

**THE EFFECTS OF
NORDIC ALCOHOL
POLICIES**

**What happens to drinking and harm
when alcohol controls change?**

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CHAPTER 1

Introduction

Nordic traditions of studying the impact of alcohol policies¹

Börje Olsson, Hildigunnur Ólafsdóttir & Robin Room

Alcohol policy: a Nordic tradition

This book is concerned with studies in the last half of the 20th century in five Nordic countries — Denmark, Finland, Iceland, Norway and Sweden — of the impact of alcohol policies. The idea of ‘alcohol policy’ itself seems to be a Nordic coinage (Room 1999), and in this topical area Nordic studies of policy impact have had a rich field of experience to work with. Each in their own way, the Nordic countries took alcohol policy very seriously in the course of the 20th century (Sulkunen et al. 2000). Denmark changed overnight from a spirits-drinking country to a beer-drinking country after very heavy taxation on distilled spirits was introduced in 1917. In the other four countries, the temperance movements were stronger, and so were the policies. Finland and Iceland had periods of complete prohibition, Finland for 15 years until 1932 and Iceland from 1915 to 1935. Norway had a period of partial prohibition, and the vote for prohibition was 49% in a referendum in 1922 in Sweden. In large part in response to the challenge of the prohibition movement, each of these countries set up stringent alcohol control systems, with the state itself operating a monopoly for the sales in package form of all spirits, wine and strong beer, and with strong oversight also of places for on-premises consumption. Twentieth-century alcohol policies in these Nordic countries have been characterized as a spectacular historical experiment in social control.

The Nordic background: changes in the societies and in drinking after 1950

The situation of the Nordic countries has changed a great deal in the last half century. Around 1950, Finland was engaged in a continuing struggle to retain independence and autonomy in the shadow of a powerful neighbor, the Soviet Union, where Stalin was still in power. Norway and Denmark were only five years beyond the experience of Nazi occupation. The European Union, in anything like its present form, was but a gleam in some dreamers’ eyes.

The Nordic societies themselves have also changed greatly in the last half-century. In 1950, the societies were not wealthy. Unions and other working-class institutions were generally well established and strong. The full flowering of the welfare state was still in the future, although the path toward it had been set in each society. There was relatively little immigration or tourism, inward or outward, and each society was quite homogeneous.

In the course of the last 50 years, there are important ways in which Nordic drinking patterns have changed. Beer has replaced spirits as the dominant beverage in Finland, Iceland, Norway and Sweden (Ólafsdóttir 1998, Leifman 2001). Wine consumption is a more significant part of total consumption than it used to be. But the way in which this has happened was already foreshadowed in the Finnish policy change of 1968/69, when medium-strength beer became available in grocery stores and cafes, and the ban on monopoly retail stores in rural areas was ended. As Finnish researchers noted at the time, new drinking occasions sprang up, often with lower drinking quantities — but they did not replace the old heavy-drinking occasions (Mäkelä 1970). And, as a beverage becomes more popular, its use-values may change. In particular, the heaviest drinkers tend to gravitate to the cheapest form of alcohol per unit of ethanol. Differentially favoring one form of alcoholic beverage in alcohol policy, in terms of price or availability, may have unintended effects.

Alcohol controls and their development

As already noted, in the wake of decades of concern about alcohol problems (Johansson 2000), in 1950 each Nordic society had quite extensive alcohol controls, and relatively low alcohol consumption levels, at least in comparison with

¹ The project which this book reports received financing from the Swedish Social Research Council, now the Swedish Council for Working life and Social Research (FAS). Most authors were supported for their worktime on the project by the institution with which they were affiliated.

many parts of Europe. Denmark relied mostly on a high tax policy to limit consumption, particularly of spirits. In the other societies, substantial parts of alcohol production and sale were monopolized by the state, in quite restrictive systems. Until 1955, Sweden's system included a ration book, the *motbok*, allowing the holder to purchase a limited quantity of alcohol each month. The *motbok* was routinely denied to problematic drinkers, not to mention such other social categories as married women (Frånberg 1987). As noted in Chapter 2, Finland also had a buyer surveillance system exercising individualized control. Except in Denmark, liquor stores were few and far between, and a visit to one was often a substantial inconvenience, and restaurants and bars were also relatively scarce.

Alcohol controls in the Nordic countries have changed considerably since 1950, but some features of the system have remained. In Table 1, we show some of the current characteristics of the systems. Finland, Iceland, Norway and Sweden still have government retail monopolies responsible for off-premise sales of spirits, most or all wine, and strong beer. The number of liquor stores and their opening hours are relatively limited, compared with the rest of Europe. Though there has been a flowering of a restaurant and bar culture, on-premise drinking still accounts for only a limited proportion of alcohol consumption in the countries north of the Baltic.

Other than in Denmark, alcohol controls are thus still quite stringent by international standards (Karlsson & Österberg 2001). But to a visitor from the Nordic world of the 1950s, the forms and degree of availability of alcoholic beverages today would seem startlingly different. The intervening half-century has been marked by many changes. Not all of these changes have been in the same direction: particularly in Sweden, there were some steps towards increased alcohol controls in the late 1970s and 1980s, one of which is studied by Ramstedt in this volume. But the predominant direction of change has been towards greater availability, occasionally in big steps, as in Sweden in 1955 and Finland in 1968, but more often in smaller steps. The irony of the tradition of research work which is this volume's concern is that, in the majority of studies, testing and demonstrating the effectiveness of the control measures has been possible because the particular control measure was being abandoned.

There is one clear exception to the general direction of Nordic state controls concerning drinking in the last half-century, and that is the area of drinking-driving countermeasures. While these lie outside the scope of this volume, it should be kept in mind that Nordic laws against drinking-driving are among the strictest in the world; thus, for instance, the legal blood-alcohol level for driving is 0.02% in Sweden and Norway, and 0.05% in the other Nordic countries. The current laws reflect a long process of progressive tightening of the controls (Hauge et al. 1978, Ross et al. 1992), even as the countries became more affluent and automobiles became more a part of people's daily lives. The drinking-driving laws are well accepted and largely obeyed.

Table 1. Some features of Nordic alcohol control systems in 2002.

	Country				
	Denmark	Finland	Iceland	Norway	Sweden
State monopoly alcohol stores for retail sales of liquor, wine and strong beer	No	Yes	Yes	Yes	Yes
Saturday closing of the state monopoly stores	–	No	No	No	No ¹
Minimum alcohol content by volume for a beverage to be defined as an alcoholic beverage	2.80	2.81 ²	2.25	2.50	2.25 ³
Highest alcohol content by volume on beer sold in grocery stores	Not limited	4.7	2.25	4.5	3.5
Age limits for off-premise purchases of alcohol					
Beer (alcoholic)	15	18	20	18	18/20 ⁴
Wine	15	18	20	18	20
Liquor	15	20	20	20	20
Age limits for on-premise purchases of alcohol					
Beer	18	18	20	18	18
Wine	18	18	20	18	18
Liquor	18	18	20	20	18
Taxes on alcoholic beverages (Euro per litre of beverage in Feb/March 2000) ⁵					
Beer	0.47	1.46	2.20	2.33	0.87
Wine	0.97	2.40	6.30	5.13	3.22
Liquor	15.10	20.60	31.36	35.97	23.73

¹ Previously closed; all state monopoly shops became open on Saturdays as of July, 2001.

² The age limit for beverages with alcohol content of 1.2–2.8% by volume is 18 years since 1997; otherwise the law on alcoholic beverages only applies to beverages with alcohol content of more than 2.8%.

³ Taxed as alcohol at 2.8% and above.

⁴ Age 18 for beer with an alcohol content of 3.5% or less.

⁵ Calculated for 1 litre of beverage with an alcohol content (by volume) of 5 percent for beer, 11 percent for wine and 40 percent for liquor (European Commission, Taxation and Customs Union, Excise Duty Tables, February/March 2000, quoted in CAN Report 2001). Converted into Euro with the mean of the Swedish Bank's exchange rate for February/March 2000, 1 EUR = 8.4531 SEK.

The development of Nordic social research on alcohol

In the decades after 1950, Nordic traditions of social science research on alcohol issues gradually developed. In Finland, most such research was organized after 1950 as a department of the Finnish state alcohol monopoly. With a sociologist, Pekka Kuusi, as the director of the Finnish alcohol monopoly, it was natural that studies of the effects of alcohol control measures received an early emphasis in the research program; in fact, Kuusi's own dissertation (Kuusi 1957) was a pioneer and landmark study in this area, and in the early years this Finnish tradition of research was motivated by an optimistic commitment to a social-engineering approach to alcohol controls (Bruun 1991). The present-day Alcohol and Drug Research Group of STAKES in Helsinki carries on the tradition of policy impact studies thus initiated, as the successor to the Social Research Institute for Alcohol Studies. In 1959, what is now the National Institute for Alcohol and Drug Research (SIRUS) was founded in Norway, and policy impact studies were a central task for it. In the other three countries, alcohol policy impact research has been carried out on a more ad-hoc basis. In Sweden, projects were initiated and funded by government commissions, the retail monopoly (Systembolaget) and more recently the Public Health Institute (FHI). Different national research councils have also provided funding to individual researchers or groups of researchers for impact studies. In 1999 the Centre for Social Research on Alcohol and Drugs (SoRAD) came into existence as a Swedish equivalent of the Finnish and Norwegian research groups.

Alcohol policies were seen as part of the welfare state, and evidence-based knowledge acquired by scientific methods was seen as a necessary element in the social planning of the welfare state. In line with this belief in science and progress, alcohol policy impact studies were considered to be an instrument for the implementation of effective alcohol policies. The vision was reinforced by the notion that the state had responsibilities in providing funds specifically for alcohol research. Studies of changes in tax or price levels, in opening or closing days or hours for stores and taverns, of the opening of new outlets, of the introduction of new beverages, or of strikes which temporarily limited alcohol availability, have therefore been a part of the Nordic alcohol research agenda.

Unplanned disruptions, such as strikes, tend to happen with short notice. If they are to be studied with especially collected data, only a short time can be spent on study design, construction of the necessary measuring instruments, and data collection. In such cases, existing longitudinal studies and panel data may form the most valuable resources for studying the effects of changes in alcohol control. Such data sets are usually the result of long-standing and coherent research projects, in many cases carried out by national alcohol research institutes. The benefits of settled institutes in Finland and Norway have also been that researchers have been able to attend to research questions that arise from sudden policy changes. As will be illustrated in the remainder of the book, a majority of the Nordic alcohol policy impact studies have been carried out by specific alcohol institutes or as governmentally funded projects.

The alcohol policy impact studies were often carried out in the context of a national political debate about proposed or implemented policy changes, so the original report of the study was usually in a national language. While reports from many of the studies have been published in English, there remain quite a large number which have not been published in English, and some which have not made their way into international reviews of the literature. One purpose of the present volume, then, is to convey the full scope of the 50-year research tradition and its findings to an international audience.

Discourse about alcohol policy changes: shifting gradations of beer and promoting continental drinking styles

As will be demonstrated in the following chapters, most policy changes have involved beer, not spirits or wine. The Nordic countries are located in the middle of the 'spirits belt' and were traditionally spirits drinking countries. The public image of the negative consequences of drinking has been mainly linked to the strong emphasis on intoxication. In the traditional stereotype, intoxication and alcohol-related harm were strongly linked with spirits, leaving very little room for liberalizations of policy on spirits. In the years after the prohibition era, 'non-problematic' beverages such as wine and beer became differentiated from spirits, and beverage-specific policy began to serve as an instrument in efforts to change the drinking habits. The consensus on the regulation of spirits has hardly been disputed. The conflicts on alcohol policy controls have therefore revolved around regulation of the weaker beverages.

Beer, usually the weakest beverage, has often been seen as a stepping stone, a threshold from the sober to the drinking world. More than any other alcoholic beverage, beer tends also to be linked to youth, a group that generally is

perceived as a legitimate object of control. Whether on these grounds or others, the regulation of beer has been the main arena for contestation about alcohol control regulations. Regulations on the definition of and taxation levels for beer, the issue of medium-strength beer in Sweden, the introduction of beer into grocery stores in Finland, and the legalization of medium strong beer in Iceland are examples of changes where such issues were contested. The present results of this history, in terms of alcohol content in different categories of beer, are shown in Table 2.

Behind these conflicts, it is possible to discern two competing theories in social discourse about how to tame Nordic drinking styles. In one social discourse, the argumentation was around how strong the most popular beverage, beer, should be, and where it should be sold. The result has been a proliferation of categories of beer, differentiated by their alcohol content, and differentially made available. This proliferation has been most developed in Sweden. Beer with 2.25% alcohol or less is treated legally in Sweden, and culturally regarded, as a non-alcoholic beverage. The next two levels, up to 2.8% and up to 3.5%, are both available in grocery and convenience stores, but are subject to an age limit of 18 for purchase. The lower-strength category is not subject to alcohol taxes; i.e., in this regard it is defined as non-alcoholic. All beer for off-premise consumption above 3.5% must be purchased at the retail monopoly shops (Systembolaget), and is subject to an age limit of 20. In Finland and Norway, the alcohol content level at which availability is limited to government monopoly stores is set higher. The issue of differentiating beers by strength, with different arrangements on availability, has been a significant factor in alcohol policies and prevention strategies in Sweden, Norway and Finland.

Table 2. Alcohol content by volume for different types of beer in Finland, Iceland, Norway and Sweden, 1998¹.

	Finland	Iceland	Norway	Sweden
Light beer	≤ 2.8	≤ 2.25	≤ 2.75	≤ 2.25
Medium light beer ²	2.81–4.7 ³	≥ 2.26 ⁴	2.76–4.75 ³	2.26–3.50
Medium-strength beer				⁵
Strong beer	> 4.70		4.76–7.00	≥ 3.51 (average strength 5.24%)

¹ Source: Adapted from Holder et al. 1998, for all except Iceland.

² Medium light beer is widely available only in Sweden.

³ In fact, Norwegian and Finnish beers presently on sale in this category are over 3.7%.

⁴ No upper limit, average strength 5.0 %.

⁵ ‘Medium-strength beer’ of about 4½% is available for on-premise consumption, but is little consumed. This strength is classed as ‘strong beer’ in off-premise sales.

In another social discourse, the continental drinking culture was presented as a governing image in contrast to the stereotypical Nordic patterns of bingeing and drinking to intoxication (Olsson, Nordlund & Järvinen, 2000). Starting already with Pekka Kuusi in Finland in the 1950s, the argument was that the Nordic populations had to learn how to drink in a civilized way (Tigerstedt 2000). Promoting a style of wine-drinking with meals, allowing wine in grocery stores, lowering taxes on wine in relative terms, and increasing the availability of beer were all considered or adopted as elements of a modern alcohol policy which would lead to new drinking habits. While both beer and wine figured in the efforts to tame drinking habits by substituting stronger beverages, wine was especially associated with the effort to promote ‘continental’, southern European, drinking styles (Olsson 1991). Thus, while beer and spirits have been perceived in terms of their alcohol content, wine has been promoted as an instrument to change the alcohol culture. The separation of spirits and beer from wine can also be seen as an expression of a distinction between working class and middle or upper class taste, style and culture. In this perspective, the promotion of a continental drinking culture becomes a part of a broader bourgeois and liberal civilizing process.

The total consumption model and its discontents

Given the Nordic tradition of applied social research, and of treating alcohol control systems as a part of a general alcohol policy, numerous studies have been carried out on implementation of alcohol control changes. These studies have used a variety of outcome variables, as will be illustrated in this volume. The emphasis has been on rates in the population as a whole, for good reasons. The studies could thereby take advantage of the excellent Nordic health and police statistical series, as well as statistics on per-capita alcohol consumption. The public health tradition, which increasingly became the frame for these studies (Hauge 1999), tends to emphasize the effects in the population as a

whole. A primary reason for the emphasis on the population as a whole, however, was what has been called the ‘total consumption approach’ (Sutton 1998). This formulation, which became established in the research literature in the mid-1970s (Bruun et al. 1975) and was later further elaborated by Skog (1985), established a scientific rationale for continuing the generally restrictive Nordic regimes on the general availability of alcoholic beverages and high prices — in particular, the elimination of private profit from parts of the alcohol market, and restrictions on the hours of sale and number of sales outlets (Brofoss 1996). Though by the 1990s the alternative to the ‘total consumption model’ was clearly a much freer availability (Sutton 1998), in its inception the model provided a retrospective justification for the removal of the stringent individual-level controls of an earlier era (Tigerstedt 2000).

The ‘total consumption approach’, sometimes known in North America as the ‘new public health approach’, came to have a number of elements (Room, forthcoming). One major element of the argument was the idea that, given the social and often reciprocating nature of drinking, lighter and heavier drinkers across the whole population tended to move up and down in concert in terms of changes in levels of alcohol consumption. Rates of alcohol-related problems, the model proposed rose and fell as the population’s per-capita consumption rose and fell.

As a set of propositions to be tested and refined in research, the approach is still very much alive and flourishing (e.g., Edwards et al. 1994). While some aspects have been subject to critical review (e.g., Gmel & Rehm 2000), the arguments against it have tended to be more in terms of political feasibilities than in terms of scientific veracity (e.g., Stockwell et al. 1997).

In the public policy arena, however, particularly in Sweden, the approach hardened almost into orthodoxy. This is how an author put it in the Swedish medical newsletter in 1980: ‘Alcoholism and alcohol consumption are directly related to the total consumption among a population. If one wants to fight alcoholism and alcohol harm, one must therefore decrease total consumption’ (quoted in Sutton 1998, p. 88). In this context, the approach drew political controversy. Already in 1992, a Swedish medical professor was arguing in a daily paper that ‘the total consumption policy, as a basis for an active alcohol policy, has seen its better days’ (quoted in Sutton 1998, p. 141).

In terms of an alcohol policy goal of minimizing harm from drinking, the whole emphasis on ‘total consumption’ in the model may be seen as a distraction. The important policy question to be answered about an alcohol policy measure from this perspective is: Does the policy reduce the level of alcohol-attributable social and health harms in the population? Whether and to what extent changes in the total level of consumption intermediate a relation between the policy measure and the level of harm is an interesting research question, but does not determine the success or failure of the policy in meeting the goal.

It is quite conceivable that an alcohol policy measure which is generally applicable will have differential effects on different parts of the drinking population. This has long been recognized to be the case for alcohol rationing, as it was applied in Sweden before 1955 (Norström 1987). But there is evidence, as reviewed in this book, that this is the case also for other alcohol policy measures. Conversely, as suggested by the results in Chapter 9, a policy measure aimed at a specific population may well have effects beyond the target group.

Aims of this book

The general perception is that the universal and restrictive measures developed have been successful in holding down levels of alcohol-related problems. A considerable number of policy impact studies supporting this conclusion are available, but they are often focused on changes in mean per-capita consumption as the indicator of success.

The purpose of this book is to take the alcohol policy impact studies one step further by carrying out a literature review and to undertake reanalysis of existing datasets concerning changes in drinking patterns and in rates of alcohol-related problems when alcohol availability changes. Instead of per-capita consumption, differential effects of the policies on different segments of the drinking population are in our focus. In the introductory review article written by Mäkelä, Rossow & Tryggvesson, the studies are discussed by intervention type. Starting with the Swedish alcohol rationing system, which has no parallel in any other of the Nordic countries, the review offers a comprehensive picture of Nordic studies of changes in availability through changes in the number of outlets, in sales hours, and in regulated prices. In chapters 3–9, results are presented from reanalyses of existing data sets and from new studies to explore differential effects beyond the effects on per-capita consumption.

This book therefore has two related aims. One is to review the rich literature of alcohol policy impact studies, many published only in Nordic languages, which have accumulated over the last half-century. The second is to examine, both in the published results of these studies, and where possible in new analyses of their data, the differential effects of the policies on different segments of the drinking population. We are interested in differential effects by demography —

on men as against women, on younger as against older, and on richer as against poorer; by drinking patterns — on heavier as against lighter drinkers; and in terms of indicators of different problems — chronic health problems, accidents, domestic violence, etc. One comparator for these differential effects, of course, is the effect on the overall per-capita consumption.

We start from recognition that per-capita consumption remains an important indicator from the point of view of general alcohol policy. But, in terms of the justification for particular policy measures, we feel that there is a need to look beyond it, directly at the effects of the measures on alcohol-attributable harm. Understanding the differential effects of particular policy measures on different segments of the drinking population is also important from the perspective of planning strategies for prevention. It is our hope that the book also opens up new and fruitful lines for further research.

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CHAPTER 2

Who drinks more and less when policies change? The evidence from 50 years of Nordic studies

Pia Mäkelä, Ingeborg Rossow & Kalle Tryggvesson

Introduction

The Nordic countries, with the exception of Denmark, have throughout most of the 20th century carried out alcohol policies with high taxes and the restriction of availability as central components. In the context of these coherent control policies, a number of research groups in the Nordic countries have made a special effort to evaluate the impact of the alcohol policy measures, often by means of experimental studies. Some ‘natural experiments’, such as strikes, have also been evaluated. Thus, a rather extensive literature can be found on the experiences that have accumulated in these countries chiefly in the past fifty years. For international readers, a draw-back has been that most of these studies have been reported in national languages in the Nordic countries. One purpose of this literature review has therefore been to bring together in English the essential findings of the main evaluation studies undertaken during the past half century in the Nordic countries.

Further, as part of a Nordic collaborative project on alcohol policy, we have also aimed at exploring whether alcohol policy measures (or other preconditions for changes in alcohol availability or demand) have differential effects across various population groups. In other words, do changes in availability affect men and women, or younger and older people, differently? Or, do they affect moderate drinkers and heavy drinkers differently? This has rarely been addressed in the research literature, but has obvious relevance from a policy point of view. In this review we will summarize the findings that have been reported in earlier evaluation studies with particular emphasis on possible differential effects.

Most of the research presented in this chapter concerns changes in the availability of alcohol, either in terms of sales hours or in terms of which types of alcoholic beverages are allowed to be sold in different types of stores. In addition, Nordic studies on the effects of changes in alcohol prices are reviewed.

The kinds of interventions in availability which we review differ in several regards. Some have been planned with a specific alcohol policy aim (e.g., introduction or ban of medium-strength beer in grocery stores), while others are the result of conflicts on the labor market (e.g., strikes in monopoly stores). There are policy changes both of liberalization (e.g., introduction of medium-strength beer in grocery stores) and of increased restrictions (e.g., Saturday closings or ban of medium-strength beer in grocery stores). The policy changes also vary considerably in how far-reaching they are: from a rationing system with monthly limits for purchase, at the most radical end of the continuum, through Saturday closing of alcohol stores, to changes in the routine inside the alcohol stores.

The effects of a policy change may depend on a variety of individual and societal level factors. One might expect that a prolonged closure of the alcohol store during the weekend would have a stronger effect on people who have difficulties in controlling or planning their consumption than, for example, on those who drink only occasionally. In the same way, a strike at the alcohol store would have a different effect on people who are able to have a stock of alcohol in their homes than on those who are not. The custom of having a stock of alcohol at home is also dependent on culture. A further example of potentially important societal level factors is that a strike would probably have different effects in times of economic depression than in good times. Effects are therefore likely to vary between different consumer groups, between different periods of time, and in some cases even between the Nordic countries.

The majority of the studies reviewed are from Finland, Norway and Sweden, but a few studies from Iceland have also been included. The reports to be reviewed have been tracked down through library searches, reference lists of reports found, and through discussions with key persons in the field. We have excluded unpublished reports.

Rather than reviewing the studies country by country, we have reviewed the studies by intervention type (policy measure or other kinds of interventions), so as to draw comparisons for each type of intervention. We will first review two studies that addressed the effects of individualized control systems: the alcohol rationing or Bratt system in Sweden and the buyer surveillance system in Finland. We will continue by reviewing studies on the effects of changes in alcohol availability in terms of the number of outlets for the sale of alcohol: introduction or abolition of different types of beer in

grocery stores, legalization of beer sales in Iceland, introduction of other types of alcohol outlets, and some other changes in availability. Next, there is a review of studies made on the effects of changes in sales hours, namely the effects of Saturday closings and strikes in alcohol monopoly stores. Thereafter follows a section on the effects of prices on demand for alcohol, and finally a summary of all the results. Discussion about the implications of the results is left to the general discussion of this book.

Effects of individualized controls

The abolition of the Swedish alcohol rationing system

In 1920 an alcohol control system was introduced in Sweden, often referred to as the Bratt system after its creator, Ivan Bratt. The most well known part of the program was the rationing book system, under which each eligible customer was issued a 'ration book' (*motbok*) that limited the monthly purchase of spirits. The allowance depended on various factors such as gender, social and marital status and social stability. The maximum monthly allowance never exceeded 4 litres of spirits (Frånberg 1987, Norström 1987). The system was criticized especially by the temperance movement, which argued that the fixed allowances encouraged alcohol consumption.

The rationing system was abolished in October 1955. Between 1954 and 1956, total consumption rose by 25% and alcohol-related mortality increased even more (Norström 1987, 1992). Drinking offences increased by close to a hundred percent and the annual cases of delirium tremens rose from approximately 160 to more than 700 (Boalt & Euler 1959, Lenke 1985). In order to counteract this, the taxes for alcohol were raised, so that the price of liquor increased by 40% between 1954 and 1958. As a result, the total consumption fell to a pre-1955 level. Rates of alcohol-related harm, however, did not decrease to the same extent as total consumption indicating, some changes in the distribution of consumption (Lenke 1985). Indeed, Norström has shown that both purchases and consumption became more unequally distributed after the abolition, with an increase in consumption among the heavy consumers and a decrease among the moderate consumers (Norström 1987). According to Lenke and Norström, the heavy consumers' share of total consumption rose because of the fact that during the rationing system heavy consumers had purchased alcohol in restaurants or on the illegal market, at a higher price. Even though the price of legal alcohol increased after the abolition of the rationing system, it was still lower than the price in restaurants or on the black market. For the moderate consumers, on the other hand, the cost of maintaining the same consumption rose (Lenke 1990, Norström 1987). This also explained why rates of alcohol-related harm increased rather independently from the total consumption. In conclusion, the rationing system obviously had a curbing effect on heavy drinkers' consumption, and thereby also on alcohol-related harm. It is noteworthy that the radical increase in price for liquor (40%) was less efficient in curbing heavy drinkers' consumption than the restriction in availability.

Buyer surveillance in Finland

Alcohol retail monopoly stores (Alko stores) started to sell alcohol after the end of prohibition in 1932. The liquor legislation forbid the selling of alcohol to alcohol abusers. 'Abuse' had a wide definition including, among other things, chronic heavy drinking, drunk driving, and selling of alcohol to other abusers or under-aged people. In order to enable the surveillance of purchases to enforce this rule, a purchase permit was introduced during the war time. The system spread to the whole country by 1948. All persons possessing the permit were registered, and they were (with some exceptions) only allowed to buy alcohol in one retail outlet. Originally only the days of purchase were stamped on the permit, but later also notes on the amounts bought were added. Additionally, external information such as reports of arrests for drunkenness were added to the register. In 1949 the permit was no longer required for the purchase of table wine and medium-strength beer, and strong wines followed in 1952. There were no maximum quotas for e.g. monthly purchases (only quotas for how much alcohol anyone could buy at a time, which had existed from the beginning). When alcohol abuse was discovered, the abuser was given an information leaflet, was invited to a discussion or an interrogation, or he could be given a warning or finally a temporary sales ban (from 3 months to 1 year). The system had its heyday in 1947 and thereafter it changed and vanished little by little. (Lanu 1956.)

In 1952–53, an ex-post-facto experiment was conducted on the effects of the buyer surveillance system (Lanu 1956). Lanu compared the experimental group (a sample of those 'alcohol abusers' who were exposed to an 'intervention': those who were interrogated, warned, or who had gotten a temporary purchase ban) with a control group ('alcohol abusers' who had not been the target of such intervention measures). There were two sets of experimental and control groups. In the first set, the abusers were identified from the registers but contacted outside of Alko stores. In the second set, customers of Alko were selected in to the groups and interviewed on the spot. In the interviews, consumption in 1949 and in 1952 was inquired about retrospectively. The part of the study which expressly addresses the effect of the intervention was a matched analysis of 110 and 52 pairs of abusers interviewed outside and inside of Alko stores,

respectively. The matching was done with respect to age, sex, marital status, place of birth, place of residence, education, occupational status, and six measures of drinking behavior and degree of misuse in 1949.

According to the results of the matched analysis, there were only small differences between the experiment and the control groups in their consumption and in the measures of alcohol abuse in 1952, and in the changes that had occurred in between 1949 and 1952. In fact, some differences pointed in the direction of the development having been worse in the experimental than in the control group. In other words, the intervention (interrogation, sales ban etc.), which the experimental group had been exposed to in between 1949 and 1952 was ineffective. Because of the small number of matched pairs, no analyses were shown for different subgroups of the population.

There was another ex-post-facto experiment with the buyer surveillance system in the city of Tampere, where the days of purchase were not stamped on the purchase permits during an experimental period (Bruun & Sääski 1955). The purchases of a sample were secretly collected in a month's period and compared to those registered by the same sample one year earlier. Only those customers who had at least one purchase in both one-month periods were compared. The purchases in Tampere as a whole had increased more than those in the whole country (13% vs. 6%; 12% in the study sample).

One-third of the study sample consisted of 'alcohol abusers', here defined as people who had been exposed to sanctions of the buyer surveillance system. Of the whole increase in purchases among the study sample, 95% was accounted for by these abusers. During the experiment, the number of purchases increased even more than the total number of litres of alcohol purchased, while the average number of litres purchased actually decreased. Interviews of 'normal working men' (n=47) indicated that these men did not consider the policy change to have had any effect on them or the society. Interviews (n=32) of alcohol abusers revealed that the policy change had facilitated the purchase of alcohol among the abusers, through the possibility to buy the maximum quota of alcohol allowed several times a day and, as a result of this, through the fact that it was now easier and cheaper to ask other people to make purchases for the abusers (if e.g. they were drunk and hence not able to buy alcohol themselves).

In conclusion, a small matched study could not show changes in alcohol abusers' consumption after they had been exposed to sanctions of the system. The Tampere study showed, however, that the registering of purchases, and hence the threat of sanctions, did affect alcohol abusers' purchases.

Changes in availability through the number of outlets

The majority of Nordic studies on changes in alcohol policy measures relate to changes in availability through an increase or decrease in the number of outlets. We will first look at those where availability was increased by an increase in the number of outlets. Such studies have been done both for outlets for beer and outlets for wine and/or spirits. We will start with the Finnish experience with the introduction of medium-strength beer in grocery stores, which is clearly the one measure that had the most dramatic impact on consumption in the post war era.

Introduction of new types of beer in grocery stores

Finland 1968/1969

A new Alcohol Act came into force at the beginning of 1969 in Finland. Before this, alcoholic beverages (containing 2.8% or more alcohol by volume) were only available in the 132 state-owned alcohol retail monopoly stores (Alko stores) and in the 940 licensed restaurants. Furthermore, the old law had not allowed any Alko stores in rural communities, where there were hardly any licensed restaurants, either. Starting in 1969, medium-strength beer (less than 4.7% alcohol by volume) could be sold in those grocery stores (17,431) and cafes (2,716) which got a license from Alko, and the ban on Alko stores in the countryside was ended. Additionally, it became easier to establish new licensed restaurants. In 1969, the number of fully licensed restaurants increased by 46%. In that year, the number of Alko retail stores also increased by 22%. As a result of all this, sales of alcoholic beverages, when transformed into 100% alcohol, rose by 46%. Beer consumption increased by 125% (medium-strength beer consumption by 242%) and consumption of distilled spirits by 12% (Österberg 1979). The consumption of strong beer continued to increase in spite of the better availability of medium-strength beer, while the consumption of light beer decreased by 50%. In terms of 100% alcohol, this decrease in light beer consumption accounted for 11% of the increase in medium-strength beer consumption in 1969.

The effects of the new law were studied in general population surveys carried out in 1968 and 1969 (Mäkelä 1971). According to Mäkelä's (1970a) results, the *number of drinking occasions* increased in relative terms more among

women (77%) and in the countryside (92% among men, 106% among women) than among men (64%) and in towns (51% among men, 66% among women). Women's share of total alcohol consumption increased from 13% to 18%. Both the relative and the absolute increase in the number of drinking occasions was by far the greatest for those occasions when only 1–4 cl (less than, approximately, 3 drinks) of pure alcohol was consumed. Yet, the contribution of 'heavy occasions' (10cl or more) to the increase in *total consumption* was high for women (32%), and for men even higher (44%) than the contribution of the 'small occasions' (1–4 cl) (40% for men, 53% for women). In another report it was shown that the dominance of Saturday as a drinking day weakened slightly for beer, but not for other alcoholic beverages (Mäkelä 1970b).

In 1969, as compared to 1968, there were about 3 times as many people who had started drinking as compared to those who had quit drinking (Mäkelä 1970c). The proportion of nondrinkers who started drinking was greater in towns (39% among women, 57% among men) than in rural municipalities (women: 21%, men: 40%) and, at least among men, somewhat greater in occupations with low status (women: 28%, men: 50%) than in occupations with high status (women: 25%, men: 33%). The majority of former abstainers who started drinking in 1969 reported drinking alcohol once per month at the most, reported never drinking so that 'you feel it slightly', and reported only drinking light alcoholic drinks. No statistically significant changes in unrecorded alcohol use could be shown (Mäkelä 1970d).

In Mäkelä's analyses in the 1970s, the panel design of the survey was not used. In reanalyses of the data it has been shown that, after accounting for the regression to the mean effect, consumption increased at all levels of volume of drinking, but the increase was, in absolute terms (in litres or centilitres), greater among those with higher initial consumption (Mäkelä 2002a; see also Mäkelä in this book).

Poikolainen (1980) followed the development in alcohol-related hospitalizations from 1968 to 1974, a period when alcohol consumption increased 120% mainly as a result of the alcohol reform. In this period, the male admission rate for alcohol psychosis increased 110%, for pancreatitis 100%, for alcoholism 70%, for liver cirrhosis 20%, and there was a very small increase in alcohol poisonings. Among women the increases were, in general, even higher: for alcoholism 140%, for alcohol psychosis 130%, for alcohol poisoning 90%, for pancreatitis 40%, though there was no increase for liver cirrhosis. The median age of female patients treated for alcoholism decreased from 45 to 38 years and for alcohol psychosis from 51 to 42 years. There were no significant changes for other causes among women or for any causes among men. No other factors (such as number of hospital beds, diagnostic practices, or technical properties of the register) besides increased alcohol consumption could be shown to be important factors causing the increases in hospital admissions. Poikolainen (1980) also refers to statistics on arrests for drunkenness, according to which the period 1969–1975 saw a 160% increase in arrests for drunkenness for all women, a 340% increase for women aged under 18 years, an 80% increase among all men and a 230% increase among men aged under 18 years (Nordic Council 1978). Thus the relative increases in arrests for drunkenness were the largest among women and among the young. Poikolainen also notes that mortality from liver cirrhosis increased by 50%, i.e. more than admissions for liver cirrhosis. The explanation offered for this is that increased consumption affects the prognosis of liver cirrhosis patients faster than it affects liver cirrhosis incidence.

According to cause of death statistics, other types of alcohol-related mortality also clearly increased in connection with the new alcohol law. In 1968 there were altogether 210 deaths from alcoholism, alcohol psychoses and liver cirrhosis (170 of which were from liver cirrhosis). In 1969 there were already 274 such deaths (193 of which were from liver cirrhosis), which corresponds to an increase of 58%.

Changes in the use of non-beverage alcohol in connection with the new alcohol law were studied by a questionnaire addressed to all the municipal police departments and rural police districts in Finland in 1967 and 1969. The police estimates of the number of users of non-beverage alcohol diminished from 1967 to 1969 by about 15% (Pöysä & Mäkelä 1970). Ahlström-Laakso (1975) studied the effects of the new Alcohol Act on alcoholics in three municipalities by interviews in 1968 and again in 1969. Alcoholics' mean consumption did not increase in the two municipalities where their mean consumption was the highest. In the municipality with the 'lightest-drinking' alcoholics, their mean consumption rose through an increase in the frequency of drinking. In all three municipalities the consumption of medium-strength beer increased strongly among the alcoholics (4-fold, 12-fold and 28-fold), but this was offset by a decrease in the consumption of other beverage types. Among those alcoholics who used non-beverage alcohol, it was observed that medium-strength beer both substituted for some of the non-beverage alcohol use and also added to it.

