

The COVID-19 pandemic and regional economic resilience in Northern Finland, Norway, and Sweden – bouncing back or not?

Jaakko Simonen, Mikko Moilanen, Jemina Kotila, Joonas Lohtander, Lars Westin, Anders Hersinger, Stein Østbye, Tapio Riepponen & Rauli Svento

The COVID-19 pandemic has been first and foremost a health crisis, but it has also had severe negative impacts on the global economy. It has shaken regional economies, especially labour markets, over the last two years. Arctic regions are no exception. The aim of this article is to analyse the regional economic impacts, as well as the recovery processes, of the COVID-19 pandemic in Arctic 5 cities in Northern Finland, Sweden, and Norway (Oulu and Rovaniemi in Finland, Luleå and Umeå in Sweden and Tromsø in Norway).

In many countries, including Finland, Sweden and Norway, governments decreed various types of lockdown policies to prevent the spread of the COVID-19 pandemic. Due to such policies, the pandemic has had an asymmetrical impact not only on individuals but also on communities and regions. This has given new urgency to a place-based approach to regional development, mitigating territorial inequalities. Our goal is to study how hard the Arctic 5 cities have been hit by the COVID-19 shock and how well they have been able to absorb, adapt to and recover from the crisis. The research question thus focuses on the resilience of the regions.

In this study, we focus on the analysis of public statistics concerning the development of labour markets. We also analyse changes

Jaakko Simonen, Associate Professor, University of Oulu; Mikko Moilanen, Professor, UiT The Arctic University of Norway; Jemina Kotila, Doctoral Researcher, University of Oulu; Joonas Lohtander, Doctoral Researcher, University of Oulu; Lars Westin, Professor, University of Umeå; Anders Hersinger, Professor, Luleå University of Technology; Stein Østbye, Professor, UiT The Arctic University of Norway; Tapio Riepponen, Doctoral Researcher, University of Oulu; Rauli Svento, Emeritus Professor, University of Oulu

in human behaviour during the pandemic using the information provided by Google Mobility data. These mobility data and labour market indicators are used to measure regional economic and social resilience. Our research shows that, for example, regional socioeconomic structures have played an important role in how well the regions have been able to withstand the pandemic and recover from it. Differences in national containment regulations have also affected this development. These cross-border comparisons provide information on how well different measures in different regions across national borders have functioned and what impacts they have had on regional economies, especially on labour markets and people's mobility.

Introduction

Society faces shocks of different magnitudes, durations and starting points. Shocks can be sudden or slow, temporary, or long-lasting, and local or global (Martin & Gardiner, 2019). The COVID-19 pandemic is a textbook example of a shock that originated outside the economy and has had an effect on both the macro and micro levels of the global economy. The shock has affected the business activities of firms, the unemployment of individuals, and the economic development of regions. Economic crises usually start with a shock to aggregate demand or a disturbance in the financial markets. Since the COVID-19 pandemic and the related restrictive measures affected both the demand for products and services and the supply and demand for labour at the same time, the shock caused by the pandemic has been fundamentally different from that caused by previous economic crises. That is why it is important to study how the economy adapted during this pandemic.

When the COVID-19 pandemic hit, the assumption was that the economic effects of the pandemic, for example, those related to employment, would last for years. How wrong were we in that sense? Based on employment statistics, the economy has recovered from the pandemic remarkably well. However, the COVID-19 pandemic has had an asymmetric impact not only on individuals but also on communities and regions. Arctic regions are no exception in this sense. An important question is about resilience at different levels. How well have people, companies, organizations, and regions been able to cope with this unexpected event?

The concept of resilience has grown in popularity among researchers, policy-makers and economists (e.g., Riepponen, Moilanen, & Simonen, 2022). In economics and regional science, the concept of resilience is used to describe how well actors are able to adapt and how vulnerable they are to unexpected changes in their operating environment (e.g., Martin & Sunley, 2015; Christopherson, Michie, & Tyler, 2010; Weichselgartner & Kelman, 2015). Resilience concerns actors at different levels. In the case of the COVID-19 pandemic, people were forced to drastically limit their mobility and social interaction. Firms had to change their business strategies and ways of working almost overnight. The need for change at the firm level, and thereby at the regional and municipality level, depended significantly on the economic structure of the regions. Shocks and crises affect people's consumption behaviour (Nakamura, Steinsson, Barro, & Ursúa, 2013). During the COVID-19 pandemic, both people's mobility and their ability to use services were restricted. These restrictions had the biggest impact on the restaurant and tourism industry, as well as various cultural events. Recent development, based on our analysis, reveals that the Arctic 5 cities, Oulu and Rovaniemi in Northern Finland, Luleå and Umeå in Northern Sweden and Tromsø in Northern Norway, have recovered, i.e. bounced back, from this shock.

The vulnerability of the whole economy to shocks and crises is significantly based on the interaction between the actors at various levels. Resilience against a shock at one level reflects

resilience at another level (Riepponen et al., 2022). The COVID-19 pandemic showed that thanks to effective measures, authorities can proactively mitigate the effects of shocks. In social sciences, the concept of social resilience is typically used to describe the adaptive and coping abilities of a large system from an actor-oriented perspective. This research emphasizes three types of societal capacities: coping capacities, adaptive capacities and transformative capacities (Keck & Sakdapolrak, 2013). When economists talk about resilience, it is quite typical to talk about recovery, i.e., bouncing back (Simmie & Martin, 2010). The speed and scope of recovery are among the most studied issues, especially in the field of regional resilience (e.g., Martin, 2012). At the organizational level, we are particularly interested in the organization's ability to maintain and restore an acceptable operating level and recover from perturbations (Duchek, 2020). At the individual level, resilience is typically studied from the psychological point of view (Bonanno, 2004). What is our ability to act and adjust our behaviour in the face of adversity or shock? How do crises affect the behaviour of individuals? Clearly, resilience at the individual level has a significant effect on regional resilience (Simonen, Herala, & Svento, 2020). The COVID-19 pandemic has shown this to be true.

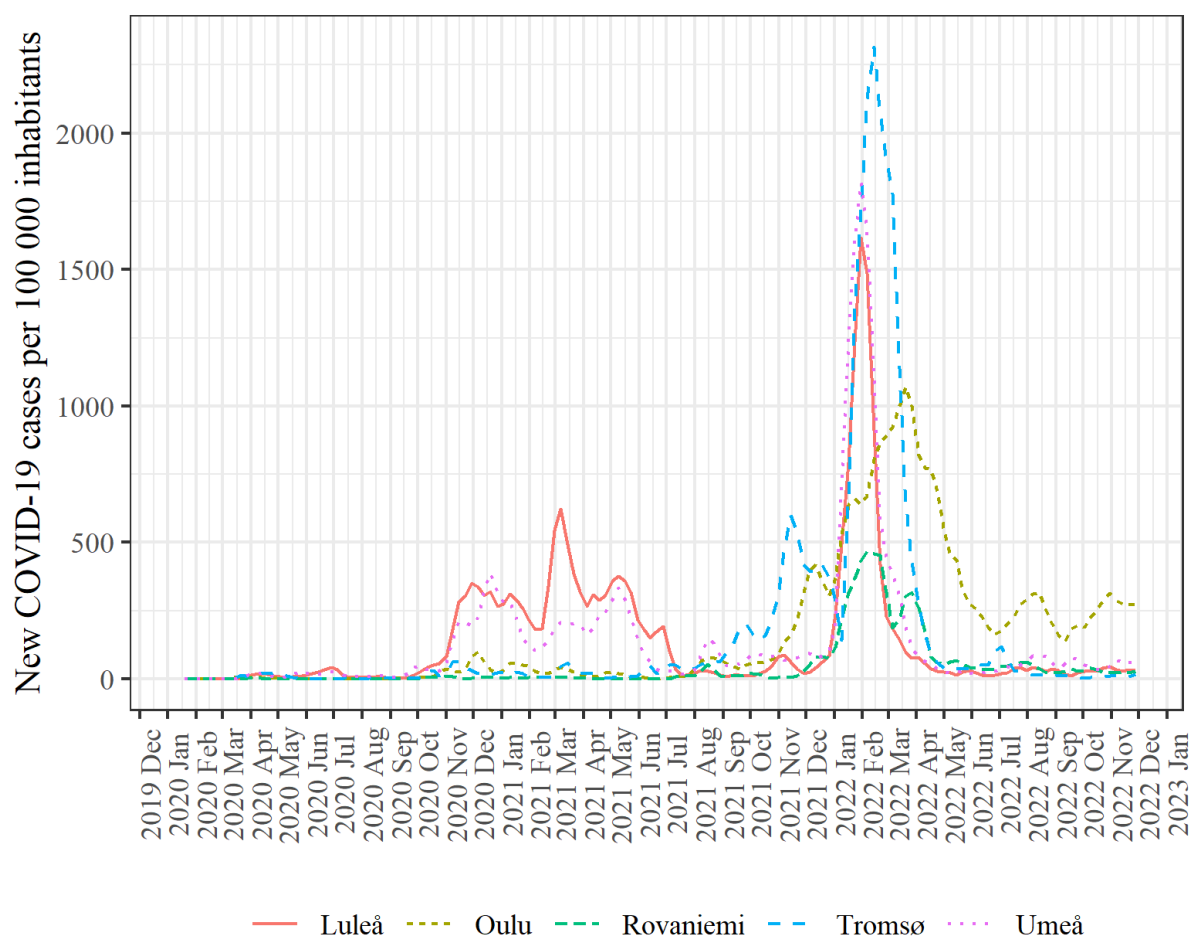


Figure 1. Weekly COVID-19 cases per 100 000 inhabitants in the Arctic 5 cities. Sources: THL, FOHM, covid19data.no.

Infobox 1: The Arctic 5 cities.

The Arctic 5 cities are located in Northern Scandinavia: Oulu and Rovaniemi in Finland, Luleå and Umeå in Sweden and Tromsø in Norway. These five cities are either the capitals or administrative centres of their region. Oulu is the capital of North Ostrobothnia, Rovaniemi is the capital of Lapland, Luleå is the capital of Norrbotten County, Umeå is the capital of Västerbotten County, and Tromsø is the administrative centre of Troms and Finnmark County. Oulu has the highest population, with nearly 210 000 inhabitants. The population of Umeå is approximately 130 000. In Luleå and Tromsø, there are almost 80 000 inhabitants. Rovaniemi is the smallest, with approximately 64 000 inhabitants.

The name of the Arctic 5 comes not only from their location in Northern Scandinavia but also from the cross-border collaboration between these cities, especially between their multidisciplinary universities. The Arctic 5 universities of Northern Finland, Sweden and Norway are the University of Oulu (Oulu, Finland), University of Lapland (Rovaniemi, Finland), Luleå University of Technology (Luleå, Sweden), University of Umeå (Umeå, Sweden), and UiT The Arctic University of Norway (Tromsø, Norway). The Arctic Five (Arctic 5) is a forum for collaboration between the five universities.

The universities in these five cities bring students to the areas, which lowers the average age. The average age of the population is approximately similar across the cities. The highest average age is in Luleå (42.2 years), and the lowest is in Tromsø (38.4 years). There is slightly more variation in the share of people with a higher education (above secondary). In Umeå and Tromsø, over 37% of the population has a higher education, while in Oulu and Luleå, this figure is over 31%. In Rovaniemi, the share of the population with a higher education is just below 30%. The numbers are higher in all Arctic 5 cities compared to the country level, which is 28.0% in Finland, 27.9% in Sweden and 30.7% in Norway.

