



SCHOOL OF
ECONOMICS AND
MANAGEMENT

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Does money grow on trees?

A study of five Swedish national parks using a GIS approach to analyse economic impact

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Abstract

National parks are key parts of worldwide conservation initiatives. Increasingly, they are being founded not only to meet conservation goals but also because of their potential positive impact on regional economies. However, the results of previous research are ambiguous when it comes to assessing the magnitude of this effect and no such studies have been conducted for national parks in southern, central and western Sweden. This GIS-based study looks at five Swedish national parks (Fulufjället, Färnebofjärden, Kosterhavet, Söderåsen and Åsnen) and analyses business establishments in their vicinities over 30 years (1993 to 2022). This methodology demonstrates the utility of using GIS tools in tandem with business registers especially when other data, such as visitor spending figures, is not available. The results show that three of the five studied national parks had positive economic impacts on surrounding areas after they were established. Many previous studies assume tourism to be the primary vector of economic development, but this thesis' results suggest the contrary: national parks seem to impact all industry sectors, albeit unevenly.

Keywords: national parks, economic impact, GIS, Sweden

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Sammanfattning

Nationalparker utgör ett centralt element i naturvård runt hela jorden. Utöver naturvård så utgör tron på deras positiva effekt för regionalekonomisk utveckling en allt vanligare motivering för att grunda nya nationalparker. Forskningsläget kring omfattningen av sådana effekter är dock oklart och den ekonomiska effekten av nationalparker i Syd-, Väst, och Mellansverige har inte analyserats i någon större omfattning. Den här GIS-baserade studien tittar på fem svenska nationalparker (Fulufjället, Färnebofjärden, Kosterhavet, Söderåsen och Åsnen) och analyserar hur nyetableringen av företag i deras omedelbara närhet har sett ut under en 30-årsperiod (1993 till 2022). Metoden visar att det kan vara givande att kombinera GIS-verktyg med företagsregister för att studera ekonomiska effekter, särskilt när annan data såsom besökarstatistik, saknas. Studien visar att i tre av fem fall så hade grundandet av en nationalpark en positiv ekonomisk effekt på omkringliggande områden. Resultatet är dock inte enhetligt i alla studerade områden, och gäller inte för alla verksamhetssektorer. Ofta antas att turistsektorn är den som främst påverkas när en nationalpark grundas, men den här studien visar att även många andra sektorer påverkas.

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Thank you, my dear Sofia, for your support, love, kindness and deeply motivating attitude during the thesis writing process. This thesis is—and certainly I am—better for it. I owe a debt to my parents, Marcela and Peter for always kindling an interest in learning and education and for editing drafts of this thesis. My dearest friends, Luka, Johanna, Julia, Paco and Sebastian, your sharing of advice and support amidst the challenge of writing our first thesis helped me produce this work to the very best of my abilities.

I am also grateful for the opportunity to write this thesis: I was interested in national parks and conservation before having started, but this thesis only made me eager to learn more! I was not aware of the depth of research in this field and just how much impact a national park can have on people and nature around it. I hope that, looking back, this thesis will have been an exciting first step towards helping me understand humanity's complex relationship with nature.

Table of Contents

Abstract	i
Sammanfattning	i
Acknowledgements	ii
List of Tables	v
List of Figures and Maps	vi
List of Abbreviations and Translations	vii
1 Introduction	1
1.1 Research problem and scope	1
1.2 Aim and contribution	4
1.3 Outline of the thesis.....	5
2 Literature review	6
2.1 Global historical background	6
2.2 Swedish national parks.....	7
2.2.1 Historical foundations	7
2.2.2 Contemporary research	9
2.3 National parks' importance for regional economies	10
2.3.1 Are they established on 'worthless lands'?	10
2.3.2 Quantitative perspectives on national parks' economic impact.....	12
3 Data and methods	14
3.1 Overview	14
3.2 Demarcation and definitions	15
3.3 Data processing steps	16
3.4 GIS analyses.....	18
3.5 Growth rate comparisons	19
3.6 Notes on the data.....	20
4 Results and discussion	23
4.1 Overview and descriptive statistics	23
4.2 Growth rates	24
4.3 In sum: the economic impact of national parks.....	32
5 Conclusion	34

References 35

Appendix A: IUCN Protected Area categories..... 49

Appendix B: National parks in this thesis and IUCN Protected Area categories 50

Appendix C: Retriever Business selected variables 51

Appendix D: Visualisation of a buffer analysis 52

Appendix E: SNI2007 5-digit tourism and hospitality sector codes 53

Appendix F: Business establishments by sector in national park buffers, 1993-2022 55

Appendix G: Extra time-series establishment growth rates for national parks 57

List of Tables

Tables in the main text

Table 1: The national parks analysed in this thesis and their years of establishment..... 3

Table 2: Municipalities intersecting with national parks’ 20 km buffer zones..... 16

Table 3: Retriever Business data processing steps..... 17

Table 4: Distribution of companies by national park..... 19

Table 5: Distribution of companies (within national park buffers) by sector..... 20

Table 6: Spread of missing values across national parks, 1993-2022..... 22

Table 7: Descriptive statistics for business establishment data 1993-2022 by national park.. 23

Table 8: Mean growth rates of business establishments by national park 1993-2022..... 24

Table 9: Mean growth rates of business establishments by sector 1993-2022..... 25

Table 10: Difference between the average growth rates of business establishments before and after park foundation (in percent)..... 26

Tables in the appendices

Table A1: IUCN Protected Area categories..... 49

Table A2: National parks in this thesis and their IUCN Protected Area categories..... 50

Table A3: The selected variables from Retriever Business..... 51

Table A4: SNI2007 5-digit tourism and hospitality sector codes..... 54

Table A5: Business establishments by sector in national park buffers, 1993-2022..... 56

List of Figures and Maps

Figures

Figure 1: Company establishments in 20 km national park buffer zones, 1993-2022.....	21
Figure 2: Data identical to Figure 1 with 1996 primary sector values imputed.....	21
Figure 3: Companies with missing sectoral information (SNI) values 1993-2022.....	22
Figure 4: Annual business establishment growth rate in Kosterhavet national park's buffer..	27
Figure 5: Annual business establishment growth rate in Åsnen national park's buffer.....	28

Figures in the appendices

Figure A1: Annual growth rate of company establishment in Fulufjället national park's buffer zone.	57
Figure A2: Annual growth rate of company establishment in Färnebofjärden national park's buffer.	57
Figure A3: Annual growth rate of company establishment in Söderåsen national park's buffer zone.	58

Map(s)

Map 1: The national parks analysed in this thesis relative to Sweden.....	2
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Map(s) in the appendices

Map A1: Visualisation of a 20 km buffer around Söderåsen national park.....	52
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List of Abbreviations and Translations

(Words in Swedish are *italicised*)

API – Application Programming Interface

GIS – Geographical Information System

IUCN – International Union for Conservation of Nature

MAUP – Modifiable Aerial Unit Problem

Natura 2000 SCI – Site of Community Importance (SCI)

Natura 2000 SPA – Special Protection Area (SPA)

SNI – Swedish Standard Industrial Classification (see below for translation)

Allemansrätten – The right of public access to nature (literal translation: “everyman’s right”)

Bolagsform – type of company

Bolagsverket – Swedish Company Registration Office

Län – county

Länsstyrelsen – county council

Naturvårdsverket – the Swedish Environmental Protection Agency

Säte – a company’s registered domicile

Sätadress – a company’s domicile address

SCB, Statistiska centralbyrån – Statistics Sweden (Swedish statistical agency)

Skatteverket – The Swedish Tax Office

Standard för svensk näringsgrensindelning (SNI) – Swedish Standard Industrial Classification (SNI)

1 Introduction

1.1 Research problem and scope

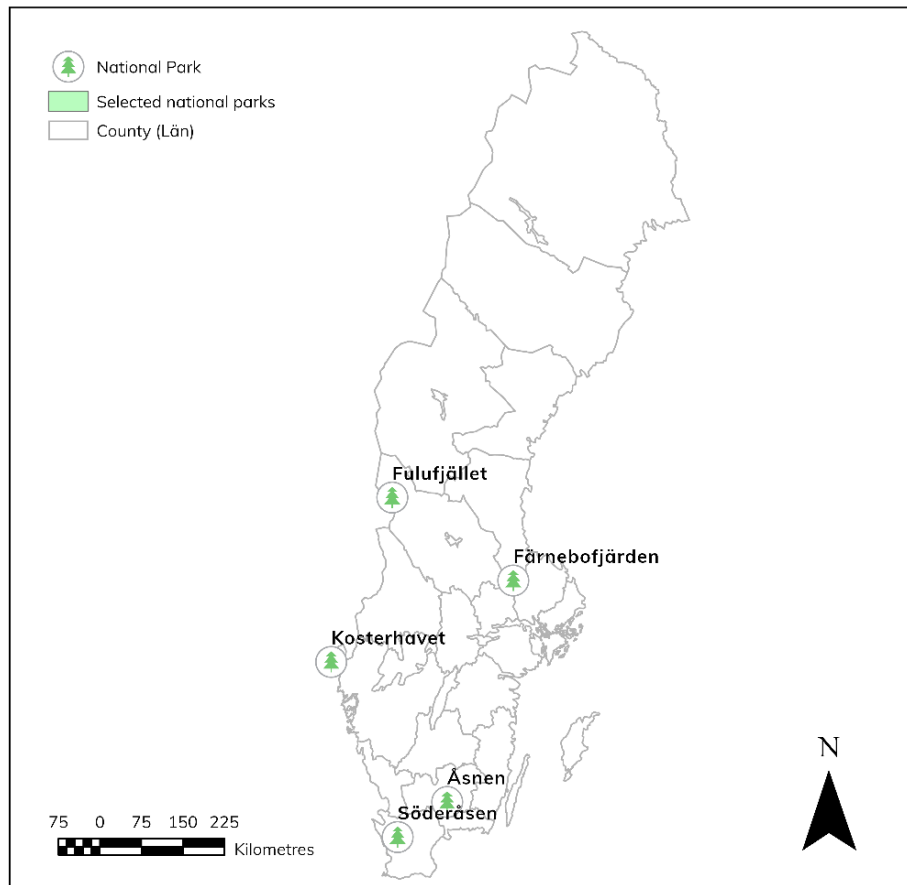
Since the first national park was founded in the United States in 1872, they have become integral to conservation efforts worldwide (Beissinger *et al.*, 2016). In contemporary times of environmental degradation, protected areas are essential in reducing global biodiversity decline (Borgström, Lindborg & Elmqvist, 2013). Recent figures suggest there are over 150 000 protected areas around the world covering over 16% of the Earth's surface (Bingham *et al.*, 2021; Watson *et al.*, 2014).

In recent times, national parks and protected areas have become viewed as places that can bridge previously unreconcilable nature conservation efforts with the economic development of local areas (Mayer *et al.*, 2010). They are established and managed in ways to both protect vital biotopes and, increasingly, to engender positive economic spillovers within surrounding areas (Duvivier, 2021; Naturvårdsverket, 2008, p.88; Watson *et al.*, 2014). Some scholars suggest that they can even spur economic development during economic downturns (Müller, 2022).

However, the magnitude of this economic impact is not clear-cut in the literature (Eagles, 2014). Research into the economic impact of national parks is deeply necessary because of the “social relevance, effective management and sustainable future of many parks and protected areas depend[s] on the results” (Eagles, 2014, p.528). In this vein, the impact of economic activities such as tourism, key in national parks, is poorly known (Eagles, 2002). Since the establishment of protected areas tends to elicit resistance from impacted populations in fear of restrictions on economic activities and livelihoods (Job, 2008; Stoll-Kleemann, 2001), it is important to shed light on this topic and provide affected stakeholders with adequate information to make informed decisions.

This thesis aims to contribute to a gap in the literature by exploring the extent of national parks' economic impact on selected local communities in Sweden through both a novel analytical approach in this field and geographical focus on western, southern and central Sweden. Consequently, this thesis' research question is as follows:

To what extent have the five most recently established national parks in Sweden influenced business establishment rates and furthered regional economic development?



Map 1: The national parks analysed in this thesis relative to Sweden.

Sources: Naturvårdsverket, the Swedish Environmental Protection Agency (2022) for park shapefiles and SCB, Statistics Sweden (n.d.-a) for county (Swedish: län) shapefiles. Visualisation by the author.

To answer this research question, this thesis considers business establishment trends to be indicative of regional economic performance and, therefore, economic development. This thesis uses GIS methodology and Swedish business registry information (from Bolagsverket, the Swedish Companies Registration Office¹) as source data for analysis.

Initial hypotheses would suggest that if national parks boost regional economic activity—this being an important reason behind their establishment in the Swedish case (Lundmark, Fredman & Sandell, 2010; Naturvårdsverket, 2008), more businesses will be set up in the aftermath of the establishment of a nearby national park. Business establishment trends are a useful indicator in this context as businesses are established (and closed down) in tandem with economic cycles and perceived economic opportunity (Fort *et al.*, 2013; Konon, Fritsch & Kritikos, 2018) while entrepreneurial activity is suggested to have a positive effect on a region's economic

¹ Wherever possible, this thesis uses the Swedish names of Swedish governmental agencies. The first time one is mentioned, an agency's official English name will be given in parentheses. For a glossary of relevant agencies referred to in this thesis, see the *List of Abbreviations and Translations* on page v.

development (Díaz Casero et al., 2013; Fritsch & Mueller, 2004; Sternberg & Wennekers, 2005). Research suggests that protected areas such as national parks play an important role in regional economic development (Watson *et al.*, 2014)—and the goal of this thesis is to determine the characteristics (or lack thereof) of this trend in the Swedish case.

