ACTA UNIVERSITATIS STOCKHOLMIENSIS
Stockholm Studies in Sociology
New Series 42
BRIDGING THE WORLD
ALCOHOL POLICY IN TRANSITION AND
DIVERGING ALCOHOL PATTERNS IN SWEDEN

NINA-KATRI GUSTAFSSON
To my parents and Mika
CONTENTS

Acknowledgement ................................................................................. ix
Abstract ................................................................................................. xiii
List of articles ....................................................................................... xv
Abbreviations ......................................................................................... xvii
Introduction ........................................................................................... 1
  Swedish traditional alcohol policy put into context ................................... 2
    Nordic Alcohol Policy and that of other European countries .............. 2
    EU membership and its implications .................................................. 2
  Background for this dissertation ............................................................ 4
  Aims/Objectives ...................................................................................... 5
  Outline of the dissertation ...................................................................... 5

Theoretical framing .................................................................................. 6
  Theories about alcohol consumption and change .................................. 6
  Policy control instruments ...................................................................... 7
    Price and availability ......................................................................... 7
  Policy changes ....................................................................................... 9
    Globalization (Europeanization) of Swedish (and Nordic) alcohol policy ............................................. 9
    Previous policy changes and their effects on alcohol consumption and alcohol-related problems ......................... 11
  Changes in alcohol consumption ......................................................... 12
    Long and short term changes .............................................................. 12
    Collectivity of drinking ................................................................... 12
    Change and stasis in alcohol consumption ........................................... 13
    Converging trends ........................................................................... 13
  Perspectives of alcohol policy presented in this dissertation ............... 15

Design, data and statistical methods ....................................................... 16
  Design .................................................................................................. 16
  Data sources ........................................................................................ 18
    The Monitoring project ................................................................... 18
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Nordic tax study</td>
<td>20</td>
</tr>
<tr>
<td>Various types of register data</td>
<td>22</td>
</tr>
<tr>
<td>Discussion of measurements</td>
<td>23</td>
</tr>
<tr>
<td>Statistical methods</td>
<td>25</td>
</tr>
<tr>
<td>The first study</td>
<td>25</td>
</tr>
<tr>
<td>The second study</td>
<td>25</td>
</tr>
<tr>
<td>The third study</td>
<td>27</td>
</tr>
<tr>
<td>The fourth study</td>
<td>29</td>
</tr>
<tr>
<td>Weighting</td>
<td>31</td>
</tr>
<tr>
<td>Limitations and strengths</td>
<td>33</td>
</tr>
<tr>
<td>Summaries of the studies</td>
<td>36</td>
</tr>
<tr>
<td>Study 1</td>
<td>36</td>
</tr>
<tr>
<td>Study 2</td>
<td>37</td>
</tr>
<tr>
<td>Study 3</td>
<td>38</td>
</tr>
<tr>
<td>Study 4</td>
<td>39</td>
</tr>
<tr>
<td>Concluding reflections</td>
<td>40</td>
</tr>
<tr>
<td>Change in price causing change in consumption?</td>
<td>40</td>
</tr>
<tr>
<td>“Charm of novelty”</td>
<td>42</td>
</tr>
<tr>
<td>Regional effects</td>
<td>43</td>
</tr>
<tr>
<td>The collectivity in changing alcohol patterns</td>
<td>43</td>
</tr>
<tr>
<td>Future research</td>
<td>45</td>
</tr>
<tr>
<td>References</td>
<td>47</td>
</tr>
<tr>
<td>Appendix 1</td>
<td>57</td>
</tr>
<tr>
<td>Study sites in the Nordic tax study</td>
<td>57</td>
</tr>
<tr>
<td>Svensk sammanfattning</td>
<td>59</td>
</tr>
<tr>
<td>Original studies I-IV</td>
<td>61</td>
</tr>
<tr>
<td>Publications within the Nordic Tax Study</td>
<td></td>
</tr>
<tr>
<td>Dissertations at the Centre for Social Research on Alcohol and Drugs (SoRAD), Stockholm University</td>
<td></td>
</tr>
<tr>
<td>Stockholm studies in Sociology, N.S.</td>
<td></td>
</tr>
</tbody>
</table>
ACKNOWLEDGEMENT

As it is time to finish another chapter of my life, my years as a PhD student, I cannot limit myself to the four years it took me to finalize the dissertation, because limitation is not my strong side, neither in writing articles nor in life. I will have to go back to where this journey started, in 2002 (or actually in 1999 but I will at least leave that part out of my acknowledgement). In the spring of 2002, I first entered the corridors of SoRAD. What could have ended as ten short weeks as a trainee in the project “Women and men in Swedish alcohol and drug treatment” gave me further employment in the Monitoring project under the management of Håkan Leifman. I am not sure if Håkan knew what he was doing letting me onboard the project, but I am forever thankful that he did. Completely fresh in the field, working as a research assistant with him was at times a cliff-hanger, although his enthusiasm was truly inspiring and I did my best to follow. Most importantly, these years at least in some respects prepared me for what would follow.

When the Nordic tax study\textsuperscript{1} was later launched I gladly tagged along (luckily unaware of the stature of the other scholars in the project), to begin with coding new data sets and co-authoring articles, but in the fall of 2006 also starting to work on my dissertation in the wake of the study. Professor Robin Room has been the main project supervisor and should have great thanks for including me in the project to begin with, but additionally not only for believing in my ability to finalize a dissertation, but also for giving me a great many professional challenges. With his well-estimated ability to challenge and support, Robin guided me in how to carry out research and provided advice and constructive comments when ever asked to; I doubt I will ever learn as much during such short time period as I have during my pre-doctoral years. Additionally, although he is a magnificent and inspiring researcher he has something that I value more - a big heart. The other researchers who have been involved in the project have also helped to make this time pleasurable.

\textsuperscript{1} Full name of the project: “Whose drinking changes how much when liquor taxes fall? Effects of tax cuts” or “Effects of major changes in alcohol availability”.

ix
During our project meetings in Stockholm and at the annual KBS\textsuperscript{2} symposiums, we have had many inspiring discussions with lots of laughs. Several of you have also shared helpful advice and good collaboration. Thank you Pia Mäkelä, Kim Bloomfield, Ulrike Gritzner, Gerhard Gmel, Jürgen Rehm, Ingeborg Rossow, Matthias Wicki, Thor Norström, Esa Österberg, Petri Huhtanen, Phillip Cook, Stefan Lhachimi and Mats Ramstedt. Mats has also been my co-supervisor during these years and most of the time been situated in the corridors of SoRAD. Additionally my dissertation includes two articles that I have written together with him. Thank you for our good collaboration.

I would also like to sincerely thank my main supervisor Professor Karin Helmersson Bergmark for guiding me in the academic jungle during personal conversations over lunches and in her office at the department. When no one else knew how things worked, she usually knew the answer. Additionally, Karin has been helpful with comments and clear in her communication, which I appreciate.

I would also would like to thank Karen Williams and Robin Room for correcting my English and Hampus Nyberg for letting me use his ravishing picture of the Öresund bridge, a central symbol for my dissertation. Also financial support from Systembolaget, the Swedish Ministry of Health and Social Affairs, NIAAA\textsuperscript{3}, NOS-HS\textsuperscript{4}, NAD\textsuperscript{5} are gratefully acknowledged.

During my years as a PhD student there have also been several occasions of inspiring seminars and course lectures at the Department of Sociology at Stockholm University, SoRAD and elsewhere. These years have given me the opportunity to grow on several levels and I have learned a great deal during meetings with the PhD Student Councils of the department and at the central level, the Faculty Council and the Academic appointments board (for senior lecturers and postdoctoral research fellows). More importantly, I have had many great times with doctoral colleagues, other students and scholars.

However, this acknowledgement cannot be written without expressing my enormous gratitude to the Centre of Alcohol and Drug Research

\textsuperscript{2} Kettil Bruun Society – Social and Epidemiological Research on Alcohol
\textsuperscript{3} National Institute on Alcohol Abuse and Alcoholism (NIAAA)
\textsuperscript{4} Joint Committee for Nordic Research Councils for the Humanities and the Social Sciences (NOS-HS)
\textsuperscript{5} Nordic Council for Alcohol and Drug Research (NAD)
(SoRAD), my abode during all these years. As a centre built up around many disciplines, it has been an inspiring environment to work in. However, SoRAD is not just any workplace, but is permeated by fellowship. During these years, my life path has been crossed by many wonderful colleagues and friends who are not just focused on work, but who also arrange social gatherings outside the building and are considerate of others’ well-being. Especially when working late at night and during weekends, the laughter of Tove, Antonina, Jessica P. and Eva has been much appreciated. Tove has surely more than anyone else shared most aspects of my life during the PhD years; while training, travelling and doing other things together, our conversations have shifted from childish humour to dead serious matters. She has also had the great advantage of getting as excited as me about research results. Also, Jenny has altruistically encouraged me to go further at the end of this journey and been supportive with advice on how to bring all the practical pieces together. Thanks also to Jessica S. who helped me with the picture for the front page and allowing me to borrow her couch late nights. However, I do not wish to exclude anyone as most of my current and former colleagues have shared good times at conferences and in private settings. Overall, SoRAD has been a comfortable environment in which to take the first steps of one’s academic life.

Great thanks and lots of love of course to my wonderful friends outside the academic world as well; thank you for being understanding when I did not have the time to meet and nevertheless was always ready to chat about life when I did. You are truly precious to me. Thanks also to the network of “Ladies of Paradise” for giving me “vitamin injections” and the energy at our dates to move forward and not give up.

This dissertation would have taken considerably more time to write if it had not been for my parents, both of whom have spent countless hours babysitting, always being there no matter what. Special thanks to my mum who has had to listen to my frustration as well as enthusiastic ramblings about my results, even though she is not a scholar; thanks as well for her way of cheering me on when needed and telling me enough is enough when I was working too much. Lots of love to you both.

Tack också till min lille tappe kilde Mika för att du inte klagat alltför mycket, trots att du många gånger har fått stå tillbaka för att mamma varit tvungen att jobba, och för att du är ett sådant klokt och kärleksfullt barn. Hade det inte varit för dina uppmuntrande ord, humor och
överösande av kramar och pussar så hade jag nog ledsnat för länge sedan. Jag älskar dig!!!

For a while it looked like my work would be greatly delayed as a consequence of the Volcano incident in Iceland, as I was stranded without my papers and books. Coming home, it literally felt like I had stepped out of the ashes and into the fire when struggling to finish on time, but now - here it is, the result of four years of labour… my dissertation.

Nina-Katri Gustafsson

Stockholm, May 2010
ABSTRACT

The present dissertation aims at analysing the effects of recent alcohol policy changes. The traditional strict policy in Sweden had focused on high pricing and limited availability to control levels of alcohol consumed and thus alcohol-related harms. However, increased travellers’ allowances meant larger availability of cheaper alcohol when importing from Denmark and Germany, which are the countries from which Swedes obtain most of their private imports; the tax decrease in Denmark further decreased the price. As the economic literature links demand to price of a commodity and the early (smaller) quota changes had resulted in higher consumption in southern Sweden, it was expected that these latest changes would mean higher consumption and more alcohol-related problems in this area in particular. Some groups were additionally expected to be more affected than others.

The present compilation thesis comprises four related articles and an introductory chapter that ties them together. Article I focuses on private imports in relation to quota changes 2002 – 2004 and relate this to purchase at the alcohol monopoly stores. Self-reported consumption and alcohol-related problems are studied in Article II and IV. In Article III, register data on alcohol-related harms, i.e. hospitalizations and police-recorded crimes, are analysed.

The results of the dissertation were puzzling, since there was no large increase in consumption or alcohol-related problems in the south, but increases in the north during the period. However, private imports and cases of hospitalization due to alcohol poisoning were found to have increased in the south. Thus, the results imply that these policy changes had an effect on private imports, but that this effect was not large enough to increase total consumption as well. Additionally, increased alcohol poisoning cases implied that there had been an impact among high consumers. The increases found in consumption and problems in the north may instead have other explanations.
LIST OF ARTICLES

Article I (with Mats Ramstedt)
Increasing travellers’ allowances in Sweden – how did it affect travellers’ imports and Systembolaget’s sales?

Article II
Alcohol consumption in southern Sweden after major decreases in Danish spirits tax and increases in Swedish traveller's quotas.

Article III (with Mats Ramstedt)

Article IV
Changes in alcohol availability, price and alcohol-related problems and the collectivity of drinking cultures What happened in southern and northern Sweden? Under consideration for publication.