The private sector employs 57-70% of the total employment in the Arctic 5 cities, which is lower than the national level. Primary production, including agriculture, forestry, and fishing, accounts for approximately 1% of total employment in each of the Arctic 5 cities. The share of manufacturing in total employment ranges from 12% in Tromsø to 20% in Oulu. Services employ the most people in all cities. Infobox 2a and 2b provides further details about the industrial structures of the Arctic 5 cities.

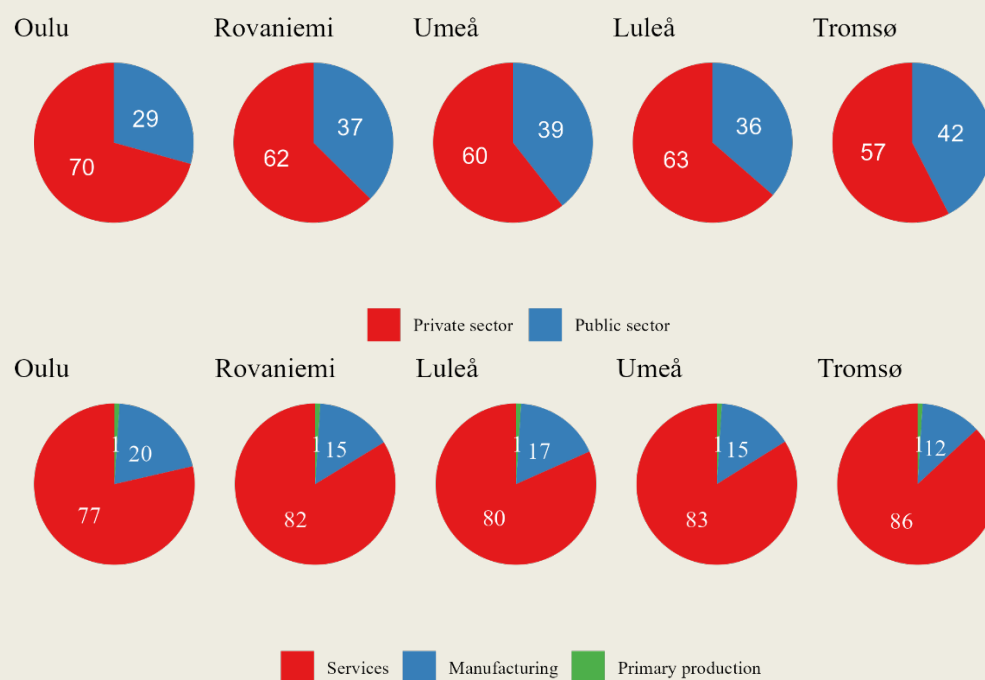


Figure 2. Industrial structure and sector shares in the Arctic 5 cities. Sources: Statistics Sweden, Statistics Finland, and Statistics Norway.

The development of the COVID-19 pandemic was significantly different in Finland and Norway compared to in Sweden. An important reason for this were the differences in national containment regulations. Irfan et al. (2022) show that Finland and Norway set very strict national restrictions starting at the beginning of the pandemic. As in many other countries, all kindergartens, schools, and educational institutions were closed, and all cultural and sports events were cancelled. Companies in which close physical contact was unavoidable were required to remain closed. People were encouraged to work from home offices whenever possible. Unnecessary travel was banned for all, and strict restrictions on foreign nationals’ access to Norway and Finland were established.

All in all, we may argue that protection regulations guided our behaviour in many ways and thus affected our resilience.

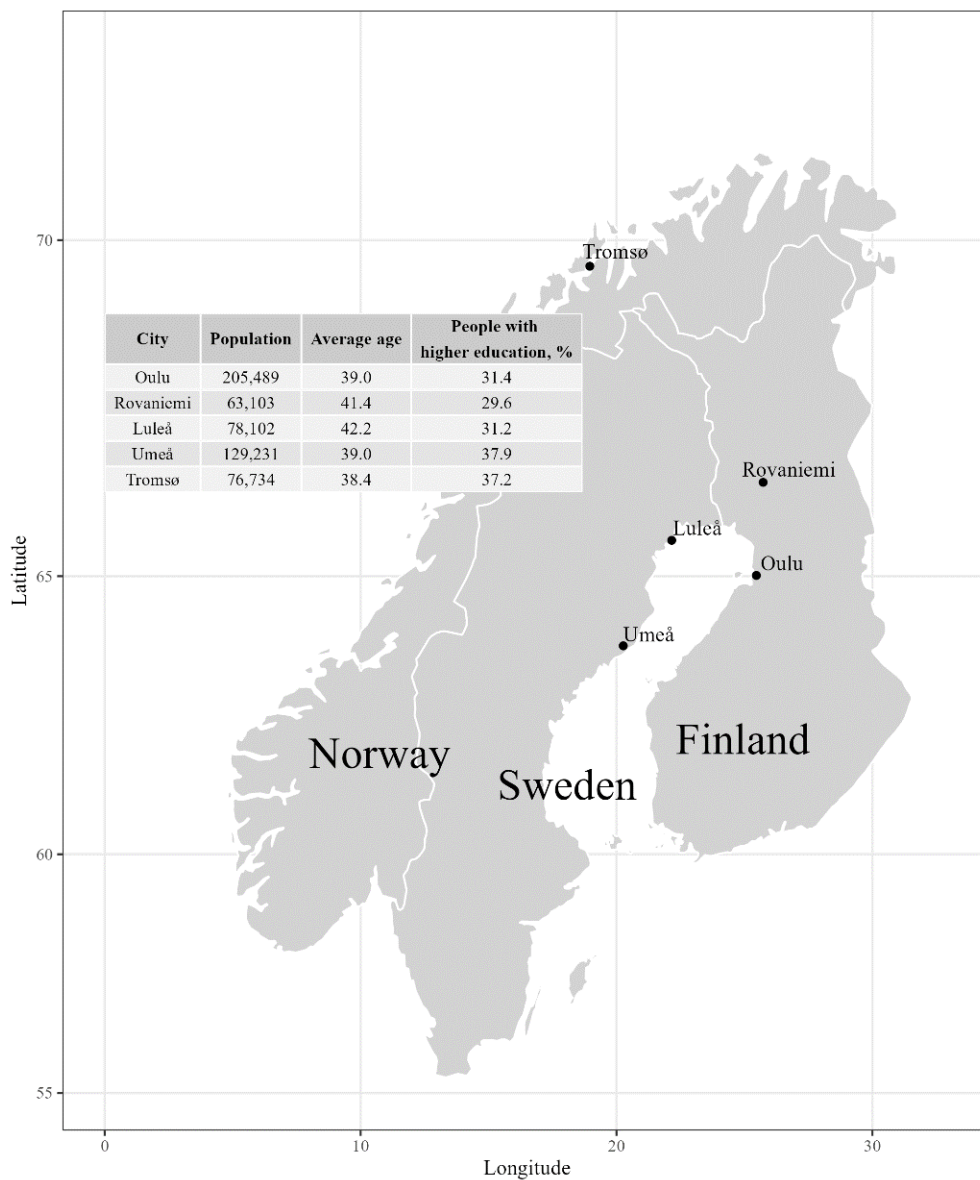


Figure 3: Key characteristics of Arctic 5 cities. Sources: Statistics Sweden, Statistics Finland, and

Statistics Norway.

Sweden applied, especially at the start of the pandemic, a different strategy to prevent the spread of the pandemic and mitigate its effects. Sweden kept its society relatively open throughout the pandemic. At the beginning of the pandemic, Sweden adopted a strategy that was based on personal responsibilities instead of regulations and restrictions imposed by the government. The economy, including shops and other services (e.g., bars and cafes), was kept open, and there were no travel restrictions imposed, which was contrary to many countries (Irfan et al., 2022). At the beginning of the pandemic, this led to people travelling to Sweden and enjoying “normal life” as much as possible by going to bars and cafes (see, e.g., Vogel 2020). Furthermore, unlike in many other countries, schools were mainly kept open to mitigate the effect of the pandemic on the development of human capital (Hallin et al., 2022). However, when looking at the restrictions starting in 2021, Sweden applied stricter restrictions than those imposed by the other Nordic countries, e.g., in regard to organizing even small public events (see Hale et al. 2021). Figure 1 below shows how these different strategies played out in COVID-19 cases in the Arctic 5 cities.

Infobox 2a: Differences in industrial structure between Arctic 5 cities.

Figure 4 shows the variation in different industries between the cities measured by the percentage point difference from the average of the Arctic 5 cities in terms of the share of people working in the industry. The values are based on the situation before the COVID-19 pandemic at the end of 2019. There are regional variations, especially in the service sector. Variation is the largest in the following service industries: educational, human health and social work, public authorities and national defence. For instance, in the human health and social work sector, the employment share in Tromsø is almost 5 percentage points higher than the regional average. In Luleå, this same value is 3.5 percentage points lower than the regional average.

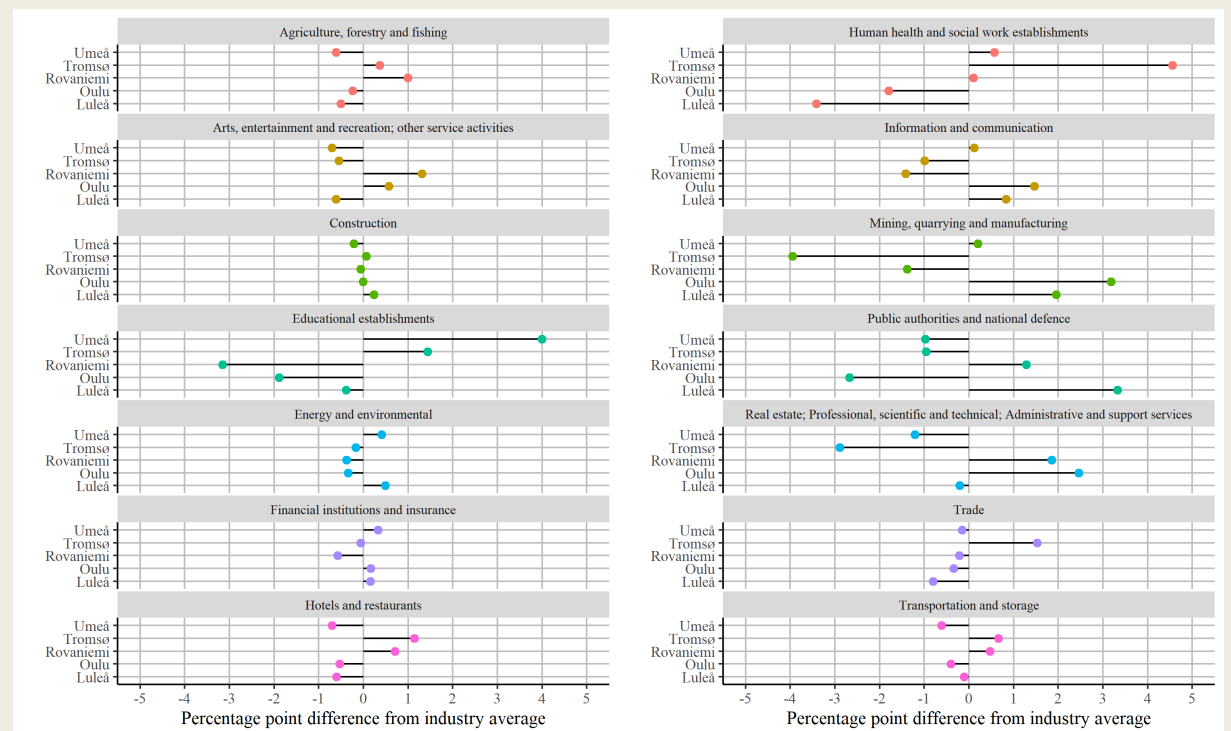


Figure 4: Percentage point differences in the share of people employed in different industries compared to the average of the Arctic 5 cities. Sources: Statistics Finland, Statistics Sweden,

Statistics Norway.