In conclusion, the introduction of the new, more liberal alcohol law resulted in a large increase in alcohol consumption in the whole population. Even though drinking occasions with only light alcohol consumption increased the most, the increase in total alcohol consumption resulted in large increases in hospitalizations and mortality from alcohol-related causes. Women, youth, people living in previously dry areas (in the countryside) and possibly also people in occupations with low status were, in relative terms, affected more than average. All consumption groups increased their consumption, but the absolute increases were larger among those with higher consumption before the increased availability of beer.

There were many municipalities in Finland that did not allow the sales of medium-strength beer in 1969, or which cancelled the permit for sales in the 1970s. In the 1980s and 1990s many of these municipalities cancelled the ban on medium-strength beer, often for economic reasons. A case study was carried out in connection with such a change in Jakobstad in 1993 (Joki & Valli 1994). The most significant effect of the change was seen in the sales of Alko, the alcohol retail monopoly store, which diminished by 30% as compared to the previous year. Neither observations made in public places nor the police records on arrests for drunkenness indicated any significant changes in public drunkenness.

A panel study was carried out among the pupils aged 13–17 years in Jakobstad and in the control town Borgå in 1993 and 1994 (n=1,296 in Jakobstad and n=202 in Borgå; Valli 1998). The total consumption of the young in Jakobstad did not increase, but the increased consumption of medium-strength beer (proportion of total consumption among the young increased from 30% to 44%) substituted for the consumption of other, stronger beverages. The proportion of pupils who had bought beer themselves increased from 4% to 10%, which indicated that the control of the minimum age limit for purchase (18 years) was not good. In the case of the young in Jakobstad, then, an increased availability did not increase total consumption. The author expresses as his opinion that a central cause for this may be that economic factors dictate the consumption of the young more than of the rest of the population and that, according to the survey, the young found it easy to get hold of alcohol even before the liberalization of medium-strength beer.

Sweden: regulation of medium-strength beer

In 1965 a new beer was introduced on the Swedish market, medium-strength beer. This new beer had a maximum alcohol content of 4.5% by volume. The sales of this new medium-strength beer were not restricted to alcohol monopoly stores, as the sales of strong beer were; it was sold also in grocery stores. The strongest beer sold in grocery stores was thereby changed from 3.5 to 4.5 percent by volume, a rather radical change, especially since there were no age limits for purchase. The purpose of the introduction was to encourage consumption of beverages with less alcohol content. Some years later, in the beginning of 1970s, some dramatically presented findings, primarily about youth and their alcohol consumption, raised political alarm. In 1972 an age limit of 18 years was confirmed by law for the purchase of medium-strength beer. Medium-strength beer continued to raise a lot of political interest, and was withdrawn from the grocery stores in July 1977 (Nilsson 1984, Lindén & Nilsson 1984).

A study by Noval and Nilsson (1984) showed that the introduction of medium-strength beer contributed to an increase in the total alcohol sales figures by approximately 15% between 1961 and 1977. In the next three years, following the withdrawal of medium-strength beer from grocery stores, alcohol sales figures went down to approximately the same figures as would have been expected without its introduction. Noval and Nilsson also examined whether the introduction of medium-strength beer changed the trends in consumption of other kinds of alcohol, without reaching any clear conclusions.

Tuominen & Bruun (1966) investigated some indicators of effects of the introduction of medium-strength beer. They compared the figures for arrests for drunkenness and the number of drunk driving cases during three six-month periods, two before and one after the introduction of medium-strength beer (first six months of 1964, 1965 and 1966). The number of arrests for drunkenness showed a moderate increase between the first 6 months in 1965 and 1966 (2.4%), but the increase was smaller than between 1964 and 1965, before the introduction of medium-strength beer (4.1%). Among persons under the age of 21, there was no increase the year after medium-strength beer was introduced, while there was an increase of 13% the year before. Women showed a slightly higher increase after the introduction of medium-strength beer, but the number of cases was very limited. The number of drunk driving cases did not show any increase between the first six months of 1966 and 1965.

The number of arrests for drunkenness decreased by 16% for people in the age group over 15 years in the next five years (1965–1970), while the figures for people aged between 15 and 20 showed a more moderate decrease (SOU 1971:66).

A special study was conducted with the aim of investigating the alcohol consumption of youth in connection with the availability of medium-strength beer. This showed that medium-strength beer was the dominant alcoholic beverage during spring 1977, just before its abolition. At the age of 15–16, half of alcohol consumption consisted of this type of beer. After the abolition, the consumption of less strong beer and of stronger beer increased. This increase did not compensate for the decrease in medium-strength beer, resulting in a decrease in total beer consumption among youth. Meanwhile, wine and liquor consumption were rather stable, so that their share of youth's alcohol consumption increased and total alcohol consumption decreased after the abolition (Hibell 1984a).

Various indicators were examined to measure the harm done by medium-strength beer. Unfortunately, the statistics in most cases only cover the period from 1972 to 1980 which is why only the effects of the withdrawal of medium-strength beer is evaluated. The population was mostly divided by age and gender, and in some cases also by level of consumption. The overall picture is that the abolition of medium-strength beer did not influence alcohol-related harm in any significant way in any group, even though it might have reduced the propensity to intoxication among youth (Hibell 1984b).

An experiment with sales of strong beer in grocery stores in two Swedish counties

The sales of strong beer has been restricted in Sweden to Systembolaget, the state-owned alcohol retail-monopoly stores. In November 1967 an experiment with sales of strong beer (maximum alcohol content of 5.6% by volume) in grocery stores started in two counties. Before the experiment, the highest alcohol content of beer sold in the grocery stores was 4.5%. The experiment was intended to last until the end of 1968, but it was interrupted in the middle of July 1968 due to reports of increasing abuse, especially among youth (SOU 1971:77).

The sales of strong beer increased dramatically within the two counties. During the first six months of 1968, the sales figures increased from 1.4 to 13.5 million litres, or almost ten times compared to the same period in 1967. For the country as a whole, the increase during this period was 26% (op. cit.). It is slightly unclear to what extent the increase in sales of strong beer influenced sales of other kinds of alcoholic beverages. From the first half of 1967 to the first half of 1968, there was a decrease in liquor sales in the two experimental counties of ten percent and of five percent, respectively, compared to five percent and three percent for the two control counties. The wine sales were stable in the experimental counties (down one and 0 percent) while there was an increase in the control counties of seven percent and six percent. The strong beer increase was 1124%, compared to 30% for the control counties. One year later (the first half of 1969), after the experiment was discontinued, the experimental counties still had higher sales compared to 1967 than the control counties, indicating that a short-term experiment could have long-term consequences.

It was not possible to investigate fully how this experiment influenced the consumption of medium-strength beer due to a lack of sales data on the county level. However, because the two counties constitute a substantial part of the population (12% in year 1968, 23% of all persons taken into custody for drunkenness in the country were reported from the two experimental counties in 1968), data from the whole country can be used as an indicator. Data for the country as a whole showed a much higher increase in the sales of medium-strength beer in the time periods just before as well as after the experiment than during the experiment. The authors interpret this to show that strong beer did replace medium-strength beer in the two counties. The authors estimated a total increase of five percent at most in terms of litres of 100% alcohol in the two counties due to the experiment (op. cit.). Variations in the increase in consumption in different population groups were not calculated.

The impact on harms was only assessed in terms of the number of persons taken into custody for drunkenness. These data were provided separately for the whole population and for persons under the age of 21. The data showed a general modest decrease from 1967 to 1968 in the number of arrests for drunkenness among the overall population. One of the experimental counties had a more favorable development than its control county, although with a higher number at the beginning, whereas the other experiment county showed a smaller decrease than its control county. The number of arrests of young people taken into custody for drunkenness was very limited. However, they showed a similar trend, with decreasing numbers in one of the experimental counties and the two control counties. The smallest experiment county was an exception and did not show any decrease but the number of cases was very limited and the result therefore rather insecure (op. cit.).

It should be noted that the experiment with sales of strong beer as well as the period when medium-strength beer was available in grocery stores, occurred during a period of a general increase in alcohol consumption in Sweden, whereas there was a general decrease in arrests for drunkenness in the same period.

Abolition of beer sales in grocery stores

Finland

When medium-strength beer was allowed to be sold in grocery stores and licensed cafes by national legislation in 1969, a permit was required from individual municipalities. This permit could be withdrawn by the local authorities, and in the middle of the 1970s this was done in several municipalities. A case study was carried out in 5 of these municipalities, where the bans on medium-strength beer came into force in 1975–1977 (Mäkinen 1978). Four of the five municipalities had some alternative source for purchasing alcohol; only two of them had a retail-monopoly outlet (Alko store).

Analyses were mainly based on interviews and sales registers (Alko sales in the municipalities cancelling the permits and the surrounding municipalities, and sales of alcohol in restaurants).

Mäkinen observed changes in alcohol sales in the municipalities where permits were cancelled, as well as in the surrounding municipalities, and compared these with those expected on the basis of the time trend before the ban. He estimated that approximately 70% (46%–81%, depending on the municipality) of the alcohol that used to be consumed in the form of medium-strength beer was replaced by other alcoholic beverages. This means that total alcohol consumption was reduced by approximately 8% in the municipalities covered by the study. So even though the *national introduction* of medium-strength beer in grocery stores in 1969 resulted in a considerable addition to consumption, a *local ban* of medium-strength beer in mid-1970s did not reduce consumption very much.

The use of non-beverage alcohol by a small number of heavy drinkers and the use of illegal alcohol increased in two of the 5 municipalities. On the basis of interviews Mäkinen concluded that there was no effect on young people's drinking, but it was observed that in the very youngest age group (below 15 years) it became harder to get hold of alcohol. In municipalities where there were no Alko stores, heavy drinkers had more abstinent days than before. Yet, their total alcohol consumption did not change essentially.

Norway

A number of Norwegian towns and municipalities have at various times, particularly in the 1970s, restricted the availability of beer to beer monopoly outlets. This implied that off-premise sales of beer was only allowed in a single outlet or a very few outlets in the town. The introduction of beer monopolies in the western coastal towns of Ålesund and Kristiansund in 1975 was evaluated by Nordlund (1978). The number of outlets for off-premise sales of beer was reduced from 49 to 2 in Kristiansund and from 67 to 3 in Ålesund, whereas outlets for wine and liquor sales and the number of bars and restaurants licensed to serve beer remained unchanged.

Sales figures showed that beer sales decreased significantly in the first year as a consequence of the reduced availability, but this was compensated for by an increase in sales of wine and liquor, so that total alcohol sales remained at the same level. Compared to the increasing trend in alcohol consumption at the national level during the mid 1970s, a net gain in terms of less consumption (or less increase in consumption) could thus be inferred in the first year after introduction of the local beer monopolies. The reduction in availability of beer, however, concerned only medium-strength beer (up to 4.75%), and although this constitutes the majority of all beer sales, a shift towards more consumption of both light beer and strong beer could be observed in response to the reduced availability of medium-strength beer. Surveys showed that the proportion of people who purchased beer decreased in response to the introduction of the beer monopolies, particularly among women. No changes in home production of beer or wine could be observed, but sales of wine and particularly liquor increased significantly.

During the second year after the introduction of beer monopolies, the trend in beer sales reached a turning point, and in Kristiansund a significant increase in beer sales was observed. Along with this, the liquor sales continued to increase, and thus total consumption increased in the second year after the introduction of beer monopolies. Possible effects on youth were assessed by additional surveys among 15 to 19 year olds, and the findings here were parallel to those from the adult populations, suggesting that there was no change in total consumption, but some shifting from beer towards liquor consumption.

A main conclusion from this evaluation was that a reduction in availability of beer through introduction of beer monopoly outlets resulted in a shift from beer towards other beverages, particularly liquor, but no significant impact on total consumption of alcohol, whether in the adult population or the youth population (Nordlund 1978).

The introduction of a beer monopoly in Tromsø in Northern Norway in 1972 was subject to a brief evaluation based on sales figures only, as was the abolition of the same monopoly outlet in 1975 (Nordlund 1984a). A beer monopoly was then introduced in Tromsø again in 1981 and again evaluated in terms of changes in sales figures (Nordlund 1984a). The findings from this study confirmed the findings from Ålesund and Kristiansund, i.e. introduction of a beer monopoly outlet implied a shift towards less beer consumption and more liquor consumption. However, total alcohol sales increased more in Tromsø than at the national level subsequent to the first introduction of a beer monopoly in 1972. After re-introduction of the beer monopoly in 1981 the increasing trend in beer sales and decreasing trend in liquor sales were turned around, but the effect on total consumption was different, as a small decrease could be observed from 1981 to 1982.

The general picture from the experiences of introducing local beer monopolies is thus that there appears to be a shift from beer consumption to other alcoholic beverages, particularly liquor, but no significant impact on total consumption.

Legalization of beer sales in Iceland

While wine and spirits have been available in Iceland in state-owned monopoly retail outlets and licensed restaurants since the end of prohibition in 1935, the ban on beer with more than 2.25% alcohol by volume was not lifted until 1 March 1989. Even before 1989 duty-free, smuggled and home brewed beer was consumed in Iceland. Different groups had therefore different access to beer and would probably be affected in different ways by the legalization. From 1989 onwards, the sale of beer was restricted to state-owned monopoly stores and licensed restaurants. The restaurant industry had great hopes for the new beverage, and the number of liquor licenses in Reykjavík increased by 47% in one year. Even if the number of licenses increased dramatically, the percentage of alcohol sold in restaurants, bars and taverns remained at the same level as before, 21% in both 1988 and 1989 (Ólafsdóttir 1999).

Total alcohol consumption in Iceland has varied quite a lot since 1988, due to an economic boom which peaked in 1987, followed by a recession which lasted until 1994, and this makes it difficult to estimate the effect of the legalization of beer. Immediately following the introduction, total alcohol consumption rose by 23% from 1988 to 1989, or from 4.48 to 5.51 litres of alcohol per inhabitant 15 years old and over. In 1992 the figure was down to 4.45 litres, followed by a new increase which led to a per capita consumption of 5.56 litres in 1998. The introduction of beer caused a major change in beverage preference to beer from strong spirits and, to a lesser extent, from wine. This change in beverage preference was observed in different demographic groups. These shifts have proved to be lasting, and beer has become by far the most popular beverage type, accounting for 47% of alcohol sales in 1998 (Ólafsdóttir 1999).

The effects of the legalization on drinking patterns were studied in three general population surveys carried out in 1988, 1989 and 1992 (Ólafsdóttir 1999, Ólafsdóttir 1998, Ólafsdóttir et al. 1997). As expected, more people reported that they had drunk beer after the legalization. For men, the proportion of all respondents who reported drinking beer during the year went up from 75% in 1988 to 78% in 1989 and to 85% in 1992. Perhaps the most striking fact in these figures is the high proportion of beer drinkers even before the legalization. For women, the proportion went up from 55% in 1988 to 70% in 1989, before it went down again to 65% in 1992. One ought to consider, though, that these figures do not describe trends in the *amount* of consumption. The survey results indicate that after beer became legal the respondents drank beer only slightly more frequently but in greater quantities per occasion. The survey results also indicate that total alcohol consumption remained at the same level for women while it increased for men.

According to the survey results, the mean number of times of having been intoxicated in the past six months dropped slightly among men, from 9.3 times a year in 1988 to 7.9 times in 1989, and it continued to decrease to 7.7 times in 1992. The mean frequency of intoxication among women remained at 3.5 from 1988 to 1989, but showed a modest increase to 3.9 times in 1992.

Separate youth surveys (13–19 years old) carried out in 1988 and 1989 showed a rise in the proportion of beer drinkers. The increase was highest for girls, among whom the proportion rose from 58.0% to 80.6%. For boys the proportion rose from 72.2% to 89% (Guðmundsdóttir 1998). Moreover, there was an overall increase of 63% in the quantity of alcohol consumed among boys between 13 and 19 years old, compared to an increase of five percent among the girls. This indicates that the relative increase in consumption was largest among boys below the legal minimum drinking age.

Another group likely to be particularly responsive to increased availability of beer were people in the process of developing symptoms of alcohol abuse. The estimated proportion of abusers among men fell, however, from 6.6% to 5.3% between 1988 and 1989, but rose again to 8.1% in 1992. Among women, the estimated proportion of alcohol abusers decreased slightly from 1.6% to 0.5% from 1988 to 1989 and increased to 1.0% in 1992 (Ólafsdóttir 1994). Neither of these changes were significant. An extensive alcoholism treatment system that developed in the 1980s may have affected abuse and decreased drinking among heavy drinkers and abusers (Ólafsdóttir 2000).

The effect of the legalization of beer on criminal offenses is difficult to estimate. The rates of arrests for public intoxication continued to decrease, but the number of intoxicated people being detained without having caused any disturbance rose by ten percent between 1988 and 1989. This might indicate an increased number of problems with drinking among those with prior alcohol problems. No effect on drunken driving or illegal brewing or smuggling was noticed. Police reports point to an increase in assaults and fights in Reykjavík from 1989 to 1991. The records from emergency rooms for patients presenting with injuries caused by violence showed, however, a peak in 1989, which was followed by a decrease in the following two years.

To summarize, the legalization of beer caused an increase in the total consumption of alcohol. Even if a certain substitution effect was discerned, the availability of beer contributed to a rise in the overall consumption. The increase in drinking was particularly pronounced among young people and adult men. A shift in alcoholic beverage preference to beer from strong spirits, and to a lesser extent from wine occurred in all demographic groups. Following a large increase

in the number of liquor licenses, beer became the most preferred tavern drink. Results of analyses based on alcohol-related harm indicators are, however, somewhat inconsistent. In general, the legalization of beer had profound influences on the drinking culture, and was a milestone towards liberalization of the alcohol policy, which for decades had been based on measures to restrict supply of alcoholic beverages.

Opening of wine and/or liquor outlets in individual municipalities

Finland

In the 1950s the idea emerged that light alcoholic beverages (beer and wine) could be sold in the Finnish countryside, which until then had been a dry area without any retail alcohol sales and with hardly any licensed restaurants. An experimental study was launched to evaluate the effects of introducing beer and wine stores. Surveys were carried out in 3 test municipalities and 2 control municipalities first in 1951, just before the opening of the stores. The respondents were re-interviewed in either 1952 or 1953, depending on the municipality. Due to a national liberalization in the requirements for customers to show their purchase permit, strong wines were included in the selection of the stores in the experimental municipalities within a few months after their opening, and they came to dominate the sales (Purchase permits were a part of a buyer surveillance system; see section 2.2 above). (Kuusi 1956, 1957).

Opening new beer and wine stores increased both the volume and the frequency of drinking among men. The estimated effect on the volume of drinking varied among men between 10% and 40%, depending on the municipality. The effects on the frequency of drinking seemed to become stronger, the higher the initial frequency of drinking was. There was no effect on abstainers or infrequent drinkers. This was confirmed by the observation that no effects on either the volume or the frequency of drinking were found among boys (15–19 years old at the first measurement) or women. Regression to the mean effects were not controlled for here, but controlling for them would only have highlighted and accentuated the differential results by drinking frequency. According to Kuusi, the differential effect observed is natural because ‘abolishment of restrictions on the sale of alcohol causes reaction, if any, primarily among those users of alcohol who have previously been forced to adjust their use to the existing sales restrictions’ (Kuusi 1957, p. 179).

Among men who increased their consumption frequency, there was an underrepresentation of men older than 50 years and men in white-collar jobs. It was found that the increasing use of beer and wine reduced both the use of spirits and the use of illicit liquors, particularly among boys and women. The effects of opening the stores on quantities drunk per drinking occasion were small. There was no proper measurement of harmful effects of drinking or drinking to intoxication.

Thus, the opening of Alko stores in a dry area resulted in an increase in the consumption of alcohol, particularly among the more frequent drinkers. The increase was greater among men than among women, larger among middle aged or young adults than among the young or the older population, and larger among blue-collar workers than among white-collar workers.

Norway

In Norway all retail sales of wine and liquor have been restricted to a relatively small number of state-owned monopoly outlets. This number has increased significantly over the past three decades, and on four occasions such openings have been evaluated in terms of possible effects on overall drinking, on distribution of consumption across beverages and (in part) on alcohol-related social consequences. These occasions comprise: the opening of a wine outlet in Notodden in 1961 (Amundsen 1967a; Amundsen 1967b); the opening of a wine outlet in Eidsvoll in 1968 (Amundsen 1973); the opening of two liquor outlets (in addition to previous wine outlets) in Notodden and Elverum and one wine and liquor outlet in Ålesund, all in 1971 (Nordlund 1974); and the opening of three wine and liquor outlets in the county of Sogn og Fjordane in 1991 (Hauge & Amundsen 1994). The openings of these outlets took place in areas with considerable travel distances to other wine and liquor outlets, but on the other hand with fairly good availability of beer in grocery stores.

The first three evaluation studies were based on panel data from both ‘experimental sites’ and ‘control sites’, and respondents were interviewed prior to the opening and then again one year later. Although there are obvious advantages of such a design, a counter-argument is that the attrition rate tends to be high, and it was thus decided to assess possible changes at the aggregate level in the fourth study through two cross-sectional surveys in ‘experimental’ and ‘control sites’.

The evaluation studies from the opening of wine outlets in 1961 and 1968 (Amundsen 1967a; 1967b; 1973) showed that there was a significant increase in the proportion who had drunk wine as well as the frequency of wine drinking in the experimental sites, as opposed to no changes in the control sites. On the other hand, a small decrease in the proportion who had consumed moonshine was found in the experimental sites and a small increase in this proportion in the control sites. Total consumption of alcohol before and after the opening of the wine outlets was not assessed in these studies.

In 1970 and 1971 the number of liquor outlets increased significantly in Norway due to legislative changes, and the opening of three outlets in 1971 was evaluated by Nordlund (1974). Again, very small changes in consumption were found. The findings generally showed that opening of outlets did not increase the proportion of alcohol consumers nor the total consumption of alcohol, but rather tended to imply a shift from moonshine to legal spirits and a small increase in wine consumption. The increased availability also seemed to result in people tending to buy wine and spirits more often, but in smaller quantities each time, given that total consumption did not increase.

The evaluation of opening three wine and liquor outlets in the county of Sogn og Fjordane in 1991 displayed very similar results to the aforementioned (Hauge & Amundsen 1994). In the experimental sites the proportion of respondents who purchased wine and liquor themselves increased significantly, as did the frequency with which people purchased wine and liquor, and this was particularly the case among the older respondents. No significant changes in total consumption of alcohol was found in the experimental sites compared to the control sites, but again there was a small shift from unregistered consumption (home made wine, moonshine and smuggled spirits) towards legal spirits and wine, particularly the latter. Moreover, a small decrease in consumption of beer (sold in grocery stores) could also be noted. With regard to drinking patterns and consequences from drinking, the overall picture was that these did not change much.

Hauge and Amundsen (1994) noted, however, that intoxication frequency increased somewhat among women, as did total consumption among women and older people. Thus, increased availability seemed to have a larger impact on purchase, consumption (and to some extent intoxication) in population groups that traditionally are less mobile. No significant changes in self-reported harm from alcohol consumption nor changes in alcohol-related harm assessed by the police and social services were found in this study. This is consistent with the overall insignificant changes in total consumption and with the fact that alcohol-related harm is mostly seen among men and young people, whereas the small increase in consumption was found among women and older people.

Thus, these evaluation studies have demonstrated consistent findings of insignificant changes in overall consumption due to increased availability of alcoholic beverages, but a shift of beverages towards those that are more available, particularly wine. A general characteristic of these studies however, is, that the evaluation has only assessed possible short-term effects, and hence the long-term effects of increased availability may differ from those observed here.

Other changes in availability

Effects of the number of restaurants

Lehtonen (1978) estimated the elasticity of supply in Finland by including the number of restaurants as an explanatory factor when calculating elasticities for beverage types within the restaurant industry. The estimated elasticity of supply was positive and statistically significant (i.e., more restaurants result in more alcohol sales). The interpretation was that the number of restaurants had been smaller than demand, which had been effective in restricting sales. According to the results, over half of the increase in on-premise alcohol sales from 1962 to 1977 was explained by an increase in the number of restaurants.

Introduction of light beer in Norway

In March 1985 a new light beer (with an alcohol content of less than 2.5%) was introduced in the Norwegian market. The light beer was, due to a taxation gradient on alcoholic beverages, significantly cheaper than stronger types of beer, and it was well marketed when introduced. The total sales of light beer increased by 60% on a 12-month basis, but light beer still comprised only around 6–7% of the total beer sales in litres, and consequently much less in terms of pure alcohol. Time series analyses of the monthly beer sales from 1980 to 1987 suggested that the introduction of this new light beer to some extent may have substituted for some of the medium strong beer sales, although the estimate was not statistically significant (Skog 1988). Thus, it follows that even though there may have been a certain substitution effect, this did not result in a decrease in overall alcohol consumption.

The Swedish state-owned monopoly store system comprises about 400 retail outlets. Traditionally sales have been on an 'over-the-counter' basis. In 1989 an experiment was done with some retail outlets organized for self-service. Skog (2000) evaluated the experiment using the sales figures for the seven experimental stores and seven control stores. In two towns, a customer survey was conducted in addition. Skog found that the self-service retail stores became popular. A 17% increase in the sales volumes occurred in the experimental stores. This increase was permanent. Skog estimated that approximately one-half of the increase was due to customers coming from close-by towns just changing the place of their purchases, and the other half of the increase might be due to increased consumption by the local residents.

Changes in sales hours

Changes in sales hours, and particularly the issue of Saturday closing, has been another policy measure that has been subject to scientific evaluation. Within this category are also the strike studies from Finland, Norway and Sweden. Although they cannot be regarded as policy measures, the experiences that can be drawn from such 'natural experiments', where sales hours have been affected in terms of closed shops for periods of time, may still demonstrate some aspects of the potential impact of decreased availability.

Saturday closings

Finland

In the 1970s, there were two separate Saturday closing trials in Finland. In 1977, an 8-month long trial closure of Alko retail stores on Saturdays was carried out in 10 alcohol retail outlets in an area consisting of 3 municipalities. One of the main reasons for this trial was that intoxicated people caused nuisance to the public and work for the police on Saturdays, soon after the Alko stores opened in the morning. The second experiment took place in 1978, when all Alko stores were closed on Saturdays during four months as a trial. Analyses were based on alcohol sales figures, which were compared to sales in the same time in the previous year.

According to Säilä's (1978a, 1978b) estimates, the 1977 Saturday closing trial resulted in a slight decrease in total alcohol consumption in the trial area (-0.5% in the trial area vs. +1.1% in the whole country), with a larger decrease in the sales through Alko stores (-4.0% vs. +2.6%), an increase in retail sales of medium-strength beer in grocery stores (+6.4% vs. +0.4%) and in on-premise sales of medium-strength beer (+2.4% vs. -1.5%), and no particular effect on on-premise sales of other alcoholic beverages (-1.6% vs. -2.1%). In restaurants, no dramatic change was observed in the number of customers (although at the beginning of the trial the popularity of medium-strength beer cafes increased) nor in the number of intoxicated patrons. According to a questionnaire addressed to the police, use of non-beverage alcohol did not increase during the trial period, but arrests of sellers of illegal alcohol clearly increased during the trial period.

In 1977, data were collected on public drunkenness in the trial area and in a control area in three periods, one before the trial and two during the trial. Owing to a simultaneous increase in police activity, the number of arrests during all weekdays among men increased in both trial periods (seven percentage points and ten percentage points more than in the control area, respectively), but the number of arrests for drunkenness on Saturdays decreased clearly in the first and marginally in the second trial period (the decrease was 22 and 4 percentage points larger than in the control area in the first and second trial periods, respectively). The decrease was particularly evident in the population aged 30 years or older. These decreases would probably have been larger if there had not been any increase in police activity. The number of day-time arrests for drunkenness on Saturdays decreased particularly, by two-fifths, while those on Saturday nights increased. Further, Säilä finds 'reason to assume that instances of arrest involved a lesser degree of intoxication than previously' (p.7). The arrests of the homeless and of those who lived in group accommodation decreased clearly on Saturdays in both of the two periods (but the weekly total increased in the first period, perhaps due to intensified police operations). Säilä concludes that limiting the availability of alcohol calmed indoor public premises and the street scene, although part of this change was due to intensified police activity. Overall, the effects seemed stronger in the first trial period and weaker in the second.

Leppänen (1979) estimated the effects of the 1978 national Saturday closing trial on total alcohol sales. According to his results, total alcohol sales during the whole trial period were 3% smaller than expected on the basis of the model, i.e. there was a 3% decrease in sales because of the closure of Alko stores on Saturdays. Sales of spirits and wine decreased by 6%, and of strong beer by 13%. In total, sales from Alko monopoly stores decreased by 7%. On the other hand, medium-strength beer sales from grocery stores increased by 5%. Säilä (1979) examined the effects of the experiment by studying changes from 1978 to 1979 in monthly rates of harm, without differentiation of the weekday when the incidents

occurred. There were no visible effects of the trial on illegal production or black market sales of alcohol, on alcohol-related arrests (arrests for drunkenness, apprehensions for drinking in a public place, causing trouble in public entertainment events) or on other types of crime (drunk driving, resisting public authority, or assault).

In conclusion, both Saturday closing experiments resulted in a small reduction in total alcohol consumption. In the geographically more restricted trial, there was a clear effect of the trial on arrests for drunkenness on Saturdays, particularly in the daytime and among men aged over 30. The effect on the homeless was also clearly visible. In the national Saturday closing experiment, the effect on harm rates, if any, was not big enough to be visible in data, which were not weekday-specific.

Norway

The Norwegian Parliament approved of a temporary closing of the wine and liquor monopoly outlets on Saturdays throughout 1984 as a trial. The evaluation of the short-term effects (mainly after 4 months and 6 months) would provide the basis for the Parliament's decision on whether Saturday closing should be continued in the years to come. This restriction in sales hours was, for the purpose of the experiment, only implemented in a limited number of towns, and it was evaluated in terms of possible short-term differences in sales, consumption and alcohol-related harm between six 'experimental towns' and six 'control towns' (Nordlund 1984b).

Sales figures from the monopoly stores showed that 1) the total number of buying visits decreased significantly in the experimental towns and a significant proportion of the Saturday sales took place on Fridays instead. 2) The sales in terms of value decreased somewhat, but far less than the number of buying visits, implying that people would purchase less often but for a larger amount each time. The effect on sales in terms of value was mostly immediate, and after the first 4 months the sales were only 3% lower than before Saturday closing; 3) the sales in litres of alcohol decreased only very slightly, and only with respect to sales of liquor. No increase in beer sales was observed.

An evaluation of admissions to a detoxification center in Oslo (mainly serving skid-row alcoholics) showed a significant decrease in the number of admissions on Saturdays and Sundays in 1984 compared to 1983 (Krogh & Ihlen 1984). Among those who were admitted in the first period after Saturday closing in Oslo, a larger proportion reported drinking non-beverage alcohol, illegal spirits, etc. than in the previous year.

Moreover, police records showed that reports of drunkenness decreased significantly in the experimental towns, particularly during Saturdays and nights before Sundays (Hauge & Nordlie 1984). The total number of arrests for drunkenness did not change significantly, but there was a shift from Saturdays to the other weekdays. Reports of domestic disturbance decreased significantly in the experimental towns, yet this decrease was larger on other weekdays than on Saturdays and nights before Sundays, and thus the decrease seems less likely to be attributable to the Saturday closing. Possible effects on drunken driving were also assessed (Irgens-Jensen 1984), but no significant change in drunken driving in the experimental towns could be observed. Thus, a summary conclusion from the various assessments of possible effects of Saturday closing was that there was hardly any overall effect in terms of changes in total consumption or alcohol-related harm in the general population, but an effect among the more marginal group with heavy drinking problems (Nordlund 1984b). The experiment of Saturday closing was not continued beyond 1984.

Sweden

In May 1981 the Swedish Parliament decided that the state-owned alcohol monopoly stores were to be closed on Saturdays during an experimental period between June and September 1981. This experiment was evaluated and the findings suggested that closing the stores had had some effects that had been desired, such as a decrease in public drunkenness, less police intervention in domestic disturbances and a decrease in assaults and disturbance on Saturday nights. No changes in the total consumption were found, nor could any significant effect on damage (vandalism), admissions to emergency rooms or injuries to persons in traffic accidents be demonstrated (Ds 1982:2, Olsson & Wikström 1982, 1984).

During the spring of 1982, the Swedish Parliament decided that the Saturday closing was to be made permanent, starting from the first of July 1982. After the permanent closing a new evaluation was conducted. This time three changes were included in the evaluation; the closing and opening in the experiment period and also the shift to the permanent closing. The last observational data are from the end of 1983, so only short-term effects can be observed. The evaluation was based on a time series analyses, with the trend for Tuesdays and Wednesdays as the control for seasonal variations and trends over time.

The results from the second evaluation were rather consistent with the first one. There were indications of a decrease in the number of purchases at the wine and liquor outlets, but also an increase in amount spent per purchase. No significant

change in the total consumption was observed. The number of drunkenness events where police intervention took place did, however, decrease. The net effect for Fridays and Saturdays was a decline of 10–12%. Police interventions in domestic disturbances dropped by 1–3%, and indoor assaults between persons known to each other fell by 5–12% (2–5% total for all days of the week). Assaults between strangers and located outdoors had a different development. Due to an increase on Fridays, the overall Friday-Saturday net effect was an increase of 4–10% (3–6% total for all the days of the week). Even vandalism showed a moderate increase of 0–3%. (Ds S 1984:8).

From these results, it was concluded that the Saturday closing had had some effect on certain consumer groups, even though the total consumption was not affected. The decline in events of public drunkenness and indoor assaults indicate that heavy consumers were most affected by the closing. Lenke also puts these arguments forward in his analysis (1990).

A survey conducted by the Swedish Institute of Public Opinion Research (SIFO) in connection with the experiment showed that eight percent of the respondents had had to refrain from drinking, or from serving other people alcohol, due to the Saturday closing. For consumers who normally purchased alcohol at the wine and liquor outlets once a month or more often, the figure was 14% (Ds S 1982:2). After the permanent closing, the same question was asked, and then the figure was 21% for people purchasing once per month or more (Ds S 1984:8). Unfortunately this category is very broad, and hence no specific information about the heavy consumers is available. No increase in the use of illegal alcohol was found.

Strikes in the wine and liquor monopolies

Finland

Alko's off-premise retail outlets have been twice shut for several weeks owing to a strike. The first strike lasted for a good five weeks in April-May 1972 and the second lasted for just over four weeks in April 1985. At both times, licensed restaurants, pubs, grocery stores and cafés were open and were supplied in the usual manner. Even though the number of Alko stores was relatively small (approximately 180 and 210 during the 1972 and 1985 strikes, respectively), the share of total alcohol sales that they accounted for was over 50% in both periods, and thus the effect of the strike could be substantial. The effects of the strike have been thoroughly studied. The different studies carried out in connection with the 1972 strike have been summarized by Mäkelä (1980), and most of the results on both strikes have been published as a separate volume (Österberg & Säilä 1991a).

Econometric analyses showed that, during both strikes, total alcohol sales were about two-thirds of the normal expected level (Salo 1991). As to the beverages, which were used as substitutes for the alcohol usually bought from Alko, there was a stronger increase in on-premise sales during the strike in 1972, while in 1985 there was a stronger increase in off-premise sales of medium-strength beer. This is probably due to the fact that the prices in restaurants had risen more than the off-premise price of medium-strength beer in the 13 intermediate years.

The results obtained from surveys about the effect of the strike on consumption were in many respects very similar in 1972 and 1985 (Mäkelä 1991a, Holmila 1991). A large majority of interviewees reported no effects of the strike on their own consumption. Approximately one out of ten women and one out of five men reported a decrease in consumption. This is understandable in light of the low frequency of drinking among the majority of people at these time points. Men reported being more affected than women and, among men, spirits consumption was affected more than beer or wine consumption. The more frequent the drinker, the more his or her consumption was affected, but even among the most frequent drinkers only one-third to one-fifth admitted to reducing their consumption of different beverage types. A small proportion (about one-tenth, or about one-fifth of the most frequent drinkers) reported more frequent use of medium-strength beer and having patronized licensed restaurants more often. The use of strong home brews (*sahiti*) and moonshine increased during the 1972 strike (Mäkelä & Pöysä 1991). There were no indications of major smuggling operations or an increase in sales of black market alcohol.