The published and accepted articles are reprinted with the kind permission from the editors of the journals.
## ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAPOR</td>
<td>American Association for Public Opinion Research</td>
</tr>
<tr>
<td>ABV</td>
<td>Alcohol by volume</td>
</tr>
<tr>
<td>ARIMA</td>
<td>Autoregressive Integrated Moving Average</td>
</tr>
<tr>
<td>AUDIT</td>
<td>Alcohol Use Disorders Identification Test</td>
</tr>
<tr>
<td>BRA</td>
<td>Brottsförebyggande rådet [The Swedish national council for crime prevention]</td>
</tr>
<tr>
<td>CATI</td>
<td>Computer-Assisted Technology Interviews</td>
</tr>
<tr>
<td>CDC</td>
<td>Collectivity of Drinking Culture theory</td>
</tr>
<tr>
<td>ECAS</td>
<td>European Comparative Alcohol Study</td>
</tr>
<tr>
<td>EU</td>
<td>European Union</td>
</tr>
<tr>
<td>GEE</td>
<td>Generalized Estimating Equation</td>
</tr>
<tr>
<td>ICD-10</td>
<td>International Classification of Diseases Version 10</td>
</tr>
<tr>
<td>NAD</td>
<td>Nordic Council for Alcohol and Drug Research</td>
</tr>
<tr>
<td>NAT</td>
<td>Nordisk Alkohol- och drogtidskrift [Nordic Studies on Alcohol and Drugs]</td>
</tr>
<tr>
<td>PED</td>
<td>price elasticity of the demand</td>
</tr>
<tr>
<td>RDD</td>
<td>Random Digit Dialling</td>
</tr>
<tr>
<td>Scb</td>
<td>Statistiska Centralbyrån [Statistics Sweden]</td>
</tr>
<tr>
<td>SoRAD</td>
<td>Centre for Social Research on Alcohol and Drugs</td>
</tr>
<tr>
<td>Sos</td>
<td>Socialstyrelsen [The Swedish National Board of Health and Welfare]</td>
</tr>
<tr>
<td>SOU</td>
<td>Statens Offentliga Utredningar [The Official investigations of the Government]</td>
</tr>
<tr>
<td>SU</td>
<td>Stockholm University</td>
</tr>
<tr>
<td>VAT</td>
<td>Value added tax</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organisation</td>
</tr>
<tr>
<td>WTO</td>
<td>World Trade Organisation</td>
</tr>
</tbody>
</table>
INTRODUCTION

As the opportunity is afforded Swedes to purchase cheaper alcohol in other countries, the real price for Swedes will decline and most likely consumption will increase.

Harold Holder

This dissertation tells a story about policy changes and social change. When the availability of cheap alcohol from the continent increased, people in the area closest to the border were expected to increase their consumption of alcohol, although we were in for a surprise with the unexpected results.

As has been discussed by Babor et al. (2003), alcohol is not just any commodity. Although it is a commodity used by the majority in many populations as part of cultural traditions, it is also a commodity that in many cultures is perceived as causing problems for the individual as well as for the society. There is also a distinct line between whether public opinion considers alcohol a daily nutrient or a luxury good. In Sweden, as well as in the other Nordic countries and the English-speaking European countries, alcohol has mainly been seen as a possible cause of problems. As part of an increasing globalization, people are travelling more as well as receiving new influences from media sources (among other things), and this also has an impact on drinking patterns. In fact, the European Comparative Alcohol Study (ECAS) (Norström et al. 2002), which covered the period 1950-1995 for several European countries, showed that there were indications of a homogenization of drinking patterns in Europe during this period, and a more pronounced homogenization of beverage preferences and consumption levels; additionally, alcohol

---

6 The introductory chapter has benefited from the comments and suggestions of Håkan Leifman (opponent at the final seminar), Karin Helmersson Bergmark and Robin Room.
policies were converging (Norström et al. 2002). At the end of that period, Sweden entered the European Union (EU), as a result of which Swedish alcohol policy has been undergoing even further major changes during recent years. Being a small country up in the northern part of Europe with a very restrictive alcohol policy, Sweden’s joining the EU – dedicated to the idea of an open market – had to affect Swedish alcohol policy, and possibly alcohol consumption and alcohol-related consequences.

Swedish traditional alcohol policy put into context

Nordic Alcohol Policy and that of other European countries
Historically only governments in the Nordic countries (Sweden, Norway, Finland and Iceland; Denmark has been the exception) have had continuity in taking responsibility for the whole range of state tasks or interests concerning alcohol (Room 1999). English-speaking countries’ interests in alcohol policy have been limited to questions of fiscal and public order, and mainly from the perspective of alcohol purchase, although during the past 30 years, English-speaking and some other societies have been influenced by the Nordic alcohol approach (Room 1999).

The contrast to the restrictive Swedish policy, or rather Nordic given that alcohol policies in these countries have many common features, is that of the southern European wine countries. Strategies for alcohol policy only make sense in countries where one perceives alcohol not only as something positive, but also as something that can cause a broad range of social and health problems (Room 1999). And whereas Sweden, together with the other Nordic countries, traditionally has had high taxation on alcoholic beverages, which in the context of measures for alcohol policy is considered to be one of the most effective measures to keep the levels of alcohol consumption and drinking problems down (Edwards et al. 1994), taxes have generally been much lower in southern European countries.

EU membership and its implications
Sweden joined the European Union (EU) in 1995: with the membership followed several implications for Swedish alcohol policy. As the EU is
mainly an economic union, where the aim is to have a free market between the countries within the union, health issues have not been on the primary agenda (see e.g. Österberg & Karlsson 2002, Cisneros Örnberg 2009). The EU put pressure on the Nordic countries as a whole, as well as on Britain and Ireland, to harmonize their alcohol taxes downwards to levels more similar to those in other countries within the Union (for an overview of taxes in relation to this study see Table 1).

Since the European Commission had repeatedly failed to reach an agreement on harmonizing alcohol taxes, it instead relied on other mechanisms such as an increase in and essentially the abolition of travellers’ allowances limiting cross-border imports within the EU to create pressure on these countries to lower their high alcohol taxes in order to keep purchases within the country. The private import quotas were then gradually increased in Sweden between 1995 and 2004 (Table 2), which finally led to the full within-EU traveller's allowances; e.g. if one can certify that the alcohol imported privately from within the EU is for one’s own use. This basically means an abolishment of the import quotas.

<table>
<thead>
<tr>
<th>Table 1. Excise taxes on alcoholic beverages in Sweden and the neighbouring countries within EU the year 2004, in €'s per volume litre for each beverage with the specified alcoholic strengths (value added tax (VAT) not included).</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beverage</td>
</tr>
<tr>
<td>Spirits (40%)</td>
</tr>
<tr>
<td>Beer (5%)</td>
</tr>
<tr>
<td>Wine (8.5-15%)</td>
</tr>
<tr>
<td>Beverages including &lt;15 vol %</td>
</tr>
<tr>
<td>Beverages including &gt;15 vol %</td>
</tr>
<tr>
<td>Source: SOU 2004:86</td>
</tr>
</tbody>
</table>

As a consequence, alcohol consumption rose steadily during this time in Sweden, from 7.8 litres of 100% alcohol in 1995 to 10.3 litres in 2003 (Kühlhorn et al. 2000, Ramstedt et al. 2009). Additionally the southern areas of Sweden, closest to the continent, seemed to increase their consumption most (Ramstedt 2005). To restrain travellers’ purchases from neighbouring countries (within the EU) with cheaper alcohol – in Denmark’s case mainly imports from Germany and in Finland’s case imports from Estonia (which was scheduled to join the EU on May 1st 2004) – Denmark decided to lower tax on spirits by 45% on October 1st 2003, and Finland decreased its overall alcohol tax by 33% (including a
44% drop in spirits) on March 1st 2004 (Mäkelä et al. 2007). This might be interpreted as a partial success for the EU strategy. In Sweden there were also discussions about how to respond to the changes. A broad-ranging Swedish parliamentary investigation (SOU 2004:86, 2005:25) recommended a 40% tax decrease on spirits and a 30% tax decrease on wine and beer but the Swedish government did not get agreement from the parties that supported it to put this into effect. As people in the southern area were already travelling fairly often to Denmark, the Danish tax reduction basically meant lower prices for them as well.

Table 2. Traveller’s allowances for alcohol imports, in litres of each beverage.

<table>
<thead>
<tr>
<th>Date</th>
<th>Spirits &amp; Fortified wine</th>
<th>Table wine</th>
<th>Beer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Jan. 1995-</td>
<td>1 spirits or 3 strong wine</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>1 July 2000-</td>
<td>1</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>1 Jan. 2001-</td>
<td>1</td>
<td>26</td>
<td>32</td>
</tr>
<tr>
<td>1 Jan. 2002-</td>
<td>2</td>
<td>26</td>
<td>32</td>
</tr>
<tr>
<td>1 Jan. 2003-</td>
<td>5</td>
<td>52</td>
<td>64</td>
</tr>
<tr>
<td>1 Oct. 2003</td>
<td>10 (General within-EU ’guidance’: Danish spirits tax reduction of 45%)</td>
<td>90</td>
<td>110</td>
</tr>
<tr>
<td>1 Jan. 2004-</td>
<td>10 (General within-EU “guidance”: imports for own use)</td>
<td>20</td>
<td>90</td>
</tr>
</tbody>
</table>

Sources: Commissions of the Board 2000/44/EG, Ministry of Finance and the website of Swedish Customs (www.tullverket.se).
Table first published in Leifman & Gustafsson, 2003.

Background for this dissertation

It has been claimed that the most direct way of studying the effects of alcohol policy instruments is to study various alcohol measures when there is a policy change (Room 2004a). Thus, when it was decided that Denmark would decrease its spirits tax by 45% on October 1st 2003, a group of researchers – already aware of the increases in traveller’s allowances in Denmark, Sweden and Finland being implemented on January 1st 2004 – decided that this was an excellent opportunity to study not only effects on the population level but on the individual level as well. Therefore, the “Nordic tax study” was implemented, and this dissertation was written within the frame of the study. That these changes would have an effect on Denmark seemed obvious, but people living in the southern area of Sweden were also assumed to be affected by the Danish tax decrease. Leifman and Gustafsson (2003) had shown that Denmark was the second most common country from which

8 The project had a couple of official names on the grants supporting it: “Whose drinking changes how much when liquor taxes fall? Effects of tax cuts”, and “Effects of major changes in alcohol availability”.

4
Swedes purchased their privately imported alcohol. Furthermore, studies of the early quota changes in 1995 have illustrated that private imports were common in the southern parts and that the effect dropped off further away from the Danish border (Norström 2000a).

Aims/Objectives

The dissertation aims at analysing effects of the Danish tax decrease and the later increases in Swedish travellers' allowances (primarily affecting personal imports from Denmark and Germany) on alcohol consumption and alcohol-related harms. Southern Sweden is of primary interest, since this site was hypothesized to be the one most affected, but attention is paid to other regions of Sweden as well. A second aim is to study the effects these changes had on various segments of the population.

Outline of the dissertation

Following this introduction, a theoretical framing of the articles included in the dissertation is presented; this involves theoretical assumptions about the distribution of alcohol consumption as well as consequences related to the same, and theories on when consumption and alcohol-related problems change and in which way they change. Subsequently, the design of the studies is presented, as well as the data material and statistical methods used. Limitations and strengths of the studies are furthermore discussed. In the next section, short summaries of the four studies are provided. In the last two sections of the summarizing chapter of this compilation dissertation, some concluding reflections and outlines for future research are provided.
THEORETICAL FRAMING

Theories about alcohol consumption and change

In the 1950’s, Ledermann (1956) came to the conclusion that the per capita alcohol consumption is log normal (logarithmically normally distributed) (Bruun et al. 1975, Olsson 1990).

One of Ledermann's main ideas in the “single distribution theory” was that the total consumption of alcohol, i.e. the mean consumption in the total population of drinkers, would also determine the number of high consumers, since the variance in such a distribution is closely linked to the mean. Thus consumption increases would contaminate by the effect of “boule the neige” (snowball). This aspect of the theory, where social interaction between members of the society affects the total level of consumption, has been developed by Skog (1985) and is further described below. Ledermann's work was further developed in the book by Bruun and colleagues (1975) often referred to as “the purple book”, where they argued that alcohol control measures can be used to limit the overall consumption of alcoholic beverages and thus alcohol-related health issues. A few years later, Edwards et al. (1977) contributed to broadening the concept of alcohol-related problems.