Infobox 2b: Differences in industrial structure between Arctic 5 cities.

Figure 5 displays the differences in the industrial structures between the cities compared to the country averages, e.g., Oulu is compared to Finland and Umeå to Sweden. The values are based on the pre-COVID-19 situation at the end of 2019. The employment shares in educational, human health and social work, and public authorities and national defence are typically larger in the Arctic 5 cities compared to the national averages. The share of mining, quarrying, and manufacturing sector as an employer is smaller than its share nationally in all Arctic 5 cities.

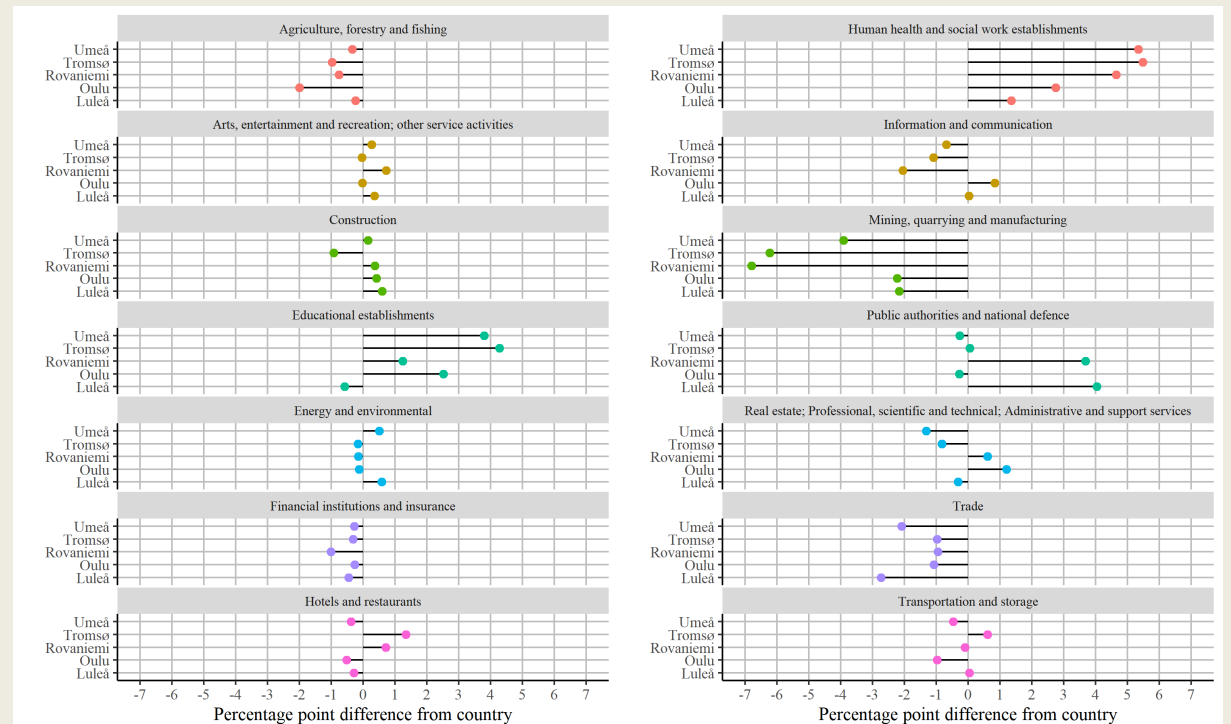


Figure 5: Percentage point differences in the share of people employed in different industries compared to the country average. Sources: Statistics Finland, Statistics Sweden, Statistics Norway.

In the early stages of the pandemic, the development of new cases was highly similar in the Arctic 5 cities. However, soon after the start of the pandemic, development paths began to diverge due to different national and regional strategies to prevent the spread of the virus. Throughout the pandemic, the number of cases decreased soon after each major outbreak. Figure 1 shows that there were clearly more cases in 2022 than in the first two years of the pandemic. In addition to different variants of the virus, loosened regulations and changed attitudes due to high vaccination coverage explain this significant increase.

In this article, we focus on the effects of the COVID-19 pandemic in the so-called Arctic 5 cities studied: Oulu and Rovaniemi in Northern Finland, Luleå and Umeå in Northern Sweden, and Tromsø in Northern Norway (see Figure 2 and Infobox 1). The development of the COVID-19 pandemic in these cities more or less followed the national development observed in Finland, Norway and Sweden.

The structure of the article is as follows: The next section will focus on changes in human behaviour during the pandemic using the information provided by Google Mobility data; In section 3, we

examine the regional industrial structures of the Arctic 5 cities and how the COVID-19 pandemic has affected their labour markets; In Section 4, we present some conclusions and discuss how the future of the Arctic 5 cities might look in the forthcoming years.

Social distancing and mobility – How did people change their behaviour?

In many countries, including Finland, Sweden and Norway, governments decreed various types of lockdown policies to prevent the spread of COVID-19. These restrictions affected how people spent their free time and how much time they spent at home. The rising vaccination coverage in the Arctic 5 cities (Figure 17 in the appendix) gradually eased these restrictions and increased the level of social interactions. Google Community Mobility Reports provide interesting, quickly updated data that we can use to evaluate the effect of these restrictions.¹ Figure 6 shows how time spent at home developed during the pandemic. The y-axis illustrates changes in human behaviour. It is measured as the weekly average change in hours spent at home compared to the baseline, which is the median day value from January 3 to February 6, 2020. Mobility regulations and restrictions on public gatherings influenced mobility, which affected how much time people spent at home. During the first two years of the pandemic in the Arctic 5 cities, people spent approximately 5.5% more time at home than in the pre-COVID-19 period.

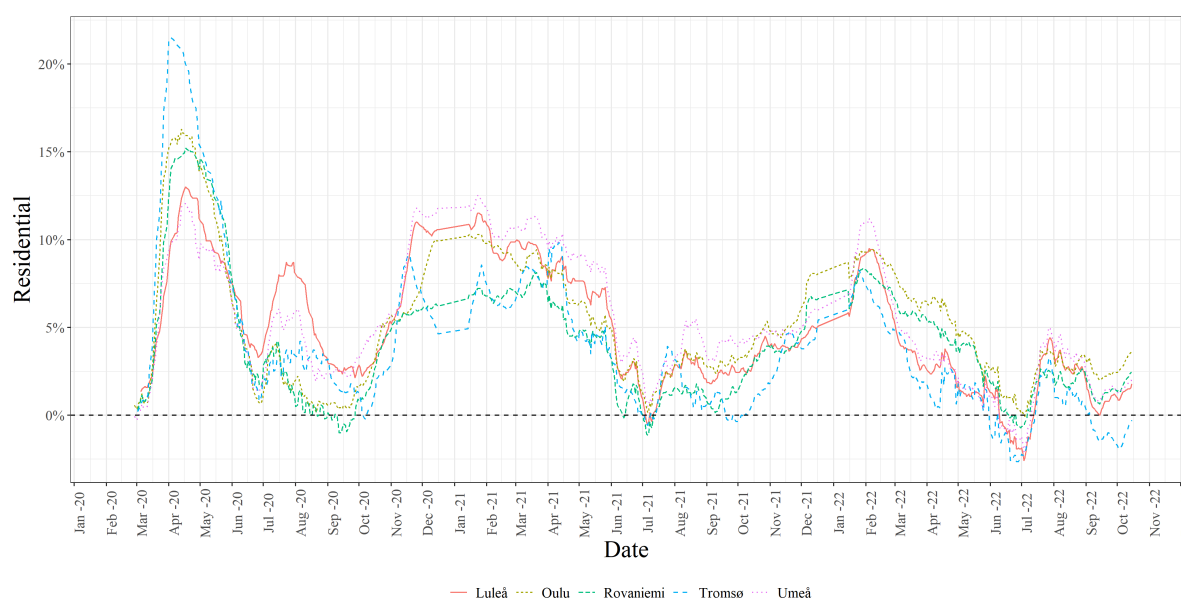


Figure 6: The time that people spent at home compared with the baseline in Arctic 5 cities. The baseline (dashed line) is at zero. Source: Google Community Mobility Reports.

The long-term pattern shown in the graphs in Figure 6 looks very similar in all the Arctic 5 cities. This would indicate that different strategies between countries had impacts, but the differences were not as large as one may expect. At the beginning of the COVID-19 pandemic, the time spent at home increased sharply in all cities. After returning to baseline levels in the summer of 2020, the amount of time spent at home increased again by the end of the year and peaked around the

¹ Google Community Mobility Reports compare changes in visits and length of stay at various locations to a baseline of median values for the same day of the week from January 3 to February 6, 2020. The reports are based on aggregated, anonymous data from users who have enabled location history on their mobile phones and may not accurately reflect the behaviour of the general population. For more information, see, <https://www.google.com/covid19/mobility/>.

beginning of 2021. In the spring of 2021, people spent much more time at home in all cities except Sweden, although the number of COVID-19 cases was extremely low at the same time. In all the cities, we notice a return to baseline in the summer of 2021. However, we must remember that baseline describes the situation in the 5-week winter period ranging from January–February 2020. People in Arctic areas tend to spend less time at home during summer than during winter. In Christmas 2021, we see a peak similar to that seen in the year before. By the end of 2022, the trend in all cities returned to levels close to the baseline set in 2022.²

Figure 7 provides further insight into how the behaviour of the inhabitants of the Arctic 5 cities has changed over the course of the pandemic. It appears that the pandemic may have permanently increased the amount of time we spend at home, with the greatest impact seen in Oulu and Rovaniemi, where the trends three years after the start of the pandemic still follow the patterns of the first year (Figure 7).

