the odds of structural vacancy are monofunctionality, lack of status, lack of facilities and the building characteristics that are most closely associated with structural vacancy are bad external appearance, bad internal appearance and low layout flexibility. In addition, even new buildings were found to be obsolete if the visual and functional qualities were low, and all Amsterdam neighbourhoods had some level of structural vacancy, including the city centre. (Remøy 2010)

Another problem that is closely related to the structural vacancy is whether to include or exclude spaces into the vacancy calculations that are going through renovations. Consider an office building that is 50% occupied and the other 50% is vacant and under renovations. The property is considered desirable in the occupier market and the vacant section is therefore easily pre-let and tenants can move in within a couple of months. Market analysts would face four possible solutions regarding this property. Ignore it completely until new tenants have moved in, consider it 50% occupied, consider it 100% occupied or remove the pre-let section from the submarket's stock temporarily and consider the other section 100% occupied. Could this type of transitional phase be considered frictional vacancy? If so, perhaps the space should be considered 50% vacant, as separating frictional vacancy from other types of vacancy is in theory not necessary and yet very hard to do in a market-wide analysis. Another possibility would speak against considering the space 100% occupied. The new tenants of said space might already reside in the same submarket and would be accounted for twice if the property is considered fully occupied. This problem also calls for a standardized solution. The problem might seem unimportant, but in relatively small submarket its effect on the overall vacancy rate might be significant as the total amount of buildings can be very modest to begin with and information might only be available from a fraction of them.

Figure 9 below is a simplified example of how a submarket's vacancy rate could be perceived. In this example, the submarket's vacancy rate is above its estimated frictional vacancy rate (20% > 10%), which would mean that there is pressure to decrease rents

until the cyclically vacant space is absorbed and the market has reached equilibrium. In this example, the current amount of frictionally vacant space is 10%. However, one would probably not be able the distinguish those spaces from the cyclically vacant spaces because after all, they are both just vacant space. Additionally, in this example, the troubled properties are not considered to be part of the submarket, and they would be excluded from the vacancy rate calculation.

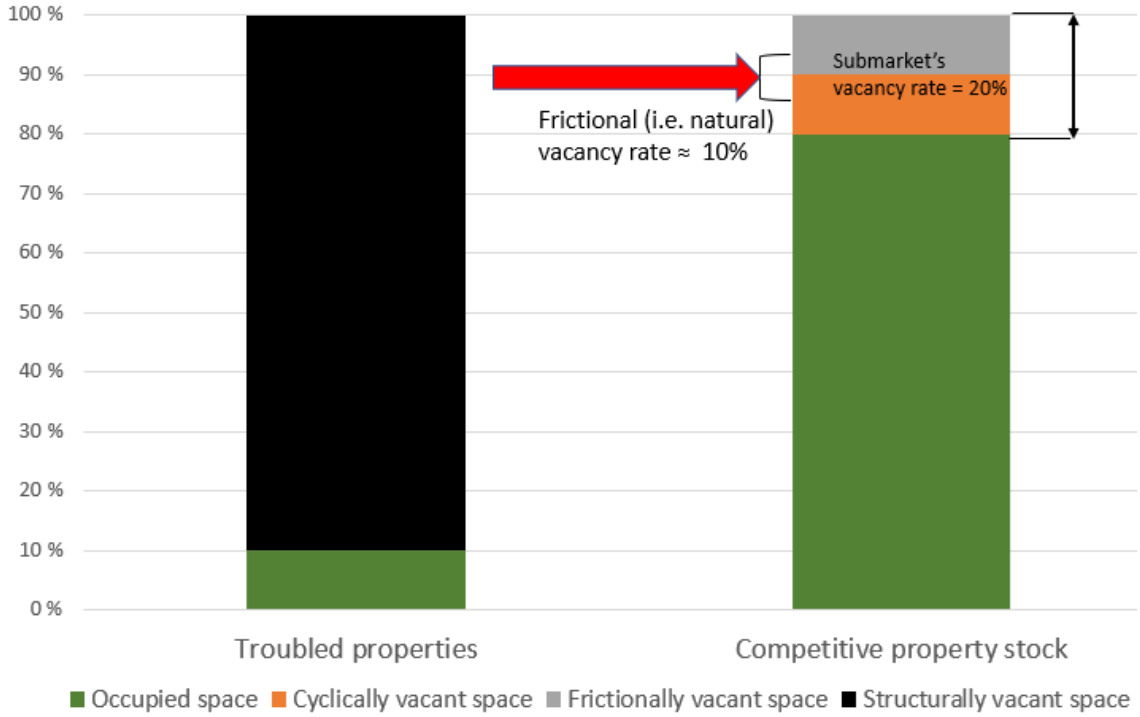


Figure 9 Vacancy types in submarkets

Regardless of the simplified example, in real analyses, the vacancy rate determination is complicated by many factors. For example, one would have to decide a criterion for identifying structurally vacant i.e. troubled properties or include them in the analysis. In addition, one would have to seek through the seemingly vacant spaces for extension options that prevent leasing and seek through the seemingly occupied spaces in order to find spaces that are available for subleases. Estimating the submarket's or the city's frictional vacancy rate might also prove to be challenging. Moreover, one would have to decide if spaces under renovation should be considered vacant, occupied or excluded from the stock temporarily.

2.4 Market rent

International valuation standards offers the following definition for market rent: " Market rent is the estimated amount for which an interest in real property should be leased on the valuation date between a willing lessor and a willing lessee on appropriate lease terms in an arm's length transaction, after proper marketing and where the parties had each acted knowledgeably, prudently and without compulsion" (IVSC 2017, 40.1). The definition lays out many requirements for consideration. The estimated amount refers to the extraction process of market rent from comparable leases. Ideally, such observations should be quite recent and from spaces with similar attributes. The best evidence for market rent is, therefore, recently made lease contract in the subject property if it was done in accordance with the above definition. The valuation date refers to the market rents dependence on time. Market conditions change over time and even if property-specific rent determinants

are held constant other determinants can change the outcome of lease negotiations. Therefore, any notation of market rent needs to include a timestamp. It also means that the reliability of any observation deteriorates with time. The interorganisational reporting consistency of a submarket's market rent therefore depends partly on the length and timing of the observation period. Other requirements refer mainly to the integrity of parties and leasing process. Those requirements are understandably often left unchecked in the context of submarket analysis because such information is mostly unavailable to the market analysts and the required resources of going through such checks would be unreasonable in that context. (IVSC 2017)

International valuations standards (2017, 40.3) states important clarification for the estimated amount and appropriate lease terms: "In particular, the estimated amount excludes a rent inflated or deflated by special terms, considerations or concessions. The "appropriate lease terms" are terms that would typically be agreed in the market for the type of property on the valuation date between market participants. An indication of market rent should only be provided in conjunction with an indication of the principal lease terms that have been assumed." In market analysis context the first sentence means that rent observations should be "cleaned" from possible special terms, considerations and concessions. Estimating the effect of special terms and considerations on the rent for every observation might prove to be laborious and difficult. In different markets, the extent of appropriate lease terms might be different, and the threat posed by special terms, considerations and concessions to the validity of market rent can vary with time and location (Boots 2014). It is necessary to have a conversation of the reasonable extent to which rent observations are "cleaned" from such factors. Typically, concessions i.e. rental incentives remain the largest concern regarding the validity of observed rents in the context of submarket analysis. The IVS clearly stipulates that market rent excludes all concessions, though some might argue that "normal concessions" such as minor amounts of rent-free months can be allowed to exist within the observations as they can be perceived to be part of appropriate lease terms. However, that approach would compromise the time series of rent data as such market tendencies are prone to change. For example, the number of concessions might be larger during "tenant's market" and consequently inflate the observed rents disproportionately to conditions prevailing in "landlord's market". The use of rent incentives can also change substantially without any specific ties to economic cycles (Boots 2014, p. 10). More importantly, Boots (2014) showed that effective rent levels correlate with vacancy rates better than contract rent levels do and that rental incentives conceal the true rent development in the market, contribute towards opaquer markets and prevent the office markets from functioning more competitively and efficiently (Boots 2014, p. 128). If left unaccounted-for rent concessions can have a significant adverse effect on the quality of the market rent data. Cross-sectional comparability would also weaken if market analysts were to adopt different approaches to rent concessions.

The definition of market rent also includes the concept of "interest in real property" (IVSC 2017). The term refers to a specific space. However, things are more complicated in the context of determining a market rent for a submarket. What kind of space would be considered representative of the submarket? Based on the initial review of the market outlooks, that the locally operating real estate service companies publish, it seems that some companies report estimated prime rents and some companies report statistically derived rents. Some of the companies that reported prime rents also listed some size, quality and location-related attributes that would represent the reported rental level. Assuming that those companies try to hold the representative space's attributes constant for every

round of reporting and considering how heterogenous real estate can be even within submarkets, how consistently can market analysts report a market rent for said "standard space" from an ever-changing sample of new rent observations? In addition, opinions about what is considered prime can be different among market analysts. Hence, some might report higher prime market rents than others, even from the same set of observations. How can recipients evaluate what kind of observations would be considered prime? Are market analysts somehow able to determine prime market rents without using biased methods that rely on a few buildings and observations? Ultimately, one must ask, what informational value needs to be conveyed with the reporting? Is the purpose to track the rental development in the submarket or is it to provide specific reference points to market participants? Is the latter even feasible given the myriad of rent determinants and the often-confidential source information?

To better understand the challenge of reporting a market rent for a submarket, the rent determinants must be discussed. What factors are comprised in office rent formation? Fuerst (2007, p. 7) compiled the following office rent determinants from earlier literature: Clapp (1993) and Mills (1992) found vacancy level to be a highly significant rent determinant in office markets, Bollinger et al. (1998) showed average floor area to be an important variable. Furthermore, amenities, services and age have been used as rent determinants in multiple studies (see e.g. Ho et al. 2005; Slade 2000; Dunse et al. 2002). Shilton and Zaccaria (1994) found a convex relationship between building height and rent levels. Bollinger, Ihlanfeldt and Bowes (1998) found that close proximity to office worker concentrations has a positive impact on rent levels. Cervero and Duncan (2002) showed that proximity to public transportation hubs has a strong positive effect on rents. The list of rent determinants is likely to be even longer. For example, Benjamin and Sirmans (1991) published an extensive list of rent determinants in residential markets: the amount of space, amenities, services, physical attributes, locational factors, occupier characteristics, quality of property management, vacancy rates, rental concessions, length of contract, taxes and accessibility were seen to determine rents. The list of rent determinants is similar in office markets, though the importance of each factor might vary greatly. Fuerst (2007, p. 43) also showed that the weights of office rent determinants change not only across submarkets but with different phases of the cycle. Given the myriad of rent determinants and their changing nature, we can make the conclusion that extracting a submarket's market rent from various observations requires detailed knowledge of the associated spaces, lease contracts and external factors, and the use of sophisticated financial models.

2.4.1 Effective rent

Effective rent represents a rent that would be achieved, less the incentives i.e. concessions paid by the owner. The average effective rent is the contract rent paid by the tenant less incentives which are amortized over the term of the lease. Effective rent can be in gross or net terms depending if the maintenance costs are included in the contract rent. (CBRE 2019, p. 4) Market rent by definition is net of all lease incentives (IVS 2017, 40.1). Empirical evidence suggests that reporting the development of effective rents is beneficial compared to reporting contract rents (Boots 2014).

2.5 Take-up and net absorption

Take-up describes the amount of space that new leases have been signed upon over a certain time period in a certain area and property market. The sum includes newly leased spaces, spaces recently sold to owner-occupiers and newly constructed spaces that have been taken to use. Spaces are considered to be taken to use when a new lease is signed,

or the space is bought by an owner-occupier. Take-up cannot produce a negative figure as is does not take into account tenant exits. Even though vacancy rate and take-up in property market can be at least partially sourced from the same origins, properties and the associated leases, they are not closely related figures. Publishing reliable take-up figures requires comprehensive information about all new leases in a certain time period rather than a snapshot of the standing leases as in the case of vacancy rate. Take-up's purpose is to describe the activity of the leasing market. (KTI 2019, Unofficial translation)

Net absorption describes the change in the amount of occupied space over a certain time period in a certain area. Unlike take-up, the net absorption takes into account tenant exits and can produce a negative figure. Net absorption is closely related to the vacancy rate as the net absorption of a certain time period should correspond to the change in vacancy rate in the same time period. For example, if the vacancy rate of an office market changes from 10% to 0% and the market's stock is 100,000 sqm, the corresponding net absorption figure is +10,000 sqm for the same time period. (KTI 2019, Unofficial translation)

2.6 Yield

Yield is understood as a synonym of capitalization rate in the Finnish real estate markets. It is derived from the relation of market-rent based net operating income and property price at a certain point in time (KTI 2019, p. 31; Kiviluoto 2007, p. 11). The formula of capitalization rate is:

$$y = \frac{NOI\ (market)}{V}$$

Where:

y = yield
NOI (market) = market based net rent of the property
V = price or value of the property

Based on the initial review of the market outlooks, the locally operating real estate service companies publish prime initial yields. The difference between yield and initial yield is that the numerator in the above formula would be the net operating income of the first year of ownership after a transaction. Furthermore, the prime prefix means that the yield is for a "property of the best physical quality, in the best location and with the best tenant's covenant and contemporary lease terms." (Kiviluoto 2007, p. 11, 16)

2.7 Impediments to practice

As discussed in the sections above, multiple factors complicate the stock, vacancy rate and market rent determination in office submarkets. For example, real estate service companies might have defined HMA submarkets differently, as there is no one correct way to determine the extents and contents of submarkets. Different submarket definitions would likely affect all subsequent stock, vacancy rate and market rent analyses. Moreover, the institutional setting and the industry culture create challenges for calculating property stock accurately as there are problems with the public data's accuracy and with the different terms used to describe areas. In addition, opinions on what spaces are considered vacant might be different. For example, differing solutions regarding renovations,

subleases, extension options and structural vacancy, might delineate the vacancy rate determination practices. Moreover, it was illustrated that referring to a "representative space" in the determination of submarket's market rent might be an oversimplification of the market's rent determination process. Furthermore, different solutions regarding rental incentives might exist. The next chapter aims to survey the interorganisational differences in the determination of property stock, vacancy rate and market rent. In addition, it is studied if the found practice related differences have had visible effects on the published submarket data.

3 Questionnaire and submarket data

The aim of the empirical section is to survey the interorganisational differences in practices regarding stock, vacancy rate and market rent determination in HMA office submarkets and to study if those differences have had visible effects on the published submarket data. By studying the differences in practices and their possible effects on the data, this thesis attempts to provide reference and motivation for future discussions and research, regarding further standardisation and sharing of office market information.

