

Health behavior in the Nordic countries

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Abstract: This paper provides a descriptive analysis of the level of and change in cigarette smoking, excessive alcohol consumption and body weight in Nordic countries and compares them with non-Nordic OECD countries. Our results show that the average prevalence of daily smokers is significantly lower for Nordic countries compared to non-Nordic countries. Four out of five Nordic countries are below the non-Nordic average. However, for alcohol consumption and obesity, it is more difficult to see a clear difference between Nordic countries and non-Nordic countries. Sweden ranks relatively low on all three health behaviors, while alcohol consumption is relatively high in Finland and Denmark. Smoking rates are relatively high in Norway, while the obesity rate is relatively high in Iceland. We conclude that although Nordic populations are often perceived as relatively homogeneous in terms of cultural and political aspects, there are interesting differences in health behaviors within these Nordic countries. These differences need more focus in health-economics research and may have a significant potential in light of the availability of health surveys and administrative register data that can sometimes be linked at the individual level. Such Nordic analyses may, in general, help to move the research front forward and can also be used to predict changes in population health and to study the effectiveness of health economic policies.

JEL classification: I10, I12, P36, P46

Key words: health behaviors, smoking, drinking, body weight

1 Introduction

Individual health status has many determinants that may be categorized according to genetic health factors or endowments, environmental factors (general living conditions in childhood, air pollution, sanitation and water purity, etc.) and health-related behaviors/lifestyle factors. Health behavior, which has attracted great interest in health economics, refers to those decisions/choices that have to do with the consumption of “goods” (if health-promoting) or “bads” (if health-compromising), such as healthy food, tobacco products, and health-care services. These choices, made in combination with time allocation decisions regarding different health-related activities, provide investments (or disinvestments) in health. In other words, the way we allocate our available resources in terms of income and time to different health goods (or bads) is an important part of health production and of the key determinants of health.

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We distinguish between three different, but related, arguments as to why health economists are so attracted to the analysis of health behavior. The first argument is that health behavior is interesting in its own right because these behaviors, as indicated above, may be strongly related to health or illness; thus, health is not entirely exogenously determined. That is, sickness is not exclusively due to an individual's "bad luck" in terms of bad genes and an unfavorable environment; sickness is also partly due to the individual's own decisions, implying that health is partly under his/her own control and that he/she may have the health status he/she desires, given economic trade-offs.

The second argument for economists' interests in health behavior is the endogeneity of health per se. This endogeneity implies that the population's health may be influenced through interventions and policies that are directed at the determinants of health behaviors, if those are understood. The more information there is on what those determinants are and the effect sizes of possible interventions, the more detail there will be for policy makers' actions. Medical treatments may not be the only way in which one can improve health, and health is not exclusively an area for the medical profession, but is also an area for behavioral scientists, such as economists. It is therefore clear that economic policies impact health through factors such as cost, income, information/advertising or health insurance premiums, which in turn influence health behaviors. It may even potentially be possible that such policies are more effective and cost-effective than treating patients in the health system when illness occurs.

The third argument relates to why policy makers might want to influence people's health decisions from an health-economics perspective, namely that health behavior may not only affect the individuals themselves. Their private decisions regarding health behavior may also have consequences for other people's health and welfare, for example, through increased taxes or health-care insurance premiums. In other words, there may be a form of "negative externalities" in health behaviors that would be an indication for action (Bolin et al. 2001; Jarl et al. 2008; Odegaard et al. 2008). The term "negative externalities" is used loosely here; because this is largely due to external effects of insurance, the term would strictly be called a moral hazard. That is certainly true for the external costs in the health-care system, but is, in fact, also the case for other relevant factors, such as labor-market effects. Without government intervention, negative effects of health behaviors in the labor market would largely be borne by the worker himself. However, given extensive government income-replacement systems and progressive tax systems, the burden starts to fall on "bystanders". Although these effects are sometimes referred to as externalities in the literature, we will refer to them here as moral hazard. Because this is a result of other interventions, the level of moral hazard can strictly be contextual and may vary substantially between health systems and wider institutional heterogeneity across countries. Because of the extensive welfare systems in Nordic countries, the effects of this moral hazard may be of greater importance there than in other countries.