In connection with the 1972 strike, demographic differences in the substitution processes were also studied (Mäkelä 1991a). Young people (<35 years) more often than older people tried to offset the effects of the strike by more frequent use of medium-strength beer and more frequent visits to licensed restaurants. Farmers and blue-collar workers, who did not have a habit of frequenting restaurants, reported a smaller increase in visiting restaurants than did white collar workers. Blue and white-collar workers reported an increase in the intake of medium-strength beer more often than did farmers.

Murto and Niemelä (Murto 1991, Murto & Niemelä 1991) studied the effects of the strike on homeless alcoholics residing in one shelter in 1972 and in 3 shelters and 3 hostels in 1985. During the 1972 strike, the rate of sobriety first rose, then fell when the alcoholics started to adopt new ways of getting drunk by using either medium-strength beer or

non-beverage alcohol, and then rose again due to, among other things, some of the alcoholics getting tired of non-beverage alcohol. The amounts consumed by the alcoholics diminished. One-fourth of the residents reported being completely unaffected by the strike. In 1985, the effects were quite similar, although fewer resorted to non-beverage alcohol than in 1972.

Arrests for drunkenness decreased by 52% during the strike in 1972, and by 50% in 1985 (Säilä 1991a, Säilä 1991b). Both times there was an after-effect of the strike: in the two weeks immediately following the end of the strike, the rate of arrests for drunkenness was larger than before the strike. In 1985, and to some extent also in 1972, the effect of the strike on arrests for drunkenness was larger on men aged over 30 years than on younger men.

In 1972, the impact was greater on socially integrated drinkers: the decrease in the rate of arrests was larger among those living in private accommodation than among those in group accommodation or among the homeless; the effect was larger on the married than on others, larger on men with high or middle than with low occupational prestige, and larger on those who had some cash on them at the moment of the arrest than on those who did not. Irrespective of these differences, the socially less integrated drinkers were also clearly affected; for instance, rates of arrests among the homeless declined by 30%. In 1985, there was a contrary differential effect, with the rate of arrests declining the least among socially integrated people (which was, in 1985, measured by type of accommodation and marital status).

There are two explanations to the change in the differential effect. The first one is that at the beginning of the 1970s people did not have the habit of stocking alcohol, but in the middle of 1980s Finnish households had stocks of alcohol which, in total, corresponded to 24 days' worth of alcohol consumption in Finland (Österberg 1991a). The stocks are not likely to be distributed equally; the more socially integrated drinkers are likely to have had more stocks. The second explanation relates to the use of non-beverage alcohol. In both years, non-beverage alcohol was involved in arrests for drunkenness more often than usual, but the use of non-beverage alcohol was much rarer in 1985 than in 1972. And the data on people arrested for drunkenness in 1972 shows that the use of non-beverage alcohol is strongly related to the degree of social integration: the more socially integrated drinkers had switched to licenced restaurants and pubs, while homeless alcoholics switched from their typical drink, fortified wine, to non-beverage alcohol.

During the strike in 1985, apprehensions for drinking in public places decreased by two-thirds, and the rate of arrest for resisting an official came down by one-fourth (Österberg 1991b). Cases of drunken driving, arrests for rowdiness at public entertainment events, and crimes of violence all decreased by approximately 20%. On the other hand, cases of illicit manufacturing of alcohol trebled, but the prevalence of illegal possession, transportation and sales of alcohol did not increase. The effects in 1972 were very similar. Also data on treatment and welfare services in 1972 (Mäkelä 1991b) implied that the strike diminished the cases treated for acute consequences of heavy intoxication. Thus trauma caused by alcohol-related accidents and violence treated in clinics decreased, although not by very much; and the number of patients coming to the nurses' reception station at alcoholism treatment clinics decreased.

In conclusion, even though most people reported being unaffected by the strikes, they had a substantial effect on total consumption. The reduction in consumption was particularly evident among men and the more frequent drinkers. The fact that the effect of the strikes on problems due to alcohol intoxication, which are particularly associated with heavy drinkers, was even stronger than the effect on consumption confirms the finding that particularly the heavier and more frequent drinkers were most affected. Österberg and Säilä (1991b, p. 200) conclude: 'restrictions on alcohol availability affect all drinkers including, and perhaps especially, the most frequent drinkers and alcoholics'.

The estimated effects on alcoholics of restrictions on availability which are based on strike studies are likely to be overestimates. In a more long-term situation of reduced availability, alcoholics would be more likely to resort to illicit channels to get alcohol, while in the event of a strike people hesitate to invest the energy, time and money which is required to get these channels organized.

Norway

During October and November 1978 a strike at the wine and liquor monopoly company in Norway affected the wholesale and distribution system and thereby also retail sales of wine and liquor. This implied a reduced availability of wine and liquor for some time, although the effect was somewhat distributed over time, due to sales from stocks already in the retail outlets at the initiation of the strike. The reduced supply implied nevertheless an opportunity to assess possible effects on consumption and alcohol-related harm (described in Horverak & Nordlund 1983).

Correcting for sales trends and the overall distribution of various alcoholic beverages, it was estimated that total alcohol sales were reduced by 25% during the strike period. The reduction in registered sales was in part compensated for by an increase in home production of wine and spirits and smuggled spirits. Taking these substitution effects into account, it

was estimated that the strike implied some 10–15% reduction in the overall supply of alcohol. Further, taking into consideration a certain amount of private stocks of alcohol, it was assumed that the decrease in actual total consumption would be in the range of 5 to 10% (Horverak 1983). Panel data collected during the strike and one year after from a national sample showed that women tended to drink less (and men more) during the strike compared to one year later. Furthermore, consumption of home-produced wine and spirits was higher during the strike, and particularly so among the heavier alcohol consumers.

A study in the detoxification centers and in a protection home for skid-row alcoholics showed that the number of patients admitted to detoxification was significantly reduced during the strike period (Krogh & Ravndal 1983). Much in line with this, the number of police reports of drunkenness, arrests for public drunkenness and police reports of domestic disturbance all showed a significant decrease during the strike period (Hauge 1983). A slight decrease in the number of road traffic accidents and arrests for drunken driving could also be observed from 1977 to 1978 (Hauge & Irgens-Jensen 1981). Possible effects of the restricted availability of alcohol on injuries, accidents and hospital admissions were also assessed (Nesvold & Reigstad 1983, Reigstad et al. 1983); there seemed to be little effect on casualty ward admissions, beyond those specifically related to falls. Data from one Oslo hospital showed that the number of patients admitted due to injuries from accidents was significantly lower during the strike period in 1978, as compared to the corresponding periods in the previous and the subsequent years. Again a marked decrease in accidents due to falls was found during the strike period. Moreover, it was found that the decrease in admissions due to accidents could mostly be attributed to people living in lower socio-economic areas, whereas no significant changes were found for those in higher SES areas.

Horverak (1983) concluded in his summary of the findings from the strike studies that ‘as a result of this very modest decrease (in total consumption), most people did not change their consumed quantity of alcohol during the strike’. He argued that this was due to activities that demand a certain amount of initiative and reasonable financial resources, which could not be expected among, for instance, skid-row alcoholics. In line with this reasoning, it was also found that the strike seemed to have a significant effect in this particular group of consumers in terms of less drunkenness and less of certain types of alcohol-related harms.

Sweden

At the end of February 1963 a strike started at the state-owned monopoly store system. The strike included foremen and managers, which limited the ability of the stores to refill their storerooms. To counteract hoarding, a rationing system was introduced. In the first weeks of the strike, most stores could offer a rather normal supply, but by the latter part of March only expensive wines were left. At the end of March and beginning of April the store system closed down 50 of their 275 stores, and the supply of liquor and wine ran out. During March and April sales of liquor fell 47.3% compared to the year before; the reduction for wine was 7.6%. However the supply of strong beer (3.5–5.625% by volume) was good, which led to an increase in sales during the same period of 384% (Erbacke 1965).

The personnel returned to work again on 17 April for the managers and 13 May for the foremen. Step by step the situation was normalized, but the rationing system was not completely withdrawn until 4 June. The strike did not affect alcohol consumption in restaurants very much. A moderate increase in liquor consumption there (3%) was noticed, while the sales of wine were stable during the first half of 1963. The biggest increase in the consumption in restaurants, 27%, was recorded for beer, even though the supply of beer was maintained during the strike (Erbacke 1965).

The short but strong impact the strike had on the availability of alcohol made it particularly appropriate to investigate short-term effects, especially for heavy drinkers. Bjerver & Neri (1965) examined what effect the strike had on different consumer groups’ alcohol consumption. They compared two groups, moderate consumers and alcoholics. The data was collected through repeated interviews and included the amount and kind of alcoholic beverages consumed and the number of drinking occasions. The drinking patterns for moderate drinkers did not change except for a slight increase in the consumption of strong beer. The drinking patterns of the alcoholics, however, were strongly affected by the strike. They reduced their consumption of all alcoholic beverages, even those that were not affected by the strike (Bjerver & Neri 1965).

In agreement with these results, Fredriksson (1965) found a decrease in police interventions due to drunkenness during the strike. He found that during a one-month long period during the time with least availability of alcohol, interventions went down approximately 50% compared with the year before. The next period showed an increase compared to the previous period but also to the previous year, indicating that the first result was not due to a generally decreasing trend. The decrease was of the same extent for different age groups; even though the number of police interventions due to women’s drunkenness was very limited, they showed the same pattern. There was, however, one exception: the four biggest cities in the south of Sweden. This was explained by the closeness to Denmark.

Torsten Garlind (1965) conducted a small study of the fluctuation of accidents at work at one of the bigger companies in Stockholm during 1960–1963. The number of employees was at that time around 2500 and the annual number of accidents 350. He divided the strike period into two-week periods and found decreases of up to 50% in accidents at work compared to 1962. Compared with the mean for 1960–62, the number of incidents in 1963 was 98% for January–February, 95% for May–June and 62% for March–April. This study is limited to only one company with a limited number of cases, but the results at least indicate that the strike might have influenced accidents at work places.

Another study focused on persons who attended emergency wards in Stockholm's hospitals between 10 April and 18 May 1963. The study included all individuals over the age of 15 who visited an emergency ward after an accident, totaling 887 persons. Goldberg et al. divided the period into two, the first one with low sales figures (26% of 1962's value) and the second one with normal figures (103% of 1962's value). They also divided the cases by pattern of alcohol use between moderate drinkers and those with chronic alcohol damages, based on whether the person had a record at the Temperance Board system. The results showed that the number of accidents increased when the sales figures increased. The number of accidents without any alcohol use were quite stable for the two periods, while the accidents where the victim had alcohol in their blood increased four to five times. They estimated the correlation coefficient between weekly accidents involving alcohol and the weekly alcohol sales figures as $r = 0.94 \pm 0.05$. This pattern was more or less the same for both men and women but the number of accidents for women was much lesser. In the group of male moderate consumers, 6% had alcohol in their blood for accidents in the first period, compared with 12% for accidents in the second period. In the group of men with chronic alcohol damages, 29% had alcohol in their blood in the first period, compared with 49% in the second period. The number of women with chronic alcohol damages was too small for a similar comparison between the two periods (Goldberg et al. 1965).

Andreåsson and Bonnichsen (1965) found that the number of persons suspected of drunk driving decreased during the first quarter of the year. In fact, the first four months showed a decrease of 17.2% compared to 1962, while there was an increase of 7.1% for the period May–August and of 13.7% for the period September–December. These authors also found that the average level of alcohol in the blood was lower during the strike period. Their conclusion was that the decrease was a result of the limited availability of alcohol, even though they admitted the limitations of the data.

Bjerver found that the rate of bed occupancy at Swedish alcohol clinics had been rather stable between 1961 and 1963. The share of beds which were occupied during 1961 and 1962 usually varied around 92%, with the lowest figure during the summer; the figure never went below 82%. The lowest figure during the strike was 68%, in May. The fall in the occupancy rate occurred after the time with the most limited availability of alcohol. The low figures lasted until the end of August, rather a long time after the normalization of alcohol availability (Bjerver 1965). The frequency of visits to one hospital ward for acute alcohol cases in Stockholm showed similar results (Dimberg 1965). The frequencies of patients with alcohol-related diseases in general hospitals or mental hospitals in Stockholm County were also measured, and showed about the same pattern with a radical decrease during the strike (Herner & Åmark 1965).

Several measures indicate that the strike had a radical impact on the alcohol consumption of a group of people with high initial alcohol consumption, while moderate drinkers seem to have been much less affected. This seems to be valid for both women and men. No other differential effects were shown.

Regulation of prices

Regulation of the prices of alcoholic beverages through excise taxes has proved to be a powerful way of influencing consumer behavior (Edwards et al. 1994). Within the Nordic countries, taxes and thus prices on alcohol have been quite high throughout the 20th century (beer and wine prices in present-day Denmark are an exception). The main method used in the Nordic studies on the effects of price changes on alcohol consumption is econometric time series analysis. Effects of price changes are measured by *price elasticity*, defined as a unit change in demand as a response to a unit change in price. The interpretation of a price elasticity of -1.2 for wine, for instance, is that, with other determinants of wine consumption kept constant, a 1% increase in the price of wine caused its demand to decrease by 1.2% in the country and the time period studied. Products which are relatively sensitive to changes in price (an often stated criterion is that the absolute value of their estimated price elasticity is larger than one) are called price elastic, and products which are relatively insensitive to prices are called price-inelastic. Correspondingly, a change of elasticity from the value of -1.0 to the value of -0.8 is referred to as 'a decrease in elasticity'.

Table 1 summarizes the results of those Nordic econometric studies which have presented elasticity estimates by beverage type (models for short-term effects have not been shown). The first observation to emerge from the table is that it is in accordance with the well-established finding (Österberg 1995, Ornstein 1980) that alcoholic beverages have

negative price elasticities. That is, alcoholic beverages are like most other commodities in the sense that when their price increases, their demand decreases and vice versa.

Before making any comparisons between countries or beverage types it should be noted that price elasticities cannot be assumed to be constant parameters. Instead, they vary across beverage types, time periods, countries, population subgroups and depending on the statistical method used. Table 1 shows that, indeed, within one country and beverage type the estimated price elasticities really do vary from one period to another. They also vary within the same period from one study to the next (e.g. Holm & Salo 1989, Salo 1990), and even within one study (Holm & Salo 1989), reflecting differences in the econometric models used and in the variables included in the models.

In spite of the relatively large number of Finnish and Swedish studies in Table 1, it is hard to evaluate whether there have been real differences over time in the price elasticities, or whether the differences are only due to differences in methods and random variation. Ahtola et al. (1983, 1986) specifically estimated the change over time of price elasticity for total alcohol consumption in Finland. According to their estimates, demand for alcohol became less price-elastic from the end of the 1950s (when price elasticity was estimated at -0.95) to the end of the 1970s (-0.7). In the same period, per capita alcohol consumption rose from 2 litres to approximately 6.5 litres. These observations have been interpreted as implying that alcohol has become more like an everyday commodity in Finland (Österberg 1995). Additionally, the level of income has increased in the same period, which is likely to be one explanation for why the price elasticity has decreased. Nyberg (1967, 1970), using data mainly from the 1950s and 1960s, found lower elasticities for vodka than for other spirits. The studies on more recent data do not show so clear differences or show an opposite pattern (Holm & Salo 1989, Holm & Suoniemi 1992). In the period between these studies, vodka has lost to beer the battle for the most popular beverage.

Table 1. Estimated values of price elasticities for beer, wine, and spirits.

hors	Authors	Country & period	Price elasticity			
			Beer	Wine	Spirits	Vodka
	OFF-PREMISE SALES					
	Nyberg (1967)	Finland 1949–1962	-0.2	-1.0	-1.1**	-0.6
	Nyberg (1967)	Finland 1949–1962	-0.5	-0.8	-1.0**	-0.1
	Holm & Suoniemi (1992)	Finland 1962–1987	-0.3	-2.3	-1.2**	-0.8
	Holm & Salo (1989)	Finland 1969–1987	-0.7*	-1.8	-1.0**	-1.2
	Holm & Salo (1989)	Finland 1969–1987	-0.3	-1.6	-0.9**	-1.6
	Salo (1990)	Finland 1969–1989	-0.5	-1.3	-1.0	
	Leppänen (1999)	Finland 1964–1997	-0.4	-1.7	-1.0	
	Horverak (1979)	Norway 1960–1974	NA	-1.5	-1.2	
	Strand (1993)	Norway 1960–1990	NA	-1.3	-0.9	
	Malmqvist (1948)	Sweden 1923–1939	NA	-0.9	-0.3	
	Bryding & Rosén (1969)	Sweden 1920–1951	NA	-1.6	-0.4	-0.1
	Sundström & Ekström (1962)	Sweden 1931–1954	NA	-1.6	-0.3	
	Huitfeldt & Jorner (1972)	Sweden 1956–1968	NA	-0.7	-1.2 (-2.9**)	-0.9
	Assarsson (1991)	Sweden 1978–1988	-1.3	-0.9	-0.9	
	Berggren (1997)	Sweden 1985–1995	-0.8	-0.92	-1.03	
	Trolldal (1998)	Sweden 1986–1995	-1.1	-0.4	-0.4	
	ON-PREMISE SALES					
	Nyberg (1970)	Finland 1949–1969	0.0	-0.7	-0.8	0.0
	Salo (1987)	Finland 1969–1986	-0.9*	-0.5*	-0.9*	
	Leppänen (1999)	Finland 1964–1997	-0.5	-1.2	-1.8	

*These figures are calculated by Leppänen (1999) on the basis of the price elasticities given by the original authors for finer beverage categories.

** The figure for other liquor when vodka ('brännvin' in Huitfeldt & Jorner's (1972) work) is excluded from the liquor group.

For Sweden, Huitfeldt & Jorner's (1972) and Assarsson's (1991) results point to a shift to a higher level in the price elasticity for spirits in Sweden at some time in the 1950s. As has earlier been pointed out by Österberg (1995), such a shift could be attributed to the removal in 1955 of the rationing system in Sweden. It could perhaps even be expected that the elasticities would have become higher, because it is plausible that, other things being equal, elasticities are higher in a situation where alcohol is more readily available than in a situation where the availability of alcohol is strictly controlled.

Nyberg's (1967, 1970), Salo's (1987, 1990) and Leppänen's (1999) separate results for on-premise and off-premise sales of alcohol allow the comparison of these elasticities. Nyberg's data from the 1950s and 1960s point to clearly higher elasticities for off-premise sales than for on-premise sales, but in the newer data this is true only in the case of wines. One explanation for the high estimated price elasticity of wine in Finland is that traditionally most of the wine drunk in Finland has been semi-sweet and not drunk with meals, and hence a price increase for wines can easily lead people to switch to other beverages. Leppänen's (1999) results on cross-elasticities give partial support for this: when the price of spirits increases by 1%, the demand for wine is estimated to increase by 0.74%. The effect of wine prices on spirits or beer was not significant, which may be due to the fact that in Finland the category of wines has been much smaller than that of spirits, and hence the effect of some wine drinkers switching to spirits or beer would hardly be detectable. The price elasticities for on-premise sales of wine were estimated to be lower. This is not surprising, because a much bigger proportion of the wine drinking in restaurants is likely to take place in connection with meals and be less easily replaced by other beverages. If we think of people who have a habit of drinking wine when they eat in a restaurant, an increase in the price of wine may well have a lesser impact on their frequency of going to eat in a restaurant (which would be mostly affected by the total expenses of the meal) and hence on their frequency of on-premise wine consumption than on their frequency of buying wine from a store.

Differences between the three countries in price elasticities are quite small and unsystematic. It seems that the price elasticity of wine in the more recent period may be the smallest in Sweden and the highest in Finland.

Differences by beverage type are quite systematic in the Finnish studies for off-premise sales of alcohol. Price elasticities are highest for wine, then for vodka and other spirits, and the lowest for beer. Norway's estimates for wine and spirits are in agreement with this. The Swedish studies are less systematic but tend to show relatively high estimates for the price elasticity of beer.

The studies reviewed above present price elasticity for three rather wide beverage groups: liquor, wine and beer. Price changes may often be unequal for different brands within a beverage category, which may result in differential changes in consumption depending on whether the price change is more pronounced in the cheap or the expensive end of the price range. The consumers who normally buy more expensive brands have the possibility of adjusting to the price change by changing to a cheaper brand, but those who already consume the cheap brands only have the choice of reducing their purchases. As Ponicki et al. (1997) suggest, this may also result in differential changes by consumer group. If the prices are increased more for the cheaper brands (which was the case in a Swedish tax reform in 1992, then those who favour these brands, e.g. young people and heavy drinkers, will be affected the most.

In addition to econometric analyses, there is another way of getting information on the effects of price changes on alcohol consumption. Major changes in the price of alcohol constitute a 'natural experiment', the effects of which we can directly observe from sales statistics. The most dramatic of such price changes took place in Denmark when there was a shortage of food during World War I. The new price of spirits (aquavit) was 10-fold higher than the former price, and the price of beer was increased by 60%. This resulted in a decrease in per capita consumption from 6.7 to 1.6 litres of absolute alcohol within 2 years. Also the rates of delirium tremens and chronic alcoholism were strongly reduced by this measure (from 27 to 2, and from 12 to 2 per 100,000, respectively) (Bruun et al. 1975, originally Nielsen 1965).

In Sweden, consumption rose approximately 25% after the abolition of the rationing system. In the following years, taxes were raised so that the real price of spirits rose by 28% in 1956 and by another 15% in 1958. This led to a decrease in the total consumption to a level below the 1955 figures (Lenke 1985, Norström 1987).

In Finland, taxes on alcohol were raised in 1975 in order to slow down the rate of increase in alcohol consumption. Consumption had increased 8% per year in 1969–1974, on the average. In 1975, real prices were raised by 10% (prices on the price tags increased by 30%). The result was that the increase in consumption stopped, and in 1975 consumption was even 5% lower than in 1974. (Salo 1987).

Summary and discussion

This review covers a broad spectrum of changes in alcohol policies during a period of approximately fifty years. As pointed out at the beginning, our interest is both in whether there are any patterns in how alcohol policy-changes affect total consumption and, particularly, in whether these changes vary for different groups. In the following we summarize the experiences and discuss the relevance of these results to current and future alcohol policy. Tables 2a–2c present a summary of the main results reviewed above. Results on price elasticities were given in Table 1 and will not be repeated here.

Table 2a. Summary table of effects of interventions concerning individualized controls.

Country & period	Total consumption	Differential effects, drinking patterns and harms
Abolition of the Swedish rationing system		
Sweden 1955	– Increase (25%)	– Heavy consumers' consumption increased most after the abolition – Alcohol-related harm increased relatively more than consumption
Effects of buyer surveillance		
Finland 1949–52, 1955		– No better development in drinking among those abusers who were exposed to sanctions – The end of purchase registering resulted in easier access to alcohol among abusers

Table 2b. Summary table of effects of interventions concerning changes in availability.

Country & period	Total consumption	Differential effects, drinking patterns and harms
Introduction of new types of beer in grocery stores		
Finland 1969	– Strong increase in total consumption (46%) – Sales of medium-strength beer increased by 242%	– Greater relative increase in consumption for women and in previously dry areas – The higher the initial consumption, the bigger the increase. – Frequency of light drinking occasions increased the most – Many abstainers started drinking – Lighter drinking alcoholics' consumption rose, but heavy drinking alcoholics' consumption did not – Alcoholics replaced spirits with beer – A strong increase in morbidity, mortality and arrests for drunkenness – Arrests for drunkenness increased particularly among youth (<18 years) and among women
Finland 1993/94		– No visible effect on public drunkenness – Among the young, beer consumption increased, but not total consumption.
Sweden 1965–77	– Consumption of medium-strength beer increased heavily – Total consumption increased by 15%	– Most popular among youth – No overall or differential effects (by age, gender or consumption level) on harm
Sweden 1967–68	– Sales of strong beer increased by 1,124% – Total consumption rose by ca. 5%	– Persons taken into custody for drunkenness: no clear effect, nor for young people
Abolition of beer in grocery stores		
Finland 1975–77	– Slight decrease in volume	– The young not affected – In some municipalities the use of illegal and non-beverage alcohol rose
Norway 1972, 1975, 1981	– No significant change in total consumption	– Shift from medium-strength beer to other alcoholic beverages – Same for youth – Purchases of beer decreased particularly among women
Legalization of beer sales		
Iceland 1989	– Strong increase in the short run	– Increase in beer consumption more due to increase in quantity drunk per occasion than increase in frequency – Intoxication frequency decreased among men but not among women – Biggest increase in consumption for men – Big increase in consumption for boys (13–19 years old) – Shift from spirits to beer – No significant change in the number of abusers – Increase in persons detained without having caused a disturbance
Opening of wine or liquor stores		
Finland 1951		– Volume and frequency increased among men but not among women or youth – Frequency increased more among frequent drinkers; no effect on non-drinkers – Older men (>50) and men in white collar jobs less affected – Beer and wine replaced spirits and illicit beverages, especially among boys and women – No effect on quantities drunk per occasion

Norway 1961, 1968, 1971, 1991	– No changes	– Slight increase in consumption among women and elderly and in intoxication among women – Purchases: more often but less at a time – Wine consumption increased and use of moonshine decreased – No changes in consequences were observed
Introduction of light beer		
Norway 1985	No effect on total consumption	
Introduction of self-service in monopoly stores		
Sweden 1989	Increase in sales figures of 17%, half of which was due to an actual increase in purchase by local residents.	

Table 2c. Summary table of effects of interventions concerning changes in hours and days of sale.

Country & period	Total consumption	Differential effects, drinking patterns and harms
Saturday closing		
Finland 1977, 1978	– A decrease in sales from monopoly stores and an increase in retail sales led to a slight total decrease	– Arrests for drunkenness decreased on Saturdays, particularly among people aged 30+ years and among the homeless – Illegal sales increased; use of non-beverage alcohol did not – No effects on monthly totals of harm rates
Norway 1984	– Modest decrease in sales of spirits	– Purchases: less often but more at a time – Detoxification centre: a significant decrease in admission on Saturdays and Sundays, and a larger proportion of illegal and non-beverage alcohol – Decrease in police arrests for public drunkenness on Saturdays but increase in the other days
Sweden 1981, 1982	– No change	– Less public drunkenness – More frequent customers most affected – Purchases: less often but more at a time – No change in emergency visits or injuries in traffic accidents – Less domestic disturbances – Increase in outdoor assaults
Strikes		
Finland 1972, 1985	– Sales decreased by one-third	– Few reported being affected – Men were affected more than women – Frequent drinkers were affected more than infrequent drinkers – Alcoholics' consumption decreased – Consumption of strong home brews and moonshine increased – Young (<35) and white collar workers used alternative sources of alcohol the most – Use of non-beverage alcohol increased, especially in 1972 – Alcohol-related crimes decreased – Arrests for drunkenness decreased by one-half; in 1972 more and in 1985 less among socially integrated; more among men aged over 30
Norway 1978	– Sales decreased by one-fourth, consumption by 5–10%	– Increase in home production and smuggled spirits, especially among heavy consumers – Women more affected – Number of patients in detoxification centres decreased – Police reports on drunkenness and domestic disturbances decreased – Decrease in accidents, especially falls and in low socio-economic status areas
Sweden 1963		– Moderate drinkers hardly affected – Alcoholics strongly affected – Effects were similar among men and women – Decrease in police interventions due to drunkenness; no differences between age groups; area closest to Denmark least affected – Decrease in accidents among both moderate and heavy drinkers – Number of patients in alcohol clinics decreased

Overall effects of policies

In the alcohol policies of Finland, Iceland, Norway, and Sweden, the control measures applied have generally been more stringent, the stronger the alcoholic beverage. Hence, higher taxation, higher age limits for purchase and less availability of the stronger beverages have been the general rule, in accordance with a political aim of making people turn to lighter and allegedly less harmful beverages. One interesting exception from this is that in Iceland beer was, until recently, seen as potentially more harmful than other alcoholic beverages, and it was in 1989 that beer sales in Iceland were first generally legalized.

Keeping in mind the rather strict control measures on wine and liquor in the Nordic countries, it is noteworthy that beer has been the beverage in the center of the alcohol policy battle field. The issue as it was implicitly formulated by the political process became: How strong should the beer on sale be and where should it be sold? The major changes in this respect were the introduction of medium-strength beer in grocery stores in Finland and the legalization of beer sales in Iceland. Particularly the Finnish liberalization implied a significant increase in availability of alcohol, and a substantial increase in consumption was also seen in response to this. The introduction of a medium-strength beer in Swedish grocery stores, which implied a significant increase in the availability of beverages with a relatively low alcohol content, not only led to a shift from stronger beer towards a lighter beer, but also to a significant overall increase in alcohol consumption in Sweden. Changes in availability of beer that seem to have been of less impact for total consumption and alcohol-related harm were the abolition of beer in grocery stores in local communities in Finland and Norway. Also, with respect to opening of wine and liquor outlets in local communities, the results from Finland and Norway indicate an increased preference for the beverages more easily available, but no significant impact on total consumption.

Modest increases or decreases in opening hours for the monopoly stores have not shown much effect on the consumption level, either. Experiments with Saturday closing or opening have been carried out in each of Sweden, Norway and Finland without showing great changes in total consumption. More drastic reductions in alcohol availability, such as have been demonstrated in strike studies, have been effective in reducing total consumption. However, the practical implications of this effect are limited, as it is not politically feasible in our part of the world to restrict alcohol availability to such a large extent. A similar argument may be raised with respect to the rationing system, despite its obvious effectiveness in curbing heavy drinking and alcohol-related harm.

Differential effects of policies

What have the Nordic studies taught us about to what extent policy changes affect various population subgroups differently? Many of the evaluations indicate that effects are not homogeneous over the whole population. We will here discuss why this should be the case, and we will summarize and discuss the evidence with respect to three contrasts: heavy versus moderate consumers, youth versus older adults, and women versus men.

A *liberalization* of alcohol policy is likely to have the greatest effect on those individuals and on those subgroups of the population who were restricted by the old policy. A price reduction would affect those people most who, before the reduction, would have drunk more alcohol if only it weren't for the money. The new possibility to buy beer in a grocery store would increase consumption most among those who felt ashamed to use a monopoly store, or who were hindered by a long distance to a monopoly store. The removal of maximum allowances for alcohol would only affect those whose desire for alcohol is greater than the maximum allowance. And, in general, people whose consumption equals their desires for alcohol will be less affected by a liberalization of policy than those whose consumption is, due to the restrictions, lower than their desires.

One of the central mechanisms on which the effects of a policy *restriction* depend is the extent to which people have possibilities to compensate for the reduction in the availability of alcohol with alternative sources of alcohol, whether by resorting to bootlegged alcohol, moonshine or non-beverage alcohol, cross-border trade of alcohol, or on-premise rather than off-premise purchase of alcohol. The feasibility and possibility of resorting to alternative sources of alcohol is often different in different subgroups of the population, and hence it is a central factor in creating differential effects.

The issue of differential probabilities of resorting to alternative sources of alcohol by subgroups of the population was explicitly studied in the Finnish strike study in 1972, and according to the results the young (<35 years) and white-collar workers were most active in using alternative sources, particularly going to restaurants and drinking medium-strength beer. Blue-collar workers did not at that time have the habit of frequenting restaurants, which explains why they resorted less to this alternative. In Sweden, one differential effect of the strike was that the area closest to Denmark was the least affected. The obvious explanation is that people in this area had an easy alternative source of alcohol; they either made trips to Denmark when needed (and probably brought some alcohol with them for friends as well) or they already had stocks of alcohol in their homes from previous trips. When alcohol monopoly stores close on Saturdays, people can in

principle buy their alcohol on weekdays instead. This alternative solution suits people who are capable of planning their life and saving the alcohol bought in one day over to the next day.

Many studies indicated that when availability changes, people with a high initial consumption are the most affected. Several studies gave direct support for this, based on measurement of consumption patterns before and after the change. These included studies made on the abolition of the Swedish rationing system, the introduction of medium-strength beer in Finland, and the opening of alcohol monopoly stores in Finland. In line with this, it was found that during Saturday closing of the alcohol monopoly stores in Sweden and strikes of monopoly stores in Finland, the more frequent customers reported more often being affected by the closing than less frequent customers.

In addition to this direct support, there is also clear indirect support for heavier drinkers being relatively more affected by various policy changes than less heavy drinkers. All studies which addressed the effects of changes in hours and days of sale (Saturday closings and strike studies), as well as some other studies (abolition of rationing in Sweden, introduction of medium-strength beer in Finland, legalization of beer in Iceland) showed effects on harm measures that relate particularly to heavy drinking (e.g., arrests for drunkenness, admissions to detoxification centers, domestic disturbances, and/or accident rates). The close relationships between the interventions and changes in these outcomes indicate that heavy drinkers are particularly affected by the interventions. When availability is radically limited, as in the strikes at the monopoly stores, the heavy drinker seems to be quite strongly affected, whereas the majority reports only small effects.

Particularly in the case of the strike studies, one may ask whether this stronger effect on heavier drinkers would last in a permanent situation. The answer to this question depends on the (time and culture dependent) possibilities of the heavy drinkers and of others to compensate for the reduction in the availability of alcohol with alternative sources of alcohol. The best evidence that the heavy drinkers can be affected also in the long term comes from the Swedish rationing system (the alcohol policy with the most radical intrusion into the market, though allowing an adult male a ration of 4 litres of spirits each month). When it was abolished in 1955, heavy consumers increased their consumption substantially. This indicates that the policy had had an effect on the heavy consumers, and that they had not compensated (at least not fully) with alcohol from other sources.

The possibilities for different subgroups of the population to resort to alternative sources of alcohol also depend on the culture and the country. In Norway, there is a quite common tradition of moonshining (Rossow 2000), which has offered a relatively easy way to get spirits from other sources when the availability from the monopoly has not been sufficient. In countries where moonshining is much less common, the threshold is much higher, as one has to first invest in the equipment and learn the tricks. As late as the 1970s, one alternative source for alcohol in Finland was non-beverage alcohol, but this was the case only among the very heaviest drinkers; one had to be very much in need of alcohol before resorting to this alternative. The two Finnish strike studies are good evidence for this. In 1972, when the socially less integrated drinkers still resorted to non-beverage alcohol and when it was still rare to have any stocks of alcohol at home, the strike had a greater impact on socially integrated drinkers than the less socially integrated drinkers. By 1985, when stocking of alcohol had become more usual and the use of non-beverage alcohol rarer, it was rather the less integrated drinkers who were affected the most.

Drinking and alcohol-related problems among youth have traditionally been of particular political concern. Thus, potential differential effects for young people compared to middle-aged and elderly people are of significant political relevance. After the introduction of medium-strength beer in Sweden, it quickly became the alcoholic beverage most often consumed among youth. In the wake of the abolition of medium-strength beer, young people's total consumption decreased, and yet to some extent beer consumption was replaced with consumption of other beverages. Likewise, after the beer legalization in Iceland, young boys more than others increased their alcohol consumption, with regards to both frequency and quantity. In Finland in 1969, arrests for drunkenness increased particularly among youth (below 18 years). In other cases, however, the total consumption of youth was not affected by the introduction or abolition of medium-strength beer in grocery stores or by the opening of wine or liquor stores (Finland 1951, Finland 1975–1977, Finland 1993, Norway 1972/1975/1981). Also, the effects of Saturday closing and the strikes in Finland were more pronounced in the age group 30 years and older. Because of these differential effects, it is hard to draw any general conclusions on the effects of availability of alcohol on youth. The effect seems to be very dependent on the context. For those people who are younger than the legal age for purchasing alcohol, the issue of increased or decreased availability may be much more complex and more difficult to measure than for the older population.

Whether policy changes have had different impact on drinking and harm for women as compared to men, does not seem to have been a key question in the evaluation studies. To the extent that gender-specific effects have been reported and evaluated, the results are not consistent, but rather tend to diverge. Taken together, the divergent results suggest that possible differential effects of policy measures are context and culture dependent. The study of the opening of liquor and wine outlets in rural Finland in 1951 found that men increased their consumption while women did not. However, eighteen years later, when medium-strength beer was allowed in grocery stores, women accounted for the largest relative increase. This is a clear indication of the importance the social context has in understanding the results of a policy

change. In 1951, the social acceptance of women's drinking was low, particularly in rural areas. At least in some segments of the population, it was still considered somehow shameful to visit the alcohol monopoly store, particularly for women. When alcohol later was introduced into grocery stores in 1969, attitudes had changed. Also, the threshold was much lower for women to buy beer from the same grocery store where they shopped for other groceries, even though women did not traditionally drink beer. The situation may have been similar in the countryside (where the relative increase in consumption was larger than elsewhere), where there were no monopoly stores before 1969, and where attitudes towards alcohol were traditionally much stricter.

