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MICRO APARTMENTS

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A Potential Solution for the Severe Shortage of Small Affordable Apartments in Stockholm

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Abstract

The purpose of this thesis is to analyze the emerging global trend of micro apartments to find out if it provides a potential solution for the severe shortage of small, affordable apartments in Stockholm.

As the concept is already a researched area in foreign real estate markets, the lack of research on the demand for micro apartments in Stockholm despite the highest rate of single households and rising housing prices was identified as a research gap.

The aim of the research is to identify the most significant opportunities, risks and obstacles of the micro housing concept applied for the Stockholm market as well as estimating a range of potential demand for varying economic scenarios.

The approach of the research was to conduct empirical studies in the form of interviews with experts in the field and conduct a survey measuring consumer preferences. Furthermore, secondary data was collected in the form of statistical data and extensive literature on the existing research on micro housing in foreign markets, characteristics of the Stockholm housing market and economic outlooks for the region. These findings allowed us to make forecasts for the housing market in Stockholm and estimate the future demand for micro units. The calculations were limited to the ownership market in Stockholm municipality and focusing on a specific target group.

The results were a demand in the most likely economic scenario of 300-400 units in the short term (specified as 2018-2021) and range of 150-250 units in the medium term (specified as 2022-2028).

The originality and the value of the paper lies in collection of opportunities, risks and obstacles of the micro housing concept specifically for Stockholm from the perspectives of multiple actors on the housing market, in addition to providing practical recommendations for developers, the municipality and researchers based on the extensive analysis and also providing a model to estimate the future demand for this housing solution.

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Sammanfattning

Syftet med uppsatsen är att analysera den växande globala trenden av mikrolägenheter och att ta reda på om dessa kan lösa bristen på små och prisvärda lägenheter i Stockholm.

Konceptet har studerats ingående på internationella bostadsmarknader, dock är undersökning angående efterfrågan för mikrolägenheter i Stockholm bristfällig, detta till trots att regionen tillhandahåller den högsta andelen singelhushåll i världen, samt har en hög tillväxt för bostadspriser, vilket medför en lucka i bostadsforskningen.

Syftet med studien är att identifiera de mest betydande möjligheterna, riskerna och hindren för konceptet mikrobostäder på Stockholms bostadsmarknad, såväl som att beräkna samt bedöma efterfrågan för mikrolägenheter för olika ekonomiska scenarier.

Studiens tillvägagångssätt bestod av utförande av empiriska studier, såväl intervjuer med experter på området samt en granskning av konsumenters preferenser för mikrolägenheter. Utöver dessa inhämtades sekundärdata såsom statistisk data samt omfattande litteratur och tidigare internationell forskning i ämnet. Med det inhämtade materialet kunde vi utföra beräkningar samt estimeringar av den framtida efterfrågan för mikrolägenheter i Stockholm. Beräkningarna var begränsade till Stockholms kommun, samt till den huvudsakliga målgruppen för mikrolägenheter.

Resultatet visade att efterfrågan för mikrolägenheter i det mest sannolika ekonomiska scenariot var mellan 300 och 400 enheter för tidsperioden 2018-2021 och mellan 150 till 250 enheter för tidsperioden 2022-2028.

Studiens värde och originalitet ligger i de samlade och specifika möjligheterna, riskerna och hindren för konceptet på Stockholms bostadsmarknad, samt i de rekommendationer vi ger till bostadsutvecklare, kommun samt forskare baserat på den omfattande analysen av ämnet, såväl som modellen vilken beräknar efterfrågan för mikrolägenheter.

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1 Introduction

Since the financial and real estate crisis in 2008 there has been a new emerging global demand for real estate. Investors are at the moment using new business models in order to adjust to the market changes, Mills *et al.* (2017). The European market is still recovering from the crisis and is currently affected political uncertainties, such as Britain's exit from the EU. The market has further experienced a wave of innovation created for real estate development financing, due to the clear and stricter regulations for risk management both for borrowers and lenders on the market, Haden (2014).

Due to economic changes and demographic preferences, high demand real estate markets around the world, such as Tokyo, San Francisco and Hong Kong have experienced an increasing demand and construction of micro apartments. Micro apartments are smaller than conventional studio apartments with optimally utilized floor plans, enabling them to become as efficient as possible for their size. They provide affordable living in central locations, Gabbe (2015). Since a study performed by Potikyan (2017), showed that only 40 percent of the living space is frequently used, micro housing can be seen as a minimalist concept, providing the necessary living space. These living solutions are attractive options for young careerists, stay over commuters and the workforce that come to the city for a limited number of years or months. These specific groups often utilize the public and social spaces within the city to a higher extent than other groups on the market, which influence their overall preference of housing, Waite (2015).

Micro apartments are, however, only a part of the housing development and the urbanization. For a sustainable society, Bildt (2017) emphasizes that future is dependent on two key factors, digitalization and urbanization, both dependent on each other. Urban areas attract a large number of young people and professionals with a high density of social and professional networks, who demands small housing. It is of importance for cities to adapt to new technology such as on demand transportation, hospitality etc., which will have a large impact on how cities are organized and functioning which has a large effect on the ability to attract and absorb a further growth of the population.

Stockholm is a market similar to San Francisco, which has also a large fin-tech industry and serves as a base for many startups, Haaramo (2017). Lundström & Wilhelmsson (2007) further describe the market as an attractive region for businesses but raise the housing shortage as an obstacle for the further positive financial development. The housing situation in the region is strained both for the ownership market and the rental market, the latter has a current average waiting time for a contract of almost ten years, Haaramo (2017).

The above-mentioned concept of micro housing is something that exists in Stockholm to some extent, however, those units are mainly student housing and not accessible for all market actors, Byggtjänst (2016). A further introduction of micro apartments as a new profitable asset class in Stockholm could allow companies to attract more talent to the region and contribute to its sustained economic growth as well as solving a part of the housing shortage.

The growing number of micro apartments for single households is a new global trend that requires further research, especially the applications in Europe. The research gap is the lack of research on micro apartments and their implications in Stockholm. There is a need for models providing a solution for the shortage of affordable, temporary housing. Currently there has not

been any research conducted on the sustainability and long-term value of micro apartments for society or on its profitability from an investment point of view.

To conclude, the potential of micro apartments in a specific area is highly dependent on the regulations and political system applied for the city. With this, global real estate markets holding micro apartments should be analyzed separately in order to understand the underlying aspects of each market. Further it is important to analyze potential markets, such as Stockholm, not only from a demand perspective but also from the feasibility perspective, and what regulations that might have to be altered in order to become a market for micro apartments. The aim of this research is to estimate a range of potential demand for micro apartments in Stockholm, depending on various financial scenarios as well as to identify the most important opportunities, risks and obstacles of the concept on Stockholm housing market.

2 Literature Review

The following literature review is performed to supplement our research that will follow an inductive approach, exploring all information without a predetermined conceptual framework and developing theories from them, Saunders *et al.* (2016). The review is focusing on research outcomes concerning the current Swedish real estate market and the possibility of micro apartments being developed in order to serve the demand for accessible housing.

2.1 Micro Apartments

2.1.1 What is a micro apartment?

Based on the literature, there is no set definition of a micro apartment, the size of a micro unit can vary a lot between cities. Iglesias (2014) notes that the average size of housing in a city corresponds with the typical size of a micro apartment, meaning that cities with larger apartments tend to have larger micro apartments, compared to cities with, on average, smaller units. Nonetheless there are some common features that characterize, not all, but most micro apartments, The Urban Land Institute (2014) states that the residents of micro units usually can use a considerable selection of amenities and diverse community rooms outside their micro unit. Furthermore, it is common to include multi-functional, built in furniture and storage systems to make the units more functional and space efficient. According to the same report, micro units are also often designed and constructed with features such as high ceilings and large windows, additionally to the flexible furniture and storage. This leads to a perception that they are larger than a conventional unit. The authors further highlight that many developers refrain from using the term micro when marketing and branding their project to avoid any negative implications people tend to associate with micro apartments such as high density and overcrowding of areas. Based on the above, we define micro apartments as a space efficient studio apartment, often including built in furniture and or storage. We further define the size of a micro apartment varies between 15-35 square meters, depending on the location.

2.1.2 Drivers of the Growth of the Number of Micro Apartments

Gabbe (2015) has detected in his article “Looking Through the Lens of Size”, an increasing enthusiasm for new micro apartments from both the general public, developers, different planners and by architects in the US. He further explains this growing interest with demographic and economic changes, environmental trends and highlights multiple big cities in the US, where the concept of micro-housing is growing due to the above-mentioned drivers. He points out that tenants of micro apartment can save about 20-30% of the rent compared a conventional sized apartment in the same neighborhood, even though they tend to pay more per square meter for a micro housing unit. Gabbe (2015) further articulates that the market potential of micro apartments also is growing with the number of single-person-households. Taking a similar position on the drivers of the increasing demand for micro units, the mentioned developers in the wide-ranging report of the Urban Land Institute (2014), articulate the following trends as significant: postponed household formation; a growing number of single-person households; declining car ownership especially in younger households; and the spreading tendency for sharing economy and younger households with consequently less personal belongings.

Haden (2014) expresses a fundamental change in preference of housing for people living in the larger American cities, where central locations are becoming more desired. This is explained in the article by the greater awareness of the social, economic and personal costs of long commuting. He further argues that modern small apartments complemented with more generous common areas and different types of common spaces, makes living in small units attractive. The change in preference of central locations has caused the cities to become denser and the average apartment size to decrease. Potikyan (2017) reports that between 2006 and 2016 the average size of apartments built the US decreased from 1015 sq. ft. (94 sq. m.) to 934 sq. ft. (87 sq. m.)). According to the author, the trend of decreasing average size of constructed apartments further can be explained with demographic changes such for divorce rate, childbirth and delayed marriages, which has led to an increase of single households. Further, the recent development cycle has been as previously mentioned, affected by the strong urbanization trend where the development has been concentrated to upscale central communities with access to public transportations and social amenities. The increased density of the cities has also lead to an increase in rent levels per square meters. The demographic and lifestyle changes accompanied with an increase of unaffordability has led to a trend for micro apartments in densely populated areas.

Iglesias (2014) claims that municipalities should form policies in order to handle an increasing population, the urban development is regulated with zoning, density restrictions and parking requirements. However, researchers have questioned traditional land use policies since they restrict the housing supply and drives up the house prices since the supply cannot keep up with the demand. In the article, Iglesias (2014) also mentions that the demand for multifamily housing will continue to grow due to the urbanization and to the expected population growth. Millennials from the baby boom in the 90's, who are now adults will represent a significant part of the demand in this segment.

2.1.3 Who is interested in micro apartments?

The Urban Land Institute (2014) funded an extensive research project, including 30 rental apartment communities with approximately 1.700 micro units in the US, to analyze the market performance and acceptance of smaller and micro units from multiple perspectives to contribute to the development of micro units in the future. They found that the primary target group is young professional singles and the secondary is younger couples, older move down singles or used as a temporary second residence for part of the year or work week. Their consumer research revealed that a quarter of renters living in conventional apartments is intrigued by the concept of micro units and would be interested or very interested in renting one. Most of the interested respondents would consider a micro unit in order to live alone in an attractive location in exchange for a, 20-30 % lower rent, compared to a conventional studio or one-bedroom apartment. Based on interviews with 400 residents in micro apartments in the United States, three main purchase motivations were identified:

1. to live in a walkable, trendy urban area and core of a relatively expensive housing market,
2. to trade off living area for less rent in absolute value in these popular urban locations,
3. to live alone.

Similarly, Iglesias (2014) finds that micro apartments are a natural solution to dense urban areas with a high demand for housing and are most occurring in urban areas with a large expanding tech community, such as San Francisco and Seattle. The author state that the target group for this type of housing are young professionals, between 20 and 30 years old, singles and people with a restricted income. The article also mention that these groups are expected to grow in numbers, this since a large group of millennials is about to enter the housing market

during the next few years. Potikyan (2017) refers to a consumer research to show that people are prioritizing location and affordability to space. The author argues that millennials and single households are groups that value the location and its amenities over the size of the apartment, and where the accessibility is important. Furthermore, Steven & Honig (2016) and Barrionuevo (2016) discuss that people considering sacrificing space in order to live in a central location will use the urban amenities such as museums, cafes, restaurants, parks etc. as their living space. Consequently, the authors suggest that micro apartments should have access to shared spaces such as a storage room, community rooms, bicycle storage, back garden, roof terrace, lounge, lobby, gym etc.

2.1.4 Foreign Examples

2.1.4.1 Micro Apartments USA

Mischke et al. (2016) state in an article published by McKinsey that about 50% of the population in California, including San Francisco cannot afford housing. California suffers from a negative housing gap which drives up the prices. The report suggests building micro housing in order to provide affordable housing and to close the large housing gap. Similar housing gaps are also recognized by Gabbe (2015) and Iglesias (2014) in other highly dense end expanding cities in the US, such as New York, Seattle and Boston among others, where the demand for new and smaller apartments has increased during the last few years. The demand of smaller housing in central locations has led to the concept of micro apartments, Garfield (2016). The concept has grown as a housing solution for these kind of cities and micro apartments have been introduced on the market both through new development and through re-development of older buildings.

2.1.4.2 Micro Apartments Germany

According to Kachmazov (2017) there are about 25.000 micro-apartments in Germany and several thousand currently in development and planned to be finished before 2019. The author reports that the German government is planning to invest €120 million in the development of the micro apartment market in the form of state subsidies. The author further claims that over 30 million people are targeted in Germany by this market where the target groups includes students, one-person households and commuting tenants among others. The rise of micro apartment development is also recognized by Voigtländer (2017), who adds that the units are connected to high rates when rented out. The author further points out that these rent levels are considerably higher than what the target groups can afford.

2.1.4.3 Micro Apartments Asia

A report by JLL (2015) found that the size of the average apartment in the major cities of India has decreased in size by 26% between 2010 and 2015. Similar trends have been noticed in Japan, Thailand etc. This is explained by the scarce resource of land in urban areas combined with the high level of urbanization. Developers in these environments construct smaller units, with the same price per square meter and quality as larger units. The development of micro units does not have an effect on the aggregated housing price level, however, it enables people to enter the housing market at a lower price level. According to the report there is a growing concern on how small micro apartments can get in an unregulated market. Many Asian countries therefor are now regulating either the minimum size of a condominium or the allowed proportion of micro housing. Li (2018) states that developers in Hong Kong are restricting the minimum building size for apartments to 18,5 sq. m. The

reason behind the restriction is to enable a healthy and sustainable living environment as well as to maintain a sustainable and long lasting real estate development.

2.1.4.4 Micro Apartments London

Beside Asian and American cities, there is also a recent growth of micro apartment on the real estate market in London. Waite (2015) interviewed multiple professionals in the London housing sector and compared their views on the increasing number of micro apartments. The interviewees agreed that there is a place and need for compact apartments in London for multiple reasons: The growing number of so called “stayover commuters” and students put a lot of pressure on the residential market, especially on the stock of small apartments. A good example is the micro apartment developer company Pocket, according to the article by Waite (2015). Pocket concentrates on a specific market segment: one-bedroom apartments, around 37 sq. m., for the intermediate housing market. The micro apartments by Pocket have a focus on design and affordability, which is reflected by the discount buyers receive, who qualify for affordable housing.

2.2 The Housing Market of Stockholm and Sweden

2.2.1 The Market

As reported by Evidens (2018), the economic growth in Sweden has been strong and stable during the last ten years, especially for the Stockholm region. This has led to an increased demand for housing, infrastructure, services and workplaces in the city which has further lead to a steep increase in housing prices and long queues for rental housing. Evidens (2016) also points out that the domestic net migration for Stockholm has decreased significantly during the last few years despite a strong labor market in the region, while other large cities in Sweden have maintained a high domestic net migration. According to their analysis, one explanation to the decreasing net migration has been the pressured real estate market where the supply does not meet the demand. Furthermore, Lundström & Wilhelmsson (2007) describe in their article that the long term low supply of housing in Stockholm combined with a high demand will most likely have a large negative effect on the economic growth for the region and for Sweden, since a well operating real estate market is one of the central factors for a positive economic growth. The authors also recognize the correlation between the efficiency of the housing market and the labor market. Evidens (2018) also emphasize that housing shortage restricts companies for recruiting talent to the region which inhibits the economic growth for the region. The effect of lagging infrastructure and service segment makes areas less attractive and increases segregation, which has a further negative effect on growth.

Additionally, Evidens (2016) states that newly produced housing tends to target already established households in the Stockholm housing market. Households with a strong economic position have more options when it comes to size, number of rooms and location of the apartment, but low income or single households are naturally more restricted regarding adjusting their options and demand. This has affected the ability for young people to enter the housing market and for single households who have to manage the housing and financing costs alone. Furthermore, they suffered more when amortization requirements and other tightening measures have been applied. This is expected to exclude young people mainly aged between 20 and 30 from certain areas of Stockholm.

Klinenberg (2013) explains why certain age groups want to live alone: young people see it as an important step in becoming a grown-up and want to be autonomous and self-reliant while

middle-age adults usually live alone after a separation or divorce to reclaim their independence and the elderly tends to see it as keeping their integrity and having self-control over their life.

2.2.2 Rent Regulation

Rent regulation was introduced in Sweden 20 years ago after subsidies in the housing segment were terminated and when the social housing sector on the market vanished, Öst et al. (2014). Since then, the incentives to alter the housing policy, according to Hansson (2015), have been very low, and are expected to remain unchanged. The weak political incentives can be explained by the parties' concerns regarding the effect on their political support and votes.

According to Wilhelmsson (2011), the rent regulations in Sweden causes rents in Stockholm to be lower and rents out in the country to be higher than what they would be in a deregulated market. Due to this, there is not enough financial incentive to construct new rental apartments in central locations, even though the demand is large. At the same time, Öst et al. (2014) argues that since the introduction of rent control, a significant part of the rental housing stock in Stockholm was converted into cooperative housing due to the unfavorable rent levels, something that was also mentioned by Glaeser et al. (2003). This has caused the supply of rental housing to decrease while the demand has increased. The high demand for housing in the Stockholm region combined with the queue system for rental units, where an apartment is allocated based on waiting lists, leads to waiting times around 10 years, even in the periphery of Stockholm. This has a negative effect on individuals arriving in Stockholm and being new to the market. Specifically, young adults and foreign nationalities face serious obstacles entering the housing market. Glaeser et al. (2003) continue by expressing that the rent regulation has a negative effect on landlords' incentives of maintenance, which leads to reduced quality of the rental housing stock, further, it also reduces the incentives to produce more units as previously mentioned by Wilhelmsson (2011). Moreover, rent control can lead to an inadequate allocation of tenants across the units which can induce large welfare losses. On an aggregated level Lindbeck (1967) recognize that rent control has a negative impact on the economic growth, due to the mentioned lack of economic motivation to construct more housing.