The submarket data presented in this chapter is sourced from the market outlooks of five locally operating real estate service companies. Four of those five companies responded to the questionnaire. The submarket figures presented in this chapter, are meant to illustrate how the published market information differs between the respondent organisations, even if they presumably measure the same things in the same submarkets. Submarket data was collected for the following benchmarks and measures: property stock, vacancy rate and market rent. The compiled submarket data and the market outlooks were used by the author to identify some initial differences in the published market information and practices, in order to better direct some of the questions in the questionnaire. The questionnaire and the submarket data are also reviewed in comparison to see the potential effects of the chosen practices on the published market information.

First, the questionnaire results are discussed separately for each of the three main sections that represent: property stock, vacancy rate and market rent. For future reference, all discovered interorganisational differences in the practices are then listed separately for each questionnaire section. After listing the interorganisational differences, the submarket data figures are presented with commentary.

3.1 Questionnaire

The real estate service companies that operate in the Helsinki metropolitan area and publish office submarket outlooks regularly, were approached with a questionnaire consisting of 31 questions, presented in English. The questionnaire method was chosen because it enabled the easy collection of practitioner methodologies and allowed the respondents the time to consider a level of detail in their answers that they could be comfortable with. In addition, the questionnaire was seen to provide easily comparable sets of answers and schedule flexibility.

The questions were divided into three main sections, each with a different focus. The sections concerned practitioner methods for determining property stocks, vacancy rates and market rents for office submarkets. The sections included questions that allowed respondents to describe their practices openly and in length. Other questions targeted specific parts of the possibly used methods in a more precise manner, in order to maximize the amount of found procedural differences between the practitioners. Four out of five practitioners replied to the questionnaire. The respondents represented Companies A, B, C, and D. The respondent individuals were chosen based on their close association with the market outlooks that contained the office submarket data, presented in section 3.2. All respondent individuals hold experience in real estate market analyses, information and research. The questions which uncovered practice related differences are presented below along with the questionnaire results. The full list of questions is provided in appendix 1. Instead of presenting full descriptions of the methodologies and practices chosen by the

respondent organisations, the sections below will focus on the interorganisational differences in practices. Results are presented separately for the stock, vacancy rate and market rent determination.

3.1.1 Stock

Practitioners were asked which information sources they use to determine office stocks for future vacancy rate calculations. All respondents use at least municipal building information databases. However, notable differences in information sourcing were still observed. One respondent was observed to mainly rely on direct reporting from property owners and managers. In contrast, another respondent stated that they rely solely on municipal building information. The other two respondents were observed to utilize additional sources, like the public population information system (VTJ), rent rolls and investment memorandums. Figure 10 below describes the usage of different data sources.

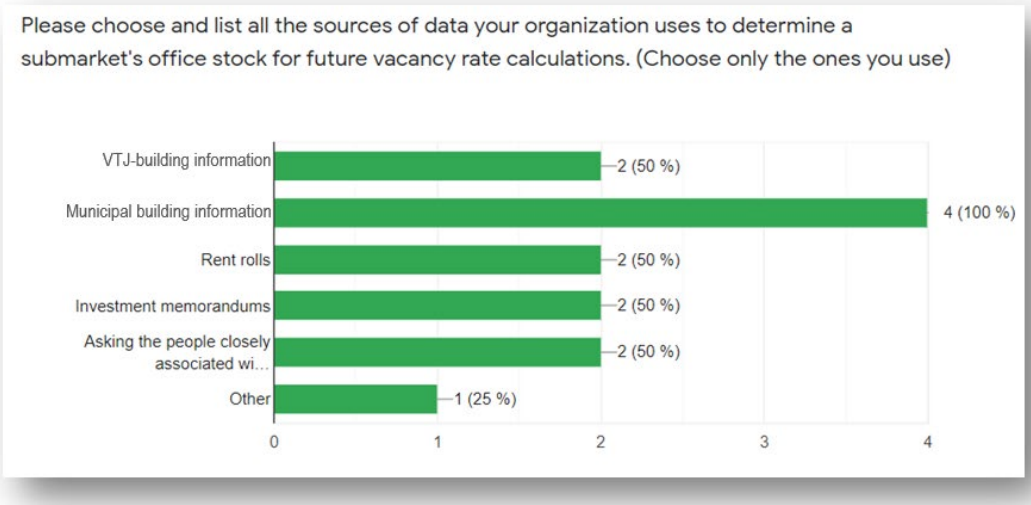


Figure 10 Stock data sources

As the chosen sources are different between the organisations, it is unsurprising that the necessary actions to utilize that data, are also different. One organisation did not directly aim to calculate submarket stocks but instead relied on the leasable and vacant areas that were reported to them for the vacancy rate calculations. Another organisation sourced net floor area data only from the municipal registries for their stock and vacancy rate calculations, though that data was seen to require partial corrections. A third respondent replied that municipal building data, rent rolls and other sources are used to arrive at the best estimate of leasable area for vacancy rate calculations. The fourth respondent wished not to disclose further details. The answers show that respondents use various sources and methods for stock calculations.

VTJ-building information and municipal building information do not provide leasable area information, instead, the information is in net floor area or floor area terms. Yet, according to (Figure 10) those two sources are widely used. Because the used source data for stock information is not always in the same terms with the vacancy information, the local practices might delineate from the guidelines and methods used in other markets, see for example the guidelines from CBRE Global Research and Consulting (CBRE 2019, p. 9-10).

Practitioners were then asked if they sometimes complemented their stock data by applying multipliers to publicly available floor area data. Two answered "Yes", and one said that the method was their only approach to stock determination. In contrast, one practitioner responded that they do not use floor area multipliers. See (Figure 11) below.

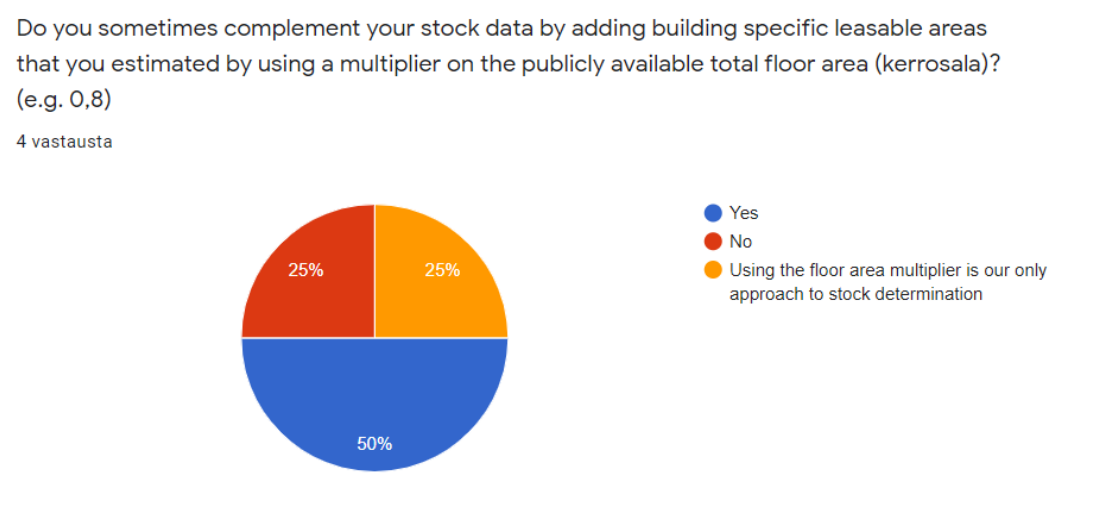


Figure 11 The use of floor area multipliers

Furthermore, one of the respondents replied that they rarely used floor area multipliers but when they do, they always use the same figure. Two other respondents were observed to use various floor area multipliers. See (Figure 12) below.

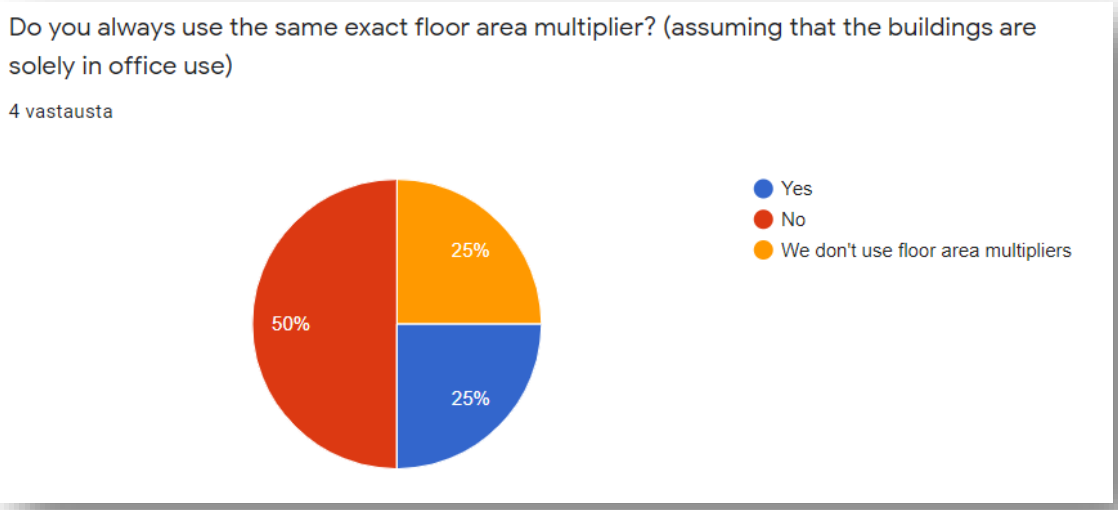


Figure 12 The use of various floor area multipliers

Practitioners were then asked which floor area multipliers they use in different HMA submarkets. Again, one respondent did not use any floor area multipliers. Another respondent was observed to use other methods for most of the cases in all submarkets, and a constant multiplier of 0,85 when needed. Interestingly, one respondent was observed to use various floor area multipliers for all other submarkets except the CBD, for which a constant figure was used. In contrast, another respondent was observed to use various

multipliers for CBD, and a constant figure for all other submarkets. Thus, interorganisational differences are notable regarding the use of floor area multipliers. For discretionary reasons the exact figures are not revealed in this thesis, thus the figure is not presented.

The use of floor area multiplier signals the need to convert the used stock data into similar scale with the used vacancy information. As such multipliers are just best estimates of the relation between leasable area and floor area, their use might have adverse effects on the vacancy rate calculations. If adequate stock information could be collected only from primary sources, there would be no further need to use such multipliers.

Practitioners were then asked: "Do you exclude such office buildings from a submarket's office stock that you consider to be in inadequate condition for the tenants or in other ways not part of the market in that area? Describe the threshold decision criteria." Interestingly, one practitioner responded that they ignore properties that are not seen to be relevant to the occupier market. In contrast, two practitioners stated that they do not exclude properties unless the properties are naturally removed from the stock by a property type conversion or demolition. This question relates directly to structural vacancy, which was discussed in chapter 2. The answers to the question show that practitioners have developed different methods for dealing with structural vacancy.

3.1.2 Vacancy rate

Practitioners were then asked to: "Choose the submarkets where you are sometimes able to calculate the vacancy rate by using the submarkets total office stock as the denominator." Two respondents said that they can calculate the vacancy rate for all the submarkets that they observed by using the total stock as the denominator. In contracts, the other two respondents preferred to use samples instead, see (Figure 13) below. Because primary data on vacancies has a constrained availability, the choice of including the complete submarket stock to the vacancy rate calculation relates to how far the organisations are willing to use secondary sources to obtain additional information on vacancies. In addition, there might be a stronger need to use secondary sources i.e. public registries to obtain additional property stock information if the leasable areas are not previously known.

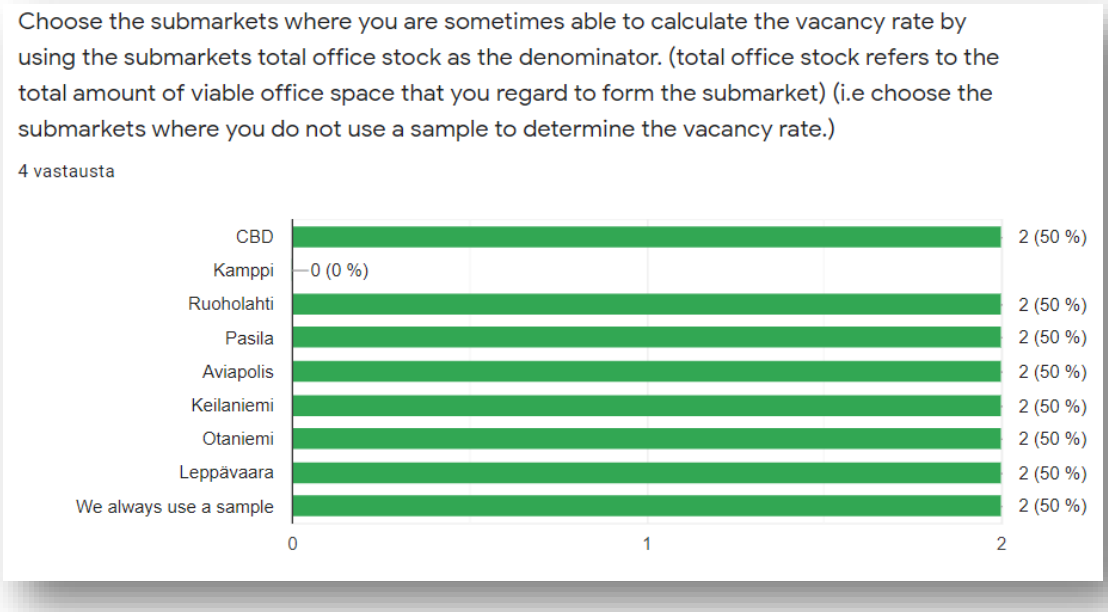


Figure 13 The use of samples vs. total stocks to calculate vacancy rates

Organisations were observed to prefer different sets of sources for information on vacant spaces. Two organisations prioritized rent rolls as their primary source, one organisation had chosen their internal leasing agency as their primary source and one organisation relied solely on direct reporting from property owners and managers. The other three organisations that used multiple sources, preferred web-based listing services as their secondary source but differed in their choices regarding the use of rent rolls, investment memorandums, internal sources, external sources and other sources. See (Figure 14) below for source preferences.