One reason for differential effects of policies on men and women might be that the effects of a restricted availability of alcohol may vary according to some factor which is not evenly distributed among men and women. An example of this is the introduction of wine and liquor stores in Norway 1991, which led to an increase in intoxication as well as consumption in women and an increase in consumption among the old. These groups are less mobile and are hence more hindered by restrictions in the physical availability of alcohol or by a long distance to the nearest monopoly store.

We have argued that the social context of a policy change is central with respect to its effects, and particularly with respect to its differential effects. The social context determines the real implications, and hence the effects, of the policy change. However, a general common-sense observation was confirmed by the review: liberalization of alcohol policy has the greatest effect on those whose behavior was most restricted by the policy, which has often meant heavy drinkers. Even though we cannot expect policy changes to have an effect of the same magnitude over time and across cultures, these evaluations from the past can help us in our understanding of what kind of effects can be expected of future alcohol policies.

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CHAPTER 3

Who started to drink more? A reanalysis of the change resulting from a new alcohol law in Finland in 1969

Pia Mäkelä

Background

As a result of a new alcohol law in 1969, sales of alcohol in Finland rose by 46% in a year (Mäkelä et al. 1981). The main focus of this chapter is to examine which groups of the population were most affected in this process: who were the people who changed their drinking habits the most? Which demographic subgroups of the population changed the most, and were infrequent or light drinkers more or less affected than frequent or heavier drinkers?

The answer to these questions serves the purpose of giving us a better understanding of the changes that occurred in 1969. Previously, there has not been any one publication that looked at the change from this perspective. And those articles that offer bits and pieces of such information have not been written in English.

Secondly, an analysis of the processes of change in history may serve the purpose of predicting the future. The restrictive alcohol control policy regimes in the Nordic countries have changed and are under pressure to change further. It has been predicted that this will result in increases in per capita alcohol consumption. Can we learn something from the history about how this increase will be likely to be distributed in the society?

One particularly relevant question is whether an increase in alcohol consumption takes place to a larger extent among those who were originally light or infrequent drinkers than among those who were originally moderate to heavy drinkers. Previous literature on this issue is very scarce, partly because the statistical phenomenon of ‘regression to the mean’, whereby groups defined by initial measurement of consumption tend to converge to the mean even if no real changes occur, tends to bias the results if not properly controlled for. This paper, and a companion one (Mäkelä 2002), accordingly make use of controls for the effects of regression to the mean.

Whose drinking increases when per-capita consumption increases may have important implications for changes in the rates of alcohol-related harm. The extent to which alcohol-related harm increases as a result of a given increase in per capita consumption depends also on the shape of the risk-curve for harm at different levels of consumption: if the risk of harm is a linear function of alcohol consumption, then it does not make a difference with regard to harm rates whether it is light or heavy drinkers who most contribute to the increase. Conversely, if the risk of harm is a strongly increasing function of alcohol consumption, as is the case with liver cirrhosis, for example, then a one-litre increase in consumption would be more harmful for a heavy drinker than for a light drinker.

The main contents of the new Alcohol Act in 1969 were already described in the review (Mäkelä, Rossow & Tryggvesson in this book), but are repeated here. Before 1969, alcoholic beverages (containing 2.8% or more alcohol by volume) were only available in the 132 state-owned alcohol retail monopoly stores (Alko stores) and in 940 licensed restaurants. Furthermore, the old law had not allowed any Alko stores in rural communities, where there were hardly any licensed restaurants, either. Starting in 1969, medium-strength beer (up to 4.7% alcohol by volume) could be sold in those grocery stores (of which there were 17,431) and cafes (2,716) which got a license from Alko, and the ban on Alko stores in the countryside was ended. Additionally, it became easier to establish new licensed restaurants. In 1969, the number of fully licensed restaurants increased by 46%. In that year, the number of Alko retail stores also increased by 22%. Altogether, sales of alcoholic beverages in 100% alcohol rose by 46%, from 3.9 to 5.7 litres of pure alcohol per inhabitant 15 years of age or over. Beer consumption increased by 125% (medium-strength beer consumption by 242%), and consumption of distilled spirits by 12% (Österberg 1979). The consumption of strong beer continued to increase in spite of the better availability of medium-strength beer, while the consumption of light beer decreased by 50% (this decrease in light beer consumption, in terms of 100% alcohol, compensated for 11% of the increase in medium-strength beer consumption in 1969).

In summary, the aim in this chapter is to examine how the changes that occurred in drinking habits — in terms of giving up abstinence or increasing the frequency or volume of consumption — were distributed between demographic groups (sex, age, education, marital status, urbanity of the place of residence) and in relation to the original level of

alcohol consumption. A panel survey of the general population carried out in 1968 and 1969 is used for the purpose. The results about how annual consumption changed as a function of initial level of annual consumption are reported elsewhere (Mäkelä 2002) and are only referred to here. Here we examine more thoroughly how the changes in drinking changed as a function of the initial frequency of drinking.

Data and methods

Data

The Finnish panel surveys were carried out in 1968 and 1969 using face-to-face interviews. The study population consisted of Finnish men and women aged 15–69. Men were over-sampled so that the number of men in the sample was three times as large as that of women. The original sample size was 1,885, of whom 1,823 (96.7%) responded to the first survey and 1,723 (91.4% of the original sample) responded to the second survey. The sample size used in the analyses varied depending on such factors as the age ranges used, and are shown in tables.

Abstinence was measured by a question on whether the respondent had drunk any alcoholic beverages during the 12 months preceding the survey. Those who had not were defined as abstainers.

Annual alcohol consumption was measured by a survey period measure developed by Mäkelä (1971) for the year 1968 survey. It asks about the drinking occasions that have occurred during a specified time period before the interview. The length of the period depends on drinking frequency so that the period is expected to cover four drinking occasions. In the sample, average alcohol consumption increased from 1.6 litres of pure alcohol to 2.5 litres, i.e. by 54%, which is just slightly more than the increase in sales statistics in the same period.

There were two measures available for the frequency of drinking. One was a question about the overall frequency of drinking alcohol, with 9 response categories varying from 'daily' to 'less than once a year'. The other came from the survey period measure: the actual number of drinking occasions reported to have occurred in the survey period was multiplied by a suitable constant in order to get an estimate for the whole year (e.g. when a period of one week was covered, the number of drinking occasions was multiplied by 52). The maximum frequency was set to 365. Because the latter was closer to a continuous measure of frequency, this was selected to be used in the present analysis.

Control data

The regression to the mean effect occurs if we select an extreme group (e.g., heavy drinkers, frequent drinkers, or abstainers) on the basis of one measurement and then measure the same (or even another, correlated) variable for that group in a second measurement. Only if the correlation between consecutive measurements is 1.0 does this effect not occur. For these extreme groups, the second measurement will, on the average, be closer to the overall mean of the sample than is the initial measurement, i.e. the groups regress to the mean. The effect is stronger, the higher the random or within-person variation, and the effect is also stronger the more extreme the group in regard to the initial measurement. (See, e.g., Cambell & Kenny 1999, Bland & Altman 1994a, 1994b, Hayes 1988).

In the current case this means that if no real, long-term changes had occurred, those people who were categorised as heavy or frequent drinkers at an initial measurement (1968) would generally have reported lower or less frequent consumption in the second measurement (1969), and those who were light drinkers or abstainers at the initial measurement would generally have reported higher consumption in the second measurement. Hence, when we try to answer the question of how different consumption groups changed their drinking, we would get biased results if the regression effect were not accounted for.

The approach chosen here in order to control for the regression to the mean effect is to use control data. We have had the opportunity to get access to panel data, with a one-year period between the measurements, from the US and from Norway. It should be a plausible assumption that the regression to the mean effect, which is due to random variation, is similar in these data and in the Finnish data. By comparing the difference between the changes that occurred in Finland and the changes that occurred in the US / Norway, we get a better picture of the changes that occurred in Finland *because of the new alcohol law*.

The first set of panel data comes from the US for the years 1993–1994, from the Impact of Alcoholic Beverage Warning Labels study (directed by Tom Greenfield, and funded by Grant No. AA 08557 from the US National Institute on Alcohol Abuse and Alcoholism) carried out by the Alcohol Research Group at Berkeley. The warning labels originally studied in this panel survey (and other, earlier surveys) were introduced already in 1989. Hence, the change caused by this ‘intervention’ in between years 1993 and 1994 should be small and does not invalidate the use of the data as a control.

The US data set is a national probability sample, carried out with Computer Assisted Telephone Interviewing techniques, with 1,050 respondents aged 18–40 in 1993 (Greenfield & Kaskutas 1999, Greenfield, Graves & Kaskutas 1999). We used those respondents who responded also in 1994 (685, 65.2%). Annual alcohol consumption was measured by the graduated frequency measure, where the annual frequency at five different levels of consumption (12+, 8–11, 5–7, 3–4, and 1–2 drinks per day) was enquired about (here the sum of these frequencies is capped to 365 by cutting down reported frequencies evenly across levels). There were two different measures of overall frequency to choose from: a question on the ‘usual’ overall frequency of drinking, with 11 response categories, and the summed frequency of drinking at different levels, as obtained from the graduated frequency measure. The latter, which is more of a continuous measure, was selected.

The second of the two data sets is a Norwegian panel from 1975–1976. These panel data from SIFA (Statens Institutt for Alkohol- og Narkotikaforskning) in Oslo, Norway, were originally collected in 1975 and 1976 in Molde, which was selected as a control city for an experiment with beer sales in two other Norwegian cities (Nordlund 1978, 1979). The sample included 302 respondents aged 18 and over in 1975, 280 of whom responded also in 1976 (92.7%). Respondents aged 18–69 (n=254) were used in this study.

In the Norwegian survey, alcohol consumption was measured by a quantity-frequency measure where the frequency of consumption was asked for beer, red wine, white wine, fortified wine, home-made wine, spirits, and home-distilled spirits, and a typical quantity was asked for beer, wine and spirits. The measure for the overall frequency of drinking was a sum of these beverage-specific frequencies, with a maximum value set at 365 times a year. The annual consumption of wine was calculated by adding the annual frequencies of the four types of wine and multiplying the sum with the typical quantity for wine. The annual consumption of spirits was calculated accordingly by adding the annual frequencies of ordinary spirits and home distilled spirits and multiplying with the typical frequency of spirits.

Because the Norwegian control data set was much smaller than the other data sets, the categorizations of initial consumption frequency and initial annual volume of consumption were different for different comparisons. In the Finland-US comparison the aim was to get close to a hundred respondents in each category; in the Finland-Norway comparison, close to 50 respondents in each category was the aim.

Results

Change in drinking by demographic factors

The changes in the proportion of abstainers, in median frequency of drinking and in median annual consumption of alcohol that occurred between 1968 and 1969 are shown in Table 1 by several demographic variables: sex, age, type of municipality, education, and marital status. Here the median instead of the usual arithmetic mean was selected to describe the subgroups’ average drinking frequency and volume, because the latter is much more affected by single outliers and by which demographic groups these outliers happen to belong to. This choice makes the results diverge in some respects from those presented by Mäkelä (1970) by sex and type of municipality. The results also depend on whether one looks at absolute (i.e., unit) changes or whether emphasis is put on relative (i.e., percentage) changes. Both are shown in Table 1.

The main conclusion to be drawn from these data is that the increase in drinking between 1968 and 1969 concerned all subgroups of the population, although to a somewhat varying extent. A larger number of women than of men took up drinking, although in proportion to the number of abstainers, which was in both time points much higher among women, the change was bigger among men. Men’s median drinking frequency and volume rose more than women’s, but in proportion to the original volume of drinking, which among women was only a fraction of what it was among men, the increase in volume was more significant among women.

The oldest age group (50–69 years), which initially had the highest proportion of abstainers and the lowest frequency and volume of drinking, was also clearly the most resistant to change. The changes shown in Table 1 for the two other

age groups (greatest increase in frequency in the middle age group and greatest change in volume in the youngest age group), as combined for men and women, do not actually describe the age pattern either among men or among women too well. Among men, the increase was quite similar in the two younger age groups for both the median frequency (+18 and +21 times per year, respectively) and the median volume of drinking (+87 and +96 cl per year, respectively), whereas among women the increase was higher in the youngest age group for both frequency (+8 and +1 times per year) and volume (+19 and +5 cl per year).

Table 1. Proportion of abstainers, median drinking frequency in times per year, and median annual consumption in cl. of 100% alcohol in 1968 and 1969, and the changes in these by demographic factors (N=1,719).

	Proportion of sample	Abstainers,%		Change		Median frequency		Change		Median annual consumption		Change	
		%	1968	1969	units	%	1968	1969	units	%	1968	1969	units
TOTAL	100	28	22	-6	-21	6	12	+6	+100	21	48	+27	+129
Sex													
Women	25	43	36	-7	-16	2	3	+1	+50	3	8	+5	+167
Men	75	13	9	-4	-31	12	30	+18	+150	104	169	+65	+63
Age													
15-29	29	18	11	-7	-39	9	18	+9	+100	39	102	+63	+162
30-49	39	26	21	-5	-19	6	18	+12	+200	30	65	+35	+117
50-69	32	39	33	-6	-15	3	4	+1	+33	6	10	+4	+67
Place of residence													
Urban	49	17	13	-4	-24	12	26	+14	+117	52	104	+52	+100
Rural	51	39	31	-8	-21	3	6	+3	+100	6	18	+12	+200
Education													
Lower	73	35	27	-8	-23	3	6	+3	+100	11	24	+13	+118
Higher	27	9	8	-1	-11	18	39	+21	+117	60	120	+60	+100
Marital status													
Single	26	28	21	-7	-25	6	15	+9	+150	23	65	+32	+139
Married	66	25	19	-6	-24	6	18	+12	+200	30	54	+24	+80
Other	7	47	41	-6	-13	1	2	+1	+100	1	4	+3	300

Finns living in urban municipalities had a much higher level of frequency and volume of drinking than did Finns living in rural municipalities. In absolute terms, the changes or the increases that occurred, were also much higher in urban than in rural municipalities. Relative to the initial median volume and frequency, the changes were almost as big (for frequency) or even bigger (for volume) in rural municipalities. In fact, as reported previously by Mäkelä (1970), the relative change in *mean* frequency was clearly greater in rural municipalities. This slight difference in results when looking at mean or median frequency was because there was a much higher relative increase in the highest group of consumers (whose values affect the mean but not the median) among the residents of rural municipalities than among urban residents.

In 1968, Finns with a lower education (elementary school at the most) were much more often abstainers than were Finns with a higher education, and they drank much less often and much less in volume. It is hardly surprising, then, that in absolute terms the changes in drinking frequency and volume of drinking were, once again, larger in the group with a higher level of consumption, i.e. among those with a higher education. In relative terms, the differences between the groups were much smaller. In both relative and absolute terms, it was the lower educated who gave up abstinence more often.

Finns with a lower education are older, on the average (43 years), than Finns with a higher level of education (35 years), which partly explains their higher rate of abstinence and lower level of consumption. However, even after (direct) age standardization, the results remained similar to those mentioned above.

Comparing the different marital status groups, it is the group 'other', i.e. those divorced and widowed, who have the lowest level of consumption, and they have changed their consumption the least. This is mostly due to the fact that this group is much older, on the average (54 years), than the married respondents (43 years) and particularly the single respondents (28 years). But because there are very few divorced or widowed respondents below the age of 35, age standardized consumption estimates were too much affected by random variation to be usable here.

Change in drinking by initial consumption level

As Tables 2 and 3 (column for Finland: change, T2–T1) show, the *observed* increase in drinking frequency was greatest among those respondents whose initial level of consumption was moderately high. In the group with the very highest initial frequency of drinking, the increase was much lower, or even a decrease (Table 3) was observed. This could be expected on the basis of the regression to the mean effect, and it does not give a good description of the effect of the new alcohol law, without a comparison with the control data. The corresponding changes for Norway and the US actually show a similar pattern (Tables 2 and 3, columns for Norway / US: change, T2–T1).

Table 2. Mean of the overall drinking frequency at Time 1 (T1) in times per year (standard deviation, SD) and changes in the mean drinking frequency in times per year, by categories of T1 drinking frequency, in Finland and Norway. Male and female respondents aged 18–69 who participated in both years.

Frequency category at time 1	Finland			Norway			Change in Finland – change in Norway
	n	T1 mean (SD)	Change T2–T1	n	T1 mean (SD)	Change T2–T1	
0	335	0 (0)	8	74	0 (0)	2	6
0/1–13	596	5 (4)	25	59	6 (4)	8	17
14–47	378	25 (8)	30	60	27 (10)	–2	32
48+	326	113 (79)	16	61	100 (52)	–23	39
All	1,632	25 (53)	20	254	32 (47)	–3	23

Table 3. Mean of the overall drinking frequency at Time 1 (T1) in times per year (standard deviation, SD) and changes in the mean drinking frequency in times per year, by categories of the T1 drinking frequency, in Finland and the US. Male and female respondents aged 18–40 who participated in both years.

Frequency category at time 1	Finland			US			Change in Finland – change in US
	n	T1 mean (SD)	Change T2–T1	n	T1 mean (SD)	Change T2–T1	
0	116	0 (0)	7	186	0 (0)	3	4
01–5	143	3 (1)	16	105	3 (2)	7	9
6–23	235	12 (4)	37	111	11 (4)	27	10
24–50	130	30 (6)	35	103	34 (10)	8	27
51–105	126	68 (16)	47	85	76 (14)	30	17
106+	51	208 (71)	–9	95	228 (94)	–68	59
All	801	27 (50)	25	685	48 (84)	1	24

The difference between the changes in Finland as compared to those in Norway (the last column in Table 2) and in the US (the last column in Table 3) are measures for the differential effect of the new alcohol law in Finland on drinking frequency by initial level of drinking frequency. Both comparisons show that the increase in frequency of drinking was the greatest among those who already initially drank the most often and the lowest among those who were abstainers initially.

Tables similar to Tables 2 and 3 were done for changes in the frequency of drinking in groups defined by the initial level of annual consumption (tables not shown). Results were similar to those in Tables 2 and 3: the higher the respondents' initial annual level of consumption, the greater the increase in frequency of consumption, relative to the U.S. and Norwegian samples.

Elsewhere it has been examined how annual consumption of alcohol changed in categories of initial annual consumption, using the same method to control for the regression to the mean effect as here (Mäkelä 2002). The results showed that consumption increased at all levels of volume of drinking, but the increase was, in absolute terms (in centilitres), the greater the higher the initial consumption.

If the control data sets work as they should, then the comparison of the US data to Norwegian data should show that the changes in the US, after controlling for the regression to the mean effect by the comparison, do not change systematically with the initial level of consumption, and vice versa. This was tested and it was found that there was no systematic change in the US data when using Norwegian data as control or vice versa.

Discussion

We set out to examine which population groups changed their drinking in a situation where a change in an alcohol law led to an almost 50% increase in per capita consumption. The simplest answer is that changes occurred in all groups of

the population: in both sexes, in all age groups and all educational and marital status groups, in both urban and rural areas; among abstainers, light, moderate and heavy drinkers.

However, the changes in all these subgroups of the population were not equal in size. The main pattern that could be observed was that the changes in drinking frequency and volume of drinking were most often the greatest in those groups which initially had the highest level of consumption, i.e. that the changes in a group were often approximately proportionate to the level of consumption in the group. This applied to those demographic groups which had a high level of consumption, and it also applied when groups categorised on the basis of their initial level of consumption were explicitly compared.

A limitation of the research design used here is that the measures of the overall frequency of drinking were different in the groups to be compared. However, the fact that the comparisons of Finnish data to both of the two control data sets yielded similar results and the fact that results on changes in the frequency of drinking and in annual consumption also yielded similar results increases confidence in the results.

Behind the basic pattern that subgroups of the population changed their drinking roughly proportionately to the initial level of consumption in the group, there were some smaller variations. Relatively, women increased their drinking more than did men. Older people were the most resistant to change; among women, it was the youngest age group (15–29) who increased their drinking the most, while among men the increase was approximately the same in the two age groups below 50 years. In rural municipalities the changes were, in relative terms, similar or even larger than in urban municipalities. This was to be expected, since the changes in the availability of alcohol were much greater in rural than in urban municipalities.

To what extent can these results be generalized to apply to other places or time periods? It is quite likely that the general patterns of change found in this analysis may occur elsewhere and in other times as well. Thus it is likely that a significant change in alcohol regulations that has a considerable impact on per capita consumption will affect all subgroups of a population, at least if the population is as homogeneous as in Finland. It is also likely that the changes will be roughly proportionate to the original level of drinking in a group: those who originally drank the most or the most frequently, will also increase their drinking the most. Then again, the extent and direction to which specific groups of the population will deviate from this pattern will probably be context-specific.

As noted in the introduction, the consequences to alcohol-related harm rates of a given increase in per capita consumption depends on which consumption groups most increase their consumption. In many types of harm, e.g. with liver cirrhosis, the risk increases faster for every litre of consumption among heavier than among light drinkers. Therefore, the observed pattern of change, that absolute increases in consumption are the greatest among moderate to heavy drinkers, implies greater eventual harm than would a pattern where the greatest changes occurred among light drinkers.

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CHAPTER 4

Changes in the characteristics of drinking occasions resulting from liberalization of alcohol availability: A reanalysis of the 1968 and 1969 Finnish panel survey data

Heli Mustonen & Reijo Sund

Background

At the onset of 1969, new liquor laws came into force in Finland. They meant a remarkable change in the availability of alcoholic beverages, especially in rural municipalities. At the time, nobody understood how dramatically consumption would increase, because all the economic and other predictions indicated that the increase would remain rather limited, but in fact, sales of alcohol increased by 46% in a single year (Mäkelä 2001). In an earlier chapter (Mäkelä in this book), results from a reanalysis of the 1968–1969 Finnish Alcohol Consumption Study have been presented, which examined which population groups changed their drinking patterns, and who changed their drinking most. In the present chapter, we examine in what way the changes in the alcohol laws are reflected in drinking occasions.

One of the most important justifications of the new liquor laws, as seen by contemporaries, was to put an end to the prohibition which in practice had prevailed in the rural municipalities, and thus, to make rural people (49% of the entire population) more equal with those living in the towns and cities (see e.g., Mäkelä 2001). Earlier studies had also shown that even if illegal alcohol had not had a central role in consumption, at least in the rural municipalities its use was substantial (Kuusi 1956:189). Thus, the new laws were expected to direct drinking from illegal alcoholic beverages to legal ones in the rural municipalities.

Another main target of the new legislation was to develop the assortment of restaurants to meet better the needs of different population groups and rising tourism, and to strengthen the movement towards milder alcoholic beverages (Kuusi 1968, Puntila 1968). In 1968, the sales of spirits was less than half of the total sales of alcoholic beverages for the first time since the State Alcohol Monopoly had been founded in 1932 (Oy Alkoholiliike Ab 1969).

The most important changes introduced by the new legislation in the availability of alcoholic beverages are listed in the following (Oy Alkoholiliike Ab 1969, Oy Alko Ab 1970):

1. *Under the new law, the State Alcohol Monopoly was allowed to open liquor stores in rural municipalities, not only in cities or towns, as had been previously the case. The number of liquor stores increased from 132 to 161 (by 22 per cent) during the year 1969. At the end of the year, 26 out of 443 rural municipalities had gotten a liquor store.*
2. *Under a special law concerning tax class III beer ('The Medium Beer Act') the sales and serving of medium-strength beer (3.71% to 4.69% by volume) was allowed also at food stores and catering establishments. Earlier medium-strength beer had been sold only in the liquor stores or served on licensed premises. At the end of 1969, there were over 7,500 retail establishments selling medium-strength beer and 1,500 catering establishments serving it in cities and towns, whereas the respective numbers in the rural municipalities were almost 9,900 and 1,200.*
3. *Simultaneously with the liberalization of the beer trade the restaurants previously permitted to serve wine and beer only were licensed to serve all kinds of alcoholic beverages. Thus, the number of fully licensed restaurants rose by 39% (from 529 to 735) in the cities and towns and by 95% (from 100 to 195) in the rural municipalities in 1969.*

As the result of these changes in the availability of alcohol, the per capita annual alcohol consumption reported in the sale statistics increased from 2.9 litres in 1968 to 4.2 litres in 1969. The consumption of spirits rose by 12%, wines by 1% and beer by 125%.

Although no dramatic increases in alcohol consumption were expected, a comprehensive panel survey was undertaken by the Finnish Foundation for Alcohol Studies in 1968 and 1969. This survey, carried out by Klaus Mäkelä, laid the foundation for the extensive drinking habit surveys conducted at specific intervals in Finland until today. In addition to

other important topics, Mäkelä also analyzed the frequency of different kinds of drinking occasions and the distribution of consumption between them during the time before and after the introduction of the new liquor laws (a list of Mäkelä's publications based on the 1968–1969 Alcohol Consumption Study is in Mustonen et al. 1999, Appendix 1). Instead of analyzing the individual level data, he based his situational analyses on population estimates, i.e., he calculated how many thousand drinking occasions accumulated to different population groups on the national level during the survey weeks and the percentage increases in the estimates between the two years (Mäkelä 1970).

We use the 1968–69 panel survey to examine changes on the individual level, and we analyze to what extent men and women, and men living in urban and rural municipalities, changed the number of their drinking occasions from 1968 to 1969. We analyze four characteristics of the drinking occasions: the type(s) of beverages consumed, the day of week, the drinking place (home or other private place vs. restaurant), and heavy vs. other drinking occasions. We assume that these characteristics, if any, were affected by the increased availability of alcohol.

Methods and data

On the basis of the 1968 population register, a sample of 1,885 persons from a total of 61 urban and rural municipalities, representing the Finnish population aged from 15 to 69 years, was taken. Women were under-sampled in the 1968 survey, with three men being interviewed for every woman. Those in the sample were interviewed twice, first in October 1968 and for the second time in September–October 1969. The response rate in the first year was 96.7%. In the second year the response rate fell to 91.4%; 429 women and 1,294 men were re-interviewed. The follow-up analyses are based on the respondents who were interviewed at both times (1,723).

The analyses are based on drinking occasions, which had occurred during the week immediately preceding the interview — the so-called one-week occasions. 99.5% of the interviews in 1968 and 98.8% in 1969 were collected in September. Therefore, the occasions had occurred at the end of August and in September. The data consist of 1,061 and 1,742 one-week occasions of male respondents in 1968 and in 1969, and 125 and 221 one-week occasions of female respondents in the respective years.

In both years, detailed information was collected on the drinking occasions. We have used information about the following characteristics:

- 1) The total number of drinking occasions during the week preceding the interview;
- 2) The type(s) of alcoholic beverages consumed during one occasion when classified into the following, mutually exclusive categories: beer, wine and spirits; wine and spirits; beer and spirits; spirits; beer and wine; wine; beer;
- 3) The day of the week classified into the following categories: Monday–Friday, Saturday, and Saturday–Sunday;
- 4) The drinking place classified into the following categories: home and other private places, restaurant or other public places, other places (outside, in car, on train etc.)
- 5) The division between heavy ($BAC > 0.1\%$) and other drinking occasions was based on the blood alcohol concentration reached during the occasion. Alcohol concentration was calculated by using data on total alcohol intake during the drinking occasion, the duration of drinking and the respondent's body weight, a detail that was asked separately.

We analyzed the changes in the drinking occasions by gender and for men also by the type of municipality (urban and rural). The difference in the number of different types of drinking occasions for each respondent before and after the new legislation was used to measure these changes.

In the case of a skewed distribution, a suitable test to see if the members of a pair differ in size is the Wilcoxon signed-ranks test. The null hypothesis for this test is that the difference between the members of each pair has the median value equal to zero. This is a non-parametric test and the exact p-value can be calculated by simulation.

We were also interested whether the changes were similar in different subgroups (such as urban vs. rural) or not. It is possible to test this by using a standard two-sample test on the difference variable. We chose to use a non-parametric permutation test (Pitman's test) with a null hypothesis that 'the differences in subgroups are similar'.

In order to describe the changes in the different characteristics of the drinking occasions, we divided the number of drinking occasions into different groups. In other words, we calculated the number of certain types of drinking occasions for each individual and tested the significance of the change by using the procedure described above.

However, there are some drawbacks, which must be kept in mind when interpreting the results. First, the change is measured only for one type of drinking occasion at a time. For example, there could be a result that the number of ‘type-1’ occasions has increased and the number of ‘type-2’ occasions has decreased, but it is not valid to make conclusions about the relations between ‘type-1’ and ‘type-2’ occasions for any individual. A more advanced statistical modeling is needed to describe these kinds of relations.

Second, to test things, which are almost the same by using the same data set results in the problem of multiple comparisons (see, e.g., Tukey 1991). In other words, the obtained p-values may be deceptively significant, because the significance level is valid for a one-test situation. In principle, different kinds of corrections can be made to the p-values. For example, the so-called Bonferroni corrected p-values can be easily obtained by multiplying each p-value by the number of the same tests done. In spite of these reservations, we decided to report the non-corrected p-values. In other words, the reported p-values must be interpreted in an exploratory way: a smaller p-value means a more significant difference, but there is no specific significance level. In practice, the situations with meaningful differences can be easily seen from the results.

Results

Total number of drinking occasions

Among a notable part of the male (46%) and female (69%) respondents, no changes occurred in the number of drinking occasions from 1968 to 1969 (Table 1). Yet, it was more common to increase drinking occasions than to decrease them. A fifth of the female and more than a third of the male respondents increased their drinking occasions. The average number of drinking occasions increased both among men and women from 1968 to 1969, but the increase was greater for men. Among men, the increase was larger in the urban municipalities, but the difference between the urban and rural municipalities was not statistically significant when measured by the number of drinking occasions. Had a proportional measurement been used, the increase would have been much greater for rural men because the pre-legislation-change drinking frequency for them had been significantly smaller.

Table 1. Changes in the number of drinking occasions from 1968 to 1969 by gender, and for men by type of municipality.

	Proportion of respondents			Mean number of drinking occasions				
	Decrease (%)	No change (%)	Increase (%)	In 1968	In 1969	Change from 1968 to 1969	p-value of the change	p-value of gender and urban-rural differences in the change
Women	8	69	22	0.30	0.51	0.22	<0.00001	0.00043
Men	16	46	38	0.84	1.35	0.51	<0.00001	
Urban	20	38	42	1.14	1.69	0.55	<0.00001	0.225
Rural	13	53	34	0.54	1.01	0.47	<0.00001	

Type of beverage

Of all the possible combinations of alcoholic beverages during a drinking occasion, only the mean number of beer-only and spirits-and-beer occasions increased among women. For men, even the increase in the mean number of wine-and-beer occasions was statistically significant, but these occasions were uncommon during both survey years.

Table 2 shows the most remarkable change in the drinking occasions from 1968 to 1969: both men and women increased their beer-only occasions significantly more than occasions of any other beverage combinations (all combinations not shown in the Table). Men increased their beer-only occasions to a larger extent than women did. In both the urban and rural municipalities men increased their beer-only occasions at about the same magnitude.

Table 2. Changes in the number of drinking occasions from 1968 to 1969, by type of alcoholic beverage, by gender, and for men by type of municipality.

	Proportion of respondents			Mean number of drinking occasions				
	Decrease (%)	No change (%)	Increase (%)	In 1968	In 1969	Change from 1968 to 1969	p-value of the change	p-value of the gender and urban-rural differences in the change
Spirit and beer								
Women	0	97	2	0.01	0.03	0.02	0.00579	0.0064
Men	6	84	10	0.10	0.16	0.06	0.00006	
Urban	9	78	12	0.16	0.23	0.07	0.0043	0.18
Rural	3	90	7	0.04	0.08	0.04	0.0008	
Spirit-only								
Women	5	86	6	0.07	0.08	0.00	0.34	0.31
Men	12	76	12	0.23	0.22	-0.02	0.23	
Urban	12	74	14	0.23	0.24	0.01	0.27	0.071
Rural	13	78	10	0.24	0.19	-0.05	0.071	
Beer-only								
Women	5	80	15	0.11	0.31	0.20	<0.00001	0.00002
Men	11	59	30	0.38	0.84	0.46	<0.00001	
Urban	15	51	34	0.57	1.04	0.47	<0.00001	0.48
Rural	5	68	27	0.19	0.65	0.46	<0.00001	

Table 2 also shows that both among men and women the number of spirits-only occasions did not change. These even show a decreasing trend among rural men, but the difference between the study years was not statistically significant. The urban-rural difference among men was not statistically significant.

Day of week

Both weekday and weekend drinking occasions increased from 1968 to 1969 (Table 3). Monday–Friday occasions increased more than weekend occasions, and for men these increases were greater than for women. No gender differences can be seen for the weekend drinking occasions. Both urban and rural men increased the average number of weekday and weekend occasions at about to the same extent. Men living in the rural municipalities increased their Saturday occasions more than urban men did, but the difference was not statistically significant.

Table 3. Changes in the number of drinking occasions from 1968 to 1969, by day of the week, by gender, and for men by type of municipality.

	Proportion of respondents			Mean number of drinking occasions				
	Decrease (%)	No change (%)	Increase (%)	In 1968	In 1969	Change from 1968 to 1969	p-value of the change	p-value of gender and urban-rural differences in the change
Monday– Friday								
Women	7	80	13	0.15	0.27	0.11	0.0033	0.00091
Men	14	58	28	0.47	0.79	0.32	<0.00001	
Urban	17	50	33	0.64	0.99	0.33	<0.00001	0.23
Rural	10	67	23	0.31	0.60	0.29	<0.00001	
Saturday–Sunday								
Women	7	80	13	0.14	0.25	0.10	<0.00001	0.040
Men	14	58	28	0.36	0.54	0.18	<0.00001	
Urban	16	53	31	0.50	0.68	0.18	<0.00001	0.49
Rural	10	66	24	0.24	0.41	0.18	<0.00001	
Saturday								
Women	5	83	12	0.10	0.17	0.07	0.00009	0.27922
Men	12	67	21	0.25	0.34	0.09	<0.00001	
Urban	16	62	22	0.36	0.42	0.06	0.0080	0.060
Rural	9	72	19	0.16	0.27	0.11	<0.00001	

Drinking place

After the new legislation had come into force, drinking occasions at home or at other private places increased more than occasions in restaurants or other public places (Table 4). Both women and men increased their drinking occasions at home or at other private places, whereas only men increased their drinking occasions also at restaurants and other

public places. Among men, the increases in the private and public occasions were at about the same level in the cities and towns and in the rural municipalities.

Table 4. Changes in the number of drinking occasions from 1968 to 1969, by drinking place and by gender, and for men by type of municipality.

	Proportion of respondents			Mean number of drinking occasions				
	Decrease (%)	No change (%)	Increase (%)	In 1968	In 1969	Change from 1968 to 1969	p-value of the change	p-value of gender and urban-rural differences in the change
Home or other private place								
Women	8	71	21	0.22	0.43	0.21	<0.00001	0.10
Men	15	55	30	0.60	0.91	0.31	<0.00001	
Urban	20	47	33	0.79	1.09	0.30	<0.00001	0.41
Rural	11	63	26	0.41	0.73	0.32	<0.00001	
Restaurant or other public licensed place								
Women	2	94	4	0.05	0.06	0.01	0.28	0.0022
Men	7	78	15	0.17	0.30	0.13	<0.00001	
Urban	11	71	18	0.27	0.43	0.16	0.00013	0.16
Rural	4	85	11	0.07	0.17	0.11	<0.00001	
Other place (outside, in car, on train etc.)								
Women	1	98	1	0.02	0.01	-0.01	0.34	0.11
Men	4	90	6	0.07	0.09	0.03	0.042	
Urban	4	90	5	0.08	0.09	0.01	0.28	0.17
Rural	4	90	6	0.05	0.09	0.04	0.021	

Heavy drinking

The 'other-occasions' increased clearly more than heavy-drinking occasions from 1968 to 1969 (Table 5). Both men and women increased their mean number of heavy drinking occasions, but the change was barely greater than it would have been just by chance. The situation was the same when comparing urban and rural men.

Table 5. Changes in the number of drinking occasions from 1968 to 1969, by heavy vs. other drinking occasion and by gender, and for men by type of municipality.