The theory of the single distribution model is also closely linked to the “prevention paradox”, which was first discussed by Rose (1981) in relation to cardiovascular diseases. In relation to alcohol, Kreitman (1986) noted that most alcohol consumers are moderate drinkers, which is why the majority of alcohol-related problems are expected to be found among people in the general population, rather than among high consumers. This is in line with the results of Bruun and colleagues (1975).
Changes in the overall consumption of alcoholic beverages have a bearing on the health of the people in any society. Alcohol control measures can be used to limit consumption: thus, control of alcohol availability becomes a public health issue.

Bruun et al.\textsuperscript{9}

The three perspectives of a single distribution, social interaction (collectivity) and availability together form what has later been called “the total consumption model” (Leifman 1996), which the WHO recommended in order to limit alcohol-related problems (WHO 1980). Although various research has questioned parts of the total consumption model (e.g. Gmel & Rehm 2000) this model has been crucial to how the Swedish alcohol policy has been designed (Sutton 1998).

Policy control instruments

When it comes to tools for policy control, Babor and colleagues (2003) have identified pricing, availability and interventions against drunk driving to be the most effective in preventing harms in a population. This is in accordance with Room’s (1999) conclusion that those policy instruments that have been shown to work are those that focus on the whole population (all alcohol consumers). In order to keep the total alcohol consumption low, Swedish alcohol policy, as already mentioned, has mainly focused on limiting the physical availability and keeping prices high.

Price and availability

The basic economic law that links price to demand (Chaloupka et al. 2002) anticipates that when there is a reduction in price, the demand for the same commodity increases. In this particular case, it would mean that when availability changes, physically as people are allowed to buy more alcohol abroad and economically as tax decreases mean lower price, the incentives for people living in the area affected (Southern Sweden, see introduction) would increase the likelihood of these persons to buy alcohol, and thus, they would buy more and presumably also increase the volume of alcohol they consume. In a review of literature linking

\textsuperscript{9} p. 90 in Bruun K et al. (1975): Alcohol control policies in public health perspective. The Finnish foundation for alcohol studies Volume 25. Helsinki, Finland: The Finnish foundation for alcohol studies (in collaboration with the World health organisation (WHO) and the Addiction research foundation of Ontario).
measures of alcohol tax and price levels to alcohol sales or self-reported drinking, Wagenaar, Salois and Komro (2009) in fact stated that the effects of prices and taxes on alcohol are larger than the effects of other prevention policies and programs.

**Price elasticity**

The reason why price is considered to be one of the most important instruments for regulating alcohol consumption (Edwards et al. 1994, Babor et al. 2003, Wagenaar, Salois & Komro 2009) is that the demand for alcohol is somewhat sensitive to price changes. Studies measuring this refer to the price elasticity of the demand (PED),\(^{10}\) which is defined as how responsive, or sensitive, the demand of a commodity is to price changes. The more people are willing to pay for a commodity, the less elastic is the demand. During a time with fairly stable real-prices of alcohol in Sweden, except for a 15% decrease in beer price due to a tax cut, Norström (2005) confirmed that the demand for alcoholic beverages is responsive to changes in price. Comparing this price elasticity to the elasticities found by Assarsson (1991), he also found that Swedish price elasticity for alcoholic beverages has been fairly stable over time when there have not been any relevant changes. Given a price change, however, Swedes respond fairly quickly (Norström 2005). However, he notes that the demand does not correspond to the geographic distance to the border, something that could have been expected in relation to a previous study by Norström (2000a) and that was also observed by Trolldal (2000).

**Distance effects**

Thus we can note that there are sometimes distance effects and sometimes not. It is, however, fairly common that people living near the border are likely to cross-border shop when the prices are substantially lower and the border is fairly open. Sweden has, for example, a fairly large amount of cross-border shopping from Denmark and Germany (Ramstedt et al. 2009), and Norway from Sweden (Lund, Trolldal & Ugland, 1999). Additionally, the willingness to make this trip has been shown to decrease with distance from the border (Norström 2000a), although a more recent study has shown that the large difference by distance from the border seems to have dampened (Trolldal 2005). Asplund, Friberg and Wilander (2007) used the economic approach of

---

\(^{10}\) This is measured as the ratio of percentage changes between the quantity of commodity demand and changes in price for the same commodity.
calculating price-elasticity in relation to distance to the border but came to the same conclusion: elasticities are highest closest to the border.

Skog (1986) has also pointed out the importance of geographical distance, but rather as a factor regulating social interaction. Thus, geographic distance is important in regard to which region is most affected because of level of availability but additionally to what extent these new habits spread to other population groups.

**Economic factors**

Norström and Ramstedt (2009) have recently shown that economic factors, like increased income and price decreases, are more important for alcohol sales than availability. Not only the absolute price and the distance should be taken into account in considering the total effective price of the commodity, but other costs related to the purchase as well. One such thing, which also correlates with distance, is petrol price. Lhachimi (2006) studied the changes in Swedish petrol prices in relation to alcohol consumption and found that the cross-price elasticity between alcohol and petrol was positively related near the Danish border, especially for beer; it became negative with increasing distance. Lhachimi explained this in terms of decreasing imports (and more purchases in Sweden) as a result of increasing petrol prices.

**Policy changes**

*Globalization (Europeanization) of Swedish (and Nordic) alcohol policy*

Already before Sweden entered the EU, discussions were heated between various interests groups within the country. On the European level, this has been described as a battle between the Nordic countries and the EU, or between a public health approach and economic interests, a battle some did not think the Nordic countries could win. This issue, as well as consequences for Nordic alcohol policy, in terms of taxes, the alcohol retail monopolies, and also local prevention, was later discussed during a meeting organized by the Finnish Social and Health Ministry in 2001 (Paaso, Tigerstedt & Österberg 2002).

When it later was decided that Sweden and the other Nordic countries that were part of the EU (i.e. Denmark and Finland) would not be able to keep their restrictive alcohol policy but would have to adopt the
indicative levels of the EU for private imports, discussions followed on what further implications this would have. One potential risk that was discussed by researchers for the Nordic countries was whether alcohol retail monopolies would be able to continue their business, and what consequences this would have on alcohol consumption and harms (Holder et al. 1995). An underlying expectation was that increased private imports (and smuggling) would also imply increasing consumption and thus increases in alcohol-related harms. Sulkunen et al. (2000) described the situation in terms of the traditional Nordic alcohol system being broken. However, recent analyses do not support the idea that an increasing share of alcohol being imported would automatically result in more harms, but rather that the total level of alcohol consumed is of greater importance (Norström & Ramstedt 2008).

Given the pressure that the new EU standards of traveller’s import quotas put on Nordic alcohol policy; Denmark decided to decrease its spirits tax by 45% on October 1st 2003 to suppress at least some of the expected increase in private imports from Germany in particular. Finland followed Denmark’s example by decreasing taxes by an overall average of 33% (spirits by 44%) on March 1st 2004, as an increasing border trade from Estonia was expected when Estonia entered the EU on May 1st 2004. Sweden also considered decreasing taxes; it was suggested by an official investigation that Sweden should decrease the tax on spirits by 40% on January 1st 2005 (SOU 2004:86) and on beer and wine by 30% on January 1st 2006 (SOU 2005:25), but the Swedish minority government could not get agreement from other political parties to do this.

Sulkunen and colleagues (2000) have argued that it was not really EU membership that caused the transformation in Nordic alcohol policies, but rather a type of underlying modernization whereby the role of the national state is weakened; the European integration only determined the timing and content of the change. This corresponds well to the term globalization. Hellebo (2003) has discussed globalization (defined as “world integration”) as a potential changing force in relation to Swedish and Norwegian alcohol policy, recognizing that international influences had been mentioned in both countries at the ministry level. While in a global perspective the issue is how the World Trade Organization (WTO) influences trade and the World Health Organization (WHO) influences health issues, the discussion linking Nordic policies to “globalization” rather involves solely the European arena, so that the discussion is in fact not different from a discussion of the Europeanization of Nordic alcohol.
policy (Cisneros Örnberg 2009 discussed the Swedish case in this perspective).

**Previous policy changes and their effects on alcohol consumption and alcohol-related problems**

Consequences of changes in policies on the aggregate level have been studied by Holder and colleagues (2000), who analysed the effects of Sweden entering the EU. There was a temporary dramatic shift in the attitude towards alcohol, away from support of the traditional restrictive model. However, the most important finding in this study was that the regulatory changes brought on Sweden by the EU membership resulted in increasing alcohol consumption, but not in an increase in alcohol-related harms. Furthermore, diverging trends between consumption and harms have also been observed in Australia, as alcohol-related harm increased sharply, while consumption stayed stable (Livingston et al. in press).

Data covering over a 50 year long period with several Nordic alcohol policy tools and changes were also studied by Room and colleagues (2002). It was noted that effects differed depending on the intervention, but that liberalizations are most likely to affect groups most restricted by earlier policy, so that policies were found to have differential effects across various populations (Mäkelä, Rossow & Tryggvesson 2002). Policy changes most often had their largest effect among people with high initial alcohol consumption, whereas effects on demographic groups such as youths as well as by sex depended on contextual social differences (Mäkelä, Rossow & Tryggvesson 2002).

To date, the study most similar to the present study is the Swiss study of a substantial reduction in the tax on foreign spirits (Heeb et al. 2003, Kuo et al. 2003, Mohler-Kuo et al. 2004). Kuo and others (2003) found increases in consumption of spirits in all population groups, i.e. by sex, age groups and consumption level group. Moderate drinkers were found to have increased their consumption more than others according to these analyses. Younger persons, in particular young men, were found to have increased their consumption most. Analyses for alcohol-related problems (Mohler-Kuo et al. 2004) were in accordance with this, showing the largest increases among young persons, mainly among those consuming large amounts of spirits. Thus, research indicates that effects from various interventions can differ between sub-population groups.
Changes in alcohol consumption

Many countries have tracked their alcohol consumption over time. The accumulated research in this area has evolved several theories of trends and patterns in alcohol consumption.

Long and short term changes

Fluctuations in alcohol consumption have been observed even when there are no policy interventions at stake. When one refers to long-term changes, this includes also demographic changes and changes in living conditions. Even longer fluctuations, running across 60 to 80 years, are referred to as “long waves of consumption” (Mäkelä et al. 1981). Besides such longer fluctuations, there are also short-term changes, over approximately five years or more, typically occurring when there are price fluctuations or large changes in alcohol policy. Although this dissertation is more concerned with short-term changes, other types of changes may also have had an effect on how responsive people are to policy changes at a given time.

Collectivity of drinking

It has long been recognized that drinking is primarily a social activity, and that there are strong differences between societies in drinking norms and practices. Already more than half a century ago, the French epidemiologist, Ledermann (1956), as already mentioned, recognized that individuals are socialized into a drinking culture, and that social pressure causes changes in drinking habits to spread from one drinking group to another. His ideas were further developed by Skog (1985) in the theory of the “collectivity of drinking cultures”. In short this “strong” version of the theory assumes that when average consumption changes in a population, the whole population moves in concert up or down the consumption scale. Since persons in the same society/culture interact with each other, one can look upon society as a large network where each person influences at least some other persons in the same society. Given that these persons have other ties, belong to other groups as well, a change in consumption affects not only the closest group of persons; changes are spread like rings on the water, affecting the whole culture. This is the reason why changes are not expected only in particular population groups, but are expected to spread to other segments of the same population at least in relative terms, high consumers are still expected to increase more than others in absolute numbers. The first version of Skog’s theory (1985) stated that various drinkers would
increase and decrease their level of consumption together. However, later on he weakened his theory (see e.g. Skog 1986, Skog 2001, Skog & Rossow 2006) to allow for changes in different directions for different groups as well. As this revising is rather problematic for the whole idea of a collective change, the “stronger” version of this theory is tested here.

Change and stasis in alcohol consumption

Room and colleagues (2009a) discussed factors underlying what might be observed as “saturation” in consumption. Although they identified factors that tend to stabilize consumption and factors that could affect consumption either way, they focused on factors tending to change consumption. Room et al. identified controlled physical availability, taxation and societal response to alcohol-related problems as factors tending to push consumption down, while enlarged availability, advertising and rising purchase power would rather tend to increase consumption. However, drinking habits and culture were identified as tending to stabilize consumption levels, implying that determinants of change do not always have the expected result. Additionally, structural changes and drinking norms could push consumption either way. Skog (1986) also discussed how various macro processes could have erratic results, and explained it in terms of individual choices spreading through networks as a neutralizing factor. Thus drinking cultures are only to a certain limit affected by exogenous pressures like availability.