The aim of this paper is to provide a descriptive analysis of the level of and change in the three of the most prominent health behaviors or health bads: cigarette smoking, excessive alcohol consumption and body weight. Body composition and body weight are obviously not health behaviors in and of themselves. They are, however, often a part of the go-to list of lifestyle indicators because they stem directly from behavioral and lifestyle factors that are of increasing importance—nutrition and physical activity. Their inclusion is therefore deemed to be justified as an indicator of those behaviors. Mokdad et al. (2004) show that in the US, tobacco is the main cause of death, followed by poor diet/physical inactivity and alcohol consumption. We focus on these health bads partly because they are prominent in terms of the health problems that they cause and because they may therefore indicate a scope for health improvements. Furthermore, they indicate tomorrow's health

because there are generally long lags between changes in health behaviors and changes in health. Thus, changes in health behavior may predict something about future health, which is not generally reflected in direct health measures, such as mortality or life expectancy.

We compare and contrast Nordic countries to examine which of them has the lowest prevalence and/or the most dramatic changes in the behaviors of interest. Thus, comparison across the Nordic countries plays a large role in this analysis. However, to place our focus on Nordic countries into perspective, we also make comparisons with other non-Nordic countries, mainly those of the OECD. The goal of this aggregate country-level analysis is to better understand the differences and similarities in health behaviors between those relatively politically, demographically and culturally “homogeneous” Nordic countries. By doing this, we aim to detect patterns within the Nordic countries and further determine whether Nordic countries have specific health behaviors that set them apart from other countries as a group.

The contribution of this paper is to show the similarities and differences of the main health behaviors within and between Nordic countries using non-Nordic OECD countries as a benchmark. This examination is of interest from a public-health perspective because health behaviors underlie the health situation now and in the future and because health behaviors may also explain the demand for, and structure of, health-care consumption in our health-care systems. This choice-driven influence at the individual level is largely exogenous to health-care decision makers in the different countries.

2 Data and Methods

In making comparisons between countries, we draw on data sources from the Organization for Economic Cooperation and Development (OECD), the World Health Organization (WHO) and the World Bank. The results are generally presented graphically. To make clear comparisons, we calculate population-weighted averages for Nordic countries on the one hand, and for their counterparts on the other hand. These counterparts are somewhat data dependent, but the OECD is the most frequently used comparison group. We do, however, always provide the results for each Nordic country as well. The decision not to arbitrarily select countries for comparison was motivated by the fact the determinants of health behaviors are multiple and can easily lie outside the health-care system. Such a selection will thus always be debatable. When the averages are calculated for multiple countries, they are weighted by the population within each country. This is done using the population level reported by the OECD when health data are used from the OECD. The averages are calculated based on population data from The World Bank when health data from WHO is used. This is done as the countries vary greatly in population. Thus, the averages should be read as the average consumption per person in those geographic areas, rather than as the averages for the countries regardless, of their number of inhabitants. For robustness, simple averages were also calculated, but they did not significantly differ from the weighted averages. When examining the current state of affairs, without trends over time, the results are generally presented in histograms. In such cases, it is often possible to include multiple individual countries outside of the Nordic ones without a loss of clarity. This is not possible when examining developments over time. In those cases, each Nordic country is generally displayed separately, while other countries that are used for comparison are lumped together. In those cases, population-weighted averages are provided as well.

Statistics on alcohol consumption were obtained from the OECD’s *StatExtracts* and the WHO’s *Global Health Observatory Data Repository*. Both sources report the consumption of pure alcohol per person aged fifteen or more by country and year. The WHO

reports the consumption of four different categories of alcoholic beverages and foods: beer, wine, spirits, and other alcohol.

The OECD dataset includes reports from the member states and use slightly different methods for estimating the annual consumption of pure alcohol, for example, in converting the alcoholic content of drinks to pure alcohol. The Danish, Norwegian and Icelandic data are from the countries' statistical agencies, while the Swedish and Finnish data are from national health institutes. Iceland, Sweden and Finland use the reported sales of alcoholic beverages as a proxy for alcohol consumption, while Norway uses the reported imports and production of alcoholic beverages. The Danish time series is based on alcohol sales until 2000, when a more accurate indicator is said to have been introduced (OECD 2013). The WHO dataset is derived from many sources, including The Food and Agriculture Organization of the UN, World Drink Trends, Canadian, Wine Institute, and WHO Global Survey on Alcohol and Health, and various national agencies (WHO 2014). Although those organizations make attempts to present data that are as comparable as possible, those important differences, and the errors that they may cause, should be kept in mind. Alcohol consumption is inherently difficult to measure consistently, and many errors can occur, for example, sales data include measurement errors due to home breweries or imports by individuals. Such errors are probably not random, but are systematically related to country-level characteristics, such as the taxation of alcohol. Survey data on self-reported alcohol consumption also include errors due to misreporting, and this misreporting may be positively related to level of alcohol consumption (Livingstone and Callinan 2015).