The choice of Sweden as the focal country of this study is multifold. First, a thorough historical grounding in conservation puts Sweden at the head of the European conservation movement, having established Europe’s first national parks in 1909 (Grundsten, 2009). Furthermore, 15% of Swedish land is classified as ‘formally protected’ including 30 national parks giving ample study opportunities (SCB, 2021). Additionally, Sweden has a wealth of data resources available to the public, following a history of deeply rooted governmental transparency (Kassen, 2017).

While Sweden boasts a total of 30 national parks spread across the country, this thesis analyses the five most recently established ones in the interest of contemporary application, policymaking relevance and novel geographical distribution (previous studies tend to focus on only central or northern Sweden). The selection of national parks is shown in *Table 1* and geographically contextualised in *Map 1*.

Name of national park	Year established	Area (hectares)	County (<i>län</i>)
Åsnen	2018	1 873	Kronoberg
Kosterhavet	2009	38 878	Västra Götaland
Fulufjället	2002	38 500	Dalarna
Söderåsen	2001	1 625	Skåne
Färnebofjärden	1998	10 100	Gävleborg*, Dalarna, Uppsala, Västmanland

Table 1: The national parks analysed in this thesis and their years of establishment.

Source: Naturvårdsverket (n. d.) and Gävleborg county, Länsstyrelsen Gävleborg (n. d.).

** The management of Färnebofjärden national park falls under the responsibility of Gävleborg county (it lies on the border between four counties).*

1.2 Aim and contribution

The question of how Swedish national parks contribute to the setting up of nearby businesses has not been studied with this scope or methodology before, nor have there been attempts to quantify the extent of national parks' economic spillovers through business establishment data.

Indeed, the methods used in this thesis provide the groundwork for further research into national parks' economic impacts. According to Huhtala (2007) and Huhtala, Kajala and Vatanen (2010), no overarching nor generally accepted method of evaluating protected areas' economic impacts exists. The GIS methodology established in this thesis remains previously unattempted with this application and geographical context. It may prove particularly useful in countries, like Sweden, where data on visitor spending is low and a new approach is needed (Fredman & Sandell, 2009). A lack of data on which to base traditional methods of impact analysis is a frequent occurrence in this field and hence new analytical methods are called for (Eagles, 2014).

This thesis is also deeply relevant for other Scandinavian countries and regions surrounding protected areas around the globe. Nordic countries have similar institutional and historical makeups where protected areas cover significant parts of their territories². Policymakers in these countries have a "demand for knowledge" for the justification of public expenditure (Huhtala, Kajala & Vatanen, 2010, p.5) and the improvement of park management and safeguarding them for future generations (Eagles, 2014).

Few scholars have explored the role national parks may play in local economic development in western, southern and central Sweden. These areas are home to over half the Swedish population (SCB, 2023a) and have much higher population (and hence business) densities per geographical area. Importantly, western, southern and central regions of the country and their national parks are rarely studied together.

The parks chosen in this analysis, therefore, are more relevant to study than others around the country both because of literature gaps and a greater economic impact potential on local residents' livelihoods. Additionally, northern parks (located in rural and mountainous areas) are thought to have a low potential in directly impacting local businesses (Byström & Müller, 2014).

² 17.6% of land areas in Norway are protected while in Sweden it is 15%, Denmark 8.3% and 25% in Iceland (Environment Norway, 2022; EUROPARC Nordic-Baltic Section, 2021; Government of Iceland, n.d.; Hovik, Harvold & Joas, 2009; SCB, 2021).

1.3 Outline of the thesis

The following sections explore the literature on national parks in a global and Swedish context. The literature review first provides a historical background on national parks around the world before focussing on the Swedish case and relevant contemporary research perspectives. Next, the literature review investigates the importance of national parks for regional economies within a theoretical and quantitative framework.

The data and methods section demonstrates where the data is gathered from, how it is processed and analysed and how the results of this thesis are calculated. This is also where the definitions, delimitations and scope of this thesis are elaborated upon. Last in this section is a discussion on data limitations.

Next, the results and discussion section presents the findings of this thesis while placing them in a broader Swedish context. Lastly, the conclusion summarises this thesis' findings and proposes further approaches of study.

2 Literature review

The story of the national park has attracted significant scholarly interest. To understand how Swedish national parks came to be, it is necessary to consider the historical ramifications of national parks first with a broader, global overview of national parks before focussing on the Swedish case. The literature review concludes with a detailed exploration of national parks' economic impacts from a theoretical and quantitative perspective.

2.1 Global historical background

The practice of conservation is centuries, perhaps millennia old (Grundsten, 2009; Jones, 2013; Rozenberg & Krasnoshchekov, 2000) while the concept of national parks as we know it today is suggested to be born with the establishment of Yellowstone National Park in the United States (US) in 1872 (Frost & Hall, 2009). The “Yellowstone model” of protected areas was instrumental in spreading national parks around the world (Jones, 2013, p.46). But it was not created in a vacuum: Jones (2013, p.33) highlights how natural prowess, romantic ideals such as a new “cult of wilderness” and cultural influences from Europe, beliefs in American exceptionalism and democratic foundations were key ingredients to its ultimate success. In a nutshell, Jones (2013) paints a picture of Yellowstone being a new American recipe with mature, Old World ingredients. Indeed, Yellowstone's models and foundational ideas were malleable, allowing countries around the world to take the “template” and adjust it for their own specific uses and preferences (Jones, 2013, p.47). This enabled the spread of national parks and protected natural areas across anglophone nations and later throughout the world (Hall & Frost, 2009a).

Yellowstone's foundational ideas were not unique to the US, however (Wall Reinius, 2009). In the first half of the twentieth century, European countries adopted the concept, with Italy, Iceland, Romania, Greece, Sweden, Spain, Ireland and Switzerland all establishing national parks while Belgium and France founded them in their colonies (Hall & Frost, 2009a). Following the Second World War, national parks spread globally such that most countries had one—indeed, as Hall and Frost (2009a, p.7) write: “one could hardly boast of being a true nation without one”. In short, national parks have come to international prominence in nigh on 150 years while spurring on the spread of protected natural areas. Their total area has reached almost 20 million squared kilometres globally, covering an area of about twice the size of Canada (Statistics Canada, 2018; Watson et al., 2014).

While the establishment of national parks is considered a noble goal by some, others—namely local residents—believe protected areas have profoundly negative effects on their livelihoods (Stoll-Kleemann, 2001). This is a phenomenon observed in many conservation initiatives when it comes to protecting large areas of land, from Sweden to South Africa (Carruthers, 2012; Grundsten, 2009). Some scholars attribute this to the ‘Yellowstone model’ mentioned above

where the default practice was to exclude local and indigenous peoples from using park land (Schelhas, 2001). The assumption by conservationists, according to Pimbert and Pretty (1995, p.i), was that local inhabitants are detrimental to conservation efforts. They go on to suggest that, in this context, “social conflicts have grown in and around many protected areas, and conservation goals themselves have frequently been threatened”. There is an ongoing debate between scholars on both how to consolidate these stakeholder differences and whether initiatives to consolidate them are worthwhile in the first place (Holmes, 2007; Schelhas, 2001; Stoll-Kleemann, 2001; Tichnell & Machlis, 2019). Ultimately, this highlights an increasing need for dialogue, empathy and flexibility from conservationists (Stoll-Kleemann, 2001), lest it result, as in a recent Swedish case discussed in the following section, the non-establishment of a planned national park (Sandell, 2005).

2.2 Swedish national parks

2.2.1 Historical foundations

Sweden’s national parks were also Europe’s first. Founded in 1909, they charted the first steps of Sweden’s long and bountiful history of nature conservation³ (Fredman & Sandell, 2009; Grundsten, 2009). Initially, parks were founded on land that was not considered economically useful (Wall Reinius, 2009). It was only in the 1930s that park establishment started to tie into the popularisation of recreation among urban populations taking place around the world (Hall & Frost, 2009a)—in other words, parks started to be explicitly founded for the sake of leisure in tandem with conservation (Grundsten, 2009).

This was also a time when conservation was often superseded by economic priorities, for instance with the construction of new hydroelectric dams in a national park in northern Sweden (Grundsten, 2009, p.14). After the Second World War, perceptions shifted and conservationists worked in tandem with policymakers when constructing hydroelectric projects to limit their ecological impact. It was also a time when the environment and nature were becoming increasingly intertwined with cultural and national identities: Swedish national parks became a patriotic symbol and a part of the national identity (Mels, 1999, 2002; Wall Reinius, 2009).

³ There are several types of nature protection in Sweden, and national parks are only one of them. Others, for example, include nature reserves, Natura 2000 zones and habitat protection areas. For illuminating statistics on this topic, see SCB (2022).

In the 1960s, Naturvårdsverket⁴ was set up and later empowered with the management of Sweden's protected areas (nowadays this is undertaken by *länsstyrelser* or county councils). The criteria for the establishment of national parks in Sweden were amended at this time to tie in with the internationally recognised IUCN guidelines for formal protection⁵ (Grundsten, 2009).

Over the course of the following decades, more national parks were established in Sweden. This brought the total to the present 30 and distributed the parks to include previously “under-represented” regions such as central and southern areas of the country (Grundsten, 2009, p.16). During this period, the establishment of national parks in Sweden's northern regions has been criticised as being insensitive towards indigenous peoples' cultural and natural heritage (Flodén & Reimerson, 2023; Mels, 1999; Wall Reinius, 2009).

According to Grundsten (2009, p.16), Swedish national parks are now managed and established in ways that unite “the goals of nature conservation with the aspirations of people who live nearby”. This is a shift away from what scholars call ‘fortress conservation’ or ‘no touch’ approaches to park management (Fredman & Sandell, 2009; Gissibl, Höhler & Kupper, 2012). Indeed, one of Naturvårdsverket's objectives in the management of national parks is to promote “socially and economically sustainable development” (Naturvårdsverket, 2005, p.15). This, however, does not always result in the successful establishment of national parks. A recent collaborative policymaking initiative resulted in the cancellation of a planned national park in northern Sweden when opposition from locals, who were concerned about the restrictive impact this would have on hunting, fishing and using snowmobiles, was taken into account (Flodén & Reimerson, 2023; Sandell, 2005).

In the context of Swedish national parks, there is room for improvement. The means for conservation in Sweden are tied to political decision-making, where environmental concerns are not always prioritised (Naturvårdsverket, 2023). Additionally, Hovik, Sandström and Zachrisson (2010, p.174) maintain that local participation policies, while theoretically beneficial, are “more of a response to local opposition to nature conservation than a purposeful strategy by [the] central government to mediate and reconcile opposing views on conservation”. An approach that attempted to bridge gaps between conservationists and local stakeholders enabled the establishment of Fulufjället national park in 2002, but not without criticism from scholars: Hovik, Sandström and Zachrisson (2010) suggest that this collaborative approach was

⁴ The Swedish Environmental Protection Agency will be referred to using its Swedish name, Naturvårdsverket in this thesis.

⁵ There is no universally accepted procedure through which national parks are accredited as each country can essentially term any location or area to be called a ‘national park’ (Hall & Frost, 2009a). The International Union for Conservation of Nature (IUCN), however, has attempted to create a unified categorisation hierarchy of protected areas, but it is worth keeping in mind that countries are not obliged to follow it (Hall & Frost, 2009a). See *Appendix A* and *B*.

limited by the fact that only local tourism entrepreneurs were given consultative positions in the park's implementation and that there were too few opportunities to truly engage with the matter on a community-wide level.

2.2.2 Contemporary research

Research into Swedish national parks has focussed heavily on the northern regions of the country, as this is where the parks that are the “greatest in size [and] appeal” are located, according to Byström and Müller (2014, p.117). Lundmark, Fredman and Sandell (2010), Brouder (2013) and Byström and Müller (2014) underline the importance tourism plays as a factor in these northern parks' economic success. Lundgren (2009), in a study on the influence of protected areas on local economies in Sweden, finds a positive correlation between the number of protected areas on income growth with nonsignificant correlations vis-à-vis employment in the tourism sector. Lundmark, Fredman and Sandell (2010, p.1), on the other hand, find other factors (such as the proximity to ski lifts) which stimulate the tourism labour market more than the assumed “automatic positive relation between nature conservation and tourism”. Similar findings are echoed by Byström and Müller (2014).

Scholars have, however, repeatedly raised the question of *allemansrätten*, the right of public access, and its important relationship with nature conservation in the Nordics (Campion & Stephenson, 2010; Fredman, Friberg & Emmelin, 2007; Kaltenborn, Haaland & Sandell, 2001; Lundmark, Fredman & Sandell, 2010; Sandell, 2006a; Sandell & Fredman, 2010; Sténs & Sandström, 2014). In the Swedish case, the right of public access grants individuals the ability to access natural areas, camp overnight, pick mushrooms and berries, whether they be on publicly- or privately-owned land such that they do not damage their surroundings or disturb local inhabitants (Campion & Stephenson, 2010; Lundmark, Fredman & Sandell, 2010). While *allemansrätten* is enshrined in the Swedish constitution, no delimitations are made in the legal code when it comes to explicit rights or responsibilities—instead a series of informal ‘golden rules’ from Naturvårdsverket are to be followed using visitors' own judgement (Campion & Stephenson, 2010). Visitors are able to—generally speaking—do as they please, but restrictions apply for commercial and large organised activities (Sandell, 2006a). Despite its informal nature, the right of public access has been resistant to fundamental changes to its application and delimitation over the last half-century (Sténs & Sandström, 2014). Importantly for this thesis, however, the right of public access also has ramifications for the study of national parks in Sweden. In fact, the ease of accessing nature in Sweden impedes the centralisation of tourist activities around national parks—access to protected nature is not fenced off (or subjected to visitor fees), as is the case in countries such as the US (Lundmark, Fredman & Sandell, 2010).