	Proportion of respondents			Mean number of drinking occasions				
	Decrease (%)	No change (%)	Increase (%)	In 1968	In 1969	Change from 1968 to 1969	p-value of the change	p-value of gender and urban-rural differences in the change
Heavy								
Women	1	96	3	0.02	0.04	0.02	0.017	0.34
Men	11	76	13	0.23	0.26	0.03	0.030	
Urban	13	71	16	0.31	0.35	0.05	0.070	0.33
Rural	8	81	10	0.16	0.19	0.03	0.11	
Other								
Women	9	70	21	0.28	0.48	0.19	0.00002	0.00072
Men	14	51	35	0.60	1.06	0.46	<0.00001	
Urban	19	42	39	0.82	1.31	0.48	<0.00001	0.30
Rural	10	59	31	0.38	0.81	0.43	<0.00001	

Conclusions

In this chapter we have examined to what extent men and women increased their various drinking occasions as the result of the much augmented availability of alcohol after the new alcohol laws had been introduced in the beginning of 1969 in Finland. We have used a panel survey conducted in 1968 and 1969. In addition to examining the change in the total number of drinking occasions, changes in the following characteristics of the drinking occasions were analyzed: type(s) of beverages consumed, the day of week, the drinking place, and heavy vs. other drinking.

Both men and women had increased almost all types of drinking occasions in 1969. The increases were larger for men than for women. There were no notable differences between men living in the urban and rural municipalities. There are, however, some important exceptions to these general findings:

The number of spirits-only occasions remained at the same level from 1968 to 1969, and they even showed a decreasing trend among the rural men. At the same time, however, drinking occasions combining beer and spirits had increased among both genders and among both urban and rural men. We could not determine whether beer was consumed after the drinkers had run out of spirits, or if the shift of beverages had taken place in the other direction.

Only men had increased their drinking occasions at restaurants or other public licensed places, whereas both genders had increased their drinking occasions at home or at other private places.

Men and women had increased their weekend occasions to about the same extent.

Both men and women had increased their heavy drinking occasions to about the same extent.

All in all, the new alcohol legislation resulted in remarkable increases in drinking occasions. The occasions with the most significant changes were those of other-than-heavy-drinking occasions, beer-only occasions, drinking occasions at home or at other private places, and weekday occasions. The increases caused by the new laws were additive, i.e., increases in certain types of occasions did not result in significant decreases in some other types of occasions. Only rural men seemed to substitute their spirits-only drinking occasions to a small extent with beer-only occasions. On average, after the new laws drinking started to become more an everyday phenomenon both among men and women in Finland.

It may appear surprising that the changes in the number of occasions were not significantly different between urban and rural men. Considering the small number of retail places and premises serving alcohol in the rural municipalities prior to the new legislation, one might have expected to see a catch-up phenomenon, i.e., larger increases in the countryside. It should be realized, though, that in this chapter we have examined the increases in the drinking occasions in absolute terms. Had we presented proportional changes, the picture of the changes would have been notably different, because the 'baseline' number of drinking occasions differed significantly, for example, between urban and rural men. Consequently, increases of the same magnitude in the absolute numbers of drinking occasions among both rural and urban men signify much larger proportional increases among the former group of respondents. Only the average number of spirits-only occasions had been at the same level for both groups of men in 1968. The situation is similar with respect to the genders, albeit to a lesser degree, because the absolute numbers of different occasions had been smaller for women than for men.

We do acknowledge that it may be valid to examine also proportional measurements, because they reflect what is happening to the differences between two or more groups — whether the gap is becoming wider or narrower. Nonetheless, we feel that absolute changes capture better the essence of the developments, which resulted from the new legislation introduced in the late 1960s in Finland. The absolute figures reflect the response of the various population groups to the changing situations. Thus, our findings lead to a paradox: researchers having confidence in proportional measures would conclude that rural men increased their drinking occasions more than urban men, but this happened because the former used the new distribution channel of alcoholic beverages very much to the same extent as the latter.

The increased availability of alcoholic beverages was not only a quantitative but also a qualitative change. Prior to the legislative reform, legal alcohol was sold only in liquor stores in towns and cities or in licensed restaurants. Even though the new laws brought liquor stores to the rural municipalities (in the short term only to a small number of them) and increased the number of licensed restaurants and other premises serving alcohol, the profound change was the introduction of medium-strength beer in thousands of ordinary stores. While making purchases at a liquor store or drinking at restaurants were still rather controlled situations in late 1960s Finnish society, ordinary stores selling beer made purchases of alcoholic beverages a much more common-place event, and on relatively equal terms in both the rural and urban municipalities.

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CHAPTER 5

Legalizing beer in Iceland: its effects on alcohol consumption in times of recession

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Introduction

The Icelandic arrangement to ban beer with more than 2.25% alcohol by volume strength, but to authorize the sale of other and stronger alcoholic beverages, is an example of the varied measures the Nordic countries have applied for the purpose of controlling alcohol consumption. This arrangement is further notable because the prohibition of beer was so long lasting, having been enforced for about three-quarters of a century when it was finally repealed on 1 March 1989. The use and availability of alcoholic beverages in Iceland have always been limited for socio-political and geographical reasons. Alcohol policy has been restrictive, including a period of prohibition from 1915 to 1935. When prohibition of wine and spirits was lifted, beer was still prohibited. This policy was based on the theory that beer, as the lightest alcoholic beverage, would be a stepping stone to other and stronger alcoholic beverages. Correspondingly this measure was supposed to prevent young men from drinking.

When the ban on beer was lifted it became a major alcohol policy event, highlighted in the mass media and receiving a great deal of attention in the society. In a Nordic perspective, this change in alcohol availability is indeed as extensive as the Finnish alcohol reform of 1968, and as the introduction of medium-strength beer in grocery stores in Sweden in 1965.

The new beverage was a medium-strength beer with approximately 5.0–5.3% alcohol by volume. In order to emphasize that the new beverage was an alcoholic beverage, the pricing of beer per unit of alcohol was set no lower than the price for wine and spirits. The legal age limit for purchasing beer was the same as for wines and spirits, 20 years. In the same way as advertising wines and spirits is not legal, beer advertisements were also prohibited. Such a restriction, however, did not seem to hinder huge campaigns of advertising the brand names of beer on the pretext of legally advertising light beer. Distribution of beer was to follow the same regulations as for other alcoholic beverages. Beer could, therefore, only be sold in monopoly stores and in licensed restaurants, pubs or cafés. Retail sale of distilled spirits and wine have been controlled by a state monopoly, the State Liquor and Tobacco Monopoly (ÁTVR).

Indeed, there were great geographical differences within Iceland in alcohol availability, both regarding retail and on-premise outlets. In 1988, there were six monopoly stores located in Reykjavík, and as few as 11 outlets were distributed throughout the rest of the country. In the following year, one new monopoly store opened in Reykjavík and another outside the capital. A larger increase took place in the number of liquor licenses. From 1988 to 1989, liquor licenses in Reykjavík increased by 49%, and the rise amounted to 16% in other parts of the country. But although the number of liquor licenses increased so dramatically, the percentage of alcohol sold in restaurants, pubs and cafés remained at the same level as before, 20% both in 1988 and 1989 (Ólafsdóttir 1993).

Even if it was not legally on sale, beer was consumed in Iceland before March 1989 in the forms of duty-free, smuggled and home-brewed beer. Access to beer was limited to rather diverse groups: frequent travellers (often found among the higher social groups and the young), seamen, fishermen and aircraft crews. People belonging to these groups were considered to be in a privileged position by having the opportunity to buy limited quantities of beer. However, buying a stock of beer could be an indication of illegal behavior. Drinking beer could, therefore, give a questionable message and its value, as a mark of distinction, was low.

The official alcohol statistics are exclusive of duty-free alcohol; beer was not recorded in the statistics until it was on sale in the monopoly stores. Therefore, there are great difficulties involved in estimating how much beer was drunk before the sale was legalized. In the mid-1980s an attempt was made to estimate the quantity and composition of the unrecorded alcohol consumption (Guðmundsdóttir 1990). Information on the main categories of unrecorded alcohol was gathered from surveys, official statistics and by interviewing key persons. The study found a general tendency towards a gradual increase in the unrecorded consumption of alcohol. The main contributory factor was the large increase in foreign travel by Icelanders, who brought back duty-free alcohol or alcoholic beverages bought abroad. A decrease in smuggling was assumed and a reduction in homemade alcohol was reported. When beverages containing less than 2.25% alcohol by volume strength are excluded from these estimates, the unrecorded alcohol consumption

seemed to be a little less than a quarter of the recorded alcohol sales. As a matter of fact, spirits, rather than beer, was the biggest component of unrecorded consumption.

Iceland was among the countries that had doubled their per-capita alcohol consumption from 1950 to 1985, in the so-called post-war drinking binge (Smart 1989). In this period, increased affluence led to a rise in consumption of alcoholic beverages, new attitudes to alcohol and changes in beverage preferences. When beer was introduced at the end of the 1980s, alcohol consumption was still rising. The introduction of beer also had a strong symbolic value in signaling the rise of a new drinking culture, and created an opportunity for new social distinctions. Beer as a new beverage could be expected to become a tool to show a new drinking profile, distinct from the traditional drinking habits.

As a counterbalance to these changes in the drinking culture, a drop in disposable household income per capita, followed by fluctuations, occurred in the years following the legalization of beer.

In this study, we will examine the impact of the legalization of beer sales on the total alcohol consumption, and the effects on the alcohol consumption of different population groups.

Data and methods

The analyses are divided into two parts. The first is a time-series analysis assessing the impact of the introduction of beer sales in the state monopoly stores in 1989. The time-series analysis is based on a technique developed by Box & Jenkins (1976), often referred to as ARIMA-models. The time series includes sales of alcoholic beverages as the outcome variable (dependent variable) and the beer introduction (legalization), represented by a dummy variable (coded 0 before the intervention 1950–88, and 1 thereafter) as an input variable (independent variable). Also, disposable income is included as an input (independent) variable. In this kind of intervention — or interrupted — time-series analysis it is important not to limit the time period to only a few years before and after the intervention, since this would involve difficulties in deciding whether a change after the intervention is within ‘normal’ fluctuations in the time series or not (see also Ramstedt in this book). The time period is 1950 to 1999.

The main analyses conducted in this study, however, are not based on time series but on data from nation-wide surveys collected in 1988, 1989, and 1992 (in October each year). The surveys were conducted in order to follow the changes in Icelandic drinking habits following the legalization of beer. In each of the three years, a questionnaire was sent out to the prospective respondents. In total there are six surveys, three directed to the adult population (20–69 years) and the three others to adolescents (13–19 years of age). In each of the six samples the list of respondents was drawn from the central population register. This register lists every Icelandic citizen currently living, with their current address (see also Ólafsdóttir et al. 1997). In this analysis the adult and youth survey for each of the three years are combined into a larger sample. For comparative reasons, the 13–14-year olds have been excluded from the present analysis, so the samples represent the population between 15 and 69 years of age. Data for the 15–19 years old are weighted down in the analysis, as the samples in the youth surveys were proportionally larger than the adult samples. The size of the samples comprising 15–69-year-olds was 1,195 in 1988, 1,118 in 1989, and 1,163 in 1992. The response rates for the adult samples were around 75% and for the youth samples around 80%.

The questionnaire included items on demographic variables, amount and patterns of drinking, alcohol-related problems and attitudes towards drinking. For each alcoholic beverage (beer, spirits and wine) questions were asked about the average frequency of drinking and the average amount per drinking occasion during the last 6 months. The average frequency and amount of alcohol per occasion have been converted to a 6-month mean consumption in centilitres of pure 100% alcohol (for more information, see Ólafsdóttir et al. 1997, 1998).

The survey analyses focus on changes in self-reported consumption (total and beverage-specific) between the three years (1988, 1989, and 1992). All analyses are gender-specific and study the consumption changes for the following variables: age, education, region and drinking habits (low-moderate, and high consumers). For the latter three variables, the possible effect of age is controlled for. In addition to analyzing whether changes are statistically significant or not for these different variables, interaction effects are tested between each of these four variables (e.g. age) and the year of the study. A significant interaction term implies that the changes over these years are different for different groups of the variable (e.g. for different age groups).

All respondents are included in the analysis. In general, the proportion of drinkers remained stable across the three surveys, even though abstinence rates fluctuated slightly in each age group. Among all women, the percentage of abstainers fell from 18% to 16%, but it rose for men from 9% to 12% between 1988 and 1992 (for definitions of abstainers, see Ólafsdóttir et al. 1997).

Results

Recorded and unrecorded alcohol sales before and after the beer legalization

The trends in the recorded total alcohol sales and disposable real income 1950–99 are shown in Figure 1. As can be seen, the sales increased in 1989, the year of the beer introduction. Figure 2 shows that this was accompanied by decreased sales of both spirits and wine. The result of the interrupted time series analyses with the beer introduction (a dummy coded 0 before 1989 and 1 from 1989 onwards) and disposable income (logarithmized) as input variables, and alcohol sales as output variable, is shown in Table 1. Both the beer dummy and disposable income showed significant positive effects. The beer effect parameter of 0.21 implies that the sales from 1989 onwards were 22% higher than before 1989, and the disposable income parameter that an increase in disposable income by 1% on average has been accompanied by an approximately 0.4% increase in alcohol sales. The beer parameter remained more or less the same in bivariate analyses excluding the disposable income variable.

Figure 1. Trends in alcohol sales and disposable incomes 1950–1999.

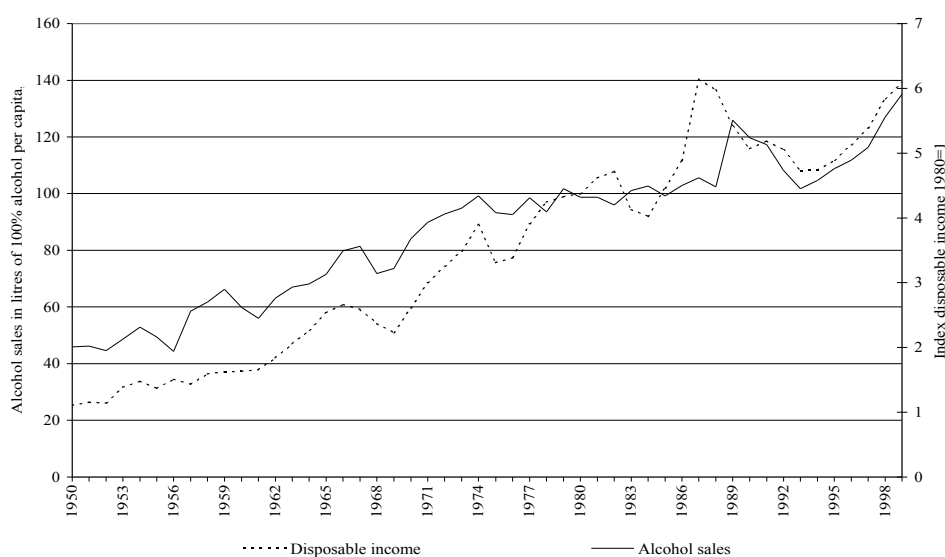


Figure 2. Trends in sales of spirits, wine and beer 1950–1999.



Table 1. Estimated intervention effect (beer-dummy) and effect of disposable income on alcohol sales. Logarithmic model estimated on differenced data for the period 1950–1999.

Variable	Coefficient	Std. Error	t-statistics	Probability
Beer-dummy	0.215	0.064	3.360	0.0016
Disposable income	0.414	0.094	4.403	0.0001
Noise:				
MA(1)	-0.358	0.144	-2.485	0.0167
Test:				
Q+ (lag 15)	10.783 (p<0.768)			

This result could be interpreted to mean that the introduction of beer had a significant effect on the level of alcohol consumption on Iceland: it raised the alcohol consumption by approximately 1 litre. However, two circumstances should be considered before this statement can be accepted. First, as mentioned earlier, Icelanders drank beer even before 1989, but the beer was unrecorded. Iceland was, and still is, one of the few countries where it is possible not only to buy duty-free alcoholic beverages on the way out from Iceland but also on the trip back to Iceland. There is a duty-free store at only one place in Iceland, namely at the Keflavik airport. Almost all of Icelanders' purchases of duty-free alcoholic beverages take place at this duty-free store at Keflavik airport.

Table 2 shows the main purchase source according to responses to the three sets of surveys. In the 1988 surveys, 55% of the respondents aged 15–69 stated that they generally purchased the beer they drink in the duty-free store. The percentage was about the same (50%) in the teenage group (15–19 years of age), despite the fact that they were below the legal age limit of 20 for purchasing (duty-free) alcoholic beverages. The young adults (20–29 years of age) reported a somewhat higher percentage: 63%. As shown in the table, the percentages reporting the duty-free store as their general purchase source, as well as the percentage reporting other unrecorded sources, such as buying from a sailor and smuggled beer, were also reduced in 1989 and 1992 in all age groups, even among the 15–19-year-olds. It should be stressed that these figures are not based on consumption volumes, but only on the respondents' answers to a question about where they generally buy the beer they drink.

All in all, the lowered percentages in 1989 and 1992, especially in young people, was the result of a switch from unrecorded, mainly privately imported beer, to recorded beer bought at the state monopoly stores. (As will be shown later, beer consumption increased in all groups, and significantly in most age groups after the beer introduction in 1989). Of importance here is that this substitution of one beer source for another means that the effect of the legalization of beer sales shown in the time series analyses becomes exaggerated. Table 3 shows estimates of duty-free beer sales at Keflavik airport in 1987 and 1989–92. As shown, the total sales of duty-free sales of beer decreased from about 784,000 litres beer in 1987 to 571,000 in 1989 and to 267,000 in 1990. In 1991 the sales increased to 446,000, which is somewhat higher than in 1992. Assuming that 70 per cent of the purchases at the airport are made by Icelanders, as was assumed in a study in the late 1980s (Guðmundsdóttir 1990), the beer sales in litres of 100% alcohol per inhabitant aged 15 or over decreased from 0.16 centilitres in 1987 to 0.05 in 1990. In 1991 and 1992 the sales increased to 0.08–0.09 litres.

Table 2. Where the Icelanders generally purchase the beer they drank, according to survey data in 1988, 1989 and 1992 (in per cent).

Source of purchase	1988	1989	1992
15–19 years of age:	(n=441)	(n=399)	(n=434)
In a monopoly store	..	77	73
In a restaurant	..	34	29
In the duty-free store	50	12	10
From a sailor	17	4	1
Smuggled	18	7	3
Home-made	6	2	1
Drink beer abroad	33	17	11
Have never drank beer or barely tasted it	19	8	7
20–29 years of age:	(n=216)	(n=189)	(n=192)
In a monopoly store	..	70	76
In a restaurant	..	24	31
In the duty-free store	63	6	10
From a sailor	25	3	2
Smuggled	25	3	3
Home-made	1	0	0
Drink beer abroad	32	8	7
Have never drank beer or barely tasted it	12	15	10

15-69 years of age ¹ :	(n=1184)	(n=1118)	(n=1174)
In a monopoly store	..	65	71
In a restaurant	..	15	19
In the duty-free store	55	9	10
From a sailor	21	5	2
Smuggled	14	2	1
Home-made	2	1	1
Drink beer abroad	31	10	8
Have never drank beer or barely tasted it	15	15	13

¹ data weighted for age.

Table 3. Sales, prices and estimated purchases of duty-free beer at the Keflavik airport 1987–1992.

	Total sales in litres beer ¹ To Icelanders and to non-Icelanders	Sales to Icelanders		Purchase per Icelandic passenger, in litres of beer
		In litres of beer	In litres 100% alcohol per capita (aged 15+) ²	
1987	784,000	549,000	0.16	3.8
1989	571,000	400,000	0.11	2.8
1990	267,000	187,000	0.05	1.3
1991	446,000	312,000	0.09	2.2
1992	409,000	286,000	0.08	2.0

¹ Sources: 1987: Guðmundsdóttir 1990 (no data for 1988 available); 1989–92: Generation DataBank 2001.

² Alcohol content in duty-free beer estimated at 5.25% alcohol by volume (Guðmundsdóttir 1990). The per capita figures shown assume that 70% of the beer purchases are done by the Icelanders (Guðmundsdóttir 1990).

The total consumption of unrecorded beer was estimated at 0.22 litres of 100% alcohol (per capita 15+) in 1987 (private import: 0.16, homemade: 0.03, smuggled: 0.03). Assuming that there was a reduction by one-half not only in the duty-free sales of beer, but also in smuggling and home-made beer in the following years, the estimated unrecorded beer would be reduced by approximately 0.10 litres after the legalization of beer, that is from about 0.22 litres 1987 to 0.12 litres in 1992.

Guðmundsdóttir (1990) estimated the total unrecorded alcohol consumption as approximately 1 liter of pure alcohol in 1987 (beer: 0.22, spirits: 0.70; wine: 0.09). Spirits thus accounted for 70% of the total unrecorded consumption. Duty-free sales data for 1985 and 1989–92 for wine and spirits (which in 1987 was estimated at 0.41 litres) showed an increase by almost 30% in nominal values from 1985 to 1989, from USD \$2.9 million in 1985 to \$3.8 million in 1989. In 1992, the sales had increased to \$6.3 million (Generation AB, 2001).

Probably the most important factor explaining this increase in duty-free sales is that the number of travellers arriving in Iceland increased by 44 per cent from 1985 to 1988 (from 96,500 in 1985 to 136,000 in 1987, and to 149,200 in 1988), with a larger increase for Icelanders (55 per cent) than for foreigners (33 per cent). The following years, the number continued to increase for foreigners but decreased for Icelanders. In both 1989 and 1990, the number of Icelandic travellers arriving in Iceland was as many as 142,000 Icelanders. In 1991 and 1992 the number increased again, to about 148,000 per year.

This large increase in the number of travellers makes it unlikely that the sales of spirits and wine decreased between 1985 to 1988. The decline after 1988, however, makes it likely that the sales decreased somewhat in 1989 and in the first years in the 1990s, but not below the 1987 level of 0.41 litres of pure alcohol per inhabitant aged 15 or more. In addition, it is unlikely that these changes in duty-free sales were related to the legalization of beer.

The second and third largest groups of unrecorded alcohol in 1987 was smuggling and homemade alcoholic beverages, with spirits being the dominating beverage in both categories. In 1987, smuggling and home-distilled spirits contributed to one third of the total unrecorded consumption (spirits: 0.33 litres, wine: 0.03 litres). Consumption of illicit spirits is often motivated by economic reasons, at least in the Nordic countries where prices on alcoholic beverages are high, not the least for spirits (see Nordlund & Österberg 2000). It is therefore unlikely that people substituted the consumption of more expensive recorded alcoholic beverages, in this case beer, for the consumption of relatively cheap illicit spirits. It seems therefore safe to assume that homemade and smuggled spirits and wine were not more than marginally affected by the beer introduction in March 1989.

In sum, the legal beer effect on unrecorded consumption would be a reduction of approximately 0.1 litres of pure alcohol, resulting from a decline in duty-free sales of beer. The legal beer effect on the total consumption would then be approximately 0.9 litres of pure alcohol per inhabitant 15 years of age or more. Even if one departs from the highly unrealistic assumption that also the consumption of home-made and smuggled spirits and wine were reduced by half

due to the legalization of beer, the legal net effect on total consumption would still be an increase of 0.7 litres of pure alcohol.

The other circumstance that should be considered is the economic recession, which started in 1987/88 but increased in 1989. The recession continued until the mid-1990s, with 1993 as the worst year, at least in terms of disposable income (Figure 1). From 1987 to 1993 the disposable income fell by approximately 25%, which was the worst decline during the whole post-war period. From 1993 onwards, income started to increase again. This means that the beer introduction was carried out during a period of severe economic recession, almost of depression. The disposable income effect parameter in Table 1 implies that a reduction of disposable income by 1% would be followed by a 0.4% reduction in the total sales. From 1989 to 1993, the disposable income decreased by 13%, which itself would indicate (on average) a reduction in sales of about 5%. According to the *recorded* sales statistics (Figure 1), the sales decreased by almost 20%. However, the sales level never went below the 1988 level, i.e. the level in the year before beer introduction. In addition, and as will be shown below, the survey estimates of the mean alcohol consumption of 1989 and 1992 were not lower than 1988, despite the deepened recession.

The recession should be considered when interpreting the survey consumption estimates from 1988, 1989 and 1992 below. Thus, if Iceland had not suffered from the most severe recession during the post-war period, the consumption figures in 1989 and especially 1992 would be higher compared to the 1988 figures. Lastly, it is worth noticing that since 1993, the sales figures have increased by one third, i.e. from 4.5 litres in 1993 to 5.9 litres in 1999, which is the highest sales figure ever measured in Iceland.

Self-reported alcohol consumption 1988, 1989 and 1992

Gender and age

Tables 4 and 5 show the mean alcohol consumption for each of the alcoholic beverages and the total consumption (all alcohol) for different age groups for the three years. The general picture is of small changes among the adults, but greater changes among the adolescents; this was more marked among men than among women. Among men, the consumption increase between 1988–1989 and 1988–1992 was statistically significant for the youngest age group (15–19 years of age), and between 1988 and 1992 also for the oldest age group (50–69 years of age). However, the interaction term between year and age in the analysis of variance was not statistically significant. As shown in Table 4, among the 15–19-year-old males, the mean consumption during the last 6 months almost doubled between 1988 and 1992, from 107 cl in 1988, to 163 cl in 1989, and to 208 cl of pure alcohol in 1992. Among women (table 5), no significant changes were found in adult age groups. However, the 15–19-year-olds showed an increase in consumption: from 82 cl in 1988, to 90 cl in 1989, and to 101 cl in 1992.

Table 4. Mean alcohol consumption (cl 100% alcohol last 6 months) among men in different age groups and by type of alcoholic beverage in 1988, 1989 and 1992.

	Age groups					
	15–19 years	20–29 years	30–49 years	50–69 years	20–69 years	15–69 years
Beer						
1988	17	42	29	9	27	26
1989	71*	88*	62*	21	58*	60*
1992	78*	67	49*	35*	50*	53*
Spirits						
1988	78	131	88	49	91	89
1989	86	94	65*	44	67*	69*
1992	114*	109	61*	68	75	79
Wine						
1988	12	24	24	12	21	19
1989	5	9*	19	6*	13	12*
1992	11	17	26	10	20	18
All alcohol						
1988	106	196	141	71	138	134
1989	162*	191	147	70	138	141
1992	202*	193	136	112*	144	151
n (1988)	210	112	151	103	366	576
n (1989)	213	84	158	100	342	555
n (1992)	216	88	192	91	371	587

* $p < 0.05$ statistically significant change from 1988 within each age group. For all ages, interaction effects between year (1988, 89, 92) and age (15–19, 20–29, 30–49, 50–69) were tested by analysis of variance.

No statistically significant interaction effect was found.

Data weighted for age.

Table 5. Mean alcohol consumption (cl 100% alcohol last 6 months) among women in different age groups and by alcoholic beverage in 1988, 1989 and 1992.

	Age groups					All
	15–19 years	20–29 years	30–49 years	50–69 years	20–69 years	15–69 years
Beer						
1988	10	21	7	5	10	10
1989	22	27	25*	8	21*	21*
1992	23*	22	21*	8	18	18*
Spirits						
1988	59	43	32	19	32	36
1989	62	34	26	18	27	31
1992	66	39	19*	14	24	29
Wine						
1988	13	15	19	9	15	15
1989	6*	10	14	3	10	10*
1992	11	15	12	8	12	12*
All alcohol						
1988	82	79	58	33	58	61
1989	90	71	66	29	58	61
1992	101	76	52	30	53	59
n (1988)	231	104	181	92	377	608
n (1989)	186	105	162	110	377	563
n (1992)	218	104	176	89	369	587

* $p < 0.05$ statistically significant change from 1988 within each age group. For all ages, interaction effects between year (1988, 89, 92) and age (15–19, 20–29, 30–49, 50–69) were tested by analysis of variance.

No statistically significant interaction effect was found.

Data weighted for age.

The two tables also reveal that beer consumption increased significantly in a majority of age groups between 1988 and 1989 and/or between 1988 and 1992. Since the mean consumption remained almost the same among the adults (20–69), the beer increase was accompanied by a decrease in consumption of spirits and/or wine. For the whole age group (15–69-year-olds), the decrease in wine consumption between 1988 and 1989 was statistically significant for both men and women. For men, but not for the women, the wine consumption increased again between 1989 and 1992.

Among the 15–19-year-old men, it was not only beer but also spirits consumption, which increased significantly between 1988 and 1992, whereas wine consumption remained stable. For the youngest women (15–19 years), wine consumption decreased significantly between 1988 and 1989, but then increased again in 1992 almost to the 1988 level.

Education and region

Possible interaction effects were also tested for education (number of years in school) and region. Tables 6 and 7 show the mean consumption for three educational levels and in two regions (Reykjavik area vs. the countryside) for men and women separately. For men (Table 6), neither education level nor region showed any significant interaction effect with the year variable, i.e. the different education groups and the two regions did not show any significant differences in the change between the years, despite the result indicating a larger increase 1988–92 among the men living in Reykjavik area compared to those living outside the capital area.

Table 6. The mean alcohol consumption (cl 100% alcohol last 6 months) among men in different regions and educational groups 1988, 1989 and 1992 in the age group 15–69 years.

Education:	1988	1989	1992
Low (<10 years)	100	92	92
Medium (10–12 years)	154	170	169
High (> 12 years)	173	151	166
Reykjavik area	144	147	169

Countryside	125	136	136
All (men)	134	141	151

* $p < 0.05$ statistically significant change from 1988 within each region or educational group. For region and education, interaction effects with year (year*region, year*education) were tested by analysis of variance. No statistically significant interaction effect was found. All analyses were controlled for age.

Table 7. The mean alcohol consumption (cl 100% alcohol last 6 months) among women in different regions and educational groups 1988, 1989 and 1992 in the age group 15–69 years.

Education: #	1988	1989	1992
Low (< 10 years)	62	32*	30*
Medium (10–12 years)	63	74	52
High (> 12 years)	53	70	73
Reykjavik area	60	67	63
Countryside	62	54	53
All (women)	61	61	59

* $p < 0.05$ statistically significant change from 1988 within each region or educational group. For region and education, interaction effects with year (year*region, year*education) were tested by analysis of variance. #: A statistically significant interaction effect was found for education * year of study. All analyses were controlled for age.

For women, the consumption changes were significantly different in the three educational groups (i.e. the interaction effect was significant, $p < 0.05$). Among women with the lowest education, the consumption decreased between 1988 and 1989 and then remained stable between 1989 and 1992. Among those with higher education, the consumption increased between 1988 and 1989. For those with the highest education, the level was almost the same in 1992 as in 1989, whereas it decreased among those with a medium high educational level.

Region showed no significant effects, even though women in Reykjavik increased their consumption somewhat between 1988 and 1989 while women living outside Reykjavik decreased their consumption with approximately the same amount as those in Reykjavik increased theirs.

Consumer groups

The same analysis as for age groups (Tables 4–5) was also conducted on two drinking categories: high consumers, and low-moderate consumers, using the same dividing line between the groups in all three years (see Tables 8 and 9; men: >351 cl of pure alcohol, women: > 190 cl of pure alcohol past six months). In 1988, the cut-off point for the 10% consumers with highest consumption among men was 351 cl of pure alcohol during the past 6 months. Among women the cut-off point for the 10% consumers with highest consumption was 190 cl. The same cut-off points were used for 1989 and 1992. It should be noted that the data for the three years are cross-sectional. This means that even if we find changes in mean consumption among the highest drinking category over the three years, it does not necessarily imply that the high consumers have changed their consumption. To test whether the high consumers have changed their consumption, data on the same individuals over the three years, i.e. longitudinal data, would be needed. The analyses on different samples of cross-sectional data conducted here can only show whether the mean consumption in the two drinking categories has changed over the years.

Tables 8 and 9 show the mean alcohol consumption for each of the alcoholic beverages and the total consumption (all alcohol) for the two different drinking groups for the three years by gender. For both men and women, significant interaction effects with years were found for all three alcoholic beverages and total alcohol. Thus the changes in mean consumption over the three years differed for the two drinking categories. As for beer, both drinking categories among both men and women showed increases in 1989 and 1992 compared to 1988 but the increase in absolute levels was larger in the higher drinking categories (those respondents reporting a past six months consumption exceeding 351 cl [men] / 190 cl [women] of pure alcohol). Wine and spirits consumption decreased between 1988 and 1989, in all drinking categories but more so for the higher drinking categories with the exception that wine consumption decreased more in the lower than in the higher category among men.

As concerns the mean consumption of all alcohol (sum of beer, sprits and wine), the changes in the two drinking categories differ somewhat between men and women, although none of the interaction effects were statistically significant.

For women, the mean consumption in the higher drinking category decreased somewhat between 1988 and 1989 but increased in the lower category and then remained stable in both groups between 1989 and 1992. Among men, the mean consumption increased in both drinking categories and in the higher drinking category also between 1989 and 1992. In absolute terms, the increase was higher in the high drinking category.

Table 8. Mean alcohol consumption (cl 100% alcohol last 6 months) among men in different drinking groups 1988, 1989 and 1992. Only consumers during the past 6 months.

	Low-moderate consumers (0.1–351 cl of pure alc.) ¹	High consumers (>351 cl of pure alc.)	Total among consumers
Beer #			
1988	15	140	28
1989	43*	283*	70*
1992	33*	255*	59*
Spirits #			
1988	63	371	97
1989	57	272*	82
1992	58	314	88
Wine #			
1988	16	63	21
1989	10*	42	14*
1992	12*	83	20
All alcohol #			
1988	93	574	146
1989	109*	597	166
1992	103	651	167
n (1988)	462	52	514
n (1989)	415	57	472
n (1992)	445	75	520

* p < 0.05 statistically significant change from 1988 within each consumer group for each alcoholic beverage and all alcohol. Interaction effects between year and consumer group (low-moderate, high) were tested by analysis of variance. Statistically significant interaction effects are indicated by #. All analyses were controlled for age.

Table 9. Mean alcohol consumption (cl 100% alcohol last 6 months) among women in different drinking groups 1988, 1989 and 1992. Only consumers during the past 6 months.

	Low-moderate consumers (0.1–190 cl of pure alc.) ¹	High consumers (>190 cl of pure alc.)	Total among consumers
Beer #			
1988	5	87	12
1989	15*	136	25*
1992	14*	126	21*
Spirits #			
1988	27	200	42
1989	26	151	36
1992	25	159	33*
Wine #			
1988	12	81	18
1989	9*	36*	11*
1992	11	45*	13*
All alcohol #			
1988	44	368	71
1989	50*	322	73
1992	51*	329	67
n (1988)	466	52	518
n (1989)	428	46	474
n (1992)	468	48	516

* p < 0.05 statistically significant change from 1988 within each consumer group for each alcoholic beverage and all alcohol. Interaction effects between year and consumer group (low-moderate, high) were tested by analysis of variance. Statistically significant interaction effects are indicated by #. All analyses were controlled for age.

Proportion of beer consumption to total consumption

In 1988, 21% of the men's and 15% of the women's total alcohol consumption consisted of beer (Tables 10 and 11). For both genders, the proportions were rather similar across different groups. The only exception is among the two consumer groups: the low-moderate consumers reported a significantly lower proportion than the high consumers, both among men and women. However, it should be remembered that the low consumers, i.e. the lowest quartile, report low consumption levels (see Tables 8 and 9).

Table 10. The average proportion of alcohol consumption which is beer consumption among men in different categories 1988, 1989 and 1992.

	1988	1989	1992
Age groups			
15–19	24	48*	41*
20–29	20	43*	36*
30–49	21	38*	35*
50–69	22	34*	32*
Consumer groups ¹			
Low-moderate consumers	21	39*	34*
High consumers	20	47*	41*
Education			
Low	25	38*	33*
Medium	18	39*	34*
High	19	39*	35*
Region			
Reykjavík area	20	42*	38*
Countryside	22	38*	32*
Total (men)	21	40*	35*

¹ The same division as in Table 8

* $p < 0.05$ statistically significant change from 1988

No variable showed a significant interaction effect with year (after controlling for age).

Table 11. The average proportion of alcohol consumption which is beer consumption among women in different categories 1988, 1989 and 1992.