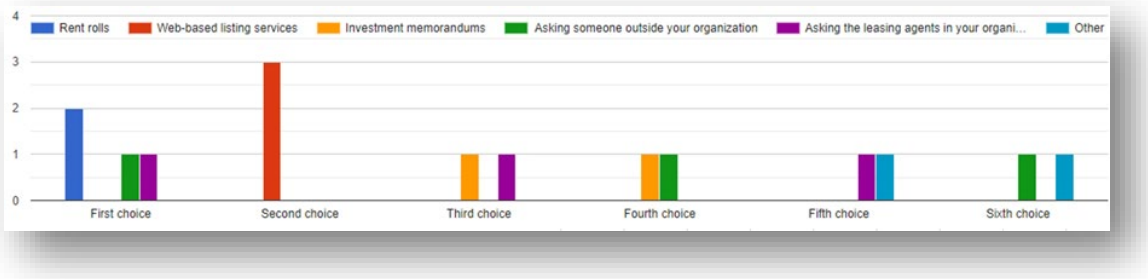


Figure 14 Source preferences for vacancy information

Depending on the preferred sources, the organisations had developed different procedural patterns for data handling, modification and analysis. Some organisations were observed to use at least partially automated processes and algorithms. In contrast, some relied on more manual processes. One organisation was observed to perform adjustments in their vacancy calculations if the quality of the offices in the sample did not represent the overall submarket. In contrast, another organisation, which aimed to use the total stock of a submarket in their vacancy rate calculations, saw quality-based adjustment as a bigger problem for intertemporal data-consistency than slightly biased vacancy levels. One organisation was also observed to account for the sample sizes in their data analyses and to publish their sample sizes along with the submarket vacancy rates.

Practitioners were then asked if they saw their submarket definition for Helsinki CBD to capture mainly high-quality properties. This relatively specific question was asked in order to asses if different submarket definitions could be the explaining factor for the large differences in reported CBD vacancy levels. One out of four respondents perceived their analyses to mainly capture high-quality properties regarding the CBD submarket. See (Figure 15).

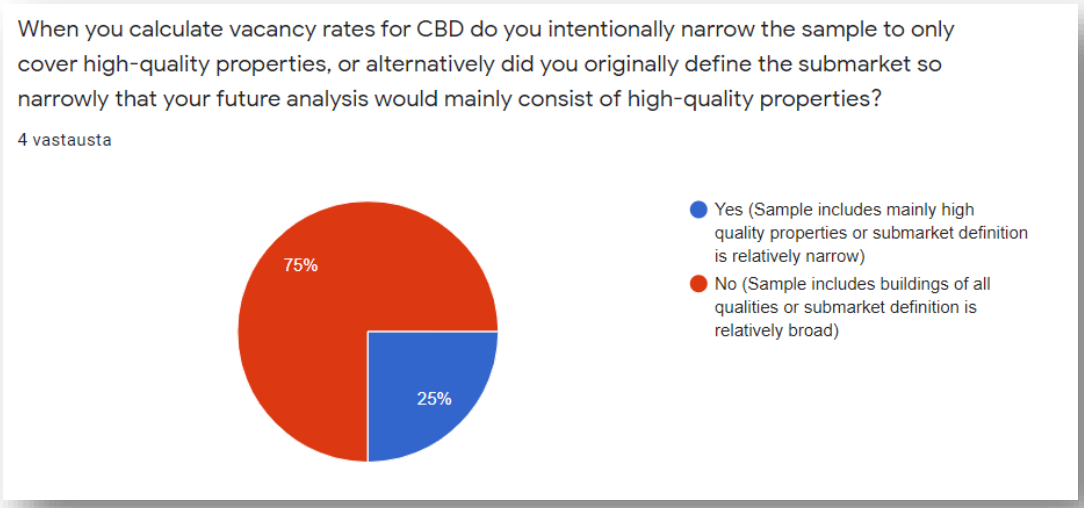


Figure 15 CBD submarket definition

Practitioners were then asked: "In what situations do you drop vacancy and stock observations from vacancy calculations?" Respondents mentioned various situations which would cause them to proceed in such manner. Three practitioners would not consider spaces under renovation vacant. Another practitioner mentioned that if it was not relevant to market the space or the space was not in the market, it might be excluded. Furthermore, another respondent was observed to exclude observations from vacancy calculations if according to the property owner the space was not attempted to be leased. The results show that practitioners have different solutions to structural vacancy and renovations.

A specific scenario was then presented to practitioners to asses if they would treat spaces under renovation differently in vacancy calculations. As can be seen from (Figure 16) below, practitioners do not necessarily treat such space in similar ways. One practitioner (violet) responded that usually the spaces under renovation are not considered to be vacant, but the extent of the renovation might affect the decision making. One respondent was more inclined to consider spaces under renovation vacant. In contrast, two other respondents considered the hypothetical property to be fully occupied.

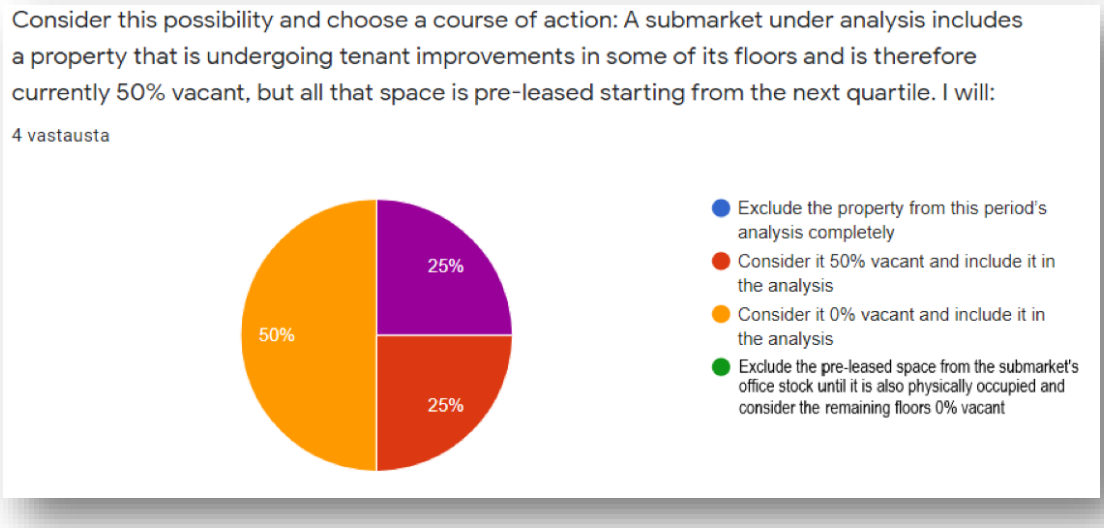


Figure 16 Renovation scenario

It seems that practitioners handle renovations differently in their vacancy rate calculations. The difference in practices regarding this matter might be related to the concept of frictional vacancy. For example, it might not always be clear if an office space under renovation should be considered as new upcoming supply, already absorbed space or simply frictionally vacant space. This is might also be the reason behind the fact that at least one of the respondents would take the extent of the renovation into account in the decision making.

3.1.3 Market Rent

Multiple open questions were then asked from the practitioners in order to know how their practices differ regarding market rent determination for submarkets. All but one practitioner responded that their market rent determination involves at least some level of subjective adjustment in addition to using direct rental evidence. Two respondents were also observed to use at least slightly different approaches for different submarkets. Three out of four respondents use a 6-month observation period for determining market rents. In contrast, one respondent uses a 3-month observation period. All respondents used estimated costs to convert gross rents to net rents or vice versa when deemed necessary.

Respondents were observed to have differing criteria for the exclusion of rent observations. One respondent mentioned that outliers might be excluded, another one mentioned that internal lease agreements are normally excluded. One respondent also said that extremely high rental incentives might cause their organisation to exclude an observation. Moreover, two of the respondents answered negatively when asked if they take rental incentives into account in any way. Little information was extracted in how the other two organisations exactly take rental incentives into account. A respondent wrote that an observation with unusually high incentives might be ignored or corrected to reflect an average level of incentives via effective rent calculation.

Based on the questionnaire results the real estate service companies treat rental incentives differently in their analyses, have differing observation periods and exclude observations on different basis. More importantly, most of the respondents perform subjective adjustments in addition to using direct rental evidence in their rent reporting. Based on the market outlooks, the same companies that use subjective adjustments were observed to report prime rents. Thus, it seems that the two practices are related and therefore the reported rents are partly dependent on what practitioners consider as prime office space. The practice of reporting prime rents might be related to constrained sample sizes that could prevent the use of more direct and statistical reporting.

3.1.4 Interorganisational differences

Multiple interorganisational differences in practices can contribute to low comparability or even inaccuracies in submarket data. The differences in (Table 1) were confirmed through the questionnaire results and market outlooks.

Office Stock	Vacancy Rate	Market Rent
Source preferences	Source preferences	Source preferences
Usage of floor area multipliers	Usage of floor area multipliers	Different approaches for different submarkets
Excluding troubled properties	Excluding troubled properties	Calculating effective rents
	Making adjustments based on sample size or sampling bias	Basis for excluding observations
	Response to renovations	Making subjective adjustments
	Using a sample vs. the total stock	Length of the observation period
		Reporting format (ranges,net,gross, prime)

Table 1. Interorganisational differences in the determination of office submarket information

3.2 Submarket data

HMA office submarket data regarding stock, vacancy rates and market rents was collected for years 2014-2019. In order to collect that data, the market reports and outlooks were utilized from Companies A, B, C, D and E. Company A's and E's data is partly confidential due to copyright reasons and some of the data was therefore removed from the figures below. However, for the purposes of interorganisational comparison, the removed data is represented in the vacancy rate and market rent figures with highlighted areas. General comments and observations that include mentions of Company A's and Company E's market data are still made, but the exact figures are not disclosed in every figure.

General commentary is provided individually for each of the figures. The differences and similarities in the time series between the participant organisations are visually analysed and discussed. The organisations practices are in some cases suggested as explanatory factors for the observable features in the time series. When possible, relevant questionnaire answers are analysed, to provide evidence for and against the presented scenarios.

3.2.1 Disclaimer

All the data presented below is extracted from the real estate service companies market reports and outlooks. Diligence was practised in the data extraction process but due to the large amount of manual work needed, the data below might not identically match the originally published figures. Originally reported data might be based on differing definitions or assumptions and therefore direct comparison is not always possible between the time series. The reporting styles and practices might have also changed within the observation period, making some of the compiled time series inconsistent. The intention of the figures is to present how different practices have led to time series that are low in comparability and to give support for the claimed effects that differing practices might have on the data. The intention of the figures is not to claim that any of the companies report worse or better market information than the other competing companies. The associated real estate service companies are not liable for the data published in this thesis and readers are discouraged from the use of any of the provided figures as basis for decision making or market operations. For original data, readers are advised to approach the locally operating real estate service companies.

3.2.2 Stock

The following figures present the perceived coverage of the HMA office submarkets by the studied organisations in 2019. Three major factors constitute to the sum of the reported property stock figures: The extent of the area that is seen to be the submarket, the filtering process of properties that are seen to represent the submarket in that area and the organisation's ability to identify all eligible properties within their submarket definition. Except for Company A, the reported figures did not state any defined format for the stated sqm's. The author suspects that reported figures are likely in undefined leasable area terms or alternatively, in net floor area or floor area terms. All Company A stock data is reported in floor area terms. However, Company A's exact stock figures have been left out from this thesis due to copyright issues. None of the reported stock figures necessarily mean that all constituting properties would be taken into consideration in the vacancy and rent reporting for a particular submarket. However, the published stock figures give clear indication of the coverage that each organisation initially recognizes to form the submarket. No attempt is made to explain the difference in submarket definitions with the organisation's practices. The reasons why organisations have defined submarket differently vary greatly and it is difficult to provide any clear reasoning to why this has happened as such perceptions can be very subjective. Different or similar submarket definitions are, however, used as one possible explanation for features found in vacancy and rent figures.

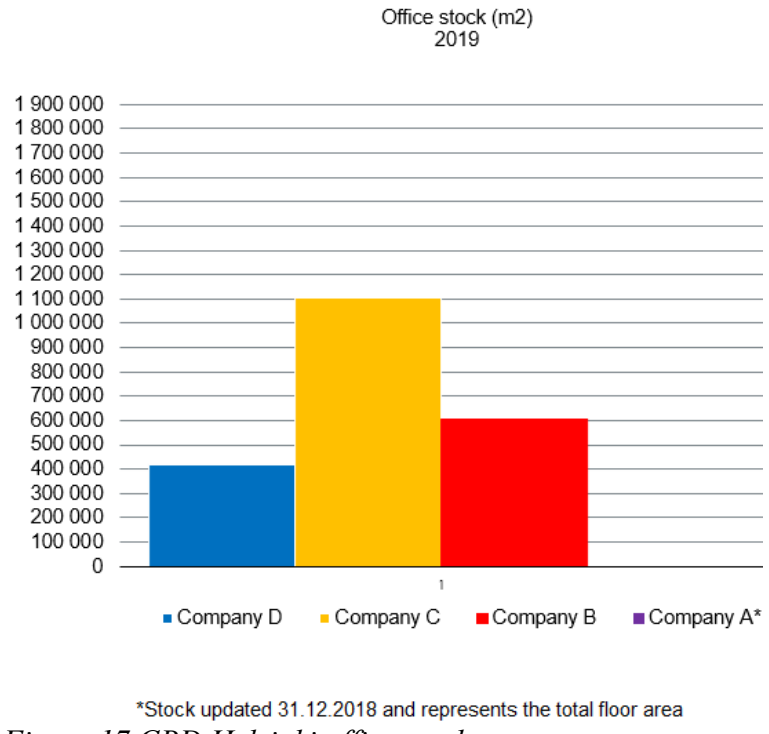


Figure 17 CBD Helsinki office stock

In (Figure 17) large differences can be seen in how organisations perceive the extent of the CBD office submarket. Company D and Company B see the stock be approximately 500,000 sqm while Company C sees the submarket to cover over 1,0 million sqm. Based on the market outlooks and the reported figures, it seems that Company A holds the broadest view of the CBD submarket. Company A's stock figure far exceeds even Company C's figure, even if the difference between leasable area and floor area is accounted for. Although, Company E's CBD stock figure was not found on their market outlooks, Company E's and Company B's view of the CBD submarket are rather similar, based on the reviewed maps. Company A's CBD submarket area on the other hand, includes properties

that are not included in the maps provided by Company B and Company E. For example, two additional city blocks are included directly south of Ludviginkatu and Rikhardinkatu. Company A also considers the Töölönlahti area, eastern parts of Kamppi district and properties between Yrjönkatu and Annankatu to be part of the CBD submarket.

Based on the reviewed maps, it seems that the differences in the CBD submarket's stock figures rise mostly from the area's perceived extent, rather than from summing up multiple city districts together in their entirety. However, the differences between CBD definitions are significant in terms of office area. Even the seemingly small difference between Company B's and Company D's figures is more than 40%.