Converging trends

Additionally, researchers in the alcohol field have been talking about converging trends. This research refers to convergence at several levels: converging trends in volumes of alcohol consumed (Leifman 2001), taste convergence (Aizenman & Brooks 2005), convergence in cultures (Tigerstedt & Törnroos 2007), as well as convergence in politics (Cisneros Örnberg 2009). The ECAS study explicitly investigated whether there was a homogenization in trends in volumes of alcohol consumed in Europe (e.g. Leifman 2001, Simpura & Karlsson 2001a, 2001b) as well as in other aspects of drinking, i.e. drinking patterns and consequences as well as policy responses (Norström et al. 2002). Furthermore, the researchers discussed possible explanations for change (Norström et al. 2002).

Leifman and Gustafsson (2003) noted a rise in Swedish per capita consumption in 2002, linking it to the Nordic (except for Denmark)
“dry” drinking culture yielding to the Southern and Central European “wet” culture. Others (e.g. Room 1999, Norström et al. 2002) have also pointed at the convergence between temperance cultures up in the north and wine cultures in the south concerning the levels of drinking. Especially the new drinking patterns in the countries in the southern parts of Europe seem to have interested researchers, further discussed below (Gual & Colom 1997, Simpura 1998, Room & Mäkelä 2000). Sulkunen (1989) also noted a decrease in consumption levels as a result of changing beverage preferences. Several other studies have additionally reported a change in beverage preferences in various countries (e.g. Sulkunen 1989, Simpura & Karlsson 2001a, Simpura & Karlsson 2001b, Norström et al. 2002, Cipriani & Prina 2007). Aizenman and Brooks (2005) even noted that there is a global convergence, extending that found in Europe, in taste preferences for wine and beer, where typical wine drinking countries were found to drink more beer and vice versa.

Other possible explanations have also been given: Karlsson and Simpura (2001), for example, sought to explain changes in alcohol consumption with such changes in living conditions as increasing urbanization, de-agrarianization and an emerging service sector, i.e. modernization. However, they concluded that modernization of drinking habits could lead to opposite trends in different types of countries. Other studies have explained changes in terms of marketing factors (e.g. advertising), alcohol-free beverage alternatives, public health policies, price and tax changes, increasing health concerns (Gual & Colom 1997), modernization processes (Sulkunen 1989, Simpura 1998, Tusini 2007), and a high degree of integration with other cultures (Aizenman & Brooks 2005). Additionally, while not finding urbanization to be important for French changes, Sulkunen (1989) identified region as an important factor in explaining where the changes were observed in French drinking. Although there was a convergence between areas, the collectivity in each region was also shown to preserve old patterns (Sulkunen 1989).

Additionally, alcohol policies are converging (Hellebø 2003, Cisneros Örnberg 2009), which has been discussed as a result of globalization (Hellebo 2003) or rather Europeanization (Cisneros Örnberg 2009). Although alcohol policies have often been discussed as causing converging changes in the European context, they have sometimes been referred to as merely a catalyst that determines when these changes happen (Sulkunen et al. 2000). However, in some ways, the increased similarities in drinking habits are probably also causing homogenization in policies. It is perhaps convenient to speak of globalization also when it
comes to drinking habits. But unlike the globalization of alcohol-related policies, changes in alcohol patterns are more complex. As Tigerstedt and Törrönen (2007) have pointed out cultures that first look similar are not always similar in a deeper sense.

Perspectives of alcohol policy presented in this dissertation
During the past 15 years, Swedish alcohol policy has been Europeanized as a result of Sweden becoming a member of the EU. The Europeanization in this respect meant that availability of cheap alcohol increased, particularly because of higher traveller’s allowances, which meant a reduction in the effective price at least for those living closest to the border, given the increased availability of cheap alcohol. People were then expected to buy more alcohol from abroad but also to consume more, so that there should also be an increase in alcohol-related harms. On theoretical grounds, it would thus be expected that the lower price of alcohol would increase the demand to buy alcohol. As the change did not occur in Sweden but in another adjoining country (Denmark), it was not certain that people would actually buy more given the extra effort and costs related to this. However, since the increased quotas for private imports were changed considerably, and the Danish tax was also decreased, as well as that people living in the southern parts of Sweden were already purchasing large shares of their alcohol from Denmark, the changes were expected to have an effect. Furthermore, since alcohol demand had been shown to decrease with distance, the northern parts of Sweden were assumed to be significantly less affected by these changes.
DESIGN, DATA AND STATISTICAL METHODS

Design
The present dissertation was generated from the Nordic tax study, so the set-up follows the general aim of that study in relation to Sweden in particular, to study the effects in southern Sweden of the final traveller’s allowance changes and of the Danish tax drop in spirits. Since earlier studies of policy changes (e.g. Room et al. 2002) had been criticized for not having a control site, it was decided that a site assumed to be fairly similar to the three study sites, Denmark, Finland and southern Sweden, would be included as a control. The choice fell on Northern Sweden (widely defined) because it was part of the same drinking culture but assumed not to be affected by the tax- or quota changes, given the distance to the borders. For this purpose, Sweden was divided into three regions, of which two were included in the study. The southern region consisted of the areas closest to Denmark: the counties of Skåne, Blekinge and Halland, as well as the city of Gothenburg (part of Västra Götaland). From here, the Öresund bridge a little northwest of Sweden’s southernmost point and the ferries to Denmark elsewhere made it easy to cross the border in order to purchase cheaper alcohol. The northern region consisted of the counties of Norrbotten, Västerbotten, Jämtland, Västernorrland, Gävleborg, Dalarna, Örebro and Värmland. However, five municipalities 100km or less from the Finnish border in the extreme north of Sweden (Haparanda, Kalix, Pajala, Övertorneå and Överkalix) were excluded in view of the Finnish tax changes on alcohol at this time (see Appendix). Neither of the regions included the Stockholm metropolitan area, since Stockholm is likely to be affected by both the Danish and Finnish tax decrease to a higher degree due to large-scale ferry and air traffic to this area. This is the set up for the second and fourth study, where survey data collected for the Nordic tax study are used. The first study, which uses survey data on private imports collected for the Monitoring study (further described below), uses the same division of regions but includes the middle region as well. The third
study, using police records and hospital data, only focuses on the southern parts, but includes the northern parts of Sweden to control for common variation in harms. Registers are also used in the first study when analysing sales data. While survey data have the advantage of being able to study variance between population subgroups, it also has several drawbacks. One is that some groups of the population are reached to a lesser extent than others, e.g. heavy drinkers are known to be such a group (Kühlhorn et al. 2000). To pick up on changes in these groups as well, register data are invaluable.

When comparing self-reported consumption as in the second study, or part of the consumption (for example, private imports) as in the first study, to registered sales data from the monopoly stores (Systembolaget), one has to consider the fact that self-reported consumption underestimates the true consumption by about half. This is likely to be true for private imports as well. Still, comparing trends in these two and using Systembolaget in order to see whether there is a substitution or addition effect should not be a problem unless the extent of underestimation of the amount of privately imported alcohol changes. Total consumption (registered and unregistered consumption together) is additionally presented in the second study as a comparison.

Self-reported harms following the wider definition by Edwards et al. (1977), where not only alcohol dependent persons are included, are analysed in the fourth study. Measured by survey, these data have the same drawback as self-reported consumption: people might not be responding truthfully and we might not reach all segments of the population. Therefore, harms as reported by registers, i.e. hospitalization data and police-reported crimes, which were used for the fourth study, are a good complement. These data not only captures other population groups, but measure a more harmful level of drinking as well.

The use of a quasi-experimental design has many similarities with regular experiments, given the control group. We also used both pre- and post-tests. Ideally the groups should be similar to each other to avoid drawing the wrong conclusions. However, as our regions were non-equivalent, we were not able to control for everything, which could mean that there are other factors than those we have studied that have affected the results. Our control group (Northern Sweden), for example, had the drawback that the northern parts of Sweden had a lower initial consumption. To get around this problem, Hartman (2004) recommends the use of time-
series to avoid differences in change between groups, and these are used in the third study.

Data sources

The most central indicators in this study are alcohol consumption and alcohol-related harms; these are measured with various data sources, which are presented below. Additionally, region was of great importance for this study.

The Monitoring project

In the first paper, data from the Monitoring project (Leifman & Gustafsson 2003) were used. This study was initiated not least because of the tension between the traditional Nordic drinking culture and the Southern-/Central European culture, which was becoming more obvious after Sweden entered the EU, as well as the then-upcoming policy changes. The main aim of the study is to survey the total consumption in Sweden and monitor trends over time. Since registered data are available elsewhere -- sales statistics from Systembolaget (the Swedish Alcohol Retail Monopoly described below), grocery stores sales figures for beer class II and on-licence sales of restaurants for strong beer and beer class II (from Swedish drinking statistics: Delfi) -- the most important task is to measure unregistered consumption. Unregistered (and untaxed) alcohol consists of private travellers' imports, smuggled alcohol, home-manufactured wine and beer and home-distilled spirits (moonshine). Although registered consumption is the largest part of the total amount of alcohol consumed in Sweden, the proportion of unregistered consumption has increased over recent decades, and there are apparent regional differences. Measuring unregistered (untaxed) consumption can only be done by using surveys though this involves several problems, such as forgetfulness, social desirability, telescoping and non-response. In fact, it is a well-known fact that registered sales only capture about 40-60% of what is actually consumed (Midanik 1982 for an overview, or Ramstedt et al. 2009 as reported in the Monitoring study). A study that highlighted this issue in Sweden was the KALK-study (Kühlhorn et al. 2000), which included agents from Systembolaget (the Swedish alcohol retail monopoly).

--

11 Delfi's figures are compared to the official statistics of the Public Health Institute and the difference is used to correct the series from Delfi.

12 Any alcohol purchased that the respondent believes someone has brought into the country with the aim of selling it to earn money.
retail monopoly), the Swedish National Institute of Public Health, the Swedish Ministry of Health and Social Affairs, the Swedish Brewer Organisation (Svenska Bryggareföreningen) and Wine and Spirits Corporation (Vin & Sprit AB; the new-demonopolized state-owned wholesaler and producer). Based on experiences from this study, the Monitoring project was set up at SoRAD on June 2000, financed by the Swedish Ministry of Health and Social Affairs (Socialdepartementet). The monitoring study has also developed the measurement techniques further, and has been evaluated by several international researchers (see Appendix 1 and 2 in Ramstedt et al. 2009). Rather than answering questions about consumption, respondents are asked about acquisition, which has been identified as better capturing true consumption; only when asking about homemade alcohol do the questions refer to consumption (Kühlhorn et al. 2000). Interviewees are asked beverage-specific (spirits, strong wine, table wine, strong beer, beer class II, cider and alcopops) questions about their purchases of alcohol. This method has the advantage that it is easier to respond to, since it asks about standard amounts of alcohol and the interviewee does not have to estimate the total amount consumed themselves (Gmel et al. 2006). Another advantage is that questions generally refer to the past 30 days to avoid forgetfulness and telescoping. However, it has the disadvantage of only asking about typical drinking and does not consider variability (Gmel et al. 2006). Every month 1500 Swedish adults (aged 16 years and above) are interviewed by the well-known market research agency Synovate about their alcohol purchases (from registered as well as unregistered sources), drinking patterns, alcohol-related problems and more. CATI-assisted telephone interviews are collected by random digit dialling (RDD) and the last birthday method. The general response rate in the study has varied between 60% during the first years (2000-2004) and 45% during recent years (Ramstedt et al. 2009). Although this is a survey, results refer to aggregated rates rather than the individual level due to the short observation period as well as the questions about purchase and import. The telephone survey in the Monitoring study also serves as a platform for other studies. The Nordic tax study is one of the studies that have added additional questions to the core survey.