	1988	1989	1992
Age groups			
15–19	12	25*	27*
20–29	14	28*	29*
30–49	15	34*	32*
50–69	16	32*	25*
Consumer groups ¹			
Low-moderate consumers	15	30*	29*
High consumers	15	42*	32*
Education			
Low	16	29*	26*
Medium	15	34*	29*
High	15	32*	31*
Region			
Reykjavík area	15	32*	29*
Countryside	14	30*	30*
Total (women)	15	31*	29*

¹ The same division as in Table 9

* $p < 0.05$ statistically significant change from 1988

No variable showed a significant interaction effect with year (after controlling for age).

In 1989, all groups showed statistically higher proportions of beer (except male low consumers). No significant interaction effects were found with year. The beer proportions in 1992 were somewhat lower in 1992 than in 1989, but

still significantly different from 1988. Thus, the main changes occurred during the first year, when beer was introduced in state monopoly stores, and these changes in beverage choice remained to a large extent three years later.

Discussion

In this study we have addressed two questions. The first question is: what were the effects on the total alcohol consumption after beer was legalized in Iceland? And the second question is: what effects did the legalization have on the alcohol consumption of different subgroups as measured in survey data? For the purpose of responding to the first question we have applied a time series analysis on the total recorded sales of alcohol beverages, with considerations of changes in unrecorded consumption following the legalization of beer, and for the purpose of answering the second one an analysis of survey data has been performed.

The time series analysis of changes in the recorded sales volume shows a significant intervention effect for the whole population. During the post war period, alcohol consumption in Iceland increased at a slower pace than in other western countries. Following the introduction of beer sales in monopoly stores in 1989, the recorded alcohol consumption rose sharply in one year from 4.53 in 1988 to 5.52 litres per inhabitant 15 years and over 1989.

This effect on the alcohol sales is, however, exaggerated due to the substitution of some unrecorded beer, and perhaps also some unrecorded spirits and wine, by recorded beer. How large the real effect of the legalization of beer was on the total consumption is difficult to assess. A duty-free store was one source for obtaining alcohol, but the amount of alcohol sold in this way was not officially recorded. But though the estimates of duty-free beer are inexact, the basis for their measurement is more solid than information on smuggling and homemade beer. As soon as beer went on sale in the monopoly stores, duty-free sales of beer decreased by half. To what extent other sources of unrecorded beer such as smuggling and home brewing decreased is not known. It is very likely that they diminished, but equally unlikely that they completely disappeared. In addition, one cannot exclude the possibility that unrecorded spirits and wine were also somewhat affected by the beer introduction. The decline in unrecorded consumption following the introduction of beer in the state monopoly stores was roughly estimated at 0.1, at the very most 0.3 litres of pure alcohol. If this were correct, the effect on total alcohol consumption would be between 0.7 and 0.9 litres of pure alcohol, not the 1.0 liter that was the effect on the recorded sales of alcoholic beverages.

It should be stressed that the time series analyses aimed at estimating the effect of the introduction of beer, net of the effects from other factors influencing the sales of alcoholic beverages. If all these other factors had remained unchanged during the years following the beer introduction, the sales volumes would have increased by about 1 liter of pure alcohol (and the total consumption by 0.7–0.9 litres). However, other factors did not remain unchanged. As shown in Figure 1, the sales increased in 1989 but then decreased every year until 1993 with a sales level only marginally higher than the year before the legalization of 1988. One important explanation for this decrease was the economic recession, which started in 1987/88 but increased in 1989 and continued to mid-1990s, with 1993 as the worst year.

The survey data did not show any significant increase between 1988 and 1992, which corresponds quite well with recorded and unrecorded consumption: the recorded consumption, that is alcohol sales, were a quarter of a litres higher in 1992 than in 1988, but the unrecorded consumption decreased during the same period by at least 0.1 litres of pure alcohol. The large sales increase (23%) in 1989, the year of the legalization of beer introduction, however were not mirrored in survey data collected 1988 and 1989. One explanation for this discrepancy may be that the sudden increase was a transient phenomenon, which is not easily captured in surveys.

Beer was thus introduced in times of decreasing disposable income, consequently cutting back a strong novelty effect of the new beverage. Economic factors, such as an increased prosperity, have been considered to be important explanatory factors in the increased alcohol consumption in most western countries between 1950 and 1975 (Mäkelä et al. 1981, Edwards et al. 1994). In the Icelandic as well as in other Nordic cultures, alcoholic beverages are not considered as ordinary commodities, but as luxury goods meant to increase the pleasures of life. In hard times, people are thus likely to cut down redundant consumption, with the opposite effect for spending in times of prosperity. However, the economic factor may affect different socio-economic groups in varying ways. In the survey analysis, it was found that those with less education drank less over time, especially women. If it is presumed that lower education and lower income are highly related, it may explain why this group of people decreased their consumption over time. Women are probably more sensitive to economic factors than men, as they are probably more vulnerable than men on the labor market. Thus, they may have to decrease their spending more than men spend in times of stringency.

The analysis of the survey data also showed that the mean consumption increased more in the high drinking category than in the low-moderate category among men whereas the opposite was the case for women. As a matter of fact, the high drinking category among women showed a lower mean consumption in 1989 and 1992 than in 1988. Men tend to drink more and may have greater desires for alcohol than women, and may be more reluctant to abstain from drinking even when they are badly off.

The survey analyses showed no significant increase in mean alcohol consumption for adults, neither for men or women. However, a significant increase among 15–19 year old males was found, as their mean consumption doubled from 1988 to 1992. There was also a significant increase among 50–69 year-old men. Even though the increase in mean alcohol consumption in the total population was not found to be significant, beer consumption increased significantly in all groups, but was largely counterbalanced by the decline in drinking wines and spirits.

Thus, the outcome was stability in the mean alcohol consumption in 1988 to 1992, but with a peak in 1989, even though the society was enduring a deep recession. This shift in choice of beverage towards beer continued in the following years. In 1989 the price of beer had been set high, but was cut in the following years. From 1989 to 1993 the index for the real price of beer fell from 100 to 87. At the same time, the real price index for wines rose from 135 to 143 and for spirits from 90 to 98 (Nordisk Alkoholstatistik 1989–1993). These changes in price may have furthered the shift in preference to beer from wines and spirits, particularly among those buyers wanting to buy the cheapest alcohol.

Traditionally, Iceland belonged to the spirits-drinking cultures, with most of the alcohol consumed as strong spirits and very little wine drinking. Therefore, the shift in beverage preferences may be considered as a part of an ongoing cultural shift towards a lighter beverage, in this case beer, and away from the traditional spirits drinking. In this development, young men and people living in the Reykjavík area could be seen as leading the course. In general, older generations tend to adhere to traditional drinking habits, whereas the younger generations have been more receptive to foreign influences, new life styles and modes of consumption.

At the time of the change, opinions on whether beer should be allowed on sale or not very much reflected a generation gap in attitudes to drinking. The younger generations, who had often traveled or lived abroad where beer was widely available, felt restricted by the former alcohol policy to ban beer but allow spirits and wine. Thus, the increased drinking among teenagers in Iceland is very much in line with the results from Sweden, where youths increased their consumption dramatically after medium-strength beer was introduced in grocery stores (Nilsson 1984). Besides, the public discourse in Iceland on alcohol, when the pros and cons of the legalization of beer were debated may have stimulated young drinkers to further experiment with drinking.

Reykjavík is the only large city in Iceland, and people living there tend to have more frequent contacts with the outside world. Therefore, Reykjavík has been the center for experimenting with and introducing new lifestyles and drinking habits. The diffusion of leisure patterns and public drinking has thus been from the capital area to other towns and rural areas. Another instrumental factor in shaping drinking habits is that people living in the countryside have a more restricted access to alcohol, with few outlets and a longer distance to a monopoly store than those living in Reykjavík and the areas around the city.

Even if the legalization of beer sale in monopoly stores increased the selection of alcoholic beverages, other instruments of control, such as high prices and restricted hours and days of sale and density of outlets, mattered. In a wider context, Icelandic alcohol policy measures are still very restrictive. It is widely reported in the research literature that countries with strict alcohol policy systems have a lower level of alcohol consumption than those with weaker formal controls (Room 1999, Leifman 2001).

In North American and Nordic cultures, drinking symbolizes a shift from work to play (Gusfield 1987). Introduction of light alcoholic beverages may ease the barriers between social situations where drinking is accepted and where it is not tolerated. For years, alcohol was closely related to drinking to intoxication in Iceland, and this association kept many zones of social life free of alcohol. There are indicators that this is changing, and that alcoholic beverage are to a greater extent than before incorporated in more different kinds of social settings and situations than was the case for most of the twentieth century (Ólafsdóttir 1999).

However, it may be pointed out that it took seven years after 1989 until beer became the dominant beverage. This confirms that a transformation of the drinking habits developed at a much slower pace of change than could have been predicted from the experiences of the introduction of medium-strength beer in grocery stores in Finland and Sweden (Mäkelä, Rossow & Tryggvesson in this book). All in all, the introduction of beer was part of an ongoing process of modernization of the consumption pattern, which was far from linear, due to economic, social and cultural factors.

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CHAPTER 6

The repeal of medium-strength beer in grocery stores in Sweden — the impact on alcohol-related hospitalizations in different age groups

Mats Ramstedt

Introduction

Before July 1, 1977, beer with a maximum alcohol content of 3.6% by weight (4.5% by volume) could be bought in 11,550 Swedish grocery stores by anyone aged 18 years and over (Leifman 1995). Since its introduction in 1965, this medium-strength beer (in Swedish: ‘middle beer’) had obtained great popularity, particularly among young people and constituted the dominant alcoholic beverage in this group (Hibell 1984). From July 1, however, it was taxed like strong beer and sales were restricted to slightly more than 300 retail monopoly stores (the Systembolag system) where no one below 20 years of age was allowed to purchase.

The introduction and repeal of this kind of beer seem to have influenced not only beer consumption, but also overall alcohol consumption in Sweden. Noval & Nilsson (1984) estimated that overall consumption in Sweden between 1965 and 1977 was 15 per cent higher than would have been the case without sales of medium-strength beer in grocery stores. Furthermore, per capita alcohol consumption was 8 per cent lower in 1979 than in 1976, despite substantially increasing sales of other kinds of beer, weaker and stronger, after the repeal. There is some evidence that the decline was largest among young people (Hibell 1984). For instance, alcohol consumption among 15-year old students was estimated to have decreased by about 20 per cent, according to two surveys conducted in 1977 and 1979, respectively.

Changes in some key markers of alcohol-related harm matched the trend in overall alcohol consumption fairly well. For instance, several indicators of alcohol-related mortality in the whole of Sweden and of morbidity in Stockholm county declined considerably between 1978 and 1984 (Romelsjö & Ågren 1985), in particular among young people (Romelsjö 1987). International comparisons also suggest that alcohol-related harm became higher when medium-strength beer was available in grocery stores. Liver cirrhosis mortality increased more in Sweden than in any other Western European country around this time and, in a Western European context, Sweden had remarkably high cirrhosis rates during the period of medium-strength beer availability, compared with before and after medium-strength beer (Ramstedt 1999, see also Davies & Walsh 1983).

However, in the only attempt to evaluate the impact on alcohol-related harm from removing medium-strength beer, a decrease was revealed only among young people (Hibell 1984). While no single indicator of alcohol-related harm offered support for an effect among adults, problems seemed to have gone down among young people. For instance, a diminishing fraction of youth was found among reported drinking and driving offences, and survey findings showed a clear reduction in the propensity among young people to get intoxicated by alcohol. Thus, the evaluation came to the following conclusion: ‘A change in the frequency of alcohol-related disabilities among adults related to the removal of medium-strength beer was not observed, but a small decrease is evident in the figures concerning young people’ (Nilsson et al. 1984, 11).

The lacking of refinement of the analytical method (eyeball inspection of yearly data before and after the repeal) was to some extent compensated by the use of several different indicators. Still, this fairly radical change in availability deserves to be evaluated with more modern statistical tools. This chapter is an effort to accomplish this on the basis of alcohol-related hospitalizations in different age groups.

Data and method

The data set consists of monthly hospitalizations in psychiatric and somatic institutional care during 1973–1981 where alcoholism, alcohol intoxication or alcohol psychosis (referred to as AAA-diagnoses), are the main or secondary diagnoses. In addition, we will analyze some diagnoses of external causes (E-codes) where it is well established that alcohol consumption is a risk factor (diagnoses related to violence, attempted suicide, accidental falls and motor

vehicle accidents). All 26 Swedish counties have a complete coverage of psychiatric hospitalizations during this time period, whereas somatic hospitalizations are absent or incomplete in 10 counties. The somewhat inadequate coverage for somatic hospitalizations is a minor problem for AAA-diagnoses, since about 80 per cent of these are reported from psychiatric care. However, concerning the E-codes the majority of cases are reported from somatic care, and areas with incomplete coverage during the study period are therefore excluded in the subsequent analyses of these diagnoses¹. Descriptive information comprising ICD-8 codes and average monthly harm rates by age groups is presented in Table 1.

Table 1. Average monthly rate of hospitalizations with alcohol diagnoses and E-codes per 100,000 by age group between 1973 and 1981.

Diagnosis	ICD-8 code	Hospitalizations by age group							
		10-19		20-39		40-59		60+	
		N	Rate	N	Rate	N	Rate	N	Rate
Alcohol diagnoses									
Alcoholism + Alcohol psychosis + Alcohol intoxication (AAA)	303, 291, 980	72	7.0	1,853	78.6	2,246	117.7	658	37.2
Alcohol intoxication	980	47	4.2	114	4.1	59	3.1	17	0.9
E-codes									
Motor vehicle accidents	E8190- E8198	200	17.8	229	9.7	130	6.8	139	7.9
Accidental falls	E880- E887	247	21.9	405	17.1	506	23.9 1,631		92.0
Attempted suicide	E950- E959	36	3.2	204	8.7	119	6.2	74	4.1
Attempts at homicide									
Manslaughter and assaults	E960- E969	26	2.3	97	4.1	41	2.2	12	0.7

It should be noted that hospitalization data are suitable in this context since they are regarded as relatively sensitive to new cases (Romelsjö 2000), or as in this case, to a reduction of new cases. Furthermore, as seen in Table 1, the number of hospitalizations is fairly large for each month, which allow for a statistical analysis on a monthly basis. Monthly data are particularly adequate in this case since the repeal went into effect in the middle of a year, and the development during the initial months without medium-strength beer thus contains important information.

From a methodological point of view, it is necessary to avoid analyzing just a short period before and after the repeal, since this involves difficulties in estimating whether a subsequent change lies within 'normal' fluctuations in the time series or not. For instance, a reduction in alcohol-related hospitalizations after the repeal may be related to seasonal variation or may just be a continuation of longer downward trend. ARIMA impact analyses (e.g. Norström 2000, Yaffe 2000) reduce the risk of these kind of fallacies by removing any trend or seasonal variation in the data before estimation of the statistical model.

Other factors than the repeal that affect alcohol-related hospitalization rates should be included if possible in the model. In the current case, the decriminalization of public drunkenness in January 1977 (replaced by a law on custody of intoxicated persons) was associated with a substantial reduction in the number of drunken persons taken into custody by the police during 1977. The number fell from 110,000 persons in 1976 to 83,000 in 1977, i.e., by about 27,000 cases (CAN & FHI 1999). Thus, it is important to consider changes in alcohol-related hospitalizations resulting from this reform in the subsequent analyses.

The impact assessment with the ARIMA-approach is accomplished by estimating the various hospitalization rates as outcome measures, with the repeal of medium-strength beer represented by a dummy variable, measuring the intervention. A sudden-permanent effect is assumed, implying an immediate response that is permanent. Thus, a dummy variable representing the repeal takes the value 0 before July 1, 1977 and 1 afterwards. Besides being reasonable on theoretical grounds, this modeling of the dummy variable has proven to be adequate in other similar studies (e.g. Zhang & Casswell 1999). The same construction of a dummy variable is included in order to model the

¹ Counties not included in the analysis of diagnoses with E-codes were: Göteborg, Sörmland, Östergötland, Västmanland, Jönköping, Kronoberg, Blekinge, Värmland, Västerbotten and Norrbotten.

effect of the decriminalization of public drunkenness, which takes the value 0 before January 1, 1977 and 1 after. The following general model will thus be estimated:

$$\ln H_t = a + b \cdot D77_{jul} + c \cdot D77_{jan} + \ln N_t$$

where H denotes the hospitalization rate (age-specific), a marks the constant, $D77_{jul}$ is the dummy variable representing the repeal of medium-strength beer, $D77_{jan}$ a dummy variable for the decriminalization of public drunkenness and N denotes the noise term in which other etiological factors are modeled and estimated in terms of auto-regressive (AR) and moving-average (MA) parameters. The estimated effect of the repeal is obtained by calculating $(1 - e^b) * 100$ where b is the estimated effect parameter for the repeal, expressing the percentage change in the hospitalization rate, which is assumed to be permanent. (The percentage change is obtained since hospitalization rates are transformed into the natural logarithm). The estimated effect parameter for the decriminalization, c , is calculated and interpreted in the corresponding way.

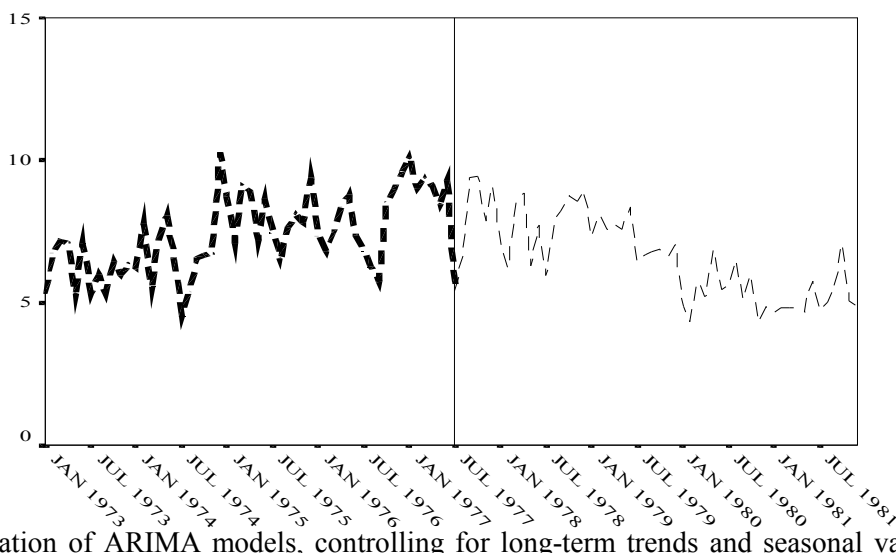
For all hospitalization time series except motor vehicle accidents, a regular differencing removed the trend in the data and the remaining temporal structure was estimated with a seasonal auto-regressive term (AR-term of order 12) and a moving-average parameter of order 1, MA(1). (This model is denoted (12, 1, 1) in the tables). For hospitalizations due to motor vehicle accidents, a very strong seasonal variation was observed with a peak in the summer. Thus in this case a seasonal differencing combined with a seasonal auto-regressive term removed the temporal structure in the series, in some models also with a MA(1) term. (Models denoted (12, 12, 0) or (12, 12, 1) in the tables). The Box-Ljung Q-statistic was used to test that no significant temporal structure remained after model estimation.

Results

Hospitalizations directly attributed to alcohol

Figure 1a shows the development in AAA-hospitalizations rates (per 100,000) for the age group assumed to be most affected by abolishing medium-strength beer in grocery stores, i.e., people below 20 years old. According to eyeball inspection, the development gives the impression that the repeal reversed an increasing trend in alcohol-related hospitalizations.

Figure 1a. AAA-hospitalization rates per 100,000 aged 10–19 years.



Estimation of ARIMA models, controlling for long-term trends and seasonal variation in the data as well as for the decriminalization of public drunkenness, confirms this conclusion. In fact, a statistically significant impact from the repeal is estimated to represent a reduction of fully 20 per cent (Table 2).

Table 2. Estimated intervention effects of the repeal of medium-strength beer and of decriminalization of public drunkenness on alcohol-related hospitalizations by age groups.

	Estimate for repeal of medium-strength beer	SE	Estimate for Decriminalization	SE	Model
AAA-diagnoses					
10-19	-0.225*	0.107	0.163	0.109	(12,1,1)
20-39	0.002	0.033	0.064(*)	0.038	(12,1,1)
40-59	-0.062	0.039	0.040	0.044	(12,1,1)
60+	-0.054	0.037	0.061	0.042	(12,1,1)
Alcohol intoxication					
10-19	-0.159	0.116	0.222(*)	0.113	(12,1,1)
20-39	-0.104	0.071	0.240**	0.073	(12,1,1)
40-59	-0.051	0.090	0.219*	0.089	(12,1,1)
60+	-0.036	0.153	0.212	0.152	(12,1,1)

(*) $p < 0.10$, * $p < 0.05$, ** $p < 0.01$ *** $p < 0.001$. Box-Young Q-tests (lag 12) for residual autocorrelation are satisfactory in all models

Figure 1b displays the trend for older age groups where no corresponding obvious decline is observed after the repeal. However, the increase before the intervention levels off somewhat, and even starts to decline around 1980. This is echoed in the statistical analysis, where the intervention effect is negative but statistically insignificant for the two older age groups and weakly positive for the age group 20-39 years. Moreover, the parameter estimates for the decriminalization of public drunkenness are all positive, but statistically significant only for the age group 20-39 years.

The possibility that the consequences from removing medium-strength beer from grocery stores and decriminalizing public drunkenness are more pronounced for an acute consequence like alcohol intoxication was also tested. Trends in hospitalization rates for alcohol intoxication shows that an increasing trend during the pre-intervention period is clearly broken after the repeal for the two younger age groups, in particular for those below 20 years of age but not for the older age groups (Figure 2a-b).

Figure 1b. AAA-hospitalization rates per 100 000 in the age groups 20-39, 40-59 and 60+.

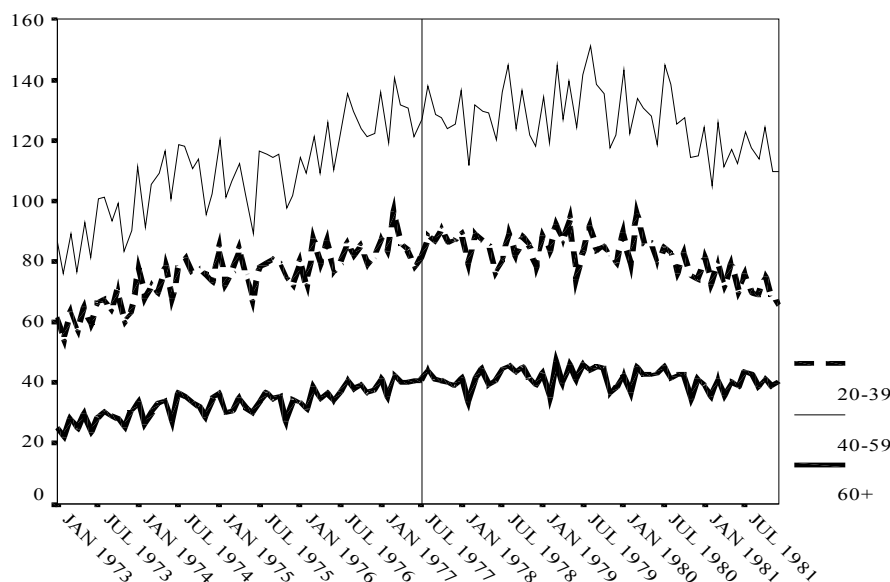


Figure 2a. Hospitalizations with an alcohol intoxication diagnosis per 100,000 aged 10–19 and 20–39.

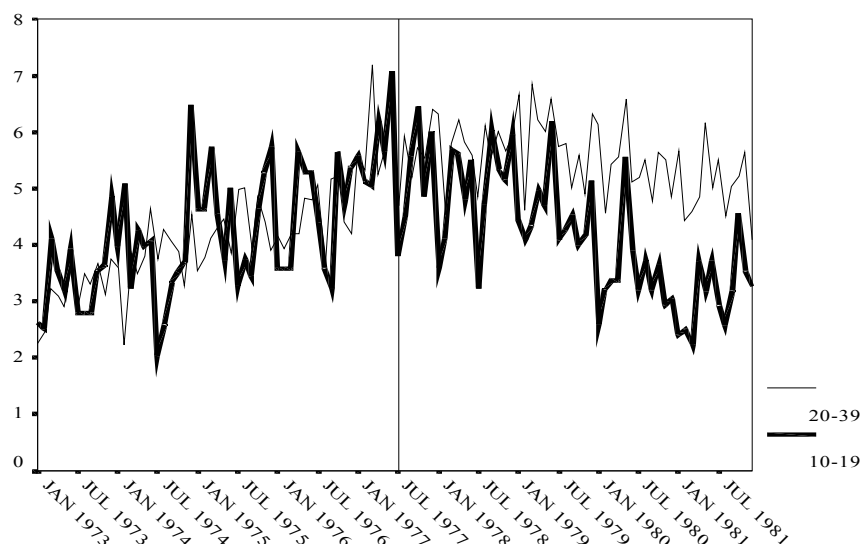
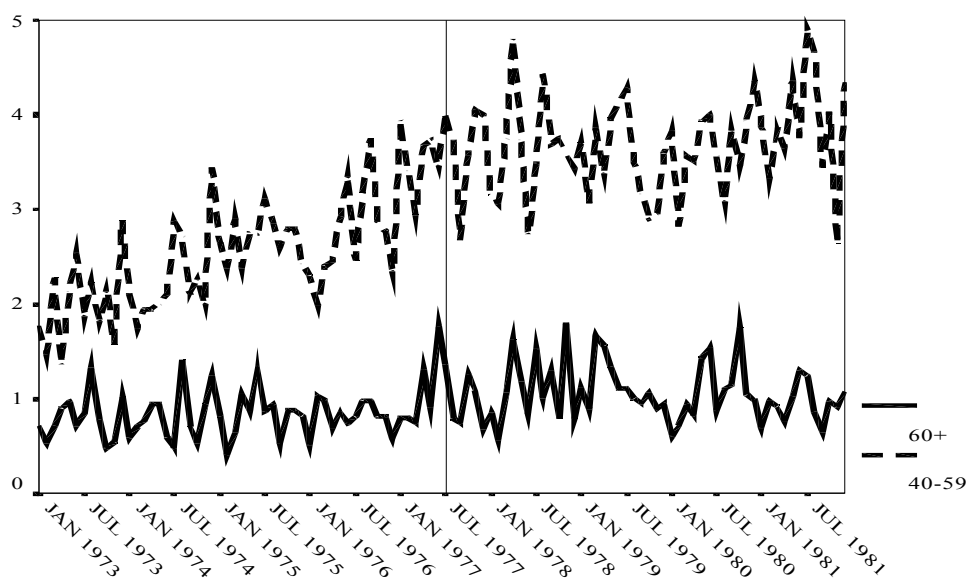


Figure 2b. Hospitalizations with an alcohol intoxication diagnosis per 100,000 aged 40–59 and 60+.



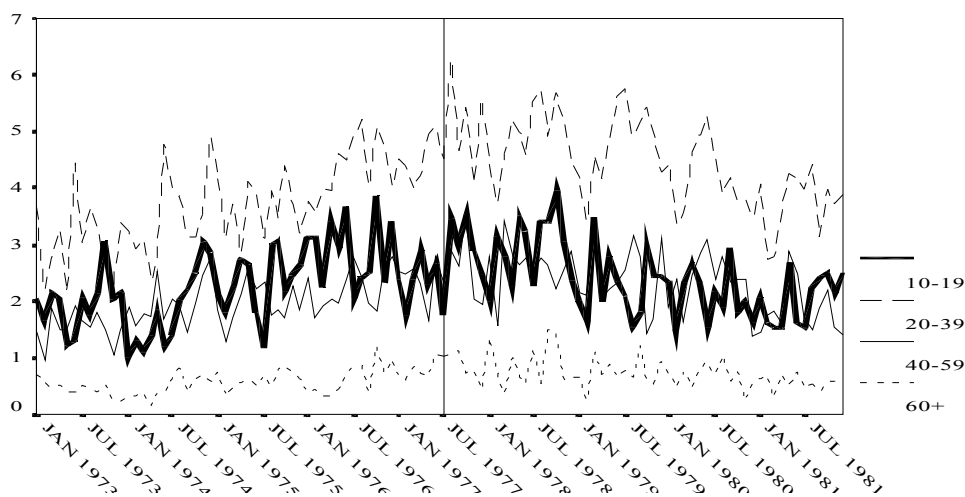
This pattern is also confirmed in the estimation of ARIMA-models, where larger negative estimates are obtained for the younger age groups as compared with the estimates for the older groups (Table 2). However, no estimate reaches statistical significance.

In all age groups, the decriminalization of public drunkenness was associated with an increase in hospitalizations for alcohol intoxication by 20–25 per cent and the estimates reached statistical significance in the three youngest age groups. Thus, the number of hospitalizations with alcohol intoxication diagnoses appears to have increased as a result of this reform.

Hospitalizations indirectly related to alcohol

To further illuminate if the repeal had any effect on alcohol-related harm, some other diagnoses where alcohol is a well-known risk factor will be analyzed, namely diagnoses of violence (attempted murder, manslaughter and assaults), attempted suicide, accidental falls and motor vehicle accidents. As can be seen in Figure 3, the post-intervention period displays a general decreasing trend in assaults, whereas the pre-intervention period is characterized with an increasing trend.

Figure 3. Hospitalizations with attempts at homicide, manslaughter and assaults per 100,000 aged 10–19, 20–39, 40–59 and 60+.



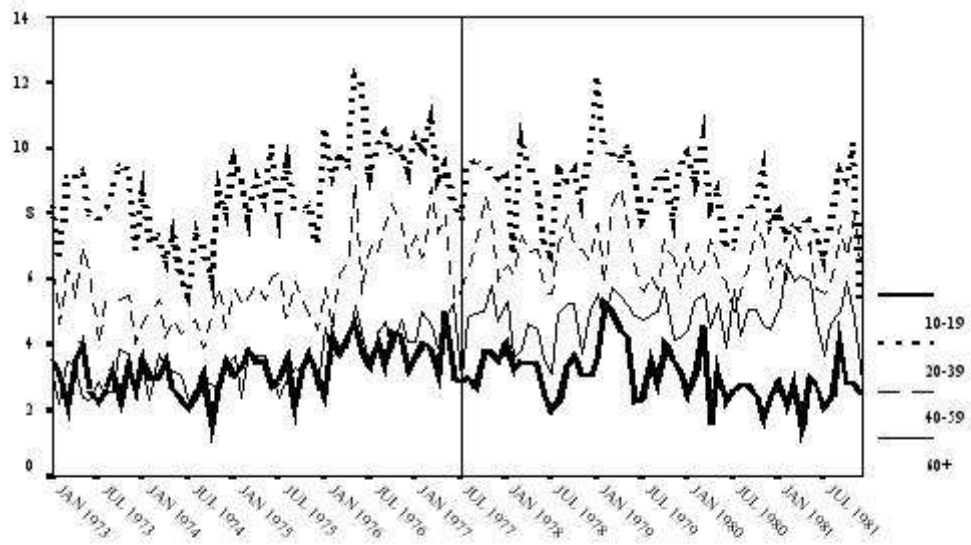
This ocular impression is however not verified in the ARIMA model estimation, since no estimate reaches statistical significance and three out of four estimates are positive (Table 3).

Table 3. Estimated intervention effect of repeal of medium-strength beer and of decriminalization of public drunkenness on alcohol-related hospitalizations by age groups.

	Estimate for repeal of medium-strength beer	SE	Estimate for Decriminalization Of public drunkenness	SE	Model
Assaults					
10–19	0.138	0.163	-0.256	0.163	(12,1,1)
20–39	-0.014	0.087	0.012	0.087	(12,1,1)
40–59	0.067	0.131	0.047	0.131	(12,1,1)
60+	0.080	0.214	0.102	0.213	(12,1,1)
Suicide					
10–19	-0.126	0.137	-0.060	0.137	(12,1,1)
20–39	-0.017	0.103	-0.027	0.103	(12,1,1)
40–59	-0.113	0.094	-0.025	0.094	(12,1,1)
60+	-0.090	0.088	0.052	0.088	(12,1,1)
Falls					
10–19	-0.050	0.070	-0.062	0.070	(12,1,1)
20–39	-0.037	0.058	0.024	0.058	(12,1,1)
40–59	-0.055	0.072	-0.082	0.072	(12,1,1)
60+	-0.041	0.059	-0.007	0.059	(12,1,1)
Motor vehicle accidents					
10–19	-0.151*	0.073	0.070	0.073	(12,12,1)
20–39	-0.045	0.056	0.127*	0.056	(12,12,0)
40–59	-0.153*	0.667	0.278***	0.667	(12,12,1)
60+	-0.159**	0.058	0.196***	0.058	(12,12,0)

(*) $p < 0.10$, * $p < 0.05$, ** $p < 0.01$ *** $p < 0.001$. Box-Young Q-tests (lag 12) for residual autocorrelation are satisfactory in all models. With respect to hospitalizations due to attempted suicides, there is a weak tendency for the removal of medium-strength beer to halt an upward trend for all age groups (Figure 4).

Figure 4. Hospitalizations with attempted suicides per 100,000 aged 10–19, 20–39, 40–59 and 60+.



The outcome of the model estimation confirms this impression: the estimates in all age groups are negative, except from the oldest, but without reaching statistical significance (Table 3). Furthermore, there is no effect on hospitalizations for accidental falls in any age group (Figure 5), which also is verified in the statistical analysis. Although the effect estimates in the majority of models are negative, no individual outcome is even close to statistical significance.

Figure 6 shows the trend in motor vehicle accidents, which appear to have a peak around the time for the intervention, although a considerable seasonal variation in the data makes it difficult to read the trend.

Figure 5. Hospitalizations with accidental falls per 100,000 aged 10–19, 20–39, 40–59.

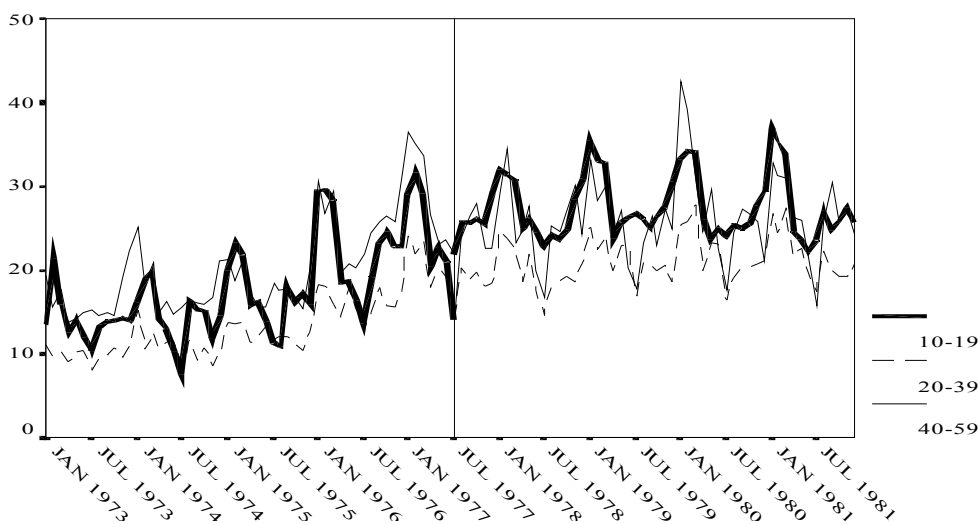
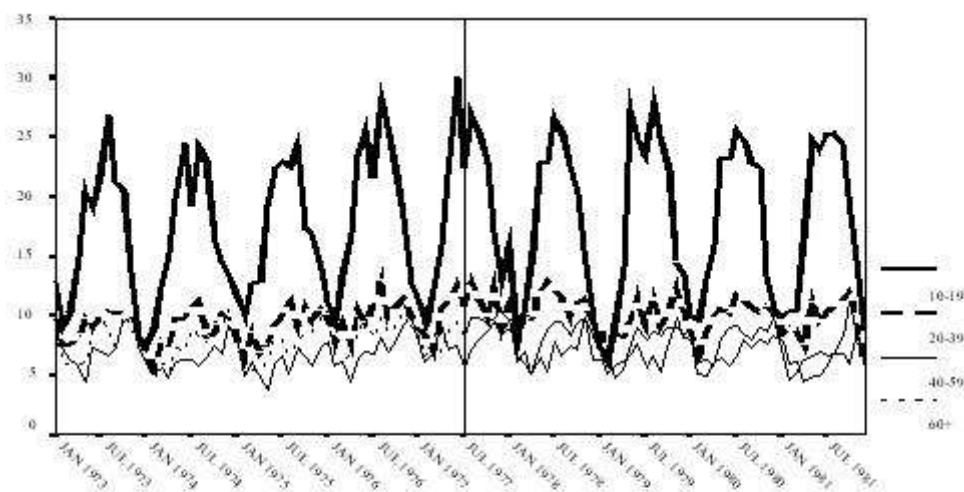


Figure 6. Hospitalizations with motor vehicle accidents per 100,000 aged 10–19, 20–39, 40–59 and 60+.