Statistics on tobacco consumption were obtained from the OECD's *StatExtracts*, which contains data on tobacco consumption by country, year and gender. Two statistics are presented: the percentage of the population aged fifteen or older who report that they are daily smokers and the annual consumption of tobacco products, in grams, per capita of those aged fifteen or older.

Data on the percentage of people who are tobacco smokers are based on health interview surveys. Due to a lack of standardization in measurements, the OECD notes that the international comparability of this statistic is limited. Among Nordic countries, there is some variability in the survey instrument, phrasing of the survey question and sample that is surveyed. Postal surveys, telephone surveys and in-person interviews were all used in collecting data. The lower boundary of the age group is 13 years in Denmark and 16 years in Sweden and Norway. There are upper age boundaries in data from Finland (64 years), Iceland (89 years), Norway (74 years) and Sweden (84 years until 2002). Before 1994, the Danish question was, "Did you smoke yesterday?" but has changed, specifically, to that of being a daily smoker. To reduce random variances in percentages, Norwegian figures are based on a three-year moving average.

As with measures on alcohol use, smoking frequency is difficult to measure, and the variation in the data-collection mode should be kept in mind. For example, extensive moist snuff use among Swedish men complicates analysis. The international data for smoking was, however, even more difficult to compare than the Nordic data, especially when looking at past data. Thus, comparing Nordic countries to their counterparts is carried out only for the most recent data, but is not included when examining past trends. Examinations of trends, therefore, focus only on comparisons across Nordic countries.

An international comparison was, however, most challenging in the case of body weight, as data are collected in a variety ways, and data collection itself is scarce. Among the Nordic countries, there is some variability in the survey instrument and the age group surveyed. The Norwegian and Swedish figures are from national statistical agencies; the Finnish, Icelandic and Danish figures are from national health institutes. Postal surveys, telephone surveys and in-person interviews have all been used to collect data. The lower

boundary of the age group ranges from 15 to 18 years, and various upper boundaries have been used in Finland (64 years), Norway (84 years), Iceland (80 years until 2002) and Sweden (84 years until 2002). Iceland reports that it uses self-assessed height and weight to calculate BMI; other countries do not report the method by which an individual's BMI is calculated (OECD 2013). Finland and Sweden are the only Nordic countries for which consistent time series are available. Data from other countries are sparse and irregular.

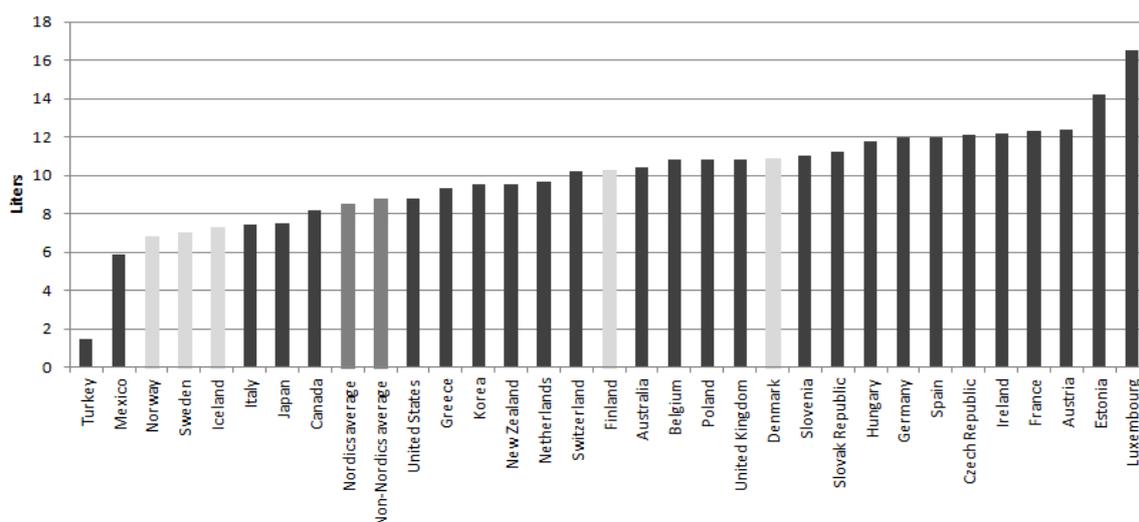
Consequently, this examination was done only between Nordic countries, without international comparisons. Statistics on overweight and obesity were obtained from the OECD's *StatExtracts*. The dataset includes both self-reported and measured figures, but Finland is the only Nordic country for which measured data are available. Obesity is defined as a body mass index (BMI) of 30 kg/m² or more, whereas, "overweight" is defined as a BMI of 25-29.9 kg/m².