2.2.3 Home Ownership

There are three main types of tenure forms in Sweden: ownership of single-family housing, multifamily rental family housing and multifamily cooperative housing. Cooperative housing refers to a concept where the property is owned by an association and each member owns a share of the association and has the tenancy right for an apartment, Öst. (2014).

According to a report by Evidens (2017), the cost of living in a rental apartment today is on average higher than the cost for a comparable tenant owned apartment (association owned apartment). This has led to generally higher rate of home ownership according to Wulff (2001), who further adds that the slowest growth for home ownership has been for single households and young people, groups of people that in general prefer living in centrally located apartments.

Jansson (2017) found, based on his micro data analysis, that when the risk for unemployment increases, the home ownership investment decreases. Diaz-Serrano (2005) confirms that home ownership is highly dependent on risk factors, such as the risk for unemployment and the investors approach to these risks.

Öst et al. (2014) analyzed tenure choices on the Swedish housing market two years before the mortgage cap was introduced. The research used data on the total population older than 25, 940.000 households in Stockholm County, and found that financial restrictions by credit constraint, has a higher impact on young households and people with a foreign background compared to other households and is consistent with lower ownership rates. It is also common that the mentioned sub-groups are having problems in the rental market to establish themselves.

The report by Evidens (2017) further expresses that strict regulations regarding financing for housing limits the ability for households with a small amount of savings and low income, this inhibits these households to grow capital in real estate and other savings. As mentioned, the regulations regarding financing and the housing market inhibits young people to enter the market, Evidens (2017). Instead, this group of people live with their parents for a longer period. How long young adults live at home for is according to a study conducted by Ermisch (1999) dependent on the income level of the parents. Studies conducted by Mulder and Smits (1999) further expresses that the parents' wealth has an effect on the children's ability to enter the housing market and the ability for them to own their first home. Öst (2012) further explains that apart from the wealth of the parents the individual's salary and its possible development also has a large effect the ability to purchase an apartment.

Sharpened regulations will cause an even bigger gap and inhibit more households from entering the housing market, according to Evidens (2017), as a result, they are even more exposed and vulnerable to financial constraints regarding borrowing or amortization conditions. Öst et al. (2014) also point out that the recent tightening of loan restrictions can potentially intensify the unfavorable situation of young and low-income households and thus lead to more housing segregation.

2.3 Demographic Drivers

Eichholtz & Lindenthal (2014) argue that the key challenge for developed cities is the changing demography, such as a growing population and an increase in the average life length. These changes will affect the housing market significantly. The study based on a hedonic regression analysis using data collected for the English Housing Condition Survey concluded that the housing demand is highly dependent on education, wealth and health. Since these attributes are more common for young people today than for previous generations, an aging population is estimated to demand more housing on an aggregated level. Lindh & Malmberg (2006) also concluded from time series regression analysis that the housing demand and residential construction in Sweden and other OECD countries is related to the age structure of the population. On the other hand, this study found that aging groups have a negative effect where young age groups have a positive effect on the housing demand.

A report by HSB (2015) found that with around 40% of all households in Sweden being single households, Sweden is the country with the highest single household rate in the world, closely followed by other Nordic countries. For this reason, we found it indispensable to analyze the existing research literature on single households as a driver of housing demand in more detail.

Wulff (2001) looked at one-person households in Australia to differentiate their life course stages based on age and marital status and analyze their housing demand. A key result is that the housing demand of one-person households varies greatly depending on the age, household income and that it is different across renters and homeowners. Significant factors are also the

timing of the single person household formation and the expected length of time living alone according to the article. A significant outcome of the research is that individuals living alone prefer apartments over detached houses all things being equal regardless the level of disposable income.

2.4 Co-livings

Primarily on the west coast of the US, there has been an emerging trend of co-livings, Robinson (2017). The author explains that the concept is connected to cities with a large tech development and high-pressure housing markets, but it has spread to different tech hubs around the world. The trend has now reached Stockholm where Invest Stockholm (2016) has detected several co-living communities. The goal of co-living is to attract young professionals and millennials with its low cost and central locations, low maintenance and sense of community, compared with traditional urban housing alternatives.

2.5 Urbanization

There is and has been a significant urbanization trend. According to the World Urbanization prospect by the UN (2015), 54% of the world population lives in urban areas. This number according to UN is predicted to increase to 66% by 2050, and the numbers are much higher for high developed countries, such as Sweden.

Bildt (2017) states that the future is dependent on two key factors, digitalization and urbanization, both impacting each other. Urban areas attract a large number of young people and professionals with a high density of social and professional networks. With the expected population increase in the cities, it is of high importance to adapt new technology such as on demand transportation and hospitality etc., which will have a large impact on how cities are organized and functioning. It is also of importance to consider the development of the infrastructure- and real estate development in order to meet the future needs. The importance of infrastructure is also something that PWC (2014) highlights in order for urban cities to continue to expand and develop. PWC (2014) additionally expresses the need for cities to develop in a globally sustainable manner. The funding of these urban investments is dependent on strong fiscal policy which will be a challenge for governments to follow through.

2.6 Critique

Iglesias (2014) agrees that the concept of micro apartments is expected to ease the current gap between the supply and demand as well as the future gap due to demographic changes. However, the author also highlights that micro apartments will increase the density of already dense areas and with consequently burden the existing infrastructure. The author recommends that the concept of micro-apartments should be evaluated with an extensive supporting analysis of housing needs and policies also considering the possible consequences for other housing types.

3 Theoretical Framework

The research problem has been investigated through the lens of multiple academic theories that correspond with the different layers of the subject area. We applied multiple academic theories since the micro housing depends on factors that are studied in multiple academic disciplines, creating a theoretical bricolage.

3.1 Macroeconomic Theories

First, in order to look at the overall residential market in Stockholm we applied basic macroeconomic theories in order to examine the connection between economic growth, employment levels and level of innovation. This highlighted the relevance of the problem of providing inefficient amount of affordable housing for the new workforce that is essential for growing Swedish businesses and the satisfying the expanding housing demand.

3.2 Supply and Demand Theories

We also used the stock-flow model based on the article by Wheaton (1999). This theory helps to determine the level of new housing supply based on previous supply and demand. Another theory regarding supply and demand is the neoclassical theory, according to this theory stated by Jansen et al, (2011), it is very seldom that the acts of consumers and producers on the housing market are met, meaning that the market supply rarely meets the demand of the market. The market however is continually adjusting to a long-term equilibrium where both the supply and demand of the housing will adjust over time and with that the housing prices will change as well. Changes in the supply side of the housing market, the actual housing stock is characterized by the accumulated net construction (new construction minus demolishing of existing housing units), however the stock on a short time view can be seen as constant due to the time lag of construction. Changes in the demand side is characterized by the net relocation and the net population growth. The market equilibrium is where the market demand meets the market supply and is the determining point for the market price and ultimate housing stock on the market. This theory can also be used for individual units or a specific section of units where the amenities of the dwelling and its surroundings has an effect on the equilibrium price.

3.3 Consumer Preference and Behavioral Theory

Further we used several consumer and behavioral theories. Jansen et al, (2011) claims that by using the so called traditional housing demand theory, current and short-term demand can be estimated for housing for a specific region. The regions can then be put together in order to cover a larger geographical area. According to the theory the demand is estimated by the consumers' housing preferences based on their lifestyle. People with different lifestyles will value different housing features and regional amenities. It is therefore of importance to document potential target groups. In order to measure the preferences for housing markets characterized by a limited supply and a high demand it is preferred to directly study the preferred preferences rather than using revealed preference research where the preference is seen as the housing choice for the individuals. The researcher should choose a range of variables, reflecting both on the apartment, building and the environment amenities, affecting the preference for a unit and with that measure the demand.

To clarify the distinction between consumer choices and preferences in housing research. S.J.T. Jansen et al, (2011) explains that the difference lies in the following. A preference is dependent on the subjective attractiveness of a unit and it is relatively unconstrained while housing choice reflects the influences of preferences, but also other limitations. Priemus (1984) argues that a choice will be made based on a number of constraints that restrain the possibilities. These can be connected to regulations, market conditions related to supply factors like prices and the transparency of the market but also the preferences and budget of the household. Due to these factors, the existing behavior (revealed preferences) can be considerably different from the initial preferences (stated preferences), Jansen et al, (2011). In this thesis, our primarily focus was on housing preferences and not the revealed choices due to the limitations regarding individual transactions, however we looked at observable average prices on an aggregate level.

Further, another common and important approach we used to analyze housing demand was by looking at population changes through the theoretical framework of life cycle models. Rossi (1955) introduced a life cycle model that explains how the different stages in our life are connected to different patterns of housing types (rental to owned, flat to house; etc.). S.J.T. Jansen et al, (2011) further explains that different social demographic features such as age, income and profession have different effects on demand for housing where for example single households usually live in smaller dwellings and households with a larger income often live in more central locations. However, Pinkster & van Kempen (2002) distinct that preferences are not only dependent on social demographics but also based on behavioral patterns such as individual goals and values. Typically, the type of housing is more dependent on social demographic variables while the appearance of the house and surrounding amenities is more often connected to lifestyle and behavioral patterns. Since this early model of the lifestyle model many new models emerged to provide theory to explain housing demand from a life course and sociological perspective. Winter & Stone (1999) expanded the model with the idea of a “risk society”. The term refers to the observation that the order and timing of life cycle events (such as marriage, family foundation, divorce, etc.) are getting more unpredictable and a logical sequence cannot be assumed. Fishbein & Ajzen (1975) further claims with the Expectancy-Value Model that intentions are the determinant driver for behavior. This theory suggests that a behavior or an intention is a function of the sum of the expected values of an object’s attributes. In other words, the attitude towards an object is dependent on the perceived likelihood that this object has a certain attribute and the attractiveness of that attribute. It is also important to note that de Jong et al. (1986) applied the model for migration decision making in housing research and argue that beside intention, the two main predictors of migration behavior are being single and having the necessary monetary resources to move.

These theories enabled us to build a model to estimate the potential demand for micro housing and the optimal application of the micro housing concept in the future considering life cycle models and consumer preferences and how they affect the balance between the supply and demand on the market.

4 Methodology

To perform our research, we used different methods in order to collect information and data on the subject. We used empirical studies in the form of interviews and questionnaires as well as collect secondary data in the form of statistical archival data. By investigating micro apartments in other cities in Europe and worldwide we could generalize the phenomenon, Saunders et al. (2016). We also estimated the future demand for micro housing in Stockholm based on our findings and found out about any constraints in terms of regulations and policy that could affect the concept in the Stockholm housing market.

4.1 Reviewing the Literature

When collecting information for the literature review, we used a clear and systematic structure to the research as advised by University of Bedfordshire, (2018). The information we found was mainly retrieved from journal and library databases as well as from institution, company and newspaper websites. In order to sort the articles relevant to our topic we divided them up in different subtopics based on keywords and areas of research. Further we examined the original sources of the articles in order to avoid confusion and to maintain accuracy of the information retrieved. We then summarized the relevant key points of each article and divided these key points to where they would fit in the thesis itself.

4.2 Economic Outlook

As one of the aims of this research is to estimate the future demand for micro apartments in Stockholm with different economic scenarios, it was essential to include a section on the economic outlook of the region which was done with an aggregating method, OECD (2011). To create an overview of the current state and expected development of the economy and real estate market we used the secondary data and forecasts in the reports of Swedish institutions and some established real estate related companies, aggregating them into one outlook. We primarily focused on macroeconomic and property market indicators in Sweden and Stockholm, but also included a global and a European outlook and its impact on Sweden.

4.3 Descriptive Statistics

We collected pre-existing statistical secondary multipurpose data, which is data that previously has been collected, Goodwin (2012). With these data, we could identify demographic trends, housing market indicators and other parameters that affect the demand for micro apartments. Primarily we used multipurpose data from Statistics Sweden, categorized as a government source, Birks and Malhotra (2005). Further we used secondary data provided by Mäklarstatistik, an independent actor collecting data on all housing transactions performed through agents in Sweden (90 percent of all transactions), Mäklarstatistik (2018). We also adopted other secondary data from previous academic research in order to increase the knowledge about micro apartments and in order for us to refine the questionnaires to yield significant results with the survey.

4.4 Questionnaires Design

In order to reach and collect information from potential users of micro apartments we worked with questionnaires. We applied self-administered, internet-mediated questionnaires, Saunders et al. (2016), to collect empirical information on the expectations, preferences and experiences regarding housing. We collected responses from different sources including Facebook groups

for expats, international and Swedish students, groups for people who currently look for housing in and around Stockholm just to name a few. The questions were based on an extensive consumer research on the experience of micro apartments owners conducted by the Urban Land Institute (2014) and adjusted for people who are not necessarily living in micro apartments but might consider it. The questions were further focusing on decision making and exploring preferences regarding housing attributes based on their attractiveness or importance. The aim of the survey is to estimate the general interest for micro apartments and identify what respondents are founding their decisions on when looking for the housing solution.

4.5 Conducting Interviews

One of our chosen methods were interviews, due to its flexibility in the sense that the interviews can be adjusted to the specific subject in order to retrieve high quality information. Following the instructions from Saunders et al. (2016), we applied a semi structured method with standardized questions and had a list of topics to be discussed during the interview in order to cover our interests. Having a semi structured interview guide also contributed to the validity and objectivity of the empirics, which increases the credibility of the result, Kallio (2016). Wengraf (2001) further describes that in order for a semi structured interview to be successful the interviews require to be fully planned and prepared which we adapted. For this method, the interviewer needs to be more creative and to be more disciplined compared to other forms of interviews, further the interviewer needs to take more time for interpretation and analysis of the empirics after the sessions. By performing semi structured interviews with local housing developers, academic experts on the local housing market, as well as the responsible from the municipality and other specialists like relocation agencies, we were able to gather information about the current state of the housing market, their outlook on future developments, as well as their view on micro apartments and what they see as the main opportunities or risks of the concept in Stockholm. The duration of the interviews varied between 45 and 70 minutes.

4.6 Model to Estimate the Demand for Micro Apartments

In this section, we discuss the approach we developed to be able to estimate the demand for micro housing in Stockholm. The process is based on the extensive literature review and methods to calculate housing demand according to S.J.T. Jansen et al, (2011). To estimate the demand for a specific type of real estate in a specific city, we analyzed the different arguments and reasoning's found in the literature in order to explain the growth and expansion of the micro housing concept. From this we were able to derive which factors can have an effect on the demand and compiled a list of independent variables. We also considered factors that are specific for Stockholm and are not necessarily mentioned elsewhere, i.e. rent control. Subsequently we searched for statistical data for each factor and if not available, we searched for and quantified information from interviews and a survey to fill in the gaps. Then, forecasts for each independent variable were made and their future effect on the demand for micro units estimated. Finally, the findings were summarized in a table at the end of the result section. To do these future forecasts and estimates on demand, we employed the instructions of Boumeester (2004): the projections should contain multiple scenarios with estimated variables. The different scenarios had to be explained in detail and clearly differentiated between each other. Further, the estimation of the variables for the different scenarios had to be sensible and have a cogent and a rational relationship with the current situation. Building our research on the mentioned methods enabled us to estimate a range of the future market demand for micro apartments in Stockholm for each scenario.

5 Economic Outlook

5.1 Global and European Outlook

According to Gurría & Mann (2017), the global economy in general has been strengthened during the last few years, many countries has experienced an upturn in production, employment levels and in export and import. The growth levels are slightly lower compared to the average annual growth, this means that the current growth has lifted the market but not to the extent that it can improve people's life quality. This is also supported by the National Institute of Economic Research, NIER (2017) who also emphasized that even though the economy for many countries has turned for the better, the inflation is estimated to remain at a low level. Further, Gurría & Mann (2017) express that the employment levels and participation levels are currently higher than what could be observed the years before the previous financial crisis. Nevertheless, the growth development for salaries is still restrained according to NIER (2017), however there are indications that the salary level will increase. Gurría & Mann (2017) explain further that the growth of trade has increased in the most recent years, however the trading industry is far more volatile than it used to be. The trade market is primarily driven by the technical development, enabling globalization and opens up for new trading markets which has a positive effect on productivity.

Looking closer at Europe as a region, Newsec (2017) states that since the last financial crisis the region has been characterized by a low level of productivity, high debt levels and weak economic policies. Recently however, the economy in Europe similarly to the global trend is getting stronger and is expected to continue to grow in the near future according to their report. Despite the economic growth, there are still uncertainties on the European market, such as the effects of Brexit and concerns regarding US trading policies. This has caused the recovery of the market to be less strong compared to recoveries from previous financial crises. Other factors slowing down the growth is the aging population, the historically high unemployment levels and the globalization, which have a negative effect on the price levels. The result is low level of inflation, interest rates and growth of salaries despite the growth of the economy.

5.1.1 Risks

According to Gurría & Mann (2017), the global financial market is currently rather sensitive, potential political shocks and change in trade policies could have a devastating effect on the price levels in the real estate market and the financial market. NIER (2017) further expresses that a sudden slowdown of the Chinese economy is also a risk to be considered according to the due to the high indebtedness and partially fragile balance sheets of the banking system. NIER (2017) also identifies the high levels of bad loans that some of the Southern European banks have as potential risks to the economy, because they could reduce the credit supply if the situation worsens. The above-mentioned risks are risks that potentially could have a large impact on the Swedish economy.

5.2 Macro Indicators in Sweden

According to the annual report by the NIER (2017) a strong global economy and the complete recovery from the financial crisis have been very favorable for the Swedish economy. The strong economy can be explained by the increasing demand and production that strengthen each other. NIER (2017) further expects the output gap to grow in 2018 due to expansionary

fiscal policy in Sweden and as a result of the growth abroad that they expect to be stronger. The authors also assume that the surplus target will not be reached this year, so they anticipate a tightened fiscal policy for 2019. Sveriges Riksbank (2017) expects the economic activity to remain strong in Sweden in the next years dominated by expansionary fiscal and monetary policy and identifies international economic developments as the potential risks.

Further, Newsec (2017) reports that Sweden currently has a very low inflation and interest rates, however the growth of the economy has been stronger compared to many European countries. The construction rates have increased and enabled side investments in building material and interior solutions. The public expenses during the last couple of years have been high due to the high level of immigration which had a positive effect on demand. Despite the high GDP in the beginning of 2017 the growth of the economy is expected to be lower, the utilization of capacity however is expected to remain high. Different sectors, as the construction sector and public companies are now facing resistance finding new labor force. Since the inflation target was achieved of 2% the Swedish Central Bank is expected to increase the interest rate moderately, however the interest level will still remain low. As reported by the NIER (2017) the central bank (Riksbanken) is not expected to raise the repo rate before the autumn of 2018, which is in agreement with market expectations and the Riksbanken's predictions. The NIER (2017) believes that the repo rate will not reach 1.75% until the end of 2021 and even then, the real repo rate will still be negative which indicates a very low real equilibrium interest rate.

