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Estimating the effect of being close to outdoor activities on cottage prices: The case of Northern Finland before and after Covid-19

Department of Economics

Master's thesis

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In the beginning of 2020, a global pandemic Covid-19 spread around the world, affecting people's lives in multiple ways. In addition, many of the global and local markets were impacted, for example the real estate markets. In this thesis the changes the cottage real estate markets of Northern Finland have experienced are examined by looking at cottage prices per square meter before and after the pandemic. Northern Finland is defined as the entire area of Lapland and the municipalities of Kuusamo and Pudasjärvi. Nature is abundant in Northern Finland and urban areas are scarce, and most of the popular activities are outdoor activities: in winter downhill skiing and Nordic skiing and in summer hiking and mountain biking.

The purpose of this thesis is to look into if in Northern Finland Covid-19 has impacted the price per square meter of cottages near Nordic skiing, hiking and mountain biking -tracks differently than of cottages near downhill skiing locations. The topic of cottages, which are sometimes also called second homes or free-time residences, and especially cottage prices has not been widely researched in the past, and seemingly not at all in Northern Finland. This thesis aims to add to the topic of cottage real estate prices and to start the research on the topic in Northern Finland.

Difference-in-Difference analysis is used as the analysis method, to find if there have been differences in reactions to Covid-19 between cottages in different locations. The model created derives also from the theory of hedonic price model, as a basis for how to estimate the effect on price of attributes external to the properties. For the analysis data on cottage sales in Northern Finland from 2017 to 2021 was received from the Federation of real estate agency in Finland.

It was found that in answer to the research question, the connection between Covid-19 and cottage price per square meter seems to be heterogeneous based on how close to it is to which outdoor activities. Being near downhill skiing activities seems be associated with higher cottage price per square meter, and the price would seem to increase even more when the cottage is near both downhill and Nordic skiing. This was found to apply both before and after Covid-19, but the estimates increased significantly after Covid-19. The estimates for being only near Nordic skiing were found not to be statistically significant post-pandemic, but there is an indication that being only near Nordic skiing is associated with slightly lower cottage prices after Covid-19. Indications were also found that there are differences between different areas in the connection between price per square meter and cottage location in relation to outdoor activities.

Key words: cottages, second home, real estate market, Covid-19, pandemic, difference-in-difference

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Vuoden 2020 alussa maailmanlaajuinen pandemia Covid-19 levisi ympäri maailman, vaikuttaen ihmisten elämään monin eri tavoin. Samoin pandemia vaikutti eri markkinoihin, esimerkiksi kiinteistömarkkinoihin. Tässä tutkielmassa tutkitaan millaisia muutoksia pohjoisen Suomen asuntomarkkinat ovat kokeneet, tarkastelemalla mökkien neliöhintoja ennen ja jälkeen pandemian. Tutkielmassa määritelmä pohjoinen Suomi sisältää koko Lapin alueen, sekä Kuusamon ja Pudasjärven kunnat. Luonto on tarjolla ja saatavilla suurissa määrissä pohjoisessa Suomessa, ja suurin osa suosituista aktiviteeteista ovat ulkoilma-aktiviteetteja: talvella laskettelu ja murtomaahiihto, ja kesällä vaeltaminen ja maastopyöräily.

Tämän tutkielman tarkoituksena on selvittää, onko Covid-19 vaikuttanut pohjoisessa Suomessa eri tavoin mökkien neliöhintoihin, riippuen siitä onko mökki lähellä lasketteluaktiviteetteja vai murtomaahiihtoa. Mökkien, tai vapaa-ajan asuntojen, hintoja ei ole aikaisemmin tutkittu paljoa, etenkään pohjoisen Suomen aluerajauksella tehtyjä tutkimuksia ei löydy. Tämän tutkielman tavoitteena on myös jatkaa mökkejä ja niiden hintoja koskevaa tutkimusta, sekä aloittaa mökkien hintojen tutkiminen pohjoisessa Suomessa.

Analyysimenetelmänä käytetään Difference-in-Difference analyysiä, eri aktiviteettien läheisyydessä olevien mökkien neliöhintojen muutosten eroavaisuuksien tarkasteluun. Käytetty malli pohjaa myös hedonisen hintamallin teoriaan mökkien itsensä ulkopuolisten ominaisuuksien, sijainnin, vaikutuksen neliöhintaan arvioimiseksi. Analyysia varten käytetään Kiinteistönvälittäjien Keskusliitolta saatua data pohjoisessa Suomessa myydyistä mökeistä, vuosien 2017–2021 välillä.

Vastauksena tutkimuskysymykseen analyysissa havaittiin, että Covid-19:ta yhteys eri sijainneilla olevien mökkien neliöhintoihin vaikuttaisi olevan heterogeeninen. Lasketteluhissien läheisellä sijainnilla vaikuttaisi olevan yhteys korkeampiin mökkihintoihin, etenkin jos mökki on lähellä sekä lasketteluhissejä että hiihtolatuja. Tämän havaittiin pitävän paikkansa sekä ennen että jälkeen pandemian, joskin pandemian jälkeen estimaatit kasvoivat merkittävästi. Estimaatit hiihtolatujen läheisyydelle lasketteluhissien ollessa kaukana eivät olleet pandemian jälkeiselle ajalle tieteellisesti merkitseviä. Mutta vaikuttaisi siltä, että pandemian jälkeen vain hiihtolatujen läheisyydessä sijaitsevat mökit ovat yhteydessä matalampiin neliöhintoihin kuin ennen pandemiaa. Tutkimuksessa havaittiin myös, että eri alueiden välillä saattaa olla eroja ulkoilma-aktiviteettien ja mökin hinnan välisessä yhteydessä.

Avainsanat: mökit, asuntomarkkinat, kiinteistömarkkinat, Covid-19, pandemia, difference-in-difference

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Introduction

In early 2020 the world was impacted by a serious pandemic, often called Covid-19. Covid-19 is an infectious disease with flu-like symptoms, which in many cases spreads easily and the more severe cases affect especially people's lungs (WHO 2022). The pandemic has affected the world in many aspects, from peoples' personal lives to the global economy. For example in the real estate markets, in the beginning of the pandemic the real estate prices dropped in most areas, and the recovery has taken different paces in different areas (Battistini et al. 2021; Deghi et al. 2022). The reasons for real-estate markets' fluctuations due to Covid-19 can be varied, and the effects can be different in different countries, sectors, and climates (Battistini et al. 2021). Covid-19 might also have affected peoples' preference for free time activities. For example, since the pandemic started, in cities and countries where it has been allowed, such as Sweden and Finland, more people have been participating in outdoor recreational activities (Beery et al. 2021, p. 19). Increased participation in outdoor activities can be an indication of realized and increased preference for outdoors.

This thesis considers these three topics: Covid-19, a real estate market, and people's desire to spend time outdoors. More specifically, the main interest in this thesis is how Covid-19 has affected the prices per square meter of cottage listings near different outdoor activities in Northern Finland. Here "Northern Finland" refers to the whole area of Lapland, and the municipalities of Kuusamo and Pudasjärvi. Lapland is a vast area in Northern Finland, covering 25.7% of the area of Finland (National Land Survey of Finland 2022), the northernmost quarter of Finland, and it includes several municipalities within itself. Kuusamo and Pudasjärvi are municipalities in Northern Finland right below Lapland, just being left outside the geographical border of Lapland.

This specific area was chosen as it is the part of Northern Finland that has arctic fells. There are no more arctic fells south of Pudasjärvi, the southernmost municipality of this study, as it is the home of the most southernmost arctic fell in the Finland (Pudasjärven kaupunki: Iso-Syöte). The presence of arctic fells in the landscape is important in this thesis because the main outdoor activities considered in this thesis are downhill and Nordic skiing. Two snowless activities popular in Northern Finland, hiking and mountain biking, are also included in the scope. But as these activities use for the most part the same tracks that are in winter Nordic skiing tracks (InfoGis), and the thesis focuses

specifically on the locations and tracks in which the activities are executed, hiking, mountain biking and Nordic skiing are bundled into one activity group. For simplicity, in the thesis this bundle of activities is referred to by mentioning Nordic skiing only.

The aim in this thesis is to discover how the prices of cottage listings in near proximity to downhill skiing and the activity bundle referred to as Nordic skiing have changed since Covid-19 in relation to each other, after. For example, if since Covid-19 the prices of cottages near downhill skiing slopes have changed more or in a different direction than the prices of cottages near Nordic skiing tracks, or perhaps the other way around. The research question of this thesis is:

"In Northern Finland, has Covid-19 impacted the prices of cottages near Nordic skiing (and hiking and biking) tracks differently than cottages near downhill skiing locations?"

In addition to the main question, further points of interests in this thesis are: What attributes are most significant for cottage prices before and after Covid-19? Is the proximity to outdoor activities a significant variable affecting cottage prices? Based on the cottage prices, does the interest in different outdoor activities vary in different locations in Northern Finland? Has this changed on the municipality-level since the start of Covid-19?

To find answers to the points of interest, in this thesis the changes in connections between different factors and the square-meter prices of cottages are looked at, based on a Difference-in-Difference (DiD) analysis modification. The regression model is based on the hedonic price model, based on which effects on price of different distances to downhill and Nordic skiing activities are measured. For example Gnagey & Grijalva (2018) and Parent & Vom Hofe (2013) have previously derived from Rosen (1974) amongst others when considering the effect of outdoor activities' proximity on housing prices in a hedonic model. The DiD analysis setting enables modelling for the changes of effect of proximity to these activities, before and after Covid-19. In the DiD analysis the treatment is defined with a binary variable based on the date of the sale of the cottage, treatment starting when Covid-19 can be seen to start impacting the cottage real estate market in Finland. DiD analysis has also been used for example to inspect the effect Covid-19 has had on the number of preterm births (Oakley et al. 2022), trust in government (Oude Groeniger et al. 2021) and housing prices (Wang 2022). Price per sqm was chosen as the main variable to keep the prices of cottages comparable.

This thesis also fits into the research on second home and cottage real estate markets. This topic has been studied mostly from the perspective of tourism, development of rural areas and reasons for visiting cottages, for example Strandell & Hall (2015) have studied the relationship between the surroundings of the cottage users' permanent home and cottage use as a reason for cottage use in Finland. The perspective of price formation has not been much studied especially in the Nordics. However, some studies on the prices have been done, for example Soguel et al. (2008) have studied in the Swiss Alps the differences in hedonic implicit prices for landscape quality between tourists and residents. Kauppila is one of the most significant single contributors to the research on tourism specifically in Northern Finland, having studied for example the locations of cottage owner's permanent homes and their reasons for visiting peripheral resorts (Kauppila 2008; 2010b), cottage and resort tourism and regional development (Kauppila 2009; 2010a; 2011; Kauppila & Saarinen 2008) and the changing functions of peripheral resorts (Kauppila 2006). However, Kauppila too has not studied specifically the prices of the cottages. As the area is still little studied, this thesis also aims to contribute insights into the cottage real estate markets of Northern Finland.

The thesis is divided into four main chapters. In the first chapter background and previous studies of the cottage markets in Northern Finland and globally are looked at, starting with who visits Northern Finland and why, then considering what factors affect the cottage prices and finally looking at cottage owners and reasons for owning one. In the second chapter first the empirical theory and second the empirical analysis relevant for this thesis are explained. The chapter starts with the basic theory of the hedonic price model, or how external factors become a part of the price formula, and then the theorical background of Difference-in-Difference (DiD) analysis are explained. Then the means and method, or the data and the model, used are explained. An in-depth overview is given of what kind of data is used and what kind of a model is formed, basing on the theory explained in the beginning of the chapter. Then in chapter three the results of the conducted analysis are given, explained, and discussed after which finally in chapter four are given the summary and main conclusions of this thesis.

1 Cottage real-estate markets in Northern Finland

According to Official Statistics of Finland (OSF) in 2021 there were 48,267 cottages in Northern Finland. In this first chapter previous literature on the properties of Northern Finland and their users is examined. Chapter 1.1 starts by looking into who visits Northern Finland and why, laying the basis for understanding demand in the northern Finnish cottage market. The visitors and visitor segments, nature as an attraction, and the outdoor activities' appeal are considered in separate sections. The terms "tourists" and "visitors" refer here as well as the rest of this thesis to all the people who do not live primarily in the property they are visiting. These tourists can either own or rent the property they visit. Next in chapter 1.2 the cottage price function comes into play. There a deeper look is taken into how different factors affect property prices, according to previous literature. The factors considered are divided into sections as per following: nature, outdoor activities, other factors such as cottages' internal attributes, and finally price shocks caused by pandemics. Then finally chapter 1.3 looks into the cottages of northern Finland, and who owns them and why. The cottages and their owners are looked at first and after this, cottages are looked at as a revenue generating investment.

1.1 Visiting northern Finland

1.1.1 The visitors

Konu et al. (2011) established six customer segments for domestic tourists visiting Finnish Lapland: passive tourists, cross-country skiers, want-it-all, all-but-downhill skiing, sports seekers, and relaxation seekers. These segments were created on the account of which amenities of the ski centers the tourists preferred. Passive tourists are those that arrive to the destination without an active interest or participation for the choice of destination. Children and people travelling with friends, that do not seem to be particularly interested in any of the possible amenities fall under this category. Cross-country skiers are the tourists whose preferences focus mainly on cross-country skiing. Want-it-all tourists have strong preferences for all possible amenities. All-but-downhill-skiing tourists don't show a preference for downhill skiing, but all other amenities are important to them. Sports seekers show a strong preference for all sporting activities, namely downhill and cross-country skiing, but don't value other services such as spas or

restaurants highly. And finally, the relaxation seekers are the inverse: they strongly prefer the restaurant, spa and social services but are not interested in sporting activities.

The number of foreign tourists visiting Northern Finland has increased relatively steadily from the beginning of this millennium until March 2020. In 2017, 2018 and 2019, 50 to 53 per cent of the yearly visiting tourists were foreign tourists. The relative number of foreign tourists varies between the peak winter months and the rest of the year. From 2017 to 2019 December through February of the tourists in Northern Finland 70 to 80 per cent were foreigners and the same applied still to January and February of 2020. In 2017 to 2019 in the other months the relative number of foreign tourists has varied between 15 to 55 per cent. After March 2020 the number of foreign tourists has fallen to 10 per cent and less. Most of the foreign tourists come from other European countries, but the number of Asian tourists has been on the rise. In 2017 to 2020 approximately 17 per cent of the foreign tourists came from Asian countries and over 70 per cent came from other European countries. Germany, France and Great Britain are the most notable single countries from which foreign tourists arrive to Northern Finland. (Official Statistics of Finland (OSF): Accommodation Statistics 2021.)

The monetary value of foreign tourists to overall Finland is also significant. In the year 2018 foreign tourists contributed 3,1 billion Euros to Finnish travel and hospitality market. Out of 2.9 million holidays foreign tourists had in Finland in 2018, about 600 000 or 21 per cent took place in Lapland. (Visit Finland 2019.) In northern Finland these visitors are concentrated in specific months, with some months seeing a lot of tourists and others barely any. During 2019, the most recent pre-Covid-19 year, of the registered overnight stays in Lapland 23 per cent occurred during the summer months from May to August, 10 per cent during the non-snowy autumn months from September to October, and the rest 67 per cent during the skiing season. Thus, during the snowless half of the year each month saw on average around 5.5 per cent of the yearly tourists, while the snowy months saw around 11 per cent of the tourists on average. When looking at the months individually the differences are even more drastic. While the two most popular months, December and March, combined draw in over 900 thousand visitors, the two least popular months May and October draw in combined a little over 200 thousand visitors. The pandemic has decreased the number of tourists significantly during all seasons and the variation would seem to be more based on restrictions in Finland and

around the world than the tourists' preferences. (Official Statistics of Finland (OSF): Accommodation statistics 2021.)

1.1.2 Nature is an important attraction

There are many reasons for why people travel to nature and spend time in forested areas. Most common reasons include that people find nature calming and relaxing, they want to enjoy the beauty of the forest and increase their own well-being. Many people just simply report to like the forest wilderness. (Bertram & Larondelle 2017.) To categorize these reasons more broadly, it can be stated that people report going to forest areas to enhance their physical, mental, and perhaps spiritual well-being. These reported preferences are well in accordance with the studies that have found a link between being in nature and human's subjective wellbeing (see MacKerron & Mourato 2013; Buckley & Westaway 2020).