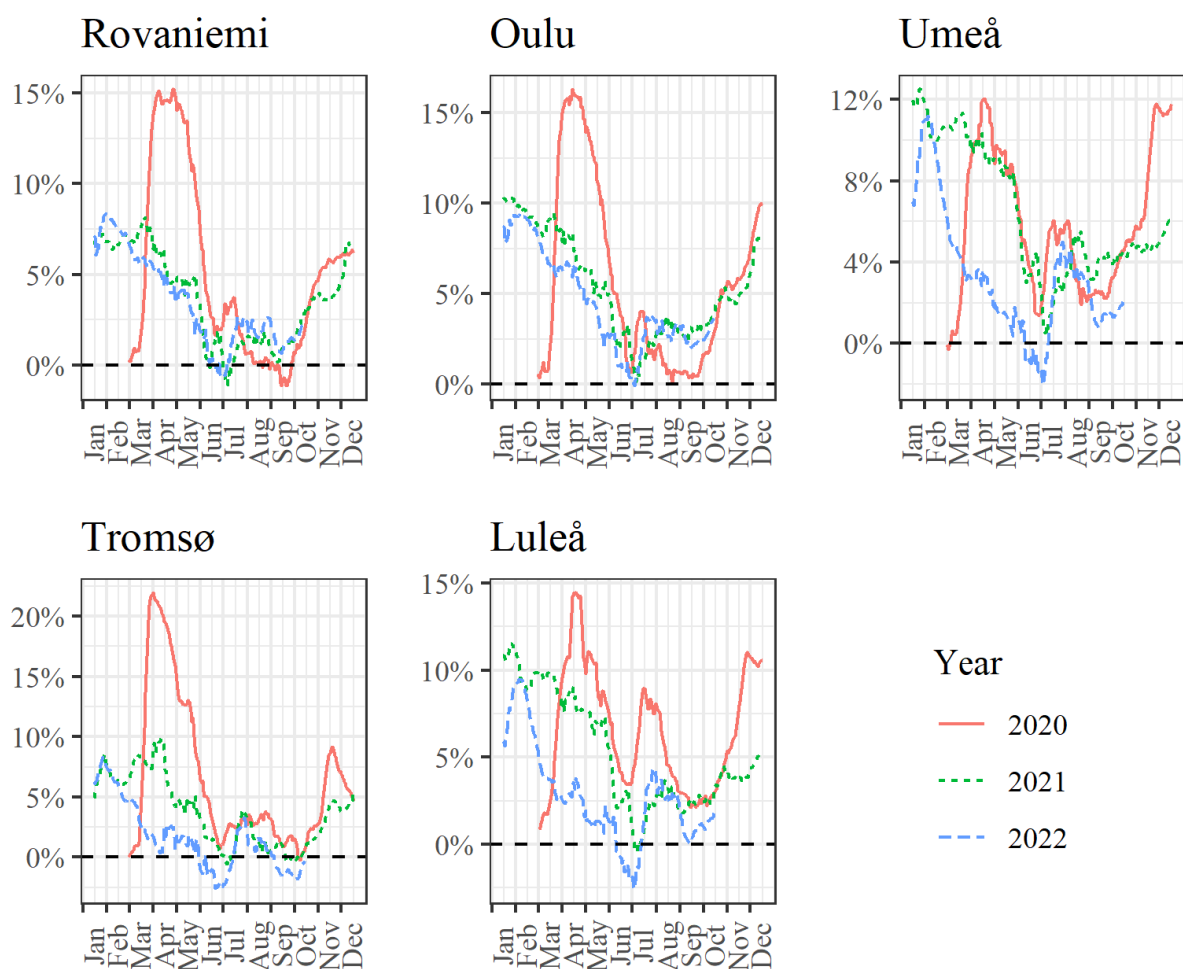


Figure 7: The time that people spent at home compared with the baseline in Arctic 5 cities, year comparison. The baseline (dashed line) is at zero. Source: Google Community Mobility Reports.

² The percent increase in time spent at home in the Arctic 5 cities was lower than in the national capitals of Helsinki, Stockholm, and Oslo, with average increases of 8.9%, 10.3%, and 11.4%, respectively.

This change in human behaviour affects the economy. When the time spent at home increases, that time is taken away from something else. Spending time at home during the COVID-19 pandemic has negatively influenced local demand for services, for example.

Services related to tourism, for example, hotels and restaurants, have suffered the most. Figure 8 shows how the number of visits to places categorized as retail and recreation have changed in the Arctic 5 cities. The retail and recreation category consists of places such as restaurants, cafes, shopping centres, theme parks, museums, libraries and movie theatres. Figure 8 demonstrates that the number of visits to retail and recreational places in all Arctic 5 cities was higher in the first half of 2022 than in 2021. Most people had received their first COVID-19 vaccinations by August 2021, and most social distancing measures were lifted in each of the Arctic 5 cities in 2021 (see Figure 17 in the appendix). In autumn 2022, the mobility patterns in all cities followed those of autumn 2021, with the exception of Oulu and Rovaniemi, where mobility was lower.³

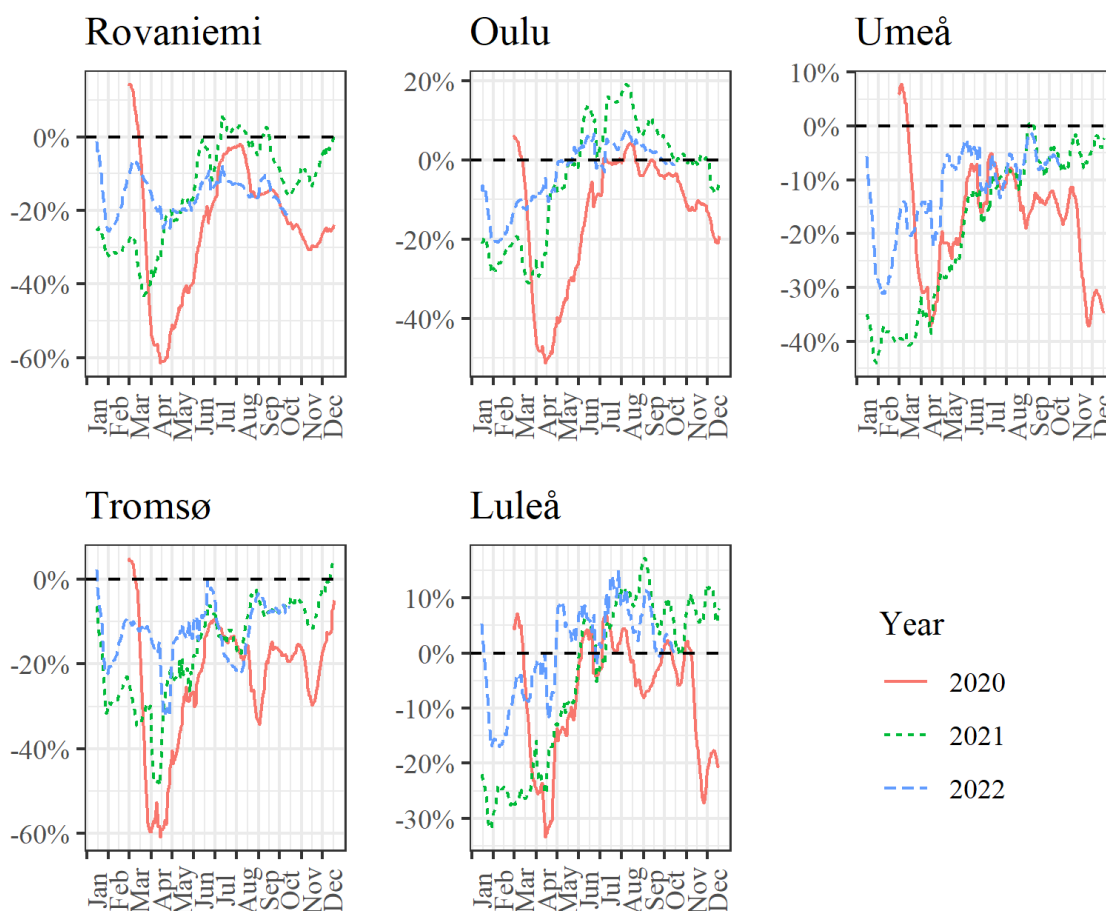


Figure 8: The number of visits to retail and recreation places compared to the baseline in all Arctic 5 cities, year comparison. Source: Google Community Mobility Reports.

Figure 9 illustrates the impact of the pandemic on visits to workplaces; in other words, it shows the shift towards remote work. Throughout the whole pandemic, the Arctic 5 cities have been below the baseline. The differences in regional development can be seen, especially starting from the beginning of summer 2021. Stricter regulations and recommendations in Finland compared to

³ The changes in visits to grocery stores and pharmacies and to transit stations are shown in the appendix.

those in neighbouring countries during the whole pandemic at least partly explain this outcome. The differences in industrial structures are another possible factor behind this development. In Oulu, for instance, visits to workplaces have been approximately 30-40% below the baseline level since the beginning of 2020. Although the pandemic is more or less over, people have not returned to their workplaces. The ICT sector and other knowledge-intensive sectors employ a significant number of people in Oulu, making remote working more available. Rovaniemi and Tromsø saw a decline of approximately 20%, while the average decrease in Luleå and Umeå was approximately 10% in 2022.

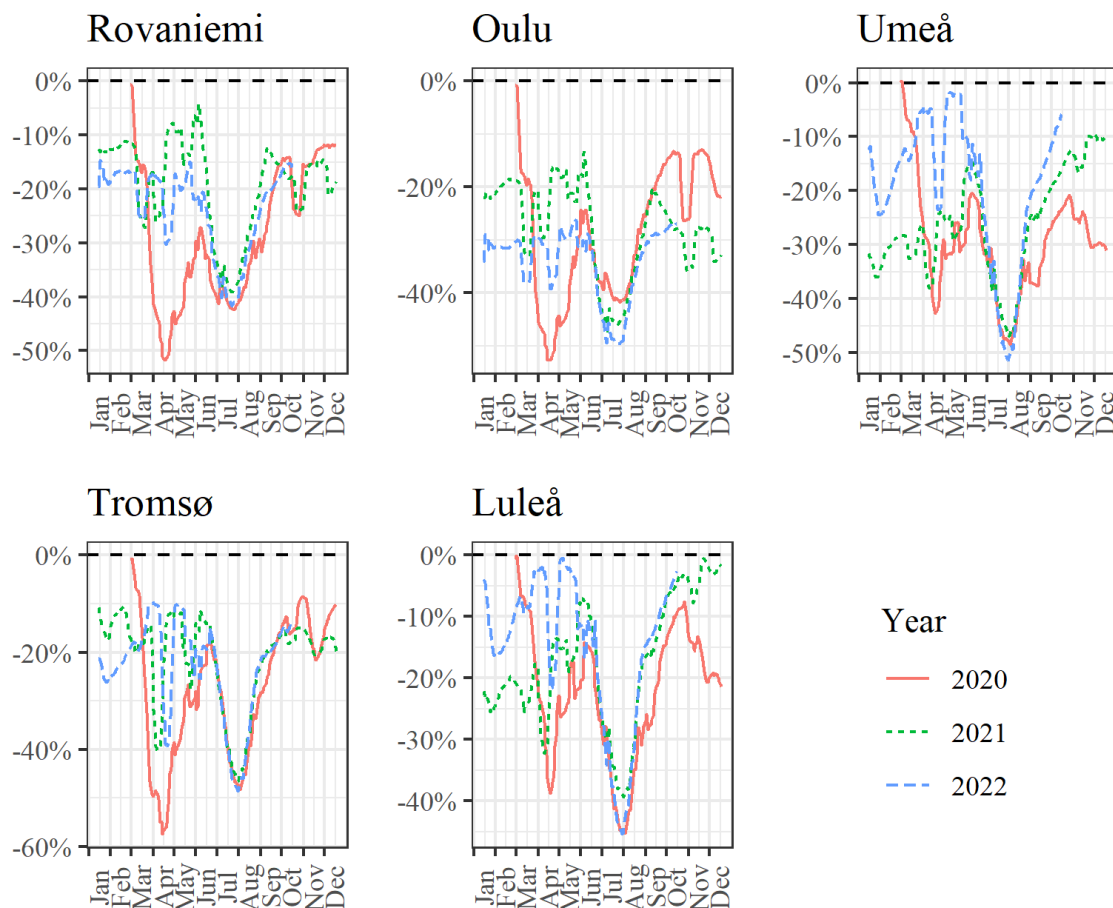


Figure 9: The number of visits to workplaces compared to the baseline in all Arctic 5 cities, year comparison. Source: Google Community Mobility Reports.