In general, there are very few studies with economic perspectives on national parks located in Sweden's southern or western parts. Pantzar (2020, p.299) studied Kosterhavet national park on the western coast of the country, but their qualitative analysis was not able to numerically concretise the economic impact of the park beyond the conclusion that “local stakeholders agree that the economic and social benefits [of Kosterhavet national park] have greatly surpassed its costs”. In southern Sweden, Krozer *et al.* (2007) find that Söderåsen national park only received

a trifling direct income of the equivalent of €50 000 from tourists, but this figure likely only considers income from tourists at the visitor centre and related amenities (again, recall the lack of entrance fee obligations). Boije and Larsson (2016) conducted a willingness-to-pay analysis on two southern Swedish national parks but did not consider the wider ramifications of protected areas. In short, the literature on national parks located elsewhere than Sweden's northern regions is sparse, uses vastly different approaches and does not attempt to rigorously quantify parks' economic impacts.

2.3 National parks' importance for regional economies

From providing jobs to locals to helping achieve development goals, national parks play crucial roles in their respective regions. This section delves into scholarly research on their economic impact on a global scale. First, it builds upon the historical building blocks of national parks (see *Section 2.1*) and evaluates an influential view in the literature: whether national parks have been established on land that was considered to have no alternative economic purpose. This is undertaken with historical and contemporary scholarly perspectives in mind. Second, this section examines the quantitative aspect of national parks' economic impact and discusses some findings in this field.

2.3.1 Are they established on 'worthless lands'?

Historical national park establishment

Theories abound in the literature concerning historical national park establishment motives. Some, like Hall and Frost (2009a, p.7)—citing primary sources—suggest the founding of national parks was due to policymakers' then newfound interest in providing recreational opportunities to urban populations while highlighting areas' "natural beauty". Grundsten (2009) instead suggests that conservational reasons were paramount. Sellars (1983) and Wall Reinius (2009) highlight the role railways seemed to have played in advancing tourism- and hence profit-focussed endeavours. Hall (1988) notes the power of politics in determining where national parks are located while Runte (1977, p.65) proposes "cultural anxiety" and quests for a collective national identity as driving forces in the United States' case. In general, however, there seems to be no singular reason behind national park establishment. Motives are heavily dependent on context and vary worldwide: they are variform and are deeply influenced by geographical, social, economic and historical prerequisites (Wall Reinius, 2009). What remains clear, however, is that capitalistic exploitation of national parks has been present since the get-go (Gissibl, Höhler & Kupper, 2012).

There is a theory that has gained much traction since its publication half a century ago. Runte (1972, p.6) was the first to suggest that national parks were founded because the land they covered was considered to be economically “worthless” and had no other worthwhile use. It was through a materialist quest after the tourist dollar that “worthless” lands were said to become economically worthwhile.

This ‘worthless lands hypothesis’, as it came to be known, gained traction and has been applied to national parks worldwide, generating debate in the United States (Cox, 1983; Schullery & Whittlesey, 2003), Australia (Common & Norton, 1992; Hall, 1988), along with South Africa (Carruthers, 1989, 2012), New Zealand (Hall & Higham, 2000) and Sweden (Wall Reinius, 2009). Given this backdrop, Carruthers (2012, p.36) notes that during the early decades of the twentieth century “the concept of biodiversity conservation and the science of ecology were in their formative years”, and by this they raise two points. First, that it is important to historically contextualise national park establishment and not fall prey to presentism (Moro-Abadia, 2009): while nature conservation may be emphasised in today’s world, it was not necessarily one of the park founders’ priorities in the past. Second, in this context, it is unreasonable to expect national park creators and stakeholders to have conservationist ideals at the forefront of their work, given the conservation movement was only then beginning to gain a foothold in scientific and popular discourse (Evans, 1997).

Runte’s ‘worthless lands’ thesis has applications beyond the borders of the US. Hall and Frost (2009b, p.51) claim that Australian national parks were formed in the interests of “tourism, scenic beauty and a lack of intrinsically valuable resources”, echoing Runte’s view. But a dearth of “intrinsically valuable resources” was not the only motivator behind the establishment of national parks: Hall and Frost (2009b) add that these decisions were not made in isolation from public sentiment and, much like Wall Reinius (2009) highlight the role of the Romantic movement in developing a collective appreciation for landscapes and nature. Indeed, books like *Man and Nature* by George Perkins Marsh (first published in 1864) helped put conservation thinking onto the map and, in turn, spur public willingness to support national park formation (Hall & Frost, 2009b; Lowenthal, 2000).

The answer to the question whether developing countries’ parks are established on lands considered ‘worthless’ is unclear. Joppa and Pfaff (2009) propose that protected areas, on a global scale, are founded where alternative economic uses are unlikely. This is debated by McDonald and Boucher (2011) who instead suggest that whether protected areas are located on ‘worthless lands’ depends on country-specific context. The latter finding, however, has potential applications for developing countries, whereby the then colonies’ land was looked upon with disdain amid colonial nature conservation initiatives (Neumann, 1995).

In sum, Runte’s (1972) ‘worthless lands’ hypothesis remains to be a useful intellectual framework to understand and analyse the reasons behind national park foundation around the world. This hypothesis ought to, as scholars have highlighted, be considered in tandem with other—perhaps less powerful but nevertheless present—contemporary pressures to found national parks. In the Old World, seemingly empty swathes of land with little apparent use—

from the perspective of the central authority—than recreation and tourism development were common. In the developing world, it was instead an imposition of colonial powers and now, more recently, contemporary administrations in the hunt for tourists' money (Cochrane, 2009). At the end of the day, as Hall and Frost (2009b, p.62) write, Runte's hypothesis raises the possibility that

the creation of national parks is not purely the result of aesthetic and ecological considerations but was, and to an extent still is, strongly determined by the materialist utilitarian perception that national parks are, in essence, 'worthless lands'.

Contemporary national park establishment

In recent decades, national park establishment motives have begun to grasp the necessity of environmental conservation amidst the climate crisis and shifted away from Runte's 'worthless lands' theory. Protected areas' conservation efforts in protecting vulnerable species are key when considering the toll anthropogenic climate change has on biodiversity levels (Baron *et al.*, 2009; Beissinger *et al.*, 2016; Burns, Johnston & Schmitz, 2003; Mayer *et al.*, 2010). Simultaneously, policymakers have become more aware of parks' rural development potential (Mayer *et al.*, 2010; Turner, 2002) and their ability to potentially cushion local communities from the impact of economic depressions (Müller, 2022).

The view that tourism in general can help stymie peripheral areas' economic decline is not new (Hall, 2007). Christaller's (1964, p.104) influential paper suggested that tourism "gives the economically underdeveloped regions a chance to develop themselves" because those are ultimately the areas that tourists are interested in visiting. But this notion is only nowadays being incorporated into the management of national parks and protected areas (ed. Mose, 2007). Several studies have suggested that the 'brand name' of national parks induces an inherent boost in visitor numbers, not only in Sweden (Fredman, Friberg & Emmelin, 2007; Mels, 2020), but also elsewhere around the world (Eagles, 2001; Loomis, 1999; Weiler, 2006; Weiler & Seidl, 2004). This influx of tourism can be leveraged to support regional economies during economic crises (Jóhannesson & Huijbens, 2010) and that national parks and other areas of high-level environmental protection can engender positive economic spillovers on local communities (Job, 2008; Mayer, 2014; Mayer *et al.*, 2010). It is becoming increasingly clear that more research is needed since studies tend to contradict each other: certain studies support (Bennett *et al.*, 1996; Fredman & Yuan, 2011; Job, 2008; Mayer *et al.*, 2010) and others counter (Byström & Müller, 2014; Jakus & Akhundjanov, 2018; Lundmark, Fredman & Sandell, 2010; Müller, 2022) the idea that protected areas have substantial positive impacts on regional economies.

2.3.2 Quantitative perspectives on national parks' economic impact

Tentative estimates suggest that the world's protected areas attract approximately 8 billion visits per year (of which 3.8 billion are in Europe) and result in US\$600 billion direct in-country expenditure (Balmford *et al.*, 2015). While these estimates are extremely broad and may harbour inaccuracies, they underline the fact that visits to national parks do not result in trivial

expenditures. In recent years, scholars have attempted to quantify national parks' economic impacts given their importance for policymakers, local stakeholders and park management boards (Eagles, 2014). This is despite a lack of overarching or prevailing quantification methodology (Eagles, 2014; Huhtala, 2007; Huhtala, Kajala & Vatanen, 2010).

Bergstrom *et al.* (1990) calculated the expenditure relating to recreation in rural areas using an input-output model from questionnaire data on visits to state parks in the US state of Georgia. They found that visitor spending at these state parks “stimulates a proportionately large amount of economic activity in surrounding rural areas”, supporting 1400 jobs and US\$14 million income for the local region (Bergstrom *et al.*, 1990, p.35). They conclude that visitor spending on recreation at state parks could result in a “viable” economic development alternative to the status quo of investment in manufacturing or industry.

Mayer *et al.* (2010, p.73) analysed the impact of tourism on the local economy surrounding six German national parks and found that it can generate “considerable income”. Using face-to-face visitor surveys and a Keynesian multiplier approach⁶, they find that the studied national parks add €525 to €1.9 million in annual income to their respective regions, depending on which park was studied (their size varies wildly). Mayer *et al.* (2010) cite Küpfer (2000), Huhtala (2007) and Berghäll (2006) as having results of a similar magnitude for parks located in Switzerland and Finland. However, Mayer *et al.* (2010, p.81) note that the impact of European parks is less significant than that of their North American counterparts, partly because of the American approach to the charging of entrance fees and a “wider range of [visitor] consumption opportunities”.

All things considered, national parks and other protected areas can be significant boons to both regional and national economic outcomes. Quantification challenges remain, however. As Mayer *et al.* (2010, p.74) state, it is “difficult and costly to gauge visitor numbers and draw representative visitor samples”. It is in light of this that Eagles (2014) highlights the necessity of conducting research in this field amidst gaps in the data and the necessity in developing new methods of analysis. It is this topic this thesis will turn to next.

⁶ In their study, Mayer *et al.* (2010) consider the income multiplier to be the most frequently occurring kind of Keynesian multiplier. It measures the amount of income an additional unit of tourist spending produces in the economy.

3 Data and methods

3.1 Overview

The novel approach of this study—estimating business activity levels through the geocoding⁷ of registered businesses in the vicinities of national parks—was born out of a desire to evaluate the economic impact of national parks where visitor spending data, a key factor in impact studies, is poor. In these instances, the geocoding and analysis of business registry information is a worthwhile analytical method. Indeed, research into protected areas' economic impacts using new analytical and methodological approaches is called for by scholars (Eagles, 2014).

Geocoding has had substantial applications across various fields, from the health sciences to crime mapping and logistics (Maantay & Ziegler, 2006; Owusu et al., 2018). It has proven to be an effective tool for analysis when other data was incomplete in health research (Fiscella & Fremont, 2006) and has a solid grounding in the analysis of business locations and establishment trends (Feser & Sweeney, 2000; Kalnins & Lafontaine, 2013; Lu, Wang & Zhu, 2019; Neumark & Kolko, 2010).

Traditional methods of research design, such as face-to-face surveys, direct expenditure estimates or questionnaires would be incompatible with the specificities of Swedish national parks and the timeframe of this thesis. Direct expenditure would be challenging to quantify, given the lack of entrance fee obligations and the closure of visitor centres over the winter months (Fredman & Wikström, 2018; Länsstyrelsen Skåne, n.d). National parks themselves remain open during the off-season, but a lack of visitor centres open year-round would hamper the potential collection of visitor-related data. Looking at business establishments directly instead of extrapolating figures (as previous studies have done—for example, using Keynesian multipliers—see *Section 2.3.2*) spurred the geocoding and business-establishment-growth-analysis approach of this thesis.

This thesis' approach

This thesis' approach scope will take the form of an analysis of five national parks across Sweden: Åsnen, Kosterhavet, Fulufjället, Söderåsen and Färnebofjärden (see *Table 1*). Specifically, the analysis will be undertaken through GIS software ArcGIS Pro 3.1.

Business activity (and specifically the creation of businesses) will be used as a proxy for economic activity in this study as economic activity can be used to indicate economic development (Díaz Casero *et al.*, 2013). These companies will be selected from municipal-level

⁷ Geocoding is the process of converting street addresses into longitudinal and latitudinal coordinates.

databases through a 20 km buffer around each national park. These buffers around national parks have a two-pronged application:

- a) The definition and demarcation of what “regional development” means in this thesis (see *Section 3.2*): a selection of relevant companies within 20 km of national parks
- b) The exclusion of major population centres: all the national parks analysed in this study are further than 20 km from large towns and cities. This includes the population living close to a national park and is based on an approach by Lundmark *et al.* (2010).