The Finnish Lapland is considered almost entirely a natural area. It covers almost a third of Finland's total area (National Land Survey of Finland: Land areas by region 2021) but is the permanent home only to approximately 176 000 people (Official Statistic of Finland: Preliminary statistic of population 2021). This represents only 3 per cent of the Finnish population in 2021. Due to the low population Lapland is a very natural area and the nature there could be described untouched compared to the rest of Finland. Especially when travelling long distances to outdoor areas, the untouched nature of the areas has been found an important factor and the quiet and peaceful atmosphere of forests is preferred by forest visitors (De Valck et al. 2017; Tardieu & Tuffery 2019). Visit Finland Visitor Survey (2019) found that foreign tourists see the nature as the most important reason for travelling to Finland. It could also be argued that domestic tourists travel to Finland also for the natural element. Since Lapland is located for the most part within the arctic circle, its nature is different to other parts of Finland in both in its fauna and flora and how large untouched areas are found there. Different and unique natural areas have been found to be preferred by nature visitors (De Valck et al. 2017).

Tyrväinen et al. (2014) found that both the international and domestic tourists to Northern Finland, specifically Ruka in Kuusamo, found the natural landscape and forests an important feature of their holiday. The study found that the tourists would be open to pay monetary fees to aid the upkeep and improvement of natural areas that the tourists frequent. This indicates that the tourists appreciate the Finnish nature and see it as an

important task to preserve it. The study also found that the foreign tourists had a higher Willingness-to-Pay than domestic tourists, indicating it is a more important factor to them than native Finns. This could be explained for example by Finns taking nature more for granted, since they have an abundance of it, which many other countries don't anymore. Other explanation could be that the Finns might feel like they are already "paying" for the nature in the form of taxes, as Finland has a high tax level (OECD 2021) and some of the tax money is used for the upkeep of nature and forests.

When it comes to nature, different types of landscapes and natural attributes are preferred differently by visitors, even though nature in general is preferred by a lot of them. For example nature visitors often prefer broad-leaved trees to conifer trees as the dominant tree type of the woodland (Colson et al. 2010; Tardieu & Tuffery 2019). This can indicate that the visual aspect of nature is often very important to visitors, making less visually pleasing nature areas less visited. This can also be connected to why tourists would be open to pay for the natures upkeep, as mentioned above. In addition to trees that can be deemed more beautiful, natural water features are also preferred. These are appreciated regardless of if the feature in question is a lake, river, waterfall, or some other kind of water element (Colson et al. 2010). Water elements are often seen as calming and serene (Kaplan & Kaplan 1989; Sonntag-Öström et al. 2015), and these elements can be seen as adding to the mindfulness, calming and visual aspects of the nature. Colson et al. (2010) also found that slopes and height differences in the terrain are usually attractive to nature visitors, when compared with even terrain. The height differences too can also be seen as a visually pleasing factor of the nature, also providing viewing spots for example on top of hills.

1.1.3 Recreational activities in Northern Finland

The vast differences in the number of tourists visiting each month depend on the seasonal holiday periods, but also on the recreational activities available in Northern Finland at any given time. The activities can be divided into two subgroups: snow activities and snowless activities. As mentioned in chapter 1.1.1, the most popular months to visit northern Finland were December and March. Even though these popular months coincide also with Finnish and international holiday periods, snow and "winter wonderland" type of activities are an even larger common denominator. The concentration of travelers to the snowy months indicates that in large the main attractions of the Finnish North are

Snow activities such as downhill skiing, cross country skiing, snow shoeing, sledding, snowmobile driving, husky tours, visiting igloos, visiting Santa Claus village, viewing the northern lights, and so on. Snow activities and good snow conditions have also been found to significantly increase people's Willingness To Pay (WTP) and Willingness to Travel (WTT) to outdoor recreational areas in winter (Sælen & Ericson 2013), making snow activities the most important activity group to consider during the winter months.

Nevertheless, a third of the yearly visitors do visit the Northern Finland during the snowless months, when the main activities done include for example, hiking, horseback riding, kayaking, orienteering, trail running, bird spotting, foraging for mushrooms and berries, driving all-terrain vehicles, and so on. In addition to these, snowless activities also include indoor activities, which are doable in any season. Some indoor activities available in most ski centers in Northern Finland are spa services, cinemas, bowling, eating in restaurants and visiting shops. But the availability of indoor activities does vary according to the season, and many service providers from restaurants to bowling alleys close their door for the slowest months. (Levi.fi; Ylläs.fi.) As mentioned in chapter 1.1.1 the least popular months were May and October, and other moths around these, such as June and November. The indoor activities being often closed during the slow season can further increase the lack of interest in these months.

According to Konu et al. (2011) the most important activities and services expected by the domestic tourists from the skiing centers can be divided into four categories: downhill skiing services, cross-country skiing services, restaurants and social life, and spa services. According to their literary review, within all these groups the cross-country skiing services were found more important in Finland than other studies have found in other countries. Both variety and quality of the services offered in all four service categories were very important factors of destination choice. The activities the tourists prefer can vary significantly both by gender and age of the tourist. Females would seem to prefer more often cross-country skiing while males prefer more often restaurant and social services and downhill skiing. Downhill skiing is also more popular amongst younger age groups and the oldest age group defined seemed to avoid downhill skiing to a large part. Passive tourists and relaxation seekers were also at a large part of the younger age groups. The age groups in the middle often preferred all sporting activities somewhat equally. (Konu et al. 2011.)

Although restaurants, spas and other social services are also important for visitors of northern Finland, at least most domestic tourists visiting ski centers in Northern Finland come there to do varying sporting activities, with more people showing interest in cross-country skiing than downhill skiing (Konu et al. 2011). The popularity of cross-country skiing over downhill skiing is no surprise, since only approximately 17 per cent of the Finns report to participate in downhill skiing, while 33 per cent report to participate in cross country skiing (The Finnish Ski Area Association 2021).

Tjørve et al. (2018) found that foreign visitors to Norwegian ski resorts have similar interests as Konu et al. (2011) found for domestic tourists in Finland. Since Norway is somewhat close to Finland in culture, climate and geographical location, the findings of this study in Norway seem to be at least partially applicable to the Finnish skiing market. According to the study conducted by Tjørve et al., the foreign tourists were especially interested in a mix of snow sporting activities such as cross-country and downhill skiing. In Norway as in Finland the use of cross-country tracks is free, and this was found to be an important sales point to foreign tourists. Northern Finland also has one unique tourist attraction: Santa Claus and Santa Claus Village in Rovaniemi. According to Tervo-Kankare et al. (2013) Santa Claus is one of the biggest selling points for foreign tourists to travel to Northern Finland.

With a third of tourists visiting northern Finland in the snowless months, it is also prudent to look at different snowless activities and consider their importance for attracting visitors. Especially since more southern outdoor recreational locations such as Austria and the Alps are losing their attractiveness due to the climate change (Pröbstl-Haider et al. 2021), the summer seasons in Northern Finland and other northern parts of the world can see an increase in tourism due to this. Outdoor activities people enjoy have been found to include for example walking in nature, biking, swimming and jogging as their preferred summer activities in nature (Bertram & Larondelle 2017; De Valck et al. 2017). Natural areas also seem to be made more attractive by recreation facilities, such as bathrooms, trails, and campsites, which make being active and enjoying nature more easily approachable. The attractiveness of an area does not seem to increase much by additional facilities, after some facilities have already been installed. The facilities preferred and their qualities also differ slightly, but not significantly, between different user groups, such as hikers and bikers. (Colson et al. 2010; Tardieu & Tuffery 2019.)

1.2 Factors affecting property prices

1.2.1 Nature

One of the areas of interest of this study is how cottage prices in Northern Finland are affected by the proximity of nature. The effects of nature and green areas on human health and wellbeing are positive and well-documented (see for example MacKerron & Mourato 2013; Buckley & Westaway 2020) and most studies report results of property price increases when the proximity to green and recreational areas decreases, regardless of the urbanity of the area (see for example Gnagey & Grijalva 2018; Asabere & Huffman 2009; Parent & Vom Hofe 2013). Even in the developing world access to recreational and conservation areas has been found to be a factor increasing house prices (Humavindu & Stage 2003), indicating that the preference for good quality environment and nature goes beyond the western world and is a natural preference for humans. Most previous studies on the effects of nature and recreation on property prices have been conducted in the Western developed world, the vast majority being from the United States.

While in general the proximity to nature and recreational areas seems to be a factor increasing property prices, the effects of different kinds of natural areas in different locations are not as clear as one might assume. Ham et al. (2012) looked at the assumption that nature areas might not provide as homogeneous an effect on preferences as has often been assumed. Their study found that for example noise decreases the effects of proximity to nature. This showed as buyers discounting the prices of properties near areas where nature recreational areas are noisier, due to for example off-road vehicles or logging activities. This would indicate that the preference to lodge near nature is an umbrella term for a bundle of preferences, for example quietness, peacefulness, clean air, and green views.

Tardieu & Tuffery (2019) found that when it comes to outdoor recreation of a certain regional park in France, demand decreases sharply when the distance increases for the first three to four kilometers. This could indicate that a distance of a few kilometers to the nature and outdoor recreation is the distance within which the prices of cottages in Finnish Northern Finland decrease sharply and quite linearly. From this is also taken the idea that drawing a certain distance-based boundaries for examining the distance to Nordic and downhill skiing in this thesis can be a valid way to group cottages based on their location.

1.2.2 Outdoor activities

Property prices are not affected by only the proximity to nature, but the prices can also reflect the activities available. For example, according to Gnagey & Grijalva (2018) in Ogden, Utah in United States the availability of outdoor recreational activities increased property values. The area where the study was conducted is an area where nature is prominently present in the landscape and a large portion of the properties are inherently near forested or other natural areas. Ogden, Utah is also an area where many residents are "outdoor enthusiasts" and have high preferences for nature. In the study they used the distance to trails and trailheads to measure the effect of distance to recreational outdoor activities. The study did not differentiate between holiday and permanent homes since the hypothesis was that all property prices are affected by availability of recreational activities. The study found that a one-minute decrease of travel time to the nearest trailhead increased the property value by between 0.6 per cent to 1.4 per cent in this area, where nature is relatively close by to every house. The study's setting can be seen to represent a similar setting to those around the large centers of northern Finland, even though the study featured significantly more permanent residences than there are even in the centers in the Finnish north.

In an urban setting too the possibility to enjoy outdoor recreation preferably in a highly vegetated area increases property prices. A study conducted in United States, San Antonio, Texas, found that the proximity of trails, greenbelts, and trails in greenbelts, increased property values by 2 to 5 per cent in an urban setting. Only the availability of outdoor recreation already increased the property prices, but if the outdoor recreation area was also full of trees, grass and other forms of vegetation, the proximity to the area increased house prices even more. By greenbelts and trails this study referred to man-built green areas and biking and walking trails inside the urban development areas. (Asabere & Huffman 2009.) Being near nature has been found to be important in rural areas too, Nilsson (2015) found that in Sweden being close to the nature has a positive influence on the prices of second homes in rural areas.

It seems that the proximity to different outdoor activities is a commonly accepted factor influencing property prices and it has been confirmed by numerous studies. But it would seem that the activities affect prices differently in different areas. This heterogeneity of effects of proximity to recreational nature activities has been noted for example by Soguel

at al. (2008) in the context of ski runs. They found that the recreational possibilities, specifically the ski run lengths, affect the prices of cottages and rentals differently in different areas in the Swiss Alps. This indicates that other factors are also heavily weighted in the property prices and that the effect of proximity to a nature recreational activity might be heterogeneous across different locations. Supporting this conclusion, for example Nilsson (2015) found that the heterogeneity in preferences of amenities is related to how urban or rural the area is.

1.2.3 Other factors

Cottage prices are determined as a sum of a large number or qualities, and other factors than proximity to outdoor activities have a large impact on the price. In this chapter the importance of proximity to nature is left unmentioned since it has been covered in previous chapters. Location seems to be one of the most important if not the most important price determining factor. But depending on country, area and city different types of locations are deemed “good”. Some common locations, proximity to which usually increases the price per square meter of properties, are stores, restaurants and transportation (Schirmer et al. 2014). These areas are likely popular since being close to daily services makes commute times shorter and can make daily life easier. Proximity to areas with an abundance these services often also increase prices, since availability of properties is usually always limited, thus making it possible for demand to exceed supply.

In addition to location, many internal factors affect real estate prices as well. The condition of the property affects the price significantly in most areas, better condition increasing prices more. Properties still under construction are in many cases more expensive in relation to finished properties in “like new” condition (Ham et al. 2012; Taruttis & Weber 2022), possibly since the buyer can have some possibility to influence the layout and interiors of the properties still under construction. How new the house is does affect how visually pleasing and livable the house is, but also the cost of upkeep and renovations. Other factors relating to the cost of upkeep and owning the house can affect the price too. Energy efficiency can be an important price influencing factor especially in more rural areas, where energy is less available and thus often more expensive. (Taruttis & Weber 2022) Likewise building material of the house can be important, since the materials used affect how lasting the house is, and how insulated from heat and cold the

inside of the house is. Well-built house is also more energy efficient, being more sustainable and possibly more cost-efficient.

Size of the lot and the building's indoor space also affect prices. Often the price per sqm is increasing in relation to the lot size. This also applies with the indoor area of the building. However, the price per sqm can also become decreasing in relation to the indoor area, especially when the size of the property is large in relation to the number of inhabitants. (Schirmer et al. 2014.) Because lot size isn't directly connected to the indoor area, or the number of square meters, it's effect can be simpler to calculate. But when the indoor area itself increases, it clearly has a straight connection to the square meters. Thus, it also has a more complicated relationship to the price per square meter. The relationship can be an increasing or decreasing one in relation to the indoor area size, depending on the area, property, and so on. When the price per sqm decreases in relation to the indoor area, it means that the price per square meter of larger houses is smaller than that of smaller houses, even though the total sale price does increase with indoor area of the building.

Not just the size of the house matters. The type of the house can also affect price. By type of the house is meant whether the house is an apartment, detached house, semi-detached house or something else. Apartments often have higher price per square meter since they are smaller (see previous paragraph) and often located in more densely built areas closer to services. The cost of other houses in the area are also an indication to the price of the house, but it can be unclear whether the prices of other houses in an area affect the price itself or if the effect is solely from being in a specific area. (Caplan et al. 2021; Taruttis & Weber 2022.)

In addition to the more fundamental characteristics and factors mentioned, many studies have also found miscellaneous factors affecting the house prices. Such factors are often related to quality and ease of everyday life. For example, terraces, balconies, elevators, saunas, quality home appliances and fireplaces can affect the price. (Ham et al. 2012.) Quality of everyday life can also include visual factors of the house such as large windows, visually pleasing interior design and unique building styles.

1.2.4 Pandemics

As is with any market, the prices in real estate markets fluctuate and sometimes experience price shocks. A price shock happens when the demand or supply curve suddenly moves, resulting in the price also suddenly changing. The still ongoing Covid-19 pandemic has impacted the real estate markets as a whole, at least temporarily. As people have been discouraged by fear or even restricted by governments from many free-time and even working activities, people's consumption behavior on the whole has been significantly affected, in relation to how severely the area has been impacted by the pandemic. The change in consumption behavior can also be seen as to impact housing demand and supply. (Baker et al. 2020; Wang 2022.) However, the effect on real estate markets in different areas has not been uniform. In some areas the prices have increased while in others they have decreased, and the size of the effect also varies other markets being impacted significantly more. (Battistini et al. 2021; Deghi et al. 2022.)