13 The alcohol content (ABV) for these beverages could vary somewhat but for spirits a common ABV is 35-40%. Strong wine usually contains 15-22% of alcohol, regular table wine about 12%, cider (strong) and alcopops about 5%. The “beer class II” category includes “folköl”/“people’s beer”, that are sold at the grocery stores, and has a maximum of 2.8% and “extra brew” with a maximum of 3.5%. The category “strong beer” (ABV above 4.5%) here also includes “mellanöl”/“in between beer” (3.6-4.5%).
The Nordic tax study

As a result of their EU membership, Denmark, Finland and Sweden had to carry out several major policy changes in 2003 and 2004. Under the pressure of the single-market rules of the EU these three countries had to adapt their restrictive private import traveller's allowances quotas to those of the EU. Basically, this meant that people could bring back unlimited amounts of alcohol from other countries within the EU as long as they could prove it was for their own use. These adaptations were implemented fully on January 1st 2004 in all three counties. Additionally, Denmark and Finland also announced that they would decrease taxes in order to lessen the effect of the increased traveller's allowances: Denmark lowered its tax on spirits by 45% on October 1st 2003 and Finland diminished its alcohol taxes on 1 March 2004 by an overall average of 33%. A team of researchers in these countries decided to study the effect of these changes on self-reported alcohol-consumption and alcohol-related problems, and thus the Nordic tax study was started (for more details on the study: Room 2004a, 2004b, Mäkelä et al. 2007). Some parts of Sweden, in particular the southern parts due to the closeness of the Danish border, were also assumed to be affected by the Danish tax decrease. Thus, it was assumed three regions would be affected by these interventions: Denmark, Finland and Southern Sweden. Only the possible effects on Sweden are studied here.

Using the Monitoring study as a base, data for the Swedish part of the study of “Effects of major changes in alcohol availability” - the “Nordic tax study” for short – were collected in the third and fourth quarter of 2003 (for more details on the other countries in the study, e.g. Denmark and Finland, see Mäkelä et al. 2007). New samples were interviewed during the third and fourth quarter of 2004-2006 as well. Although the original project plan included cross-sectional samples from both the third and fourth quarter to distinguish between the Danish tax decrease and the Swedish travellers’ allowance change, the fourth quarter was dropped in 2005 and 2006 since there were no significant differences between the two periods. Additionally, the sample from 2003 was re-interviewed 2004-2006 following the same design, constituting a longitudinal sample, sometimes referred to as the panel data. The design in the study was in large parts developed on the basis of a Swiss study of spirits tax change (Heeb et al. 2003, Kuo et al. 2003, Mohler-Kuo et al. 2004) as well as on experiences from Nordic studies where the lack of a control site had been questioned (Room et al. 2002).
Figure 1. Overview of fieldwork\textsuperscript{14}

<table>
<thead>
<tr>
<th>Timetable</th>
<th>Southern Sweden</th>
<th>Northern Sweden</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textbf{2003}</td>
<td>1425 interviews</td>
<td>1353 interviews</td>
</tr>
<tr>
<td>3rd qr</td>
<td>1449 interviews</td>
<td>1353 interviews</td>
</tr>
<tr>
<td>4th qr</td>
<td>1123 reinterviews</td>
<td>999 interviews</td>
</tr>
<tr>
<td>\textbf{2004}</td>
<td>1408 interviews</td>
<td>1053 reinterviews</td>
</tr>
<tr>
<td>1st qr</td>
<td>1082 reinterviews</td>
<td>1050 reinterviews</td>
</tr>
<tr>
<td>2nd qr</td>
<td>896 interviews</td>
<td>1102 interviews</td>
</tr>
<tr>
<td>3rd qr</td>
<td>854 interviews</td>
<td>1050 interviews</td>
</tr>
<tr>
<td>4th qr</td>
<td>759 interviews</td>
<td>855 interviews</td>
</tr>
<tr>
<td>\textbf{2005}</td>
<td>972 interviews</td>
<td>714 reinterviews</td>
</tr>
<tr>
<td>1st qr</td>
<td>1050 interviews</td>
<td>719 reinterviews</td>
</tr>
<tr>
<td>2nd qr</td>
<td>742 reinterviews</td>
<td>1065 interviews</td>
</tr>
<tr>
<td>3rd qr</td>
<td>719 reinterviews</td>
<td></td>
</tr>
<tr>
<td>4th qr</td>
<td>714 reinterviews</td>
<td></td>
</tr>
</tbody>
</table>

\textsuperscript{14} Sample not linked by vertical lines are independent samples.
Although the Monitoring study, where questions referring to the past 30 days are asked, served as a base for the Swedish sample telephone survey and many of the questions asked were already similar to those in the other countries, some adaptations had to be implemented. Denmark and Finland, for example, asked about consumption during the past 12 months, so that is why Sweden took on this approach as well.

Although changes in volumes of alcohol consumed and alcohol-related problems were the main focus for the study, other alcohol-related areas was covered as well, such as drinking patterns, drinking context, attitudes towards alcohol and sociodemographic questions.

Various types of register data

Swedish alcohol monopoly sales data
The Swedish alcohol retail monopoly\textsuperscript{15}, Systembolaget, keeps records of sales statistics which is available to researchers by beverage type at the municipality level on a monthly basis. For the purpose of the first study, data was divided into three regions representing southern-, mid- and northern Sweden as areas corresponding to those defined by the Nordic tax study. Statistics are given by beverage type and to recalculate the total amount of alcohol bought, beverages have to be recalculated into pure (100\%) alcohol. Average alcohol content is also provided by Systembolaget, since this is something that which varies annually.

The response rates by year for Sweden were calculated by Synovate AB, using the standard formula in Sweden\textsuperscript{16}. This gave response rates of 50.5\% in the southern site and of 48.4\% in the northern site for 2003. Unfortunately the corresponding response rates for the following years decreased, resulting in response rates of 46.9\%, 48.5\% and 37.9\% in 2004, 2005 and 2006 in the southern site and 44.2\%, 45.6\% and 33.4\% respectively in the northern site. Interviewees in the longitudinal sample who responded in all four waves had an overall completion rate of 79.1\% in the southern site and 77.7\% in the northern site, on the base of those who responded in the initial study. However, since the main aim of the

\textsuperscript{15} The Swedish Alcohol Retail Monopoly: \url{www.systembolaget.se}

\textsuperscript{16} “Bortfallsmurran” which can be obtained from the Swedish Fellowship of Statistician at: \url{http://www.statistikforskning.se/survey/bortfallsmurran/}. This is a Swedish adaptation of the AAPOR RR4 formula described by the American Association for Public Opinion Research at: \url{http://www.aapor.org/uploads/standarddefx_4.pdf}
study was to study changes over time rather than the absolute levels of consumption, these low response rates are potentially less of a problem than in many other surveys.

**Hospital data**
The frequency of alcohol poisonings was collected from the *Swedish Hospital Discharge Register*. Data include all hospitalizations in which alcohol poisoning was the main or secondary diagnosis. The register monitors all public in-patient care in Sweden, but for the purpose of the analysis data for the years 2000-2007 were included. The selection of diagnosis representing alcohol poisonings used here was guided by the criteria set up by the Swedish Board of Health and Welfare, which includes “Acute intoxication” (F100), “Harmful use” (F101) and “Toxic effect of alcohol” (T51) on the basis of codes from the 10th version of ICD.

**Police records**
The number of reported cases of violent assaults and drunk driving was acquired from the *Swedish National Council for Crime Prevention*. Although violent assaults are not limited to persons under the influence of alcohol, previous studies have shown that both perpetrators (Rossow, Pernanen, Rehm 2001) and victims (Pernanen et al. 2002) often are intoxicated. Additionally, alcohol consumption levels have been shown to have an effect on the rates of violent crimes, although the size of the effect is likely to be dependent on which population group is affected; rates are more likely to increase if young males rather than middle-aged or heavy consumers are affected (Lenke 1982). Drunk driving was chosen on more apparent grounds and indicates changes in heavy drinking.

**Discussion of measurements**
Alcohol consumption and alcohol-related problems are for obvious reasons linked to each other, given that one causes the other. However, it has been shown that alcohol consumption and alcohol-related problems can sometimes change in opposite directions in both surveys and register

---

17 The Swedish Hospital Discharge Register (Socialstyrelsen): [http://www.sos.se/epc/english/ParEng.htm](http://www.sos.se/epc/english/ParEng.htm)
18 The Swedish National Board of Health and Welfare (Socialstyrelsen): [http://www.socialstyrelsen.se/english](http://www.socialstyrelsen.se/english)
20 The Swedish National Council for Crime Prevention (Brottsförebyggande rådet): [www.bra.se](http://www.bra.se)
data. Additionally, in some studies alcohol-related harms as reported by registers have been shown to increase more than alcohol consumption, which is why it is important to look at both. A great deal of this variation relates to who we include in our data, and when we compare trends it is important to be aware of this. Self-reported problems are more likely to describe problems in the general population, while hospital data to a larger extent describe problem drinkers, but also within the same type of data these distinctions can be made. For example, liver cirrhosis is more related to a type of constant long-term drinking, which does not have to be related to binge-drinking occasions, whereas binge-drinking occasions are obviously required for alcohol poisonings. The harm indicators obtained from register data needed to respond fairly rapidly to changes in level of alcohol consumed. Although increases in problems developing over a longer period of time (e.g. liver cirrhosis) can sometimes be observed fairly quickly due to a higher consumption already before policy changes, other types of harm (e.g. alcohol poisonings) are more likely to respond fairly quickly. Drunk-driving and violent assaults are also related to periodic heavy (binge) drinking. The main rationale for still choosing these three harm indicators was that these indicators were used in a Danish study conducted during the same period, with which we wished to compare our results. Norström (1998) has observed that assault rates are mainly related to beer and spirits consumption on-premise, i.e. in bars and restaurants, while it is rather homicide rates that are linked to consumption of spirits in private settings. The Danish spirits tax decrease and traveller’s allowances of course are more likely to affect spirits consumption.

In the present dissertation the harm indicators selected from register data were chosen in order to reflect changes in various kinds of alcohol-related harm, as well as because they respond fairly rapidly to changes, which is not necessarily the case, for example, for liver cirrhosis. Additionally, registered and unregistered alcohol consumption could also go in opposite directions, so these analyses included both sources, as well as consideration of total consumption. Thus, these measures complement each other and are interwoven to give a more valid picture than if we only focused on one or the other.

Furthermore, region is also important in this context, not only as an indication of distance to the Danish border, and thus to cheaper alcohol, but also concerning cultural divergence between the north and south.
Statistical methods

Regular descriptive statistics (mean consumption, proportion (%) of persons reporting problems), t-tests (Study 2) and chi-squares (Study 3), were used in order to verify whether the changes between years were statistically significantly different in the cross-sectional samples. When studying the significance of differences between the two sites between years, linear regression was used for alcohol-consumption (Study 2) and logistic regression was used for alcohol-related problems (Study 3: problems).

The first study

Initially, the annual amount of average purchase of privately imported alcohol by beverage types (spirits, beer and wine) and for three sites (Southern-, Mid- and Northern Sweden) was studied. The focus was on three changes in travellers’ allowances implemented on January 1st 2002, 2003 and 2004. In order to establish how the change had been distributed, whether there was an instant effect and whether it was maintained throughout the year, quarterly data were analysed as well, using the same approach. When testing whether the change was significant, the change was tested compared to the same period during the prior year, using t-tests. Changes in sales of spirits, beer and wine at Systembolaget were also analysed by year and quarter to establish whether there was any substitution effect, but these changes was not statistically tested.

The second study

Changes in average consumption in 2003 compared to 2004, 2005 and 2006 in cross-sectional samples were tested using t-tests to verify whether consumption had changed significantly, at least at the 5% level. This was done for the site assumed to be affected by the changes – southern Sweden – as well as for the control site – northern Sweden. In order to test whether the changes between years in these two sites were additionally statistically significantly different from each other, regression analysis was also performed. For this purpose an interaction term for time and region had to be constructed: where there was a significant result, northern Sweden was interpreted as having changed significantly differently from southern Sweden during this period. Similar analysis was carried out for various sub-population groups, e.g. by sex, age group, educational level, income group, drinking pattern and consumption level group (e.g. in the highest 10% of consumers), as well as by beverage type.
To study whether similar results were found on the individual level, a longitudinal sample using the same design was analysed. For this sample, paired t-tests were performed to test changes within sites and a generalized estimation equation (GEE, described below) was used to test the changes between sites.

**Generalised estimation equation**

For the purpose of analysing whether the difference in change (between years) was significantly different in the southern and northern sites on the individual level (the longitudinal data set), generalized estimating equations (GEE) were used. This approach is used to handle correlated outcomes in regression analysis when there are repeated measures for the same person over time (Liang & Zeger 1986, Zeger et al. 1988). What the technique does is to estimate regression parameters only when they affect the marginal means. Each follow-up was tested against 2003 sample; the longitudinal outcome for a person can be described by the following mathematical model:

\[ y_{ij} = \beta_0 + \beta_1 \text{Region}_{ij} + \beta_2 \text{Time}_{ij} + \beta_3 \text{Region}_{ij} \times \text{Time}_{ij} + e_{ij} = X_{ij} \beta + e_{ij} \]

where

- \( y_{ij} \) denotes the alcohol consumption from the subject \( i \) at time \( j \) for \( i=1, \ldots, n \) and \( j=0 \) (baseline), 1 (follow-up).
- \( \beta_0 \) through \( \beta_3 \) are regression parameters, and \( e_{ij} \) is a Gaussian random error term.
- The region referred to is either southern or northern Sweden.