The size of the buffer zone around national parks raises the question of the Modifiable Aerial Unit Problem (MAUP). The MAUP highlights the issue of delimiting areas to study, each of which may suggest different geographical patterns and later, results (Ballas *et al.*, 2018; Fotheringham & Wong, 1991). In this thesis, business establishment figures within buffer zones of 5, 20 or 50 km around national parks are likely to differ significantly from one another—as each buffer expansion would include additional municipalities or settlements and hamper efforts to interpret results. For example, a 5 km buffer would be too restrictive by not including sufficient surrounding areas and drastically limiting the number of companies within the buffer while a 50 km buffer would be too broad, including large nearby towns, and hence making it impossible to draw meaningful conclusions. Therefore, adequate motivation of buffer selection through relevant literature is key—as it is in this thesis’ case with Lundmark *et al.*’s (2010) study.

3.2 Demarcation and definitions

Regional economic development is a broad concept where scholars actively employ many different definitions in line with their studies’ particular scope (Brekke, 2021). In general, definitions are dependent on context and no universal definitions exist (Pike, Rodríguez-Pose & Tomaney, 2007).

For the purposes of this thesis, “regional economic development” constitutes the year-on-year growth levels of business establishments within a 20 km radius of the selected national parks. Business establishment figures (per year) are used as a proxy for economic development. This is because business establishment trends are argued to follow economic cycles (Fort *et al.*, 2013; Konon, Fritsch & Kritikos, 2018), and new businesses, in turn, affect regional economies (Díaz Casero *et al.*, 2013; Fritsch & Mueller, 2004; Sternberg & Wennekers, 2005).

3.3 Data processing steps

Relevant municipality selection

Relevant municipalities were selected based on their intersection (overlap) with the 20 km national park buffer. This Euclidean (or ‘planar’) buffer⁸ was calculated within ArcGIS Pro 3.1 with the use of national parks’ and municipalities’ shapefiles sourced from Naturvårdsverket (2022) and SCB (n.d.), respectively. The results of this intersection analysis are depicted in *Appendix D* and *Table 2*, the latter which shows the 31 municipalities that intersect their respective national park buffer.

National park	County (<i>län</i>)	Municipality	Count
Söderåsen	Skåne	Bjuv, Eslöv, Helsingborg, Hässleholm, Höör, Klippan, Kävlinge, Landskrona, Perstorp, Svalöv, Åstorp, Ängelholm, Örkelljunga	13
Färnebofjärden	Gävleborg, Dalarna, Uppsala, Västmanland	Avesta, Gävle, Heby, Hofors, Sala, Sandviken, Tierp	7
Åsnen	Kronoberg	Alvesta, Karlshamn, Olofström, Osby, Tingsryd, Växjö, Älmhult	7
Fulufjället	Dalarna	Malung, Älvdalen	2
Kosterhavet	Västra Götaland	Strömstad, Tanum	2
Total			31

Table 2: Municipalities intersecting with national parks’ 20 km buffer zones.

Source Retriever Business (n.d.) and own analysis.

⁸ The buffers used in this thesis only considered planar (‘as the bird flies’) geographical distances. They do not take other factors (such as elevation) into account (this would be called a ‘geodesic’ buffer).

Retriever Business

Business data was sourced from the Retriever Business service, a third-party database compiling information about Swedish companies from Bolagsverket and Statistics Sweden (SCB) subscribed to by Lund University.

A raw export of data from the Retriever Business database resulted in 310 variables (columns) of business-related data. This ranged from address and registration information to financial data and statistics about companies' board members. For the purposes of this thesis, only 26 variables are of interest. Most of these contain address and registration data and are listed in *Appendix C*.

Extracting all the companies listed the selected municipalities (*Table 2*) resulted in 152 564 total entries (i.e. businesses). This number was narrowed down in subsequent steps following the exclusion criteria outlined below in *Table 3* and enabled the reduction of the analysable sample size to 66.43% of the original.

Step #	Exclusion criterion	Count	% of total
1	Total number of companies in relevant municipalities	152 564	100.00
2	Year founded 1993-2022	126 965	83.22
3	Missing domicile (säte)	126 361	82.82
4	Visiting addresses = 31 municipalities and missing addresses	121 798	79.83
5	Missing visiting address and domicile at Post Office (PO) boxes	115 334	75.60
6	Non-profits, missing companies and "other"	103 147	66.43

Table 3: Retriever Business data processing steps.

Source: Retriever Business (n.d.) and own analysis.

This table shows the six steps taken to exclude various categories of data from the final analysis. These steps are elaborated upon below.

Notes on data processing steps (refer to *Table 3*, above)

1. The total number of companies from selected municipalities;
2. Companies were excluded based on their years of establishment (only those founded between 1993 and 2022 were included in the later stages of the analysis);
 - a. Using a 5-year analysis window, the earliest relevant year with respect to the establishment of national parks is 1993 (see *Table 1* in *Section 1.1*);
 - b. 2022 was the latest fully elapsed year at the time of writing;

3. Companies with missing domicile information were excluded outright as their main address and thus operating location would be impossible to determine;
4. Exclusion of those companies with visiting addresses outside of the 31 relevant municipalities (see *Table 2*, this section). This was in addition to the removal of companies with missing visiting addresses. In the latter case, the domicile address would take precedence in subsequent geocoding steps;
5. Companies with missing visiting addresses and domicile addresses listed as PO boxes were excluded as it would be impossible to determine the actual geographical proximity of said companies to national parks. PO boxes do not necessarily reflect a company's operating location (Hurley *et al.*, 2003).
6. Finally, the last step excluded companies which did not have an explicit focus on profit (such as non-profit organisations) and excluded companies with missing information on the type of company they were (*bolagsform*) and those with the company form corresponding to "*övriga bolagsformer*" ("other company types") as it would not be possible to determine whether this company had a profit-oriented focus.

Once these steps were completely, the data was processed and ready for GIS analysis.

3.4 GIS analyses

Geocoding

Geocoding, the process of converting street addresses into coordinates was undertaken through Google Maps' Geocoding Application Programming Interface (API). It converted the database of addresses into x and y (latitude and longitude, respectively) coordinates to import into GIS software.

Some companies' addresses returned multiple search results. In these instances, the first result was considered the most likely to be accurate and led to the discarding of additional results. Out of the total 103 147 addresses, only 774 (0.75%) returned zero results, in other words could not be found by the geocoding API. This is a very low error rate.

Buffer implementation

The 103 147 within-municipality geocoded coordinates were selected using five 20 km national park Euclidean buffers. This enabled the final selection of 21 162 companies within these buffers and which will be used in later stages of the analysis. A breakdown on the number of companies per national park is depicted in *Table 4* and a visualisation of this process is available in *Appendix D*.

National park	Number of companies	% of total
Söderåsen	10219	48.29
Kosterhavet	3659	17.29
Åsnen	3363	15.89
Färnebofjärden	2855	13.49
Fulufjället	176	0.83
Total	21162	100.00

Table 4: Distribution of companies by national park.

Source: Retriever Business (n.d.) and own calculations

3.5 Growth rate comparisons

This thesis' main results are made up of growth rate comparisons of companies in four sectoral categories (primary, secondary, services and tourism/hospitality; see *Table 5*) within national park buffer zones. These growth rate comparisons are calculated from five- or four-year intervals pre- and post-national park establishment and are compared with the relevant county's data for context (see *Table 10* in *Section 4.2*). Data for the year 1996 in the primary sector is outlying and seems to be erroneous (as discussed in *Section 3.6*). As a result, company establishments for that year and sector are imputed by mean substitution, a common imputation method in statistical analysis and social sciences (Donders *et al.*, 2006; Ryder *et al.*, 2011). While this method is imperfect, it facilitates explanation and the lucidity of the analysis (Durrant, 2005).

To compile the four sectoral categories, it was necessary to condense the original dataset's 822 industry classifications into the four overarching categories (see *Table 5*). The industry classifications are part of the Swedish Standard Industrial Classification (SNI), developed by SCB (online) and based on the European Union's NACE Revision 2 classification system (Eurostat, 2023).

Sector	Number of companies	% of total
Services	9108	43.04
Primary sector	5480	25.90
Secondary sector	3044	14.38
N/A	2272	10.74
Tourism/Hospitality*	1258	5.94
Total	21162	100.00

Table 5: Distribution of companies (within national park buffers) by sector.

Sectors are based on SNI classifications (see Appendix E).

* The 'Tourism/Hospitality' category is mainly a subset of service sector-operating enterprises, but includes some in the primary sector as well. See Appendix E for a list of all the sectoral codes that are part of the 'Tourism/Hospitality' category.

Source: Retriever Business (n.d.), SCB (online) and own calculations.

3.6 Notes on the data

Outliers

By far the biggest issue with the data is the seemingly erroneous, unexplained and disproportional spike of company establishments in 1996, illustrated in *Figure 1* of 1763 establishments. Subsequent analyses show that this spike is driven by an increase in the establishment of sole proprietorships (*enskilda firmor*) in the agricultural and forestry sectors, all concentrated on 4 November 1996. This figure is not surpassed at any later point in the data. While there were changes in the tax law concerning sole proprietorships in 1996 (Skatteverket, n.d.), this spike in data was not able to be corroborated from other sources (Bolagsverket, n.d.) and the focus around one single date is suitable grounds to suggest a notable change in data reporting to Skatteverket, the Swedish Tax Agency or a data transfer error to the Retriever Business database. Consequently, 1996 primary sector business establishment data is excluded from many of the analyses in this thesis and imputed using mean substitution in growth rate calculations. The raw, pre-imputation and outlying data is located in *Appendix F* for reference.

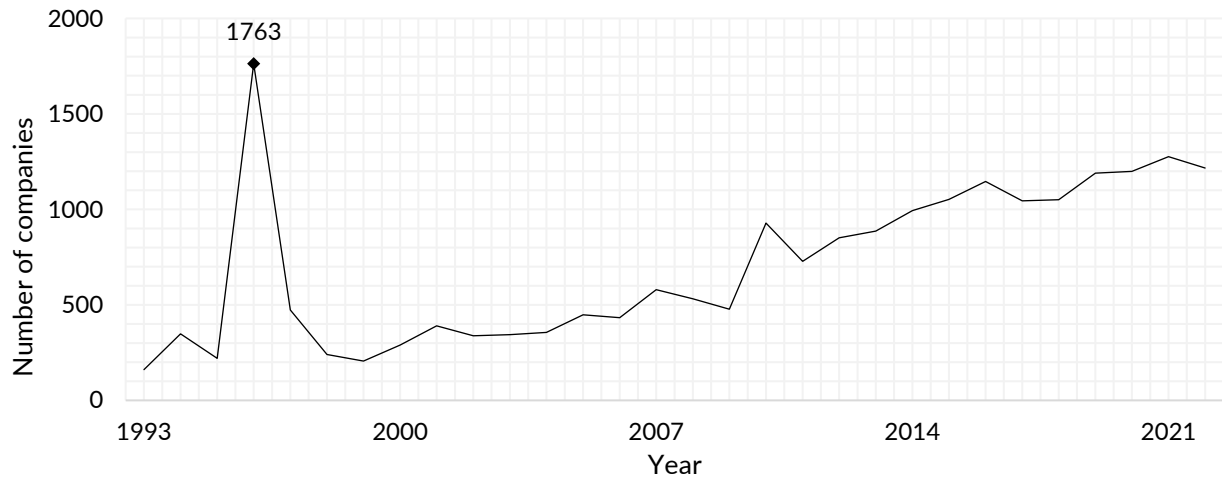


Figure 1: Company establishments in 20 km national park buffer zones, 1993-2022.

The suspected erroneous value from 1996 is highlighted. An unlikely 1763 new company registrations took place that year.

Source: Retriever Business (n.d.) and own calculations.

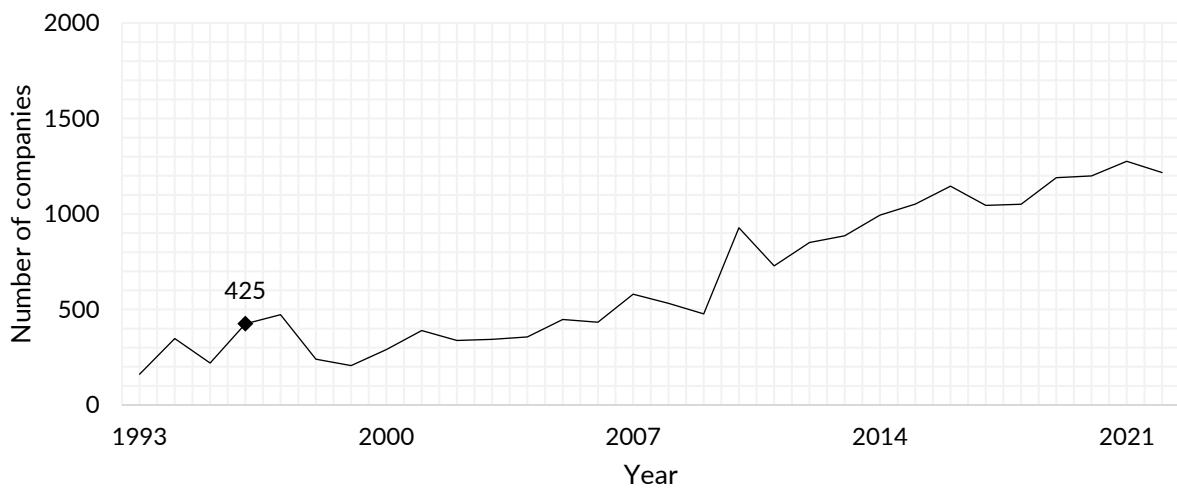


Figure 2: Data identical to Figure 1 with 1996 primary sector values imputed.