City centers are one area where the effect on market prices has been quite similar in most areas, the prices of city-center real-estate has seen a global decrease. Before the pandemic hit city centers were a factor heavily increasing prices of real estate, even generating price bubbles in some cities. Since the Covid-19 pandemic started spreading, the prices of real estate near city centers have fallen in relation to pre-Covid levels, in some countries to even historically low levels (Rosenthal et al. 2022). Decreasing price is often an indicator of decreasing demand, indicating that people's interests might have changed. City center apartments and houses are often properties with a higher price per sqm relative to the qualities of the house, as location is an attribute increasing the price the other attributes might be of lower quality when comparing to areas further from centers. The decreasing demand of city centers can also be seen as an indication of the more rural areas' attractiveness increasing, as an effect of people wanting to spend more time at home with more space and peace and often at a lower cost.

Even though the real estate prices have changed after the pandemic started, it is debatable whether or not the changes will be long- or short-term. The effects some of the real estate markets have experienced have been great and can stem from the changed preferences of buyers, but in the end Covid-19 might only be another price shock amongst others. For example (Francke & Korevaar 2021) have found that over the course of history, even though pandemics do impact real estate prices and rent prices, the effects of pandemics

have been short and the prices return to the pre-pandemic trend after the shocks. But as there has been no real data of the demand and preference factor from the previous cholera and plague pandemics, these findings might not be applicable in the case where due to the pandemic the buyers have discovered something new about their own preferences. In addition it has been found that emotional changes and responses remaining after a pandemic can make the changes in real estate prices more permanent (Ambrus et al. 2020). A pandemic in this modern age could also have a more profound effect on the real estate market because technology allows and has already allowed us to reorganize our lives and society more permanently with for example remote working, making the realization of the buyers' new preferences possible.

1.3 Cottages as second homes and investments

1.3.1 The cottages and the owners

Between 2000 and 2020 estimated 12 329 new cottages have been built to Finnish Lapland. This approximates to a little over 600 new cottages built yearly. (OSF: Buildings and free-time residences 2021.) Putting together a good estimate for cottages sold in Northern Finland every year is difficult, since many of the cottages sold are sold as shares of a holiday village. The shares give their owners the full rights to their cottage and the property it stands on, but the cottage is still part of a holiday village, and the owners are then part of a cottage owners association in that village. According to National Land Survey of Finland between 200 and 500 cottages, and properties where cottages will be built, have been sold yearly between 2000 and 2020, but as stated this number does not include the cottages sold as shares of a holiday village.

The owners of the cottage properties in Northern Finland are distributed all around the country. According to Kauppila (2008) most owners of cottages in Ruka and Levi live either within a comfortable driving distance to the cottage (approx. 200km) or in the capital area. According to the study many owners come also from the bigger Finnish cities outside the capital area. These results are seconded by Kauppila (2009) and they also apply to the last two of the four largest resorts in Northern Finland: Ylläs and Saariselkä. Combining the findings of Kauppila (2008; 2009) we can see that only 40 per cent of the owners of cottages in Ylläs, Levi and Saariselkä live within 400km from the resorts, and less than 25 per cent live within 200km. The respective numbers for Ruka are slightly but

significantly higher. It is important to note here, that unlike the three other resorts, Ruka is not a part of Lapland. Ruka is located significantly southwards relative to the other three resorts, thus bringing the larger Finnish cities closer to it.

People living in concentrated urban areas are more likely to own a cottage and the denser the first home environment is, the more time people spend at their cottages (Skak & Bloze 2017; Strandell & Hall 2015). This also seems to apply with the owners of cottages in northern Finland, according to the findings of Kauppila (2008; 2009). Studies have found that owners of cottages are more commonly older households and individuals, with people over 65 being the likeliest to own a cottage. People over the age 65 also spend the most time at cottages. (Skak & Bloze 2017; Strandell et al. 2020.) Being married and not living alone and having a vocational or tertiary education also increase the probability of owning a cottage. At least in Denmark income does not affect greatly the probability of owning a cottage, but a steady income could play a role since higher education does increase the likelihood of cottage ownership. (Skak & Bloze 2017.)

Owning or having regular access to a cottage in Finland does not seem to be a matter of income, only the number of people who own a cottage significantly decreases only in the least affluent socioeconomic class (Strandell & Hall 2015). This is no surprise, since cottages are a part of Finnish culture and the number of cottages relative to the population is one of the highest of the world. It has been estimated that out of 5.5 million Finns as many as 4 million have access to a cottage, since cottages are often used also by the friends and family of the owners. (Hiltunen et al. 2013.)

1.3.2 Revenue generating cottages

Without much analysis, the price fluctuations of the properties in Northern Finland seem not as predictable and not as drastic as in Southern Finland, due to which investing in cottages merely with the prospect of gaining profit when eventually selling the cottage carries a large risk. This is most likely why cottages are rarely only, if at all, seen as an investment in Northern Finland. For the most part the owners seem to want to enjoy the nature and the benefits of having a second home base (Saarinen & Vaara 2002). Some areas very close to the ski slopes can be seen as more reliable investments both due to the price increasing over time and because of the steep rental prices in these locations (Federation of real estate agency). Renting out the cottage and gaining profit, or at least covering yearly expenses, without selling the property can also decrease the risk of the

investment significantly. Nevertheless, the use of cottages has been estimated to be increasing in the near decades as Finland becomes more urbanized and the average age of the population increases (Strandell et al. 2020). Thus, it can be argued that investing in a cottage is a good investment, whether or not one rents it out.

Around 3500 or approximately 9.6 per cent of cottages in Finnish Lapland are available for rental, according to the experimental statistics available from Official Statistics of Finland (2021). But as the number of cottages for rental reported by OSF is only an estimate, due to the data collection methods used not being absolute, the reported 9.6 per cent could be an undervaluation. This possibility is supported for example by Skak & Bloze (2017), who found in a fellow Nordic country, that 40 per cent of Danish second homeowners rent out the home at least occasionally. Yet, as the Skak & Bloze study was conducted in Denmark, a Nordic country but the most southern one, the applicability of their findings to the northernmost part of Finland can only be seen as indicatory. In contrast Skak & Bloze's (2017) findings, for example Bieger et al. (2007) found that 97 per cent of second homeowners in Switzerland are unwilling to rent out their second homes. The difference in the findings of these studies could be explained by cultural differences and different attitudes in the cottage markets. Since Finland can be considered culturally closer to Denmark as they are both Nordic countries functioning under the Nordic welfare system (Kautto & Kuitto 2021), the results of the Danish study can be seen as more applicable to Finland.

As there have also been problems regarding the cottage statistics by OSF, for example in classification of properties as cottages, distorting the statistics (Kauppila 2007), it increases the likelihood of the number of rented-out cottages being underestimated. One of the problems with the cottage statistics by OSF has been that the number of rental cottages is based on a monthly statistic, while the number of cottages altogether is based on a yearly statistic. In addition, it is not clear if the data of cottages for rental includes privately out rented cottages. For example, Skak & Bloze (2017) found that over 60 per cent of Danish second homeowners owning a single second home prefer to rent out their holiday properties privately. It would seem that Finnish people also prefer renting out their cottages privately, when looking at the number of properties for rental on some of the most used Finnish cottage rental sites Nettimökki.fi and Gofinland.fi. Nettimökki is a website for private individuals to advertise their cottage rental, and Gofinland is a website gathering rentals from different cottage rental companies.

Private properties around resorts such as the large centers of Northern Finland are more commonly rented out for tourists than properties in more rural areas of Finland (Federation of real estate agency). Some of the owners of these properties view their cottages both as a vacation spot and an investment, even though it would seem that the largest part only see the cottage as their second home or an escape to nature (Strandell et al. 2020), where strangers might not be wanted. It would seem that there are very few owners who view the property only as an investment, but on these attitudes of seeing cottage as and investment studies conducted are very limited.

For the type of people who do end up renting out their cottages, older second home owners have been found to be less likely to put out their cottage for rent, even though they are more likely to own a cottage (Skak & Bloze 2017). Or in other words, younger people are more likely to rent out their cottage, at least occasionally. This indicates that also in Finland it would be more common for young people rent out their cottage. One explanation for this could be that younger cottage owners often have busier lives and are thus able to spend less time at their cottages. Renting out the cottage can then ease the costs of ownership or gain profit to the owner. Older people who have more free time to spend at their second homes can treat the cottage more like another home, making the cottage more of a personal place for them. And of course, for example retired people are able to spend more time at their cottages, resulting in the cottage being free for rental less often.

2 Empirical theory and analysis

In this chapter in the first part the theorical background, and in the second part the empirical analysis conducted are explained. In the first chapter 2.1.1 we first look at the Hedonic Price Model, as it gives theoretical and mathematical background to how not only internal but also external factors, such as location, affect the price of a good. After this in chapter 2.1.2 the theory of the analysis method used in this thesis, Difference-in-Difference analysis, is explained. The analysis in this thesis is a modified Difference-in-Difference analysis, including in which is the theory of Hedonic Price Model to estimate for the effect of location in relation to location of outdoor activities on cottage prices.

After the theorical background, a closer look of the empiric analysis for this thesis is provided. First in chapter 2.2.1 the data is under scrutiny. The chapter provides a look into the data sources, data collection methods, data modification methods and what information the data includes. Then in chapter 2.2.2 the regression model used in this thesis and why it is formed as it is, are explained.

2.1 Empirical theory

2.1.1 The Hedonic Price Model

When considering the price of a good, it is a fair assumption that the price and the demand of the good are formed based on the qualities of the good. For example, the durability of the good or the materials used. On markets such as the housing market it is important to also consider environmental factors mainly regarding the location, such as availability of services and transport, the land use plans, and the relative amount of noise in the area. In Hedonic Price Model (HPM) it is assumed that the observed prices are an aggregation and combination of the prices of the goods' attributes. The different attributes are present in the good at different amounts and forms, and each attribute has a price according to the amount and form it is present in. (Rosen 1974) In the context of research the HPM are usually regression models, where the effects of different attributes of a good on its price are separated and estimated individually (Limsombunchai 2004).

As the environmental qualities of the goods can also be valuated with HPM, it suggests a way of modeling the location factor in cottage prices. At the core HPM aims to use some other market as a surrogate, to create prices for goods such as the environment or nature,

which don't have a market where the prices would be formed (Soguel at al. 2008). HPM has also been previously applied successfully to explain similar questions about the effect of nature and outdoors on property prices (see for example Gnagey & Grijalva 2018; Nilsson 2015; Parent & Vom Hofe 2013).

HPM assumes that both consumer and seller are rational and their decisions on pricing and buying are both utility-maximizing behaviors. The optimums found in the model are all feasible and can be reached through individuals' utility maximizing decisions. The goods sold, in this study the cottages of northern Finland, are created or modified by their sellers. The seller provides bundles of different attributes with different prices and these bundles form the final product and its price. HPM assumes that there are enough sellers or at least enough differentiated goods on the market giving the consumers a true choice over what goods with which attributes they choose to consume. If two bundles are equal in attributes but have different prices, the buyer will choose the cheaper one and the identity of the seller plays no role in the decision. (Rosen 1974.)

Usually, HPM is presented as a regression model. In the model there is n units of goods $g_{1, 2,..., n}$ in the market, creating the entire market offering $G = (g_1, g_2, ..., g_n)$. The goods g_i are evaluated equally in the quantity of their attributes $z_{1, 2,..., k}$. The attributes within a good create a bundle $Z_i = (z_1, z_2, ..., z_k)$. Since each good is equal to the attributes it contains, from now on $g_{1, 2,..., n} = Z_{1, 2,..., n}$. While attributes z_i might have different valuations for one unit of the attribute in different buyers' eyes, the buyers perceive the same number k of different attributes in all goods on the market. The Willingness To Pay (WTP) for the whole bundles of attributes Z_i, the goods, is different for different consumers, due to the differing valuations on single units of an attribute. (Rosen 1974.)

The consumers maximize their respective utility functions, that depend on the attributes of the good and their amounts and all other goods the consumer consumes. The sellers maximize their profit functions. The profit functions have the two common variable groups: the income and the costs. The costs include the cost of producing and proving the good: the cost of each attribute and the number of goods, and other underlying costs. The income is the money made from selling the goods. In HPM the equilibrium is found when the buyers and sellers maximizing their respective utilities are matched and the market clears. The equilibrium prices $p^*(z)$ are determined as per basic economic theory by

demand and supply. The equilibrium is assumed to be Pareto efficient, no individual being able to improve their position alone. (Rosen 1974.)

2.1.2 Theory of DiD

Difference-in-difference analysis, or DiD, is often used when analyzing the effects of a policy change or an intervention. In DiD the differences in reaction or changes from an event are compared between different groups. In a simple DiD there are only two groups: one that is affected by an intervention and one that is not. Both groups would be in a similar environment, or in some other way as comparable as possible before the treatment or event happens to one group. The variable of interest is monitored and analyzed before and after the treatment or event for both groups. After the event or treatment, the difference in changes or reactions in the variable of interest between the group that has received a treatment and one that has note is analyzed.

One of the first DiD designs was created by John Snow in 1855 when analyzing the spreading of Cholera, finding that the disease spreads by water, which is contaminated by cholera being in contact with peoples' excrement. Before Snow's findings people commonly thought that the disease spread by air. Snow made his findings by analyzing the cholera rates in different areas of London served by different water companies. Before 1849 all of the water companies took their water input from Thames river's lower parts, below large sewage disposal functions, thus all using the contaminated water. In 1849 one of the companies changed their water input area further upstream, above the sewage discharge areas. Snow analyzed the cholera rates in different areas before and after 1849 and found that in the areas that used the water company that changed it's water input location the Cholera rates dropped. In other areas the rates kept rising. (Cunningham 2021; Snow 1855.)

Still to date DiD is often used in health-related sciences. One simple example of a DiD experiment and analysis is testing the effectiveness a new drug. This could be based on the health data before and after treatment of people with the same disease, half of whom have not received the drug ang half of whom have. Below is the equating for a simple DiD regression.

$$Y = \beta_0 + \beta_1 * Group + \beta_2 * Treatment + \beta_3 * (Group * Treatment) + \varepsilon$$

In our example case of a new drug Group would be a dummy variable for whether the person belongs to the treatment or no-treatment group and Treatment would be a dummy variable for when the people in treatment group started receiving the new drug.

In addition to health sciences DiD is popular in other sciences too. In fact it can be argued that DiD is globally the most popular study design in quantitative social sciences (Cunningham 2021). And for example, in this thesis DiD analysis is used in the context of economics, to ascertain the difference in effects a price shock has on different groupings of cottages.

2.2 Empiric analysis

2.2.1 Data

The cottage sales data used in this thesis is provided by Federation of Real Estate Agency in Finland. The sales data is a record of cottages sold from 1st January 2017 to 31st December 2021 and the data has 1,625 data entries. Additional 1,707 data entries from 2010 to 2016 is also available for analysis, although the data is at this point excluded firstly because the data is too far in time from the assumed start of the treatment and secondly because the data prior to 2017 lacks many control variables included after 2017, limiting the scope of usage of the data prior to 2017.

As mentioned the cottage sales data includes many variables, many of which didn't have enough entries to be included in the thesis. These variables weren't especially relevant for the thesis and thus they don't need to be compensated for in any way. Based on previous studies (see for example Grislain-Letrémy & Katossky 2014; Ham et al. 2012; Jackson 1979; Nilsson 2015; Parent & Vom Hofe 2013) when estimating the property price, the most important variables to include in the regression include a variable for location, size, condition, age of the building, or if it is a new development, and some variables for different internal attributes of the building. All of these are included in the data. In Appendix 1 is shown a list of the variables chosen to use in this analysis either directly in the regression model, or to create the variables used in the regression model.

One text variable in the dataset, that has been important for the study, is the address of the cottage. The addresses were used to derive coordinates also mentioned in the table

above for each cottage. The coordinate points for each cottage have been added into the cottage sales, derived with a VBA code from the addresses, with the use of Google API.

In addition to the cottage sales data, a dataset of the skiing center and the locations of downhill skiing, Nordic skiing/hiking and stores is used. The dataset was built using the coordinate function in Google maps and InfoGis. InfoGis is a website used for tracking all tracks for outdoor activities in northern Finland. From Google maps were derived coordinates for all downhill skiing starting points around the ski centers, based on the addresses, or found locations for the lower points of ski lifts. Also, from Google maps the coordinates for the food stores were found by searching for nearest food store within each area. If two food stores were right next to each other, the K-Group alternative was included in the data since most stores in northern Finland are K-stores and these seem to indicate the centers of areas the best.