5.2.1 Labor Market in Sweden/Stockholm

According to the NIER (2017) there is a growing and substantial shortage of labor with the right skills despite the labor market's strong performance. This suggests an above average resource utilization in the labor market and allows rising employment in the foreign-born population, even though the unemployment in this group is still high. Newsec (2017) also reports that the unemployment has remained high partly due to the high immigration levels, however the employment for the region has improved significantly. Meanwhile, unemployment rate in the native-born population is at a historical low and it is probably not possible to further decrease it according to the NIER (2017). The authors of the report expect the employment growth to slow, but unemployment to further decrease to just above 6% in 2018 and the shortage of labor with the required skills to rise further. Additionally, Sweden has a very rigid labor market, as noted by Ulku & Muzi (2015). This means that Sweden may want to hire labor on flexible employment term to in order to balance the rigid labor market

5.2.2 Risks

NIER (2017) finds that the rise in prices in recent years could be disproportionate as a result of the use of unconventional monetary policies. A possible correction in the future would affect investment and consumption negatively.

5.3 Property Market in Sweden and Stockholm

5.3.1 Prices & Indebtedness

According to a report by Evidens (2018), by 2025 the population of Sweden is estimated to reach 11 million. In order for the population to reach this number a continuous investment strategy is necessary, both within infrastructure, housing and work places. In order for the construction levels to be sufficient, the terms and conditions of financing, tax and other regulations regarding real estate needs to be propitious. Regulation proposals by the government regarding capital demands for banks will, if they would be established, have an

effect on investment costs, tax levels etc., which would have a further negative effect on the demand for housing. Additionally, if these regulations were implemented, the estimated effect would correspond with an interest rate increase of two and three percent units.

Holzhey & Skoczek (2017) reveals in the UBS Global Real Estate Bubble Index report that in the last decade prices in Stockholm increased by 60% after being adjusted for inflation. Meanwhile, Sveriges Riksbank (2017) reports that Swedish apartment prices have tripled over the last decade. Holzhey & Skoczek (2017) further state that this growth was twice as fast as the rise in salary, mainly due to the favorable financing conditions. According to the authors, the increasing mortgage debt and building investments signals overvaluation in the market. The report by Sveriges Riksbank (2017) also explains the development of the past ten years by the imbalance between supply and demand in the market and the growth in disposable income and decreasing interest rates. These factors lead to a rise in housing prices and household borrowing. The household indebtedness is expected to continue to increase faster than household incomes that results in a rising debt-to-income ratio, (Sveriges Riksbank, 2017 and NIER, 2017). Newsec (2017) reports that during the last few years Sweden experienced a strong urbanization and high levels of immigration, which caused an increase of the demand for housing, leading to a high construction level. The high level of construction combined with the forecast of increasing interest rates and amortization demands has caused the market to saturate according to the authors. The NIER (2017) forecasts that after years of growing housing investment the market will slow down in 2018 and investment will contribute a smaller share to GDP growth.

5.3.2 Risks

The Financial Stability Report by Sveriges Riksbank (2017) forecasts that housing prices are going to grow slower in the next years after the decrease during the autumn of 2017. The authors explain this with the larger supply of housing and growing household indebtedness. Sveriges Riksbank (2017) and Newsec (2017) both see a risk of the increased supply not being met with demand. In case of a high imbalance there is a risk of a fast correction of the inflated housing prices that could threaten the financial and macroeconomic stability. The authors further explain that Swedish households are sensitive to shocks like rising interest rates and price falls in the housing market due to the rising household debt and variable-rate loans that most borrowers have. The authors warn that historically high indebtedness is more likely to lead to longer and deeper recessions and financial crises. They conclude that the high and continually rising indebtedness in Sweden constitutes the greatest risk for the economy. Likewise, according to Newsec (2017) the primary risk for the economy in Sweden is the property market and the household debt ratio. The debt levels are high and have increased lately for the region, but the authors highlight that the value of the assets have increased at the same time as well. They explain that people with more debt are mainly high-income takers and owners of great assets. Newsec (2017) further draws the conclusion that even if interest levels are expected to increase, it is not likely that they will become as high as the level before the crisis, and certainly not as high as the levels during the financial crisis in the 90's. On the other hand, the authors warn that a new financial crisis leading to a real estate crisis in Sweden could be caused by external uncertainty, political concern or external shocks - such as armed conflicts, trade wars. Such shocks will affect investors who will be more risk averse and become more cautious, this could lead to a steeping market alternatively a freeze on the market. According to the report the property market could also face a crisis if local regulators introducing several tightening measures at the same time, limiting the market. Furthermore, a potential financial tightening from banks, banks being less keen on lending money for property investments, could also have a negative effect especially for new production. Newsec

(2017) emphasizes that on the current market, the likelihood of one of these above-mentioned factors causing a market crisis is very low. However, in the wrong timing, with a combination of these factors happening simultaneously, might challenge the market and it could cause a steep downturn of the market.

5.3.3 Consumption & Saving

In the very low interest rate climate of recent years, households are saving more as their disposable income is higher, compared to what it would be in a normal interest rate environment, and they expect higher rates in the future according to NIER (2017). The authors of the report expect that households can increase their spending in 2018 without reducing their saving due to the tax cuts and higher transfer payments suggested by the government. In the years after 2018 tighter fiscal policy and growing interest rates are expected to restrain disposable income, but households are expected to lower their saving rate and continue to have a relatively normal consumption rate, NIER (2017).

5.3.4 Investment

Looking at real estate investments, Newsec (2017) states that Stockholm is the city in Sweden with the most real estate transactions and it is still considered to be the most attractive investment area. Domestic investors have been dominating the transactions and are expected to continue to do so. Since 2016 the number of transactions on the Stockholm market has decreased, which can be explained by limited supply that does not correspond with the market demand and not necessarily an indication of a decreasing market. Newsec further expresses that residential housing in Stockholm county is expected to deliver stable returns between 9-11% with a low level of volatility.

Further, Sweden is the country in Europe spending most per capita on research and development, 3,2% of GDP. This has led to Stockholm becoming the second largest tech hub, after Silicon Valley. The fin-tech industry in Stockholm has grown rapidly in the last five years, during this time Stockholm based fin-tech companies has received 18% of all private placements for fin-tech in Europe. Stockholm is also a world leader when it comes to IoT (internet of things - such as autonomous cars, wearables, smart home systems etc.). The tech development has led to not only attracting international capital but also international talents to work and be a part of the tech development, Business Sweden (2018).

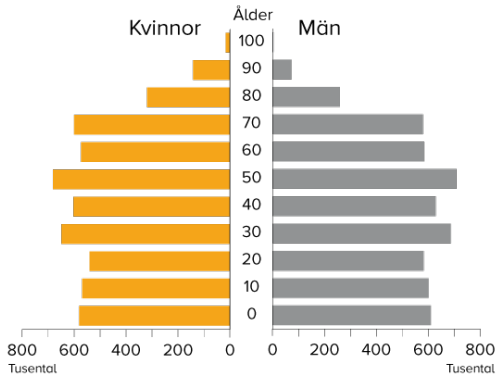
6 Statistical Analysis and Empirical Findings

6.1 Demographic Analysis

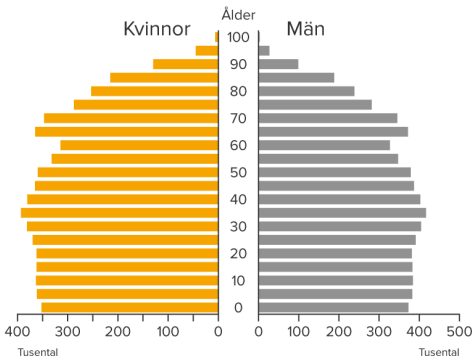
6.1.1 Population

According to SCB (2017), the Swedish population recently reached ten million and is expected to increase to eleven million by 2026. According to Statistics Sweden, the population will grow with more than 100 000 people yearly until 2024. By 2026 the age group between 0-19 will increase with just over 16 percent, the age group between 20-64 will increase with almost seven percent and the age group 65- will increase with 15 percent. Children born is expected to grow every year until 2026, this primarily since the baby boom of 1990's is now in a childbearing age and secondary due to the fact that a large part of immigrants coming to Sweden is in the childbearing age as well. Since the life expectancy has increased and is expected to continue to increase, the age group above the age of 65 is expected to increase as well.

Graph 1. Population pyramid 2016
Source: SCB (2017)



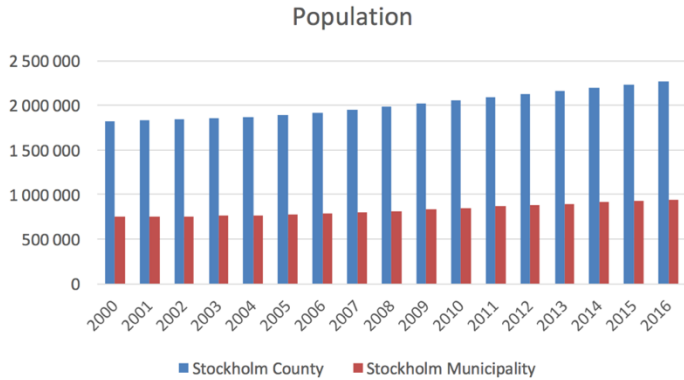
Graph 2. Population pyramid 2060
Source: SCB (2017)



According to Stockholm Stad (2017) population in Stockholm was by the end of 2016 consisting of 935 619 people and their projection is that the population will further grow with 152 000 more by 2026 and the it is expected to reach 1 million by 2021.

Graph 3 shows steady growth in the population both in Stockholm County and Municipality in the past 16 years, which generally indicates a constant need for the increase of housing supply. Looking more closely on the annual population growth in Stockholm municipality, we can see an increase of around 10-20 thousand people per year in the past 10 years. Birth rates were relatively constant in the past decade and were considerably higher than in the two preceding decades.

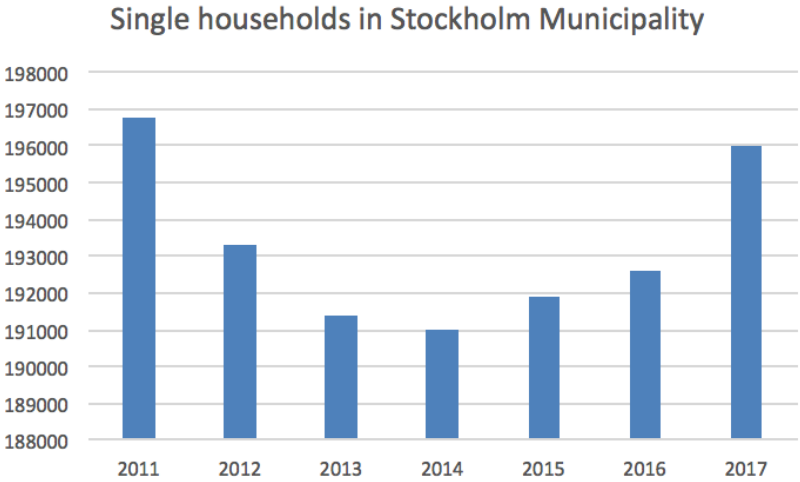
Graph 3. Population



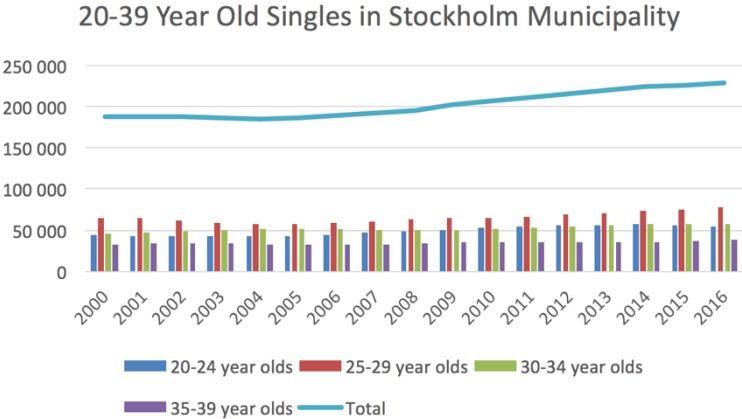
6.1.2 Single Households

As the population is increasing in Stockholm county and municipality, so is the number of singles in the age group between the age of 20-39. The people in this group, 450 thousand in 2016 in Stockholm county and 196 thousand in Stockholm municipally, are highly likely to live alone or in collectives so their number and growth indicate an increasing need for apartments for single households, please see graph 4 and 5 for the number of single households in Stockholm municipally and its trend development.

Graph 4. Single Households

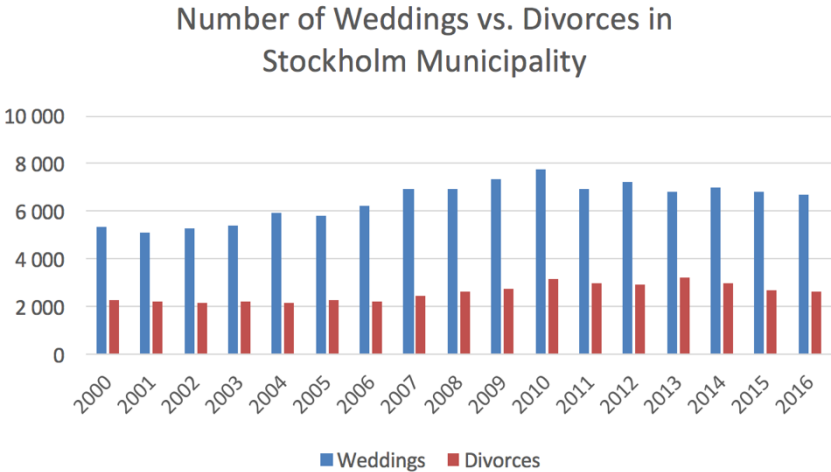


Graph 5. Single Households Age Dependent



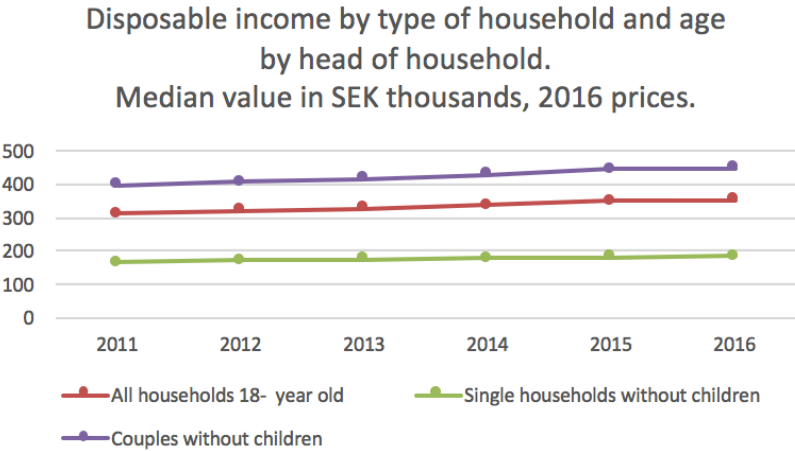
The annual number of divorces is a good indicator of households that split up in a year and form additional households. This number appears to have stayed relatively constant in the past decade in Stockholm municipality and county, see graph 6. We assume the divorce rate to stay relatively constant for the future with minor fluctuations as it has been in the past. However, the absolute number of divorces is expected to increase due to the rising population. The divorce rate is relevant for the housing market, because an increasing divorce rate leads to increasing number of single-person households. Furthermore, the number of single-person-households has an effect on the demand for micro apartments.

Graph 6. Weddings vs. Divorces



In Stockholm municipality, the disposable income for single and spouse households has increased since 2011 in a moderate but steady rate, see graph 7, meaning that these households have experienced a general increase in their disposable income. We expect the moderate and positive growth to remain.

Graph 7. Disposable income

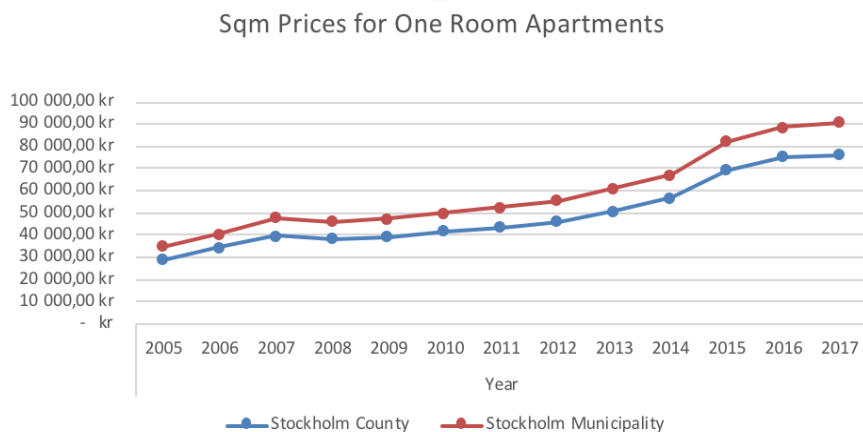


6.1.3 Price and Size Development

The average price for one room apartments has steadily increased since 2005 for both Stockholm County and Stockholm Municipality. Graph 8 shows the clear increase in the average housing prices per sq. m. in both Stockholm County and Stockholm Municipality. The county and municipality seem to move together. The price development also show that the market has had a positive growth since 1996 with the exception for 2008 during the financial crisis where a small drop in price per sq. m. can be detected. Based on the economic outlook we expect the general level of square meter price, to flatten out and stabilize during the next couple of years.

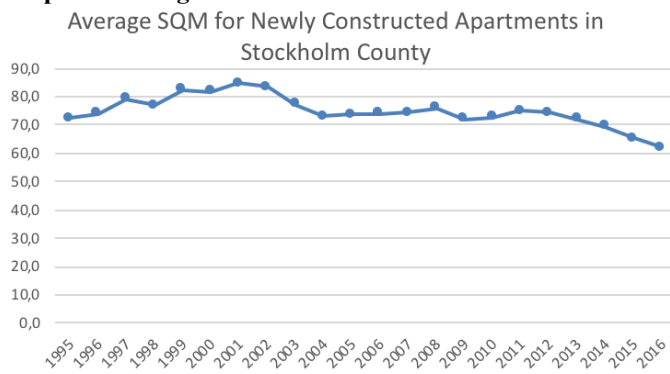
The growing trend seems to be similar for both the County and the Municipality. The rate of growth has decreased during the latest years, but it is expected to pick up in the future and the prices for small apartment continue to grow as the demand is expected to increase in the next years due to the decreasing average household size and growing population. Further, with the market risks mentioned in the economic outlook, even a potential downturn in the economy would not necessarily have a negative effect on the price development of small apartments since less people would afford larger living options and would be forced to size down. With that we expect the average price of one room apartments to continue to grow in a stable phase.