Imputing the values results in a more plausible 425 business registrations in 1996.

Source: Retriever Business (n.d.) and own calculations.

SNI-related issues

A number of companies in the dataset lacked sector-related SNI information. This ranged from 4.9% in 1996 to 20.5% in 1997 with a mean missing rate of 10.61%. The temporal distribution of these missing values is depicted in *Figure 3* while the spatial (by park) distribution is illustrated in *Table 6*. Following from these tables and figures, the missing data is assumed to be randomly distributed. This data falls into the ‘N/A’ category in *Table 5* and, since there is no reliable way of determining sectoral affiliation, the data is discarded.

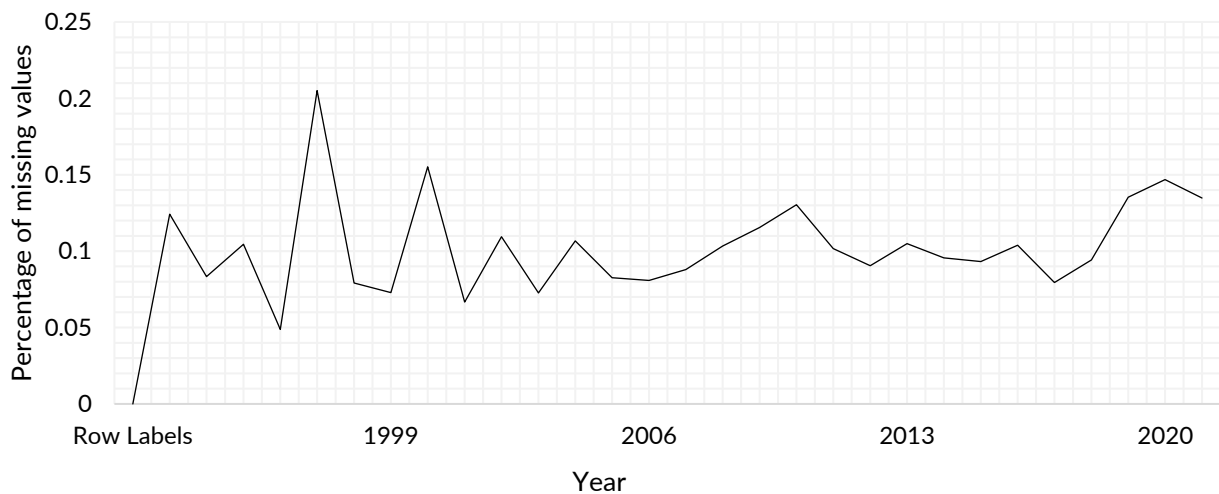


Figure 3: Companies with missing sectoral information (SNI) values 1993-2022.

Source: Retriever Business (n.d.) and own calculations.

National park	Åsnen	Fulufjället	Färnebofjärden	Söderåsen	Kosterhavet
% of missing values	6.89	7.18	9.60	11.37	13.76

Table 6: Spread of missing values across national parks, 1993-2022

Source: Retriever Business (n.d.) and own calculations.

It can be challenging to determine *exactly* which sectors companies operate in. In the data, there seems to be no limit on how many SNI categories a company can have, with some listing upwards of ten SNI sectors they operate in. For the purposes of this analysis, only the first listed SNI sector was selected but this naturally excluded a number of companies from other sectoral classifications. This implies that there are potentially more companies operating in the tourism and hospitality sectors because many of those operating in the services sector may *also* operate in the tourism and hospitality industries. A list of tourism- and hospitality-related SNI codes—those used in this thesis to demarcate whether the companies take part in the tourism and hospitality industries—can be found in *Appendix E*.

4 Results and discussion

This section will present the findings of this thesis and then situate them in a broader historical, theoretical and quantitative context. First, this section presents a general overview and descriptive statistics of the data and then delves into mean growth rate analysis in *Section 4.2*. A detailed sector-by-sector analysis of the data takes place in the end part of *Section 4.2*. This part of this thesis concludes with a discussion of the overall implications of the findings in *Section 4.3*.

4.1 Overview and descriptive statistics

	National park				
	Fulufjället	Färnebofjärden	Kosterhavet	Söderåsen	Åsnen
Mean	5.66	94.86	119.41	347.59	101.41
Median	5	89	100	254	114
Standard deviation	3.69	49.90	61.12	226.83	45.75
Range	14	157	185	715	146
Minimum	0	21	32	78	23
Maximum	14	178	217	793	169
Sum (total)	164	2751	3463	10 080	2941
Frequency	29	29	29	29	29

Table 7: Descriptive statistics for business establishment data 1993-2022 by national park.

This excludes data from 1996 (no imputation), hence the count or frequency of 29 years instead of 30.

Source: Retriever Business (n.d.) and own calculations.

Descriptive statistics of business establishment data in *Table 7* show a high data spread for each variable. There are also wide differences between national parks in the total number of businesses registered over the time period, the range of annual business registrations and the standard deviation of the data. Söderåsen, located in densely populated southern Sweden (SCB, 2023b), has by far the highest number of companies within its buffer zones with 10 080 business registrations over the study period. Färnebofjärden, Kosterhavet and Åsnen have around three thousand companies founded within their buffers over the studied time period (2751, 3463 and 2941, respectively). Fulufjället national park is located in the least densely populated area

relative to the other parks (SCB, 2023b), and this is reflected in business establishment figures as well. In fact, there were two years where no companies were established at all within 20 kilometres of Fulufjället national park.

4.2 Growth rates

Growth rates form the backbone of this thesis' findings and are depicted in *Tables 8 to 10*. These tables illustrate the difference in growth rates in equal time periods before and after a national park was established in an area (see *Table 8's* caption). They show whether national parks have affected their regions' business establishment figures and, by that measure, regional development. Both *Table 8* and *Table 9* illustrate broad, cursory trends across national parks and sectors. Building on these results, *Table 10* delves in a little deeper and elicits more nuanced findings as it compares growth rates before and after a national park is established in addition to contrasting them with figures for the county the national park is located in.

	National park				
Mean growth rates (in %)	Fulufjället	Färnebofjärden	Kosterhavet	Söderåsen	Åsnen
Before park establishment	26.00	78.77	6.92	15.94	3.33
After park establishment	41.14	7.27	22.02	11.66	2.30
Analysis window (years) *	10	8	10	10	8

Table 8: Mean growth rates of business establishments by national park 1993-2022.

* Analysis windows signify the sum of two 5- or 4-year periods before and after park establishment. See *Table 1* for the years of establishment of the five national parks.

1996 data is imputed. Cells highlighted in green show results where the mean growth rates after the park was founded exceed those in the preceding period.

Source: Retriever Business (n.d.) and own calculations.

Table 8 shows the mean growth rates of businesses established within national park buffers over the study period. Initially, the findings from only two national parks, Fulufjället and Kosterhavet suggest an increase in the rate of business establishments across all sectors. The declines in growth rates in Åsnen and Söderåsen national parks are rather mild—only down several percentage points across the analysis window. Färnebofjärden's results demand further attention simply because of the scale of the collapse of business establishments around this

national park (from 78.77% before park establishment to 7.27% afterwards). Taken as a whole, *Table 8* seems to give partial support (in the cases of Fulufjället and Kosterhavet) to the claim that national parks engender growth in business establishment rates in their regions.

	Sector			
Mean growth rates (in %)	Primary	Secondary	Services	Tourism and hospitality
Before park establishment	30.12	28.19	21.71	44.02
After park establishment	18.23	43.32	12.79	20.59

Table 9: Mean growth rates of business establishments by sector 1993-2022.

1996 data is imputed. Analysis windows (the periods of time before and after park establishment) that are used to calculate this table are shown in *Table 8*. Companies with missing data about their sectoral affiliation are excluded.

Source: Retriever Business (n.d.) and own calculations.

Table 9 shows the mean growth rates of business establishments across the five national parks by sector. While they may be generally declining both over time and after park establishment, all the growth rates over the analysed time period are positive (like in *Table 8*). Taken as a whole, these findings do not seem to suggest that national parks spur businesses to be established in their vicinities—except in the manufacturing sector (from 28.19% before parks were established to 43.32% afterwards). The latter result is the opposite of what was expected, given the supposed decline in rural manufacturing in Sweden (Hedlund et al., 2017) and the expected (and observed, in the case of Fulufjället national park) increase in tourism after a national park is designated (Fredman, Friberg & Emmelin, 2007). In the same vein, an observed decline in business establishments within the primary sector (from 30.12% to 18.23%) is not surprising, as it is part of a general downtrend of rural industry (Hedlund et al., 2017). Echoing Lundmark, Fredman and Sandell (2010)’s findings, *Table 9* raises the question of whether national parks should be automatically assumed to have a positive effect on nearby tourism- and hospitality-related businesses. However, this only indicates a very broad correlation: more nuanced analysis takes place later in this section.

	National park									
	Fulufjället		Färnebofjärden*		Kosterhavet		Söderåsen		Åsnen*	
Industry sector	Buffer	County	Buffer	County	Buffer	County	Buffer	County	Buffer	County
Primary	N/A	40.30	-67.56	-49.22	32.44	10.03	-3.54	-9.50	-8.91	-15.64
Secondary	N/A	17.11	-5.02	24.12	15.76	0.75	-2.66	11.42	52.44	3.39
Services	N/A	6.94	5.97	-2.60	6.97	4.87	9.42	5.22	-0.72	-8.97
Tourism and hospitality	N/A	-19.27	N/A	14.92	-24.39	7.94	-17.09	1.05	-28.81	3.07
All (mean of totals)	15.14	0.09	-71.50	-4.62	15.11	5.38	-4.28	3.52	-1.03	-3.28

Table 10: Difference between the average growth rates of business establishments before and after park foundation (in percent).

Notes: County figures serve as contextualisation data. Cells highlighted in green are those where national park growth rates exceed county growth rates for given industry sectors. Data for 1996 is imputed. Analysis windows according to Table 8 are used in the calculation of this table. Companies with missing data about their sectoral affiliation are excluded.

N/A (not applicable) denotes a lack of results (i.e. some years, no companies were established and therefore growth rates cannot be calculated).

Source: Retriever Business (n.d.) and own calculations.

More detailed results are illustrated in Table 10. It shows the difference between the average growth rates before and after a park was founded (within each park's buffer zone). These numbers are ordered by both national parks and by the industry sectors businesses participate in. The growth rate differences are then contrasted with a county reference value to facilitate the contextualisation and comparison of the data.

Generally, the findings are mixed but show promising tendencies. Within 20 km of three national parks (Kosterhavet, Söderåsen and Åsnen), the growth rates of business establishments exceed that of their counties. For Kosterhavet and Åsnen, all sectors except that of tourism and hospitality feature superior growth rates than county baselines. Färnebofjärden's figures are more conservative, with an increase only in the growth of service sector business establishment. There is not enough data for the analysis of Fulufjället national park's businesses due to the area's remoteness and lack of inhabitants. Nevertheless, across all sectors (computed as a mean), business establishments grew faster after Fulufjället national park was founded than before. Table 10's results are discussed in more detail in a sector-by-sector analysis later in this section.

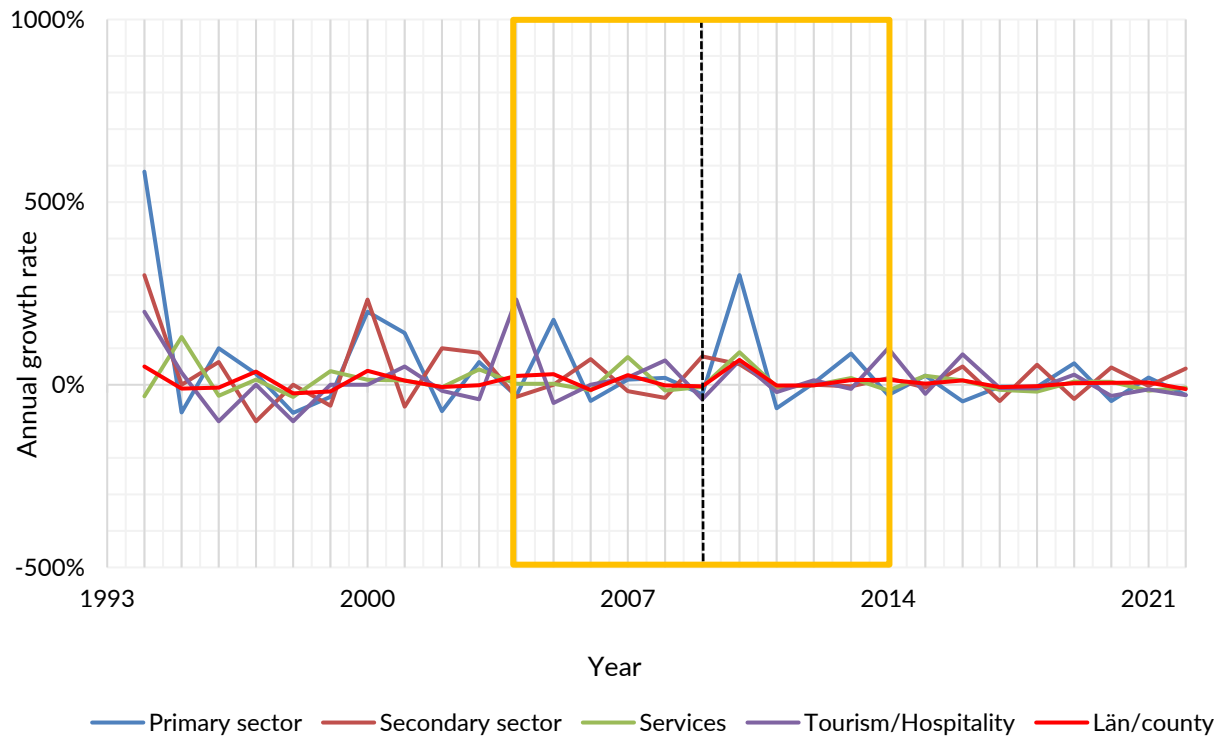


Figure 4: Annual business establishment growth rate in Kosterhavet national park's buffer.