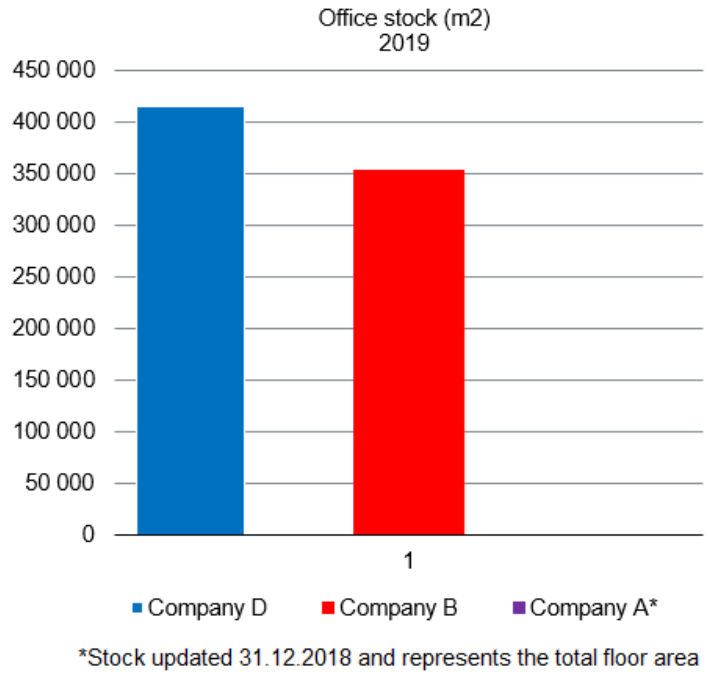


Figure 18 Ruoholahti Helsinki office stock

In (Figure 18) the differences in office stock views are relatively small. All estimates are within 25% of each other. The relatively uniform view of the submarket's contents at least in terms of area coverage might be due to Ruoholahti's easily identifiable peninsula like shape, which is also respected by the official city district border. For example, Company A is known to use the official city district areas as their submarket borders, except in the case of Helsinki CBD.

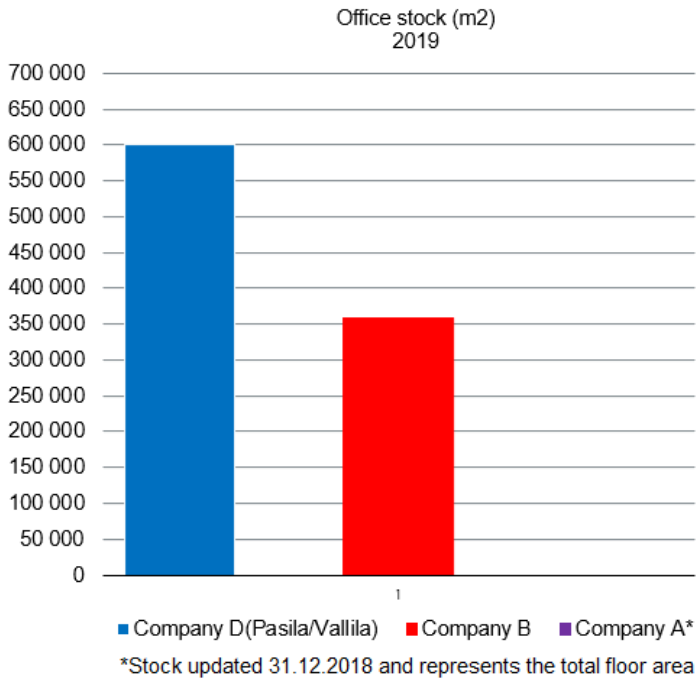


Figure 19 Pasila Helsinki office stock

Large differences in reported stock figures can be seen in (Figure 19). Company D identifies Pasila and Vallila areas as one submarket unlike the other studied organisations, which might also make the direct comparison of vacancy and rent figures difficult. Company B identifies the submarket in a relatively narrow fashion. Company B's perception of Pasila submarket comprises mostly of the properties directly east and westward of the Pasila railway station, whereas for example Company A's submarket definition expands far further into north, west and east. Based on the very different submarket definitions, it would not be surprising to see large differences in the reported vacancy and rent figures for the Pasila submarket.

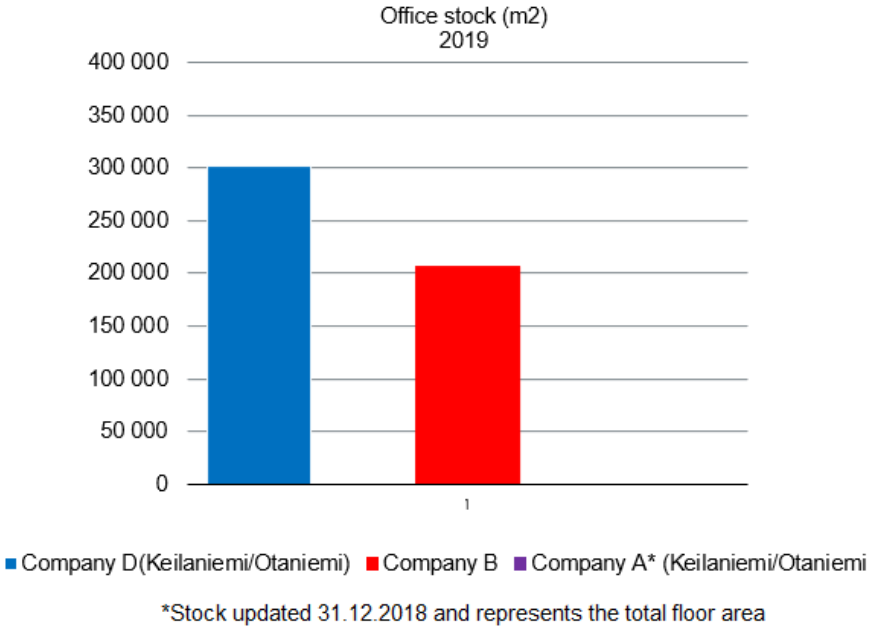


Figure 20 Keilaniemi Espoo office stock

Keilaniemi office submarket is one of the most polarizing submarkets in terms of the perceived area coverage. Some organisations like Company A and Company D see the submarket to consist not only from the Keilaniemi area but also from the properties in Otaniemi, whereas for example Company B sees them as separate submarkets. As the subsequent reporting is based on completely different districts, the direct comparison of the reported market benchmarks becomes difficult. Keilaniemi area by itself, however, is easily delineated if other districts are not included into the submarket, because Keilaniemi is geographically a very distinct area that consist almost solely from high density office buildings. Company A's figure's difference to Company D's figure could be for the most part explained by the use of floor area vs leasable area. See (Figure 20).

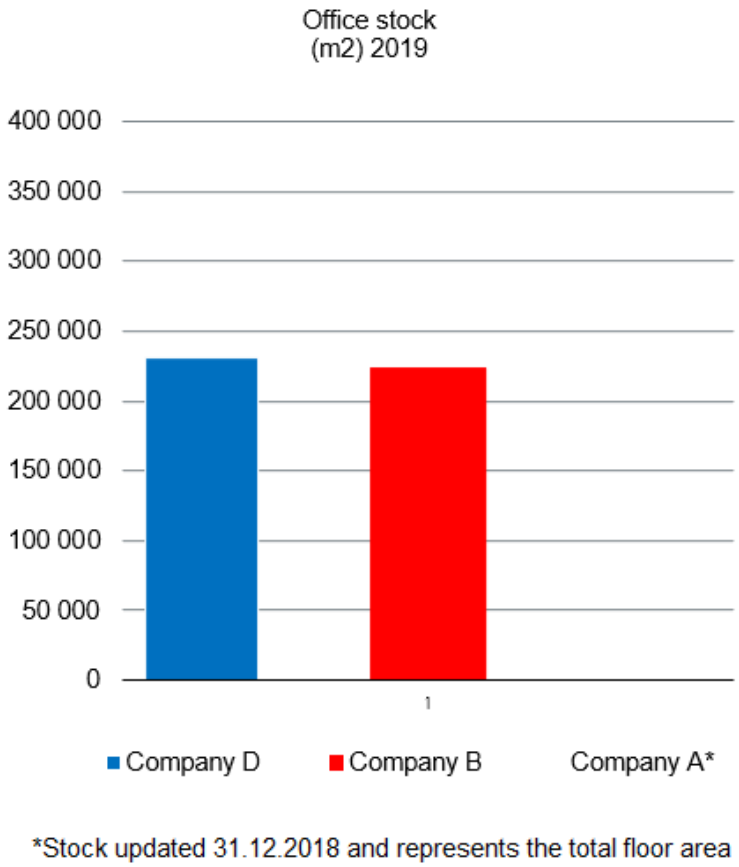


Figure 21 Leppävaara Espoo office stock

Leppävaara submarket is seen to cover relatively similar area by Company D and Company B, see (Figure 21). Company B reports market information separately for the office properties located in Perkkaa. Based on the Company A's map, their perception of the Leppävaara submarket was perhaps the broadest, as large areas north of Turuntie were included in it, as well as Perkkaa. Indeed, Company A's reported property stock figure is significantly larger than the figures of Company B's and D's.

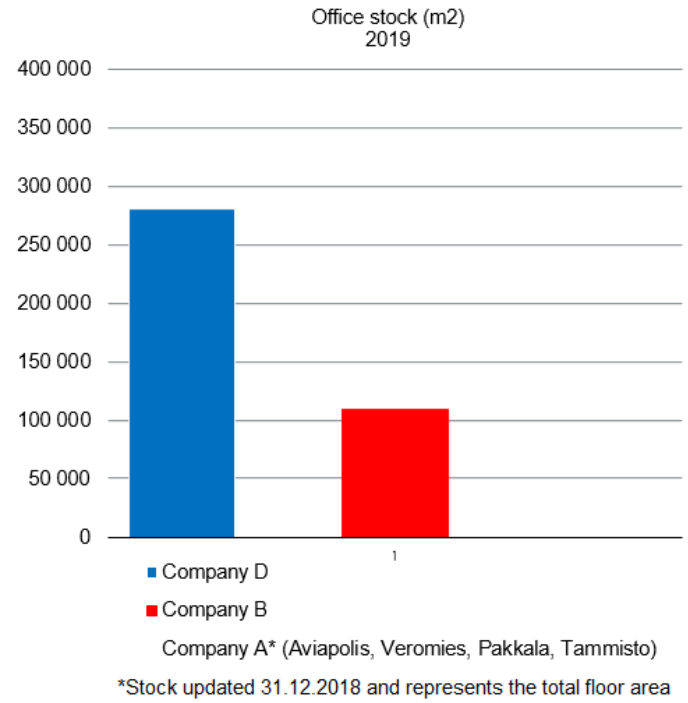


Figure 22 Aviapolis Vantaa office stock

Figure 22 shows a large difference in the perceived coverage of the Aviapolis submarket. Company B reports separate figures for Veromies and Aviapolis and identifies the Aviapolis market to consist mainly of the properties in close proximity to the airport. On the other hand, Company A recognizes the submarket to cover a very large area, consisting of the Aviapolis, Veromies, Pakkala and Tammisto districts. Company D stock figure is more in the scale of Company A's figure rather than Company B's, especially if Company D reports leasable areas instead of floor areas.

Out of the stock figures and maps that were available in the market outlooks, a claim can be made that Keilaniemi, Pasila and Aviapolis are perceived very differently by the studied organisations which brings added uncertainty to the comparison of the reported benchmarks in those submarkets. CBD, Ruoholahti and Leppävaara are understood in a more harmonious fashion but not identically, which readers are advised to remember while reviewing the following vacancy and rent figures.

3.2.3 Vacancy rate

The following figures show the reported vacancy rates of different HMA office submarkets by the studied organisations. Many different factors can affect the outcome of measuring vacancy in submarkets. For example, the chosen area and the set of buildings determines the pool of possible observations, the organisation's role and market share can influence the amount of available primary data and the organisation's practices in handling and sourcing the data can also affect the outcome.

Company B reported vacancy rates for Q3 2018 in a range format. Hence, the are two datapoints at that point of time in the figures below. For example, in (Figure 23) the reported range for Q3 2018 was 10-14%.

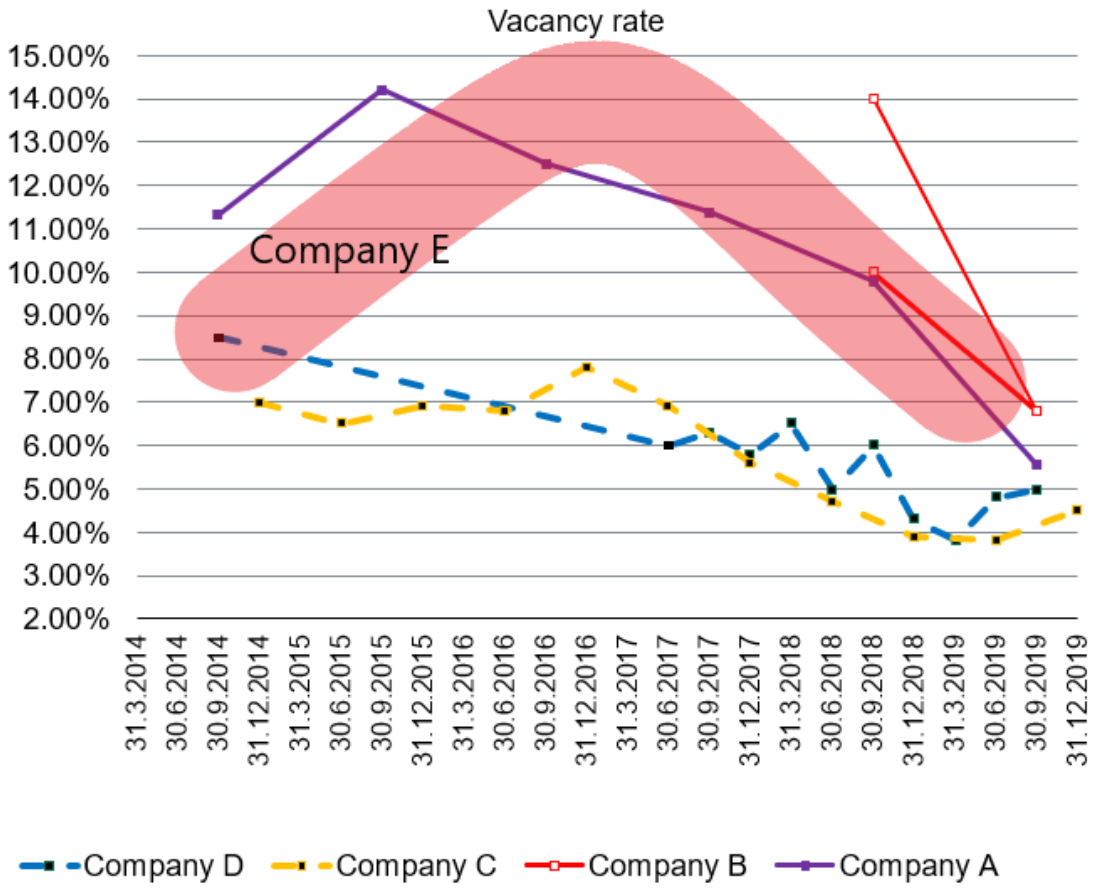


Figure 23 CBD Helsinki vacancy rate

In (Figure 23) a significant difference between the reported figures is apparent. Company D and Company C reported CBD vacancy rates to trend from approximately 7% to 3,8% between Q2 2017 and Q2 2019 while Company A, Company B and Company E reported about 3-5% higher rates for the same time period. In some individual quartiles' differences of 6-8 percentage points were registered between the two groups of companies. The data suggests that some interorganisational differences in the analysis methods separate the vacancy rate calculation outcomes between the two groups of companies. Such a clear and consistent difference between the two groups is unlikely to result from random differences in the pool of observations. One explanation is that Company D and Company C have defined the CBD submarket relatively strictly and their subsequent analyses, therefore, capture mainly prime properties. However, (Figure 17) shows a significant difference in the reported stocks between Company D and Company C. Assuming that the explaining factor for the lower vacancy rates is "strict" submarket definition, we should expect Company C to exclude some vacancy observations from troubled properties to arrive at the same low level of vacancy rate as Company D. However, if Companies C and D don't have similar CBD submarket definitions the difference between the two groups of companies could be explained by some other practice-related factor.