Positive and statistically significant estimates are, however, obtained in three age groups: motor vehicle accidents declined significantly by about 15 per cent after the repeal among those 10–19 years, 40–59 years and 60+.

The parameter estimates for the dummy variable, representing the decriminalization of public drunkenness, show a similar pattern, in that statistically significant estimates are only found for motor vehicle accidents, whereas no other estimate reaches statistical significance. However, in this case the association is positive, suggesting that motor vehicle accidents increased after decriminalization by between 10 and 30 per cent.

Discussion

The abolition of sales of medium-strength beer in Swedish grocery stores in July 1977 was followed by a reduction in Swedes' alcohol consumption that most likely was particularly marked among young people, the group that had gained most from the former high accessibility of this type of beer. However, in an earlier evaluation of this reform no effect on alcohol-related harm rates in the adult population was found whereas several indications of diminishing alcohol problems among young people were observed. In this chapter, I have tested this conclusion by analyzing monthly variations in different alcohol-related hospitalizations between 1973 and 1981 in various age groups by means of ARIMA impact analysis.

The results gave support to previous findings of a reduction in alcohol-related harm among young people, but revealed also indications of a reduction in the adult population. AAA-diagnoses (alcoholism, alcohol psychosis and alcohol intoxication) declined significantly only among young people after medium-strength beer was removed, whereas motor vehicle accidents declined significantly also in two of the older age groups. This suggests that removing medium-strength beer from grocery stores was associated with fewer alcohol-related problems not only among teenagers but also among older segments of the population. However, the picture is not clear-cut: hospitalizations related to violence, attempted suicides and accidental falls, were not significantly affected by the repeal in any age group.

The analysis also showed that the decriminalization of public drunkenness in January 1977 was associated with significantly increasing hospitalizations due to alcohol intoxication and motor vehicle accidents. Considering the sharply declining number of persons taken into custody by the police during 1977, the increase in alcohol intoxication hospitalizations might appear surprising. However, it might be explained by the fact that main purpose of the decriminalization reform was to offer treatment and that a higher fraction of those taken into custody might have been sent to hospitals. Moreover, the increase in alcohol-related motor vehicle accidents could be related to the reduced number of drunken persons taken into custody during 1977, which implied that more people could continue drinking and subsequently experience an elevated risk of running into a motor vehicle accident.

Still, a couple of cautious remarks are needed. First, with regards to the data, a potential pitfall is the incomplete coverage of somatic hospitalizations. Although the largest areas were included in the analysis, there is a small risk that complete nation-wide coverage would have produced a different result.

There are also some methodological considerations to be made, although the statistical model implies a reduced risk of obtaining spurious relationships by removing trends and seasonal variation in the data (see e.g. Skog 1986). Still,

without a control area, there is always a risk that the estimated sudden-permanent effect to some extent is produced by the impact of other factors during the post-intervention period, in this case between August 1977 to December 1981. For instance, the significant decline in alcohol-related hospitalizations in July 1977 observed in some analyses, might have become permanent because the issue of alcohol as a serious societal problem was very much on the agenda during this period. More severe restrictions on alcohol advertisement (law changes) were introduced in 1978 (Sulkunen et al. 2000), and alcohol rationing returned as an issue pursued by physicians in 1980 with some support in the general population (Tigerstedt 2000).

On the other hand, other factors known to affect alcohol sales, such as real alcohol prices and real disposable incomes were stable between 1978 to 1981 (Ramstedt 1998). Moreover, exactly at the same time as the medium-strength beer reform, the random controls of customers at retail monopoly stores (by the so-called 'red lamp' technique) was abolished. These controls were a way of checking that the customer was not on the so-called blacklists of those forbidden to purchase alcohol. These lists contained persons sentenced for drunkenness, and included 11,000 people as late as in 1974 (Tigerstedt 2000). It is unknown whether this change had any significant effects. However, the increasing possibility to buy alcohol for this group of heavy drinkers would in that case be associated with higher rates of alcohol-related hospitalization, and thus, counteract a possible reduction caused by the repeal.

With the above-mentioned cautious remarks in mind, this study has confirmed previous results suggesting that alcohol-related problems among young people in Sweden declined after the repeal of medium-strength beer. However, it seems also that a slight modification of previous conclusions on the Swedish experience with medium-strength beer might be needed. In fact, some alcohol-related problems appear to have declined also among older age groups, when availability of medium-strength beer was limited to monopoly stores only.

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CHAPTER 7

The strike hits

The 1982 wine and liquor monopoly strike in Norway and its impact on various harm indicators

Ingeborg Rossow

Studies of how strikes on the alcohol supply side may affect alcohol consumption and alcohol related harms have been conducted on a number of occasions, and generally as an assessment of how a significant, although temporary, change in availability of alcohol may affect consumption and harms. Throughout this book we aim at assessing whether various alcohol policy measures, or the like, may affect various consumer groups or demographic groups differently. Previous strike studies from Sweden, Finland and Norway (see Mäkelä, Rossow & Tryggvesson in this book) have indicated possible differential effects of strikes in the wine and liquor outlets; i.e. the reduced availability of alcohol during the strikes seems to have had a stronger impact on the heaviest drinkers than on the majority of drinkers.

The strike at the Norwegian wine and liquor monopoly company in 1978 was studied quite thoroughly in terms of assessment of impact on consumption as well as various harm indicators (Horverak & Nordlund 1983). The findings were that the overall consumption was reduced only moderately, in the magnitude of 5–10% during the strike period. However, there were marked reductions in arrests for drunkenness and domestic disturbances, and a marked decrease in number of admissions to alcohol detoxification, whereas only a modest decrease in road traffic accidents and drunken driving was observed, and no change in admissions to casualty ward beyond a significant decrease in injuries from falls. Thus, Horverak (1983) concluded from these findings that for most people the strike did not have any impact on alcohol consumption or harm, whereas for the most heavy drinkers and skid-row alcoholics the strike appeared to have a significant impact in terms of less drunkenness and alcohol related harms.

From 1978 to 1986 there were four strikes at the production facilities of the wine and liquor monopoly in Norway. The 1982 strike was the most comprehensive of these strikes and lasted for 100 days (August 27 to December 9). It was also the longest strike in any industry in Norway after the Second World War (Hamran & Myrvang 1998).

The 1982 strike started in the production facilities in Oslo, which served the retail outlets in the south and eastern parts of Norway, and was followed by strikes in the other production facilities in Bergen, Hamar and Trondheim in late October. The effect of the strike did not reach the customers immediately, as the retail outlets sold from their stocks, but the selection of beverages was reduced in a short time. The outlets in the south and eastern part of Norway were closed during September, but a number of outlets were kept open during October, and the last outlets were closed by November 20. Allowing a small delay from starting up the production again after December 9, the retail outlets were re-opened during the period December 15–20. The sales of liquor and wine were significantly reduced in 1982 compared to 1981, i.e. liquor sales were 24% less than in 1981 (and 7% less than in 1983), and sales of fortified wine and table wine were 22% and 18% less than in 1981. The reduction in sales was significantly larger in Oslo than in the other large cities in Norway, probably owing to the fact that the strike lasted longer in Oslo. The total alcohol sales in 1982 were, however, only 10% less than in the preceding year, and 1% less than in the following year. This was due to the fact that beer sales increased by 4% from 1981 to 1982 and decreased again in 1983, which implies that the reduced availability of wine and liquor during the strike in part was compensated for with a shift towards beer. A similar observation was made during the 1978 strike (Nordlund & Horverak 1983). There are no indications neither of the extent to which the illegal alcohol market was expanded during the 1982 strike, nor to what extent border trade and legal home production of wine and beer increased. Studies from the 1978 strike indicated that nearly half of the reduction in sales of wine and spirits was compensated for by alternative sources of alcohol (Horverak 1983).

Thus, although the impact on overall consumption may have been very limited, the experiences from the previous strike studies in Norway, as well as in Finland and Sweden, imply that the impact of the 1982 strike in Norway might also have had a differential impact on various consumer groups. Given the rather modest reduction in the registered total consumption (which may have been even more modest if border trade and illegal production and sales increased), it is likely that the strike did not have much effect on the overall amount of alcohol-related harm. On the other hand, it can be argued that in order to get around the reduced liquor (and wine) availability during a strike, a certain amount of initiative and reasonable financial resources would be required, and further that such initiative and resources would not be expected among the very heavy consumers and skid-row alcoholics.

In this study the purpose was to assess whether the 1982 strike in the Norwegian wine and liquor monopoly did affect the heavier and more marginalized drinkers more strongly than other consumer groups, and thus to explore whether the findings from the previous Nordic strike studies could be validated. Hence, it was *a priori* hypothesized that the group of drinkers where we would expect the largest impact of the strike would be the very heavy drinkers and particularly the skid-row alcoholics. This group was assumed to constitute the majority of the admissions to the detox center, and to constitute a significant proportion of those sanctioned for drunk and disorderly conduct. They were assumed to constitute a smaller fraction of those sanctioned for drunken driving and reported for violent crimes. Hence, it could be hypothesized that if the 1982 strike were found to have any impact on these indicators, the impact would be larger on admissions to the detox center and arrests for drunk and disorderly conduct than on drunken driving and violent crimes.

Data and methods

The previous studies of the 1978 strike (Horverak & Nordlund 1983) were planned and undertaken during and immediately after the strike period, and thus access to detailed data from police and hospital registers, detox centers and other valuable sources of information (such as survey data) could be secured. The evaluation of the 1978 strike was also primarily based on comparisons of various harm indicators during the strike period and the corresponding weeks in the preceding year.

Corresponding analyses of the 1982 strike were, however, not possible, as the data at such a detailed level (i.e. week by week and for a limited geographical region) were no longer available. An alternative approach was therefore to apply data from longer time series of the same harm indicators, where each data point represents either a quarter of a year or a full year, and mostly national data. Time series of admissions to the largest detox center for alcohol abusers (mostly skid-row alcoholics) were available from another project at the National Institute for Alcohol and Drug Research (Rossow et al. 1998), the data being aggregated from event level data on all admissions during the period 1972 (when the detox center was opened) to 1996. These time series were constructed both as series of annual data and as series of quarterly data. Time series on other alcohol related harms were based on national data and the numbers were calculated into rates per 1,000 inhabitants. These series comprised: sanctions for drunken driving (annual data) for the years 1960 to 1999; reported violent crimes (annual data) for the years 1960 to 1999; and sanctions for drunk and disorderly conduct (annual data) for the years 1971 to 1996. The time series for drunk and disorderly conduct was rather short due to the fact that parts of the Act on vagrancy ('Løsgjengerloven'), e.g. sanctions for public drunkenness, were abolished in 1970, and hence the figures on sanctions in this category differ too much before and after 1970 to constitute a meaningful time series. Data on admissions to hospitals or emergency rooms were not available.

Statistical analyses

A possible impact of the 1982 strike was analyzed with the technique for time series analysis that has been suggested by Box & Jenkins (1976), often referred to as ARIMA-models. Since this method requires stationarity, and these data exhibit time trends, the analyses were performed on the differenced series — in other words, rather than using the raw series the yearly changes are analyzed. The advantage of such a procedure is that it greatly reduces the risk of obtaining a spurious correlation, i.e. a Type I error (e.g. see Skog 1986). The disadvantage is, on the other hand, an increased risk of a Type II error (acceptance of a false null-hypothesis). Further, the noise term, which includes explanatory variables not considered in the model, is allowed to have a temporal structure that is modeled and estimated in terms of moving average (MA) or auto-regressive parameters (AR). Semi-logarithmic models were specified based on the argument that the hypothesized effect of the 1982 strike on various harm indicators may trigger the impact of other factors of importance to alcohol related harms, whereby the impact of the strike would be proportional to the preexisting level of harm. Moreover, by arriving at estimates of the relative impact of the strike on various harm indicators, comparisons across these indicators could be drawn. Thus, in the time series analyses based on annual data the specified model was of the form:

$$\nabla \text{Ln}Y = \alpha + \beta \nabla X + \nabla \text{Ln}N,$$

where ∇ is the difference operator, Y denotes the output series (either drunken driving, violent crimes, drunk and disorderly conduct or admissions to detox), α is the constant term (which can be interpreted as the average trend in the harm indicator rates due to other causes), X is the input series (a dummy variable for the 1982 strike), β is the effect parameter, and N is the noise term (including other causal factors). In the analysis of admissions to detox based on quarterly data, the dummy variable for the strike took the value 1 for the fourth quarter of 1982 (i.e. the period during which the strike was effective), and seasonality was also taken into account in the model specification.

Results

Admissions to detox center

As shown in Figures 1a and 1b, the number of admissions to the detox center in Oslo were on a decreasing trend from the late 1970s and throughout the 1980s and 1990s. The year 1982, and particularly the fourth quarter of that year, seems to represent a downward deviation from this trend, the number of admissions to detox being significantly lower during the strike period than in the preceding and succeeding periods. Time series analyses also showed a statistically significantly lower number of admissions due to the strike period. The estimate implies a 41% reduction in admissions during the strike when the quarterly series was analyzed (Table 1). When the annual series of admissions to detox was analyzed, the impact of the strike was significantly lower and not statistically significant (Table 2). This is in accordance with the expectations, as the strike period was mostly in effect during the fourth quarter of 1982, and a stronger impact on admissions could be expected for this specific period than for the entire year of 1982.

Figure 1 a. Number of admissions to a detox center in Oslo by year.

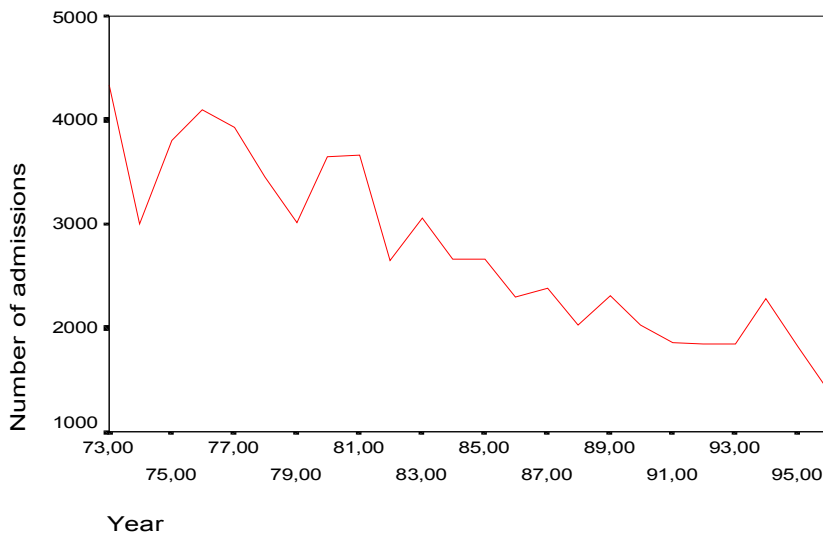


Figure 1 b. Number of admissions to a detox center in Oslo by quarter of a year, the period 1981 to 1984.

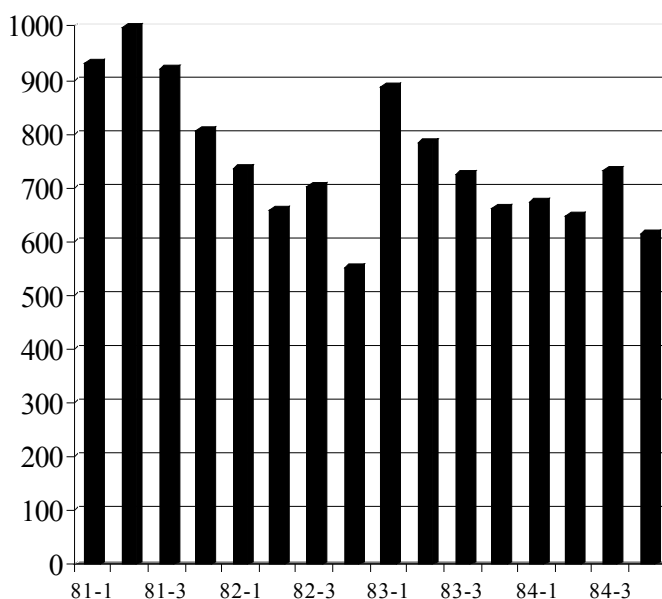


Table 1. Estimated effect of the 1982 strike on admissions to a detox center. Semi-logarithmic models estimated on quarterly data.

	Regression coefficient	Standard error	T-ratio
AR1	-0.287	.108	-2.67**
SAR1	-0.766	.113	-6.80***
SAR2	-0.507	.146	-3.47***
SAR3	-0.482	.132	-3.66***
SAR4	-0.340	.125	-2.72**
Strike -82	-0.347	.115	-3.02**
Constant	0.00003	.005	0.01 ns

Levels of statistical significance:

*** $p < .001$

** $p < .01$

ns $p > .05$, not statistically significant

Table 2. Estimated effect of the 1982 strike on sanctions for drunken driving, of reported violent crimes and of admissions to a detox center. Semi-logarithmic models estimated on annual data.

	Sanctions drunken driving	Reported violent crimes	Sanctions drunk & disorderly conduct	Admissions to detox center
Effect strike 82	--0.01 ns	-0.09 *	-0.03 ns	-0.21 ns
Standard error	0.06	.03	0.09	0.12
Error term	MA1	MA1	MA1	AR1
Box-Ljung	8.21 (p=.41)	5.79 (p=.67)	6.73 (p=.57)	5,51 (p=.79)

Levels of statistical significance:

* $p < .05$

ns $p > .05$, not statistically significant

Other harm indicators

Figures 2, 3 and 4 show very different trends for the three indicators of alcohol related harms. Sanctions for drunken driving increased significantly throughout the 1960s and most of the 1970s, and decreased again in the late 1980s and 1990s. Sanctions for drunk and disorderly conduct decreased significantly throughout the period from 1972 to 1996, whereas rates of reported violent crimes increased quite dramatically from the 1960s to the late 1990s. As shown in Table 2, no significant deviation from the trend was found for the year 1982 with respect to drunken driving and drunk and disorderly conduct, whereas a modest negative effect was found with respect to reported violent crimes, i.e. the violent crime rates were 9.4% lower. Figure 5 shows the registered alcohol sales (in litres of pure ethanol per inhabitant 15 year +) for comparison with the time series on the various harm indicators.

Figure 2. Rates of sanctions for drunken driving (numbers per 1,000 inhabitants) by year.

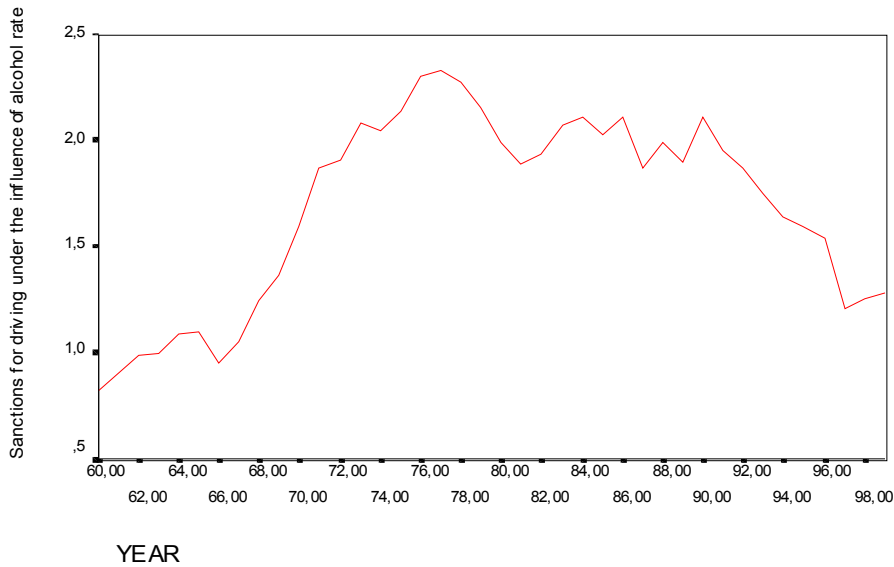


Figure 3. Rates of sanctions for drunk and disorderly conduct (numbers per 1,000 inhabitants) by year.

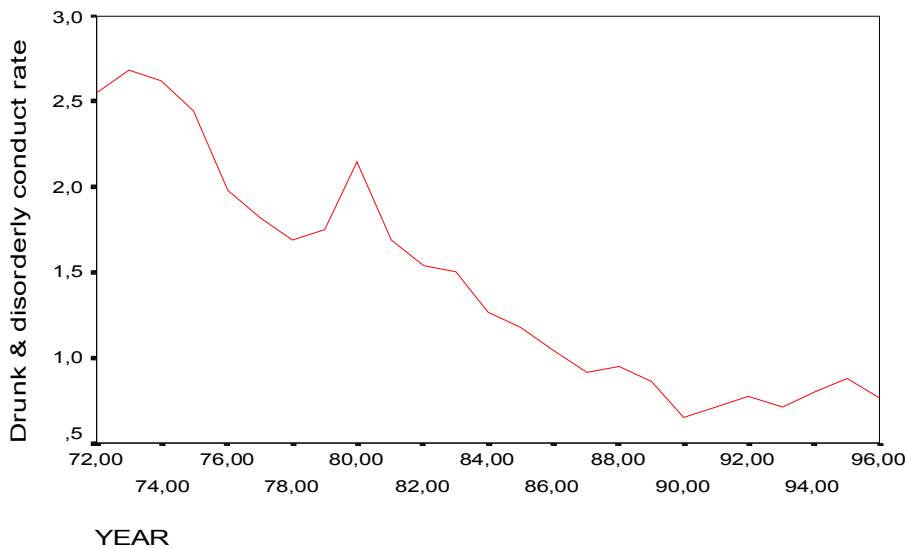


Figure 4. Rates of reported violent crimes (numbers per 1,000 inhabitants) per year.

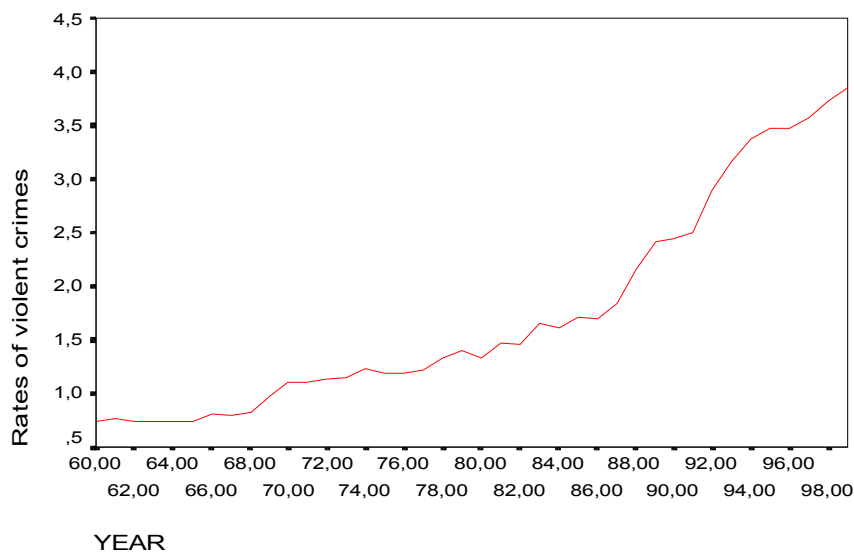
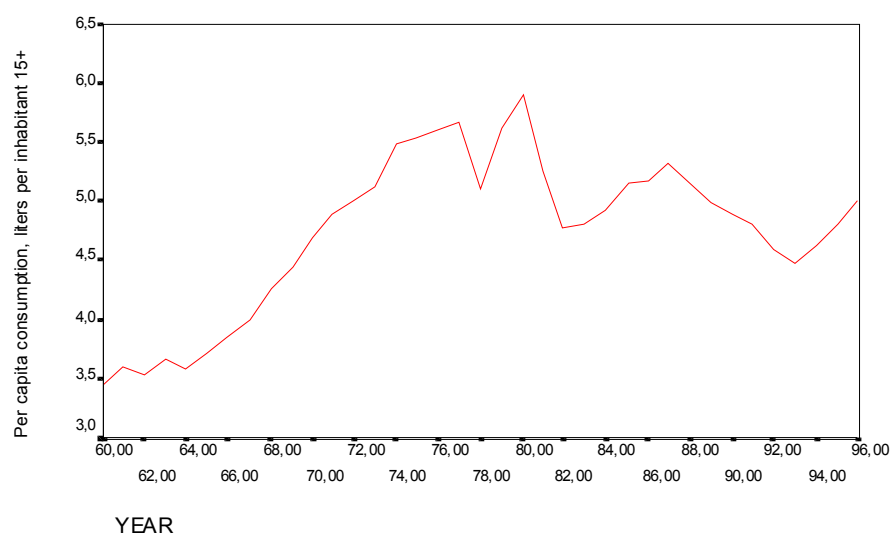


Figure 5. Alcohol sales in litres of pure ethanol per inhabitant 15 year + by year.



Discussion

Although the 1982 strike in the wine and liquor monopoly was quite extensive in terms of length of the strike, its impact on the national consumption level that year was probably rather modest. From that point of view it was not very likely that any impact on various harm indicators on the national level could be detected. Yet, it was assumed that if the 1982 strike had a stronger impact on the heavy drinkers and skid row alcoholics, the relative impact of the strike would be larger with respect to admissions to detox center and arrests for drunk and disorderly conduct than the impact on drunken driving and violent crimes.

However, the findings only support this hypothesis in part. Similarly to the findings from the 1978 strike, there was a significant reduction in admissions to the detox center, and the relative impact was larger than on any of the other harm indicators. Yet, no significant impact on drunk and disorderly conduct was found. This may, at least in part, be due to the fact that the time series were based on national data on an annual basis, whereas the strike primarily affected the Oslo area and southeastern part of Norway, and only for a quarter of a year. Moreover, the figures on sanctions for drunk and disorderly conduct reflect the police efforts and police priorities of resources, which may to a large extent also explain the diverging trends when compared to total consumption figures. A similar argument may be put forward with respect to the figures on sanctions for drunken driving.

In the analyses of the 1978 strike, it was found that the number of reported offences of domestic disturbance and violence was significantly lower during the (first part of the) strike, and it was argued that heavy drinkers and skid-row alcoholics to a large extent contribute to the cases of domestic disturbance and violence (Horverak 1983). Whether the relatively small but statistically significant effect of the 1982 strike on all reported violent crimes may be interpreted as being due to an effect primarily on the very heavy drinkers and skid-row alcoholics is, however, dubious. Yet, the relatively smaller effect estimate of the strike on violent crimes as compared to admissions to the detox center (comparing the effect on annual figures), is in line with the assumption of a stronger impact on very heavy consumers.

The findings from this study are thus much in line with those from the studies of the 1978 strike in Norway (as well as the strike studies from Sweden and Finland), supporting the view that a (temporary) limitation in the availability of liquor (and wine) seems to affect the most heavy and marginalized drinkers more strongly than other drinkers. Of relevance here is the finding from the medical detox ward in Manitoba, Canada where rates of admissions decreased during the period of a liquor strike, but did not decrease during the period of a beer strike (Harper et al. 1981). This may reflect the fact that very heavy drinkers and skid row alcoholics to a large extent may tend to drink and prefer to drink spirits to beer, which has been shown to be the case among Norwegian alcoholics (Krogh 1988). This preference for spirits among the heavy drinkers may thus to some extent explain why the wine and liquor store strike appeared to have a stronger impact on heavy drinkers than on other consumer groups.

The design of the present study was far from optimal, in the sense that most of the data could not be broken down to the weeks and the regions when and where the strike was in effect, and in this respect possible effects of the strike may well have been missed. On the other hand, the present empirical analyses have provided rather similar findings as those

reported from the 1978-strike study. Hence, given that similar inferences are drawn from studies that have applied different data sets and statistical methods, a stronger support can be claimed for a differential impact of a strike on alcohol-related harms.

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CHAPTER 8

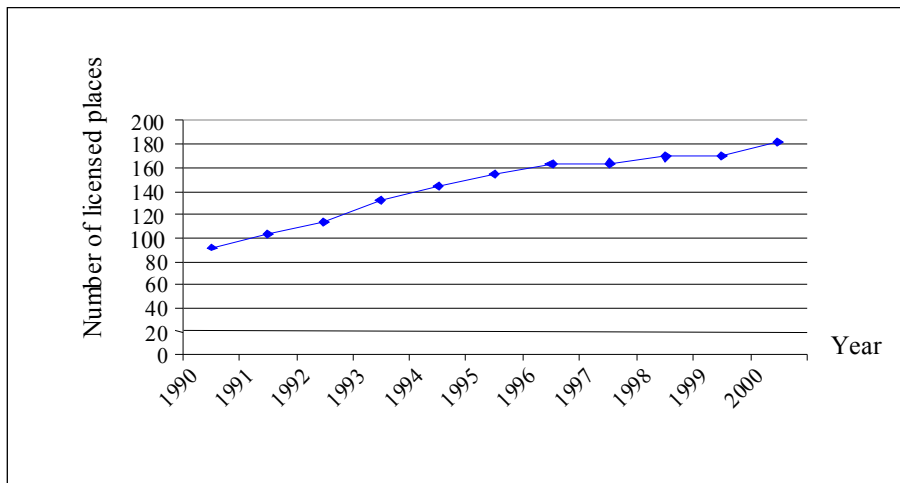
Effect of extended alcohol serving-hours in Reykjavík

*Borgerður Ragnarsdóttir, Ásgerður Kjartansdóttir
& Sigurlína Davíðsdóttir*

Introduction

Reykjavík, the capital of Iceland, despite being a small town on an international scale, with 111,500 inhabitants in December 2000, has acquired many symptoms of a cosmopolitan city during the last few decades. The supply and variety of entertainment has risen remarkably in a short while, with an increase in the number of liquor licenses (Figure 1). Almost all of the offers of entertainment are constricted to a very small area in the city center. Bars and restaurants outside that area are very few.

Figure 1. Number of liquor licenses in Reykjavík 1990–2000.



Until 1999, the alcohol serving-hours were restricted to 2 a.m. on weekends and 11.30 p.m. on other weekdays. During weekends, a crowd of people leaving restaurants and bars gathered at closing time in the city center and created a peak in the workload of service professionals. The waiting time for a taxi ride home could become long and tiresome, the police had a rough time and the emergency ward, situated about 1.5 miles from the city center, filled with people injured from fighting or falling. This situation gave rise to a discussion about the rules on alcohol-serving hours and ideas emerged about making them less restrictive. Those who spoke for the change argued that it would lead to a more even police-workload and maybe less problem drinking. Those against it expressed the opposite, that less restriction would lead to more drinking and related problems.

Since the revision of the Icelandic alcohol law in 1998, municipal councils are responsible for liquor licensing of restaurants and bars. In Reykjavík, the city council decided to initiate an experiment with unrestricted alcohol serving-hours at bars and restaurants. The experiment was initially intended to last for three months, from July 1999 to October 1999. Before the end of this period, the experiment was prolonged to one year, until July 2000, since a three months experience was not accepted as valid. An evaluation of the effect of the change was planned from the beginning. When the present evaluation, with the aim of assessing the effect of the experiment, was started in April 2000, the city council of Reykjavík had given out 33 permits for unrestricted serving-hours, 31 of them in a relatively small area, confined to the city center.¹

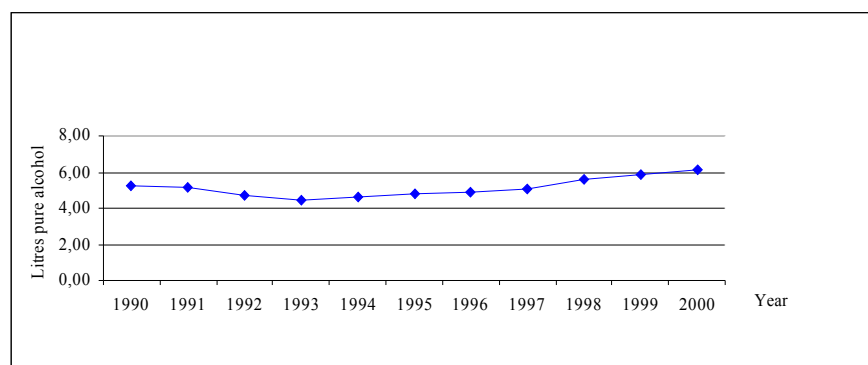
¹ Since the city council has income from liquor licenses and expenses from keeping order in the city, its conflicting interests called for external evaluators, who nevertheless had to have the city council's cooperation in order to obtain necessary information. The writers of this paper offered to the city council to do the evaluation as a final assignment in a course in program evaluation at the University of Iceland, under the supervision of Dr. Sigurlína Davíðsdóttir and in close co-operation with representatives from the city council of Reykjavík.

Restricted hours for alcohol serving

Availability theory, stating that increased availability of alcohol will lead to increased consumption and consequently more harm, is well known. The Ledermann model describes a direct relationship between the level of alcohol consumption per capita and the number of problem drinkers in any given population (Edwards et al. 1994, Chikritzhs et al. 1997). Thus it has been held that by restricting the availability of alcohol to diminish the total consumption the gain will be less harm. A number of studies support the idea that the density of outlets is very influential, such as studies on the effect of introducing beer into grocery stores (Mäkelä, Rossow & Tryggvesson in this book, Smith 1989). Another restrictive measure used is the control of hours and sales of alcohol in outlets, bars and restaurants. In general, greater restrictions have been associated with decreases in drinking and drinking problems such as levels of assaults and traffic accidents (Grube & Nygaard 2001, Chikritzhs et al. 1997, Smith 1990). Chikritzhs et al. (1997, forthcoming) recently evaluated the effect of extended trading permits in Perth, Australia. They found that the extended trading hours corresponded to a shift in timing of serious alcohol related problems, but also strong evidence for an increase in the levels of assault offences and that public opinion did not support the extension.

Ever since the end of prohibition in 1935 availability theory has been very influential in the formation of alcohol policy in Iceland, which is among the most restrictive in Europe. State-monopoly outlets have restricted availability of alcohol, days and hours of sale, high prices, an advertising ban and a lower age limit of 20 for the purchasing of alcohol. Last but not least, any beer stronger than 2.25% was banned in the country until 1989. All these measures have kept the registered consumption of alcohol in Iceland among the lowest in Europe up to this day (Ólafsdóttir 2000, Ólafsdóttir et al. 1997). Since the 1980s there has been a strong movement towards liberalization of alcohol policy. The introduction of beer into the Icelandic market was an important turning point (see Ólafsdóttir & Leifman in this book). Since then the number of state-monopoly outlets, restaurants and bars licensed to sell alcohol has risen markedly, both in the capital city of Reykjavík and throughout the country (Figure 1) and simultaneously the total per capita consumption of alcohol is on a steady rise since the country recovered from a short economic depression in the early 1990s (Figure 2). The latest move towards liberalization of alcohol policy was the experiment with unlimited serving-hours of pubs and restaurants in Reykjavík in 1999.

Figure 2. Annual sales of alcohol in Iceland, measured in liters pure alcohol per inhabitant aged 15 years and over, 1990–2000 (National Statistics Bureau).



Method

The evaluation was an attempt to assess the consequences of an experiment with unrestricted serving-hours for alcohol in Reykjavík. The consequences were evaluated in terms of crowds gathering in streets and bars in the city center and the workload of the police as well as the professionals at the emergency ward during weekend-nights.

Data was collected from: 1) statistics obtained from police reports and the emergency ward; 2) a telephone survey of all the 33 barkeepers who had permission to serve alcohol around the clock; 3) interviews with representatives for the inhabitants in the neighborhood of the city center, where most of the night life takes place, professionals in the tourism industry, street sweepers, restaurant inspectors and participants of the nightlife; and 4) two field visits. The data from the police and the emergency ward are not drawn from a sample but from reports that include all relevant incidents that happened in Reykjavík on the weekend nights chosen for data collection.