Graph 8. Price Development 1room apartments
Source: Mäklarstatistik (2018)



During the last 15 years, there has been an overall decrease in size for newly constructed apartments (Graph 9). This decreasing trend has been the most prominent the last five years where the average size of constructed apartments has decreased by 10 sq. m. This decreasing trend does not show any signs of slowing down. With the expected growth of number and density of households in Stockholm, we expect the average apartment size to decrease further.

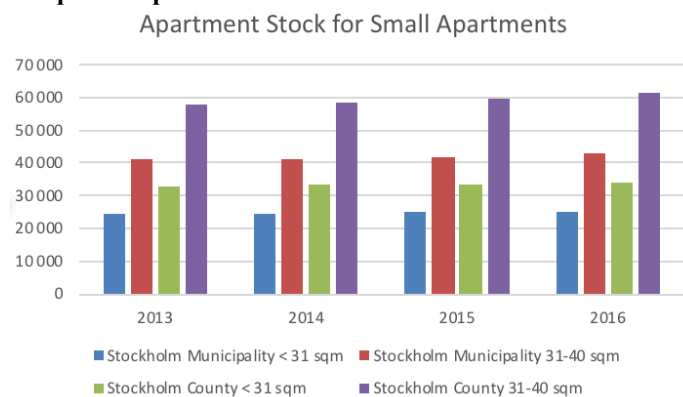
Graph 9. Average Size for New Construction



6.1.4 Stock of Small Apartments

Between 2013 and 2016 the apartment stock for apartments below 31 sq. m. has been rather stable both in Stockholm County which had an increase of 2,4% and Municipality which had an increase of 2,5%. There has been a larger change in stock for apartments between 31 and 40 sq. m, Stockholm Municipality had a stock increase of 4,2% and Stockholm County had a stock increase of 6,5% (Graph 10).

Graph 10. Apartment Stock

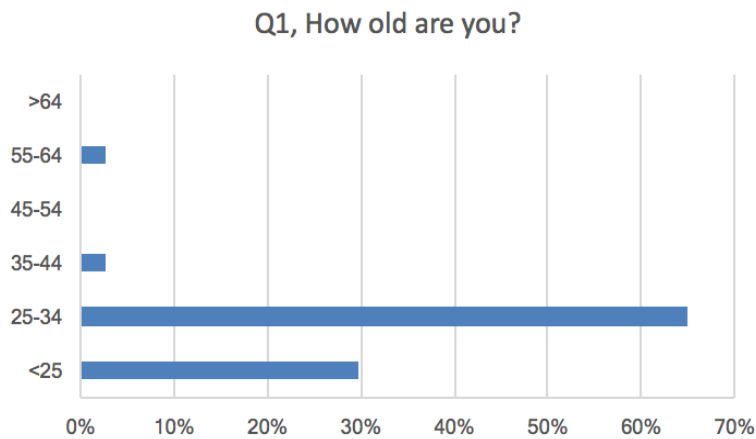


6.2 Survey

The survey conducted through Survey Monkey resulted in 74 responses. The following section is presenting the result from the 14 questions that the survey consisted of.

6.2.1 Age Distribution

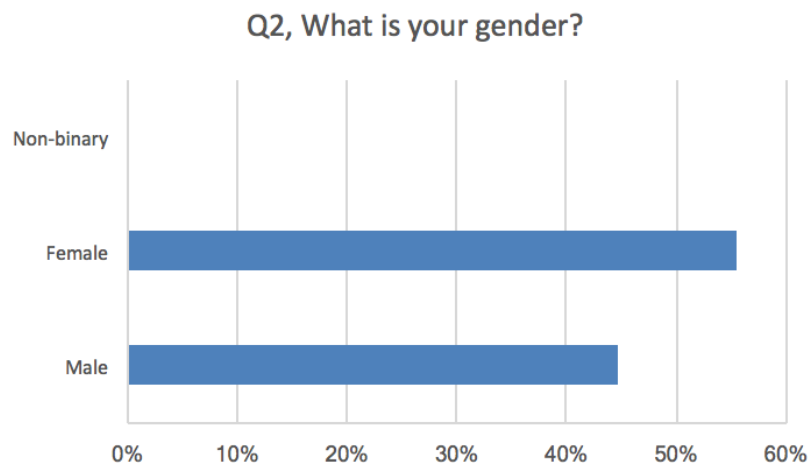
Graph 11. Q1



The largest age groups of the respondents were people aged under 25 (30%) and people aged 25-34 (65%), see graph 11.

6.2.2 Gender Distribution

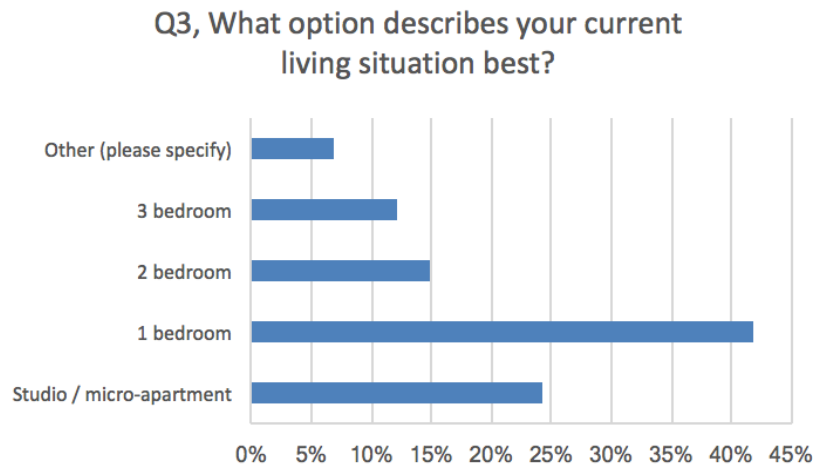
Graph 12. Q2



Of the respondents, 55 % of them were women and 45 % of them were men, see Graph 12.

6.2.3 Current Form of Living

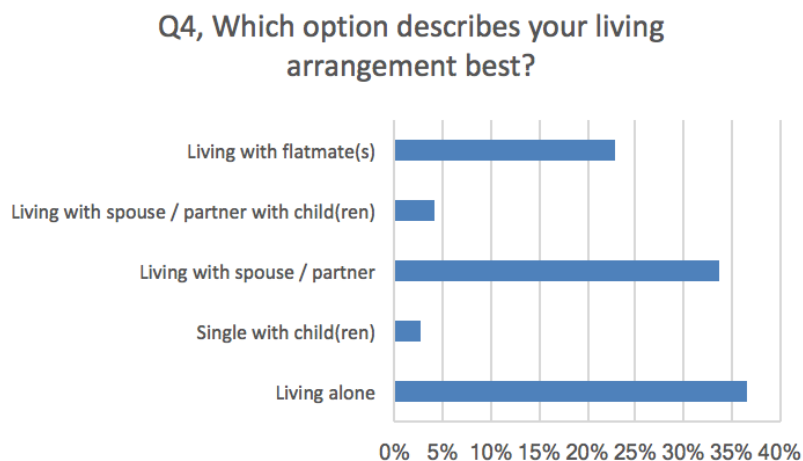
Graph 13. Q3



The majority of the respondents currently live in a one-bedroom apartment (42%), the second largest group of the respondents currently live in a studio apartment (24%), followed by living in a two-bedroom apartment (15%) and a three-bedroom apartment (12%). 80 % of the people living in other type of living (7%), are currently living with their parents or in a student corridor, see Graph 13.

6.2.4 Living Arrangement

Graph 14. Q4

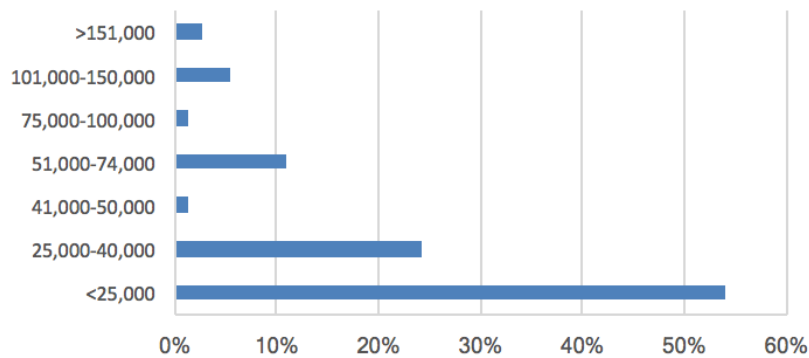


The largest group of the respondents are currently living alone (36%) closely followed by the group living with a partner (34%) followed by living with a flat mate (23%). Only 7 % of the respondents stated that they love either alone or with partner and children, see Graph 14.

6.2.5 Household Income

Graph 15. Q5

Q5, What is your annual gross household income in euros (€)?

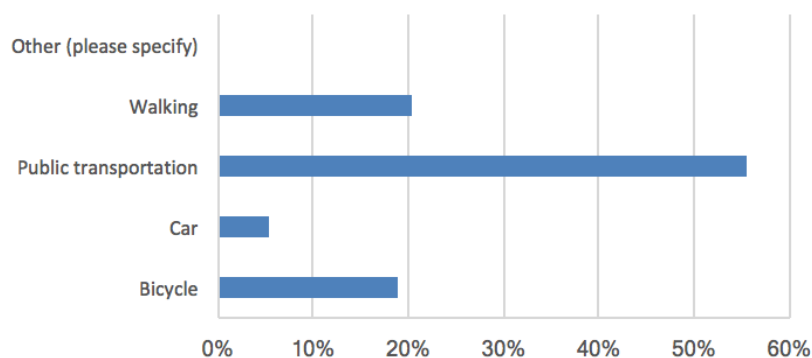


The vast majority of the respondents had a gross household income below € 25.000 (54%). The second largest income group had a gross household income between € 25.000 and € 40.000 (24%). The other 22% of the respondents had an income above € 41.000, rather evenly distributed over the different income levels, see graph 15.

6.2.6 Primary Method of Transportation

Graph 16. Q6

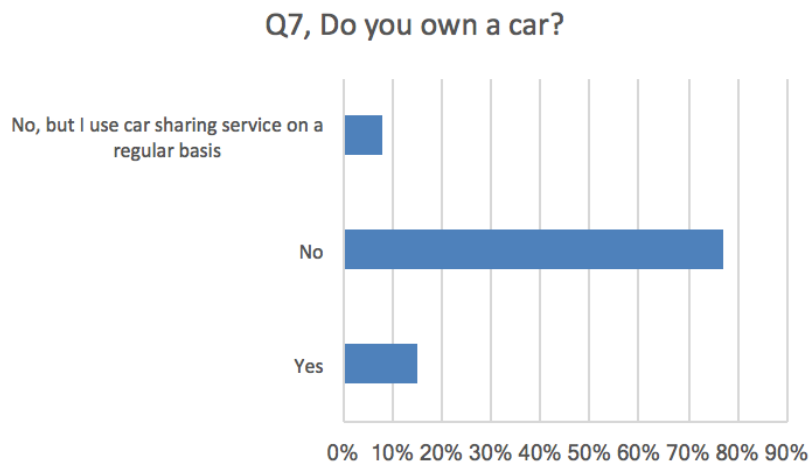
Q6, What is your primary method of daily transportation?



The primary method of transportations for the respondents consisted of four different methods, walking, car, public transport and biking. The most common method of transportation was public transport (55%), followed by walking (20%) and biking (19%). The most uncommon method of transportation with a significant lower rate was transportation by car, only used by 5% of the respondents, see graph 16.

6.2.7 Car Ownership

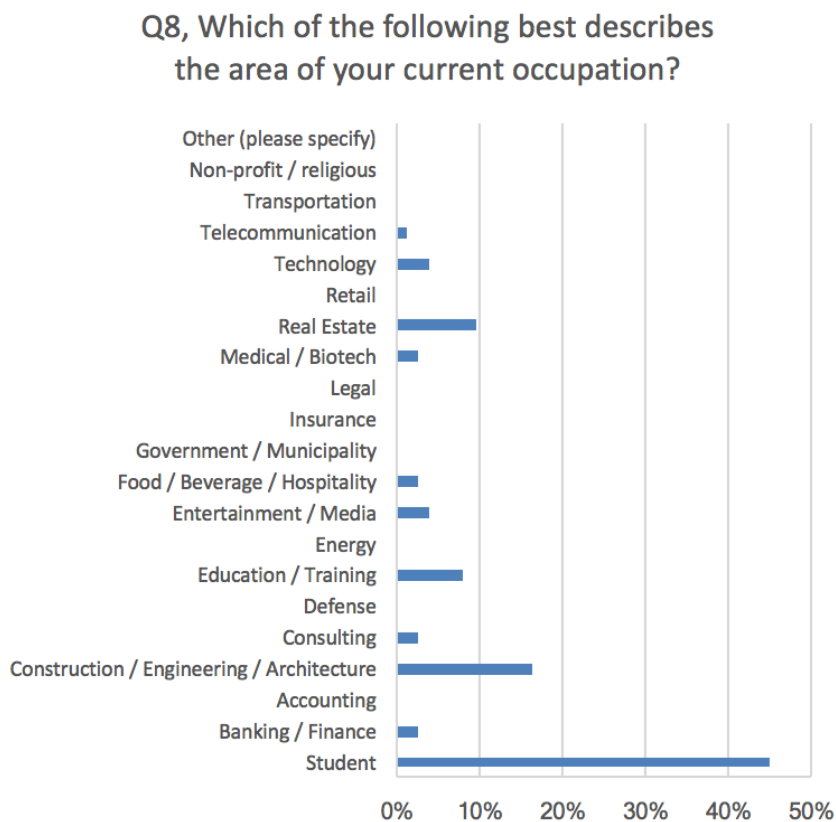
Graph 17. Q7



The question about car ownership showed that 77 % of the respondents did not own a car. 15 % of the respondents owned a car and 8 % of the respondents did not own a car but used car sharing services such as Sunfleet and DriveNow, see graph 17.

6.2.8 Current Occupation

Graph 18. Q8

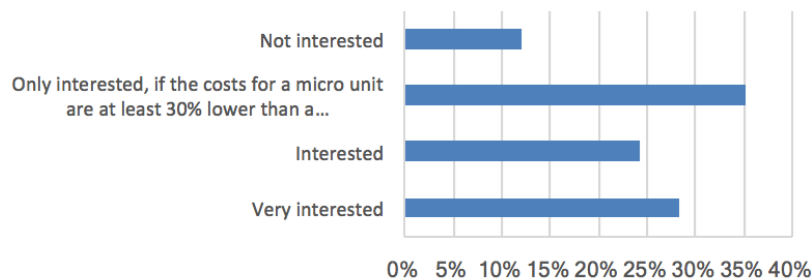


The most common occupation by the respondents was studying (45%), the second most common occupation was working in engineering/architecture/construction (17%). The third and fourth most common occupation was within real estate (10%) and education (8%). The rest of the occupations were rather evenly distributed among the answers, see graph 18.

6.2.9 Interest of Moving to a Micro Apartment

Graph 19. Q9

Q9, If you are living or considering moving to Stockholm, would you be interested in having a micro-apartment as either primary or secondary housing?

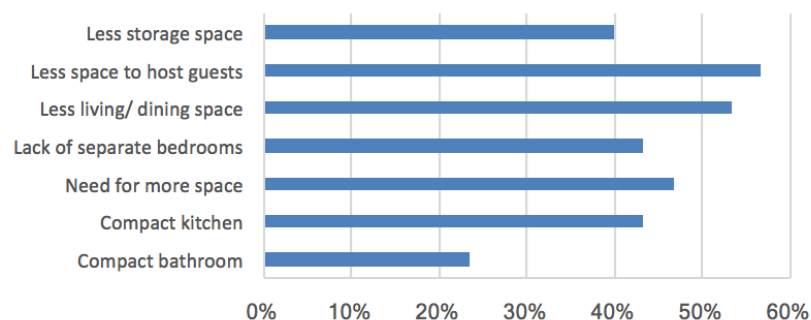


On the question of the interest of a micro apartment on the Stockholm housing market, only 12 % stated that they were not interested of a micro apartment, meaning that 88 % of the respondents had some kind of interest in a micro apartment. Further, 28 % stated that they had a very high interest and 24 % of the respondents answered that they were interested. However, the largest group of respondents, 35 %, answered that they were interested but only if the running costs of a micro apartments is 20-30 % lower than for a conventional apartment, see graph 19. Even though most respondents were students, we didn't find that separating the answers of students / non-students had a significant change in the distribution of the answers.

6.2.10 Undesirable Features of the Concept

Graph 20. Q10

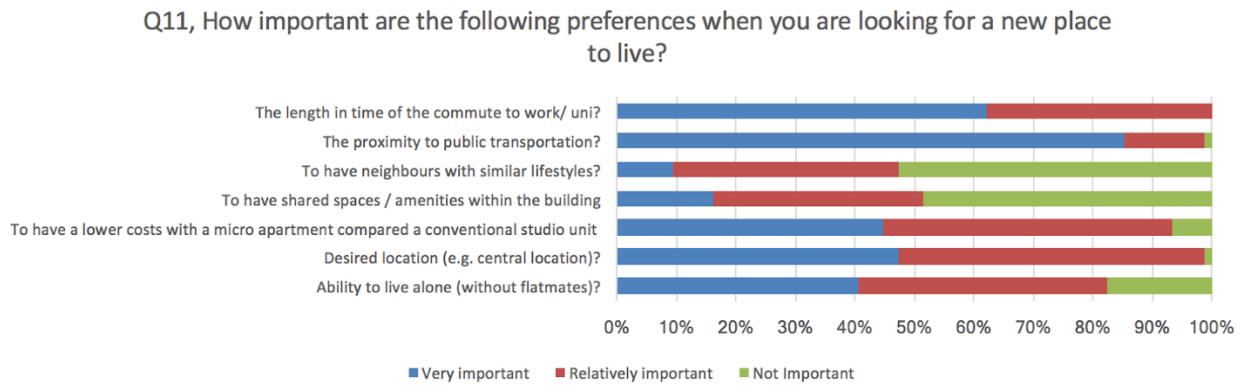
Q10, If you are not interested in living in micro apartments, what makes this concept undesirable?



When asked what the most undesirable features of a micro apartment was, the alternatives had a rather even distribution, however, a compact bathroom was the least concerning feature according to the respondents. The most undesirable features of the concept according to the respondents were a small dining space (53%) and less space to host guests (57%), see graph 20.