Based on the questionnaire and the CBD stock figures in (Figure 17), it seems evident that Company D and C don't have similar submarket definitions. In fact, Company D considers their CBD submarket definition to mainly capture high-quality properties, unlike Company C. In addition, Company C's CBD stock figure is significantly larger than Company D's and based on the questionnaire Company C does not exclude vacancy and stock observations in larger quantities than the other companies do. Therefore, Company

D's relatively low vacancy rate could potentially be explained with the "compressed" submarket definition, but Company C's similarly low vacancy rate could not be. Furthermore, Company D's stock figure is relatively similar with Company B's, yet Company B has reported significantly higher vacancy rates than Company D. Thus, it is unlikely that the "compressed" submarket definition is the only explaining factor for Company D's relatively low vacancy rates.

Another practice distinguishes Companies C and D from Companies A and B. Companies C and D use the submarket's total stock as the denominator when they calculate vacancy rates. In contrast, Companies A and B prefer to use samples, see (Figure 13) in the questionnaire section. For a clearer illustration, the time series of the companies that calculate vacancy rates for the total stock are drawn with dashed lines. Based on the questionnaire, Companies B, C and D all use web-based listing services as their secondary source for vacancies. Assuming that Companies C and D don't regularly possess more primary data on CBD vacancies than Companies A and B, and that Companies A and B do not use very large samples to calculate the vacancy rate, an argument could be made that Companies C and D are more likely to use larger amounts data from web-based listing services than Companies A and B are. The shares that different sources represent in the vacancy rate calculation could affect the calculation outcome if the sources ability to reflect the overall vacancy rate in the submarket varies. For example, a primary sample consisting of qualitatively unrepresentative properties could lead to a distorted vacancy rate estimate, particularly if the used sample size is small. Similarly, interpreting the lack of active listing as office occupancies has the potential to suppress vacancy rate estimates if a significant portion of the vacant office space in the submarket is not actively marketed. It is possible that the decision to calculate vacancy rates either from samples or from the total submarket stock is the explaining factor behind the clearly separated vacancy rate estimates in (Figure 23) above.

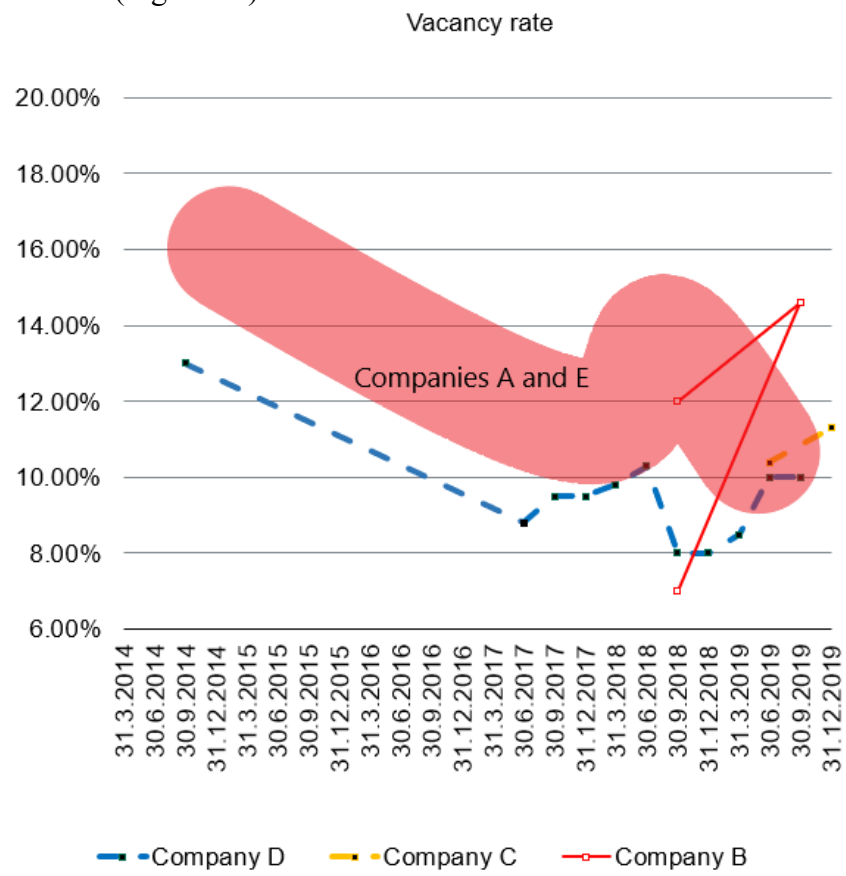


Figure 24 Ruoholahti Helsinki vacancy rate

In (Figure 24) differences in the reported vacancy rates are more subtle than in (Figure 23). For example, from Q3 2015 to Q4 2017 the difference in reported rates varies mostly between 0-2% units and the largest difference in the whole observation period is 6% units. The most likely explanation for the relatively consistent vacancy rate reporting is the rather uniform view of the submarket between the organisations, see (Figure 18) above. However, in two separate time periods, clearly divergent trends were reported between multiple companies. Divergent trends raise significant concern of the reliability of the reported figures in Ruoholahti submarket, which still represents a very recognizable and substantial portion of the total office stock in HMA. Even though the number of data points is smaller in (Figure 24) than in (Figure 23), the same notion can be made, Company C's and D's vacancy rate estimates lay lower than Company A's and B's figures. Though, in (Figure 24) the difference of approximately 2% units between the two groups is not as large as in (Figure 23).

What could have caused the companies to report so contradictory trends in 2017-2019? The divergent trends in the (Figure 24) could be explained by sampling bias. For example, one of Company A's 2019 vacancy rate estimates relies on nearly 40% smaller sample than the previous estimates, which could have contributed towards the possibly inaccurate figure, which shows a contradictory trend from Companies B and E. Because no sample sizes were available for the other time series, it is hard to assess the reliability of the other figures in the same time period. Regardless of the divergent trends, Ruoholahti submarket offers a special opportunity to see the possible effects of different practices on the market data as the variance caused by different submarket definitions should be relatively limited. Apart from one observation from each Company A and Company E, the separation between the Companies A, B, E and C, D is notable. Once again, it is unlikely that that separation is caused by different submarket definitions. For example, in (Figure 18) the stock figure of Company D is relatively similar with Company A and B, yet their vacancy rate estimates are clearly different. The fact that the separation between the two groups of companies persist in (Figure 24) supports the claim that the decision to calculate vacancy rates either from samples or from total submarket stock, might have caused the separated vacancy rate estimates between companies A, B, E and C, D.

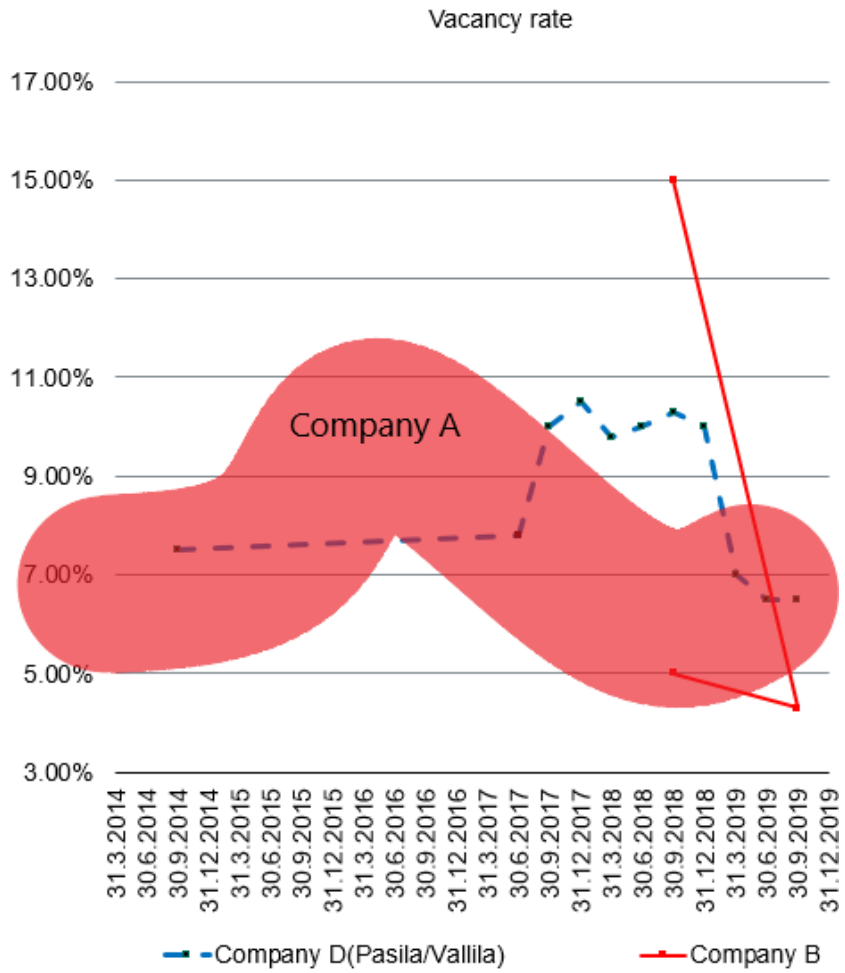


Figure 25 Pasila Helsinki vacancy rate

Submarket of Pasila represented in (Figure 25) is defined very differently between Company B, Company A and Company D. For example, Company D reports combined figures of Pasila and Vallila, Company A uses the official city district border and Company B applies a relatively compressed view of Pasila submarket. The reported figures are fundamentally incomparable due to the large differences in submarket definitions and large differences can be seen in both vacancy level and trend directions.

Due to the large differences in the submarket definitions regarding Pasila and the lack of datapoints, no other organisational practices are suggested to explain the features in (Figure 25).

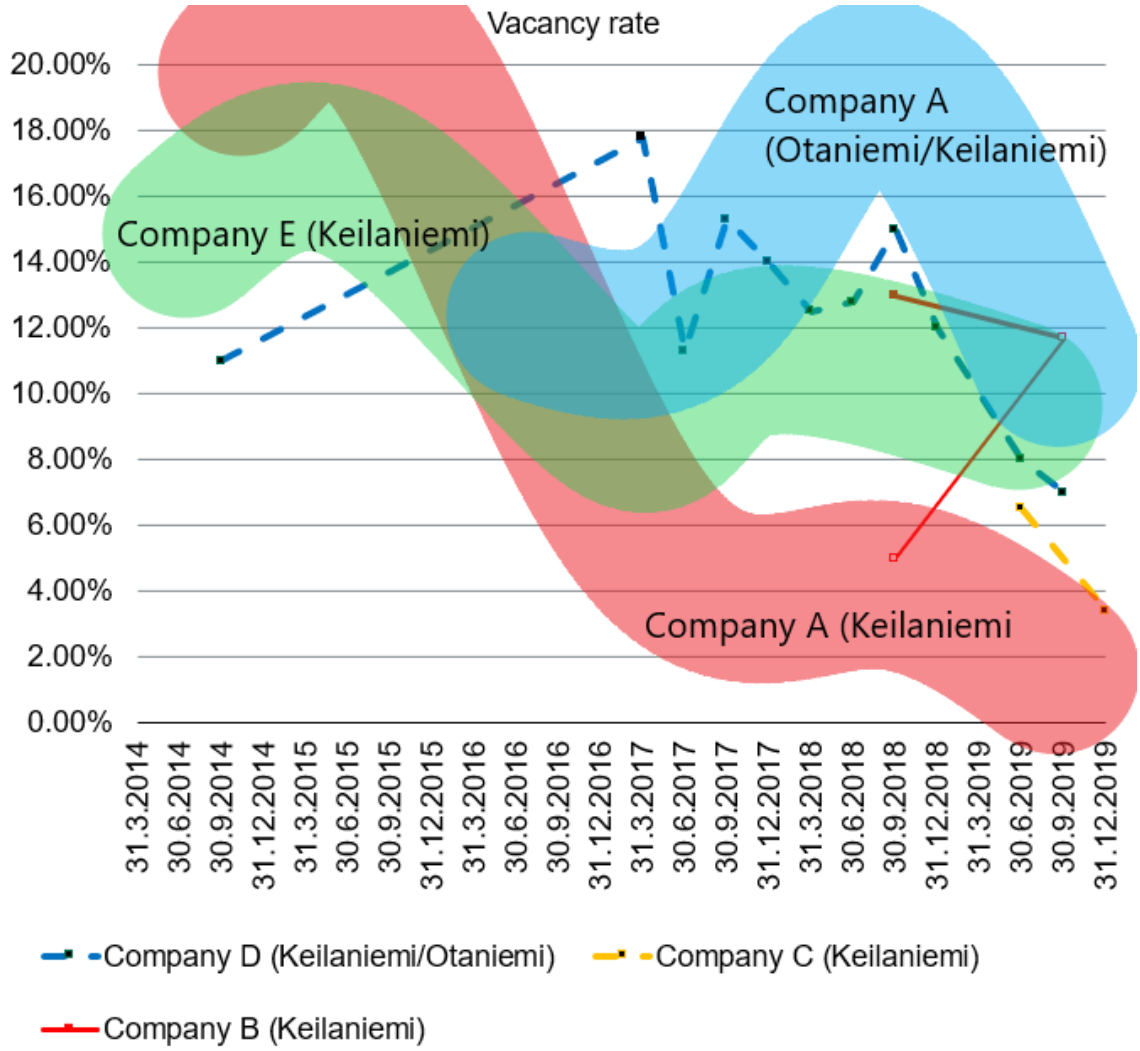


Figure 26 Keilaniemi Espoo vacancy rate

The comparability of the figures in (Figure 26) is reduced because some companies include the area of Otaniemi into their analyses while some do not. In the time period of 2016-2019 Company E and Company B defined their submarket area as only the Keilaniemi area and reported figures of similar scale with Company D, that reports figures for Keilaniemi/Otaniemi area. Furthermore, it is apparent in the (Figure 26) that Company A's 2017-2019 vacancy rate estimates for Keilaniemi are relatively low compared to Companies B and E, which is surprising, given that their figures are relatively similar in (Figures 23 and 24). In addition, the notable difference between the Company A's Otaniemi/Keilaniemi figures to Company A's Keilaniemi figures illustrates how significant effects differing submarket definitions can have on the data.