If the interaction term is shown to be significant, it can be interpreted to mean that there are differences in change over time between the different levels of the other independent variable e.g. in this case that alcohol consumption has changed differently in the two sites.

The marginal expectation of the response, \( E(y_{ij}) = \mu_{ij} \), depends on explanatory variables \( x_{ij} \) through a link function \( g(\mu_{ij}) = \eta_{ij} = X_{ij} \beta \). The variance of \( y \) depends on the marginal mean according to \( \text{Var}(y_{ij}) = \nu(\mu_{ij}) \varphi \); where \( \nu(\mu_{ij}) \) is known variance function and \( \varphi \) has to be estimated. An estimate of \( \beta \) can then be obtained as the solution to the following generalized estimation equation:

\[ \sum_{i=1}^{n} \frac{\partial \mu}{\partial \beta} V_i^{-1}(Y_i - \mu(\beta)) = 0 \]
where $\mu'$ is the corresponding vector of means $\mu_i = \left( \mu_{i1}, ..., \mu_{it} \right)'$, $Y_i = (y_{i1}, y_{i2}, ..., y_{it})$ is the vector of longitudinal observations for the subject $i$, and $V_i$ is an estimator of the covariance matrix of $Y_i$. The covariance matrix of $Y_i$ is specified as the estimator:

$$V_i = \phi \Lambda_i^{\frac{1}{2}} R_i(\alpha) \Lambda_i^{\frac{1}{2}}$$

where $\Lambda_i$ is a $t_i \times t_i$ diagonal matrix with $\mu_{ij}$ as the $j$th diagonal element. The GEE estimator of the parameters in the marginal mean is unbiased and its asymptotic distribution is normal. Its variance is robust under misspecification of the covariance matrix of $Y_i$.

The effect of each effect was thus not tested, but 2003 denotes the time before both interventions (the Danish tax decrease and the abolition of private import quotas) and the three following samples as “after the intervention”. The effect of the sites and the effect of the interventions cannot be tested in the same model because of problems of collinearity. Analyses followed the approach described by Fitzmaurice, Laird and Ware (2004).

The third study

Hospital register and police statistics data for the years 2000-2007 were analysed using interrupted time-series analysis (ARIMA, described below). For the purpose of testing the effect of the two policy interventions, two dummy variables were constructed; one dummy describing time before (value 0) and after (value 1) the Danish tax change (i.e. before October 1$^{st}$ 2003) and the other before (value 0) and after (value 1) the large change in travellers’ import quotas on January 1$^{st}$ 2004. A total of three models were tested; the first analysed the effects of these two interventions only, the second controlled for changes in harms in the northern parts of Sweden during the same period, and the third model included two earlier quota changes occurring on January 1$^{st}$ 2002 and 2003.

Interrupted time-series (ARIMA) – intervention effect

Box and Jenkins (1976) developed a technique, often referred to as ARIMA models. In these analyses, a version of this type of interrupted time-series analysis, ARIMA impact analyses (McDowall et al. 1980), was
performed. For this purpose one needs temporal data with observations before and after the intervention, so monthly data covering the period January 2000 through December 2007 were analysed. As a first step, descriptive analyses were used to study the harm series. An extreme peak during June and July 2001 was observed for violence rates in the southern region. Since there were riots related to the EU top meeting in Gothenburg (part of southern Sweden) at this time where both activists and police accused each other of crimes of violence, the series was corrected using linear interpolation for these months.

Additionally, in ARIMA modelling data need to be stationary and long-term trends should be removed before the analyses. In order to test for stationarity, theDickey-Fuller test was used. The series showed seasonal peaking (every 12th lag) with gradual attenuation, which is an indication that the series requires seasonal differencing for stationarity (Yaffee & McGee 2000). In accordance with the seasonal variation found in the series, the estimation was performed on seasonally differenced data. With a seasonal differencing of $Y_t$, defined as $Y_t - Y_{t-12}$, the relationship between the changes in the same month but during the following year was analysed rather than the relationship between the raw series $Y_t$ and $Y_{t+1}$, i.e. one month compared to the following month during the same year.

The three models described above were then tested for each of the three harm indicators in order to determine whether the interventions had an impact that could not be explained by normal fluctuations and long-term trends within the series.

A semi-log model of the following specification was used:

$$\ln H_t = b_1 D_1 + b_2 D_2 + N_t$$

where $H$ symbolizes the harm indicator and $D_1$ and $D_2$ are the dummy variables representing the tax and quota intervention. The estimates of $b_1$ and $b_2$ can be converted into change in % by applying the formula: $100*(\exp(b)-1)$. $N$ signifies the noise term.

The method also requires that a temporal structure is allowed for in the noise term (including other etiological factors). The structure of the noise term ($N$) was therefore modelled and estimated in terms of the autoregressive parameters (AR) or moving average parameters (MA). The model and noise specification are specified by the expression $(p,d,q)$ $(P,D,Q)$, the first parenthesis referring to the regular noise modelling and the second to the seasonality component. The order of the auto-
the second to the seasonality component. The order of the auto-regressive parameter is indicated by $p$ and $q$ respectively, and the order of differencing is indicated by $d$. The corresponding symbols for the seasonal parameters are $P$, $D$ and $Q$. Furthermore, in order to have a good model, the residuals of the estimated model should be white noise, which means that there should not be a significant autocorrelation in the noise term. This was tested using the Box-Ljung Q-test (Ljung & Box 1978).

The fourth study

In order to compare alcohol-related problems, 16 separate questions were first studied separately in terms of the proportion (%) of persons having reported each problem in cross-sectional samples. This study compared changes according to a before-after intervention design, in which changes in 2004-2006 together were being tested against the proportion reporting problems in 2003 using ordinary Pearson chi-square tests ($\chi^2$). Here as well as in the consumption paper, this was done separately for southern and northern Sweden.

However, the paper also had the aim of studying differences between various subgroups, and then the approach of analysing them question by question is not convenient. One can also choose to add all problem items together, another common approach within alcohol research which could have been appropriate for this data as well considering the dimensionality of consequences (Wicki et al. 2009). If one believes that there will be differences in change between various types of problems, this is however not the ideal approach either. Having decided that one wants to divide items into different indexes there are yet more choices to be made. One could choose to replicate another study with the same problem items. Ideally, that could have been thought about before collecting data but as in many other cases we had to take what was already available, which meant a little bit of everything, with no other survey having the exact same questions. Computing indexes purely by intuition was not an option either, in order to avoid favouring a “pet theory”. It is better to try to distinguish which items belonged together; this was done with exploratory factor analysis (described below).

For the two indexes, further analysis was carried out. Changes in the proportion of people reporting alcohol-related problems in each site were tested against each other, using logistic regression analysis. For this purpose a dummy variable for year (2003/other) and a dummy variable
for site (south/north) as well as an interaction term between the two was constructed. Analysis was repeated for the various subgroups.

To test Skog’s theory of the collectivity of drinking cultures, additional tests between various subpopulations were also carried out. Equivalent logistic regressions were performed with dummies for year (2003 vs. other) and subgroups (e.g. men vs. women) when differences within sites between sexes, age groups, etc. were analysed. To test the difference between sites in trend differences between subgroups, a dummy for site was also included.

**Factor analysis**

For the purpose of dividing the single problem items into indexes, an exploratory factor analysis was carried out on all four years together. The principal components analysis generated five factors with eigenvalues higher than 1.0, although four of these had eigenvalues of 1.27 or lower. Thus, as in many other studies (see for example Gmel et al. 2000, Room & Hradilova Selin 2004, Wicki et al. 2009), most questions loaded strongly on the first factor, which had an eigenvalue of 3.82. Taking this into account, together with five being too many indexes, a choice was made to limit further analysis to two factors (a three- and four-factor solutions were tried as well, but the two-factor solution gave the most meaningful solution). After using varimax rotation (Kaiser 1958), the rotated solution came close to a solution used by others (e.g. Cahalan & Room 1974, Rootman & Moser 1984) with a division between 1) psychological problems or impaired self-control and 2) extrinsic problems that could potentially be externally verifiable. Some adjustments were made. Two items assigned to extrinsic problems (getting in a quarrel and relative/friend disturbed by the respondent’s drinking) loaded higher on the second factor, although also fairly high on the first, while a third item (the respondent’s drinking caused an accident or injury to self or another) loaded equally on both factors. The two indexes used here were identified as describing “impaired self-control/dependence problems” and “extrinsic problems”, composed of seven and nine items respectively. Persons were identified as having had these types of problems if they had a positive response to at least two items composing the specific index. These two indexes are actually not too different from those used in the study by Bloomfield et al. (2010), which were computed only on the basis of being a question used in the AUDIT questionnaire or not. It should be remembered that when one uses an exploratory analysis, one always ends up with a post-hoc solution.
**Weighting**

When the sample represents the general population no weights are needed, so analyses using register data have not been weighted. However, when using a sample not equally representing the whole population, as is often the case with surveys, a weight has to be constructed to make the sample representative. Analysing travellers’ imports in the first study, data from the Monitoring-project were used. Weights in the Monitoring project are provided with the data from Synovate AB and take into account household size, sex, age and region/urbanization (e.g. according to region and municipality type\(^{21}\)). Finally the weight was adjusted so that the weighted number of interviews would respond to the un-weighted number. Additionally for the monitoring project, the day of the week of interview was taken into account in the final weight.

For the Nordic Tax Study, separate weights for the cross-sectional samples in southern and northern Sweden were calculated for each year based on the number of eligible respondents in the household (adults between 16-80 years old) and post-stratified weighting, that is weighting on an ex-post-facto basis to match census distributions by sex and age group in the specific geographical districts, using data obtained from Statistics Sweden\(^{22}\). Finally, the weights were scaled down so that the weighted sample sizes would respond to the un-weighted sample sizes. Additionally the final weights were capped to vary between 0.33 and 3 to avoid extreme weights. Where the longitudinal sample was analysed, however, no weight was used. Although there are differing opinions on whether one should use a weight and what weight to use, for longitudinal data, the choice not to weight was based on the consideration that the purpose was not to estimate absolute rates of change but rather to study whether the persons included in the sample on an individual level changed and whether these results were in accordance with the cross-sectional samples. Additionally, as longitudinal samples have an even lower response rate than cross-sectional samples, the question is who we

---

\(^{21}\) Region according to this definition: 1 – Stockholm (the capital of Sweden)/Södertälje, 2 – Gothenburg/Malmö/ Lund/Trelleborg (large cities in the south of Sweden), 3 – Municipalities with more than 90000 citizens within a radius of 30 kilometres from the centre of the municipality, 4 – Municipalities with more than 27000 but less than 90000 citizens within a radius of 30 kilometres from the centre of the municipality as well as more than 300000 citizens within a radium of 100 kilometres from the same point, 5 – Remaining municipalities.

\(^{22}\) Population on December 31st for each year from the data base at Statistics Sweden: www.scb.se
are really measuring if we weight the sample to correspond to a general sample.
LIMITATIONS AND STRENGTHS

Since the data from the Nordic tax study covers only 2003 to 2006, and the large increases in per capita consumption in the southern parts of Sweden were observed before 2004, it has been argued that this study missed the effects of the changes. Although it is true that the study did not cover the large increase in per capita consumption in this site, it still covered the largest changes in price and availability. According to theories on the effects of price and availability on consumption, one would expect that the largest increase would be observed in relation to the largest change, i.e. the abolition of private import quotas, as was demonstrated in the first paper of the dissertation. Thus it was not that the study started too late, but rather that the assumptions on what effects these interventions would have, in a region that had already increased its consumption over quite a long period, might have been overestimated. Travel imports did not increase to the extent expected in this site, and more importantly, the changes did not result in higher alcohol consumption and more related harms. As Norström (2000b) did not find an addition to total consumption (i.e. indirectly measured by harms) but only a substitution effect, it might be argued that we should not have expected an increase. However, Norström studied all of Sweden, while we focused on the southern area, which was the region where the first increases in total consumption were observed and where one might have thus expected a further effect.