Park establishment took place in 2009 (represented by the dashed line). The analysis window (from Table 8) is depicted as a yellow rectangle.

Source: Retriever Business (n.d.) and own calculations.

Figures 4 and 5 illustrate the longitudinal distribution of annual company establishment growth rates within the Kosterhavet and Åsnen national park buffers. These two parks have the most sectors outperforming county benchmarks out of the five national parks in this study⁹. The period before Kosterhavet national park was established in Figure 4 is characterised by a higher volatility of growth rates whereas the post-park establishment period is comparatively stable. In both national parks, growth rates rarely formed directly discernible year-on-year trends with significant fluctuations between years.

The data for Kosterhavet national park (Figure 4) shows that there was a higher fluctuation in growth rates in the period before the national park was established. It also documents high levels of economic activity found in the park's vicinity *before* its establishment and suggests a vibrant local economy irrespective of protected areas located there, raising questions about the park's immediate contribution to the regional economy in this regard. However, the process of establishing a national park can take upwards of a decade (as was the case with Söderåsen national park, see Naturvårdsverket, 1989) and so the impact on business establishments can be spread over a relatively long period.

⁹ See Table 10. The same graphs for Fulufjället, Färnebofjärden and Åsnen national parks are available in Appendix G for reference.

Pantzar (2020) highlights Kosterhavet’s dramatic impact on local property prices (425% increase over 10 years) and the increase in the number of holiday homes and seasonal residences after the park’s establishment. These seasonal economic activities have a two-pronged effect on locals: they both augment the contribution of tourism to the regional economy and increase income fluctuations between the high and low seasons (Pantzar, 2020). Morf, Sandström and Jagers (2017) found that locals working in animal farming, tourism and marine transport-related businesses experienced the greatest boost in economic development around Kosterhavet, findings corroborated by *Table 10* and *Figure 4*. However, Morf, Sandström and Jagers (2017) also highlight locals’ expectations of higher economic development that did not materialise because of factors such as a lack of infrastructure, economic recession and a shrimp boycott.

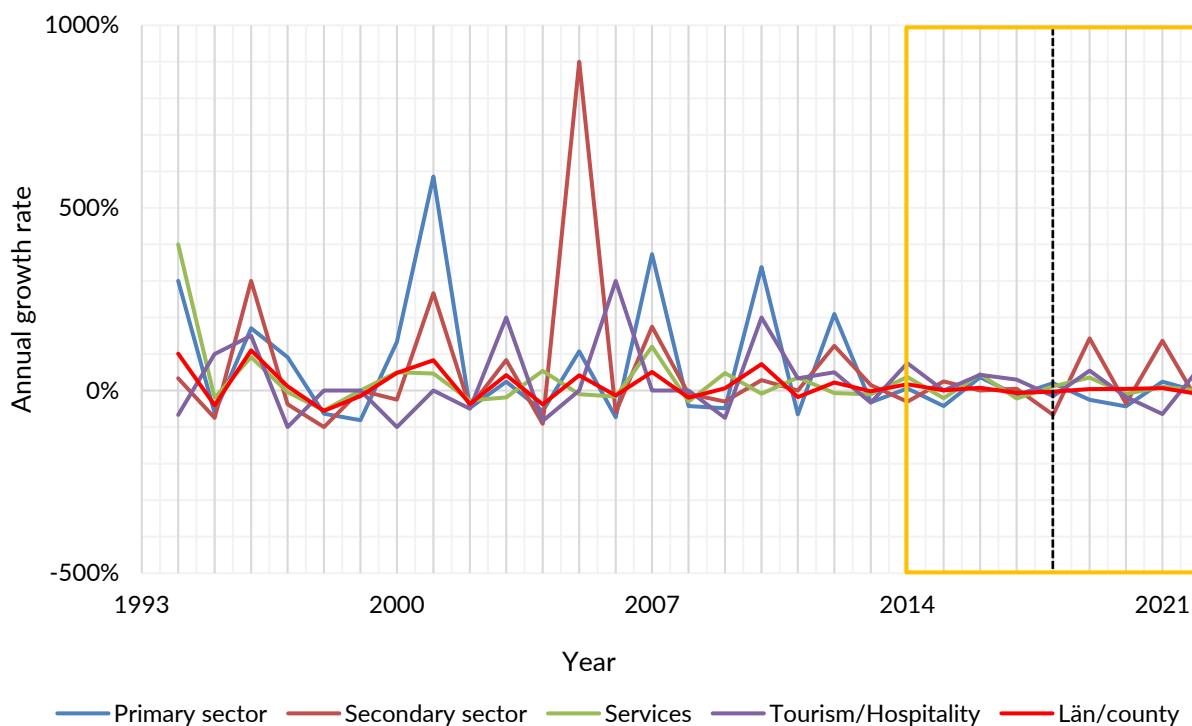


Figure 5: Annual business establishment growth rate in Åsnen national park’s buffer.

Park founded in 2018 (represented by the dashed line). The analysis window (from Table 8) is depicted as a yellow rectangle.

Source: Retriever Business (n.d.) and own calculations.

Figure 5 illustrates the year-on-year growth rates of business establishments near Åsnen national park. Here, it is important to note that, as of writing, only four years have elapsed since the park was founded, restricting the comparability of longitudinal data. Similarly to Kosterhavet, Åsnen’s figures show a lower fluctuation of growth rates after park establishment. There is an outlying spike in growth rates in 2005 which is due to the low number of companies being founded in the region. A 900% spike, in this case, resulted from an increase of 9 companies from 1 being founded the previous year to 10 being established in 2005.

Comparing Figures 4 and 5, it appears that Kosterhavet was not as impacted by the 2007–8 recession as Åsnen, for instance. This is despite the fact that Kosterhavet was established in 2009 just after the economic downturn and during a time of rising between-individual

inequalities and economic uncertainty in Sweden (Björklund & Jäntti, 2012; Chung & Thewissen, 2011). The only evidence for this, however, is a dip in establishment rates in 2009 (*Figure 4*). Åsnen experienced a similar decline in 2008–9, but this was around a decade before the park itself was established. The growth rates of business establishments within national park buffers seem to have stabilised after the parks were founded and seems to back the claim that national parks can help quell the impact of economic downturns (Müller, 2022).

Primary sector

Even if the growth of business establishments within the primary sector is in overall decline following park establishment (see *Table 9*), agriculture, forestry and other primary activities still form 25.9% of the total number of established businesses in the buffer zones across the studied national parks: this sector is a force to contend with (see *Table 5* in *Section 3.5*). Like elsewhere, the national parks studied in this thesis are located in rural areas and so agricultural and silvicultural activities form large parts of the regions' economies (Hedlund, 2016; Lundmark, Fredman & Sandell, 2010).

According to *Table 10*, the relative economic impact of national parks in the primary sector seems to be positive in the Kosterhavet, Söderåsen and Åsnen national parks. There, the growth rates of company establishments exceed that of the county levels. Färnebofjärden's primary sector is declining at a faster rate than the county baseline—and not enough data is available for Fulufjället. For the three parks where business establishment growth rates exceed county levels, it seems that the founding of a national park in the vicinity of primary sector businesses may have contributed to slowing the areas' decline (two of the three parks' business establishment growth rates for the primary sector are negative). There has been a generally observed decline in agricultural and silvicultural employment in the rural economy (Hedlund, 2017; OECD, 2006; Pettersson, 2002), and so a decline in primary sector business establishment rates over the study period is to be expected—and is likely not caused by the presence of national parks.

Some scholars suggest the *perceived* negative impact of protected areas on primary sector livelihoods (see Niedzialkowski, 2016; and Stoll-Kleemann, 2001 for examples from Poland and Germany, respectively). Locals feel that new protected areas would restrict their agricultural and leisure-based activities and therefore detract from the local economy (Stoll-Kleemann, 2001). However, these concerns vis-à-vis the decline of the primary sector have not directly materialised in this thesis' results (see *Table 10*). In fact, for three out of the five national parks (Åsnen, Kosterhavet, and Söderåsen), business establishment rates were both higher after national parks were established *and* exceeded their county figures.

The tentative findings of this thesis echo that of Lundmark, Fredman and Sandell (2010) and Lundmark (2006) whereby the establishment of a national park did not necessarily contribute to a decline in primary sector employment. The downturns that locals experience, then, are not necessarily directly caused by national parks: Keskitalo and Lundmark (2009, p.162) suggest that “environmental protection is perhaps unduly blamed for a negative employment change that so far is mainly attributable to national and global processes”.

Secondary and service sectors

Table 10 shows growing rates of manufacturing business establishment across all county baselines, contrary to the expectations of rural manufacturing decline (Hedlund, 2017). Two national parks' buffer zones exceed those baselines (Kosterhavet and Åsnen) while two are in decline (Färnebofjärden and Söderåsen). Not enough data is available for Fulufjället national park. Across the board, however, the results suggest partial but weak support for the findings of Hedlund and Lundholm (2015) and Pettersson (2002) who propose that a decline of the manufacturing sectors translates into growth in the service industry. Their suggestion is in line with a general trend seen across European countries (Hedlund *et al.*, 2017). However, it would be rash to conclude that the manufacturing sector in the vicinity of national parks is deteriorating during the analysed period—indeed, there is a notable growth of manufacturing in Åsnen national park following its establishment, although these figures do not surpass previous levels (see *Figure 4*).

With respect to service industry-related businesses, *Table 10* shows a very promising and favourable economic environment—all the national parks for whom data is available show superior growth rates compared to their counties. Such figures were expected for the tourism and hospitality sectors (see overleaf), but it seems that the transformation of rural areas in Sweden instead puts the service sector at its forefront (Hedlund & Lundholm, 2015; Pettersson, 2002). Indeed, *Table 10*'s figures suggest that, despite being located in mostly rural areas, service sector business establishments are on the rise. Scholars have suggested that the relocation of most service sector employment is towards urban areas (Hedlund & Lundholm, 2015), but it does not seem that locations proximate to national parks have been left behind. While national parks may drive up property prices in rural areas (as was the case with Kosterhavet national park, see Pantzar, 2020), it does not exclude the fact that they can “offer both cheaper housing and proximity to the urban job and service markets”, at least when compared to more expensive urban centres (Hedlund & Lundholm, 2015, p.131).

The difference in business establishment growth rates in the service sector in comparison to that of tourism and hospitality sectors is an entirely unexpected finding. The expectation of this thesis was that national park establishment would spur growth in the number of tourism- and hospitality-related businesses (Lundmark, Fredman & Sandell, 2010). This is not the case. The service sector dominates business establishment growth rates instead. This may be due to erroneous SNI categorisation and selection (see *Section 3.6*): no tourism-specific SNI classification codes exist and this makes tracking the development of the industry challenging. There have been motions submitted to the Swedish Parliament underlining the challenge of reporting tourism-related figures with the current SNI system: “tourism cuts through many industries” which increases the risk of “not all tourist activities [being] counted” (Riksdagsförvaltningen, 2009).

Tourism and hospitality sectors

Tourism and hospitality sector figures show negative developments after park foundations across the board (see *Table 10*). In three parks, these sectors' business establishments experienced severe growth downturns whereas in two of the parks, not enough data was available to constructively contribute to the analysis. The lack of tourism sector growth is contrary to the commonplace assumption—and finding—that protected areas spur tourism business establishment (Dharmaratne, Yee Sang & Walling, 2000; Fredman, 2004; Whitelaw, King & Tolkach, 2014).

Potential explanations for this lack of tourism and hospitality sector development are multifold. Fredman and Sandell (2009) suggest that the relationship between Swedish national parks and tourism is not adequately developed, namely that commercial activities are regularly forbidden within national parks. This may, in turn, disincentivise the establishment of tourism-focussed businesses near national parks.

Seasonality is another potential culprit in the decline of tourism and hospitality-related businesses in *Table 10*. It is a well-observed phenomenon in the tourism industry (Hartmann, 1986), which Butler (1998) finds to be accentuated in rural areas. This, according to Jurdana and Zmijanovic (2014) and Zhang and Xie (2023) can negatively affect sustainable economic and tourism-related development. With those findings in mind, national park visitation seasonality can hamper tourism-related business establishment rates.