The vacancy rate estimates of Company C and D are relatively similar, which could be a result of similar practices. However, the clear separation to the other companies is not present in (Figure 26). Thus, the Keilaniemi data does not provide clear evidence for or against the claims made in the comments for (Figures 23 and 24).

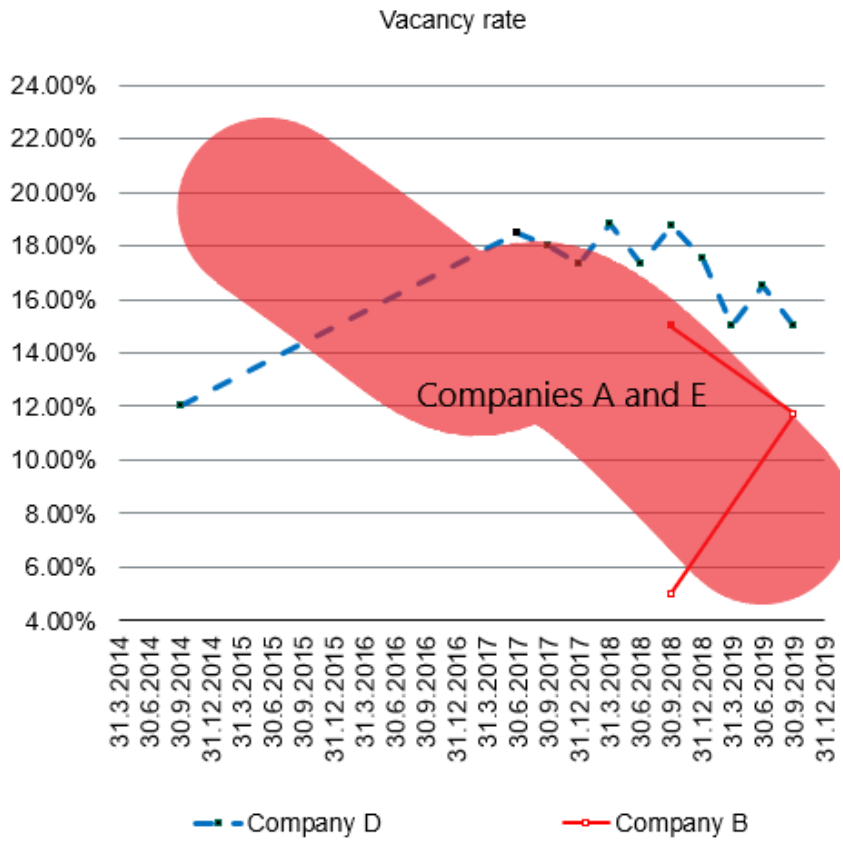


Figure 27 Leppävaara Espoo vacancy rate

In (Figure 27) no divergent trends are apparent since 2016, except for one minor case, which is apparent in only one observation. However, the reported figures vary wildly and 6%-unit differences in the reported vacancy rates between the companies are common. In addition, in multiple time periods the reported trends differ greatly in their slopes. The decreasing trend of Leppävaara vacancy is clear in all time-series but multiple opinions of the prevailing rate exist in all time periods.

In the comments for (Figures 23 and 24), Company D's and C's practice to calculate vacancy rate for the total submarket stock was suggested as the explaining factor for the differences in the time series. However, in (Figures 23 and 24) Company D's and C's estimates were lower than the other time series, but in (Figure 27) Company D's vacancy rate estimates are higher than the other time series. If the separation in (Figures 23 and 24) was caused by the different vacancy rate calculation practice, it might also mean that the web-based listing services contain more vacancies for the Leppävaara submarket compared to the samples that Companies A, B and E have used. However, because Company C has not published market information for the Leppävaara submarket, it is not possible to see if the two Companies with similar practices publish similar results on a constant basis, regardless of the submarket. However, apart from (Figure 26) Companies A, B and E have reported similar trends and levels in the office vacancy rates.

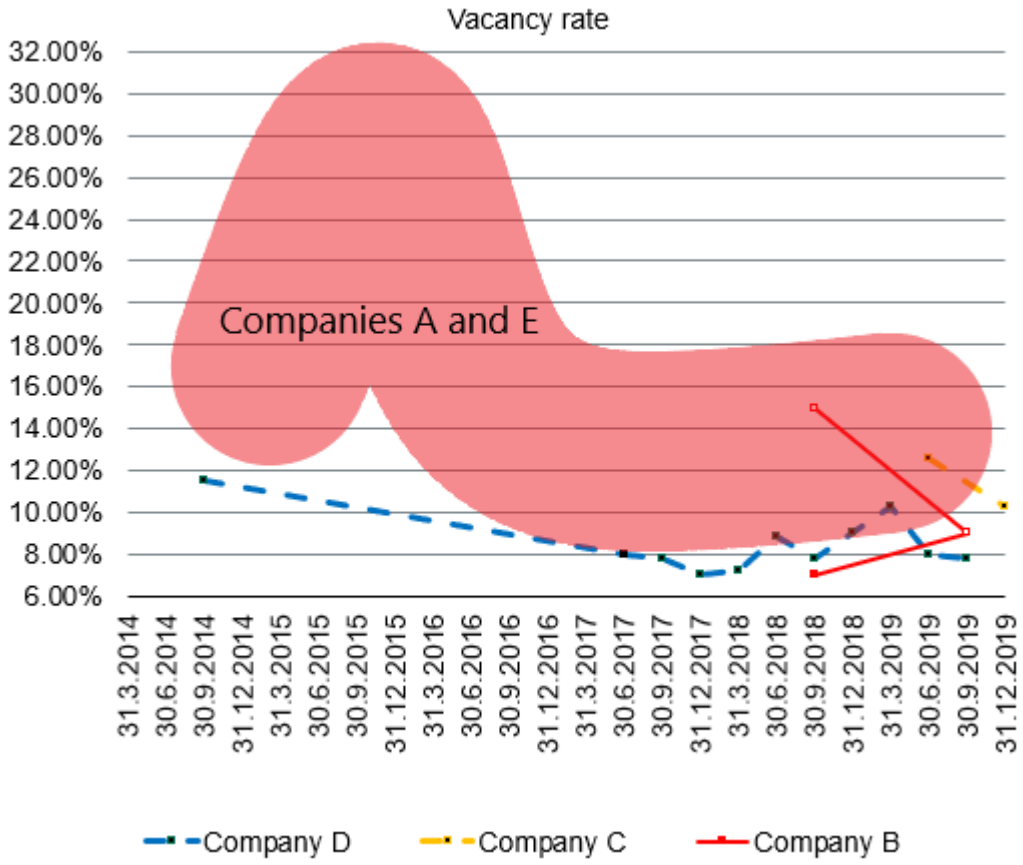


Figure 28 Aviapolis Vantaa vacancy rate

Company B uses a comparatively narrow definition of the Aviapolis submarket and only includes the areas very close to the airport to their analyses, for example Veromies area is reported separately by Company B, while other companies consider the Aviapolis submarket to cover not only Veromies but other areas as well. Due to that large difference in submarket definition the Company B data is incomparable to other reported figures. In 2019 the differences between the reported rates are approximately within 4 percentage points, representing a relatively uniform view of the prevailing vacancy rates, though much larger differences are noticeable in the preceding years.

Figure 28 has similar characteristics as (Figures 23 and 24) regarding the two different approaches to vacancy rate determination between Companies C, D and A, B. However, the difference between Company C's and D's time series is approximately 3% units. Because Company C has not published figures for years 2017 and 2018 it is hard to say if the time series from Companies C and D are similar, like in figure 23.

Company B's vacancy rate estimates are not similar with Company A's and E's estimates, like in (Figures 23, 24 and 27). This suggests that different submarket definitions can decrease the comparability between the time series. It is unsurprising that different submarket definitions can cause large variances in vacancy rate reporting. Indeed, clear differences in the reporting consistency can be seen, if the vacancy rate reporting from relatively similarly defined submarkets, like CBD and Ruoholahti is compared to data from Pasila, Keilaniemi and Aviapolis. Furthermore, in (Figure 26), Company A's two time series are drastically different even though their submarket definitions are partially overlapping.

3.2.4 Market rent

The two following figures describe rental development in CBD and Ruoholahti submarkets. It was noted during the study that most companies have published rental figures consistently for the CBD submarket but not for the other submarkets. The data from such submarkets is not analysed in this thesis due to the lack of datapoints. However, (Figure 29) below illustrates the differences in rent reporting between the companies fairly well.

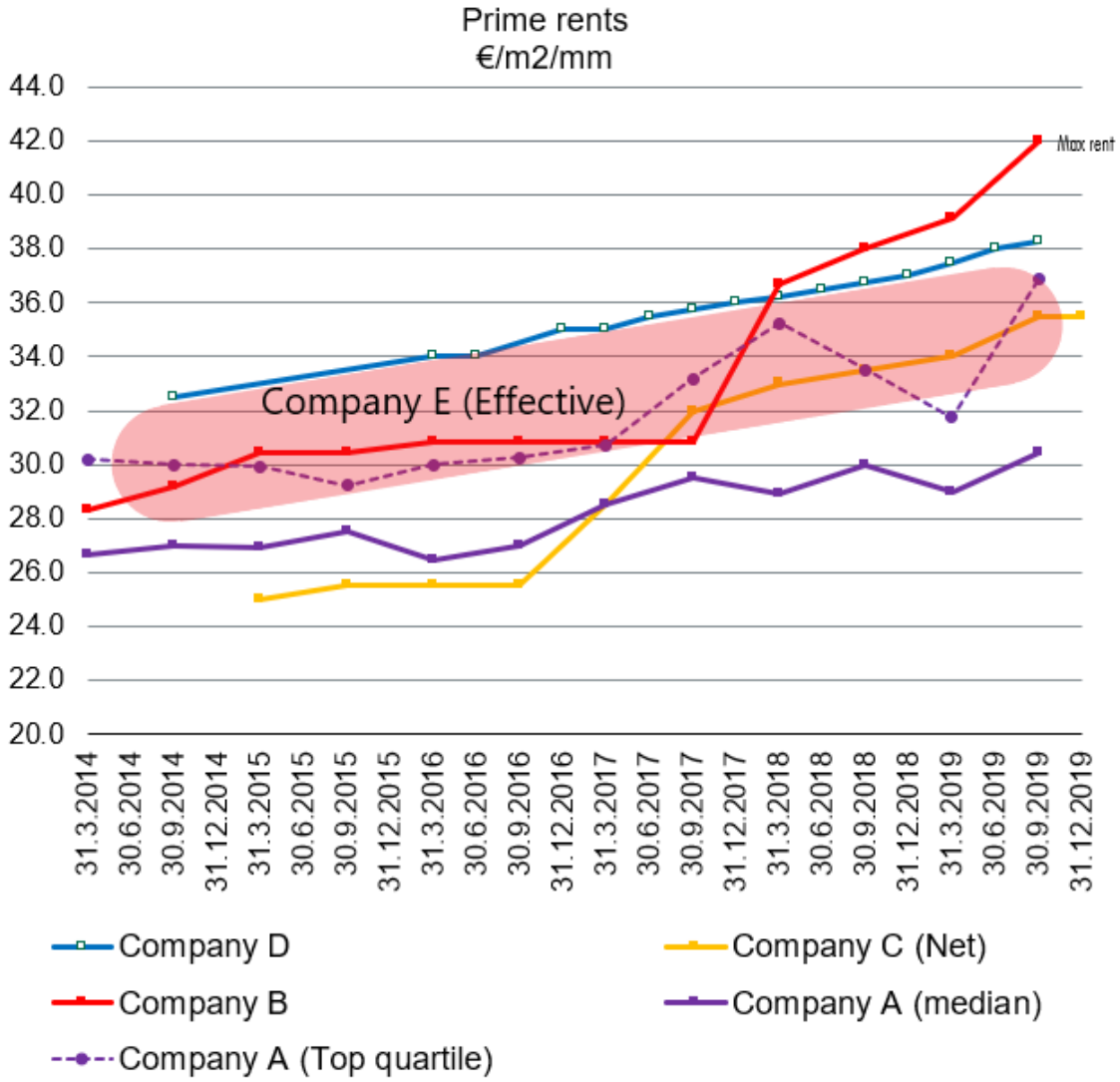


Figure 29 CBD Helsinki market rent

Multiple factors decrease the comparability of the different time series regarding market rents in (Figure 29). For example, Company B changed their rent reporting style in Q3 2018, Q1 2019 and again in Q3 2019. The upper figure of the given market rent range was used in this thesis for Q3 2018 and for Q3 2019, though the ranges for those time periods might have been determined with different principles. A single figure was used for the Spring 2019 and pre-autumn 2018 time period, as originally published. Furthermore, Company C reports net rents, which complicates the interorganizational comparison. Moreover, based on the information from Company E's market outlook, they report effective rents, meaning that their figures should be free of all rental incentives. Based on the questionnaire, Companies C and D also take incentives into account in some way, though they were not observed to report effective rents. Company D's figures lay constantly above others, except for the period between Q1 2018 – Q3 2019 when Company B reported higher figures. Based on the questionnaire results and (Figure 17) Company

D's utilizes a relatively strict CBD submarket definition, which consists mainly of good quality properties. The different submarket definition could have contributed towards the higher reported rents. However, there are other factors that could have contributed to the differences in the reported rent levels. For example, in the years 2018-2019 Companies B, C and D reported figures within 1,50€ of each other if the approximate difference between net and gross rents is accounted for (3,50€), but Company A's and E's figures are clearly lower in the same time period. Companies B, C and D use subjective adjustments and report prime rents. Company A applies statistical methods directly to the new leases reported to them by the property owners. Company E did not take part in the questionnaire; therefore, their reporting method is unknow. It is also possible that the practitioners have different opinions on what rental observations should be considered to represent the level of prime rents in the submarket, regardless of their particular submarket definitions.