Also, looking in the rear view mirror, the northern site was perhaps not ideal as a control site since there were changes going on there that we did not foresee. The consumption increased unexpectedly in this site, which is especially surprising since the trend in southern Sweden was the opposite. There might be two possible explanations for this increase. The first one is related to tax changes and increased import allowances. Given that changes in allowances involved such large amounts one could bring back into the country, it actually might have meant that people in the north calculated it as more profitable to travel the longer distance (even considering the higher petrol prices during this period). There is also the possibility that this site was affected by policy changes in nearby
countries, particularly by Finnish tax decreases. Although we tried to isolate this site as much as possible, by excluding the municipalities up to 150km from the Finnish border in order to control for possible increased purchases from Finland, this might not have been far enough. The second explanation is that there were other factors we did not take into consideration that affected consumption in this site; such changes could be of a cultural or demographic (i.e. living conditions) nature. Additionally, the lower initial level of consumption in this site might have made this region less suited as a control site.

As there were some assumptions that might not have been valid, there are also other factors that might have affected the outcome, i.e. that increases in private imports were not as large as hypothesized in the region expected. One such factor might be the effects of petrol prices. Since Lhachimi (2006) could identify that purchase at the Swedish alcohol retail monopoly stores increased at the same time as petrol prices increased, he has argued that the demand for purchasing alcohol in another country decreased. It would therefore be important to identify the effect on private imports in relation to petrol prices as well.

A strength of the dissertation is that the interventions were studied from different angles: Was the total consumption of alcohol or only private imports affected? Were social alcohol-related problems and harms affected? Did the interventions affect various sub-population groups differently? Was the effect of availability or tax change most important? For instance, in the Danish and Finnish part of the Nordic tax study, there was no overall increase in self-reported total alcohol consumption (Mustonen et al. 2007, Mäkelä et al. 2008, Grittner et al. 2009) or alcohol-related problems (Bloomfield et al. 2010). In the register data, however, harms increased among those younger than 15 years old in Denmark (Bloomfield, Rossow & Norström, 2009) and among marginalized heavy consumers in Finland (e.g. Mäkelä & Österberg 2009). Thus, in both these countries changes were observed among groups that were not included in the survey sample. The dissertation took the same approach of combining survey data and register data, results further discussed in the concluding reflections.

One great drawback with the data was, however, the response rates in the survey, which were relatively low and which decreased over the study period. This is an increasing problem in Sweden as well as in many other countries and it is hard to say what effect it had here. The results at hand point in the direction of a consumption increase among older women,
which is not a likely group to import large amounts of alcohol and therefore possibly increased their consumption due to other factors. A more likely group to import is middle aged men; in fact Svensson (2009) studied the importers of privately imported alcohol and found that this was the group in which it was most common. Still, we could not observe increases in total consumption. As mentioned above, this could be due to a substitution effect rather than an addition effect in the southern site. However, it cannot be ruled out that a larger increase in imports took place in other population groups not captured in our data that affected their total consumption. An indication of this is the observed increase in alcohol poisonings (although it covers a longer period, it was the last import quota change which had an effect). What if the largest increase was actually occurring among high-consuming men, possibly a more marginalized group as in Finland, who did not respond to the telephone survey (as this group is less likely to do, see Kühlhorn et al. 2000)? To answer this question, one also needs to study the number of persons (by sex) in treatment. However, whether the people who do the importing are also the ones that later are alcohol poisoned is more questionable. Svensson’s study (2009) has the same drawback as our survey – we do not know who is being missed.

The approach of using a quasi-experimental design has its limits, mainly because the intervention and control groups are not randomly divided. Although we made the assumption that these groups should be equivalent to each other, there might have been other things we did not consider that might have affected the outcome. However, since we, as mentioned in the design, data and method section, also studied time-series data, we are, to some extent, taking these variances into account. However, the pre-test indicated that alcohol consumption was different in our two sites and although we rather look at changes than exact volumes of alcohol consumed, a lower initial consumption level could mean a different response to change in availability and price.

As in Denmark and Finland, we received diverging results for various types of data. This also shows the importance of combining various data sources and methods when studying a problem. While survey data made it possible to study sub-population groups and alcohol-related social problems that cannot be measured in any other way, register data covered other types of negative consequences.
SUMMARIES OF THE STUDIES

Study 1
This paper examines whether the three increases in the Swedish travellers’ allowances (quotas) in 2002, 2003 and 2004 were associated with increasing travellers’ imports in Sweden. It also studies how effects are distributed over the quarters of the following year, that is, whether there was only a short-term effect, a delayed effect or a consistent effect throughout the year, as well as the results for the whole year together. This was done for three regions, southern, central and northern Sweden, separately and together as well as for the three major beverage types, spirits, beer and wine. Additionally sales statistics from Systembolaget [The Swedish Alcohol Retail Monopoly] were analysed correspondingly to see whether increases in travellers’ imports also meant increases in consumption or whether there was rather a substitution.

In studying the amount of alcohol imported privately, data on self-reported purchases (imports from) abroad collected within the Monitoring study and referring to the most recent trip during the past 30 days were used. Sales data for Systembolaget were received from Systembolaget. Both these data sources were analysed quarterly by beverage type as well as for the complete year, compared to the same period the year before.

Results showed that purchase of alcohol in another country increased in relation to these changes, mainly in the southern parts of Sweden. There was also a clear correlation between the size of the change in alcohol purchased and the magnitude of the quota change. However, there was a “charm of novelty” effect observed in the results.
Study 2

In the second paper, self-reported alcohol consumption in the past 12 months was analysed in relation to the Danish spirits tax decrease in October 2003 and the increased Swedish traveller's quotas in January 2004. The aim of the study was to examine whether these two changes had an effect on alcohol consumption in the southern parts of Sweden, since people living in this region are known to derive a large share of their alcohol from private imports and also because northern Sweden was assumed to be situated too far away from Denmark to be affected by the tax change, which is why this area was used as a control site in these analyses. Thus the average alcohol consumption was analysed separately for southern and northern Sweden.

The data used were collected by telephone surveys with the general population aged 16-80 years (the Nordic tax study) in these two sites during the third quarter 2003 and during the same period during the three following years (2004-2006). As one aim of the study was to study whether there was a short-term effect, a consistent effect, or a delayed effect, data from 2004, 2005 and 2006 (after the changes) were compared to 2003 (before changes) within each site. The same procedure was repeated by sex, age group, educational level and income group. Additionally, separate analysis by drinking pattern (binge drinking) and consumption level (highest 10%) was also carried out. Although the abolished quotas could result in increase in any beverage, since the Danish tax decrease was on spirits we could expect an increase particularly in this beverage. Thus, separate analyses were also carried out by beverage type. Additionally a longitudinal sample, whereby the respondents interviewed in the third quarter 2003 were re-interviewed in the following years, was analysed in the same fashion.

The tax and import quota changes did not result in an overall increase in alcohol consumption in southern Sweden as was expected. Overall, there were no increases in the southern site, and where the results were significant it was most often in the direction opposite of what was expected – what was found was a decrease in overall consumption. Additionally, not even the sub-groups expected to be most affected changed their level of consumption. Surprisingly, consumption in the northern site increased, overall and among several sub-population groups. Analyses from the panel data went in the same direction. Thus, the conclusion was that something else seems to be going on in these two sites that goes beyond effects of the policy changes.
Study 3

Changes in the Danish spirits tax and Swedish changes in private import quota allowances to the indicative levels of the EU were expected to result in increases in alcohol consumption levels and alcohol-related problems in the southern area of Sweden. The results in the second (and fourth) study in the dissertation were, however, surprising in several respects. Self-reported alcohol consumption and social alcohol-related problems did not increase in southern Sweden as expected, whereas a non-expected increase was observed in northern Sweden. Nor did men increase their consumption as expected in the southern site. Although not significant, there seemed to be some indication among older heavier consumers (among women rather than men) that this group had increased the volume of alcohol consumed, but more alcohol-related problems were not reported in this group after the changes. Thus, the overall impression was that there was no increase in the southern site.

With the absence of expected changes in consumption and problems, and survey data with response rates of only 50%, a possible explanation was that these changes affected another group than those included in the survey. Thus this study used register data, i.e. crime statistics on violent crimes and drunk-driving as well as hospital data on acute alcohol poisonings, which were more likely to capture groups less likely to be included in the survey, e.g. high consumers and young men.

The data series covered monthly data January 2000 until December 2007 for these three harm indicators. The data were analysed with interrupted time-series analysis, i.e. ARIMA impact analysis. In order to analyse whether the Danish tax decrease in spirits on October 1st 2003 and the abolition of private import quotas on January 1st 2004 had any effect, two dummies were constructed. The study also tried two other models controlling for changes in harm in the northern site as well as for two earlier quota changes.

Acute alcohol poisonings were shown to have increased in the southern site in this study, at least in relation to the abolition of the private import quotas. This finding was shown to be significant even when controlling for trends in the northern sites and the two earlier changes in import quotas. However, violent assaults and drunk driving did not increase in relation to either the Danish tax decrease or the abolition of Swedish alcohol import quotas. Given these results, there seems to have been an effect in relation to the policy changes. Since alcohol poisonings are most common among chronic heavy consumers and young drinkers with
occasional heavy drinking (i.e. binge drinking), it is suspected that some individuals in these groups were affected by the policy changes.

Study 4

In the last paper, self-reported problems were analysed, mainly as presented by two indexes, in relation to the Danish tax decrease and the Swedish abolition of private import quotas. The indexes were constructed using a factor analysis with varimax rotation and principally described problems related to impaired self-control or alcohol dependence (index 1) and problems that were externally verifiable (index 2) (further described in the methods section above). The paper had two aims: to analyse whether trends in alcohol-related problems corresponded to results found for self-reported alcohol consumption, and to analyse whether results were behaved in accordance with what could be expected by the “collectivity of drinking cultures” theory developed by Skog (1985). Overall changes were studied, as well as changes for various population groups, e.g. by sex, age group, income group and consumption level group. For this purpose surveys collected for the purpose of the Nordic tax study were used.

Results for the alcohol-related problems were overall in accordance with those found for alcohol-consumption: there were no obvious increases in alcohol-related problems in the southern site in general or in any of the expected population groups. There were, however, some increases found in the group of people with common drinking (not the 10% consuming the highest amounts of alcohol); for the first index, significant increases were found among those aged 16-29 years old and people in the low income group, and for the second index among women. In the northern site, however, several groups reported more problems, e.g. men. With respect to the first index, it was mainly among men with lower incomes as well as consumers in the oldest age category who were not in the highest 10% of consumers where more people reported these types of problems. With respect to the second index, it was rather in the groups of young men and men with low income (below €1350 each month) where more reported problems. Thus, the increase among men in the northern site that was observed for volume of alcohol consumed was observed for various problems as well. However, the results did not correspond to Skog’s theory of the collectivity of drinking behaviour since various population sub-groups did not change in concert but moved in various directions.
CONCLUDING REFLECTIONS

The main aim of the present dissertation was to study whether alcohol consumption and alcohol-related harms increased when availability and price changed. More directly, changes in Swedish private import quotas occurring between 2002 and 2004 were studied, in particular the last change when quotas were abolished and Sweden switched over to the indicative levels of the EU. A change in the Danish spirits tax was also taken into account as a change in price for those living in the southern parts of Sweden. Before these policy changes were carried out, there were many who presented predictions about what would happen when borders were “opened”, in part based on the increases that had already been observed in the southern parts of Sweden (Leifman & Gustafsson 2003). The “alcohol import investigation” (SOU 2004, 2005) expected that the Swedish retail monopoly would be shut down if Sweden did not decrease its taxes on alcohol. Although other Nordic countries, i.e. Denmark and Finland, lowered their taxes on alcohol to diminish the effects of the increased travellers import quotas, the Swedish government decided to wait. Still, the expectation was that people living in the southern parts of Sweden would be affected in particular.

Change in price causing change in consumption?

On theoretical grounds, it was expected that consumption levels would increase as price decreased, as it basically did for people living close to Denmark in the south of Sweden when the limitation on private import allowances was abolished. Thus, an assumption was made that not only would private imports be affected but that the total volume of alcohol consumed (as measured by surveys) would rise, since an additional hypothesis was that people would drink more when stockpiling larger amounts of alcohol in the home. It was also assumed that not only would the drinking of travellers be affected, but also the drinking of family members, friends and neighbours as well. In these ways, it was assumed that the overall total consumption in the society would increase. But even though people in southern Sweden were offered greater availability of
cheaper alcohol, the second paper in the dissertation implies that they did not increase their total consumption but rather decreased it. Nor did survey data confirm that there had been an overall increase in alcohol-related social problems in the southern parts of Sweden in relation to the last two policy changes (the Danish tax decrease and the abolition of private import quotas).