The effect of the pandemic on the regional labour market

The economic shock caused by the pandemic has been unique in many respects, from the scale and speed of its impact to the specific nature of how economic activity was curtailed. The COVID-19 pandemic slowed economic activity and, as a result, had a significant effect on the labour market. When the pandemic started, it harmed employment in the Arctic 5 cities. At the same time, it increased the marginalization of the unemployed by affecting their job search. The economic impact of the pandemic did not have the same effects across regions. At the regional level, the effects were linked to both the length and stringency of the lockdown measures and the resources and economic structures of the regions. In the bigger picture, questions remain about the resilience of the regions.

The concept of regional resilience is typically used to describe how regions respond to changes in their economic environment. The concept of regional resilience refers to a region's capability to adapt to changes in a way that provides good opportunities for the development of both production and employment after a shock. Equally important is the ability of regions to anticipate and prepare for disturbances and to recover from them through regional policy (e.g., Martin, 2012). From a regional economics point of view, the interesting question is why "highly resilient" regions are less vulnerable and more capable of adapting to and recovering from external shocks and disturbances than "less resilient" regions.

The local industrial structure is closely linked to regional resilience. Regarding regional resilience, when a region's industrial structure becomes increasingly specialized, the risk of a slowdown in growth arising from external shocks also increases. A diversified industrial structure provides regions with better resistance against shocks by acting in the same way as a decentralized investment portfolio against risk (e.g., Martin, Sunley, Gardiner, & Tyler, 2016). However, Simonen, Juutinen, and Svento (2015) have shown that the optimal diversified structure of a region, from the point of view of regional economic growth, is highly dependent on the size of the region. This may well also be true in the case of regional resilience.

Regional socioeconomic structures, for example, industrial structures (Martin & Sunley, 2015) and the roles of the public and private sectors as employers (European Central Bank, 2022), also have an important influence on how well regions are able to withstand and recover from various shocks. The public sector can act as a stabilizing force and help other sectors (e.g., tourism and other industries in the service sector) and industries adapt to economic shocks. It can create demand for other industries and reduce unemployment during and after economic shocks and recessions. In all Arctic 5 cities, the public sector employs a higher share of workers than it does nationwide. The share of the public sector is largest in Tromsø at 42% and lowest in Oulu at 29%, which at least partially reflects the larger size of Oulu compared to other cities. In the Euro area, for instance, the increase in public employment during the COVID-19 pandemic has been stronger than in past recessions (European Central Bank, 2022). In this article, we focus specifically on the employment effects caused by the pandemic. The bankruptcy of companies and subsidies offered by the government to companies are excluded from the review.

Industrial structures also vary quite a lot among the Arctic 5 cities (Infobox 2a and b). There are regional variations, especially in the following industries of the service sector: educational, human health and social work, public authorities and national defence. Interestingly, in the Arctic 5 cities, the employment shares of these same industries in the service sector are typically larger than the national average. Employment shares also vary in mining, quarrying, and manufacturing, while their position as employers in these cities is smaller than their share nationally. The industrial structures of the manufacturing sector in these cities vary widely. For instance, Oulu and Luleå have internationally recognized research and business activities in the fields of wireless technology, health technology, and data centre industries.

Infobox 3: Overnight stays by foreign and domestic visitors.

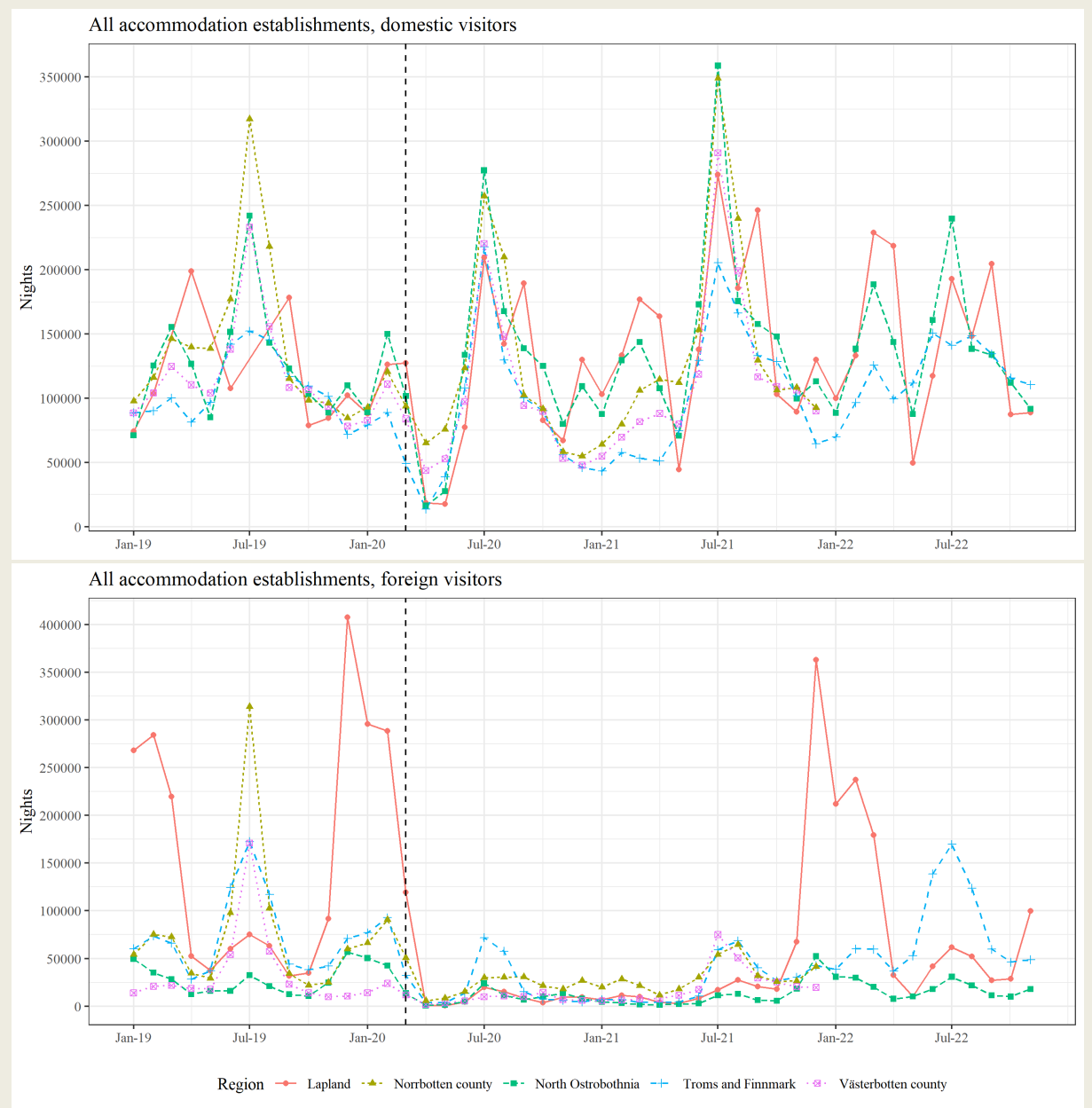


Figure 10: Overnight stays by domestic (above) and foreign (below) visitors in all accommodation establishments in counties where the Arctic 5 cities are located. Source: Statistics Finland, Statistics Sweden, Statistics Norway.

The COVID-19 pandemic caused a significant decrease in overnight stays by foreign visitors in many regions. However, the lifting of travel restrictions and the use of COVID-19 vaccination passports led to an increase in travel during 2021, which was reflected in overnight stays in the Arctic 5 cities. After a record-breaking summer for domestic tourism in 2021, overnight stays by foreign visitors in December 2021 were close to pre-pandemic levels, compared to reaching only a fraction of these levels in December 2020. The increase was particularly significant in Lapland during the Christmas holidays, largely due to the increase in charter flights from European countries. Although overnight stays decreased in January–February, it is expected that both domestic and foreign tourism will return to pre-pandemic levels in 2022.

While the hotel and restaurant sectors received much attention during the pandemic due to strict restrictions, it is important to note that many other sectors in the tourism industry were also severely impacted. This was particularly evident in Lapland and Tromsø, where companies such as husky and snowmobile safari operators, which employ hundreds of workers, saw a decrease in foreign visitors (see Infobox 3). The event industry, including summer festivals, was also affected by restrictions on movement and gatherings. For instance, in the summer of 2020, a survey of event organizers in Oulu (unpublished report) found that two-thirds of those surveyed estimated their 2020 turnover to be at least 25% lower than that in 2019, and one-third estimated their 2020 turnover to be only half of their 2019 turnover.

The COVID-19 pandemic has had a unique impact on the labour market compared to previous crises in recent decades, which typically first impacted manufacturing. Currently, the private service sector is the most affected. This sector has long been responsible for employment increases, especially in large cities (Brodeur, Grey, Islam, & Bhuiyan, 2021). The introduction of strict control measures in mid-March 2020 contributed to a sharp increase in unemployment in Oulu, Rovaniemi and Tromsø (Figure 11). The unemployment rate rose in those cities to the highest point it had been in over ten years. One reason for this was that Finland and Norway made changes to unemployment and laid off coverage on the eve of the COVID-19 pandemic (Møller et al., 2022). In Luleå and Umeå, the effect was substantially smaller as the unemployment rate increased by approximately five percentage points.

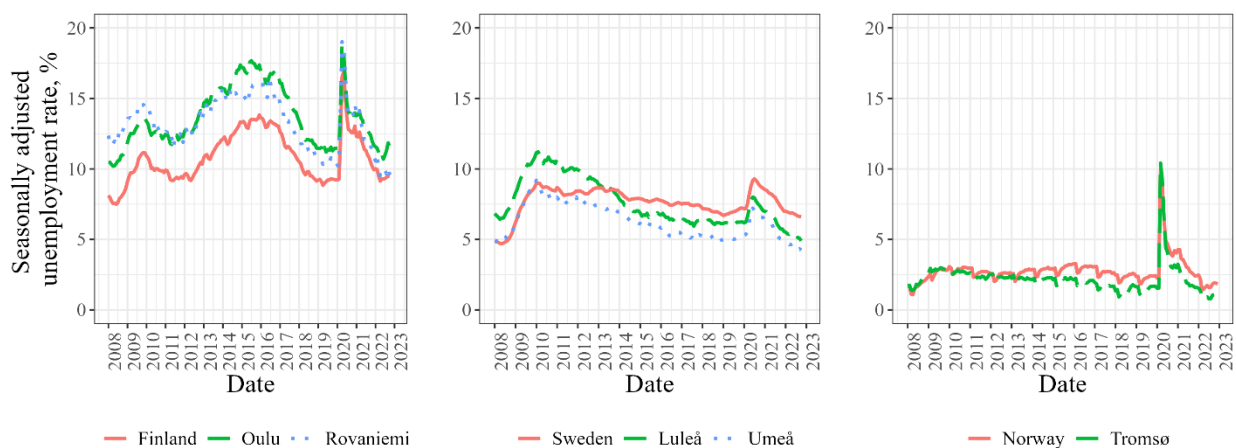


Figure 11: Seasonally adjusted unemployment rates in Arctic 5 cities, Finland, Sweden, and Norway (January 2008 – November 2022). Sources: Ministry of Economic Affairs and Employment in Finland, Swedish Public Employment Service, Norwegian Labour and Welfare Administration.