From InfoGis were derived locations for Nordic skiing/hiking/biking tracks. If there was a major variation between the routes of different types of tracks, only the Nordic skiing track was included in the data. This did not provide an issue for the thesis since the tracks varied significantly only in a few places and only in sparsely populated or uninhabited areas. From areas further than 2km from any roads and nature conservation areas (where it is prohibited by law to build anything) no coordinate points were taken. Coordinate points were taken from on top of the tracks in intervals of 1 to 2km. Altogether within northern Finland 675 coordinate points for Nordic skiing/hiking/biking, 41 for downhill skiing and 49 for food stores were included in the data. In the table below is a breakdown of the distribution of the coordinate points by skiing center.

Table 1 Number of outdoor activity coordinate points per skiing centre

Skiing center	Number of stores	Number of Nordic skiing track points	Number of ski lift points
Aavasaksa	1	18	1
Hetta	1	13	1
Iso-Syöte*	6	33	3
Kallin ulkoilukeskus	4	28	1
Kiririnteet	1	14	1
Levi	3	66	9
Ounasvaara	9	59	1
Pallas & Olos**	2	23	2

Skiing center	Number of stores	Number of Nordic skiing track points	Number of ski lift points
Pyhä & Luosto**	5	50	4
Ritavalkea	3	63	1
Ruka*	6	87	8
Saariselkä	3	12	1
Salla	1	42	3
Suomutunturi	2	41	3
Ylläs	2	126	2
Grand Total	**49**	**675**	**41**

*Not in Lapland

**Pyhä and Luosto and smilarily Olos and Pallas are two different fells close to each other and they share for example the same Nordic skiing track network, which is why they are combined in this table.

From the coordinate-point data the closest coordinates of each category (downhill skiing, Nordic skiing/hiking/biking and food stores) were found for each cottage, as also shown in variables presented in Table 1. The distance between the coordinates of the cottage and the coordinates of nearest downhill skiing, Nordic skiing/hiking/biking and food store location was calculated using the Haversine formula. Only the nearest location point for each of the three categories was considered. For simplicity the number of coordinate points near the cottages was not considered.

2.2.2 Model and methodology

For this thesis the DiD (Difference-in-Difference) analysis is conducted with Stata 17. DiD regression is used to examine the change potentially taken place after the treatment period has started. The treatment affecting real-estate prices is Covid-19. The treatment is considered to have started March 1st 2020, since looking at the data available worldwide, March of 2020 can be considered to be the point at which Covid-19 started affecting real-estate markets (Balemi et al. 2021). The treatment variable used in the analysis is a binary value taking the value of 1 for cottage sales taking place at and after March 1st 2020, and 0 otherwise.

This thesis uses the DiD regression to estimate the effects on cottage prices of proximity to different activities. Since the data includes many different distances to many different activities, an analysis was conducted to create suitable groups to analyze. The activities of interest for this thesis are for one downhill skiing, more of a man-made activity that is

very centralized in certain locations. And second of interest is also the activity bundle including Nordic skiing, biking and hiking, activities done more freely if there is only nature present. Albeit these activities are more accessible if humans have created suitable paths for them. From now on, when these main groups (including the two additions discussed shortly), they are simply mentioned as “groups” or “activity groups”. It is also good to note that by forming these two groups a third one is also formed: the group of cottages that don’t fit in either activity group.

Further to include these two groups in a DiD analysis and to avoid unwanted correlations and having the same observations in all groups, the groups are narrowed down by using distances as the classification method. This provides the question of how to set the distance to both activity groups so that the empiric results provide a good estimate of the analyzed effect on prices per sqm. In this thesis the distances were chosen by first examining the distances used in previous studies (see for example Tardieu & Tuffery 2019). Then by comparing different combinations of distance to the outdoor activities, the combination that maximizes the number of observations in both the Nordic skiing and downhill skiing group was chosen.

The combination chosen is 450m to Nordic skiing activities and 1km to downhill skiing activities. With these distances the groups represent 31% and 32% of the data respectively, and the sizes of the groups can be considered equal. During the analysis of choosing the combination that maximizes observations in both groups, it was found that a fourth group must be added to the analysis, a group where the observed cottage is close to both Nordic and downhill skiing. In the data 501 cottages are within 450m of the Nordic skiing tracks and 516 cottages are within 1km of the ski slopes. 212 cottages are both within 450m of the Nordic skiing tracks and 1km to the ski slopes. 820 or 50.5 % of the cottages are left out of all other groups and thus placed in group “no ski”.

Further analysis also showed that in order to avoid unwanted correlations within control variables, the municipalities and nearest ski centers to the cottage should be used to create two grouped control variables: one for the size of the skiing center nearest to the cottage and one for the size of the municipality the cottage is in. Table 2 below shows two combined tables: the municipalities of northern Finland, their sizes and allocated size groups for this thesis. And the skiing centers, the number of slopes in the center to indicate size and the size group of the skiing center allocated in this thesis.

Table 2 Municipality and ski center sizes

Municipality	Ski Center	Number of Slopes*	Size of Ski Center	Number of Residents*	Size of Municipality
Kittilä	Levi	43	*3*	6526	*2*
Kolari	Ylläs	63	*3*	3985	*1*
Kuusamo	Ruka	35	*3*	15142	*3*
Inari	Saariselkä	15	*2*	7008	*2*
Kemijärvi	Suomutunturi	10	*2*	7107	*2*
Muonio	Olos	10	*2*	2321	*1*
Muonio	Pallas	9	*2*	-	*1*
Pelkosenniemi	Pyhä	15	*2*	924	*1*
Pudasjärvi	Iso-Syöte	17	*2*	7801	*2*
Rovaniemi	Ounasvaara	12	*2*	64194	*3*
Salla	Salla	15	*2*	3415	*1*
Sodankylä	Luosto	7	*2*	8187	*2*
Enontekiö	Hetta	2	*1*	1787	*1*
Keminmaa	Kalli	2	*1*	7903	*2*
Pello	Ritavalkea	5	*1*	3296	*1*
Posio	Kiririnteet	3	*1*	3066	*1*
Ylitornio	Aavasaksa	3	*1*	3832	*1*
Kemi	-	-	*0*	19991	*3*
Ranua	-	-	*0*	3670	*1*
Savukoski	-	-	*0*	1008	*1*
Simo	-	-	*0*	2904	*1*
Tervola	-	-	*0*	2882	*1*
Tornio	-	-	*0*	21326	*3*
Utsjoki	-	-	*0*	1178	*1*

Size groups allocated for the purposes of this thesis are allocated as follows. For ski center size, groups are based on the number of slopes in the center, specifically on under which percentile they fall: under 25th percentile (=1), between 25th and 85th percentile (=2), or above 85th percentile (=3). If the municipality has no ski center it is marked as zero (=0). For municipality size, groups are set based on number of permanent residents, by whether the number of residents falls under 25th percentile (=1), between 25th and 75th percentile (=2), or above 75th percentile (=3).

With the corrections and new variables mentioned, in this thesis the following regression model is used for the DiD analysis:

$$Cottage\ Price = \beta_0 + \beta_1 * Treat + \beta_2 * Ski + \beta_3(Treat * Ski) + C + \varepsilon$$

In the model Treat indicates the post treatment period, the period after 1.3.2020, and Ski indicates the ski group (0 = SHB450m or Ski1km not applicable, 1 = only SHB450m applicable, 2 = only Ski1km applicable, 3 = both SHB450m and Ski1km applicable). C indicates the control variables and Ɛ the errors. Control variables included in this regression are described in Table 3 below.

Table 3 Description of control variables included

Variable	Description
Sqm	Cottage size in square meters
Year Built	Building year of cottage
Rooms	Number of rooms in cottage
Condition	In what condition the cottage is (satisfactory, okay, good, excellent, new)
Sale Date	Date of the cottage sale close
Own Land	If the cottage is built on own (=1) or rented (=0) land
Land sqm	How large the plot size the cottage is on is
Sale Time (days)	How many days it took to sell the cottage
Building Material	What building material or materials have been used
Beach	Does the cottage have it's own private beach (=1, 0 otherwise)
Elevator	Does the cottage or the building it is in have an elevator (=1, 0 otherwise)
Rented	Has the cottage been rented out by the previous owner (=1, 0 otherwise)
Sauna	Does the cottage have a sauna (=1, 0 otherwise)
Store Dist (km)	Distance to the nearest grocery store (km)
Ski Group	Is the cottage near to no ski center (=0), near a small ski center (=1), near a medium ski center (=2) or near a large ski center (=3)
MSize Group	Is the cottage located in a small (=1), medium (=2) or large (=3) kunta.

The groups for the variables SkiGroup (size of nearest ski center) and MSizeGroup (size of municipality) are determined by location. SkiGroup is determined by a formula that determines the distance between the cottage's coordinated and the coordinates of each of the skiing centers and returns the closest skiing center. Here it should be noted that the skiing center could in theory be tens or even hundreds of kilometers away. The MSizeGroup is determined by the cottage's municipality given in the data, for which the sizes were explained in Table 2.

According to for example Cunningham (2021) and Bertrand et al. (2004), without any inference standard errors of a DiD analysis can be underestimated. The suggest three

possible solutions for this and of these in this thesis clustering is applied to diminish for example serial correlations. As suggested by previous literature, in this analysis clustering is applied based on the postal code of the observation. This creates 134 clusters where standard errors are adjusted.

3 Results

In this chapter the results of this thesis are shared and explained. The main results of the DiD analysis are presented first, in chapter 3.1. In addition to the main analysis, three other analyses were conducted in the end to gain more insight into the smaller points of interests in this thesis and to find a clearer direction for future research. These additional analyses are explained and presented in chapter 3.2. After this the chapter 3.3, Discussion, starts. The discussion is divided into three sections, first of which studies further the price trends evident in the data before and after Covid-19. Second, the main question of how being near downhill and Nordic skiing affects cottage prices is discussed. Third and finally, the limitations of this thesis are discussed.

3.1 Difference-in-Difference

Out of the 1,625 observations, 1,276 observations included most of the chosen control variables and were included in the analysis. The number of observations in the different groups is as shown in the table 4 below.

Table 4 Number of observations in each group before and after treatment

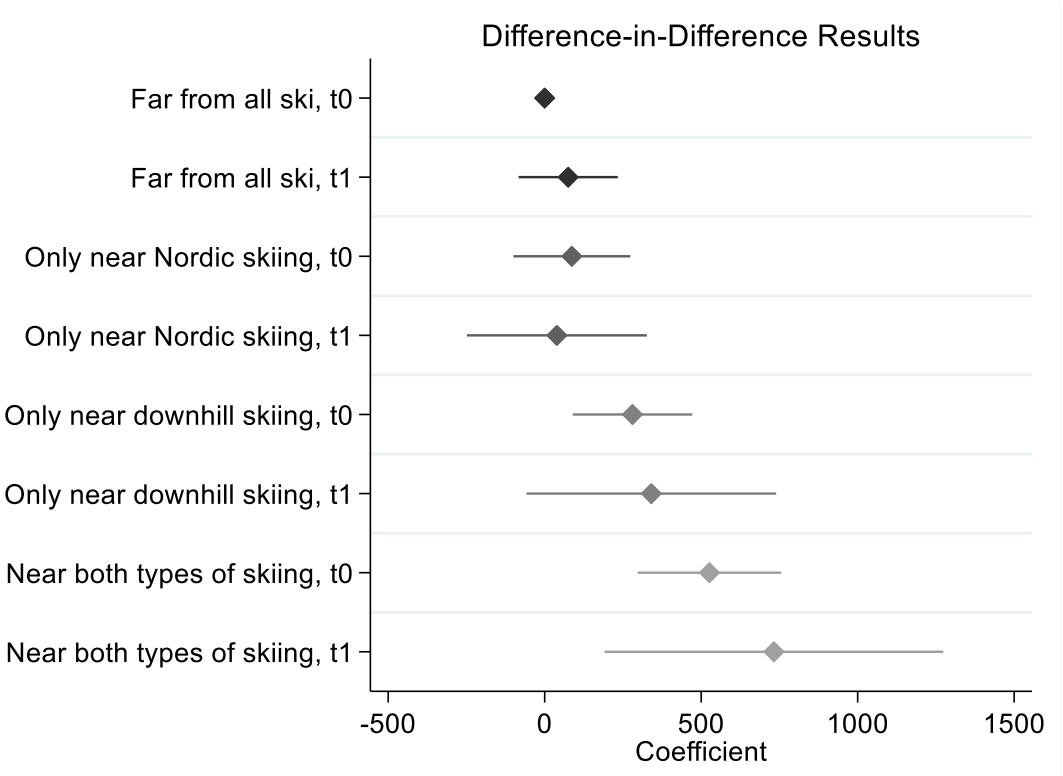
	Treat	
Group	**0**	**1**
0 (no ski)	420	398
1 (only Nordic ski)	153	136
2 (only downhill ski)	161	143
3 (both types of ski)	119	93

There is a similar number of observations in groups 1 to 3 both before and after treatment, group 3 especially after treatment being the biggest discrepancy. This is because in Northern Finland there are less cottages that fall into group 3 than into the other two groups. Both before and after treatment group 0 has approximately as much observations as the three other groups combined.

The results presented in Figure 1 and Table 5 below show that there have been significant differences in the prices of cottages between the groups even before Covid-19 (See also chapter 3.3.1). Before the treatment period already the proximity to Nordic skiing only had the least effect on prices per sqm, and the coefficient found for this group before Covid-19 was not statistically significant. Before treatment, as after also, being only near

downhill skiing activities had the second largest effect on price per sqm and being close to both Nordic and downhill skiing activities had the largest effect. The coefficient for proximity of both types of skiing is 606% and 188% larger than the coefficients of only Nordic skiing and only downhill skiing groups, respectively.

Figure 1 Results of the DiD analysis



As seen in Table 5 below, the results show that even when controlling for time induced and other variations, the effect of proximity to downhill skiing and especially combined effect of proximity to both downhill skiing and Nordic skiing have increased after Covid-19. The estimated coefficients for Nordic skiing are not statistically significant but show a fall in the estimates. The estimated effect on sqm price of cottage being only near the Nordic skiing tracks fell by over 55% from 86.85 to 39.00, although as mentioned this thesis did not find either of these results to be statistically significant. The estimated effect of cottage being only close to the skiing slopes increased by 22 % from 280.50 before the treatment cutoff to 340.73 after. The estimated effect of being both close to the skiing slopes and Nordic skiing tracks saw the larger increase, with estimates increasing by 39% from 526.45 to 732.40.