3 Results

3.1 Alcohol consumption

Figure 1 shows the consumption of pure alcohol from alcoholic beverages per capita aged fifteen or older in 2008 according to the OECD's *StatExtracts*. The population-weighted averages are included.¹ The bars that represent Nordic countries are shown in a lighter shade. Within the OECD, alcohol consumption per capita aged fifteen or older ranges from 1.5 liters in Turkey to 16.5 liters in Luxembourg. Among Nordic countries, this figure ranges from 6.8 in Norway to 10.9 in Denmark. The non-Nordic OECD average is 8.8 liters per person (standard deviation 2.84), while the Nordic average is 8.5 liters per person (standard deviation 1.97). This difference is statistically insignificant at any traditional level. By those numbers, a specific Nordic consumption culture does not appear to be detected. According to the figures, alcohol consumption seems to be low in Norway, Sweden and Iceland and high in Finland and Denmark from an OECD perspective.

Figure 1: Consumption of pure alcohol per capita of individuals aged fifteen or older, 2008

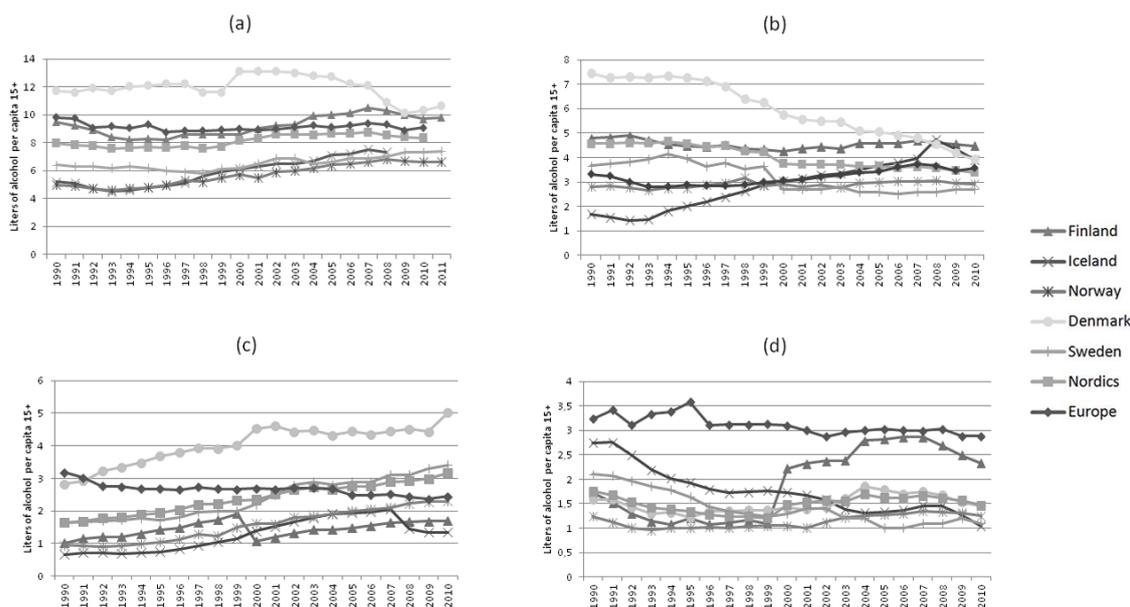


Source: OECD 2014.

¹ Alcohol consumption data for 2008 was not available for the following non-Nordic OECD countries: Chile, Israel, and Portugal. These countries were thus not included in non-Nordic OECD average.

Figure 2 shows the consumption of all alcohol (panel a), alcohol from beer (panel b), alcohol from wine (panel c) and alcohol from spirits (panel d) in 1990-2011 for individual Nordic countries, for Nordic countries as a whole and for the Europe region as defined by the WHO, net of the Nordic countries.² A few things stand out in these figures. Beer consumption is rather stable in Norway, Sweden and Finland, while Denmark decreases its consumption markedly over the period, but from a relatively high level. Iceland shows an increase in the consumption of beer during this period that may be due to the legalization of beer in 1989 as beer was completely banned in the country up to that point. Although that ban predates the period in question here, one cannot exclude it as the impetus for slowly changing consumption patterns. A considerable jump in the consumption of spirits occurs in Finland around, and shortly after, the turn of the century. All of the Nordic countries increase their consumption of wine over the period, and it may be argued that this increase is a part of a convergence towards the European consumption pattern. The sharp drop in wine consumption for Iceland after 2008 is undoubtedly due to the financial collapse that took place there, and the subsequent economic crisis, which decreased all alcohol consumption (Asgeirsdottir et al., 2014). This convergence does not appear to be the case for consumption of spirits, except in the case of Finland.