Another explanation for the lack of tourism development could relate to time lags. Den Braber, Evans and Oldekop (2018) found that older protected areas in Nepal have more significant economic spillovers compared to newly-established ones, and perhaps a similar phenomenon is taking place here. Charles and Wilson's (2009) findings nuance this: in the case of marine protected areas (such as Kosterhavet national park in this thesis), costs may be incurred in the short term, but the longer-term picture is an economically positive one. However, determining the length of time lags is outside the scope of this thesis but yields itself well to future study.

Lastly, there is also the question of the *allemansrätten*, the right of public access and its effect on visitor numbers to national parks, explored in some detail in *Section 2.2.2*. Scholars have repeatedly suggested that the possibility for any individual, within certain bounds, to access nature freely across the country limits tourists' appetite for visiting national parks (Fredman & Sandell, 2009; Sandell, 2006b). This reduction of visitor numbers could reduce the incentives for entrepreneurs to establish tourism-focussed businesses.

To summarise, these national parks are all located in areas where the tourism and hospitality industries are well grounded but are not growing as much as other sectors (see *Table 5* in *Section 3.5*). According to Lundmark, Fredman and Sandell (2010) and Fleischer and Felsenstein (2000), tourism is thought to spur economic development in rural areas. The findings of this thesis, however, suggest more cautious assumptions about tourism and regional economic development are necessary. Indeed, as Lundmark, Fredman and Sandell (2010, p.16) note: "tourism development is not equal to regional development". For the time being, figures from this analysis do not suggest that the establishment of a national park in rural areas *immediately* spurs tourism-related business establishments.

4.3 In sum: the economic impact of national parks

As a whole, the results of this analysis suggest that national parks *can* spur the growth of business establishments. But the picture is more nuanced when one steps away from the averages (*Table 8* and *Table 9*) and considers geography, market structures, historical circumstances and local actors' roles in developing regional economies. The results of the sector-by-sector breakdown (in *Section 4.2*) show increases in the growth of business establishment rates following the founding of a national park nearby. However, this finding is not universal and there were numerous sector-specific instances, especially in the tourism and hospitality industries, where establishment growth rates declined following the creation of a national park.

Tourism from national parks was expected to contribute positively to surrounding regions, however like Lundmark, Fredman and Sandell's (2010) study, this thesis does not find definitive results to support that expectation, at least when comparing national park figures to county baselines (see *Table 10*). This may be because of classification errors in the analysis (see *Section 3.6*) but also, as Müller (2013, p.125) suggests, because tourism produces employment opportunities which fail to "create the economic values and salaries associated with staple industries".

However, this thesis considers broader regional development across all sectors and not only that of (or caused by) the tourism and hospitality sector. While tourism is touted to be the vehicle of regional development, this thesis suggests that this assumption should be challenged. In its broadest sense, this thesis shows that the economic impact of national parks ranges across all sectors of the economy and that actors within those sectors which oppose the establishment of national parks may, conversely, be the ones that benefit (Pantzar, 2020; Stoll-Kleemann, 2001).

The results of the analysis also provide an insight into broader trends in the Swedish economy, such as the decline of traditional industries and the rise of the service sector. But scholars warn against interpreting restructuring processes as a "simple shift of labour from one sector to another" (Müller, 2013, p.124). Despite that, this thesis' results suggest that the establishment of firms that operate within the service sector increased following the founding of national parks nearby. This finding is consistent across all the studied national parks data is available for (see *Table 10*) and therefore shows some solidity across temporal (the parks are all founded at different points in the last 30 years) and geographical context (the parks are located within areas of different population densities and biotopes).

It is also important to note the challenge of deducing causal mechanisms because of the impact external shocks may have had on the number of businesses being established. The analysis period covered in this thesis, 1993 to 2022, witnessed no fewer than three financial upheavals, first a financial crisis in 1993, the Great Recession in 2008-9 and the Covid-19 pandemic in 2019-22 (Björklund & Jäntti, 2012; Fernandes, 2020; Verick, Schmidt-Klau & Lee, 2022).

With this in mind, it has been suggested that tourism-related economic development emanating from national parks can help weather economic storms (Müller, 2022), but a general trend is elusive as studies' results tend to be contradictory (see *Section 2.3.1*). This thesis also shines a light on the impact national parks have on non-tourism businesses: perhaps it is there instead that Müller's (2022) dampening effects of national parks on economic crises can be observed. This presents itself as an ideal avenue of future research.

5 Conclusion

National parks form a core part of nature conservation initiatives around the world and have done so for centuries. In more recent times, however, their *raisons d'être* have shifted from purely conservation-focussed motives to more socially-conscious ones. This means a greater emphasis on mostly economic but also social indicators and a greater participation of local residents in park initiatives and management.

With respect to economic goals, national parks have been suggested to drive up visitor numbers to rural and peripheral areas—and by that means, further tourism and foster economic development in their regions. This thesis analysed whether this was the case in five Swedish national parks between 1993 and 2022: Fulufjället, Färnebofjärden, Kosterhavet, Söderåsen and Åsnen. To that end, the analysis in this thesis took a GIS-focussed approach, using 20 km buffer zones around national parks to delimit pertinent areas and select business establishment data, which was used as a proxy for economic development.

Following previous studies, this thesis assumed national parks to positively impact regional economies, particularly since that is a primary contemporary motive behind parks' establishment, in Sweden as well as elsewhere (Naturvårdsverket, 2008, pp.87–88). However, the findings show a less clear-cut picture. Compared with county baselines, this thesis found the regions surrounding Kosterhavet, Söderåsen and Åsnen national parks to have superior business establishment growth rates after national parks were founded across primary, secondary and services sectors. Färnebofjärden outperformed baselines in the services sector and there was not enough data for Fulufjället (the latter, taking all sectoral data as an average, outperformed county business establishment growth rates). Contrary to previous assumptions, none of the national parks' regions outperformed county baselines when it came to the tourism and hospitality sectors. This may be down to data categorisation issues, time lags, external shocks or the ease of visiting natural areas through the right of public access (*allemansrätten*).

This study raised the question of whether national parks can be said to contribute to regional economic development. Do they fulfil the motives set out by policymakers and stakeholders to contribute to regional economies—and, as the title of this thesis asks, does money grow on trees? It seems that in many cases, it does. This thesis' findings are notable for the impact national parks can have *outside* of the tourism and hospitality industries. It is the growth of those industries which may help parks bring rural areas economic development. But the findings of this thesis do not show a universal pattern and, given the economic tumult of the last three decades, further research is necessary to delve into the nuance of causal mechanisms.

Lastly, this thesis charts a path down a novel study method, illustrating the potential benefits (and pitfalls) of taking on a GIS-focussed approach when attempting to measure the economic impact of national parks. Future research should analyse a wider range of indicators such as property prices and business expenditure data which may reflect wider economic implications than business establishment figures. The findings of this thesis should encourage more researchers to attempt novel methodologies in this field. Our national parks need it.

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Appendix A: IUCN Protected Area categories

Category	Description adapted from Shafer (2015)
Ia	Areas under strict protection established to safeguard biodiversity and geological features. Their aim is to ensure the protection of conservation goals by limiting human interference.
Ib	Wilderness zones encompassing areas that remain largely unaltered or minimally influenced by human activities (and have no permanent residents), therefore retaining their natural essence.
II	National parks are vast natural or nearly natural spaces that safeguard crucial ecosystems and species. They also offer opportunities for compatible spiritual, scientific, educational, recreational, and visitor experiences that respect the environment and local culture.
III	Natural monuments or features that are designated to protect specific natural landmarks, such as unique landscapes and geological formations like caves. Their purpose is to ensure the preservation of these exceptional natural features.
IV	Habitat or species management areas that are established to safeguard specific species or habitats. While not all areas require regular and active interventions, some protected areas will need ongoing efforts to meet the requirements of particular species or maintain the integrity of habitats.
V	Protected landscapes and seascapes that have evolved over time through the interaction between humans and nature. These are areas with important ecological, cultural or scenic value.
VI	Protected areas with the sustainable use of natural resources encompass extensive, predominantly untouched landscapes where a portion is managed sustainably for the use of natural resources. These areas prioritise a low-impact use of natural resources that aligns with nature conservation objectives.

Table A1: IUCN Protected Area categories.

Adapted from Shafer (2015).

Appendix B: National parks in this thesis and IUCN Protected Area categories

Name of national park	Year established	IUCN categories	Description
Åsnen	2018	II	National park, Natura 2000 SPA, Natura 2000 SCI, Ramsar Wetland of International Importance
Kosterhavet	2009	II	National park
Fulufjället	2002	II	National park, Natura 2000 SPA, Natura 2000 SCI
Söderåsen	2001	II	National park, Natura 2000 SCI
Färnebofjärden	1998	II	National Park, Ramsar Wetland of International Importance, Natura 2000 SPA, Natura 2000 SCI

Table A2: National parks in this thesis and their IUCN Protected Area categories.

Sourced from UNEP-WCMC (2023):

All the analysed national parks in this thesis are categorised as IUCN Category II Protected Areas, but they are also part of (or near to) other protected area categories. See Table A2 on the previous page.

Natura 2000 sites are part of an EU-wide nature conservation initiative and the two types mentioned above are Site of Community Importance (SCI) and Special Protection Area (SPA). See Directorate-General for Environment (n.d.) for further elaboration.

Ramsar Sites (Ramsar Wetlands of International Importance) are nationally designated protected wetlands under the Ramsar Convention of 1971 (Kingsford et al., 2021).

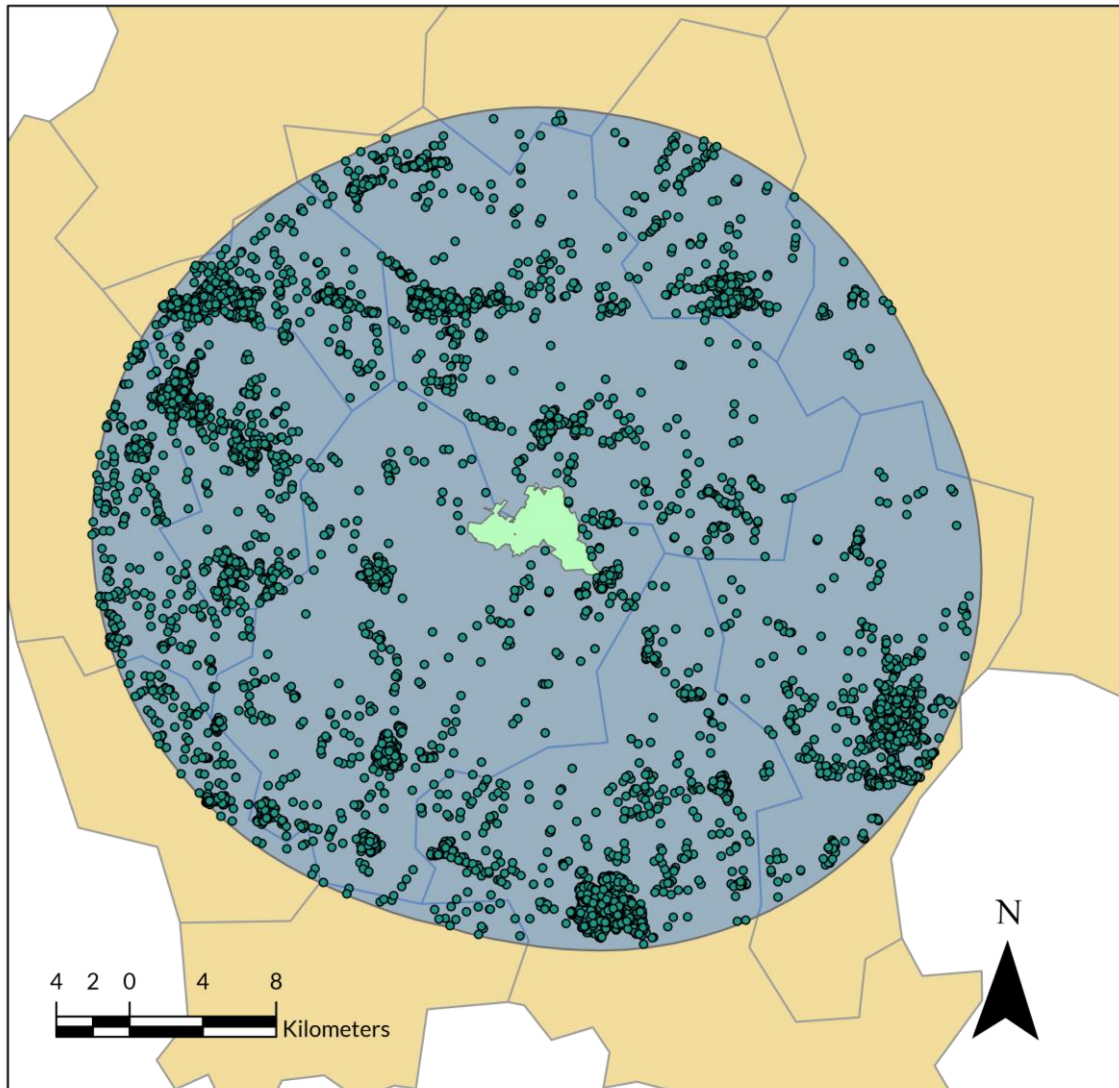
Most national parks in Sweden fall into IUCN Category Ib (wilderness areas) whereas all national parks considered in this thesis fall into the Category II (national park) (see Laven, Wall-Reinius & Fredman, 2015 and Appendix B).