Table 5 Results of Difference-in-Difference analysis

Variable	Coefficient	Robust std. error	t	P >|t|	95% conf. interval	
treat*group						
*0*1*	86.84576	94.43545	0.92	*0.359*	-99.9439	273.6354
*0*2*	280.5043	96.57999	2.9	*0.004***	89.4728	471.5357
*0*3*	526.4533	115.8709	4.54	*0.000***	297.2651	755.6416
*1*0*	75.0589	80.06172	0.94	*0.350*	-83.3001	233.4179
*1*1*	39.00149	145.3573	0.27	*0.789*	-248.51	326.5126
*1*2*	340.7286	201.6707	1.69	*0.093**	-58.1682	739.6255
*1*3*	732.3999	273.7675	2.68	*0.008***	190.8984	1273.901
sqm	-1.55819	0.823341	-1.89	*0.061**	-3.18673	0.070347
Year Built	13.86064	2.86456	4.84	*0.000***	8.19465	19.52663
Rooms	-69.4731	25.44331	-2.73	*0.007***	-119.799	-19.1472
Cottage Condition						
Passable	-259.829	139.6967	-1.86	*0.065**	-536.144	16.48533
Satisfactory	-79.2097	95.76547	-0.83	*0.410*	-268.63	110.2107
Good	326.0528	92.89056	3.51	*0.001***	142.3189	509.7867
Excellent	1181.208	230.3816	5.13	*0.000***	725.5222	1636.894
New	1307.434	171.5261	7.62	*0.000***	968.1624	1646.706
SaleDate	0.185463	0.064417	2.88	*0.005***	0.058049	0.312876
Own Land	372.5939	100.076	3.72	*0.000***	174.6474	570.5405
Land sqm	0.000902	0.000592	1.52	*0.130*	-0.00027	0.002072
Sale Time (days)	-0.09799	0.047835	-2.05	*0.042***	-0.19261	-0.00338
Building Materials						
Wood	113.0211	130.3942	0.87	*0.388*	-144.894	370.9357
Concrete	416.3118	139.3033	2.99	*0.003***	140.7753	691.8483
Stone	-253.389	209.8465	-1.21	*0.229*	-668.458	161.6789
Timber	159.636	97.28115	1.64	*0.103*	-32.7823	352.0544
Dead Wood	535.0722	139.1735	3.84	*0.000***	259.7924	810.352
Concrete Element	1029.385	196.7316	5.23	*0.000***	640.2579	1418.513
Beach	118.4779	67.38809	1.76	*0.081**	-14.8132	251.7689
Elevator	592.7865	136.9312	4.33	*0.000***	321.9418	863.6312
Rented	277.0378	61.00826	4.54	*0.000***	156.3658	397.7098
Sauna	-54.4775	57.67338	-0.94	*0.347*	-168.553	59.59822
Dist. to store	-5.07269	1.961824	-2.59	*0.011***	-8.9531	-1.19228
Near large ski c.	-399.789	205.3213	-1.95	*0.054**	-805.906	6.328957
Near med. ski c.	-130.115	147.3139	-0.88	*0.379*	-421.496	161.2659

Near small ski c.	124.0667	169.2668	0.73	*0.465*	-210.737	458.87
Near med. size t.	90.46858	167.669	0.54	*0.59*	-241.174	422.1113
Near large town	-152.063	166.345	-0.91	*0.362*	-481.087	176.9606
_cons	-30363.8	5553.456	-5.47	*0.000***	-41348.3	-19379.3

The estimated coefficients for variables indicating a newer cottage, Year built, Sale Date and New Condition, all increase the price per sqm statistically significantly. They increase the price by 13.86 per each more recent year, 0.19 per each more recent date and by 1307.43 if the cottage is in new condition. Variables “good condition” and “excellent condition”, which also indicate good condition of cottage, increase the price per sqm similarly to it being new by 326.06 and 1181.21 respectively. Based on these estimates the cottage being new or in great condition seem to be a highly important price increasing factors. In addition, being built on land belonging to the cottage property itself instead of rented land increases the price per sqm by 372.59. This is logical, as more ownership and owner rights are acquired with owning the land.

Of the building materials mentioned in the data, the coefficients for concrete, dead wood and concrete element are found to be statistically significant. Being built of these materials increase the price per sqm by 416.31, 535.47 and 1029.39 respectively. For the other building materials, wood, stone and timber no statistically significant coefficient was found. Nevertheless, a note to be taken is that being built of stone is the only material that shows signs of decreasing the price per sqm. The previous studies didn’t discuss the effect of building materials on price, making these estimates difficult and uncertain to interpret. Thus, they are not discussed further in this thesis.

Variables often associated with the cottage being very close to the ski slopes, such as there being an elevator in the building and the cottage being rented increase the price per square meter significantly, by 592.79 and 277.04 respectively. Elevator in the building indicates that the building is in one of the more populated areas, which are most often located very close to the ski lifts, thus making elevators an indicator of location near the ski slopes. And overall, in Northern Finland the cottages near ski slopes are more likely to be rented. Many of the cottages nearer to the ski slopes are relatively smaller in size than in other areas (Federation of real estate agency), which could be one explanatory factor as to why the number of rooms and square meters both decrease the price per square meter, by 1.56 and 69.47 respectively. As found in chapter 1.2.3 it is not uncommon for the price per sqm to be decreasing in relation to the indoor area size.

Being close to the store also increases the price, although this is shown in the estimates by the price per square meter decreasing less. Every kilometer further from the store, which marks the shopping and service centers in this thesis, decreases the price per sqm by an estimate of 5.07. On the other hand, even though the found estimate is not statistically significant, being close to a larger town, mainly Rovaniemi in this data, has a decreasing effect of 152.06 the price per sqm. On the other hand, being near a medium sized town has a positive effect. It is important to note here that only cottages are included in the data, thus the permanent homes that can be more expensive near big centers are excluded. Based on the estimates being close to a large city is seen as a negative factor, the previous research on the importance of nature and peacefulness from chapter 1.2.1 seems to apply also for cottages in Northern Finland.

Having a big skiing center, Levi Ylläs or Ruka, as the nearest skiing center of the cottage is found to decrease price per sqm by 399.79. The coefficient for the proximity of big skiing centers is found to be significant, but the coefficients for proximity of medium or smaller sized skiing centers are not. But being nearest to a medium skiing center also decreases the price per sqm and being nearest to a small skiing center increases it. Being closer to larger skiing centers can have a decreasing effect on price per sqm, as in these areas often have larger cottages (Federation of real estate agency) and the price per sqm often decreases as the size of the cottage increases (see chapter 1.2.3). It should be noted that these coefficients are found with being far from all skiing centers as the baseline.

3.2 Additional analyses

To compare with the original DiD analysis two modified DiD analyses, and the original analysis within smaller areas were also conducted. The first modified DiD analysis observes all the cottages near any type of skiing activity as one group, bundling downhill and Nordic skiing activities from the original analysis into one. The second modified analysis observes, as downhill skiing was found to be the most significant price affecting skiing activity, all the cottages within an arguable walking distance from the downhill skiing slopes. In this second modified analysis distance to Nordic skiing was disregarded. Thirdly, as the thesis is also interested in the differences between different areas, the Original DiD analysis was conducted with a filter for cottages in areas near Ylläs, Saariselkä, Levi and Ruka skiing centers.

The two first modified analyses further describe the effect of being close to downhill skiing activities and echo the results found for the control variables. Below in Table 6 the number of observations observed in the different groups of the two modified analyses are shown, before and after treatment.

Table 6 Observation distributions in the two modified analyses

	Near any type of skiing		Within 2km of downhill skiing	
Treat	**0**	**1**	**0**	**1**
0	420	398	420	433
1	433	372	368	402

Only the results for the main variables of interest for these additional analyses are shown, the full results can be found in appendices 4 and 5. The first modified analysis as shown in Table 7 below shows that when you bundle all of the outdoor activities from the original analysis, effect of being close to any outdoor activities seems to be statistically significant and increase the price per sqm of cottages. The effect also seems to have grown after Covid-19 from 238.92 to 273.64. Here the interesting point is that we found in previous chapter in the main analysis, that actually this is not true for all outdoor activities as the coefficients found for only near Nordic skiing activities were not statistically significant and decreased after Covid-19. This demonstrates the strong influence being close to downhill skiing seems to have on cottage prices and highlights the necessity to also have groups for different activities, as the results are not the same for them and bundling the activities causes coefficients resembling mostly the results for downhill skiing.

Table 7 Difference-in-Difference analysis for cottages near any type of ski and near no type of ski

sqmPrice		**Coefficient**	**std. Err.**	**t**	**P>t**	**[95% conf.**	**Interval]**
Treat*anyski							
	*0*1*	238.9166	87.09121	2.74	0.007***	66.65356	411.1796
	*1*0*	63.31292	76.95771	0.82	0.412	-88.9065	215.5323
	*1*1*	273.6439	146.2748	1.87	0.064*	-15.6821	562.9698
Treat*Ski2km							
	*0*1*	353.0533	73.73223	4.79	0.000***	207.2138	498.8928
	*1*0*	27.45258	102.2364	0.27	0.789	-174.767	229.6722
	*1*1*	429.5044	141.8937	3.03	0.003***	148.8442	710.1646

Table 8 Difference-in-Difference analysis for cottages within or further than 2km from downhill skiing

The second modified analysis presented in Table 8 shows that being within 2km of the downhill skiing activities seems to have a statistically significant and seemingly strong effect on the prices per sqm of cottages. Reflecting the results from the main analysis, where cottages within 1km of the downhill skiing activities were considered, the effect of being close to downhill skiing is still noticeable 2km from the slopes. The coefficients for this modified analysis too increased from 353.05 to 429.50, a 22% increase. Compared with 22% for cottages only near downhill skiing and 39% for cottages near both downhill and Nordic skiing in the original analysis, so an average of 30.5%, it would seem that the effect of being close to downhill skiing activities doesn't decrease very much when distance to the slopes increases from 1km to 2km. But it should be noted again that as the original analysis has separated cottages near downhill skiing into two further groups and this modified analysis doesn't, comparisons done can't be absolute but only give food for thought.

Finally in the third additional analysis, the original DiD analysis was repeated, but with filters for the three largest skiing centers of Finnish Lapland, and Ruka, the largest skiing center outside Lapland. This analysis was done to gain insight into the differences between the skiing centers. The main coefficients are shown in Table 9 below and the whole results are shown in appendices 6; 7; 8; 9. These analyses highlight how different the results turn out once the areas considered are narrowed down and specified. Some of the coefficients even turn from positive to negative or the other way around. The most statistical significance here is once again found for being both close to Nordic and downhill skiing, but even this doesn't apply in all areas, Ylläs not showing statistical significance for this group neither before or after Covid-19. Levi is a skiing center that can appeal more to the people who appreciate a combination of services, restaurants, nightlife and après ski, and varied skiing options. With this in mind, the results show that being close to the ski slopes where also many of the restaurants and services are located, has a price increasing effect that increases significantly after Covid-19, whether or not the Nordic skiing tracks are also close. (Levi.fi.)

Table 9 DiD analysis results for four biggest ski centres in Northern Finland

	Ylläs	Saariselkä	Levi	Ruka
Treat*group	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**
0 1	-396.169	504.6478***	-51.8595	56.77254
0 2	267.0568	-310.534	345.1583***	43.73775

	0 3	285.6551*	0	536.7791***	122.4926*
	1 0	809.0899**	306.1056	-18.6015	-175.742
	1 1	629.796	-409.208**	48.87336	-302.977
	1 2	102.4391	-437.685	570.3644***	-308.942**
	1 3	317.4949	743.7651**	1097.246***	332.1278**

The results for Ruka also show statistical significance for the coefficient for being near both types of skiing both before and after Covid-19. The coefficient increases significantly for the latter period, by 271 %, from 122.49 to 332.13. This can be seen to indicate that in Ruka being close to the ski slopes is seen as valuable. Interestingly, after Covid-19 being only close to the ski slopes has a statistically significant estimate, but the estimate is significantly negative. This could indicate for example that post-pandemic being only close to the ski slopes is not sufficient, the buyers also want to be close to the Nordic skiing activities.

For Saariselkä, where there are less ski slopes and thus the activities can center more around Nordic skiing, the coefficients for being close to the skiing tracks are significant both before and after Covid-19, but the coefficient decreases significantly, from 504.65 to -409.21. Such a decrease is unexpected and the reasons for it could include other factors than the proximity effect as well. In addition, Saariselkä is a very small place with only 173 cottage sales over the whole period from beginning of 2017 to the end of 2021, and thus the number of cottages that are close to the Nordic skiing tracks in Saariselkä might be small. This means that the possibility of results being biased is very large.

Table 10 Distribution of observations for last analysis by ski center

	Ski center area			
Treat	**Ylläs**	**Saariselkä**	**Levi**	**Ruka**
0	76	97	264	145
1	48	76	195	211
Total	124	173	459	356

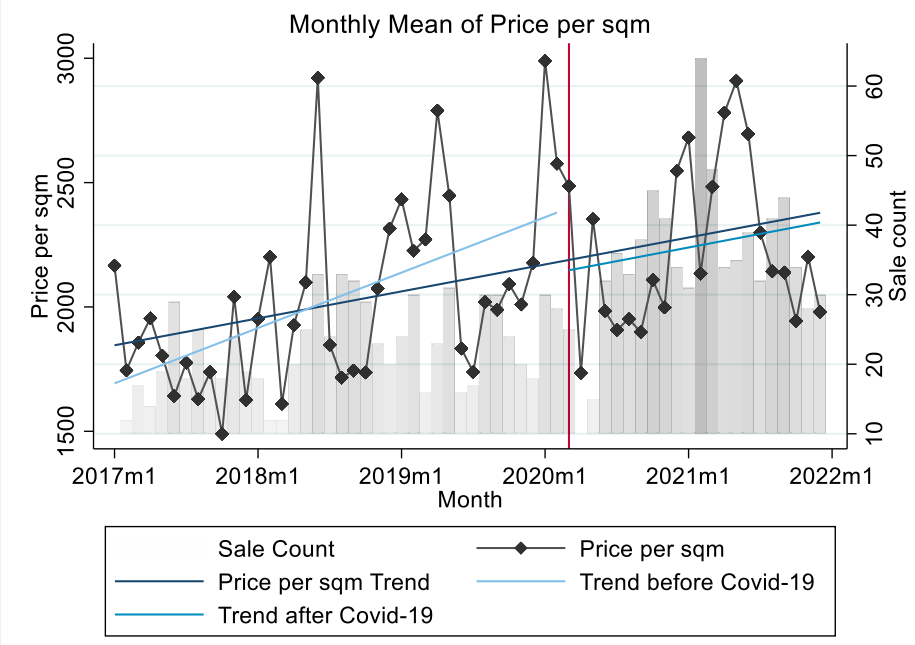
As seen in 10 above, the number of observations for any of the individual areas is not large, but especially for Ylläs and Saariselkä it doesn't seem sufficient to for analysis. This line of analysis is interesting but requires more data. However, from the additional analysis 3 it can still be understood that there can be large differences between different areas in Northern Finland, as to how proximity to outdoor activities affect cottage prices.

3.3 Discussion

3.3.1 The Price Trend

As shown in Figure 2 below, even though there have been large variations, cottage prices in Northern Finland have been rising for the whole analyzed period. A clear upwards trend can be detected. Some of the large variations in monthly price averages can be explained by individual relatively very expensive sales. Over the estimation period there have been yearly fluctuations in price per sqm, but especially there have been five very outlying peaks in price. These peaks last for 1 to 3 months, and they happen between December and June.

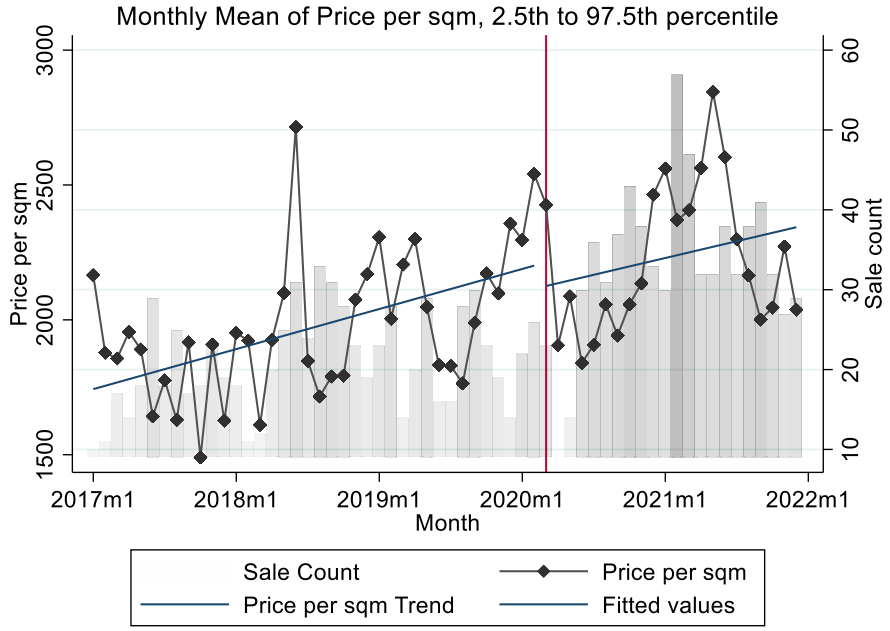
Figure 2 Monthly sqm price and monthly sale volume



As shown by the bars in figure 2 above and figure 3 below, the number of monthly sales has fluctuated throughout the estimation period, and it decreased substantially after Covid-19 hit in April and also May 2020. Due to this the average prices for these two months are based only on approximately 40% of the usual number of sales. The number of monthly cottage sales might have dropped in the first months after Covid-19 started, but since then the monthly sales have been consistently above pre-Covid levels. This can be seen as an effect of Finnish people traveling more within Finland due to Covid-19 restrictions and also as a possible indication of peoples' lifestyle changing. Over the estimation period the average monthly number of cottage sales increased from 22 pre-Covid to 35 post-Covid.