Figure 2: Consumption of alcohol per capita of individuals aged fifteen or older, 1990-2011



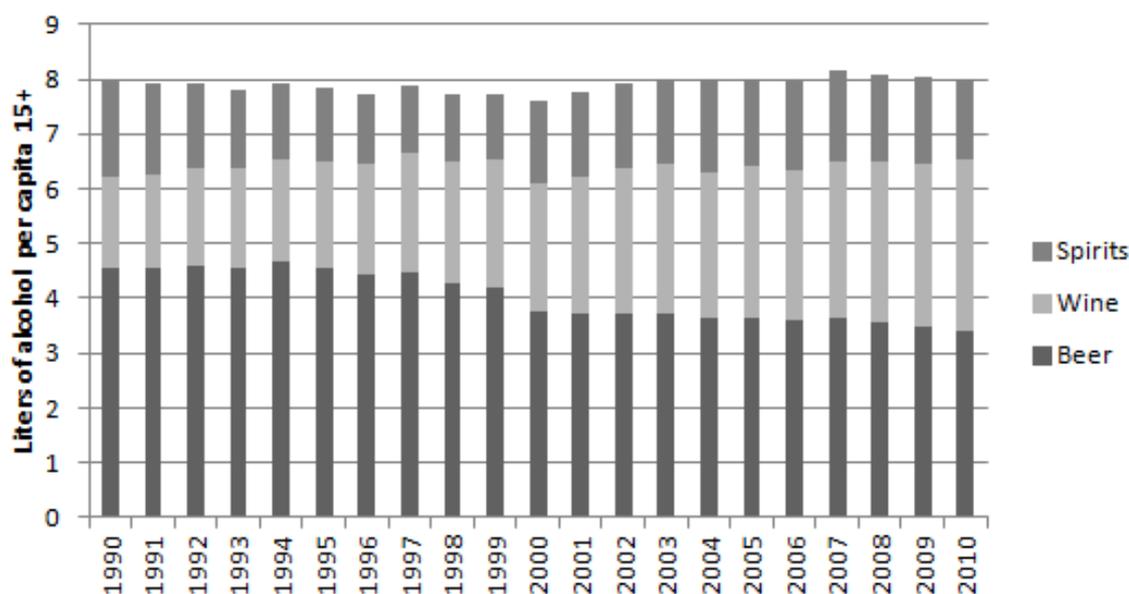
Panel (a) Consumption of pure alcohol per capita in individuals aged fifteen years or older, 1990-2011.* Panel (b) Consumption of pure alcohol from beer per capita in individuals aged fifteen years or older, 1990-2011.* Panel (c) Consumption of pure alcohol from wine per capita in individuals aged fifteen years or older, 1990-2011.* Panel (d) Consumption of pure alcohol from spirits per capita in individuals aged fifteen years or older, 1990-2011.*

* The European series excludes the Nordic countries in all cases. Sources: (Europe series) WHO 2014, The World Bank 2014; (other series) OECD 2014, The World Bank 2014.

² Data were not available for Iceland after 2008. The break in the Danish series, notable in 2001, is due to a change in methodology. Andorra, Monaco, Montenegro, San Marino, and Serbia are part of WHO's Europe region, but were not included in the analysis due to a lack of data. Alcohol consumption data were not available for some other countries in some years; these countries were not included in these years' calculation of the Europe series.

Figure 3 shows the average consumption of pure alcohol per capita aged fifteen or older in Nordic countries as a whole by the category of alcoholic beverage. When examining the Nordic countries, there appears to be an increased consumption of wine, which is also a general trend within each of the Nordic countries. Consumption of spirits and beer are constant and decreases slowly, respectively. The trends in alcohol consumption may have been affected by the countries entrance into the EU. For example, Sweden has traditionally had a comparatively restrictive alcohol policy with high prices and low availability. However, the effectiveness of the policy in Sweden has been considerably weakened during the last two decades, partly due to increased affordability and EU-laws stipulating free trade. In addition has changes in policy occurred in recent years (e.g. home delivery) while others are under debate (e.g. producer outlet “gårdshutik”) which are expected to influence both consumption and harm.