6.2.11 Preference of Living

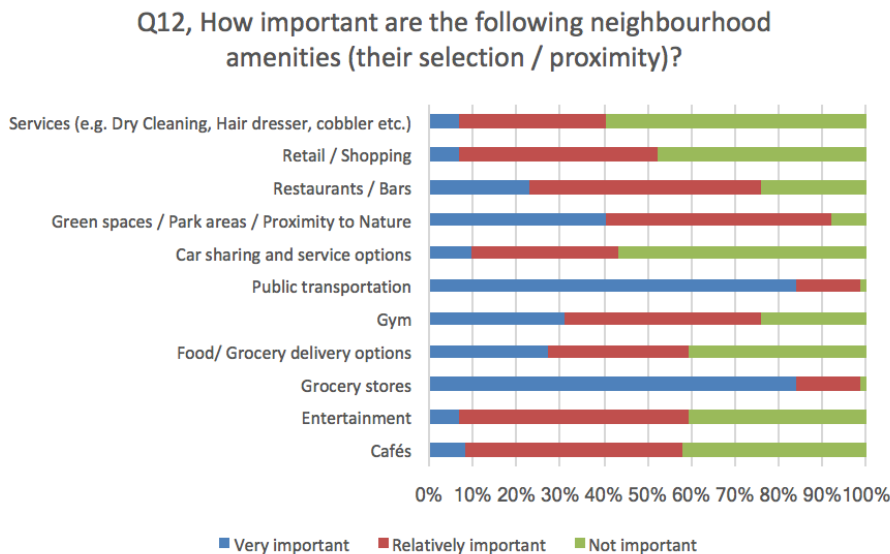
Graph 21. Q11



When looking for a new place to live, the respondents have relatively evenly distributed preferences based on their answers. The only factors that are very important for most respondents are proximity to public transportation (85%) and the length in time of the commute to work / university (62%). Furthermore, over 40% of respondents find the ability to live alone, the desired location and to have a lower cost with a micro apartment compared to a conventional studio unit very important, see graph 21.

6.2.12 Preferred Neighborhood Amenities

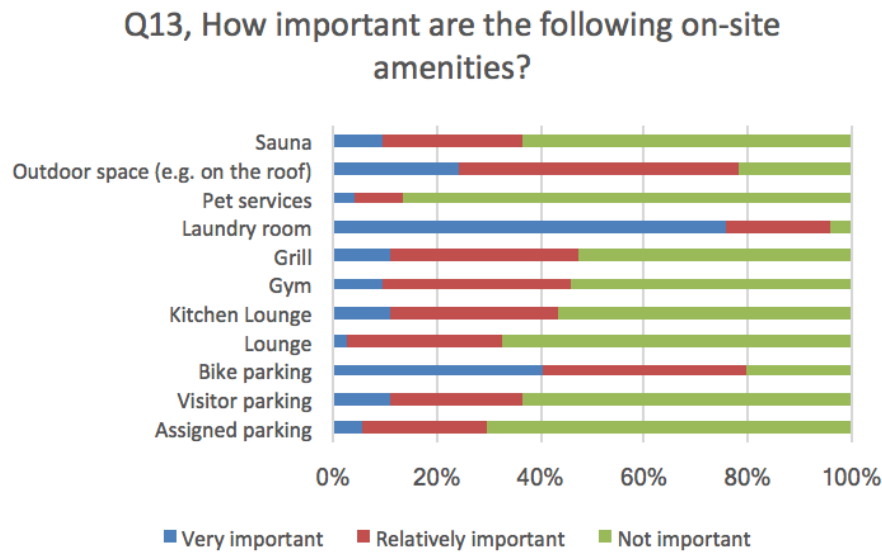
Graph 22. Q12



The most important neighborhood amenities were according to the respondents' proximity to public transport and grocery stores, 84% of the respondents thought that those amenities were very important (99% thought it was important or very important). Having green space near the building was also of preference, where 92 % of the respondents said it was important. Further, both proximity to a gym and the existence of restaurants and bars was important to 75% of the respondents. The rest of the alternative had a rather even distribution, see graph 22.

6.2.13 Importance of On-site Amenities

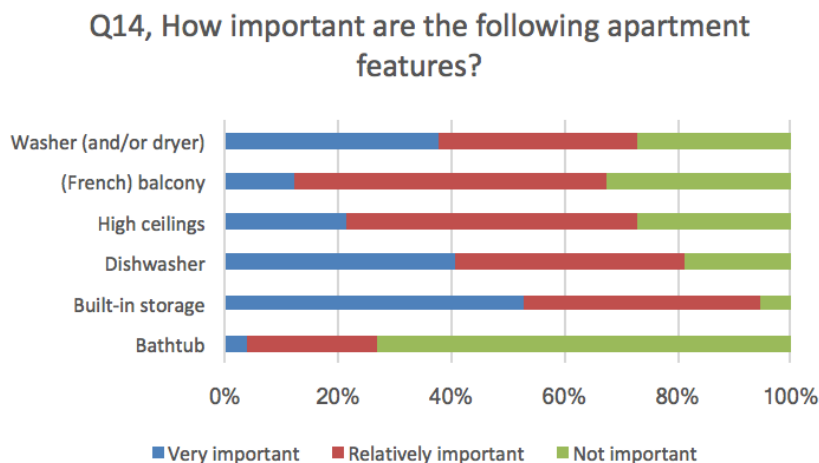
Graph 23. Q13



Regarding on-site amenities, laundry rooms are the only aspect that more than half of the respondents find very important (76%). Bike parking follows with 41% of respondents considering it a very important amenity and outdoor space was the only amenity that the majority found at least relatively important (54%), see graph 23.

6.2.14 Importance of Apartment Features

Graph 24. Q14



Built-in storage is the only apartment feature that the majority sees as very important (53%). Besides that, dishwasher and washing machine yielded the highest ratings with respectively 41% and 36% of the respondents finding them as very important features. Looking at relatively important features, balcony (55%) and high ceilings (51%) were the most popular, see graph 14.

6.3 Interviews

The interviews were conducted with different experts within the field of real estate and construction in Stockholm. Following experts were interviewed regarding the housing market and micro apartments: Hansi Karppinen, project developer at Aros Bostad; Hans Lind, Professor in Real Estate Economics; Ted Lindqvist, CEO of the real estate market analyst company, Evidens; Charlotte Danielsson, Business Developer, Skanska; Anders Svensson, Analyst at Nya Hem, Skanska; Felix Anteman Debels, Political Adviser at Stockholm Municipality; Lena Rekdal, CEO of the relocation firm Nim.Mersion.

6.3.1 Views on the Stockholm Housing Market and its Future

6.3.1.1 Current Market Trends

Up until a few months ago the housing market experienced steep price increases for all housing segments in Stockholm mainly due to a long term high demand and to a severe housing shortage, Rekdal (2018), the price increases for smaller apartments however were particularly high. Karppinen (2018). According to Lindqvist (2018), the historically and currently strong demand for housing is affected by growth in population, growth in disposable income, lower interest rate levels, growth in the households' financial assets etc. Karppinen (2018), further explains that some of the price increase and demand for small apartments was induced by the increased number of speculative buyers on the market during that time. Rekdal (2018) expresses that the steep increase in real estate prices has little correlation with changes in salary levels, which has had a far more moderate increase during the same time, Rekdal adds that this itself could be problematic and unsustainable. The current halt of the market has been particularly hard for new production according to Svensson (2018). Too many units were constructed during the previous "good times" which has led to a current oversupply of new development on the market, which lead to the dip in the market itself. Lindqvist (2018) agrees that the oversupply of new development is one of the factors causing the halt, but he also points out the effect of the recently adapted loan amortization regulations and the new rules for the granting of credit by the banks.

However, both Svensson (2018) and Karppinen (2018) express that the market in general and in particular the second hand market is starting to stabilize, Svensson (2018) further explains that it is not very likely that the price level, especially on the second hand market, will decrease significantly, however, it will take some time before the price levels will yet again increase according to Svensson and when it does the tempo on the market will probably be at lower level, similar as the market was 5-6 years ago. Karppinen (2018) anticipates a more healthy and stable market than what we recently experienced and thinks that buyers in the future will be less inclined to buy an apartment solely to make a profit, but rather buy a home to live in it for a longer period which is not expected to drive up the prices as much.

6.3.1.2 Current Trends in Demand and Supply

At the moment, the demand for housing has shifted rather heavily according to Anteman Debels (2018). With a combination of higher prices and stricter credit rules the demand for cheaper and smaller houses is increasing according to Lindqvist (2018). He argues that the only way of getting a cheaper apartment is to buy or live in a smaller apartment. This is also something that Karppinen (2018) agrees with, he further explains that people in general will probably still prefer the same amount of rooms as previously, but for the space to be smaller

and more efficient. According to Anteman Debels (2018), another effect of the stricter credit rules is that it becomes more difficult to finance housing and especially difficult for certain groups to enter the housing market, such as young people and low-income households. The young group is further affected by the parents, who previously have helped their children to finance their first home, since they either do not want to increase or might not even have the ability to increase the mortgage on their house, Svensson (2018).

Karppinen (2018) argues that the speculative buyers will almost disappear on the market due to the current market risks. Danielsson (2018) and Svensson (2018) however, argue that speculative buyers investing in small units will be still present on the market and a part of the demand. The reason is that small apartments are easy to rent out and the investor can afford to postpone a sale.

6.3.1.3 Urban Planning

According to Anteman Debels (2018), the municipality is responsible for providing housing for all people in Stockholm, but it wasn't able to live up to this function and it is not expected to for the next 20 years. The municipal goal is to construct 40.000 new dwellings until 2030, but the construction is dependent on the market conditions according to Anteman Debels (2018). The municipal goal of number of dwellings is something that Lind (2018) sees critically. In his opinion, it is problematic to only express the demand in number of units, not specifically focusing on the demand for different types of housing. He finds that this can lead to the construction of new supply that does not meet the actual demand for certain types of units on the market. As an example, small apartments are being built too big, when the demand is for something much smaller or something with more rooms.

Lind (2018) also expresses a concern about the general direction towards more density in Stockholm, and questions what is so favorable with higher density, apart from higher profits for the municipality when selling the land. Instead, Lind promotes the idea of a diverse city, with both more and less dense areas combined, in order to provide housing for different preferences. He further expresses that all these areas separately should contain different types of housing, different both in standard and in size, including affordable housing in order to prevent segregation and fulfill different kind of demand. However, this kind of sustainable and conscious urban planning would put more demand on the developers, the land price would fall and cause significant monetary losses for the municipality.

The building and planning process is complicated and expensive, which results in slow processes, Rekdal (2018). Karppinen (2018) expresses that as a developer, the projects finishing up today, are the result of plans made 10 years ago. He points out that it is important to have as flexible zoning plans as possible in order to be able to make adjustments up until the very last minute, however, with all the permits this is a big challenge for the developers. The long and expensive building processes result in very high prices for new developed apartments, Anteman Debels (2018), and the rent for those are very high, which very few people can afford. This increases the level of segregation on the market, which is one of the greatest problems today on the Stockholm housing market according to Lind (2018). Lind (2018) further highlights the long queue for rental apartments in Stockholm, which is sign of a non-efficient system. The high demand for rental is also something that Anteman Debels (2018) mentions and he adds that he does not see the supply for rental housing changing, even though the high demand will remain, however, the current costs are too high to make the issue prioritized by the municipality.

Apart from the housing situation, Rekdal (2018) is also concerned about the infrastructure in Stockholm, which is under dimensioned for its large and growing population. With a well dimensioned infrastructure, people would be more inclined to live further out from the city center.

6.3.1.4 International Business Market

Stockholm is often expressed by expats as a good climate to work in due to the flat hierarchy in company cultures with good opportunities combined with proximity to nature and the good social security system, Rekdal (2018). However, during her 23 years leading the relocation company Nim.Mersion, she found that the housing shortage has been a constant obstacle for people to move to the region. It is difficult for companies to attract talent to Sweden and Stockholm due the high living costs, and by moving here, people get less to live on and they become more limited in terms of housing, a dilemma also highlighted by Lindqvist (2018). At times, as much as 70% of the companies would say that they had a hard time expanding due to the lack of housing for their employees, something that has an obvious negative growth effect for both for the companies and for Stockholm as a region. With a current shortage and a future need for many basic jobs, among those, 79.000 teachers and 30.000 software engineers by 2022 the challenge of recruitment for companies remains. In this market, short-term assignments are getting more frequent and common, not because they are preferred, but it is what the companies have to offer in order to recruit foreign talent. However, the region is in danger to lose business opportunity due to its housing shortage to other competing European cities, such as Berlin, Frankfurt, London and Paris, Rekdal (2018) and to other emerging cities such as Malmö, Gothenburg and Norrköping, this would lead to economic losses for the region, Lindqvist (2018).

6.3.1.5 Future Outlook on the Housing Market

The main question and uncertainty on the housing market is according to Lindqvist (2018) if new credit restrains will be introduced or that the banks themselves will sharpen their demands and how they will be put in place. Lindqvist further argues that there might be easing's for the credit restrains if a too large share of the demand for new construction is affected in the future. Svensson (2018) and Danielsson (2018) both agree that the future price levels are highly dependent on the financing abilities. Despite the uncertainty, Lindqvist (2018) argues that the demand will remain strong due to increasing employment levels, increasing wage levels and low interest rates, which will remain low for the foreseeable future.

On the demand side, people born during the baby boom around 1990, are now grown up and about to start families on their own. According to Svensson (2018) the demand will most likely shift from small to larger apartment, with more rooms for this age group. This is something that both Anteman Debels (2018) and Karppinen (2018) agrees with, Karppinen further adds that this generation is preferring living in urban and central areas with access to a lot of different amenities. However, due to the credit constraints, the ability to pay and other factors, Svensson (2018) and Danielsson (2018) still see a large demand for small and very small housing.

With the current market conditions, Lindqvist (2018) estimates that the construction volume for new development will decrease significantly, around 25-30% during the next few years. Svensson (2018) adds that the construction rate will likely go back to a more normal level, as we had around 2012, not as extreme as it has been during the most recent years. Danielsson

further adds that the construction is likely to fall proportionally for all segments, not more or less for a specific apartment size.

There is a worry that when the market recovers, it will take up a similar speed to what the market experienced recently, which has a high chance of putting Stockholm in a similar position as London according to Rekdal (2018) and Anteman Debels (2018). A situation where a large number of international investors are acting in the market, which leads to increasing price levels for the city, which further forces people working in the service sector and low-income people to move further out from the city center, Rekdal (2018). Rekdal further explains that this will lead to an elite city center demanding a lot of services, whereas the people working in service will avoid working in the center due to the long commuting times. A situation like this would both have a negative effect on growth and segregation, Lind (2018).

6.3.1.6 Future of Rental versus Ownership Housing

Lind (2018) anticipates that the current uncertainty on the housing ownership market will have a positive, increasing effect on the demand on the rental market. He emphasizes however, that the increase will most likely be only temporary since the majority of people wants to own their home due to certainty and control factors. Karppinen (2018) believes that the share of ownership apartments will further increase in the future. He adds that from a developer's point of view, tenant owned associations are attractive and ease the process, partly due to the separate legislation for tenant owned organizations. In his view a change towards more owned apartments compared to tenant owned units will be difficult due to old structures and traditions within the industry.

6.3.1.7 Future locations

According to Karppinen (2018) the absorption of developments is a key aspect for the future, developers need to consider the real demand for an area, and what type of demand there is. Svensson (2018) continues by adding that the location will be very important. Both Karppinen (2018) and Svensson (2018) emphasize the attraction and future for unique and smaller locations with great possibility of communication to other areas, with at most two competing developments.

6.3.2 Views on Micro Apartments

6.3.2.1 Demand for Micro

From Karppinen (2018) own experience, small studio apartments have proven to be very attractive and lucrative on the Stockholm market, which is a similar experience to Rekdal (2018) who finds the largest struggle in her profession to find efficient small apartments. With the high number of single households and the large demand both Rekdal (2018) and Lindqvist (2018) agree that micro apartments would be a great contribution to the housing supply in Stockholm. In addition to this, Lind (2018) points out that students living in student apartments tend to want to stay in their student apartment even after graduating which is according to Lind is a good indication of demand for micro apartments. However, Anteman Debels (2018) who also sees a demand for micro housing adds that micro apartments would obviously not be a complete solution for the housing shortage. Nevertheless, both Svensson (2018) and Anteman Debels (2018) see an opportunity and demand for micro apartments to enable financially constrained people to enter the housing market, such as young people and people with a restricted income.

6.3.2.2 Current Demand for Energy Efficient Apartments

Karppinen (2018) and Lindqvist (2018) agree that only a small portion of buyers are willing to pay extra to have an environmentally friendly apartment. Karppinen (2018) finds that for most people the main consideration is to have a lower cost, so they are willing to pay more for a unit if that unit will have a lower monthly fee. According to Lindqvist (2018) households prioritize aspects such as materials and energy consumption when it comes to sustainability, but they do not tend to reduce their space deliberately just to be more economical. Svensson (2018) experienced a higher demand for environmentally friendly apartments and an increasing willingness to pay for greener units in the past 10 years. He highlights that young people are the main drivers for this demand, who consider sustainability as a regular standard instead of a luxury.

6.3.2.3 Potential Target Group

Lind (2018) strongly believes that there are countless life situations where micro apartments could serve as an optimal and interesting solution for people across all age groups, not just for young people. He emphasizes the importance of acknowledging the large diversity of the population and looking at the concept from different generations' perspective. Lind (2018) further highlights that in many cases, people does not realize that this type of housing concept would be ideal for them until it actually exist on the market. He lists many examples where life does not fit just one home and a micro apartment is a good complement: some people want to live or have a house in the countryside and have a small apartment in the city to avoid commuting every day; a job opportunity that requires one of the parents in a family to move or commute regularly to have small second home to replace a hotel, because moving the whole family is not an option; another case are people having increasing disposable income who are willing to spend more on housing, they often appreciate the flexibility and freedom of having a smaller, central unit additionally to a less central property to use it instead of hotels if they spend time in the city fairly regularly; finally, Lind (2018) explains that the concept is ideal for people who have a partner but does not want to live permanently together and share a household to maintain personal space and their independence (e.g. in a new relationship after a divorce). Furthermore, just as Anteman Debels (2018), he considers young professionals or students wanting to move to different places for a limited time period is a very important target group. Lind (2018) also believes that a version of micro housing adjusted for two-person households would also fulfill many needs.