The differing magnitude of the shock reflects different national prevention strategies. In Finland and Norway, strict regulation measures were executed, forcing firms to lay off employees or even shut down businesses. Sweden, on the other hand, kept its society relatively open, and there was no sharp increase in the unemployment rate. Although the initial shock hit Oulu, Rovaniemi and Tromsø harder, the unemployment rate of these cities started to decline quickly. The development of unemployment rates in the Arctic 5 cities did not differ significantly from the development at the national level.

Despite the magnitude of the initial shock, all Arctic 5 cities have recovered quickly. During April 2020, many companies in these cities began to call back laid-off workers. The number of unemployed individuals declined markedly through the spring and summer of that same year.

Unemployment in Umeå and Luleå peaked slightly later and began to decrease later on. Unemployment in all five cities stabilized at a higher level in autumn 2020 when infection control measures were tightened again. According to figures from labour market authorities, the number of unemployed individuals as a share of the labour force was 21 percent higher in Oulu, 33 percent higher in Rovaniemi, 7 percent higher in Luleå, 13 percent higher in Umeå and 87 percent higher in Tromsø than in February 2020, before the COVID-19 pandemic began. Comparing the impact of the COVID-19 shock with the effects of the financial crisis in 2008–2009, the unemployment level in Luleå and Umeå rose slightly less. In Oulu, Rovaniemi and Tromsø, the initial growth in unemployment was approximately of the same size as in the financial crisis (excluding the spike in March–April 2020). In May 2021, unemployment rates in those three cities were approximately 20% (2–3 percentage points) higher than before the pandemic. However, the effect was not long-lasting; the unemployment rate was already at approximately the same or lower level in spring 2022 as it was before the pandemic in every city.

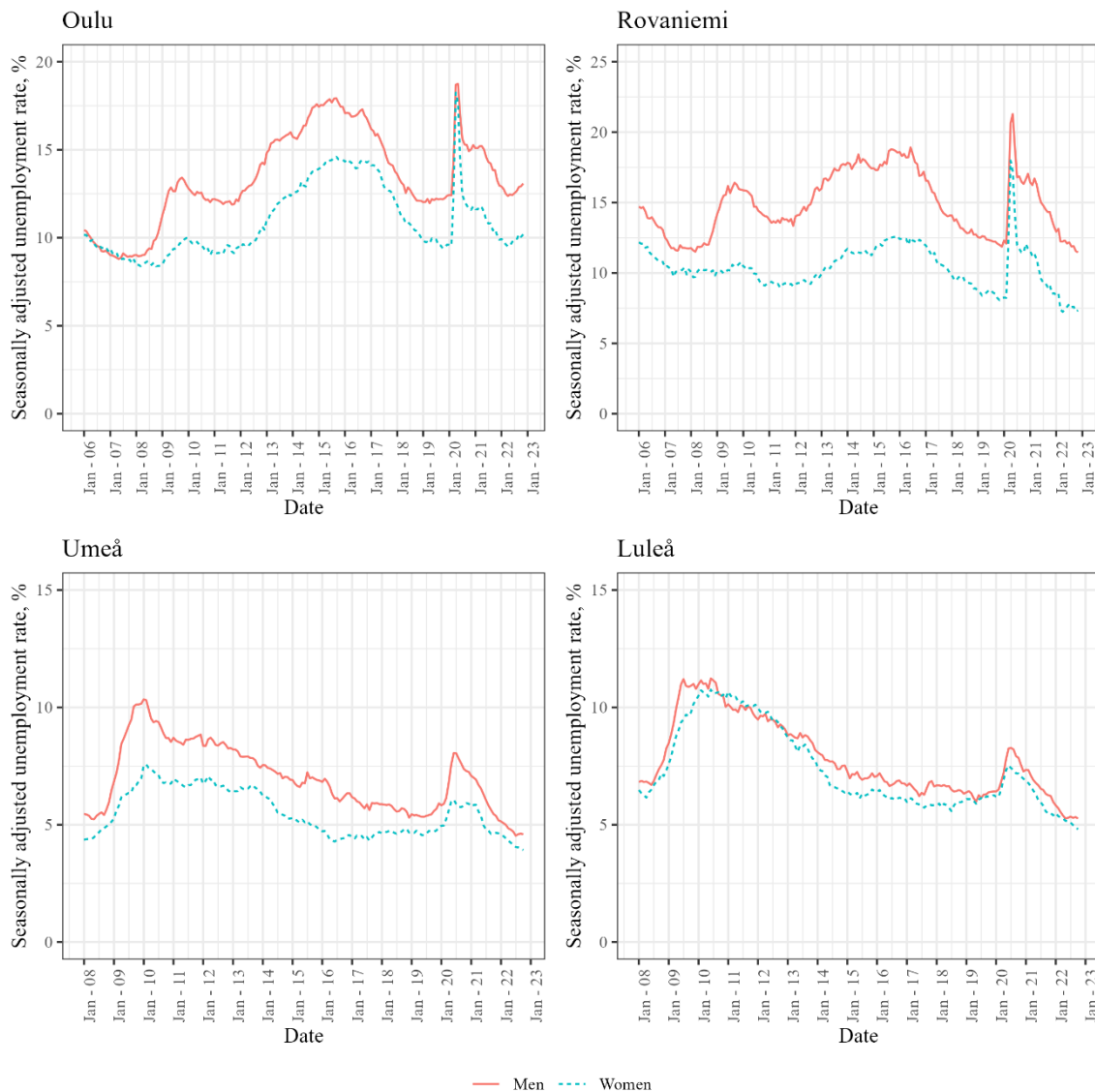


Figure 12: Seasonally adjusted unemployment rates for men and women in Arctic 5 cities (January 2008 – November 2022). Sources: Ministry of Economic Affairs and Employment in Finland, Swedish Public Employment Service. Data concerning Tromsø were not available.

Typically, male-dominated sectors are more cyclical, and previous major shocks have hit them harder. The COVID-19 pandemic, on the other hand, has affected more female-dominated service sectors, as regulatory measures have forced service businesses to close, at least temporarily. At the same time, the demand for labour in female-dominated health care has increased due to the pandemic. The overall trend seems to be that the employment of women suffered more at the beginning of the pandemic, but it also recovered more quickly than the employment of men.

This trend is especially evident in Oulu and Rovaniemi, where the COVID-19 pandemic caused a sudden increase in unemployment for both sexes (Figure 12). The increase was steeper among women, but the decline also occurred more rapidly. Currently, the unemployment rates of both men and women in Oulu and Rovaniemi are below the pre-COVID-19 level. In Luleå and Umeå, the effect of the COVID-19 pandemic was smaller than, for example, the effect of the recent financial crisis (2007–2009). In Luleå, the pandemic hit men and women quite evenly, and recovery occurred at the same rate.

In Umeå, the difference appears to have been greater as the unemployment of men rose more steeply than that for women. This is contrary to the general trend observed. In both Luleå and Umeå, both men and women have recovered from the pandemic well, and the unemployment rates seem to continue to decline.

The extent of open vacancies is a good indicator for the demand for labour and thereby for economic growth (Ando et al., 2022). The number of open vacancies fell sharply immediately after March 2020 but picked up well during the following quarters (Figure 13). By April 2021, the numbers were already above the pre-COVID-19 level in all Arctic 5 cities. Therefore, although the labour market has been strongly affected by the pandemic, the demand for labour is currently well maintained in all Arctic 5 cities. One important explaining factor of this quick rise in open vacancies is the fact that many foreign employees travelled to their home countries at the beginning of the pandemic and have not returned. Additionally, many native workers moved from hard-hit industries to other industries. Currently, at the end of 2022 and the beginning of 2023, the number of new open vacancies is declining. This may indicate that the vacant jobs have been successfully filled or that a generally observed decline in economic growth (International Monetary Fund, 2022) can also be seen in the Arctic 5 cities. In some cities, the number of open jobs has decreased, for example, in the construction industry, which typically quickly reflects a weakening of the economy's prospects. On the other hand, the current situation in Europe has increased inflation and caused uncertainty about the future of the economy in the short run. As inflation continues, it weakens consumers' purchasing power. This will reduce, among other things, the demand for services and thus affect employment.

Despite this present uncertainty, in the long run, a lack of labour force and skills will be one of the most prominent challenges in the Arctic 5 cities. There is already a significant shortage of skilled labour throughout the entire North Calotte region, with some variations between countries, and the demand for labour is increasing in several industries. For example, there is an increased interest in the energy minerals and green energy sources of Arctic cities. At the same time, the increasing dependency ratio, especially in rural areas, further amplifies the problems stemming from the shortage of labour. This trend indicates that the labour market

in the Arctic 5 cities will be influenced by global factors such as demographic changes, an ageing population, rapid technological advancement, globalization, and the shift towards more environmentally sustainable energy sources. (European Strategy and Policy Analysis System, 2019).