Figure 3: Consumption of alcohol by category, Nordics, 1990-2011

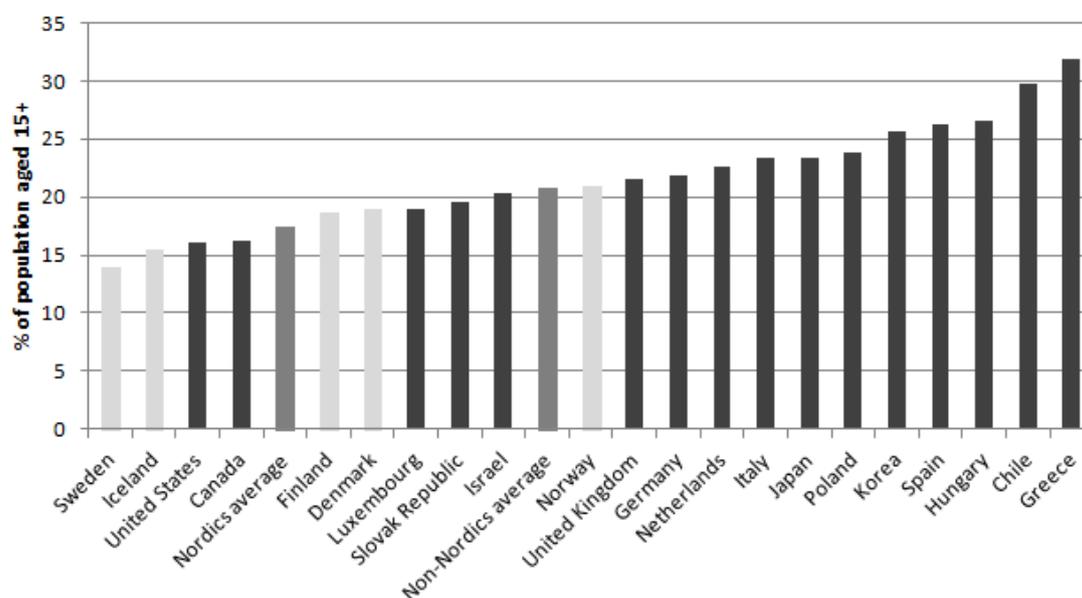


Source: WHO 2014, The World Bank 2014.

3.2 Smoking

Figure 4 shows the percentage of the population aged fifteen or older who report that they are daily smokers, according to the OECD's *StatExtracts*. Within the OECD, this figure ranges from 14% in Sweden to 31,9% in Greece. Among the Nordic countries, the figure ranges from 14% in Sweden to 21% in Norway. The non-Nordic OECD average is 20,8% (standard deviation 4,39) and the Nordics' average is 17,4% (standard deviation 2,84). This difference is statistically significant at the 1% level. As before, the averages are weighted by the size of the population as reported by the OECD in 2014.³ These numbers show that, although there is considerable variability between the Nordic smoking rates, smoking prevalence is generally lower in Nordic countries than in the rest of the OECD, with Norwegians smoking somewhat more, but not by a considerable margin. Accordingly, it can be argued that low smoking rates are a fairly distinct characteristic of Nordic countries.

³ The 2009 data are not available for the following OECD countries: Australia, Austria, Belgium, Czech Republic, Estonia, France, Ireland, Mexico, New Zealand, Portugal, Slovenia, Switzerland, and Turkey. These countries were thus not included in OECD average.

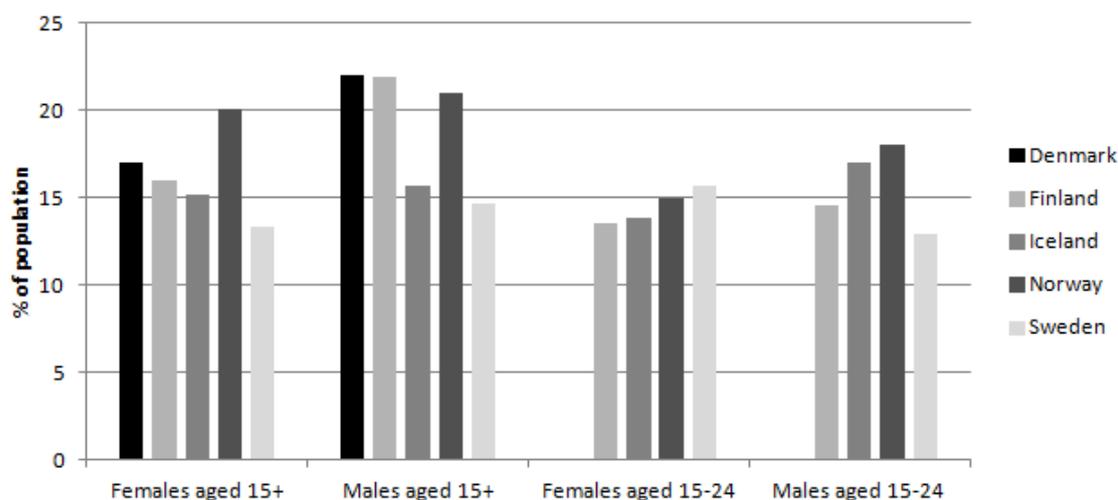
Figure 4: Percentage of population (aged 15+) who are daily smokers, 2009

Source: OECD 2014.