The reported rent levels are different between the companies, but most of the time series show relatively similar growth rates for the observation period. However, Company C and Company B reported comparatively fast rental growth between 2016 and 2018. Similarly, Company A's top quartile time series rose significantly in that time period. What could explain that other time series retain similar growth rate throughout the 2014-2019 time period, unlike Companies B's and C's time series? One possible explanation is that Company B and Company C changed the reporting methods during that time period. However, that would not explain why Company A's top quartile time series behaved similarly in that time period. Apart from Q1 2019, the rising trend in the Company A top quartile time series is apparent. The peculiarly low rental figure for Q1 2019 could be ruled as an exemption because that figure was based on nearly 50% fewer observations than the preceding and following reporting. Smaller sample sizes could lead to distortions. An alternative explanation for the notable differences in growth rates could be that the differences in the market rent development between 2017 and 2018 were "smoothed out" with subjective adjustment by other companies than Company A (top quartile), B and C. However, Company A's median time series is unaffected by subjective adjustments but shows a very constant growth rate throughout the whole observation period, which is in line with Company E's and Company D's growth rates. It is unclear why the growth rates between companies B, C and A (top quartile), D, E have so large differences in the time period 2016-2018, even though, all those time series presumably track the rental development of the high quality office buildings in the CBD submarket.

Based on the questionnaire and (Figure 17) Company D's uses a relatively strict CBD definition, which has likely contributed towards the reporting of higher rental levels in (Figure 29). Companies A, B and E reported very similar rental levels in 2014-2016. But something deviated Company B's reporting since 2017. Furthermore, the same rapid growth rate is visible in Company C's time series. Additionally, the different forms of rent reporting decrease the comparability of the figures. Based on the features in (Figure 29), it is likely that standardization of the submarket definitions and reporting format could have a positive effect on the data's consistency and comparability. However, by sharing primary lease data the used sample sizes might be sufficient for direct statistical rent reporting instead of the partially subjective prime rent reporting that is currently used by at least Companies B, C and D.

Figure 30 Ruoholahti Helsinki market rent

(Figure 30) represents relatively consistent reporting of rents. Company E's and Company A's reporting resemble each other and indicate very flat rental development in Ruoholahti. Readers are advised to bear in mind that Q3 2018 and Q3 2019 Company B's reporting were done with different principles and the figure can be misleading in that regard. Overall the time series are surprisingly consistent and comparable. The relatively consistent and uniform reporting of rents could be to the relatively similar views of the submarket between the organisations. However, the lack of datapoints from Companies B, C and D make interorganisational comparison difficult. Similarly, due to the lack of constant and overlapping rental follow-up of submarkets Pasila, Keilaniemi, Leppävaara and Aviapolis by companies B, C and D, the interorganisational comparison is very difficult. For that reason, the rental data from those submarkets is not presented in this thesis.

3.2.5 Prime yield

Unlike the stock, market rent and vacancy rate reporting, the reporting of prime yields is very consistent and comparable through the whole observation period in (Figure 31). Unsurprisingly, the prime yield estimates seem to be unaffected by interorganisational differences. This could be, because the available transaction evidence for prime CBD office properties is relatively similar between the companies.

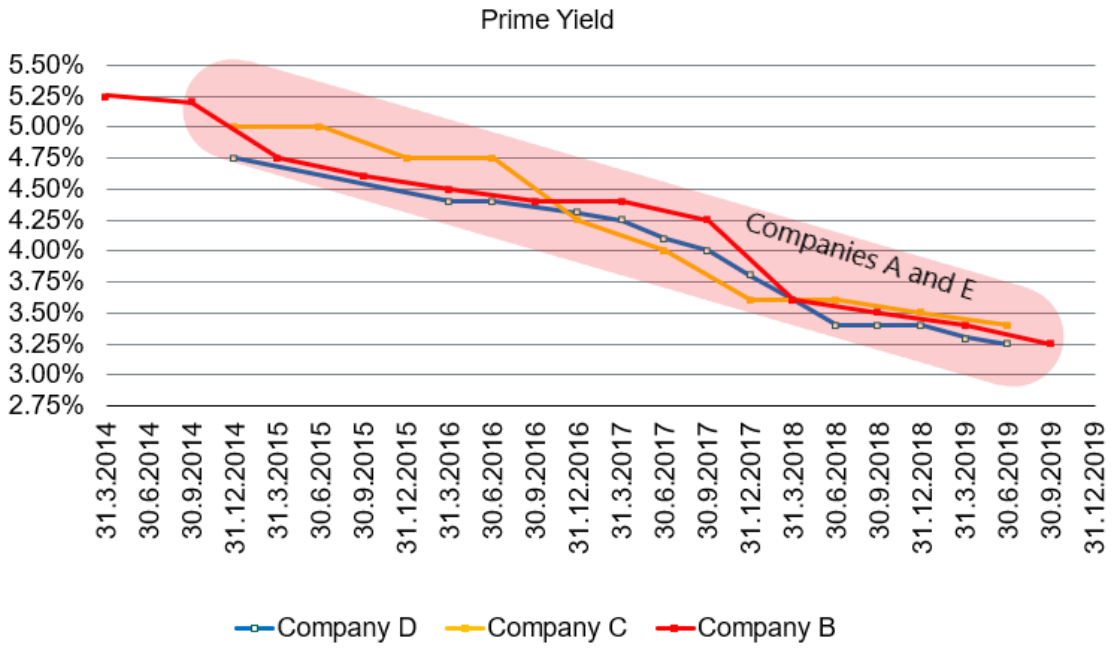


Figure 31 CBD Helsinki prime yield

4 Differences in practitioner methods and their effects

The causes and effects of the found interorganisational differences will be discussed in this chapter. When possible, the found differences in practices are compared to academic literature, industry standards and guidelines from more mature markets. Answers to the two research questions are provided individually for the determination of office stock, vacancy rate and market rent.

In addition to the interorganisational differences that were presented in (Table 1), it was shown in section 3.2.2 that organisations use differing submarket definitions. Furthermore, it was shown in section 3.2 that the different submarket definitions have visible effects on the published stock, vacancy rate and market rent information. All the factors that were shown to have visible effects on the submarket information are bolded in (Table 2).

Office Stock	Vacancy Rate	Market Rent
Submarket definitions	**Submarket definitions**	**Submarket definitions**
Source preferences	**Source preferences**	Source preferences
Usage of floor area multipliers	Usage of floor area multipliers	Different approaches for different submarkets
Excluding troubled properties	Excluding troubled properties	Calculating effective rents
	Making adjustments based on sample size or sampling bias	Basis for excluding observations
	Response to renovations	Making subjective adjustments
	Using a sample vs. the total stock	Length of the observation period
		Reporting format (ranges,net,gross, prime)

Table 2 Interorganisational differences in the determination of office submarket information (Bolded factors have visible effects on the data)

4.1 Stock

The practices regarding stock determination have interorganisational differences in submarket definitions, source preferences, usage of floor area multipliers and the exclusion of troubled properties.

It was shown in section 3.2 that the organisations stock figures vary greatly due to different submarket definitions. For the same reason, it is difficult to isolate the effects of the different stock determination practices. However, it is likely that both the different submarket definitions and different practices for the stock determinations have contributed towards the variance in submarket stock figures.

Differences in source preferences and in the usage of floor area multipliers originate from the same underlying issues. The constrained availability of leasable area information from primary sources has driven the organisations to utilize secondary sources to various degrees. Furthermore, because the secondary sources offer information in net floor areas

and floor areas instead of leasable areas, and because the secondary data is known to comprise inaccuracies, the organisations have developed different practices to overcome those problems. Some organisations comprise their stock data from multiple sources, such as publicly available floor areas, rent rolls, investment memorandums and property owners to arrive at their best estimate of the submarket's leasable area. Other organisations prefer only one source, such as publicly available net floor areas or direct reporting from property owners. Depending on the organisation and the preferred sources, the used corrective measures were observed to be different. For example, various multipliers are applied to floor areas depending on the organisation, submarket and property in question. In addition, the publicly available net floor area data was observed to be manually altered, if for example the property type information was found to be outdated. Substituting leasable area information from primary sources with secondary data, which is in other terms, might delineate the local practitioner methods from the methods that are used in more mature markets for stock determination. In order to achieve more accurate vacancy rate estimates, stock and vacant areas should ideally be sourced and recorded in the same format (CBRE 2019, p. 9-10). Sharing building-specific leasable area information from primary sources amongst the real estate service companies should minimize the need to use secondary sources and the consequent risks of inaccuracies.

In addition to differences in source preferences, local organisations were also observed to hold different opinions towards excluding troubled properties from the office stock and subsequent analyses. One organisation was willing to exclude properties that were not seen as relevant to the occupier market. In addition, one organisation was observed to not consider an office vacant, if there was no attempt to lease it. Nevertheless, some organisations would only exclude properties from the office stock if a demolition or conversion project was to take place. The decision to include both troubled and competitive properties into the same submarket's office stock and the subsequent vacancy rate calculations seems to delineate practitioner methods from the academic literature to some degree. For example, Koppels and Keeris (2006) found that the exclusion of structural vacancy from the equation improves the correlation between vacancy rate and market rent development. Moreover, since structurally vacant space is by definition not substitutable to frictionally and cyclically vacant spaces, it seems illogical to include such spaces into same submarkets, as office spaces within submarkets are supposedly highly substitutable to one another (Dunse et al. 2001, p. 238). However, academic literature does not provide an indisputable definition or method for the identification of structural vacancy. Thus, the different practices regarding the matter are understandable. Nevertheless, a standardized solution for the treatment of structural vacancy is needed. An easily applicable and standardized method to identify structurally vacant spaces with sufficient accuracy could be developed and terms like "total stock" and "competitive stock" could be used to clarify if the stock figure includes structurally vacant space or not (CBRE 2019, p. 9).

4.2 Vacancy rate

The practices regarding vacancy rate determination have interorganisational differences in submarket definitions, source preferences, adjusting based on sample size or sampling bias, using a sample vs. the total stock, response to renovations, usage of floor area multipliers and the exclusion of troubled properties.

It was shown in section 3.2 that the different submarket definitions have visible effects on the published vacancy rate estimates. For example, in (Figure 26) Company A's two time series have notable differences. By comparing the figures from relatively similarly

understood submarkets like CBD and Ruoholahti to figures from submarkets that are defined in contradictory ways like Pasila and Keilaniemi, it can be noticed that the comparability is decreased. The differences in submarket definitions are in many cases notable and that has contributed towards lower comparability between the time series across multiple submarkets. Although there is no "one and only way" to define submarkets, real estate companies could achieve more comparable results by agreeing on the extent and contents of different submarkets.

The constrained availability of vacancy data from primary sources has possibly created problems with sample sizes and driven the organisations to utilize secondary data to various degrees. Different practices have emerged from those problems. For example, some companies have chosen to calculate vacancy rates for the submarket's total stock and other companies prefer to use samples instead. A significant and visible difference was documented in the vacancy rate estimates between companies that used either samples or the total stock to calculate vacancy rates. Moreover, locally operating real estate service companies were observed to prefer different sets of sources for vacancy data. Rent rolls, property owners and internal leasing agents are each considered as primary sources by at least one organisation and all three organisations that use multiple sources, use web-based listing services as their secondary source. Since the practice of calculating vacancy rate for the submarket's total stock is likely to require larger amounts of vacancy data from secondary sources, both "source preferences" and "using a sample vs. the total stock" are bolded in (Table 2) above as they are considered to have visible effects on the published figures.

One organisation was observed to use a grading system for office space quality to minimize the adverse effects of sampling bias. In contrast, some organisations preferred to calculate vacancy rates for the total stock. One organisation was also observed to publish the used sample sizes along with the calculation outcomes. Therefore, it is relatively clear that the constrained availability of primary vacancy data has forced the organisations to make compromises in their practices for vacancy rate calculations. Sharing vacancy information from primary sources amongst the real estate service companies should alleviate the problems associated with secondary sources and small sample sizes.

Organisations were also observed to respond differently to renovations. Most of the organisations do not consider spaces under renovations vacant, but differing solutions exist. In addition, at least one organisation was observed to take the extent of the renovation into consideration before deciding if an office was vacant or not. Though some organisations prefer to temporarily ignore spaces under renovation from vacancy calculations or consider them occupied, it is also justified to consider such space to be part of the frictional vacancy in the market. For example, why would a space in need of extensive renovations be vacant during the marketing period but not during the renovation? Even in the cases where lease agreement is made before the renovation and the space is effectively off the occupier market, the space would not be physically occupied, and the future tenant might occupy another space in the same submarket. Furthermore, rental payments typically only start from the beginning of the agreed lease period. Thus, from the perspective of financial vacancy, the lack of rental payments would point towards the space being vacant instead of occupied. In other words, why should existing space be ignored or considered occupied before there is a standing lease contract? Nevertheless, since the practitioner's opinions differ so clearly, a standardized solution to the problem is needed.

Since stock determination processes also affect vacancy rate calculations, the usage of floor area multipliers and the exclusion of troubled properties are listed under sections 4.1 and 4.2. See section 4.1 for detailed descriptions.

Different practices and the constrained availability of vacancy information from primary sources have led to a situation where multiple opinions of the prevailing vacancy rate exist in all time periods and divergent trends can occur. These aspects might undermine the collective credibility of the HMA office submarkets' vacancy rate information.

4.3 Market Rent

The practices regarding market rent determination have interorganisational differences in submarket definitions, source preferences, approaches for different submarkets, calculating effective rents, basis for excluding observations, making subjective adjustments, length of the observation period and reporting format.

It was shown in section 3.2 that the different submarket definitions have visible effects on the published market rent figures. In addition, the practitioners that report prime rents might have different views of what rent observations should be considered representative of the prime rent level in the submarkets.