Appendix C: Retriever Business selected variables

Original, Swedish variable name	English variable name
Org. nr	Company number
Företagsnamn	Company name
Bolagsform	Type of company
Bolagets status	Company status
Reg. datum	Date of registration
Avreg. datum	Date of deregistration (closing)
SNI kodlista	SNI code list
Besöks - adress	Visiting address
Besöks - postnummer	Visiting address postal code
Besöks - postort	Visiting address postal area
Besöks - kommun	Visiting address municipality
Besöks - län	Visiting address county
Postadress - C/O	Postal address C/O
Postadress - adress	Postal address
Postadress - postnummer	Postal address postal code
Postadress - postort	Postal address postal area
Postadress - kommun	Postal address municipality
Postadress - län	Postal address county
Sätes-/utdelningsadress - C/O	Domicile address C/O
Sätes-/utdelningsadress - gatuadress	Domicile address street address
Sätes-/utdelningsadress - postnummer	Domicile address postal code
Sätes-/utdelningsadress - postort	Domicile address postal area
Sätes-/utdelningsadress - län	Domicile address county
Kommunsäte	Domicile municipality
Länsäte	Domicile county

Table A3: The selected variables from Retriever Business.
Source: Retriever Business (n.d.)

Appendix D: Visualisation of a buffer analysis



Legend

- Businesses
- Buffer zone (20 km)
- Söderåsen national park
- Municipalities intersecting with buffer

Map A1: Visualisation of a 20 km buffer around Söderåsen national park.

This map is of an illustrative character: it shows what the GIS methodology in this thesis resulted in but otherwise is not used for any subsequent analysis elsewhere in this thesis.

Sources: Naturvårdsverket, the Swedish Environmental Protection Agency (2022) for park shapefiles and SCB, Statistics Sweden (n.d.-a) for municipality (Swedish: kommun) shapefiles. Visualisation by the author.

Appendix E: SNI2007 5-digit tourism and hospitality sector codes

SNI2007 code	Description
01620	Support activities for animal production
03210	Marine aquaculture
47641	Retail sale of sporting equipment except bicycles in specialised stores
50301	Scheduled inland passenger water transport
51101	Scheduled passenger air transport
51102	Non-scheduled passenger air transport
52219	Other service activities incidental to land transportation
55101	Hotels with restaurant except conference centres
55102	Lodging activities of conference centres
55103	Hotels without restaurant
55201	Youth hostels
55202	Other short-stay accommodation
55300	Camping grounds, recreational vehicle parks and trailer parks
55900	Other accommodation
56100	Restaurants and mobile food service activities
56294	Catering for the transport sector
56299	Other catering
56300	Beverage serving activities
59110	Motion picture, video and television programme production activities
77110	Renting and leasing of cars and light motor vehicles
77210	Renting and leasing of recreational and sports goods
79110	Travel agency activities
79120	Tour operator activities
79900	Other reservation service and related activities
82300	Organisation of conventions and trade shows
85510	Sports and recreation education

90010	Performing arts
90020	Support activities to performing arts
90030	Artistic creation
90040	Operation of arts facilities
91020	Museums activities
91040	Botanical and zoological gardens and nature reserves activities
93111	Operation of ski facilities
93112	Operation of golf courses
93113	Operation of motor racing tracks
93114	Operation of horse race tracks
93119	Operation of arenas, stadiums and other sports facilities
93120	Activities of sport clubs
93191	Horse racing activities
93199	Other sports activities
93210	Activities of amusement parks and theme parks
93290	Other amusement and recreation activities

Table A4: SNI2007 5-digit tourism and hospitality sector codes

This list was compiled by adapting work from Lundmark, Fredman and Sandell (2010), Magnusson (2017) and SCB (online).

Conversion from Lundmark, Fredman and Sandell (2010)'s codes (SNI92) to SNI2007 classification systems was undertaken follows SCB (online).

Appendix F: Business establishments by sector in national park buffers, 1993-2022

Year	Sector					Total
	Primary	Secondary	Services	Tourism/Hospitality	N/A	
1993	55	20	56	10	20	161
1994	170	39	102	8	29	348
1995	65	29	93	10	23	220
1996	1476	56	125	20	86	1763
1997	221	25	119	11	97	473
1998	99	34	83	5	19	240
1999	42	34	100	15	15	206
2000	75	35	122	13	45	290
2001	178	39	128	19	26	390
2002	120	34	131	16	37	338
2003	128	50	115	26	25	344
2004	77	44	174	23	38	356
2005	174	51	163	23	37	448
2006	105	72	199	22	35	433
2007	167	83	252	27	51	580
2008	131	81	231	34	55	532
2009	77	75	245	25	55	477
2010	301	98	361	47	121	928
2011	92	134	385	43	74	728
2012	210	149	373	42	77	851
2013	191	141	406	55	93	886
2014	218	149	464	68	95	994
2015	192	173	518	71	98	1052
2016	167	203	576	81	119	1146
2017	156	178	541	87	83	1045
2018	151	162	544	95	99	1051

2019	131	190	603	105	161	1190
2020	97	217	612	97	176	1199
2021	110	233	669	92	172	1276
2022	104	216	618	68	211	1217
Total	5480	3044	9108	1258	2272	21162

Table A5: Business establishments by sector in national park buffers, 1993-2022.

Sources: Retriever Business (n.d.) and SCB (online)

1996 data in this table is not imputed and illustrates the outlier present in the primary sector. The N/A column represents missing data.

Appendix G: Extra time-series establishment growth rates for national parks

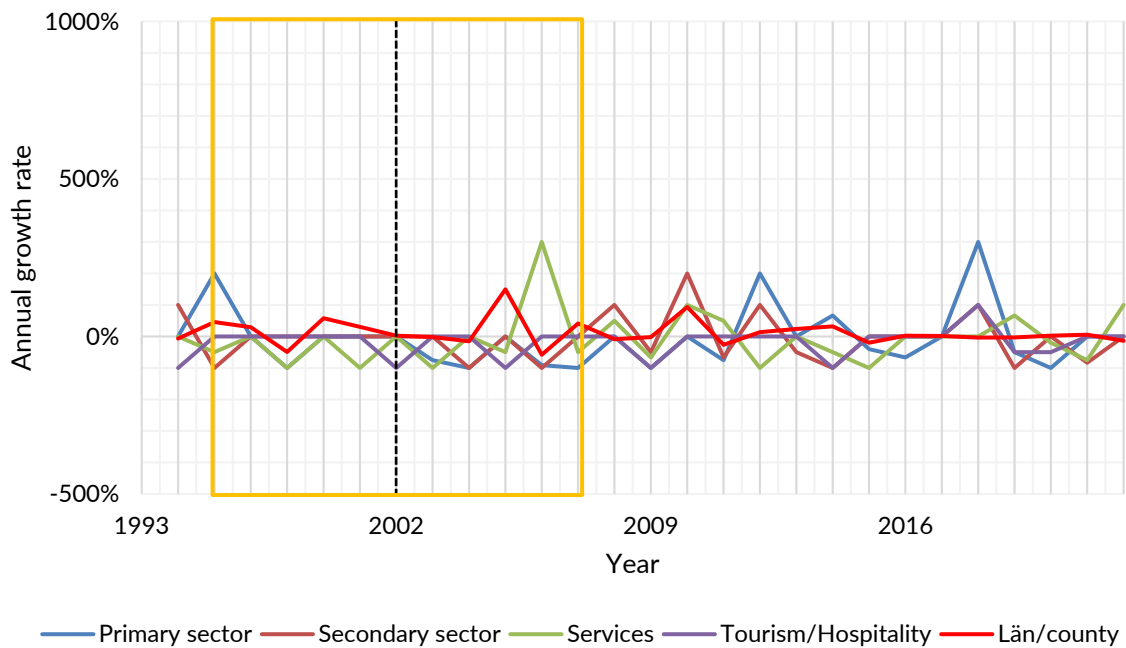


Figure A1: Annual growth rate of company establishment in Fulufjället national park's buffer zone.

Park founded in 2002 (represented by the dashed line). The analysis window (from Table 8) is depicted as a yellow rectangle. Source: Retriever Business (n.d.) and own calculations.

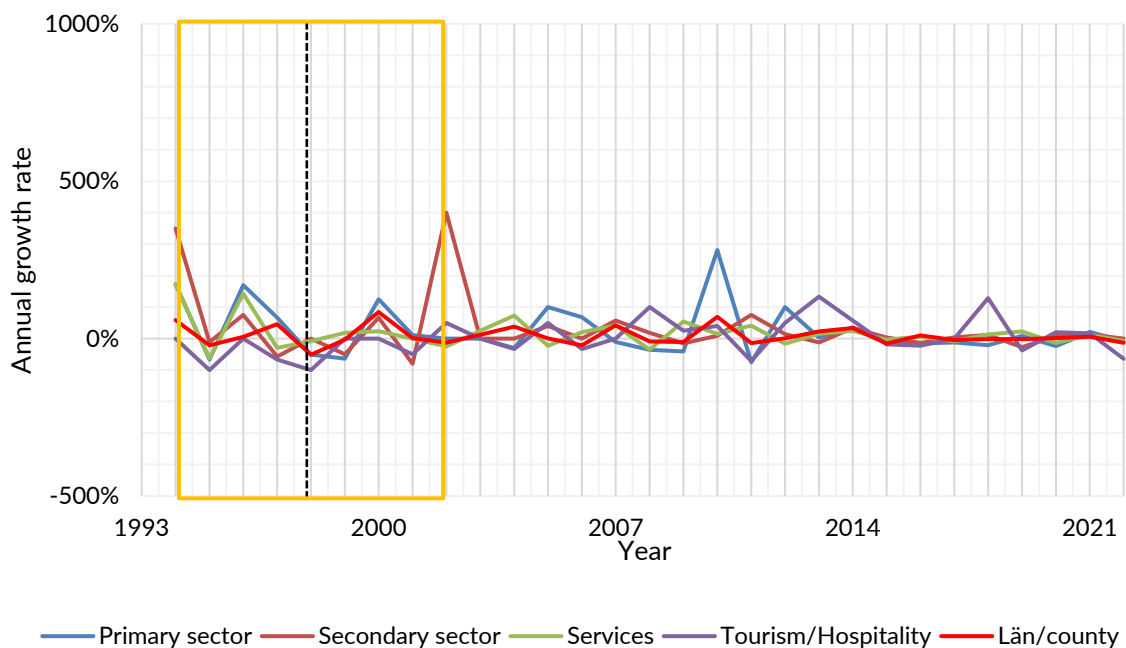


Figure A2: Annual growth rate of company establishment in Färnebofjärden national park's buffer.

Park founded in 1998 (represented by the dashed line). The analysis window (from Table 8) is depicted as a yellow rectangle. Source: Retriever Business (n.d.) and own calculations.

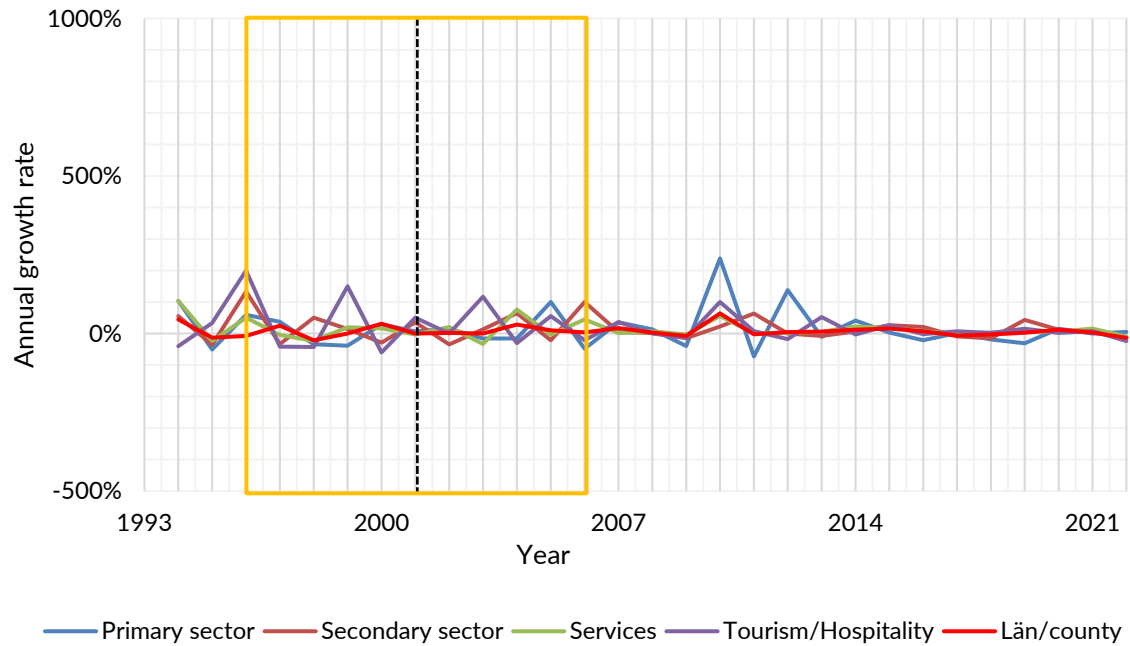


Figure A3: Annual growth rate of company establishment in Söderåsen national park's buffer zone.

Park founded in 2001 (represented by the dashed line). The analysis window (from Table 8) is depicted as a yellow rectangle.

Source: Retriever Business (n.d.) and own calculations.