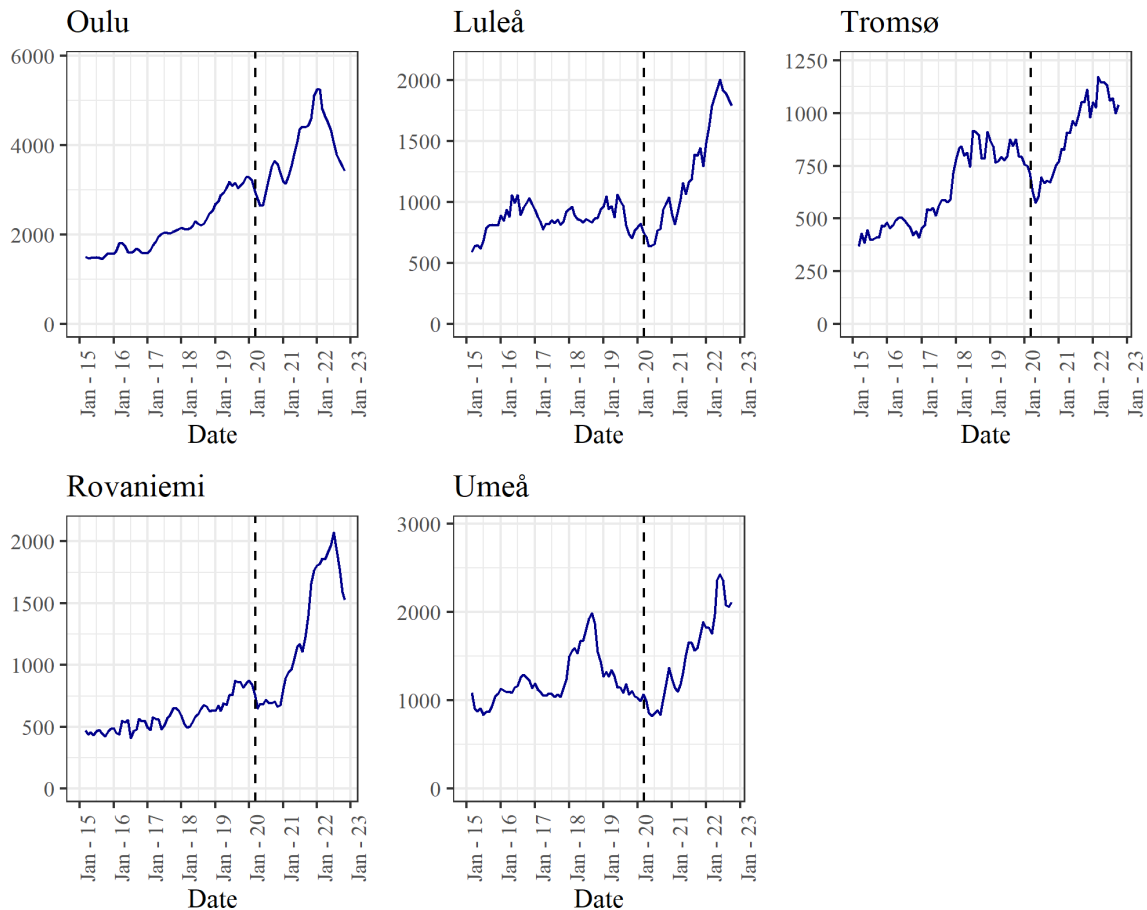


Figure 13: New open vacancies during the month, four month moving averages. The vertical line in each figure shows the date when the WHO declared COVID-19 a pandemic. Sources: Ministry of Economic Affairs and Employment in Finland, Swedish Public Employment Service, Norwegian Labour and Welfare Administration.

In the longer term, we believe the demand for labour in the Arctic 5 cities will increase in several industries. Both technology and other trends will create many new jobs. Many of these jobs will be in industries and professions other than those we have today. Large labour-intensive industrial projects in Northern Sweden, for example, the car battery factory in Skellefteå and fossil-free steel plant in Boden, and the bioproduct mill in Kemi, Finland, are good examples of this type of development. It will also be interesting to see what will happen in the tourism sector. How much will the increasing trend of local and domestic tourism (Mintel, 2021) and flight shame (Mintel, 2020) decrease foreign tourism in Arctic regions? How will the increasing interest in slow tourism (Clancy, 2018; Moira, Mylonopoulos, & Kondoudaki, 2017; Haemoon, Assaf, & Baloglu, 2016) affect the development of the sector in the Arctic regions? Another interesting topic is how the supply chains of firms will change (Shih, 2020). Will we see an increase in the demand for domestic or even local products? These global trends will offer new challenges and opportunities for Arctic cities and regions. It is clear that there is an increasing demand for the development of regional resilience.

Conclusions

The last three to four years have been a turbulent time in the global economy. Although the COVID-19 crisis was not caused by problems in the monetary real economy, as was the case in the financial crises in 2007-2009, for instance, it nonetheless changed our world and the global economy in ways which may be permanent. Digital solutions, an increasing level of remote work, and delivery services have become part of our lives. Instead of talking about our competitiveness, we are now much more concerned about our resilience and our ability to adapt to future disturbances, shocks, and crises. We all wish we were better prepared for these changes because of the lessons we learned from this pandemic.

Our results indicate that two and a half years after the outbreak of the COVID-19 pandemic, the Arctic 5 cities had bounced back in many ways. Currently, the unemployment rates in the Arctic 5 cities are lower than ever. In fact, the effects of the crisis on the labour market were ultimately relatively minor and short-lived. Although the first phase of the crisis caused an explosive immediate increase in layoffs and unemployment, the demand for labour in all Arctic 5 cities continued to grow after the crisis. It can be said that we have returned to the situation we were in before the pandemic, and there is even a labour shortage in several industries throughout the North Calotte region.

Although there are some differences between the Arctic 5 cities, they all have a relatively large public sector. This characteristic has helped these cities to bounce back. As medium-sized university cities and administrative centres, these locations employ a large number of employees with public funds. This, together with the support provided by the public sector for different industry sectors, has stabilized these cities (and the Nordic countries as a whole) and made them more resilient. However, following the general arguments in public economic theory, this dependence on the public sector may also hamper the long-run development of regions (e.g., Caponi, 2017).

The pandemic seems to have changed our behaviour in many ways. As a good example, the ways in which we work have irrevocably changed as a result of the COVID-19 crisis. Remote work and digital tools have established their position of importance. Our results based on Google Mobility data seem to suggest that remote work has changed in all Arctic 5 cities. Generally, this fast process of learning to work digitally over global distances will increase Arctic 5 cities' resilience against future crises.

The Google Mobility data also provide evidence of some changes in consumer behaviour, with fewer visits to restaurants and cafes and more time spent at home. It remains to be seen whether these changes caused by the pandemic will also be permanent in the long run. If this change is found to be not only a local trend but also a global trend, that might have an effect on, for example, tourism in the Arctic 5 cities too.

What have we learned about the pandemic over the past few years? At the very least, we must be prepared for impending crises and the related changes that increase uncertainty in society as a whole. We live in a risky world where many events around the world affect our daily lives. Fortunately, following general arguments in the resilience literature (e.g., e.g., Riepponen, Moilanen, & Simonen, 2022), we can learn from past events and crises to improve our resilience. From the perspective of Arctic regions and cities, the COVID-19 pandemic also showed that we need to be prepared for

changes and shocks, including changes other than those caused by climate change in these regions.

The pandemic crisis was also an eye-opener in that it showed how Nordic cooperation is still partly a vision, which in many respects lacks a common foundation. One of the things that we should definitely improve is cross-border collaboration in case of crises. During the pandemic, the restrictions on movement across borders within the Nordic countries were an unfortunate failure for Nordic cooperation, especially in border areas. Nordic countries should either move towards joint decision-making when crises affecting free movement occur or at least engage in a discussion on whether there should be common Nordic decision-making in matters pertaining to travel restrictions, especially in the case of cross-border labour market mobility.

The current high inflation rate, the tightening economic situation and the war in Ukraine all serve to increase the level of uncertainty about the future. There is a tendency towards a flattening or decreasing demand for labour in all Arctic 5 cities, as the Russian invasion in Ukraine increases uncertainty about the further development of the world economy. It remains to be seen what consequences this may have in the long term for the economy of the Arctic 5 cities. Nevertheless, it is clear that interest in the Arctic regions will increase in the future in many ways. Hopefully, our experiences in recent years will help us face the challenges that such interest causes. Our results indicate that at least our level of resilience will most likely be better than it was before the pandemic.

References

- Ando, S., Balakrishnan, R., Gruss, B., Hallaert, J., Jirasavetakul, L. F., Kirabaeva, K., Klein, N., Lariau, A., Liu, Q.L., Malacrino, D., Qu, H., Solovyeva, A. (2022). European labor markets and the covid-19 pandemic: Fallout and the path ahead. *Departmental Papers*, 2022 (004), A001. Retrieved from <https://www.elibrary.imf.org/view/journals/087/2022/004/article-A001-en.xml>. DOI: 10.5089/9798400200960.087
- Bonanno, G. A. (2004). Loss, trauma, and human resilience: Have we underestimated the human capacity to thrive after extremely aversive events? *American Psychologist*, 59(1), 20–28. DOI: 10.1037/0003-066X.59.1.20
- Brodeur, A., Gray, D., Islam, A., & Bhuiyan, S. (2021). A literature review of the economics of covid-19. *Journal of Economic Surveys*, 35, 1007–1044. DOI: 10.1111/joes.12423
- Caponi, V. (2017) The effects of public sector employment on the economy. IZA World of Labor, 332 doi: 10.15185/izawol.332
- Christopherson, S., Michie, J., & Tyler, P. (2010). Regional resilience: theoretical and empirical perspectives. *Cambridge Journal of Regions, Economy and Society*, 3(1), 3–10. DOI: 10.1093/cjres/rsq004
- Clancy, M. (2018). *Slow tourism, food and cities*. New York: Routledge.
- Duchek, S. (2020). Organizational resilience: A capability-based conceptualization. *Business Research*, 13(1), 215–246. DOI: 10.1007/s40685-019-0085-7
- European Central Bank. (2022). The role of public employment during the

- COVID-19 crisis. *ECB Economic Bulletin, Issue 6*. Retrieved from https://www.ecb.europa.eu/pub/economic-bulletin/focus/2022/html/ecb.ebbox202206_01~abbe041537.en.html
- European Strategy and Policy Analysis System. (2019). *Global trends to 2030 - challenges and choices for Europe*. Retrieved from <https://ec.europa.eu/assets/epsc/pages/espas/chapter1.html>
- Haemmoen, O., Assaf, A., & Baloglu, S. (2016). The motivations and goals of slow tourism. *Journal of Travel Research, 55* (2), 205–219. DOI: 10.1177/0047287514546228
- Hale, T., Angrist, N., Goldszmidt, R., Kira, B., Petherick, A., Phillips, T., Webster, S., Cameron-Blake, E., Hallas, L., Majumdar, S., and Tatlow, H. (2021). A global panel database of pandemic policies (Oxford COVID-19 Government Response Tracker). *Nature Human Behaviour*. <https://doi.org/10.1038/s41562-021-01079-8>
- Hallin, A. E., Danielsson, H., Nordström, T. & Fälth, L. (2022). No learning loss in Sweden during the pandemic: Evidence from primary school reading assessments. *International Journal of Educational Research, 114*(1): 102011. DOI:10.1016/j.ijer.2022.102011
- International Monetary Fund. (2022). World economic outlook – countering the cost-of-living crisis. Retrieved from <https://www.imf.org/en/Publications/WEO/Issues/2022/10/11/world-economic-outlook-october-2022>
- Irfan, F.B., Minetti, R., Telford, B., Ahmed, F.S., Syed, A.Y., Hollon, N., Brauman, S.C., Cunningham, W., Awad, M.E., Saled, K.J., Waljee, A.K. & Brusselaers, N. (2022). Coronavirus pandemic in the Nordic countries: Health policy and economy trade-off. *Journal of Global Health, 12*: 05017. DOI: 10.7189/jogh.12.05017
- Keck, M. & Sakdapolrak, P. (2013). What Is Social Resilience? Lessons Learned and Ways Forward. *Erdkunde, 67*(1), 5–18. DOI:10.3112/erkunde.2013.01.02
- Martin, R. (2012). Regional economic resilience, hysteresis and recessionary shocks. *Journal of Economic Geography, 12* (1), 1–32. DOI: 10.1093/jeg/lbr019
- Martin, R., & Gardiner, B. (2019). The resilience of cities to economic shocks: A tale of four recessions (and the challenge of brexit). *Papers in Regional Science, 98* (4), 1801–1832. DOI: 10.1111/pirs.12430
- Martin, R., & Sunley, P. (2015). On the notion of regional economic resilience: conceptualization and explanation. *Journal of Economic Geography, 15* (1), 1–42. DOI: 10.1093/jeg/lbu015
- Martin, R., Sunley, P., Gardiner, B., & Tyler, P. (2016). How regions react to recessions: Resilience and the role of economic structure. *Regional Studies, 50* (4), 561–585. DOI: 10.1080/00343404.2015.1136410
- Mintel. (2020). *Is “flight shaming” a thing? or is Jetblue just trying to make it one?* London: Mintel Group.
- Mintel. (2021). *Domestic tourism – uk – 2021*. London: Mintel Group.
- Moira, P., Mylonopoulos, D., & Kondoudaki, E. (2017). The application of slow movement