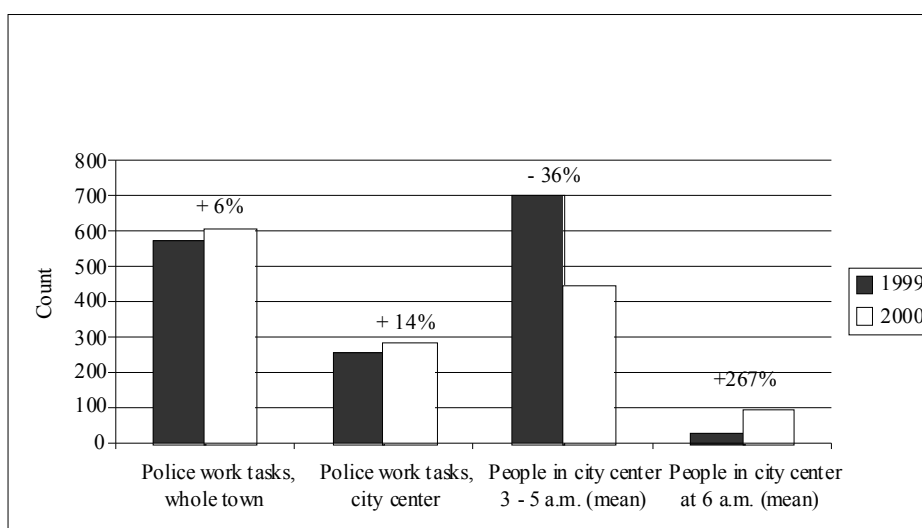
Data were obtained from the above-mentioned sources for eight weekend nights in March and April 1999 and eight weekend nights in March and April 2000. Weekend nights were defined as Saturday and Sunday nights between

midnight and 7 a.m. The nights were chosen to avoid disturbing effects from surveillance cameras that were hung up in the city center and introduced in the media late in the year 1998. Knowledge about these cameras might have influenced the behavior of city center crowds during the first months they were active. Weather conditions were also quite different in January and February 1999 than in the same months of 2000. The fact that this report was a final assignment in a university course also limited the possibilities in the choice of evaluation nights. Therefore March and April were selected for the comparison. Information from the police confirmed that no other particular events were taking place during these weekends, which might have influenced the crowding in the city center. Furthermore, police enforcement and the number of police officers on each shift did not undergo any changes in this time period.

Results

The results of the comparison are shown in Figures 3–5. As shown in Figure 3 the number of calls or work-tasks of the police in the city center rose in number from 251 in 1999 to 286 in 2000 (14%). In comparison, the number of police work-tasks in the whole town rose 6%, from 573 cases in 1999 to 610 in 2000. In police reports, there is a rough estimate of how many people are gathered in the streets at certain times during the nightshifts. Although the estimate may not be very accurate, fewer people are registered in the city center between 3 and 5 a.m. in year 2000 than in the previous year, as shown in the figure. Towards the end of the nightshift at 6 a.m., the opposite was true (Figure 3). Regrettably, the police do not register comparable data from other Reykjavík police districts.

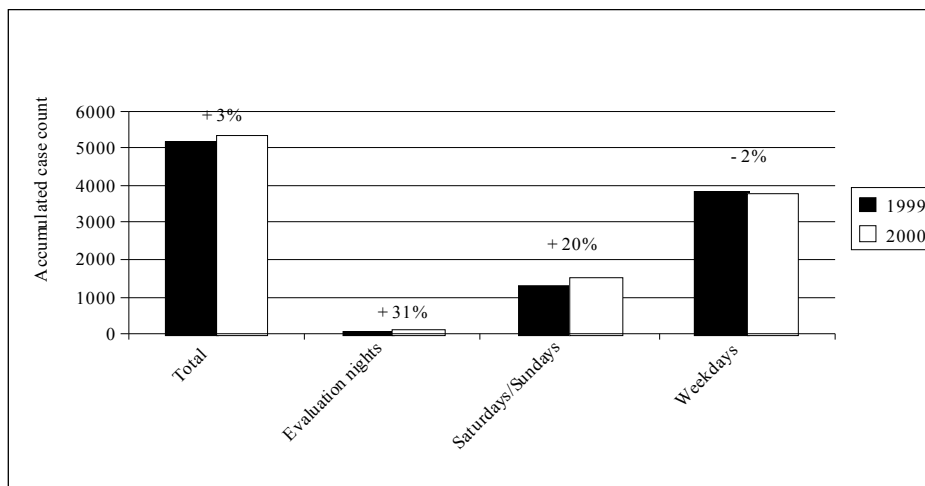
Figure 3. Count of police work-tasks and number of people in Reykjavík city center during evaluation nights in 1999 and 2000.



Answers from the telephone survey of 30 of the 33 barkeepers (91%) who had permission to serve alcohol around the clock showed that many of them made use of the extended hours, but to a differing extent. Some used the permission on special occasions but others on a more regular basis or depending on the atmosphere. The mean closing time after the change was 4:30 a.m. Saturdays and 5 a.m. Sundays. The earliest closing time was 3 a.m. and 10 a.m. the latest. 50% of the places kept open until after 4 a.m.

According to the reports from the emergency ward, the total number of cases admitted during the weekend-nights increased 31% between years (Figure 4). The total number of all admitted cases in March and April, regardless of the time of day, was only slightly greater than the previous year, or 3%. The number of cases admitted on Saturdays and Sundays rose 20% but decreased 2% during other weekdays. Because the nights of comparison are so few the relevance of estimating the differences of proportions is limited. The origin of the cases in terms of city districts is unfortunately not documented at the ward. It would have been interesting to have such data for the sake of comparison.

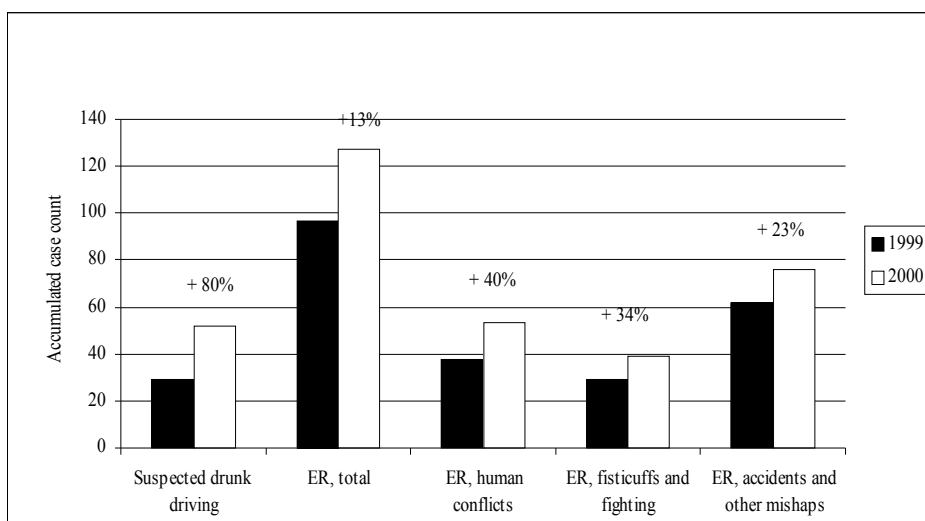
Figure 4. Admissions to ER in Reykjavík in March and April 1999 compared to March and April 2000.



In Figure 5, according to police reports, the number of cases of suspected drunk driving rose remarkably between the comparison periods, from 29 in 1999 to 52 in 2000 (80%)¹. The distribution of workload at the emergency ward during the chosen weekend-nights was more even in 2000 than in the previous year but the count of admissions per hour was greater. The reasons for admission to the emergency ward show that cases due to incidents often related to drinking increased markedly between the evaluation periods — by 23% for ‘accidents and other mishaps’ and by 34% for ‘fisticuffs and fighting’. The increase in such incidents was entirely among men; among women there was no difference between the years. Admission due to other undefined causes, self-hurt or suicidal attempts did not show any change between years. The ward does not register whether admissions are alcohol or drug related unless it is the actual reason for the admission.

Thirteen people who are residents or stakeholders in the city center were interviewed. On the whole, the interviewees agreed on the merit of longer hours, but within limits. Some residents and merchants found that there was increased disturbance because of the nightlife, and that the police were not receptive to their complaints. The street sweepers, who usually start working at 6 a.m., found it harder and more time consuming to keep the city clean after the change of the serving hours. They accommodated to the change as best they could by starting a little later and staying on a little longer, yet trying to finish before the early morning birds were stirring. Interviews with taxidivers gave similar findings. The lines of people waiting for a taxi-ride home were shorter but the drivers were busy for longer than before the change.

Figure 5. Reported cases of drunk driving and reasons for admission to the emergency ward during evaluation nights in 1999 and 2000.



¹ The BAC limit for driving in Iceland is 0.5mg% (0.05%). The police stop suspicious drivers for breath testing and if the alcohol in breath tests at 0.25 mg or more per litre of air, a blood test is required.

In the barkeeper survey 50% of the participants stated that there was a financial benefit from the extended hours. A similar percentage, 48%, found that there were more guests, and 43% said that they did not perceive an increase in the level of alcohol consumption among the guests, but 68% said the guests stayed longer despite later arrival. Field visits did not reveal any adverse effects, apart from a confirmation of what the street sweepers had said about litter in the streets.

Conclusion

The purpose of this evaluation was to find out whether the unrestricted serving-hours for alcohol in Reykjavík improved the situation of the nightlife in Reykjavík's city center, measured among other things in the workload of the police and the professionals at the emergency ward during weekend nights.

On the negative side the number of cases the police were concerned with rose after the change. Towards the end of the police nightshift at 6 a.m. people, were still gathered in the city center. This had not been taken into account in the planning of police shifts. The number of admissions to the emergency ward increased between the years. The numbers of admissions due to accidents often associated with drinking rose most in number. This is comparable to what was found by Chikritzhs et al. (1997, forthcoming) in Perth, Australia — that extended trading hours corresponded to an increase in the levels of assault offences and a shift in the timing of serious alcohol-related problems.

On the positive side, the change seemed to make the nightshift easier for the policemen, since people gathered less out in the street than before the change. This also applied for the workload at the emergency ward, which did not show the same peaks after 3 a.m. in 2000 as in 1999.

The change seems to have solved some problems related to the nightlife in the city, as predicted by supporters of the change, while giving rise to others that were not predicted by them. In the future, the city council should try to maintain the good effect of the change and try to improve the security of those seeking the nightlife, for example by making sure that police nightshifts cover the nightlife hours properly.

Despite the limitations of this evaluation, given the restriction the authors had to deal with in terms of time, access to relevant data and the limitation of the accessible data, it takes into account different perspectives of the effects of an experiment with changes of alcohol serving hours. Several findings would be interesting to investigate further. The data from the emergency ward give rise to many questions, for example on the gender differences found. It would also be interesting to analyze further the cases of police involvement in the city center, in comparison with other areas of the city. An evaluation spanning a longer time, making possible more advanced statistical analyses would have been preferable. Most useful, however, is the lesson learned about the importance of taking an evaluation into account already in the planning process for an experiment of this kind. Before starting the experiment it should be decided which data the evaluation will be based on to give opportunity for a full before and after evaluation.

Afterwards

The city council of Reykjavík decided to prolong the unlimited serving-hours for one more year, until July 2001. It should be added that in the summer of 2001, towards the end of extended experimental period, the city council decided to restrict the serving-hours in the city center to 5.30 a.m. in the weekends, 2 a.m. on Thursdays and 1 a.m. on other days. This change was made in response to a request by the Reykjavik police department and the city center steering group, in response to reports of growing nightlife-related problems in the city center.

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CHAPTER 9

Legal restrictions resulted in a reduction of alcohol consumption among young people in Denmark

Lars Møller

Introduction

In a Scandinavian perspective, alcohol consumption in Denmark is very high, but it has been more or less constant over the past 25 years. In 2000 the sale of alcohol amounted to 11.6 litres of pure alcohol per person over the age of 14. Like most countries in Western Europe, Denmark experienced a considerable increase in alcohol consumption during the period 1950 to 1980 (National Board of Health 2001).

Young people in Denmark have a relatively early alcohol début, and retrospective studies show that 30% of 11-year-old children have already had their alcohol début (Sabroe & Fonager 1996). Another study has shown that about 20% of boys and 10% of girls in the fourth and fifth grades (approximately ages 10 to 11) have been drunk (Sabroe & Lindgaard 1997).

Both in a Scandinavian and in an international perspective, alcohol culture in Denmark is very liberal. There is easy access to alcohol and norms with regard to when alcohol may be consumed are liberal. It has almost been a Danish tradition that young people should learn to drink alcohol in the home, and preferably they should be drunk for the first time together with their parents. Most young people are allowed to drink alcohol at the time of their religious confirmation, around the age of 14.

In 1997 a widespread debate started in the Danish media, focusing on alcohol habits among young people. There were several reasons for this, one of that was the launching on the Danish market of soft drinks mixed with alcohol, the so-called 'alcopops'. The launching of these products was rather aggressive and the marketing campaigns addressed very young people. Some products even targeted children, using teddy bear bottles and coloring their contents pink. The consumers' ombudsman decided to examine the issue, and several of the products were prohibited. The Danish alcohol industry never started to produce alcopops. Then, at the end of 1997, the international ESPAD-95 report was published, which included responses on drinking from 16-year-old boys and girls in Denmark and elsewhere in Europe (Hibell et al. 1997). Denmark set a record in alcohol consumption among the 26 countries covered by report.

In the licensing acts from 1939 and 1958, it had been prohibited for shops that sold or distributed strong drinks to sell such products to young people under 18. This provision was abolished in 1970, which meant that everybody, regardless of age, could buy alcohol in shops (Thorsen 1993). This was the situation until July 1, 1998; after this date a new act came into force which prohibited the sale of alcohol to young people under 15. There was a follow-up to the act in the form of a low-key campaign addressing shopkeepers.

At the beginning of 1997, the National Board of Health decided to study the consumption of alcohol among pupils in grades 5 to 10 (approximately ages 11 to 17). Trends in consumption of the new alcopops were a special concern in connection with this study. Studies in the United Kingdom, where alcopops had been launched already in 1995, had shown that alcopops constituted a problem especially among young women. The Danish study was carried out in November 1997 and covered a sample of schools representative as to geographical area, urbanization and age groups. Because the new act came into force as of July 1998, the National Board of Health found that it would be useful to repeat the study in November of the years 1998, 1999 and 2000. It is the results of these studies that are reported here, with special focus on problems relating to alcopops and the question of whether it is possible to assess the effect of the new act.

Method

The material is based on four surveys carried out at the same time in November of the years 1997, 1998, 1999 and 2000. For each survey a representative sample of Danish schools was selected covering the various geographical areas, both town and country, and grades 5 to 10 (approximate ages 11 to 17). The 1997 survey included 945 pupils, and the

surveys carried out in 1998, 1999 and 2000 included about 2,400 pupils in each. About 5% of the schools that were approached did not want to take part in the study and therefore did not receive questionnaires. In the participating schools almost all the pupils (95%) filled in the questionnaire. The questionnaires were handed out by the class teacher at the beginning of a lesson, and were collected anonymously shortly after and forwarded in an envelope to a research institute: The institute keyed the data into an SPSS file and carried out error checking. Subsequently data were analyzed using the SPSS statistical package.

Results

Figures 1 and 2 show the proportion of young people who have drunk alcopops during the past year. There is a marked drop over the period for both genders, though there is a minor increase in the proportion of boys who have drunk alcopops during the period 1999 to 2000.

Figure 1. The percentage of boys who consumed alcopops during the last year in the period 1997 to 2000.

Figure 2. The percentage of girls who consumed alcopops during the last year in the period 1997 to 2000.

By far a majority of young people has drunk alcohol during the past year, ranging from about 50% in the 5th grade (approximately 11 years of age) to over 90% in the 10th grade (16–17 years of age). In the lower grades, a few more boys than girls have drunk alcohol, but in the higher grades there is no gender difference (Figures 3 and 4). There is a minor decrease in the proportion that has drunk alcohol, and the biggest decrease is seen in grades 5 to 7 during the period 1997 to 2000.

Figure 3. The percentage of boys who consumed alcohol during the last year in the period 1997 to 2000.

Figure 4. The percentage of girls who consumed alcohol during the last year in the period 1997 to 2000.

Figures 5 and 6 show the proportion of young people that have drunk alcohol during the past month. There has been an overall reduction in this proportion, most pronounced for grades 5 to 7 both for boys and girls.

Figure 5. The percentage of boys who consumed alcohol during the last month in the period 1997 to 2000.

Figure 6. The percentage of girls who consumed alcohol during the last month in the period 1997 to 2000.

Table 1 shows a logistic regression analysis in which the dependent variable is whether the respondent has consumed alcohol during the past month. A number of independent variables have been controlled, including age, grade, gender, attitude to school (seldom or never happy with the school), absence due to illness (1 or more sick days in last 30), truancy (1 or more days away in last 30) and the year of the study. The table shows that age plays a marginal role when grade is taken into account. Young people drink according to grade level and only to a minor extent according to their biological age. In grade 10, thus, 0.9 times more pupils have drunk alcohol during the past month than in grade 5 ($p < 0.001$). There is no gender difference ($p = 0.06$), but there is a correlation with not liking school and with increasing absence due to illness. As for the year of the survey, the proportion that has drunk alcohol during the past month falls over the years studied. When this proportion is set to be 1 in 1997, it will be 0.84 in 1998, 0.78 in 1999 and 0.73 in 2000 ($p = 0.001$). Similar logistic analyses (data not shown) have been carried out for grades 5 to 7 which show a drop in the proportion that has drunk alcohol during the past month from 1 to 0.64 ($p = 0.005$). For grades 8 to 10 there is a corresponding drop from 1 to 0.83 (0.086).

Table 1. Logistic regression analyses: predicting drinking alcohol during the last month (0=no, 1=yes).

	OR	p-value
Age (years)	1.13	0.043
5 level	1.00	
6 level	1.21	0.100
7 level	1.46	0.014
8 level	3.86	<0.001
9 level	7.06	<0.001
10 level	10.91	<0.001
Gender (0=boys, 1=girls)	0.90	0.061
Unhappy at school (0=no, 1=yes)	1.49	<0.001
Sickness absence (0=no, 1=yes)	1.25	0.001
Truancy (0=no, 1=yes)	1.12	0.10
1997	1.00	
1998	0.84	0.086
1999	0.78	0.012
2000	0.73	0.001

Figures 7 and 8 show the proportion of young people that have been drunk during the past year. This proportion is relatively low in grades 5 to 7, but there is a considerable increase from grade 8. Figures 9 and 10 show the same picture for the past month, namely that the proportion is very small for grades 5 to 7, but increases steeply from grade 8. The correlations have been analyzed using logistic regression analysis, the dependent variable being drunk in the past month (Table 2). The proportion that has been drunk increases considerably from grade 8. There is no correlation with age when grade is taken into account, and no gender differences. Statistically, there is a pronounced drop in the proportion that has been drunk during the past month, from 1.00 in 1997 to 0.73 in 1998, 0.65 in 1999 and 0.68 in 2000. Analyses have been carried out, moreover, of grades 5 to 7 and grades 8 to 10 separately. For grades 5 to 7 the drop is from 1.00 in 1997 to 0.62 in 2000 ($p = 0.027$), and for grades 8 to 10 the drop is from 1.00 to 0.69 ($p = 0.048$). Thus there is a rather even drop for all grades.

Figure 7. The percentage of boys who have been drunk during the last year in the period 1997 to 2000.

Figure 8. The percentage of girls who have been drunk during the last year in the period 1997 to 2000.

Table 2. Logistic regression analyses: predicting being drunk during the last month (0=no, 1=yes).

	OR	p-value
Age (years)	1.19	0.18
5 level	1.00	
6 level	1.76	0.056
7 level	4.31	<0.001
8 level	20.48	<0.001
9 level	41.65	<0.001
10 level	56.41	<0.001
Gender (0=boys, 1=girls)	0.92	0.27
Unhappy at school (0=no, 1=yes)	1.52	<0.001
Sickness absence (0=no, 1=yes)	1.53	<0.001
Truancy (0=no, 1=yes)	1.23	0.016
1997	1.00	
1998	0.73	0.010
1999	0.65	<0.001
2000	0.68	0.002

Figure 9. The percentage of boys who have been drunk during the last month in the period 1997 to 2000.

Figure 10. The percentage of girls who have been drunk during the last month in the period 1997 to 2000.

Beginning with the study in 1998, a question was included on whether the respondent has bought alcohol in a shop during the past month, and the proportion is shown according to age at the time of the study (Figures 11 and 12). Between 30% and 40% of the 14-year-olds have bought alcohol during the past month. This proportion varies a little from year to year, but altogether there are no signs of changes during the period 1998–2000.

Figure 11. The percentage of boys who have bought alcohol products in a shop during the last month in the period 1998 to 2000.

Figure 12. The percentage of boys who have bought alcohol products in a shop during the last month in the period 1998 to 2000.

Discussion

The study was originally designed to follow young people's alcohol habits, including trends in the consumption of alcopops. Because an age limit with regard to buying alcohol was introduced in 1998, it became extremely interesting to repeat the study in order to assess any effect of this legislation on the consumption of alcohol. It is not very often that the timing allows for such base-line investigation to be used to assess control measures with regard to life-style issues.

Alcopops were launched in Denmark in 1997, and the products were especially targeted at young people. Several products were targeted at children, and the consumers' ombudsman prohibited some products because they were against existing marketing agreements. The surveys reported here show that during the period 1997 to 2000 there was a marked drop in the proportion that has consumed these products, with no difference by age in the decrease. However, among boys a minor increase can be seen from 1999 to 2000. Whether this increase will continue is uncertain, and continued monitoring of the area is required in order to answer this question.

By far the greater part of the respondents has drunk alcohol during the past year, and in order to minimize 'recall bias' a question was also asked concerning alcohol consumption during the past month. Most of the young people in the study consumed alcohol during the last year. Because the new act came into force from July 1998, the decrease we find from 1997 to 1998 among grades 5 to 7 is not related only to the fact that after then children under 15 could not buy alcohol.

But during the whole year 1998 there was a huge discussion in Denmark about teenagers' drinking. The process of debating and adopting the new act was part of this discussion, and the discussion may well have sensitized parents to pay attention to and be more concerned about their children's drinking.

With respect to alcohol consumption during the last month, the act was in force for the period asked about in 1998. In Figures 5 and 6 it is clear that the main decrease from 1997 is found in grades 5 to 7. For boys in grade 8, the consumption is very stable, and it decreased a little for girls. During grade 8 most of the children become 15 years of age, and become able to buy alcohol in shops according to the new law. A logistic regression analysis shows a clear drop of 27% in drinking in the last month from 1997 to 2000, with the greatest drop occurring already from 1997 to 1998. The drop is most pronounced for the group under age 15, grades 5 to 7, which is the group targeted by the act. In this group there is a drop of 36%, as compared to 17% in grades 8 to 10.

The fact that there is a drop in drinking in the last month for the whole group studied indicates a secondary effect on young people between 15 and 17. As noted above, this probably reflects a general shift in social attitudes about teenage drinking, in the wake of the national debate, which broke out in 1998. The drop continued also after 1998, suggesting that the intensive focus on this issue by politicians and the authorities has had a longer-term positive effect.

Concerning drunkenness figures pertaining to grades 5 and 6 are low and there is considerable uncertainty. For grades 7 to 10 there is a higher degree of statistical precision, and a drop can be seen for all grades. Logistic analysis shows that the drop is most pronounced from 1997 to 1998, and the overall drop is of 32%. The drop is more or less similar for grades 5 to 7 and for grades 8 to 10. Again there is no gender difference, but in grades 5 to 7 a few more boys than girls state that they have been drunk during the past month.

A correlation between consumption of alcohol by young people and accessibility has been documented (Casswell et al. 1997, Pedersen 1990, National Board of Health 1999). Moreover a correlation has been shown between parents' serving of alcohol in the home and young people's consumption (Pedersen 1990). There are reasons to assume that early alcohol debut increase the risk of problematic consumption patterns at a later stage (National Board of Health 1999, Jessor et al. 1977, Hawkins et al. 1997). The study shows that it is easy for young people to buy alcohol, and thus the act has not prevented young people from buying alcohol in shops. In this study we do not have any data about compliance by shopkeepers, but there is no reason to believe that young people below 15 years of age have any difficulties to buy alcohol.

When the act was prepared, it was pointed out that one of the aims of the act was to send a clear message to parents of children under 15 underlining that children and alcohol do not belong together. A very significant aim of the act was to put off young people's alcohol debut. The surveys reported here show that this aim has been achieved, and that political control measure can be a useful tool for reduction of young peoples' alcohol consumption.

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CHAPTER 10

Conclusion Impacts of alcohol policy: the Nordic experience

Robin Room, Anders Romelsjö & Pia Mäkelä

The general impact of changes in controls

In the Nordic experience, big changes in the physical or financial availability of alcohol can clearly produce big effects. The Swedish changes of 1955 and the Finnish changes of 1968 produced immediate large increases in the population's level of alcohol consumption (see Chapters 2, 3 and 4), and had big effects also on indicators of alcohol-related problems. On the other hand, a comparison of the effects of the change in Finland in 1968 with that in Iceland in 1989 (Chapter 5) suggests that the magnitude of the effect depends also on other circumstances of the time. The change in Finland in 1968 has been seen in terms of a belated opening of the doors to pent-up demand from a new 'wet generation' (Mäkelä 1978, Sulkunen 1979), whereas in Iceland, as described in Chapter 5, there was a fair degree of de-facto availability of beer before the legal change. At least as importantly for short-term effects, the Finnish economy was flourishing in 1968, while Iceland was moving into a recession in 1989.

The effects of smaller changes in availability, however, seem more variable, and often negligible in terms of the effects on total consumption. As Chapter 2 reviews, a series of Norwegian studies of the effects of restricting beer sales to local monopoly stores, and of opening new wine and spirit monopoly stores, found little or no effect on the total alcohol consumption. In terms of the total consumption, the effects of opening or closing monopoly stores on Saturdays have been relatively modest — the 3.2% increase from Saturday opening found in the most recent Swedish study (Norström & Skog 2001, 2002) is at the upper level of the range of results.

Differential impacts on different population segments

The concentration in Nordic policy discussions on the 'total consumption model' (see Chapter 1) has often meant that the primary attention, in evaluating the effects of changes in controls, has been on the effect on total alcohol consumption. Often, this was taken as the crucial proxy measure for changes in alcohol-related harm due to the change in alcohol controls.

But it is clear from the empirical data reviewed in Chapter 2, and in the other chapters of this volume, that total alcohol consumption is not always a good proxy measure for the effects of the policy change. In the first place, the effect on the drinking of different demographic segments is not always the same. In the second place, there are often variations in the effects on people with different patterns of drinking. In the third place, the effect on different alcohol-related problems often differs, and may differ from the effect on the total alcohol consumption. We shall discuss each of these points in turn.

Variations by demographic segment

A clear example of such variation is the effect of taking medium-strength beer out of Swedish grocery stores in 1977 (Chapter 6). This was the most significant of the restrictive changes in Swedish alcohol policy over a period of about 5 years (1976–1981), including prohibition of alcohol advertisements in 1978, Saturday closing in 1981, and increases in real prices of alcohol during 1979–1984. The policy measures were not age-specific, but a major aim of the changes had been to combat youthful heavy drinking. Medium-strength beer had been most popular among young people, and its removal, in particular, had some success in reducing young people's drinking. However, Ramstedt's analysis suggests that there were also some effects in reducing alcohol-related harm in some older segments of the population. Other policy measures at the time may also have contributed to the effect and its long duration (Romelsjö 1987, Romelsjö & Diderichsen 1989, Leifman & Romelsjö 1997).

Conversely, the introduction in Denmark of a 15-year-old minimum age of off-premise purchase (Chapter 9) is, obviously, an age-specific measure, but it turned out that there were declines in drinking also among older teenagers. Møller interprets this broader effect as reflecting the public discussion, which surrounded the adoption of the minimum

age legislation. His findings remind us that the effects of policy changes should not be interpreted in mechanical terms; public sentiment and reaction to the measures may also play an important role in their effects, and a new law may have an effect as much through the public attention, debate and discussion which surround it as through its direct action (Hingson et al. 1988).

There are clear findings in a number of the analyses in this volume that effects of alcohol control changes on women have often been different from their effects on men. The advent of legal beer in Iceland (Chapter 5) seems to have had a gender-specific result, as judged from the survey data: men's consumption of alcohol rose (particularly young men's), but not women's. There was a non-significant rise in teenage girls' consumption, but no net effect for women as a group.

The Finnish policy change of 1968 (Chapters 3 and 4), on the other hand, had big effects on both women's and men's drinking. In absolute terms the increase among men was much greater than among women (Chapter 3). But the details of the changes among women differed from those among men. In proportion to their drinking patterns prior to the change, men's median frequency of drinking increased more than women's, while women's median annual amount of consumption increased more than men's. Both the absolute and the relative size of the changes in frequency and amount of consumption varied by age, and were much smaller among older respondents than among younger.

There was also a difference in the size of changes, in absolute terms, for both frequency and volume of consumption by level of education. Median frequency increased by 21 units among those in the higher education group, but by only 3 in those with low education, and there were similar differences in the change in volume. But these changes were proportional to the initial frequency and volume levels of the educational groups.

There are variations between studies in the effects of policy changes in the city and in the countryside. Among Icelandic men (Chapter 5), the advent of beer seems to have had a more lasting effect on consumption in the city (Reykjavík) than in the countryside, perhaps reflecting a more severe effect of economic recession in the countryside. On the other hand, in proportion to prior consumption, the median annual consumption rose more in the Finnish countryside than in urban areas, in the wake of the 1968 changes (Chapter 3), reflecting the much greater difference in availability, which the changes made in the countryside. Again, the much greater preexisting level of consumption in urban areas meant that the absolute amount of increase was much greater in urban areas.

Further research is needed to understand better the societal and individual factors behind differences between sociodemographic categories in the effects of policy changes.

Variations by drinking pattern and amount

Clearly, when policies have a substantial impact on drinking in the population, they tend to have the strongest effect on heavier drinkers, if the effect size is measured in terms of the absolute level of change. In Mäkelä's analyses (Chapter 3 and Mäkelä 2002), controlling for the regression-to-the-mean effect, the difference in change between the Finnish and the control samples is greater for the heavier drinkers than for the lighter. Mustonen and Sund's analysis (Chapter 4), however, adds the nuance that much of this Finnish increase was actually in relatively low-consumption occasions. Since the data on what happened with the introduction of beer in Iceland is not panel data, we do not have a direct measurement of whose drinking changed how much. However, it is suggestive that among Icelandic men (Chapter 5, Table 8), the consumption level of the highest-consuming 10% of the population had increased between 1988 and 1992 by almost eight times the increase among moderate consumers.

Many other phenomena in nature have a distribution, which, like the distribution of alcohol consumption among drinkers in a population (Skog 1991), take a roughly lognormal shape. General discussions of such distributions point out that these distributions are often the net effect of processes where the amount of change on the variable from a given stimulus is roughly proportional to the previous position on the variable (Aitchison & Brown 1957). In general, it seems that this is the case for alcohol policy changes: in rough terms, drinkers tend to be affected by policy changes about proportionately to their existing drinking level. Thus, if lighter drinkers increase their drinking by one-half, heavier drinkers also increase theirs by about one-half. From the perspective of the added harm to be expected from added drinking, what happens to heavier drinkers will usually be more crucial. For chronic consequences where the risk curve rises more steeply among heavy drinkers, such as liver cirrhosis, increased drinking by light drinkers becomes relatively unimportant. The same absolute amount of increase in drinking among heavier drinkers would be more important, since the increase in risk is greater due to the steeper risk curve. However, the concentration of the effect in heavy drinkers goes beyond this. Since the actual increase tends to be proportional, so that the increase is greater in absolute terms among heavier drinkers, the effect of a policy change on heavier drinkers becomes the dominant effect for such consequences.

For problems related to occasions of intoxication, such as injuries from traffic crashes, violence, or other causes, the question of the differential effect of the policy changes on different types of drinking occasions becomes important. Drinking heavily, at least occasionally, is quite widespread in the population, producing what has often been described as the 'prevention paradox': these kinds of problems, in particular, are also quite widely spread among drinkers (Skog 1999). For problems such as traffic crashes, the effects of the 1968 Finnish policy change was presumably muted by the fact that there was a bigger increase in low-consumption occasions than in high-consumption occasions. However, Mustonen's & Sund's analysis (Chapter 4) shows that there was, nevertheless, an increase also in high-consumption occasions.

Indirect evidence that policy changes often have their greatest impact on heavier drinkers can be derived from analyses of the effects of changes on health and social problem indicators. The opening of alcohol monopoly stores in previously dry areas of Finland in the 1950s resulted in a larger increase in drinking among those already drinking frequently than among infrequent drinkers (Chapter 2). The 46% increase in consumption in Finland between 1968 and 1969 was accompanied by a 58% increase in deaths from alcohol-specific causes (Chapter 2). Rationing in Sweden seems to have had a particularly strong effect in holding down drinking by the most vulnerable heavy drinkers. Thus the end of rationing, which brought a 25% increase in per-capita consumption, brought a 438% increase in deaths from delirium tremens (Norström 1987).

Variations by type of problem

As the examples just given illustrate, the effect of policy changes on rates of alcohol-related health and social harms is often greater than the effect on the total alcohol consumption level. In fact, in a number of instances in the Nordic material, policies appear to have had an impact on the kinds of problems associated with troublesome or social marginal drinkers, even when there was no measurable effect on the overall drinking level.

Thus the analysis of the 1982 Norwegian liquor store strike in this volume (Chapter 7) shows that the strike had a clear effect on admissions to the detox center in downtown Oslo, and also an effect on reported violent crimes, although the effect on overall consumption was probably modest. As Chapter 2 summarizes, these findings are in accordance with findings in several other studies of liquor store strikes in Finland, Sweden and Norway: generally, domestic disturbances and alcohol-related crimes decreased, as did indicators of public drunkenness (arrests or detox admissions), while moderate drinkers were hardly affected by the strike.

The results of Nordic experiments with closing or opening liquor stores on Saturdays (Chapter 2), also, were often an effect on domestic disturbances or manifestations of public drunkenness, but little effect on the overall consumption level.

On the other hand, introducing round-the-clock serving hours in Reykjavík (Chapter 8) had a particularly dramatic effect on the numbers of cases of suspected drunk driving, greater proportionally than the effect on numbers of emergency-room admissions for injuries from fights. In this case, the effect was greater for the indicator normally more associated with the settled population, although the possibility that this was due to greater police vigilance cannot be ruled out.

Implications of the studies for alcohol policymaking

Our reviews of the Nordic tradition of studies of the effects of changes in alcohol controls suggest some shifting of focus in terms of alcohol control policies. Where alcohol control changes have been found to have effects on drinking and drinking problems — and in some cases these effects have been very large — the effects have often been concentrated in particular on heavier drinkers and on rates of alcohol-related problems. While there are often changes in the overall level of consumption, as well, the size of the change is often less.

From a policy perspective, it is the effects on drinking problem rates which really matter. From this perspective, the extent to which the drinking of different segments of the population rises and falls in concert remains a question which is intellectually interesting (e.g., Gmel & Rehm 2000), but is not crucial for policy. The crucial issue for some outcomes, such as liver cirrhosis, is the effect of different policy interventions on those who are already or may become heavy drinkers. For other outcomes, such as alcohol-related injuries, the population at risk is much broader, but still considerably less than the whole population of drinkers. Pointing this out has sometimes been taken as an argument for a shift away from general policy instruments that affect all drinkers, and towards more narrowly-targeted instruments (Stockwell et al. 1997). But the evidence from the Nordic policy impact literature does not support this argument. The

changes with the biggest effects on alcohol problems rates in the 50 years of Nordic experience we are considering were the Finnish changes of 1968, and probably three Swedish changes: the abolition of the *motbok* in 1955, the tax increases in the three years after that, and the policy changes in the era of the repeal of medium-strength beer (1976–1981). All these policy changes applied to and affected all drinkers, but had their strongest effects on problematic drinkers. Conversely, narrowly focused interventions, such as the adoption of a minimum purchase age in Denmark, often turn out to have effects beyond the population at which they were aimed.

The issues of the scope of effect and differential impacts of a policy thus should not simply be assumed; rather, they are matters for empirical investigation, as in the studies we have reported and reviewed in this volume.

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