These findings are rather puzzling and problematic for the axiom of economics linking price to demand. However, there is the “ceteris paribus” clause – that the axiom’s prediction is with all else being equal – whereas in fact other things seem to have been changing. The increase found for the northern parts of Sweden might, as was suggested in the studies, be a result of the northern parts of Sweden catching up to the new Swedish norm of higher consumption levels. Additionally, perhaps these changes also increased the incentives for people in the north to import since the large amounts would make the trips to Denmark (and Germany) more profitable. At the same time southern Sweden seems to have adapted to a more “continental” drinking norm, with smaller amounts per occasion, while the rest of Sweden has not.

However, the effect of the increased import quotas on private imports was still much more pronounced in the southern site, as will be discussed under “Charm of novelty”, and alcohol poisonings in this site increased as well, when controlling for similar changes in northern Sweden. I would therefore rather suggest that the somewhat unexpected results in the study’s ”north” (defined in the method section about the Nordic tax study) could be related to changing drinking patterns. Although per capita alcohol consumption has been increasing in this region during the past decade, it has increased to a lesser extent than in the study’s “south” (Ramstedt et al. 2009), and the north might simply be catching up to the increase earlier observed in the south.

There may be other things as well that have changed that are not related to the policy changes but rather to other factors. When similar changes have been observed elsewhere, i.e. when consumption decreased in France, Italy and other countries, it was suggested that there were shifts in taste and demographical and structural explanations behind this (Sulkunen 1989, Tusini 2007). Within the frame of the dissertation, it is not possible to answer this question. But there are also other explanations in terms of mechanisms affecting change and stasis in consumption patterns (see Room et al. 2009a, b), while societal collective responses could preserve old patterns (Sulkunen 1989). There is also the
possibility of a “charm of novelty” where the effect of the stimulus quickly wears off and where any further such stimuli will not produce the same effect. This and some other explanations are discussed further below. More on how one could test other possible explanations, i.e. why the economics axiom did not work in our case, is additionally presented under the section “Future research”.

“Charm of novelty”

When studying the effect of quota changes in 2002, 2003 and 2004 on private imports in the first study, availability and price were found to have had an effect; private imports did increase in relation to the two later quota changes particularly in southern Sweden, although with a “charm of novelty” effect as it seemed. Thus, people were not responding strictly in accordance with the price changes, as we then would find a step-shaped rise in consumption levels, but were rather responding in the short run to the change in price but then reverting back to their old drinking pattern, i.e. the shape of the change takes the form of a step up but a slanting (or curved) line back down. According to Simpura (2001), a “short wave” change is what could be expected from policy changes. The idea that short-term change might be different from longer-term change is recognized in the distinction between short-term and long-term price elasticities. Often discussions of alcohol prices have built in the assumption of a step-shaped change in response to a price change, but this is not realistic. The “charm of novelty” phrase is basically about fads and fashion as something can seem attractive as a new idea or a new behaviour, but fairly quickly becomes “old hat” and goes out of style. Or it can be a matter of something seeming advantageous when you first do it but then you discover hidden costs. These changes we studied required residents in southern Sweden to travel in order to take advantage of them, and driving back and forth to Denmark is both time consuming and tiring. Additionally there might have been costs people had not factored in, for example the bridge toll or the increasing petrol prices. Lhachimi (2006) did find that higher petrol prices were linked to increasing purchase from the alcohol retail monopoly stores, and thus suggested this as a potential reason for less private imports of alcohol. There are other ways in which a pattern of going to Denmark to buy alcohol can decay over time: if your drinking behaviour does not change enough, you find your liquor cabinet getting full – i.e. in economic terms, there is stock formation involved, thus resulting in a declining “charm of novelty”. There does seem to have
been an initial increase in purchase and consumption of privately imported alcohol in southern Sweden in relation to the increased availability due to the increases in private import quotas; this effect was just not as extensive or long-lasting as was originally hypothesized.

Regional effects

The gravity model of distance effects proposes that regions closer to a change will be most affected (Norström 2000a), so we assumed that the increase would be found concentrated in the southern site. The first study suggests that these effects could sometimes be there, but not always. The implicit model used by Härstedt and colleagues (SOU 2004, 2005) assumed this stating that if Swedish taxes are not drastically reduced, Systembolaget (the Swedish monopoly stores) will be wiped out in the southern parts of Sweden, and its credibility fatally wounded in Sweden in whole. In the second and fourth study, consumers do not seem to have been behaving in accordance with the expectations, nor do the results in the first study imply that people stopped purchasing alcohol in the monopoly stores as the allowances were increased. One remark in relation to this is that the gravity model assumes that the economic as well as time costs of travel stay constant; during this period, however, the costs increased, as already mentioned (Lhachimi 2006).

We seem to have two diverging trends in Sweden, where people in southern Sweden did not increase their consumption levels as expected, but people in the northern parts continued to increase theirs. The net result of these trends is that levels of alcohol consumption in these sites became more similar to each other. Overall, though, the increase in Swedish per capita alcohol consumption predicted by Leifman and Gustafsson (2003) seems to have ground to a halt (Ramstedt et al. 2009).

The collectivity in changing alcohol patterns

The “collectivity of drinking cultures” theory (CDC) implies that when segments in a drinking culture change, other segments follow. However, according to the results in the second study, changes reported in survey data from the northern region were very different for men and women in the northern region. Additionally, the third study did find changes in the south in register data, i.e. alcohol poisoning. This measure of harm has been suggested to occur mainly among chronic heavy drinkers as well as among youth in relation to binge drinking occasions (Ramstedt 2006). In
accordance with this, there was a non-significant increase observed in the second study among the 10% of the population that were consuming the largest volumes of alcohol, implying that there is something going on among the extreme heavy drinking segment of the population that is also different from what is going on in the rest of the population. This was also observed in the Finnish part of the Nordic tax study where high consumers, i.e. marginalized drinkers, were the major group to be affected (Mäkelä & Österberg 2009). In parallel findings in Australian data, Livingstone and colleagues (in press) found results with changes in alcohol-related harms only at the extreme ends of the distribution, which was therefore not in accordance with Skog’s theory either. The second and third study further implied that older persons had increased their consumption more than younger persons, agreeing with results for this group in other studies (for Sweden see e.g. Lindén-Boström, Persson, Berglund 2009, Ramstedt 2009). These results are in some concordance with earlier studies (i.e. Mäkelä, Rossow & Tryggvesson 2002) which have shown that especially heavy consumers are likely to be affected by policy changes, but that age differences depend on the social context. More importantly, the results suggest that various segments of a drinking culture do change differently. The fourth study explicitly discusses the CDC theory in relation to alcohol-related problems, stating that there is no straightforward collectivity in change.

Furthermore, trends in northern Sweden are different from those in southern Sweden in most of the analysis. The fourth study additionally suggests that northern and southern Sweden should perhaps not be considered to have a common drinking culture, but in some ways separate cultures. At a minimum, these findings highlight the issue of how we define the boundaries of the commonness, the collectivity, of a drinking culture, thus suggesting that the theory is in need of further refinement.
FUTURE RESEARCH

With an initially clearly formulated hypothesis and for many persons also a clearly expected result, the results of the present dissertation may be something of a surprise. It does not provide us with a study showing empirical results that were expected on theoretical grounds, linking availability and price to increases in alcohol consumption and alcohol-related problems, but rather leaves us with several new questions.

Although increases were noted, they were not in the groups we expected. As increases were noted in consumption and alcohol-related problems for the northern region, which was not assumed to be affected by the Danish tax decrease or the abolition of private import allowances (at least not to the same degree as the southern region), something else might be going on there different from developments in the south. One possible explanation is that the north is in fact following the development already found for the southern parts, and that we underestimated the impact these changes would have on the northern regions. In order to answer this it would be useful to look at consumption levels over a longer period of time than the dissertation covers. Additionally, the amounts private imports would be studied in detail, for example if people in the north have increased their imports from Denmark and Germany. Also, the smuggling of alcohol is of great interest.

However, there is also a possibility that there are other changes in the north that explain the increasing consumption, such as cultural changes or changes in living conditions. It would therefore be important to look more closely at the northern parts of Sweden, over a longer period of time, from this angle. Are there demographical changes that can explain this? One suggestion is that people living in the north have become more urban, that cities have become larger and that the number of restaurants and other on-premise sales have increased and thus making alcohol more available. Maybe alcohol patterns has changed as a result of this and people do not only drink at weekends? Cultural changes in drinking could possibly also explain why we did not find the expected increase in the southern site. After a longer period of increasing consumption, people
might have started to drink in another way, i.e. applying continental beverage preferences and patterns – not only drinking during the weekend, but drinking smaller amounts when drinking – and additionally people might not drink as often as they used to. Studying how people drink is therefore yet another area of interest. Additionally, as mentioned earlier in the dissertation, other economic factors, such as petrol prices or changes in disposable incomes may explain some of our results and could also be studied further.
REFERENCES


Final report from the traveller's imports commission). Stockholm: Socialdepartementet [Ministry of Health and Social Affairs].


Svensson J. (2009) Travellers’ alcohol imports to Sweden at the beginning of the 21st Century: Do those who privately import alcohol drink more than or have different patterns of drinking to those who do not? NAT (English edition); 26(2):193-203.


Trolldal B (2005). Distance effects on the private import of alcohol to Sweden. Paper prepared to the 31st Annual Epidemiology Symposium of the Kettit Bruun Society (KBS) 30 May-3 June, Riverside, California, USA.


Official sources:
Commissions of the Board 2000/44/EG, Ministry of Finance
http://ec.europa.eu/
Europa. EU:s webbportal [Gateway to the European Union]
http://europa.eu.int/abc/travel/shop/index_en.htm
SCB. Disponibel inkomst per konsumtionsenhet för individer [Disposable income per consumption unit per person] Retrieved 2009-09-11. http://www.scb.se/Pages/TableAndChart28883.aspx
Swedish Customs www.tullverket.se
The Swedish Alcohol Retail Monopoly: www.systembolaget.se
The Swedish Hospital Discharge Register (Socialstyrelsen): http://www.sos.se/epc/english/ParEng.htm
The Swedish National Board of Health and Welfare (Socialstyrelsen): http://www.socialstyrelsen.se/english
The Swedish National Council for Crime Prevention (Brottsförebyggande rådet): www.bra.se
APPENDIX 1

Study sites in the Nordic tax study

- Northern Sweden: counties of Norrbotten, Västerbotten, Jämtland, Västernorrland, Gävleborg, Dalarna, Örebro and Värmland

- Area not part of the Nordic tax study design

- Southern Sweden: counties of Skåne, Blekinge and Halland, as well as the city of Gothenburg
SVENSK SAMMANFATTNING


Denna sammanläggningsavhandling består av fyra relaterade artiklar samt en ”kappa” där dessa knyts samman. I den första artikeln studeras det vilken effekt de tre förändringarna i alkoholinförselkvoterna mellan 2002 och 2004 hade på resandeinförseln i Sverige. Resultaten relateras även till försäljningen på Systembolaget under samma period. I den andra och fjärde artikeln studeras självskattade uppgifter om alkoholkonsumtion och alkoholrelaterade sociala problem så som de rapporterats i telefonintervjuer med personer boende i södra och norra delarna av Sverige. Den tredje artikeln analyserar registerdata från sjukvården och polisen, eg. ”alkoholförgiftningar”, rattonykterhet samt våldsbrott.
Resultaten var inte de förväntade. Den totala alkoholkonsumtionen samt de alkoholrelaterade problemen ökade inte i de södra delarna av Sverige, där man lättast hade tillgång till de lägre priserna. Däremot steg både konsumtionen och de alkoholrelaterade problemen i de norra delarna av Sverige. Övriga resultat visade däremot att privatinförseln främst ökat i södra Sverige och att effekten av dessa förändringar var störst för de större kvotförändringarna. Vidare kunde det noteras att antalet fall som vårdades för "alkoholförgiftning" ökade i södra delarna men inte i de norra. Konklusionen blir därför att även om vi inte såg en ökning av alkoholkonsumtionen totalt sett, eller de alkoholrelaterade problemen, så ökade den resandeinförda alkoholen i de södra delarna. Således fanns det en effekt men den var inte så stor som förväntat. Dessutom skedde det en ökning av alkoholförgiftningar i de södra delarna, vilket tyder på att gruppen av högkonsumenter – som är underrepresenterade i survey-data – påverkades. De ökningar vi finner för norra delarna kan även ha andra förklaringar än de ökade införselkvoterna och skattesänkningen i Danmark.