Figure 5 shows the percentage of the population in Nordic countries who were daily smokers in 2009, stratified by gender and age. The 2009 data for the 15-24 age group is not available for Denmark. The reason for providing information about smoking by age is the fact that smoking initiation almost always starts early in life, and initiation after the age of 24 hardly occurs (e.g. Edwards et al 2013). For this reason, smoking by young people can provide valuable clues as to how consumption may develop. Although this age stratification, and specifically the prevalence among people under 24 years of age, may be some indication of how smoking is likely to develop in the future, the development of daily smoking can also be examined for the past quarter of a century. Such trends are displayed in Figure 6 for the population as a whole (panel b) and are stratified by gender (panels c and d), specifically showing the percentage of the population aged fifteen or older who report being daily smokers over the period 1987-2011. Those figures show a dramatic, albeit steady, decrease in smoking over the past decades.

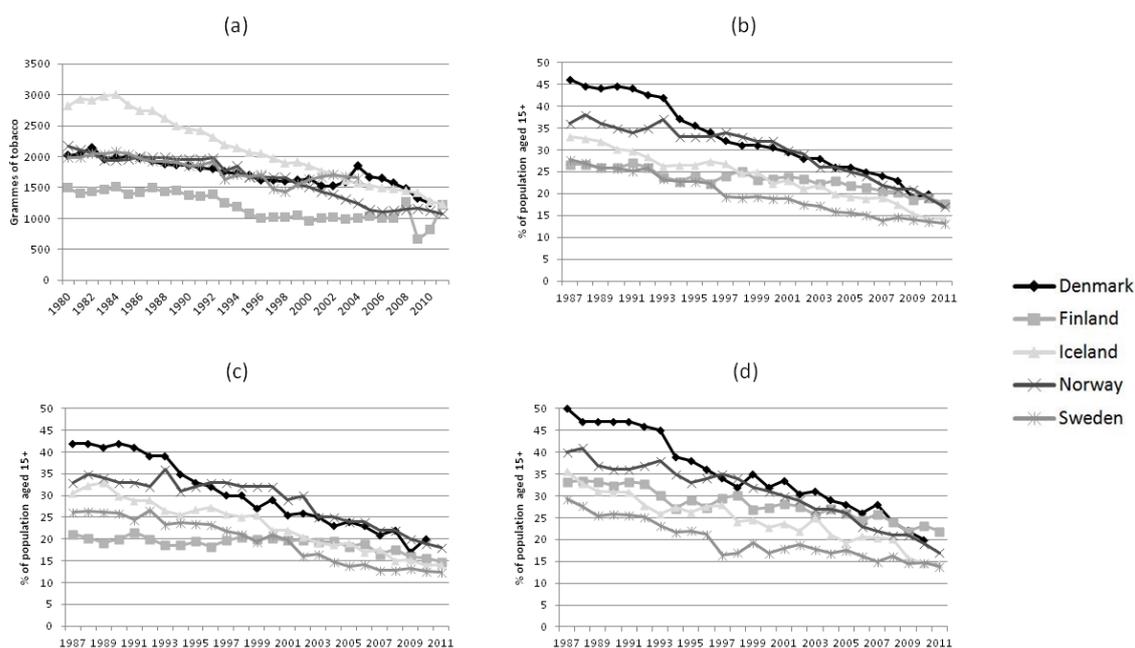
Data on the consumption of tobacco in grams per capita is based on sales figures (Iceland, Norway, Denmark until 2004, Finland since 1994), figures from tax and customs authorities (Denmark since 2004), imports (Finland before 1994) and public surveys (Sweden). There is some variability in how much tobacco one cigarette or cigar is assumed to contain; a cigarette is usually assumed to weigh 1 gram, 65-100% of which is assumed to be tobacco (OECD 2013). Panel (a) in Figure 6 shows tobacco consumption per capita aged fifteen or older in terms of the grams of tobacco in the period 1987-2011. Data are not available for Sweden after 2004 and for Denmark in 2010. The Finnish values for 2003-2007 and 2009 are estimates. Contrary to the previous results, this graph shows a substantially greater decline in tobacco use in Iceland than in the other Nordic countries. However, consumption is decreasing in all of the countries.