According to Lindqvist (2018) micro apartment are ideal for young people as a first apartment to get into the market or people who commute on a weekly basis. He is convinced that it works best for single person households but emphasizes that the concept is very restricted in the sense, that as soon as the household grows in size, people will want to move in a bigger unit. He concludes that there is definitely a market for this kind of housing solution, but it is probably limited, because he expects people to rather have a 10-15 minute longer commute time to have a bigger unit for the same price. Lindqvist (2018) suspects that older people would choose bigger units if they decide to have an apartment in the city because they tend to be financially less constrained.

Anteman Debels (2018) and Rekdal (2018) both see young people and short-term assignees (who could be also a bit older) as the main target groups. She explains, that the second group comes to Stockholm to work hard and they tend to work often long hours and eat out regularly anyway, so they do not spend too much time at home. These people do not look for a permanent solution, but they need something nicer or bigger than a hotel room. Rekdal (2018) finds that living in the city center or as close as possible is the most consistent and significant

preference of her clients coming to Stockholm for work. Anteman Debels (2018) also highlights the difficulty of getting housing in Stockholm for people who come from abroad to work in Stockholm, increasingly in the IT sector, and expects that the demand for hotel-like housing solutions will grow significantly in the future.

6.3.2.4 Project Examples

The interviewees mentioned a wide range of existing projects in Sweden that they associate with the micro housing concept to some extent. Lind (2018) describes an existing concept where 3-4 older people, have smaller units within a larger apartment where they live together and have access to a larger kitchen and living room, but having their own cooking space. Rekdal (2018) also talks about co-living projects, specifically ones by Tech Farm targeting young international professionals in Stockholm. These properties consist of small housing units with a lot of shared areas. Amenities like communal areas are one of the main highlights of the project 15/20 in Kungsholmen introduced by Danielsson (2018). Lind (2018) also mentions a student housing project in Lund, where they managed to get an exception from some of the space regulations and also applied technical innovations like a sink that can be folded up, to reduce space with less trade-offs.

6.3.2.5 Alternative Market Solutions

Most interviewees mentioned Norway as an example for a well-functioning housing market, where the rental and ownership markets are more flexible. Lind (2018) explains that in the Norwegian model people can rent out their own, or a part of their apartment alternatively buy one to rent out, if the demand for rental housing goes up. He finds it very important to have a flexible supply on the market by converting ownership into rental housing, since it takes very long time to build and react to the changing market. Even though some people think of this as a speculative market, Lind (2018) does not see anything wrong with the economics of people looking for business opportunities in the Norwegian case. Lindqvist (2018) also agrees that the Norwegians have been smart and very successful in establishing a rental market within the ownership market but emphasizes that Sweden has a different history and a strong tradition of housing policies and the market actors here are conservative when it comes to changing the established system. Lind (2018) also recognizes that the Norwegian rental market is hard to compare to Stockholm, because it is a small market primarily for temporary living. He also mentions that in Norway after the war households received a subsidy if they built a part of their house could be rented out as a separate apartment. Regarding micro housing, it is also important to realize that people do not necessarily need these compact units if they can rent a room in a property or share an apartment with strangers.

Karppinen (2018), Danielsson (2018), Svensson (2018) and Lindqvist (2018) all talk about how a similar system, where people can rent out a part of their property or alternatively rent or buy an apartment together as co-living, could be effective in the Stockholm market. Karppinen (2018) mentions that co-livings are an emerging trend in Stockholm, but it is still somewhat problematic. According to Danielsson (2018) the more conservative landlords usually do not appreciate to have several people on the same contract, just as Karppinen (2018) finds it risky from a developer's perspective on the ownership market. Karppinen (2018) proposes as possibility to rent out a part of a larger apartment that can be separated, then it is possible to fulfill all the regulations regarding space in the main apartment and the floorplan of the rentable area can be freer. Danielsson (2018) finds that Swedes traditionally prefer to have separate kitchen, bathroom and living space and the flat mate concept is not very popular, but Svensson (2018) adds that based on their surveys, people are willing to live in a more collective way.

6.3.2.6 Opportunities

Lind (2018) argues that the low interest rate environment allows to have lower rent levels, because developers does not have to demand a high rate of return. After writing papers on this very topic, he suggests that a real rate of return of 2% would be reasonable for housing projects since the safe real interest rate today is zero resulting in low risk.

Lind (2018) and his co-authors further developed a similar concept to micro housing, called basic housing. They define basic housing as an apartment that is designed for people who want a simple, well-functioning housing with good technical quality that fulfills their basic needs, but want low user costs, because they prefer to spend on other things than housing. He explains that the concept would be suitable primarily for low income households, who want something with minimum facility, looking reasonable good and as cheap as possible given the location. The concept can be applied for any apartment, not just small apartments and it also works for families according to Lind (2018). Regarding sharing economy, he also makes the distinction that basic housing generally does not include additional amenities such as a gym, like some micro housing concepts, because those amenities and services are usually more useful for high income groups. Lind (2018) is convinced that micro apartments could work within the basic housing concept and that the region would benefit from a micro housing solution, he argues that they should be built and be diversified in the city with different price settings depending on the location eliminate segregation. Lind (2018), who is also in the board of this student housing company SSSB, notes that the majority of students in Stockholm prefer to have their own micro unit with a bathroom and kitchen instead of communal kitchens and shared areas, because they usually already have friends and a network from school. Keeping this in mind and the significant student housing shortage, micro apartments would be an optimal solution for Swedish and international students, as well. Danielsson (2018) also confirms that that there will always be demand for small cost-effective apartments.

Similarly to Lind (2018), Anteman Debels (2018) sees great potential in cost effective, small functional apartments. They can provide a housing solution that is affordable for the influx of people in Stockholm who are not highly educated and are expected to have low income jobs. He emphasizes that a key issue, is that the micro units should be mixed with other type of housings and need to be integrated into the larger urban fabric. Anteman Debels (2018) agrees that micro apartments are ideal for rental as most people see as a more temporary, short term solution, but also highlights that they are also a great way to get into the ownership market for younger people who have lower salaries.

Rekdal (2018) claims that there are a lot of inefficiencies in our housing standards today, partially due to regulations. As an example, she mentions that a century ago most apartments did not have kitchens in Stockholm, but people had the option to eat out for very affordable prices which was to some extent a very productive and space effective solution. Rekdal (2018) would like to see more innovative concepts including small housing that propose new ideas to how our housing needs can be met in a reasonable way.

6.3.2.7 Obstacles

One of the main challenges for the development of micro apartments, are the stringent regulations in Sweden regarding space requirements for certain areas and functions of an apartment. Lindqvist (2018) and Svensson (2018) finds that apartments below 25 square meters already face some difficulties with regulations and Karppinen (2018) considers it almost impossible today to build anything that is smaller than 19-20 square meters. He also

warns that the layout of an apartment is often planned just to suits the legislation but not necessarily benefit the person living in it. Rekdal (2018) adds regulations are supposed to protect the interest of people, but often they cause lot of inefficiencies in the housing standards claims. Karppinen (2018) also stresses that it is almost just as expensive to build micro units as conventional units, since the largest construction costs are for kitchens, bathrooms and load bearing walls, which in Sweden traditionally are all separating walls.

All of the interviewees, agreed that micro apartments would be optimal for short term rental as most people do not consider it as a permanent solution or cannot afford to buy an apartment even in the size of a micro unit. Furthermore, Anteman Debels (2018) additionally point out that most people would be hesitant to buy a micro apartment in case the market is not favorable a few years later when they want to resell in the future. He argues that for this reason, renting micro apartments would me much more interesting for most people. In this regard, the rent regulation is a very significant challenge in establishing the concept. Lind (2018) is convinced that it would be a major improvement if only 80% of the housing has to follow the rental regulations, but he finds that there is not much development in this segment in Sweden partially due to the complex party structure. He explains that all the parties avoid being in conflict with interest groups and none of the parties would put the topic on their agenda since they would lose votes in the short run. Danielsson (2018) also agrees that it is time that someone dares to take the risk of making a change. Lind (2018) doesn't think it is realistic that the rent regulation in Sweden will be changed for the existing housing stock but he advocates giving a choice for new construction projects between introducing market rents or using the current collective bargaining system. For a well-functioning micro housing market, Lind (2018) recommends having temporary rental contracts with no right to prolong after expiration to protect the landlords and give the right to tenants to cancel the contract earlier for their security.

Lind (2018) also discusses the unfavorable tendency of people worrying too much about the side effects of square meter prices even though they are irrelevant when comparing apartments, since the more efficient an apartment is, the square meter price will go up, but in total the apartment will be still very affordable. As an example, he mentions an 8 square meters unit in Lund that has probably the highest square meter price in Sweden, but it is still the cheapest apartment you can get.

6.3.2.8 Risks

While in other real estate markets a repeated critique on the concept of micro apartments is the issue of extensive density, Anteman Debels (2018) find that density is not a significant threat for Stockholm. The risks he identifies are the question of location and what happens with these units when the market changes. He explains that he sees a higher chance of building these units in the outskirts of Stockholm instead of central locations and often what happens is that a large number of small units go to people with social problems when the market has a downturn. Regarding the location, Lindqvist (2018) argues that micro apartments would be better suited outside of the central areas as the demand for smaller apartments is greater in lower income areas due to budget constraints.

When discussing potential risks of the concept, Danielsson (2018) mentions that general concern is if people are going to move as much as in recent years, or if this trend is changing due to the increased difficulty of obtaining a mortgage. She also explains that the younger generation does not want to wait two years on a newly built apartment, it is hard for them to understand why they have to wait at all and to commit that long. She argues that this

sentiment could make the second-hand market for tenant owned apartments, more popular again.

One of the risks of new housing project is that it might attracts other people than the anticipated target group as it was the case with Hammerbysjöstad. According to Rekdal (2018) in this project the developers expected empty nesters, older people without cars, but the majority of the buyers ended up being families with children that needed parking spaces, daycare and schools which had a negative effect on the project in the beginning. This example is concerning, because micro apartments barely exist on the market and it is even more difficult to estimate the demand and anticipate the correct target group. Rekdal (2018) also warns that the bad press around projects where developers turn old buildings in central areas into properties with small apartments with very high prices, scares away a large amount of developers.

7 Discussion and Analysis

7.1 Definition of a Micro Apartment

As mentioned in the literature review, micro apartments have no set definition, and vary in size and features depending on the specific housing market. What we can detect from the different studies and from foreign examples is that a micro apartment is more efficient in terms of space than a conventional studio apartment on the respective housing market. Furthermore, they often include built in and flexible furniture adding efficiency to the floorplan and technically advanced solutions adding to the functionality of the unit. The standard of a micro apartment depends on the target group for the individual development, but the building often includes additional amenities depending on the same target group and the price level. These features are highly relevant for the Stockholm housing market and as a part of the Stockholm housing stock we consider a standard micro apartment to be between 18-30 sqm, with an average size of 25 sq. m.

7.2 Target Groups

The main target group for micro apartments are both in accordance to the literature review, Urban Land Institute (2014) and Iglesias (2014) among others, and all of the professionals interviewed, young professionals. The main target group of young professionals were according to Iglesias (2014), in the age between 20 and 30, however, with the high rate of single households in Stockholm, we estimate that the main target group for the region is aged between 20 and 35. Secondary target groups detected were young couples by Urban Land Institute (2014), young couples and older couples who are based in the countryside but want a central overnight apartment and people based in a different city but commuting during the weekdays by Lind (2018) and also by Danielsson (2018). Further, a secondary target groups for the region was in accordance with the interviewed professionals and Iglesias (2014) among others, low income earners, people who often struggle to enter the housing market. We find that the secondary target groups mentioned are all relevant target groups for micro apartments in the Stockholm housing market, however, we do think that the main target group will be dominating the demand for micro apartments due to their proportionally large part of the population and due to the characteristics of a micro apartment.

7.3 Model to Estimate Demand

In order to forecast and estimate a range of the demand for micro apartments, we created a model. The model was used based on three different economic scenarios, in order to detect changes in the demand due to changes in the economy. Further, the model included two different timeframes, short and medium term to forecast the demand for different time periods. We chose to forecast and estimate the demand for only the main target group since we expect, as previously explained, this target group to dominate the demand. Based on the preference of this main target group to live in central locations, we chose to estimate the demand for Stockholm Municipality (instead of county), which is also in line with our findings from the literature review, survey and interviews

7.3.1 Economic Scenarios

As mentioned, in order to detect changes in the demand due to changes in the economy, we used three different economic scenarios for Stockholm, the most likely scenario, a pessimistic

scenario and an optimistic scenario. The variables for the different scenarios, were estimated based on data provided by NIER (2017) Statistikdatabasen, SCB (2018), Mäklarstatistik (2018), Riksbanken and on the economic outlook in this paper.

7.3.1.1 The Most Likely Scenario

The GDP growth was based on the NIER (2017) forecast for 2018-2021. The unemployment level, which is as previously mentioned by Lindqvist (2018) currently very low, was also estimated based on the NIER (2017) forecast. Because it is at a historically low level that would be difficult to further decrease, we estimated it to increase in the short term to then normalize in the medium term, also bearing in mind the large immigration level of the population growth. The inflation is based on the CPIF used by Riksbanken (2017) and what is forecasted between 2018 and 2021 in the NIER (2017) report. In the medium term we estimate the central bank's target inflation level of 2%. Further, the repo rate is based on the NIER (2017) forecast. The nominal interest rate is the sum of the repo rate plus two percentage points which is our assumed margin for the banks. The population is based on statistical data provided by SCB (2018) and the average annual growth in percentage for the region. The number of single households were based on data from Statistikdatabasen, SCB (2018) and as a percentage of the total population, the most likely scenario is based on historical levels. The average price per square meter is based on data provided by Mäklarstatistik (2018) and the short and medium term is based on the ten-year average growth (6,8%), but based on the current dip in the market it is adjusted for a more moderate price increase for the future and we assume a yearly growth of 3%. Furthermore, the total growth of disposable income is based on data from Statistikdatabasen, SCB (2018) on the average growth of the disposable income of all households in Stockholm in the last five years. We then set the typical housing expenditure according to information provided by Lindqvist (2018) and Lind (2018), to 30% of the disposable income. See the estimated number in table 1.

1. Scenario: Most likely		Short-Term	Medium-term
	Year	2018-2021	2022-2028
GDP growth, %		1,88%	1,58%
Unemployment, %		6,33%	6,83%
Inflation, % (CPIF)		1,93%	2,00%
Repo rate, %		0,88%	1,75%
Nominal interest rate, %		2,88%	3,75%
Population in municipality		993 000	1 094 000
Number of single households		208 530	229 740
Average selling price per sqm for one-room apartments, SEK		97 774	115 172
Total growth of disposable income (base year: 2016)		9,15%	25,27%
Qualified Income for a Micro Apartment		504 293	635 754

Table 1. Most Likely Economic Scenario

7.3.1.2 The Pessimistic Scenario

For the pessimistic scenario, we expect a lower GDP growth and a higher percentage of unemployment. The repo rate is estimated to decrease in the pessimistic scenario, which results in an also lower nominal interest rate and the inflation is expected not to reach the target level of 2%. For the population, we estimated 10.000 people less than for the most likely scenario in the short term and 20.000 people less in the medium term. We further expect the percentage of single households to increase compared to the most likely scenario based on the expected additional financial strain on the households causing more separations.

We expect the annual growth for square meter prices to be one percentage point less than for the most likely scenario and for the disposable income we expect five percentage point less than the most likely scenario in the short term and six percentage point less in the medium term. Please see appendix B.

7.3.1.3 The Optimistic Scenario

For the optimistic scenario, we expect a higher growth of the GDP and only a slightly lower percentage of unemployment, because the current low level of unemployment is not likely to decrease significantly more. The repo rate is estimated to increase in the optimistic scenario, which results in an also higher nominal interest rate and we expect the inflation to reach the target level of 2%. For the population, we estimated 10.000 people more than for the most likely case in the short term and 20.000 people more in the medium term. We further expect the percentage of single households to decrease compared to the most likely scenario. We expect the annual growth for square meter prices to be two percentage points more than for the most likely scenario and for the disposable income we expect five percentage point more than the most likely scenario in the short term and six percentage point more in the medium term. Please see appendix B.

7.3.2 Qualified Disposable Income

In order to calculate the disposable income required to cover the cost of a micro apartment we made the following assumptions:

- Size of an average micro apartment is 25 sq. m.
- The price per square meter was based on data for square meter prices for one room apartments in Stockholm, with a forecast based on the historical price development in percentage for the last ten years, from Mäklarstatistik (2018), adjusted for market expectations Lindqvist (2018) and Svensson (2018), further adjustments were made for the pessimistic scenario, one percentage point less and the optimistic scenario, two percentage points more than for the most likely scenario.
- The loan to value (LTV) ratio was set to 85% accordingly to Swedbank (2018), meaning that the buyer makes a 15% down payment.
- Corresponding to the amortization requirement by Swedbank (2018), we assumed a yearly amortization of 2%, making the length of the mortgage life to 50 years.
- As previously mentioned, the interest rate (nominal) was estimated by using the sum of the repo rate and an additional two percentage points, the assumed margin of the banks.
- As previously mentioned, we assume the average spending on housing to be 30 % of the disposable income, Lindqvist (2018) and Lind (2018).
- The size of a mortgage cannot be bigger than five times the annual gross income, Finansinspektionen (2017).

The resulting calculation is seen below in table 2, where the qualified disposable income to buy a micro apartment is 504 293 kr in the short term and 635 754 kr in the medium term for the most likely scenario. The same number for the pessimistic scenario is 479 165 kr in the short term and 581 271 kr in the medium term, see appendix XX. For the optimistic scenario, we calculated 539 438 kr in the short term and 739 279 kr in the medium term, see appendix B.

Housing Costs Calculation (Most likely)	Short-Term	Medium-term
Price per sqm	97 774	115 172
Size	25	25
Price	2 444 350	2 879 310
LTV 85%, down payment 15%	366 653	431 896
Loan	2 077 698	2 447 413
Amortization of loan, 50 years (2% annually)	41 554	48 948
Interest in first year	59 734	91 778
Fee paid to tenant-owned association	50 000	50 000
Expenditures paid by the household per year	151 288	190 726
% Spending of disposable income on housing	30%	30%
Qualified Disposable Income	504 293	635 754

Table 2. Housing Calculation for the Most Likely Economic Scenario

7.3.3 Estimation of Demand

7.3.3.1 Most Likely Scenario

In order to estimate the demand for micro apartments we made the following assumptions for the most likely scenario:

- We used the number of people in the main target group in Stockholm based on SCB data from 2016 and compared that number with the total population in Stockholm in the same year to use that percentage as a benchmark for future years, SCB (2018).
- In order to estimate the number of people with qualified income to live in a micro apartment in Stockholm, we looked at the income distribution for the target age group. We used data from 2016 provided by SCB as a foundation and adjusted the data for the specific time frames based on our forecasts for the disposable income growth.
- We assume that 70% percent of the qualified part of the target group forms a single household. Assumption was based on data from SCB (2018), 44% of all households are single households in Stockholm, and that 21% of the population are single, however we assume that the majority of the single households are in this age group and therefore adjusted the percentage accordingly.
- We further assume that 25% of the remaining group would be interested in a micro apartment based on the survey we conducted, presented previously in the thesis and on the result of the survey conducted by the Urban Land Institute, (2014).
- We assume that only 5% of the those would actually move to a micro apartment in the given time period.
- Additionally, we assume that 10% of the micro apartments will end up being bought or rented by couples, which increases the demand accordingly.