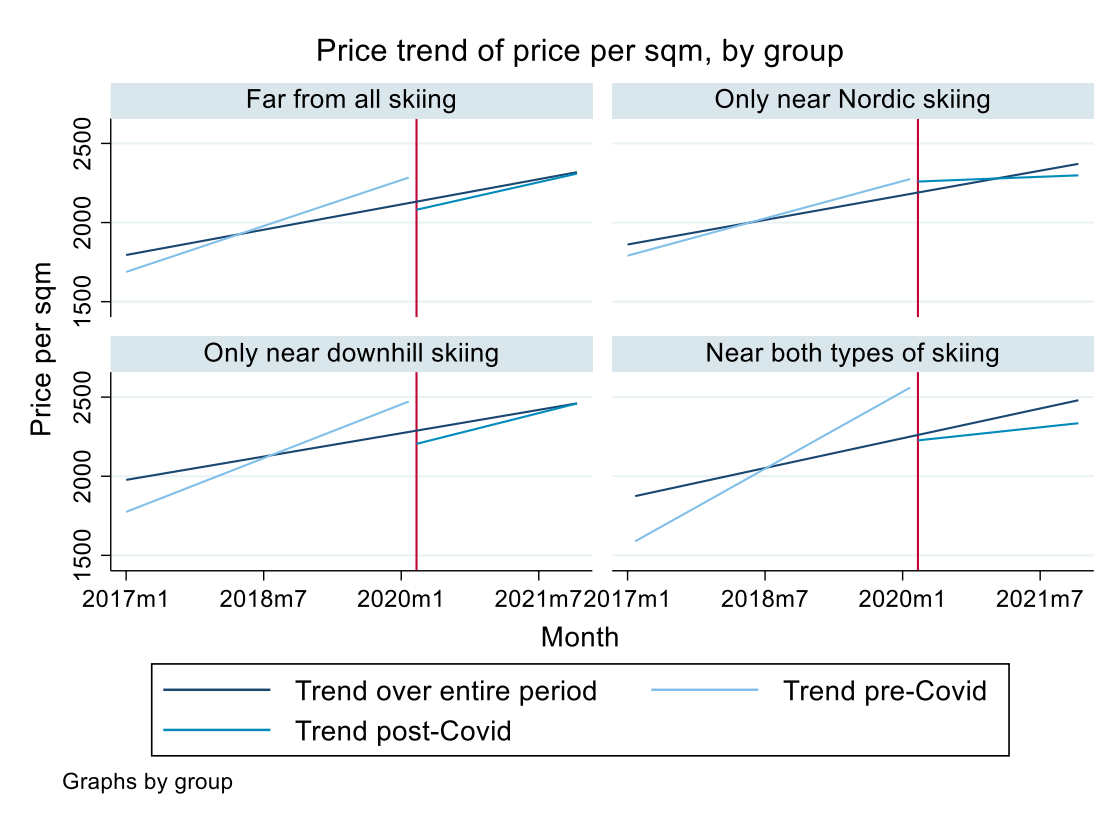
The trend lines in Figure 2 above show how before Covid-19 the price per sqm trend was in a steep incline, comparing to the trend over the whole estimation period. Post-Covid the trend continued to be increasing, but the incline became more moderate. However, since the number of observations per month is not large as also shown in the figure, the steepness of the pre-Covid trend can be explained in part by the mentioned individual highly priced observations. When only observing observations between 2.5th and 97.5th percentile, 41 of the highest and lowest observations are omitted. And as seen in Figure 3 below, the trend line pre-Covid resembles more the overall trend line as well as the post-Covid trend line, supporting that individual sales shape the trend significantly in Figure 2.

Figure 3 Monthly sqm price and monthly sale volume, 2.5th to 97.5th percentile



In the beginning of Covid-19 uncertainty in all markets was high (Battistini et al., 2021) and this is likely why the price development seen between April and November of 2020 was more subdued. The monthly price average didn't yet have time to react in March 2020 but fell substantially in April and only saw a slight upwards trend until December when the next spike in prices started. In a large part due to the conservative prices of the first 8 months of Covid-19, the post-Covid trend line has a less step incline than the pre-Covid trend. Trend line post-Covid seems to even out and only drops slightly at the beginning of Covid-19. The incline is still less steep than before Covid-19, but less noticeably so. It is good to note, that these found trends do differ between different areas, as discussed previously in chapter 3.2, and between the different activity groups as shown in Figure 4 below.

Figure 4 Trend of sqm price, by activity group



The trends for groups differ both when looking at the trend over the whole period and the trend lines before and after Covid-19, but the trend lines set for the whole time period are more similar. Between the groups the group near both types of skiing has the strongest upwards trend overall, as for this group the upwards trend before Covid-19 was quite drastic and clearly steeper than in the other groups. After Covid-19 the steepest upwards price trend is found in the group of cottages only near downhill skiing activities, and almost as steep post-Covid trend is visible for cottages far from all types of skiing. The cottages near only Nordic skiing have the highest start-point for the pre-Covid trend, but the trend is the least steep one and after Covid the trend line for this group is the only one approximately flat. Especially the pre-Covid trends are significant in this study, as they contradict one of the assumptions of a DiD-analysis. More on this in chapter 3.3.3 “Limitations”.

3.3.2 The Proximity Effect to Outdoor Activities

As the overall price trend has been increasing, the trend for groups 2 and 3 had been strongly increasing and the trend for group 1 has taken a decreasing turn after Covid-19, these trends can be seen reflected also in the DiD estimation. The estimated coefficient

fell by 55% for group 1, increased by 22% for group 2 and increased by 39% for group 3. In other words, according to the results being only close to the Nordic skiing tracks seems to have become less attractive after Covid-19 but being close to downhill skiing and especially close to both downhill skiing and Nordic skiing seems to have become substantially more attractive. Being in group 2 or 3 is connected with a substantial increase in price per sqm, when controlling for other factors.

It is relatively surprising that based on this analysis it would seem that a very close proximity only to the Nordic skiing trails could be seen as less important in the in the post-Covid market. Especially since for example Konu et al. (2011) have found that in Finland Nordic skiing is an important activity for tourists and according to The Finnish Ski Area Association (2021) more Finns participate in Nordic skiing than downhill skiing. But it should be noted again that in this thesis the estimated coefficients for Nordic skiing showed no statistical significance. This could be for example because most of the cottages in Lapland are within a few kilometers of the Nordic skiing trails, making it more of a given than a special quality to be close to the Nordic skiing trails. For example, in this thesis, out of the total 1,623 observations 602 were within 500m of Nordic skiing tracks and 1,018 or were within 1km, which can still be seen as walking distance. Thus, if the cottage is near a skiing center, it can be assumed that the cottage is always relatively close to the skiing tracks and being close to one doesn't affect the prices per sqm significantly. Being near other, relatively rarer, places such as stores, skiing centers or spas become more of the selling point of the cottages and this shows in the difference between Nordic skiing and downhill skiing activities -coefficients.

The coefficients for the both groups close to downhill skiing activities not only increased significantly, but they were also statistically significant both before and after Covid-19. There are many reasons for why the connection being close to the downhill skiing activities seems to be associated with higher prices per sqm post-Covid. For one reason, there might be relatively a lot of people in the tourist segments "want-it-all" and "sports-seekers" as Konu et al. (2011) defined them (see also chapter 1.1.1), in relation to the number of cottages. This would explain why, when cottages near downhill skiing are concerned, demand can often exceed supply, since the relatively low number of such located cottages in the whole of northern Finland. For example, of our observations 516 were within 1km of downhill skiing and 244 were within 500m. In addition, as found in chapters 1.1.2 and 1.1.3, the most popular months to visit Northern Finland are during the

winter, and downhill skiing is found to be one of the most important attractions then (Official Statistic of Finland: Accommodation statistics (2021); Sælen & Ericson 2013; Konu et al. 2011). It can also be argued that compared to Nordic skiing, when it comes to downhill skiing one needs to be closer to the activity for the distance to be still considered a walking distance. This is because one having to carry heavier equipment, wearing skiing boots that are more uncomfortable to walk in and the probability of being able to ski to the activity start point being lower. Thus, while approximately 1,018 observations in this study are within walking distance to Nordic skiing, only approximately 244 are within walking distance to the downhill skiing activities.

Because of lower supply and steady demand, the cottages close to downhill skiing can also be seen as a more reliable investment, or even the only cottage group that could be considered as a pure investment (see chapter 1.3.2). The price development further from downhill skiing activities is unreliable and unpredictable, being more heavily affected by for example new real-estate developments, construction affecting landscape and natural views and the outdoor trends. For example, according to the regional financial estimation conducted by Gaia Consulting (2017) for the municipality of Ylläs regarding the re-activation of a mine near the Ylläs skiing center, it was estimated that an active mine in the vicinity of tourist areas would decrease the turnover of the tourism sector in the area by 18 percent, indicating the area becoming less desirable for visitors. The cottages closest to downhill skiing activities are also more likely to be available for renters. Although only a relatively small portion of the cottages in Northern Finland are available for rent, in this analysis attributes contributing to the expected rentability of the cottage and the cottage having been previously rented have a positive connection with on the price.

In addition to proximity to skiing activities this thesis found other factors with significant connections with the price per sqm. The findings were in accordance with previous studies, for example Ham et al. (2012), Schirmer et al. (2014), Taruttis & Weber (2022). Attributes indicating a higher price per square meter were newer building year, cottage condition (good, excellent or new), later sale date (prices increase in time), the cottage having been built on its own land, some of the building materials (concrete, dead wood and concrete element), the building having an elevator and the cottage having been previously rented. The attributes that have a negative association with the price per square

meter were number of rooms, how long the cottage was listed for sale before it was bought, and the distance to the closest store.

The other factors indicating overall good or preferably great form of the cottage seemed to be some of the most consistently significant estimates, with all of the variables indicating good condition being significantly positive. A good condition is associated with a higher price per sqm in real estate markets around the world (see for example Ham et al. 2012; Taruttis & Weber 2022), but in the case of northern Finland's cottages it could be seen as even more important. Beyond the conventional reason of people not wanting to find unwanted surprises only after buying the cottage, this could also be because as found in chapter 1.3.1 (see Kauppila 2008; 2009), portion of the cottage owners live significantly far from their northern cottage. Thus, planning and overseeing any big renovations would be hard for a large portion of the owners and unpleasant surprises relating to the cottage can be seen to be more problematic than usual.

The estimates for larger distance to the closest store are negative, meaning that being close to the store increases the price per sqm. According to the results, distance to the store is associated with 5 euros lower price per sqm for every kilometer the cottage is further from the store. This variable is found to be statistically significant, but it is only a relatively small deduction to the price. Thus, it seems as being close to the store is not a very important factor to the price after all. This could be explained for example by the other spot to which the distance to was found very important, downhill skiing. Looking at the store locations in northern Finland, they are inconsistently sometimes close to the ski slopes and sometimes many kilometers from them. In cases when the cottages are near the store but many kilometers from the ski slopes, according to the results this location would be considered significantly worse than being close to the ski slopes but far from the stores.

3.3.3 Limitations

One of the main limitations of this thesis is that the DiD-method is used for analysis, but it is not a traditional form of a Difference-in-Difference analysis. This is firstly apparent in the structure of the analyzed groups. Conventionally a DiD-analysis has a control group that is not affected by the treatment, and one or more groups that receive the treatment. Then the differences of reaction in groups receiving and not receiving treatment are observed. However, in this thesis there is no clear control group, as all of the real estate

markets were affected by Covid-19 in some way. Thus, what is left to do is to try and observe the different reactions the different cottage groups have in relation to each other. In itself observing the differences in reaction to treatment is what DiD analysis is often used for, but the lacking control group to compare the reactions to, can decrease the reliability of the analysis.

DiD-analysis also includes many assumptions, one of which is the parallel trends assumption (Cunningham 2021, Chapter 9.4). Parallel trends assumption means that it is assumed, had there been no treatment the difference between the groups would have stayed the same over time. According to this it is assumed in the analysis that there are no pre-trends present. This assumption doesn't apply in this thesis, as we saw in Figure 4 there are differing pre-treatment trends present. There is a significant difference in the price development in the cottages in different groups even before Covid-19, due to which it can't be said that the magnification of these differences observed in this thesis would not have occurred without Covid-19. Thus, the estimates found can be at least partially biased due to the pre-treatment trends.

As the parallel trends assumption of DiD-analysis is not met, how direct the connection between location, Covid-19 and price per sqm mentioned in this thesis is should also be considered carefully. It is possible that the perceived change in how price and proximity to outdoor activities are connected is not purely due to the pandemic, but rather due to other reasons or both other reasons and the proximity to outdoor activities. In addition, the longevity of the changes found should be considered. Due to Covid-19 being a recent disruption, this thesis can't yet take a stand on whether or not the found changes in estimates will be a short-term blip or rather a start of the trend line taking a new course.

Missing variable bias is also a possible limitation of the thesis. For example, for simplicity's sake this thesis doesn't consider ski bus stops in any way. Ski buses are buses found in the skiing centers of northern Finland that travel around the cottage areas picking up skiers and then drive to the most popular ski lifts in the center. They also pick skiers from the ski centers and take them back to their closest ski bus stops. Ski bus routes focus on the main roads of an area and thus the stops can be quite far from the stops (Ski Buses, Levi.; Skibus Routes, Ylläs; Skibus Ruka Kuusamo; Skibus Timetable and Map Winter 21-22, Saariselkä). Including ski bus stops in the study as a control variable could have altered the results slightly, since some people might view cottages that are near ski bus

routes to be in almost as good of a location as cottages that are right by the downhill skiing activities. This is because in both cases one doesn't need a car to easily go downhill skiing.

As seen in Table 9 and Figure 5 below, the results find that there are major differences in price development in different areas. For example, comparing the areas with largest ski centers; Ruka, Levi and Ylläs, the prices per sqm in the first two have seen a slight trend of declining prices, but in Ylläs the prices have been steadily rising. These differences would indicate that within Northern Finland there are multiple markets defined by geographical area, within each of which the price development is different.