- to tourism: Is slow tourism a new paradigm? *Journal of Tourism and Leisure Studies*, 2 (2), 1–10. DOI:10.18848/2470-9336/CGP/v02i02/1-10
- Møller, F. S., Elkjær, K., Nielsen, P. B., Andersen, S. S., Lindroos, P., Liukkonen, S., ... Werke, L. (2022, 05 31). *The Nordics during the first phases of COVID-19*. Retrieved from <https://www.ssb.no/en/helse/helseforhold-og-levevaner/artikler/the-nordics-during-the-first-phases-of-covid-19/attachment/inline/2cb5a17b-8be2-4acf-8ac3-71fa44bb8f18:237dcef6cf79caa42dc3b8e00cb00e6e0ff8a4b6/The%20Nordics%20and%20COVID-19.pdf>
- Nakamura, E., Steinsson, J., Barro, R., & Ursúa, J. (2013). Crises and recoveries in an empirical model of consumption disasters. *American Economic Journal: Macroeconomics*, 5 (3), 35–74. DOI: 10.1257/mac.5.3.35
- Riepponen, T., Moilanen, M., & Simonen, J. (2022). Themes of the resilience literature in economics – a topic modelling approach. *Regional Science Policy & Practice (forthcoming)*. DOI:10.1111/rsp3.12612
- Shih, W. C. (2020, September-October). Global supply chains in a post-pandemic world. *Harvard Business Review*. Retrieved from <https://hbr.org/2020/09/global-supply-chains-in-a-post-pandemic-world>
- Simmie, J., & Martin, R. (2010). The economic resilience of regions: towards an evolutionary approach. *Cambridge Journal of Regions, Economy and Society*, 3 (1), 27–43. DOI: 10.1093/cjres/rsp029
- Simonen, J., Herala, J., & Svento, R. (2020). Creative destruction and creative resilience: Restructuring of the Nokia dominated high-tech sector in the Oulu region. *Regional Science Policy & Practice*, 12 (5), 931–953. DOI: 10.1111/rsp3.12267
- Simonen J., Svento R., & Juutinen A. (2015). Specialization and diversity as drivers of economic growth: Evidence from High-tech industries. *Papers in Regional Science*, 94, 229-247. Retrieved from <https://rsaiconnect.onlinelibrary.wiley.com/doi/abs/10.1111/pirs.12062>. DOI: 10.1111/pirs.12062
- Vogel, G. (2020). *Sweden's gamble*. Retrieved from: <https://www.science.org/content/article/it-s-been-so-so-surreal-critics-sweden-s-lax-pandemic-policies-face-fierce-backlash>. DOI: 10.1126/science.abf1247
- Weichselgartner, J., & Kelman, I. (2015). Geographies of resilience: Challenges and opportunities of a descriptive concept. *Progress in Human Geography*, 39 (3), 249–267. DOI: 10.1177/0309132513518834

Appendix



Figure 14: Change in visits to grocery stores and pharmacies compared to the baseline in all Arctic 5 cities. Source: Google Community Mobility Reports.

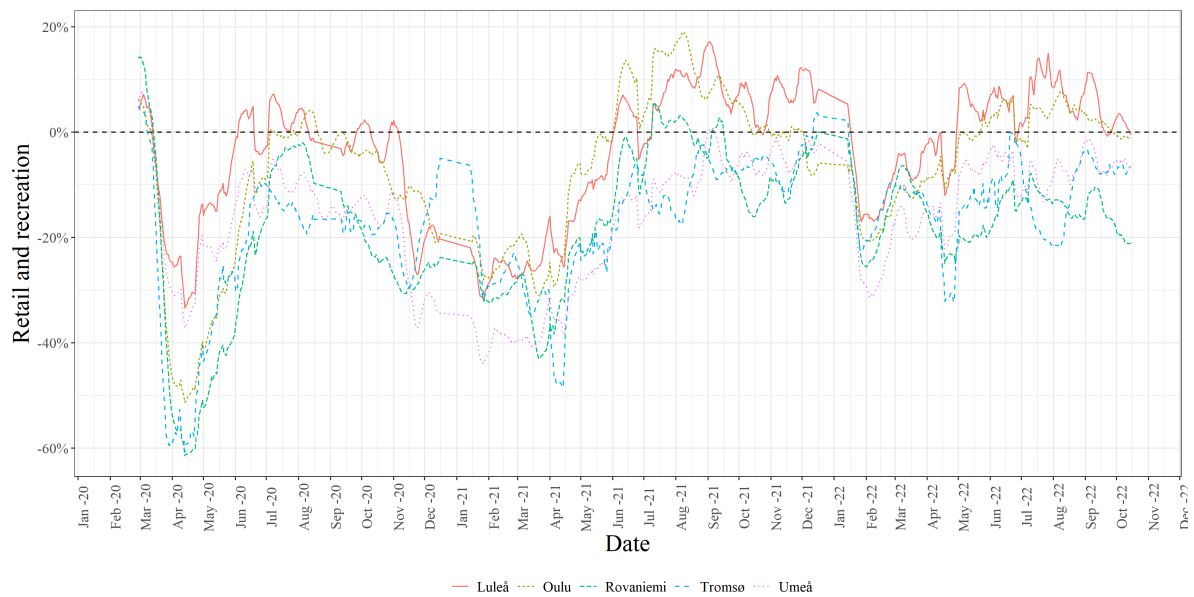


Figure 15: Change in visits to retail and recreation places compared to the baseline in all Arctic 5 cities. Source: Google Community Mobility Reports.

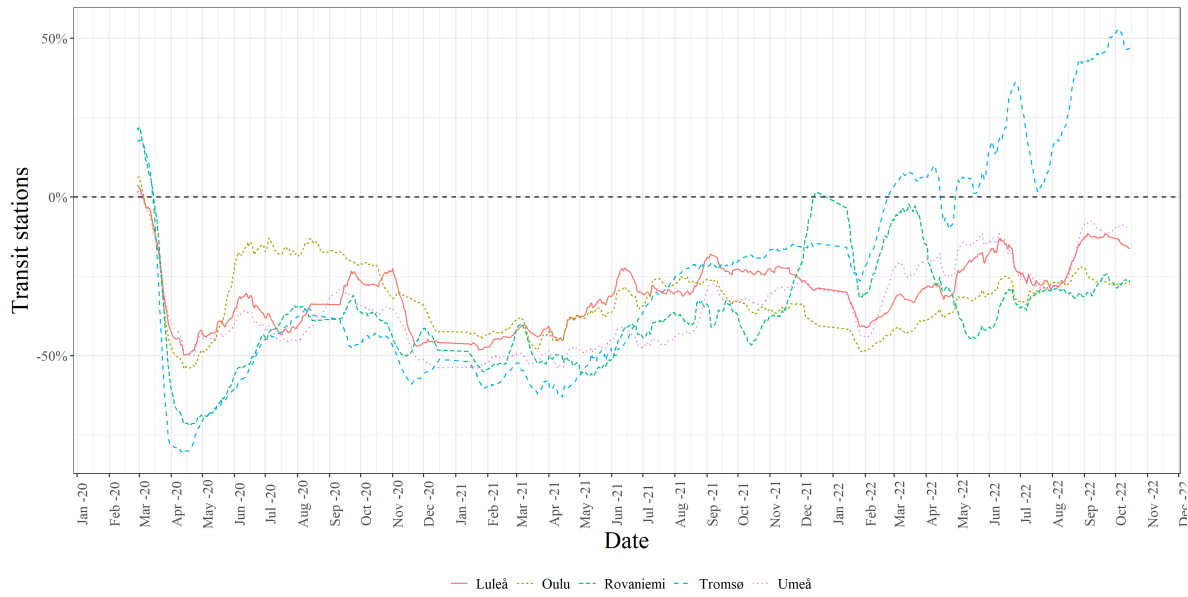


Figure 16: Change in visits to transit stations compared to the baseline in all Arctic 5 cities. Source: Google Community Mobility Reports.

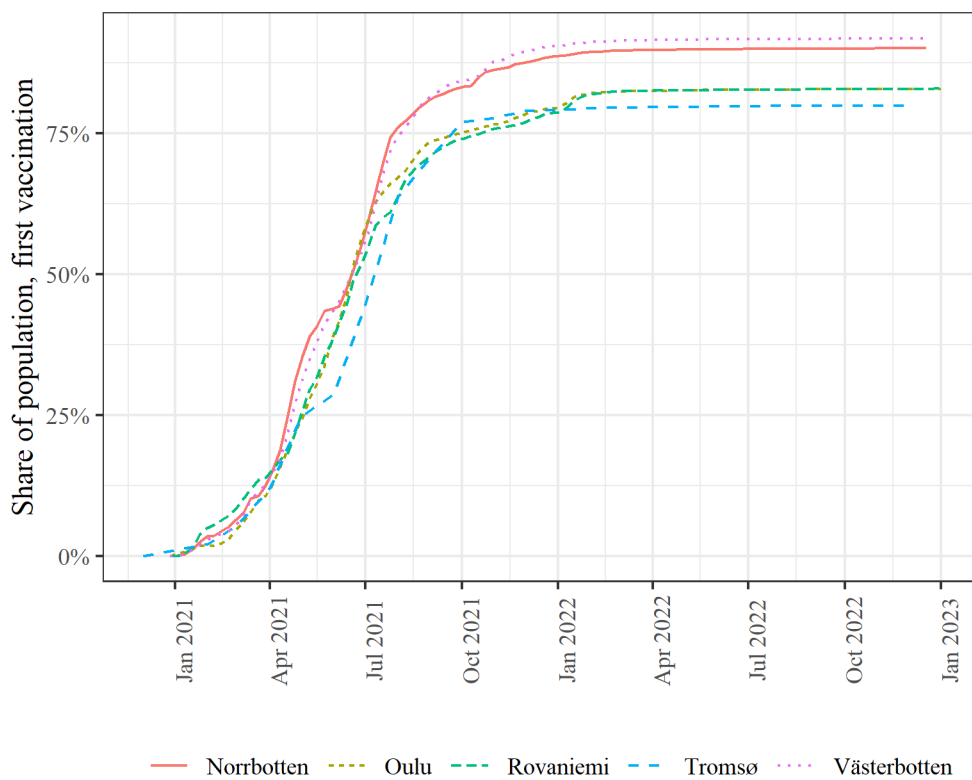


Figure 17. Share of the population who received their first COVID-19 vaccination. Note that for the two Swedish counties, the number of first vaccinations is divided by the number of people who were born latest during 2010. Sources: FHI, THL, Fohm.