Disposable Income Distribution (Most likely)

Base year	Short-Term	Medium-term	People in income group	
2016	2018-2021	2022-2028	Number	% of total
400-499 tkr	437+ tkr	501+ tkr	48 953	23,08%
500-599 tkr	546+ tkr	626+ tkr	21 467	10,12%
600-799 tkr	655+ tkr	752+ tkr	10 352	4,88%
800-999 tkr	873+ tkr	1002+ tkr	3 358	1,58%
1000+ tkr	1091+ tkr	1253+ tkr	1 608	0,76%

Table 3. Disposable Income Distribution for the Most Likely Economic Scenario

Based on all above stated assumptions and estimations, the range for total demand for micro apartments by main target group in Stockholm municipality in the most likely scenario is between 300 to 400 micro units for the short term and for between 150 and 250 units for the medium term, see table 4.

Micro Housing Demand Calculation (Most likely)		Assumptions	Short-Term	Assumptions	Medium-term
% of population in 2016 (Stockholm Municipality) -> BENCHMARK		23%		23%	
Number of people in the target age group 20-34			225 109		248 005
% of target age group in qualifying income-group		15%		9%	
Number of people in the qualifying income-group and target age-group			33 766		22 320
% single households (no children, no partner in the household)		70%	23 636	70%	15 624
% interested to live in micro apartments		25%	5 909	20%	3 125
% planning to move in given timeframe		5%	295	5%	156
Add back % for couples		10%	325	10%	172
Range for total demand for micro apartments			300-400		150-250

Table 4. Demand Range Calculation for the Most Likely Economic Scenario

7.3.3.2 Pessimistic Scenario

The range of demand was also estimated for the different economic scenarios and timeframes. The demand range mainly differs depending on the varying qualified income, which depends on the given level of interest rate and square meter prices in the specific scenario. Further, the assumptions in the demand calculation are adjusted according to the economic scenario and time frame. The range for total demand for micro apartments by the main target group in Stockholm municipality in the pessimistic scenario is between 450 to 550 micro units for the short term and for between 800 and 900 units for the medium term, see table 5.

Micro Housing Demand Calculation (Pessimistic)		Assumptions	Short-Term	Assumptions	Medium-term
% of population in 2016 (Stockholm Municipality) -> BENCHMARK		23%		23%	
Number of people in the target age group 20-34			222 842		243 471
% of target age group in qualifying income-group		13%		11%	
Number of people in the qualifying income-group and target age-group			28 969		26 782
% single households (no children, no partner in the household)		70%	20 279	75%	20 086
% interested to live in micro apartments		30%	6 084	35%	7 030
% planning to move in given timeframe		7%	426	10%	703
Add back % for couples		15%	490	20%	844
Range for total demand for micro apartments			450-550		800-900

Table 5. Demand Range Calculation for the Pessimistic Economic Scenario

7.3.3.3 Optimistic Scenario

The range for total demand for micro apartments by the main target group in Stockholm municipality in the optimistic scenario is between 250 to 350 micro units for the short term and for between 100 and 200 units for the medium term, see table 6.

Micro Housing Demand Calculation (Optimistic)	Assumptions	Short-Term	Assumptions	Medium-term
% of population in 2016 (Stockholm Municipality) -> BENCHMARK	23%		23%	
Number of people in the target age group 20-34		227 376		252 539
% of target age group in qualifying income-group	16%		8%	
Number of people in the qualifying income-group and target age-group		36 380		20 203
% single households (no children, no partner in the household)	70%	25 466	65%	13 132
% interested to live in micro apartments	20%	5 093	18%	2 364
% planning to move in given timeframe	5%	255	5%	118
Add back % for couples	10%	280	10%	130
Range for total demand for micro apartments		250-350		100-200

Table 6. Demand Range Calculation for the Optimistic Economic Scenario

7.4 The Demand Range

7.4.1 The Most Likely Scenario

The demand range of 300-400 units in the short term and around 150-250 units in the medium term seems reasonable compared to the forecasted size of the population and its share of people in the target age group and relevant income-group. Undoubtedly, these additional units would only cover a small gap in the housing shortage, however they would be the optimal solution for the main target group, who is then enabled to enter the housing market.

7.4.2 The Pessimistic Scenario

Based on our model, we estimate that the range of demand for micro apartments in the pessimistic scenario is moderately higher for the short term and very significantly higher for the medium term compared to the most likely scenario. This seems reasonable based on our previous finding, that housing investment decreases when there is a risk of a rise in unemployment, Jansson (2017). Furthermore, we believe that the average size of investments also decreases in a weaker economic environment and there is a higher risk of further tightening of the amortization and credit requirements, Lindqvist (2018). In this case, less people would be able to pay for their housing costs which would lead to forced downsizing. These factors would increase the demand for micro housing, something also confirmed by Svensson (2018) and Danielsson (2018). Thus, the micro apartments in a worsened economy would not only attract the target groups but reach to new ones. We find the demand range of 450-550 micro units for the short term, and 800-900 units for the medium term, for the main target group in Stockholm Municipality is plausible.

7.4.3 The Optimistic Scenario

Since the optimistic scenario is relatively modest in its assumptions based on the market analysis, economic outlook and the interviews, it is expected that the range of demand for micro apartments in this case are not far from the most likely scenario. It is also reasonable that the range is lower than for the most likely scenario since in an optimistic scenario people are enabled to make larger investments based on the growth in disposable income, and to the fact that the market prices will go up, which increases the hurdle for many in the target group to enter the market. We find the demand range of 250-350 micro units for the short term, and 100-200 units for the medium term, for the main target group in Stockholm Municipality is plausible.

7.4.3.1 Stockholm County and Secondary target groups

The calculated demand ranges are only representing the demand for micro apartments in Stockholm Municipality and only for the main target group, young professionals, with a small

adjustment of ten percent for couples. The total demand for micro housing in the county would be naturally larger and the demand range is further expected to increase when considering the secondary target groups such as over week commuters, low income households, older couples who live in a country home and need or want an overnight apartment in the city and for people in need for a temporary housing solution, such as recently divorced individuals or people coming to Stockholm for relatively short-term work assignments. These different target groups prefer different standards and location of micro apartments. Hence, we see the total demand for micro apartments in Stockholm municipality to be higher when including the secondary target groups independently of the economic scenario. Similarly, we see the total demand for micro apartments in Stockholm County including secondary target groups to be significantly larger than the cases just described, independently of the economic scenario.

7.5 Obstacles on the Market

One of the main challenges for the development of micro apartments is the stringent regulations in Sweden regarding space requirements, for certain areas and functions of an apartment. Lindqvist (2018) and Svensson (2018) finds that apartments below 25 square meters already face some difficulties when it comes to regulations. Karppinen (2018) considers it almost impossible to build anything that is smaller than 19-20 square meters today. He additionally warns that the layout of an apartment often is planned just to suit the legislation, not necessarily to benefit the actual inhabitants of it. The regulations are supposed to protect the interest of people, but Rekdal (2018) claims, that often they cause lot of inefficiencies with the housing standards. Karppinen (2018) additionally stresses that it is almost just as expensive to build micro units as conventional units, since the largest construction costs are the kitchens, bathrooms and the load bearing walls, which in Sweden are traditionally all apartment separating walls. The arguments regarding high building cost is very valid, however one has to consider the lower total cost for the person choosing to live in a micro unit. With this we think that there is a market for micro housing, even if the price per square meter is higher than for a conventional one room apartment, would be attractive on the housing market, although the concept could fill a larger gap on the market if there would be changes or exceptions regarding regulations.

Most of the interviewees agreed that micro apartments would be optimal for short term rental, as most people do not consider it as a permanent solution or cannot afford to buy an apartment even in the size of a micro unit. In this regard, the rent regulation is a very significant challenge in establishing the concept. Especially with the long waiting times for a first-hand contract, which has a negative effect on people arriving in Stockholm and being new to the market, primarily affecting young adults due to their income constraints. A problem that cause lack of financial incentives for to construct additional rental housing as mentioned by Lindbeck (1967) and Wilhelmsson (2011). With the lack of political incentives, the probability of the rental regulations to change is very small. What changes in the rental regulation (perhaps as suggested by Lind (2018), applied only for new construction), could affect the demand for the concept is purely speculative, but we would expect the demand to increase. Further we think that the concept, with changes in rental regulation, would enable more young and low income people to enter the market. This would have positive effect on diversity and a larger potential for the region to further grow.

The third main obstacle are strict financial restrictions that limit households with lower income, particularly young adults to enter the market. Evidens (2017) argued that sharpened

regulations will cause an even bigger gap and inhibit more households from entering the housing market and as a result, they are even more exposed and vulnerable to financial constraints regarding borrowing or amortization conditions. Öst et al. (2014) stresses that the recent tightening of loan restrictions can potentially intensify the unfavorable situation of young and low-income households and thus lead to more housing segregation. As these households are the primary target group for micro apartments, the current financing conditions can negatively affect the development of the micro housing market. Tightening of loan restrictions is a large risk for the entire real estate market, however we see both a risk and an opportunity for the micro housing concept during these conditions. On one hand the demand will grow, since less people will be able to afford the increasing mortgage costs, which will force people to downsize, on the other hand it will become an even larger hurdle for the low-income takers and young adults to enter the market, leading to that the demand shifts, the concept itself to be successful, but not being able to solve the housing problem for young professionals and other groups which further can have a negative effect on the growth for the region.

7.6 Opportunities

We see micro apartments as the housing solution effectively responding to wide range of recent development in society, such as postponed household formation; a growing number of single person households; declining car ownership, especially in younger households; and the spreading tendency for sharing economy and younger households with consequently less personal belongings. These are the main drivers of the demand according to developers in the report by the Urban Land Institute (2014). They are also a solution for the social, economic and personal costs of long commuting according to Haden (2014), who further argued that complemented with more generous common spaces, small units are increasingly attractive. One of the other key advantages of small housing units is that they enable people to enter the ownership market without a very high income as also mentioned by most of our interviewees and a report by Evidens (2016). The concept has also great potential to provide affordable, cost effective, small functional apartments for the influx of people in Stockholm who are not highly educated and are expected to have low income jobs as highlighted by Anteman Debels (2018). Gabbe (2015) points out that tenants of micro-apartment can save about 20-30% of the rent compared to conventional sized apartments in the same neighborhood. It also allows people to buy an apartment who just want a simple, well-functioning housing with good technical quality that fulfills their basic needs, but want low user costs, because they prefer to spend on other things than housing as described by Lind (2018). In agreement with Lind (2018), we also argue that micro housing is a concept that will be significantly more in demand once it is established on the market. As for now, few people are familiar with the concept or knows how it would optimize their life, however, we think that there is a great possibility that when the concept is introduced, people will find it more attractive and will find it easier to relate to.

From a real estate investment point of view, Newsec (2017) confirms that Stockholm is the most attractive investment area in Sweden providing stable returns between 9% and 11% on residential housing with a low level of volatility and Lind (2018) argues that the low interest rate environment allows to have lower rent levels, because developers do not have to demand a high rate of return and suggests that a real rate of return of 2% would be reasonable for housing projects since the safe real interest rate today is zero resulting in low risk. Regarding micro apartments specifically, the Urban Land Institute (2014) found that micro units outperform conventional units in the US housing market indicated by higher occupancy rates

and higher rent per square foot. They admit that it is difficult to determine if this performance is driven by the shortage of these units or whether a great demand actually exists for a possible tradeoff and pay more per square foot in exchange for a desirable location and better amenities. Even though these are great opportunities, we think that the investment incentive on the Stockholm market is highly dependent on the previously mentioned rental regulations. Even though the investment would be profitable it is more likely for investors to go for higher yielding projects than rental real estate.

It is widely known that Stockholm is one of the world leaders when it comes to IoT (internet of things - such as autonomous cars, wearables, smart home systems etc.) and it provides the second largest tech hub while Sweden has the highest spending per capita on research and development as mentioned Business Sweden (2018). Since one of the key factors in cultivating business opportunities in city is having a well-functioning housing market, we think that the Stockholm housing market with its extensive housing shortage would highly benefit from a smaller housing class such as micro apartment. We further think that recruitment of foreign talent would be much easier, and that Stockholm enables a stronger community of young professionals, which would foster further creativity and innovation. Providing an effective housing solution for the people coming to Stockholm to work in these industries would significantly improve the future economic growth the city and it would eliminate the risk of companies leaving Stockholm for places with higher growth potential due to a more efficient housing and labor market. However, there is a risk that due to the long planning and construction times, the concept is introduced on the market after companies have relocated from Stockholm and established themselves in competing regions, which will lead to a lost opportunity.

7.7 Risk Regarding Micro Apartments

One of the risks of introducing a new housing concept on the housing market is that it might attract other people than the anticipated target groups. This is problematic since that group of people could have very different preferences compared to the anticipated target groups, in terms of onsite and offsite amenities and infrastructure. In order for the concept to function, these amenities then require adjustments to meet the actual preferences. To change these amenities is monetary costly as well as time consuming.

As the result of the demand calculations showed, the demand shifts significantly depending on different financial scenarios, with the very long project times of ten years, it is a risk that the units planned might form an over or an under supply when they are then constructed. An oversupply could potentially lead highly discounted prices, which could lead to the units creating a new slum area. An undersupply of micro apartments will perhaps not create any harm, but it could lead to further segregation and an increasing difficulty for people to enter the housing market.

Another risk is that people get discouraged by the high square meter prices, although they are according to Lind (2018), irrelevant. The square meter price might be higher however, when looking at the total cost calculations, the costs are lower for a micro apartment than for a conventional studio apartment.

7.8 Micro Recommendations

For the specific target group of young professionals in the age group of 20-35 and keeping in mind the results of the extensive consumer research of Urban Land Institute (2014) we

strongly recommend walkable, popular urban areas as locations for micro apartments, possibly in the core of a relatively expensive housing market. The reason is that multiple research has shown that people are prioritizing location and affordability to space, Potikyan (2017). Steven & Honig (2016) and Barrionuevo (2016) discuss that people considering sacrificing space in order to live in a central location will use the urban amenities such as, museums, cafes, restaurants, parks etc. as their living space. Otherwise, the proximity to public transportation and grocery stores are the factors that were very important for most respondents and proximity to green space was important for 99% of the respondents in the survey we conducted. We agree with most of our interviewees that it is vital to mix micro apartments with other types of housing solutions and integrate them in the urban fabric to promote diversity. Furthermore, even though we limited our focus on the above-mentioned target group, there should be a variety of micro housing solutions for different target groups which will also determine the optimal location, size and standard of the unit. We further believe in importance of design and efficient floor plans when planning micro apartments. Based on our survey, built-in storage was the only apartment feature that the majority saw as very important (53%) and it is by far the most significant element that can make a micro unit more efficient and functional.

Regarding the amenities often included in the price of a micro apartment, we believe that only the necessities should be offered. Nevertheless, laundry rooms, some storage and at least some type of community space inside or outside of the building are essential based on our findings. This is in line with the recommendations of Waite (2015), Steven & Honig (2016) and Barrionuevo (2016) and it is also supported by the survey we conducted, where laundry room was the only on-site amenity, that the majority of the respondents found very important (76%). The most undesirable features of the concept, is less space to host guests (57%) according to the respondents of our survey, so at least one attractive community room could combat that concern.

We agree with Lind (2018) that too expensive amenities, such as lobby, gym or too many shared spaces can defeat the purpose of the concept and can end up making the micro apartment more expensive than a conventional one. The largest group of respondents, 35% answered that they were only interested in micro housing if the running costs of a micro apartments is 20-30% lower than for a conventional apartment. Building in some type of flexibility into the concept can be also very beneficial. We would suggest to follow the recommendation highlighted by the Urban Land Institute (2014), that some developers are building micro units with the possibility to be turned into a more conventional one- or two-bedroom apartment by joining them in the future if the housing demand changes significantly. These concepts might cost more effort to plan, but we are convinced that housing solutions should be flexible to have as much longevity as possible, which also makes them very sustainable. Recognizing that bad press and generally negative associations with micro apartments can be a huge issue, we would additionally recommend, developers to pay additional attention on the marketing of their proposal, which could potentially start with not branding the concept as “micro” apartment and also communicating effectively with the public about the advantages and risks of the concept to reduce misconceptions.

8 Conclusions

To conclude, the main drivers of micro housing, such as the increasing number of single households, rising housing prices, the establishment of sharing economy in more areas of life and generally later household formation are expected to continue developing according to the current progress. These factors are expected to further increase the demand for alternative housing solutions such as micro apartments in the future on the Stockholm housing market. Based on the mentioned market drivers, micro apartments would fill in a considerable share of the rising demand on the housing market, but they are not expected to provide a holistic solution for the severe housing shortage in Stockholm. As a result, we found that the range of total demand for micro apartments by the main target group in Stockholm municipality in the short term is expected to be between 300 to 400 micro units in the most likely scenario, between 450 to 550 in the pessimistic scenario and between 250 to 350 micro units in the optimistic scenario. For the medium term, the demand is expected to be between 150 and 250 units in the most likely scenario, between 800 and 900 units in the pessimistic and between 100 and 200 units in the optimistic scenario.

To optimize the concept, micro units should be integrated evenly into the urban fabric and mixed with other housing solutions to avoid segregation and excessive density. It is recommended that various types of micro apartments should be planned in different locations to promote diversity and serve wide ranging target groups. As young adults with relatively low income could benefit the most from the concept, we strongly believe that the easing of rental regulations would greatly benefit this segment of the population. Furthermore, providing more housing supply and facilitate their access through more rental options for foreign professionals attracted by Stockholm based companies would enhance business opportunities and promote economic growth in the future.

We also see it as the duty of political parties, the municipality and urban planners to take on the social responsibility to plan for future needs and demand instead of focusing on supplying a specific number of units. They also have to guide developers based on the best interest of the population and make adjustments to the regulations if necessary. Speculating about the future, we may also consider the application of micro housing for a larger part of the urban population, such as the elderly, poor and refugees. Micro apartments could also provide means to work towards social inclusion and counteract social exclusion and alienation. Furthermore, they can provide a social context for people since they share parts of their living space with others, while retaining their small private space.