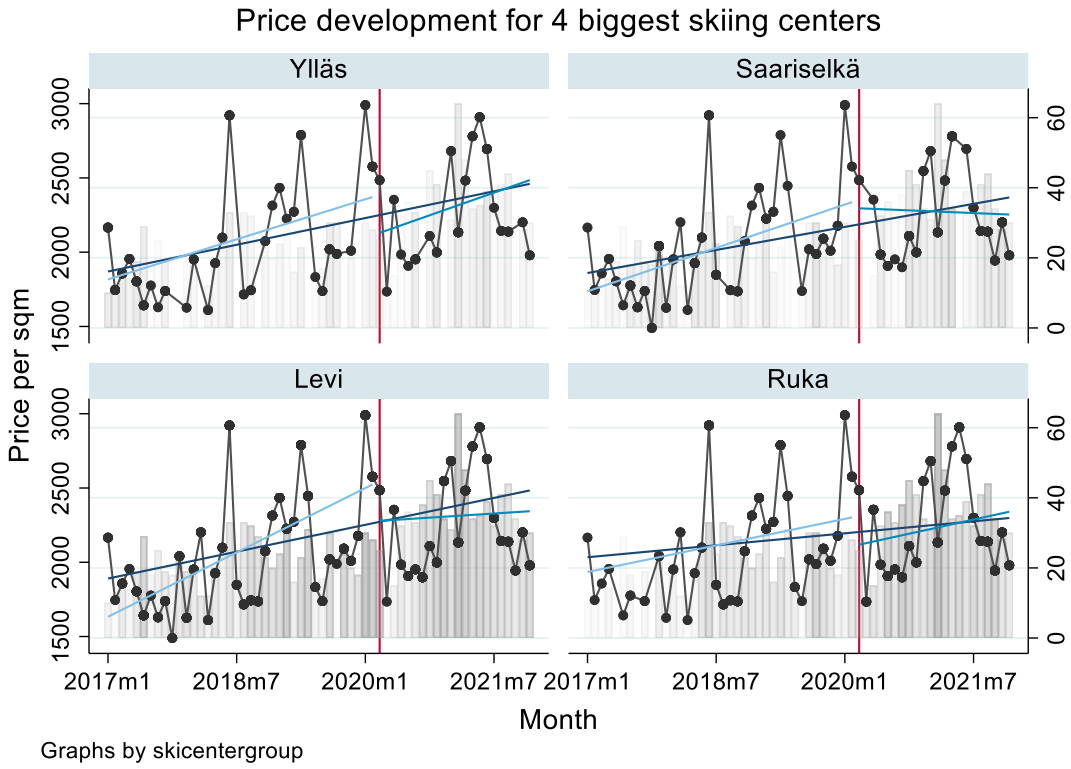


Figure 5 Price and sale volume development by skiing center

As both the estimates and the overall price trends have been different in different areas of Northern Finalnd, another possible limitation for this thesis is noted. The geographical area examined might have been too large, leading to the results not being generalizable to other similar areas. The main estimation results of this thesis resemble the estimation results in for the smaller areas very little. This supports the findings of for example Nilsson (2015) and Soguel et al. (2008), that being near to different natural amenities and activities has a heterogeneous connection with price even between areas near each other. In this thesis only one of the strongest findings is detectable both in results for the whole

Northern Finland and the smaller areas: the coefficients for the group of cottages that are both near downhill and Nordic skiing increased in all estimation variations tried (see Table 5; 7; 8; 9). Many of the control variables also remained consistent through all estimations, with only little variation (see Table 5; Appendix 3; 4; 5; 6; 7; 8).

However, all of the discussion relating to results when divided into smaller areas within Northern Finland should be considered with reservation, since when divided into different areas the number of observations per area is not large (see chapter 3.2; Table 10; Appendix 2). Even for the largest skiing center areas, the areas around Ylläs, Levi, Saariselkä, Ruka and Iso-Syöte, the number of observations per year varies between 15 to 125 with an average of 49 observations per year per area. If the geographical area included in the scope was indeed too large, the number of observations was too small and data was not sufficient for a reliable analysis. As there is an indication that there might be significant differences between areas and skiing centers, the results of this research might be only indicatory, applicable mainly to the skiing centers of Levi and Ruka, from which the thesis had the most observations (see Appendix 2).

4 Conclusions

This thesis examines whether in Northern Finland Covid-19 pandemic has affected the prices of cottages near Nordic skiing tracks differently than the price per sqm of cottages near downhill skiing activities. Northern Finland being defined in this thesis as all of the municipalities in Lapland and the municipalities of Kuusamo and Pudasjärvi. “Nordic skiing” is used to refer to a bundle of activities that for the most part run on the same tracks: Nordic skiing, hiking, and biking. According to the estimates, the connection between the price and being near these activity groups differed between the groups both before and after the pandemic, and the estimates found changed in different directions. The estimates for being close to downhill skiing increased while they decreased for being near only Nordic skiing. Overall, being near outdoor activities was found to have an important connection with the cottage prices.

Before the analysis the assumption was that being close to any of the activities would see an increase in positive estimates after Covid-19, compared to before the pandemic. As this didn’t apply for the cottages near only Nordic skiing, this is one interesting direction for future research. Possible explanation could be for example how it is often taken as a certainty that Nordic skiing tracks are near the cottage in Northern Finland, due to the vast number and length of the tracks. In addition, Nordic skiing might be seen as a sport where enjoying the nature is a central element, and in Northern Finland one can enjoy an abundance of nature almost anywhere, just by walking out the door. To research this topic more a larger data would be needed and possibly in addition a qualitative analysis to find out about the attitudes and preferences towards cottage location.

The DiD (Difference-in-Difference) analysis method can be a good method for estimating differences in changes in how prices respond to shocks. But based on the analysis done for this thesis, applying DiD to estimate differences between prices in different types of locations should be approached with caution. With real-estate the price development seems to be a long-term trend, differentiated between location and attributes, and one would need to find very similar properties in very similar areas to avoid violating the DiD assumption of parallel trends before the treatment in the analysis. In this thesis the pre-Covid trends differed between both, different areas and different activity groups. It can be assumed that diving deeper there might be more differences between more attributes that were not compared in this thesis. However, even though one should be cautious when

considering applying DiD in a real-estate context, there can very well be instances where it is a valid analysis method and should not be discarded as an option.

As there might be significant differences between different areas and skiing centers in how proximity to outdoor activities affects cottage price (see chapter 3.2; Table 9), in future research it should be considered if the analysis should be conducted in smaller areas, instead of one very large geographical area. In addition, future research should also consider including control variables for proximity to ski-bus stops and the floor the cottage or holiday apartment is in. The proximity to ski-bus stops could be included in the study to account for other car-less methods for getting to the downhill skiing centers, other than walking. This could impact the results especially for more downhill skiing -centric ski centers, such as Levi. The variable for the floor the cottage or holiday home is in could be a variable for highlighting holiday apartments in multi-story buildings. These higher buildings are often the ones in immediate proximity to the skiing slopes, thus making this a possible variable to easily differentiate between typical Finnish cottages and alpine-style apartments targeted towards the people mainly interested in downhill skiing and nightlife.

This study has shown the significant connection between cottage location in relation to outdoor activities, and cottage prices in Northern Finland. Thus, the thesis contributes to two very little researched topics, cottage or second home prices, and cottage markets of Northern Finland. Both of these areas are relevant to research even more, especially now post-Covid when the demand for outdoor activities seems to have increased, at least temporarily. Next steps for this line of research would be to modify the analysis so that the DiD assumption of parallel trends pre-treatment is fulfilled, then to conduct the analysis again preferably with more data overall. In future research more post-Covid years should be included in the data to find out more about the longevity of the effects, which is still hard to predict at present.

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Appendices

Appendix 1 Variables used in the analysis

Variable	Obs.	Mean	Std. dev.	Min	Max
Lat	1,623	67.06392	.9895382	65.16512	70.01922
Long	1,623	26.63223	1.965185	23.07739	29.99595
sqm	1,611	68.83671	44.164	8	500
Year built	1,533	1997.202	15.29678	1905	2022
Rooms	1,623	2.759088	1.414825	1	14
sqmPrice	1,611	2152.298	1171.28	42.06	10598.29
Sale date	1,623	21862.8	516.9694	20821	22645
Own land	1,623	.9038817	.2948443	0	1
Land in sqm	1,500	14001.15	73873.92	.12	2146200
Sale time (days)	1,615	200.2892	314.1882	-107	3553
Beach	1,576	.2620558	.4398924	0	1
Elevator	1,532	.0515666	.2212225	0	1
Rented	1,623	.138016	.3450231	0	1
Sauna	1,612	.7177419	.4502379	0	1
Balcony	1,310	.1641221	.3705278	0	1
DSkiLat	1,623	67.05149	.9079559	65.62511	68.42447
DSkiLong	1,623	26.61746	1.946823	23.66452	29.18065
NSkiLat	1,623	67.04619	.9100461	65.57446	68.47424
NSkiLong	1,623	26.6189	1.953759	23.5514	29.47062
StoreLat	1,623	67.0543	.9356761	65.32586	68.90604
StoreLong	1,623	26.60346	1.942375	23.63912	29.1875
DSkiDist (km)	1,623	12.51979	23.56634	0	177.3316
NSkiDist (km)	1,623	9.661204	21.17028	.0129586	171.8335
StoreDist (km)	1,623	9.355926	17.09343	.0272451	156.6966
NSki 450m	1,623	.3709181	.4831995	0	1
DSki 1km	1,623	.3179298	.4658155	0	1
treat	1,623	.4744301	.4994997	0	1
Group	1,623	1.006778	1.155303	0	3
Building materials group	1,623	2.062847	1.712288	0	6
Condition group	1,623	2.852126	1.07846	0	5

Appendix 2 Observations by municipality

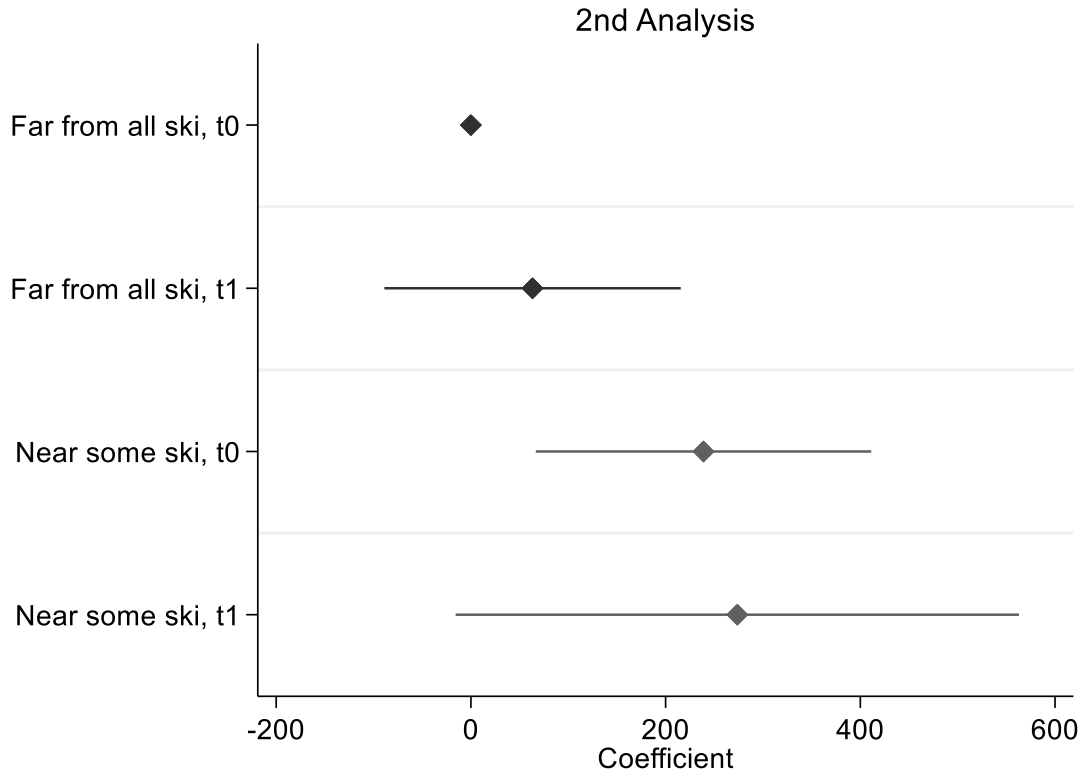
Municipality	Frequency	Percent
Enontekiö	13	0.8 %
Inari	166	10.2 %
Kemi	6	0.37 %
Kemijärvi	23	1.42 %
Keminmaa	6	0.37 %
Kittilä	462	28.5 %
Kolari	120	7.39 %
Kuusamo	458	28.2 %
Muonio	10	0.62 %
Pelkosenniemi	35	2.16 %
Pello	14	0.86 %
Posio	9	0.55 %
Pudasjärvi	76	4.68 %
Ranua	14	0.86 %
Rovaniemi	80	4.93 %
Salla	11	0.68 %
Simo	29	1.79 %
Sodankylä	38	2.34 %
Tervola	8	0.49 %
Tornio	26	1.6 %
Utsjoki	8	0.49 %
Ylitornio	11	0.68 %
Total	**1,623**	**100 %**

Appendix 3 Effects of control variables on the Price per Sqm

Variable	Strong positive effect	Positive effect	Negative effect	Strong negative effect
Sqm*			-	
YearBuilt***		+		
Rooms***			-	
Cottage condition				
**Passable*				-
Satisfactory			-	

Variable	Strong positive effect	Positive effect	Negative effect	Strong negative effect
****Good*		+		
****Excellent*	+			
****New*	+			
Sale date***		+		
Own land***	+			
Land sqm		+		
Sale time (days)**			-	
Building materials				
Wood		+		
****Concrete*	+			
Stone				-
Timber		+		
****Dead Wood*	+			
****Concrete Element*	+			
Beach*		+		
Elevator***	+			
Rented***		+		
Sauna			-	
Dist. to store (km)**			-	
Near large ski c.**				-
Near med. ski c.				-
Near small ski c.		+		
Near med. size t.		+		
Near large town				-

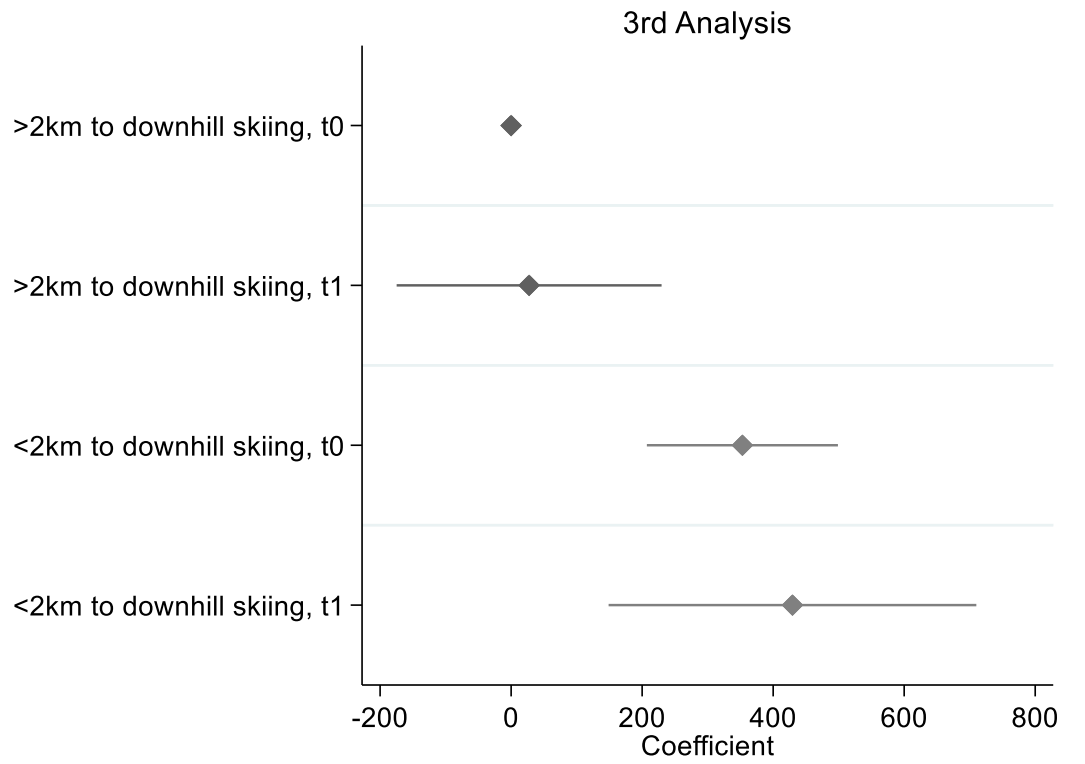
Appendix 4 Difference-in-Difference analysis for cottages near any type of ski and near no type of ski



sqmPrice	Coefficient	std. Err.	t	P>t	[95% conf.	Interval]
Treat*group						
*0*1*	238.9166	87.09121	2.74	0.007***	66.65356	411.1796
*1*0*	63.31292	76.95771	0.82	0.412	-88.9065	215.5323
*1*1*	273.6439	146.2748	1.87	0.064*	-15.6821	562.9698
sqm	-1.4098	0.903907	-1.56	0.121	-3.1977	0.378091
Year built	15.18472	3.432042	4.42	0.000***	8.396269	21.97316
Rooms	-62.953	26.91341	-2.34	0.021**	-116.187	-9.71934
Cottage condition						
Passable	-257.214	139.3551	-1.85	0.067*	-532.853	18.42495
Satisfactory	-91.7758	101.7966	-0.9	0.369	-293.126	109.5739
Good	308.6991	110.3875	2.8	0.006***	90.35691	527.0413
Excellent	1118.772	255.9671	4.37	0.000***	612.4792	1625.065
New	1364.169	152.6929	8.93	0.000***	1062.149	1666.19
Sale date	0.187698	0.061456	3.05	0.003***	0.06614	0.309256
Own land	369.4243	102.8847	3.59	0.000***	165.9222	572.9263
Land sqm	0.000874	0.000606	1.44	0.151	-0.00032	0.002073
Sale time (days)	-0.0908	0.045315	-2	0.047**	-0.18043	-0.00117

sqmPrice	Coefficient	std. Err.	t	P>t	[95% conf.	Interval]
Building materials						
Wood	150.6709	126.847	1.19	0.237	-100.228	401.5693
Concrete	548.7881	131.6509	4.17	0.000***	288.3877	809.1885
Stone	-145.52	226.7666	-0.64	0.522	-594.056	303.0156
Timber	198.2018	99.34973	1.99	0.048**	1.691851	394.7117
Dead Wood	575.1488	143.0835	4.02	0.000***	292.1352	858.1625
Concrete Element	1141.048	181.4088	6.29	0.000***	782.2287	1499.868
Beach	112.5367	69.4279	1.62	0.107	-24.789	249.8624
Elevator	669.7624	120.9988	5.54	0.000***	430.4315	909.0933
Rented	290.5774	70.27734	4.13	0.000***	151.5716	429.5833
Sauna	-63.2364	57.86696	-1.09	0.276	-177.695	51.22218
Dist. to store (km)	-4.82761	1.931698	-2.5	0.014**	-8.64844	-1.00679
Near large ski c.	-400.846	203.3561	-1.97	0.051*	-803.076	1.384879
Near med. ski c.	-180.405	150.5242	-1.2	0.233	-478.136	117.3265
Near small ski c.	87.50579	162.0612	0.54	0.590	-233.045	408.0566
Near med. size t.	133.0724	151.8338	0.88	0.382	-167.249	433.3937
Near large town	-93.9045	140.3342	-0.67	0.505	-371.48	183.6711
_cons	-33088.7	6577.693	-5.03	0.000***	-46099.2	-20078.3