Some organisations were observed to use internal sources and one organisation relied on direct reporting from property owners. However, as lease data is rarely available from secondary sources, it seems that regardless of the preferred source, most of the used lease data is from primary sources, such as rent rolls, property owners, lease contracts and leasing agents. It seems that the problems of rent reporting originate from the constrained availability of lease data. That claim is supported by the fact that three out four respondents use subjective adjustments and that it was shown in section 3.2.4 that small sample sizes might have contributed towards distortions in the data in individual cases. Moreover, constant and overlapping reporting from all the companies is only available for the CBD submarket. The constrained availability of primary lease data has most likely hindered the follow-up of smaller office submarkets since the real estate service companies have published clearly less market rent data than vacancy rate data for such submarkets. In addition, two organisations were observed to use a different approach to market rent determination depending on the submarket in question.

Organisations were also observed to have different practices in dealing with rental incentives. Based on the questionnaire and the market outlooks, one organisation calculates effective rents, two organisations take rental incentives into account in some other way and two organisations do not take rental incentives into account at all. Tracking contract rents is not wrong, per se, but empirical evidence suggests that tracking effective rents would be beneficial and contribute towards more transparent markets (Boots 2014). In addition, the basis that different organisations use to exclude rent observations from their analyses varied. For example, internal rents, statistical outliers and rents with high incentive levels are sometimes excluded by the organisations.

The length of the observation period for market rents was mostly six months but one organisation was observed to use three months instead. In addition, the reporting format of the market rents varied. One organisation reported net rents, whereas others preferred to report gross rents. Some organisations also reported rent ranges instead of single figures.

The different practices and constrained availability of primary lease data have led to a situation where multiple opinions of the current market rent exist in all time periods, individual figures are hard to trust, comparability of time series is low and the market rent development of smaller submarkets are tracked by fewer organisations. The quality and quantity of market rent information could be improved with further information sharing and standardization.

4.4 Reliability of the results

Much effort was taken to present the questionnaire's questions as unequivocally as possible. Furthermore, the respondents were chosen based on their close association with their organisations market outlooks, which ensured that the respondents were aware of their organisation's practices for the determination of market information. Though the questionnaire did not document the organisations' complete methodological frameworks for the determination of market information, the interorganisational differences in (Table 2) are reliable because many of the questionnaire's questions were very exclusionary in nature, yet, a multitude of choices was provided in addition to ample opportunity to specify the given answers. Furthermore, the examination of the market outlooks and answers to the more open questions did not bring about contradicting information.

Larger uncertainties, however, were present when the effects of the interorganisational differences on the data were assessed. There are numerous factors that can affect the calculation outcomes for the studied market benchmarks, and no quantitative methods were used to document their particular effects on the data. Furthermore, some of those factors were not considered in this study, for example, the datasets that the real estate service companies used to determine the market information were not included. Therefore, this thesis does not provide conclusive evidence for the effects that the differences in (Table 2) might have on the data. Hence, only a few factors were bolded in (Table 2) as their contribution to the lower comparability in the time series can be visually observed.

5 Conclusions

Real estate service companies provide services for the properties and markets, where the investors are invested in, which positions the companies well for the collection of market data. However, much of the market data is collected and held in other competing companies, which tends to constrain the sample sizes of any following analysis. To make matters worse, real estate service companies use different methods for the stock, vacancy rate and market rent determination, which contributes towards lower comparability in market information.

It was shown that multiple interorganisational differences exist in the practices for the stock, vacancy rate and market rent determination. Furthermore, it was shown that small sample sizes might have contributed towards inaccuracies in vacancy and market rent figures. In addition, a clear difference was documented in the vacancy rate estimates between companies that used either samples or the total stock to calculate vacancy rates. More importantly, it was shown that the overall comparability of the time series is low, multiple opinions of the prevailing vacancy rates and market rents exist in all time periods across all submarkets and that divergent trends can occur. These aspects might undermine the collective credibility of the organisations' ability to provide reliable market information.

The combined adverse effect of the constrained availability of primary data and differing practices on the submarket information is, that investors must deal with an informationally disadvantageous operating environment. The consequent problems are condensed in the following quote from an anonymous investor: "We asked for vacancy rate information from multiple companies for the area we were interested in, and all of them provided us with different results". In the current situation, the right question regarding market information is not who gets to sell it, but how much more efficiently it could be monetized if it was produced in a more meaningful and consistent manner. Further sharing of primary data and the standardisation of analysis methods could significantly improve the availability and quality of office market information. In the current situation, the market information sourced from different real estate service companies can be very contradictory, which naturally makes it very difficult to convince the investors to trust the data, even if it happened to be of good quality. In short, in the current situation investors are unlikely to develop a strong dependency on real estate service companies regarding office submarket information.

By agreeing on certain courses of conduct in compiling market information and by sharing information from primary sources, real estate service companies can achieve comparable and more accurate market information, and possibly reduce the number of hours spent on analysis. Indeed, real estate service companies have great incentives to strive for better availability and quality of market information as it has the potential to strengthen investor relationships and add to the competitiveness of local real estate market in the increasingly global capital markets. Potential for stronger client relationships exists. For example, information asymmetries encountered by foreign clients were found to be the largest challenge in investing to Finnish real estate after market size, overall liquidity and the growth of the national economy (Sperling 2017). Furthermore, some Central and Eastern European property markets have had positive experiences in forming collaborative research forums that aim to share and standardize property market data (Adair et al. 2005). I strongly encourage the locally operating real estate service companies to engage in cooperative endeavours for the improvement of the HMA office market information.

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Differing Methods of Compiling Property Market Data in Commercial Office Markets

The purpose of the following questionnaire is to survey your organization's course of conduct regarding office submarket data in HMA.

The questions have been designed to survey interorganizational differences in the practices regarding office submarket data. The answers are used to study the effects different practices have on the submarket data reported by the recipient organizations and to list the interorganizational differences behind the effects that reduce cross-sectional data comparability. The findings will be later published in a related master's thesis and can be used as potential reference if more uniform practices and consistent reporting are pursued. Please answer according to your practices and as broadly as you can. You may also answer in Finnish.

The following benchmarks and aspects will be observed:

- Office Stock
- Vacancy
- Market Rent
- Follow-up and submarket area determination

*Pakollinen

1. Sähköpostiosoite *

_____

Office Stock

The "Office Stock" section refers to the office stock determination process that your organization uses as the basis for future vacancy rate calculations.

2. Please choose and list all the sources of data your organization uses to determine a submarket's office stock for future vacancy rate calculations. (Choose only the ones you use)

Valitse kaikki sopivat vaihtoehdot.

- [ ] VTJ-rakennustiedot
- [ ] Kuntien rakennustiedot
- [ ] Rent rolls
- [ ] Investment memorandums
- [ ] Asking the people closely associated with the particular property
- [ ] Other

3. Please describe how you calculate the office stock in HMA office submarkets. Remember that all stock related questions refer to the stock data that your organization could use as the basis of future vacancy rate calculations.

_____

_____

_____

_____

_____

4. Do you sometimes complement your stock data by adding building specific leasable areas that you estimated by using a multiplier on the publicly available total floor area (kerrosala)? (e.g. 0,8)

Merkitse vain yksi soikio.

- ◯ Yes
- ◯ No
- ◯ Using the floor area multiplier is our only approach to stock determination

5. Do you always use the same exact floor area multiplier? (assuming that the buildings are solely in office use)

Merkitse vain yksi soikio.

- ◯ Yes
- ◯ No
- ◯ We don't use floor area multipliers

6. Assuming that the buildings in question are only in office use, what floor area multiplier do you use in the following submarkets? (If you determined the stock without the help of any floor area multipliers, choose "other method") (If you might change the used multiplier based on characteristic of individual office buildings, choose "Varies")

Merkitse vain yksi soikio riviä kohden.

	<0.75	0.76-0.79	0.8-0.82	0.83-0.85	>0.85	Stock undetermined	Other method	Varies
CBD	◯	◯	◯	◯	◯	◯	◯	◯
Kamppi	◯	◯	◯	◯	◯	◯	◯	◯
Ruoholahti	◯	◯	◯	◯	◯	◯	◯	◯
Pasila	◯	◯	◯	◯	◯	◯	◯	◯
Aviapolis	◯	◯	◯	◯	◯	◯	◯	◯
Keilaniemi	◯	◯	◯	◯	◯	◯	◯	◯
Otaniemi	◯	◯	◯	◯	◯	◯	◯	◯
Leppävaara	◯	◯	◯	◯	◯	◯	◯	◯

7. Please describe the procedure you use to keep your stock information up to date. (Sources of data, frequency, complete re-calculation, etc.)

8. Do you exclude such office buildings from a submarket's office stock that you consider to be in inadequate condition for the tenants or in other ways not part of the market in that area? Describe the threshold decision criteria.

9. If some essential part of your stock determination process was not touched in the previous questions, please write about it in here.

Vacancy

Vacancy section refer to your organizations repeated process of determining the amount of vacant space and vacancy rate within different HMA office submarkets

10. Choose the submarkets where you are sometimes able to calculate the vacancy rate by using the submarkets total office stock as the denominator. (total office stock refers to the total amount of viable office space that you regard to form the submarket) (i.e choose the submarkets where you do not use a sample to determine the vacancy rate.)

Valitse kaikki sopivat vaihtoehdot.

- ☐ CBD
- ☐ Kamppi
- ☐ Ruoholahti
- ☐ Pasila
- ☐ Aviapolis
- ☐ Keilaniemi
- ☐ Otaniemi
- ☐ Leppävaara
- ☐ We always use a sample

11. Please describe your process of determining a vacancy rate for a submarket (e.g. steps, sources, adjustments, exceptions, verification, exclusions, avoiding double entries)

12. In the cases where you use a sample of buildings to determine the submarket's vacancy rate, how do you take in to account the possibility of an overall quality difference between the sample and the total stock in the submarket?

13. Where do you source the data on vacant office areas? (Choose only the ones you have used and in preference order)

Merkitse vain yksi soikio riviä kohden.

	Rent rolls	Web-based listing services	Investment memorandums	Asking someone outside your organization	Asking the leasing agents in your organization	Other
First choice	◯	◯	◯	◯	◯	◯
Second choice	◯	◯	◯	◯	◯	◯
Third choice	◯	◯	◯	◯	◯	◯
Fourth choice	◯	◯	◯	◯	◯	◯
Fifth choice	◯	◯	◯	◯	◯	◯
Sixth choice	◯	◯	◯	◯	◯	◯

14. When you calculate vacancy rates for CBD do you intentionally narrow the sample to only cover high-quality properties, or alternatively did you originally define the submarket so narrowly that your future analysis would mainly consist of high-quality properties?

Merkitse vain yksi soikio.

- ◯ Yes (Sample includes mainly high quality properties or submarket definition is relatively narrow)
- ◯ No (Sample includes buildings of all qualities or submarket definition is relatively broad)

15. In what situations do you drop vacancy and stock observations from vacancy calculations? (i.e. when do you ignore buildings/spaces that are located inside your definition of the submarket)

16. Consider this possibility and choose a course of action: A submarket under analysis includes a property that is undergoing tenant improvements in some of its floors and is therefore currently 50% vacant, but all that space is pre-leased starting from the next quartile. I will:

Merkitse vain yksi soikio.

- ◯ Exclude the property from this period's analysis completely
- ◯ Consider it 50% vacant and include it in the analysis
- ◯ Consider it 0% vacant and include it in the analysis
- ◯ Exclude the pre-leased space from the submarket's office stock until its also physically occupied and consider the remaining floors 0% vacant
- ◯ Muu:

Market rent

Market rent section refers to your organisations procedure of determining market rent or levels of market rent in HMA office submarkets for the purposes of market outlooks or curious clients who don't refer to any individual comparable spaces or properties.

17. Please describe how you determine a submarket's market rent (question refers to your market outlooks)

18. Is your process of determining a submarket's market rent more like a subjective approach or a data-based observation?

19. Are different approaches used to determine the market rent in different submarkets? (e.g. subjective or data-based)

Merkitse vain yksi soikio.

- ◯ Yes
- ◯ No

20. If you use a data-based approach to determine market rents for your market outlooks, at maximum how old rental evidence your organization uses?

Merkitse vain yksi soikio.

- 1 month
- 2 months
- 3 months
- 4 months
- 5 months
- 6 months
- 7-12 months
- > 12 months

21. If you use a data-based approach to determine the submarket's market rent, do you sometimes exclude or include ESTIMATED service charges/tenant costs to convert net rents to gross rents or vice versa? Or do you exclude observations that don't specify the amount of service charges/tenant costs?

Merkitse vain yksi soikio.

- We do convert net rents to gross rent or vise versa with the help of estimated costs
- We exclude observations that would require us to use estimated costs
- Muu: _____

22. Within your definition of the submarket, do you sometimes exclude rent observations from the analysis? If you do exclude rent observations, please describe your decision criteria to do so.

23. If you report a range of values as submarkets rent level, describe how you keep the reporting consistent. (i.e. how do you make sure the low-middle-high values are based on the same decision criteria time after time.)

24. If you report a single value as a submarket's market rent or a prime rent, please describe your "standard space". i.e what size, quality and location would be considered representative of the market rent that you have determined.

25. Do you in any way take rent-free months or other concessions into account when you determine market rents?

Merkitse vain yksi soikio.

- Yes
- No

26. Please describe the way you take rent-free months or other concessions into account and your level of confidence in the adequacy of the measures taken. (e.g calculating effective rents, adjusting,)

27. Which of these submarkets would you consider to include at least one office building that qualifies as prime?

Valitse kaikki sopivat vaihtoehdot.

- [ ] CBD
- [ ] Kamppi
- [ ] Ruoholahti
- [ ] Pasila
- [ ] Aviapolis
- [ ] Keilaniemi
- [ ] Otaniemi
- [ ] Leppävaara

Follow-up and submarket determination

28. If you have once defined some office buildings to be within the submarket, under what conditions would you exclude their data on your rent or vacancy calculations for that submarket? (assuming data is available, and the building is not facing demolition or redevelopment)

Merkitse vain yksi soikio.

- ◯ Under no condition
- ◯ Muu: _____

29. From your organisation's perspective, what are the biggest obstacles of sharing more vacancy, stock and rent information with your competitors?

_____

30. In your opinion, what are the most significant factors that separate your organization's submarket data procedures from your competitors?

_____

31. In what way you usually defined HMA office submarkets for the purposes of your market outlooks between 2014-2019?

Merkitse vain yksi soikio.

- ◯ Every existing or future office building within the borders we have defined is part of the submarket
- ◯ We have selected a set of buildings from the area that we consider to represent the submarket sufficiently and we refrained from defining specific borders
- ◯ We selected a set of office buildings and defined the outer border of the submarket for future reference if new supply appears
- ◯ Muu: _____