The Stockholm housing market could greatly benefit from further research of the topic of micro housing and the appropriate establishment of this housing solution. Primarily, we recommend conducting case studies of already successful projects adopting micro housing and to conduct a similar survey to the one we did on consumer preferences regarding micro units on a bigger scale. Furthermore, in-depth research on the possible adjustment of the rental regulation allowing more exceptions would be of high importance in addition to analyzing the concept's implications for sustainability and energy efficiency in housing.

9 Limitations

Since housing markets are unique for a specific area, this research is limited to Stockholm County housing market and for the demand range calculations to Stockholm Municipality. In order to estimate demand for micro apartments, data and empirics were collected through interviews with market actors, questionnaire and through data on demographics. The market actors were limited to developers, real estate economic experts, real estate market analysts, political advisors and relocation companies. Further, the questionnaire was spread through the authors Facebook and LinkedIn accounts, which limited the distribution of the survey. This affected both the number of respondents, leading to a small sample and the distribution to become uneven. With this, the data and findings from the sample cannot be used as a proxy for the market, however the result was used as an indicator of the market. In order to be more specific we limited the target groups to the main category, young professionals, aged between 20 and 35. The concept however, as mentioned in the research, is also applicable for other target groups. We additionally chose not to do a long-term forecast for the demand for micro housing, this due to the high uncertainty of the market and the constant fluctuations. Market outlooks should be conducted multiple times a year in order to accurately estimate the market demand.

Due to the lack of previous research, ideally, we would follow the development of the micro apartment market in Stockholm for a longer period of time, this is however not achievable due to the limited time.

Despite the focus on the Stockholm housing market, we are confident that the resulting model would be applicable, with adjustments for specific market characteristics, for other housing markets.

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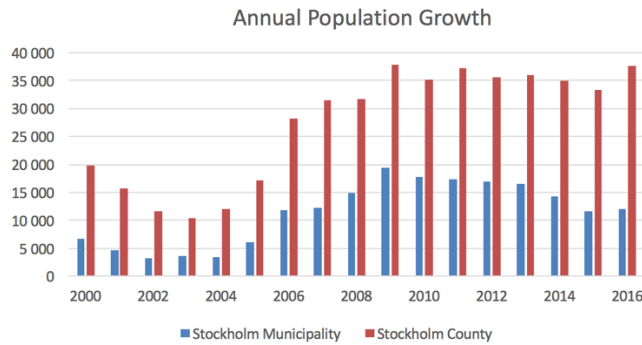
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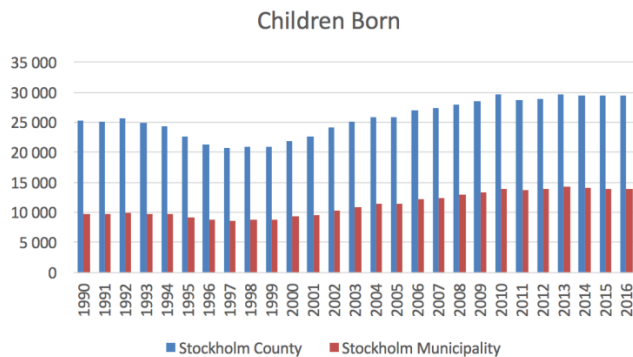
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Appendix A - Statistical Data

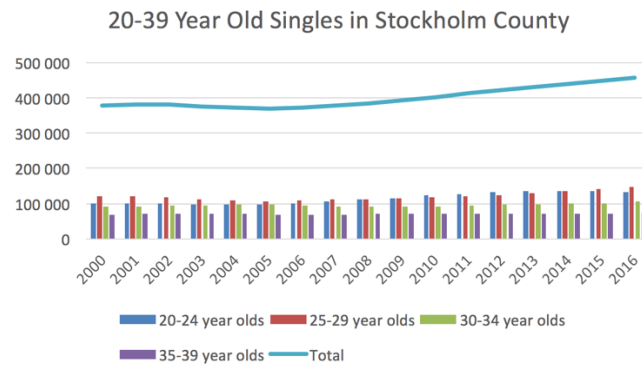
Graph A.1. Annual Population on Growth in Stockholm Municipality and Stockholm County



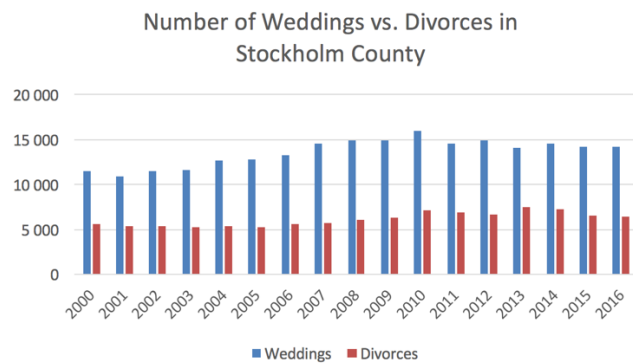
Graph A.2. Number of Children Born in Stockholm Municipality and Stockholm County



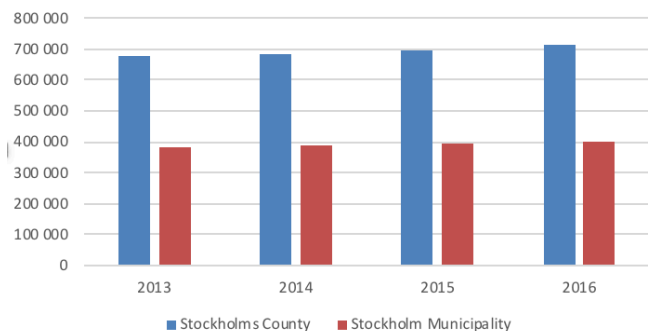
Graph A.3. Number and Age Distribution of 20-39 Year Old Singles in Stockholm County



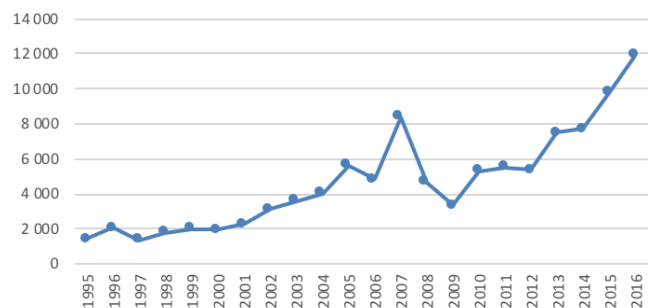
Graph A.4. Number of Weddings and Divorces in Stockholm County



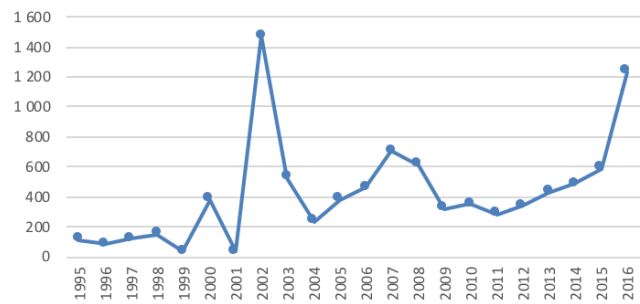
Graph A.5. Number of Apartments in Stockholm Municipality and Stockholm County
Apartment Stock



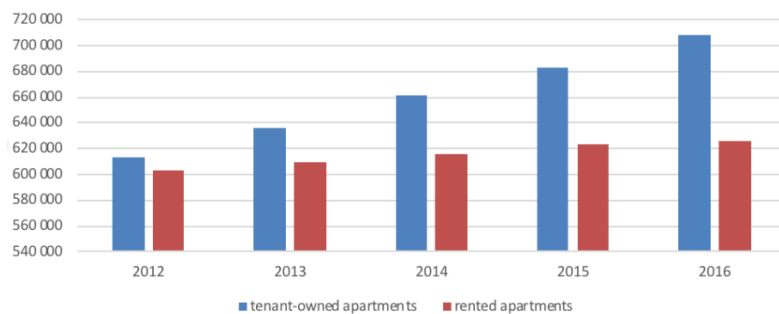
Graph A.6. Number of Apartments Constructed in Stockholm County
Apartments Constructed in Stockholm County



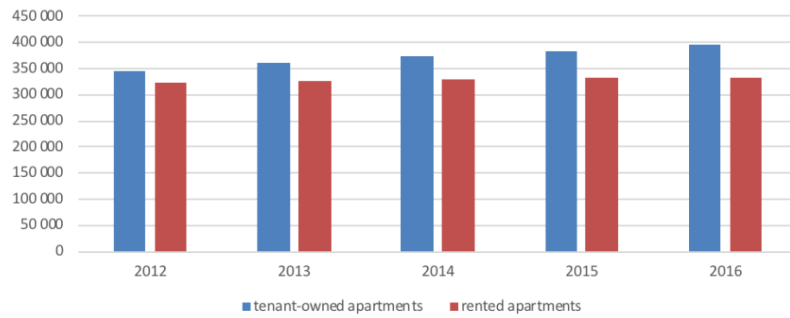
Graph A.7. Number of Apartments Constructed in Stockholm Municipality
Apartments constructed in Stockholm Municipality



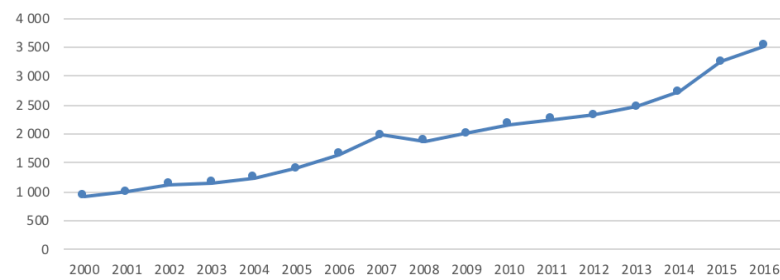
Graph A.8. Number of Tenant Owned and Rental Apartments in Stockholm County
Stockholm County



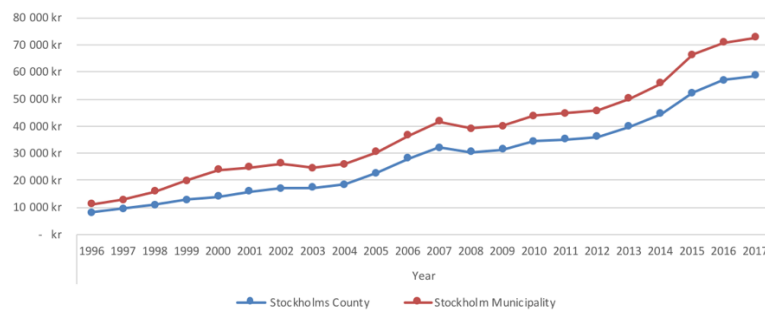
Graph A.9. Number of Tenant Owned and Rental Apartments in Stockholm Municipality
Stockholm Municipality



Graph A.10. Average Price of an Apartment in Stockholm County, in 1000 SEK
Price development - Average Price for apartments in thousands
krona for Stockholm County



Graph A.11. Average Square Meter Price in Stockholm Municipality and Stockholm County
Average sqm price



Appendix B - Model to Estimate Demand Range

Table B.1. Pessimistic Economic Scenario

2. Scenario: Pessimistic		Short-Term	Medium-term
	Year	2018-2021	2022-2028
GDP growth, %		1,48%	0,88%
Unemployment, %		7,18%	7,93%
Inflation, % (CPIF)		1,83%	1,73%
Repo rate, %		0,63%	1,50%
Nominal interest rate, %		2,63%	3,50%
Population in municipality		983 000	1 074 000
Number of single households		216 260	236 280
Average selling price per sqm for one-room apartments, SEK		95 389	106 423
Total growth of disposable income (base year: 2016)		4,15%	19,27%
Qualified Income for a Micro Apartment		479 165	581 271

Table B.2. Housing Calculation for the Pessimistic Economic Scenario

Housing Costs Calculation (Pessimistic)	Short-Term	Medium-term
Price per sqm	95 389	106 423
Size	25	25
Price	2 384 728	2 660 565
LTV 85%, down payment 15%	357 709	399 085
Loan	2 027 019	2 261 480
Amortization of loan, 50 years (2% annualy)	40 540	45 230
Interest in first year	53 209	79 152
Fee paid to tenant-owned association	50 000	50 000
Expenditures paid by the household per year	143 750	174 381
% Spending of disposable income on housing	30%	30%
Qualified Disposable Income	479 165	581 271

Table B.3. Disposable Income Distribution for the Pessimistic Economic Scenario

Disposable Income Distribution (Pessimistic)

Base year	Short-Term	Medium-term	People in income group	
			Number	% of total
2016	2018-2021	2022-2028		
400-499 tkr	417+ tkr	477+ tkr	48 953	23,08%
500-599 tkr	521+ tkr	596+ tkr	21 467	10,12%
600-799 tkr	625+ tkr	716+ tkr	10 352	4,88%
800-999 tkr	833+ tkr	954+ tkr	3 358	1,58%
1000+ tkr	1041+ tkr	1193+ tkr	1 608	0,76%

Table B.4. Demand Range Calculation for the Pessimistic Economic Scenario

Micro Housing Demand Calculation (Pessimistic)	Assumptions	Short-Term	Assumptions	Medium-term
% of population in 2016 (Stockholm Municipality) -> BENCHMARK	23%		23%	
Number of people in the target age group 20-34		222 842		243 471
% of target age group in qualifying income-group	13%		11%	
Number of people in the qualifying income-group and target age-group		28 969		26 782
% single households (no children, no partner in the household)	70%	20 279	75%	20 086
% interested to live in micro apartments	30%	6 084	35%	7 030
% planning to move in given timeframe	7%	426	10%	703
Add back % for couples	15%	490	20%	844
Range for total annual demand for micro apartments		450-550		800-900

Table B.5. Optimistic Economic Scenario

3. Scenario: Optimistic		Short-Term	Medium-term
	Year	2018-2021	2022-2028
GDP growth, %		2,28%	2,28%
Unemployment, %		6,20%	6,20%
Inflation, % (CPIF)		2,0%	2,0%
Repo rate, %		1,13%	2,00%
Nominal interest rate, %		3,13%	4,00%
Population in municipality		1 003 000	1 114 000
Number of single households		200 600	222 800
Average selling price per sqm for one-room apartments, SEK		102 686	134 732
Total growth of disposable income (base year: 2016)		14,15%	31,27%
Qualified Income for a Micro Apartment		539 438	739 279

Table B.6. Housing Calculation for the Optimistic Economic Scenario

Housing Costs Calculation (Optimistic)	Short-Term	Medium-term
Price per sqm	102 686	134 732
Size	25	25
Price	2 567 150	3 368 309
LTV 85%, down payment 15%	385 073	505 246
Loan	2 182 078	2 863 063
Amortization of loan, 50 years (2% annualy)	43 642	57 261
Interest in first year	68 190	114 523
Fee paid to tenant-owned association	50 000	50 000
Expenditures paid by the household per year	161 831	221 784
% Spending of disposable income on housing	30%	30%
Qualified Disposable Income	539 438	739 279

Table B.7. Disposable Income Distribution for the Optimistic Economic Scenario

Disposable Income Distribution (Optimistic)				
Base year	Short-Term	Medium-term	People in income group	
2016	2018-2021	2022-2028	Number	% of total
400-499 tkr	457+ tkr	525+ tkr	48 953	23,08%
500-599 tkr	571+ tkr	656+ tkr	21 467	10,12%
600-799 tkr	685+ tkr	788+ tkr	10 352	4,88%
800-999 tkr	913+ tkr	1050+ tkr	3 358	1,58%
1000+ tkr	1141+ tkr	1313+ tkr	1 608	0,76%

Table B.8. Demand Range Calculation for the Optimistic Economic Scenario

Micro Housing Demand Calculation (Optimistic)	Assumptions	Short-Term	Assumptions	Medium-term
% of population in 2016 (Stockholm Municipality) -> BENCHMARK	23%		23%	
Number of people in the target age group 20-34		227 376		252 539
% of target age group in qualifying income-group	16%		8%	
Number of people in the qualifying income-group and target age-group		36 380		20 203
% single households (no children, no partner in the household)	70%	25 466	65%	13 132
% interested to live in micro apartments	20%	5 093	18%	2 364
% planning to move in given timeframe	5%	255	5%	118
Add back % for couples	10%	280	10%	130
Range for total annual demand for micro apartments		250-350		100-200

Table B.9. Disposable Income Distribution by Age in 2016 (Base Year) in Stockholm Municipality

Disposable Income Distribution by Age in 2016, Stockholm Municipality

Age-Group	20-24 years	25-29 years	30-34 years	20-34 years	
Income Group					
1-19 tkr	4 603	2 950	1 815	9 368	
20-39 tkr	3 824	2 536	1 517	7 877	
40-59 tkr	3 997	2 713	1 554	8 264	
60-79 tkr	3 511	2 580	1 484	7 575	
80-99 tkr	3 968	2 882	1 492	8 342	
100-119 tkr	2 780	3 010	1 869	7 659	
120-139 tkr	2 824	2 719	1 637	7 180	
140-159 tkr	2 602	2 630	1 676	6 908	
160-179 tkr	2 461	2 723	1 854	7 038	
180-199 tkr	2 346	2 673	2 117	7 136	
200-219 tkr	2 210	2 683	2 169	7 062	
220-239 tkr	2 227	2 874	2 394	7 495	
240-259 tkr	2 195	3 169	2 731	8 095	
260-279 tkr	2 020	3 451	2 944	8 415	
280-299 tkr	1 773	3 758	3 331	8 862	
300-319 tkr	1 489	4 215	3 699	9 403	
320-339 tkr	1 254	4 473	3 859	9 586	
340-359 tkr	924	4 580	4 087	9 591	
360-379 tkr	629	4 284	4 044	8 957	
380-399 tkr	474	3 943	3 918	8 335	
400-499 tkr	1 007	10 910	15 569	27 486	
500-599 tkr	199	3 253	7 663	11 115	
600-799 tkr	104	1 667	5 223	6 994	
800-999 tkr	16	368	1 366	1 750	
1000+ tkr	20	331	1 257	1 608	
Total	49 457	81 375	81 269	212 101	
400+ tkr	Qualified	1 346	16 529	31 078	48 953
	% of Total	3%	20%	38%	23%
500+ tkr	Qualified	339	5 619	15 509	21 467
	% of Total	1%	7%	19%	10%
600+ tkr	Qualified	140	2 366	7 846	10 352
	% of Total	0,3%	3%	10%	5%
800+ tkr	Qualified	36	699	2 623	3 358
	% of Total	0,1%	0,9%	3,2%	1,6%

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