Appendix 5 Difference-in-Difference analysis for cottages within or further than 2km from downhill skiing



	Coefficient	std. err.	t	P > t	[95% conf.	Interval]
Treat*Ski 2km						
*0*1*	353.0533	73.73223	4.79	0.000***	207.2138	498.8928
*1*0*	27.45258	102.2364	0.27	0.789	-174.767	229.6722
*1*1*	429.5044	141.8937	3.03	0.003***	148.8442	710.1646
sqm	-1.595728	0.909384	-1.75	0.082*	-3.39446	0.202999
Year built	14.22125	3.401175	4.18	0.000***	7.493858	20.94864
Rooms	-63.70224	27.69852	-2.3	0.023**	-118.489	-8.91565
Cottage condition						
Passable	-287.652	144.7291	-1.99	0.049**	-573.92	-1.3835
Satisfactory	-101.3933	108.556	-0.93	0.352	-316.113	113.3262
Good	283.4661	116.892	2.43	0.017**	52.25812	514.674
Excellent	1123.377	269.9469	4.16	0.000***	589.4326	1657.322
New	1318.906	167.4068	7.88	0.000***	987.7819	1650.03
Sale date	0.1876446	0.060957	3.08	0.003***	0.067074	0.308215
Own land	348.9579	89.45925	3.9	0.000***	172.0109	525.9048
Land sqm	0.001021	0.00055	1.86	0.065*	-6.6E-05	0.002108
Sale time (days)	-0.1063003	0.043599	-2.44	0.016**	-0.19254	-0.02006

Building materials						
Wood	141.7706	134.1104	1.06	0.292	-123.495	407.0358
Concrete	493.1969	128.9824	3.82	0.000***	238.0747	748.3192
Stone	-87.68842	221.3349	-0.4	0.693	-525.48	350.1034
Timber	226.607	104.0041	2.18	0.031**	20.89101	432.323
Dead Wood	550.0116	146.8644	3.75	0.000***	259.5195	840.5038
Concrete Element	1126.995	177.6388	6.34	0.000***	775.6327	1478.358
Beach	172.9203	66.69984	2.59	0.011**	40.99057	304.85
Elevator	679.4057	121.9664	5.57	0.000***	438.1609	920.6505
Rented	241.1442	94.65126	2.55	0.012**	53.92768	428.3607
Sauna	-93.23481	54.37782	-1.71	0.089*	-200.792	14.32241
Dist. to store (km)	-4.041331	1.797763	-2.25	0.026**	-7.59724	-0.48542
Near large ski c.	-405.9402	203.1145	-2	0.048**	-807.693	-4.18769
Near med. ski c.	-153.0268	155.47	-0.98	0.327	-460.54	154.4869
Near small ski c.	142.3787	162.6582	0.88	0.383	-179.353	464.1103
Near med. size t.	21.68817	148.9842	0.15	0.884	-272.997	316.3732
Near large town	-201.7453	146.1382	-1.38	0.17	-490.801	87.31043
_cons	-31114.35	6681.077	-4.66	0.000***	-44329.3	-17899.4

Appendix 6 Difference-in-Difference analysis for Ylläs only

sqmPrice	**Coefficient**	**Robust std. err.**	**t**	**P>t**	**[95% conf.**	**interval]**
Treat*group						
*0*1*	-396.169	545.2133	-0.73	0.508	-1909.92	1117.586
*0*2*	267.0568	162.4289	1.64	0.175	-183.918	718.0316
*0*3*	285.6551	130.9363	2.18	0.095	-77.8825	649.1927
*1*0*	809.0899	246.9126	3.28	0.031	123.5507	1494.629
*1*1*	629.796	610.5487	1.03	0.361	-1065.36	2324.951
*1*2*	102.4391	867.0864	0.12	0.912	-2304.98	2509.857
*1*3*	317.4949	516.7427	0.61	0.572	-1117.21	1752.203
sqm	-5.79119	2.810932	-2.06	0.108	-13.5956	2.013207
Year built	28.03538	13.77432	2.04	0.112	-10.2083	66.27902
Rooms	33.76367	27.31626	1.24	0.284	-42.0784	109.6058
Cottage condition						
Satisfactory	-814.592	615.1202	-1.32	0.256	-2522.44	893.2555
Good	-780.675	406.5368	-1.92	0.127	-1909.4	348.0527
New	-665.281	390.6551	-1.7	0.164	-1749.91	419.352

Sale date	0.083931	0.552429	0.15	0.887	-1.44986	1.617719
Own land	364.0569	451.8084	0.81	0.466	-890.364	1618.478
Land sqm	-0.00044	0.001159	-0.38	0.723	-0.00366	0.002776
Sale time (days)	-0.18845	0.213145	-0.88	0.427	-0.78024	0.403331
Building material						
Wood	712.6052	438.0339	1.63	0.179	-503.572	1928.782
Concrete	312.3526	32.47919	9.62	0.001	222.176	402.5293
Timber	493.1956	455.5167	1.08	0.34	-771.522	1757.913
Dead Wood	526.2627	802.1439	0.66	0.548	-1700.85	2753.371
Concrete Element	3211.964	404.5541	7.94	0.001	2088.742	4335.186
Beach	1136.616	652.3843	1.74	0.156	-674.693	2947.925
Elevator	756.7954	738.3882	1.02	0.363	-1293.3	2806.89
Rented	172.8182	309.2496	0.56	0.606	-685.796	1031.433
Sauna	-388.697	575.402	-0.68	0.536	-1986.27	1208.875
Store dist. (km)	-60.6562	24.0501	-2.52	0.065	-127.43	6.117622
Near med. size town	-1177.03	242.5048	-4.85	0.008	-1850.33	-503.726
_cons	-55130.6	17649.74	-3.12	0.035	-104134	-6127.01

Appendix 7 Difference-in-Difference analysis for Saariselkä only

sqmPrice	**Coefficient**	**Robust std. err.**	**t**	**P>t**	**[95% conf.**	**interval]**
Treat*group						
*0*1*	504.6478	131.4731	3.84	0.005	201.4702	807.8254
*0*2*	-310.534	239.7835	-1.3	0.231	-863.476	242.4074
*0*3*	0	(empty)				
*1*0*	306.1056	308.1457	0.99	0.35	-404.48	1016.691
*1*1*	-409.208	163.3786	-2.5	0.037	-785.96	-32.4564
*1*2*	-437.685	293.6849	-1.49	0.174	-1114.92	239.5539
*1*3*	743.7651	228.7114	3.25	0.012	216.3557	1271.175
sqm	-0.89017	2.331284	-0.38	0.713	-6.26612	4.485782
Year built	15.02906	4.26212	3.53	0.008	5.20059	24.85753
Rooms	-155.167	69.71012	-2.23	0.057	-315.919	5.584951
Cottage condition						
Passable	-1302.63	608.3358	-2.14	0.065	-2705.45	100.1981
Satisfactory	-861.02	510.1297	-1.69	0.13	-2037.38	315.3415
Good	-478.097	511.9305	-0.93	0.378	-1658.61	702.4166

Excellent	72.0956	402.4561	0.18	0.862	-855.97	1000.161
New	140.8006	432.7776	0.33	0.753	-857.186	1138.788
SaleDate	0.194952	0.146673	1.33	0.22	-0.14328	0.53318
OwnLand	433.612	85.76066	5.06	0.001	235.8476	631.3765
Landsqm	0.000726	0.000781	0.93	0.38	-0.00108	0.002527
SaleTimeDays	-0.08381	0.051818	-1.62	0.144	-0.20331	0.035678
BMgroup						
Wood	603.4908	461.1862	1.31	0.227	-460.007	1666.988
Concrete	1230.194	390.3364	3.15	0.014	330.0766	2130.311
Timber	486.6363	475.8877	1.02	0.336	-610.763	1584.035
Dead Wood	816.6838	455.4695	1.79	0.111	-233.631	1866.998
Beach	247.2044	329.344	0.75	0.474	-512.264	1006.673
Rented	18.4616	132.2546	0.14	0.892	-286.518	323.4413
Sauna	174.1319	364.2945	0.48	0.645	-665.933	1014.197
StoreDistkm	-4.10832	2.444126	-1.68	0.131	-9.74449	1.527844
Near med. ski center	-370.568	528.0178	-0.7	0.503	-1588.18	847.0437
_cons	-32100.9	7140.071	-4.5	0.002	-48565.9	-15635.9

Appendix 8 Difference-in-Difference analysis for Levi only

sqmPrice	**Coefficient**	**Robust std. err.**	**t**	**P>t**	**[95% conf.**	**interval]**
Treat*group						
*0*1*	-51.8595	40.879	-1.27	0.229	-140.927	37.20817
*0*2*	345.1583	64.19457	5.38	0	205.2904	485.0263
*0*3*	536.7791	53.36587	10.06	0	420.5049	653.0534
*1*0*	-18.6015	71.30157	-0.26	0.799	-173.954	136.7513
*1*1*	48.87336	70.03242	0.7	0.499	-103.714	201.4609
*1*2*	570.3644	94.8411	6.01	0	363.7234	777.0054
*1*3*	1097.246	87.98055	12.47	0	905.5529	1288.939
sqm	-1.69464	0.358861	-4.72	0	-2.47653	-0.91275
Year built	24.57989	5.392461	4.56	0.001	12.83072	36.32905
Rooms	-68.3862	20.16235	-3.39	0.005	-112.316	-24.4562
Cottage condition						
Satisfactory	-734.146	167.9256	-4.37	0.001	-1100.02	-368.267
Good	-330.143	104.4189	-3.16	0.008	-557.652	-102.634
Excellent	228.1816	117.2535	1.95	0.075	-27.2918	483.655
New	896.2696	177.2314	5.06	0	510.1156	1282.424
Sale date	0.068896	0.047246	1.46	0.17	-0.03404	0.171835
Own land	114.8542	30.56273	3.76	0.003	48.26375	181.4447

Land sqm	0.002658	0.000171	15.53	0	0.002285	0.003031
Sale time days	-0.22869	0.042025	-5.44	0	-0.32025	-0.13712
Building material						
Wood	-448.775	111.7393	-4.02	0.002	-692.234	-205.316
Concrete	-152.975	133.5087	-1.15	0.274	-443.866	137.9156
Stone	-891.3	100.8153	-8.84	0	-1110.96	-671.642
Timber	-212.769	145.3997	-1.46	0.169	-529.567	104.0302
Dead Wood	455.6132	131.1895	3.47	0.005	169.7759	741.4505
Concrete Element	283.5879	130.1414	2.18	0.05	0.034108	567.1417
Beach	122.3028	167.5764	0.73	0.479	-242.815	487.4204
Elevator	475.0463	14.95155	31.77	0	442.4697	507.623
Rented	246.0865	27.07874	9.09	0	187.087	305.0861
Sauna	-121.604	32.72745	-3.72	0.003	-192.911	-50.2973
Store dist. (km)	-21.9183	6.672688	-3.28	0.007	-36.4569	-7.37979
Near med. ski center	-295.561	118.8186	-2.49	0.029	-554.445	-36.678
near large ski center	-998.336	371.0171	-2.69	0.02	-1806.71	-189.959
Near med. size town	326.9303	124.3496	2.63	0.022	55.99584	597.8647
_cons	-46880.4	10638.3	-4.41	0.001	-70059.2	-23701.5

Appendix 9 Difference-in-Difference analysis for Ruka only

sqmPrice	**Coefficient**	**Robust std. err.**	**t**	**P>t**	**[95% conf.**	**interval]**
Treat*group						
*0*1*	56.77254	65.80477	0.86	0.428	-112.384	225.9291
*0*2*	43.73775	51.83138	0.84	0.437	-89.4991	176.9745
*0*3*	122.4926	53.54151	2.29	0.071	-15.1402	260.1254
*1*0*	-175.742	117.2431	-1.5	0.194	-477.125	125.6415
*1*1*	-302.977	230.5548	-1.31	0.246	-895.637	289.6833
*1*2*	-308.942	106.1844	-2.91	0.033	-581.898	-35.9863
*1*3*	332.1278	124.0045	2.68	0.044	13.36404	650.8916
sqm	-1.4773	2.129939	-0.69	0.519	-6.95248	3.997884
YearBuilt	16.49197	3.606021	4.57	0.006	7.222397	25.76154
Rooms	58.0205	41.1091	1.41	0.217	-47.6538	163.6948
Cottage condition						
Satisfactory	61.20511	92.56967	0.66	0.538	-176.753	299.163
Good	276.8076	42.67041	6.49	0.001	167.1198	386.4954
Excellent	2062.515	507.7495	4.06	0.01	757.3037	3367.727

New	1389.827	88.2655	15.75	0	1162.933	1616.721
Sale date	0.424031	0.07093	5.98	0.002	0.2417	0.606362
Own land	-162.509	21.503	-7.56	0.001	-217.784	-107.233
Land sqm	0.002842	0.000739	3.85	0.012	0.000943	0.004742
Sale time (days)	-0.20255	0.041352	-4.9	0.004	-0.30885	-0.09625
Building material						
Wood	-146.587	56.74916	-2.58	0.049	-292.465	-0.70809
Concrete	308.8512	164.2814	1.88	0.119	-113.448	731.1501
Stone	-486.644	374.054	-1.3	0.25	-1448.18	474.8924
Timber	42.81393	65.98926	0.65	0.545	-126.817	212.4447
Dead Wood	-548.757	124.4547	-4.41	0.007	-868.678	-228.835
Beach	175.6491	92.13877	1.91	0.115	-61.2011	412.4994
Elevator	719.7564	116.84	6.16	0.002	419.4097	1020.103
Rented	360.8421	84.32099	4.28	0.008	144.0881	577.5961
Sauna	-163.787	98.70316	-1.66	0.158	-417.511	89.93803
Store dist. (km)	-34.3013	9.122689	-3.76	0.013	-57.7519	-10.8507
_cons	-40123.6	7041.449	-5.7	0.002	-58224.2	-22023