Figure 5: Daily smokers by gender and age group, 2009



Source: OECD 2014.

Figure 6: Smoking, 1987-2011



Panel (a) Grams of tobacco consumption per capita (aged fifteen and older), 1980-2011. Panel (b) Daily smokers, 1987-2011. Panel (c) Daily smokers, females, 1987-2011. Panel (d) Daily smokers, males, 1987-2011.

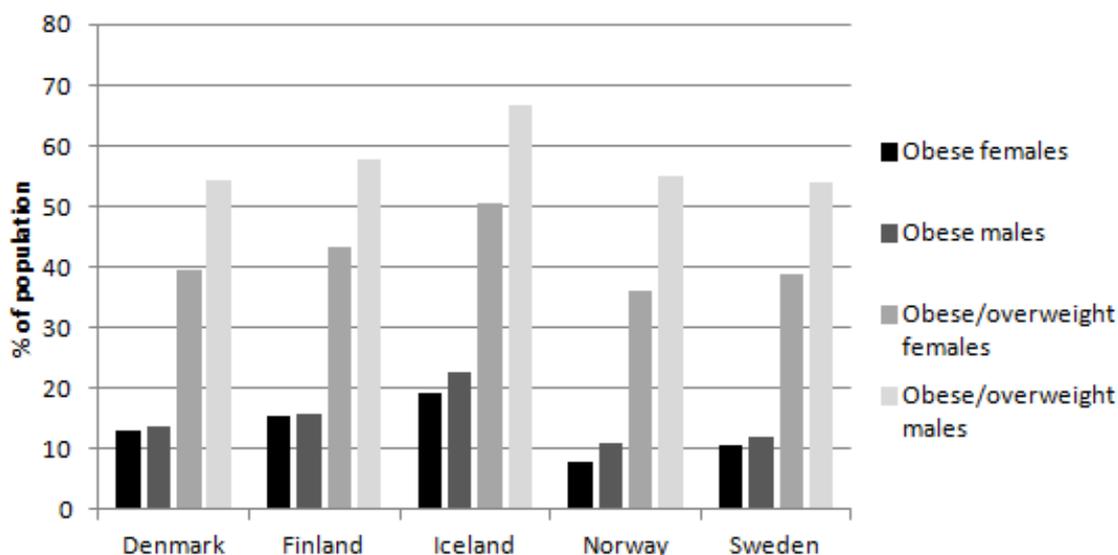
Source: OECD 2014.

3.3 Overweight and obesity

Figure 7 shows the prevalence of overweight and obesity in 2010 by gender, except for the Norwegian figures, which are from 2008. This shows that Icelanders are the heaviest among the Nordic countries. This also shows that males are more likely than females to suffer from

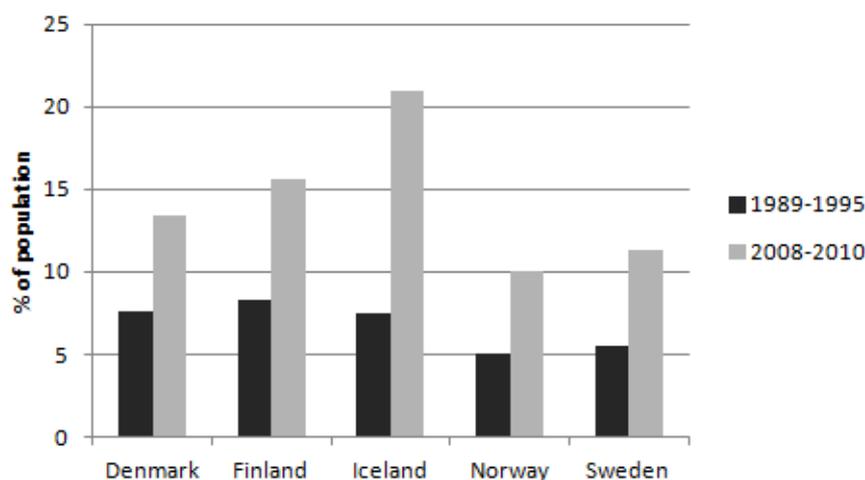
overweight or obesity in all of the Nordic countries. One of the shortcomings of BMI as a measurement is that it does not distinguish between body fat and other tissue, which can result in misclassification for various reasons (Ljungvall et al., 2015). For example, muscular individuals can appear to be too heavy for their height, even though their bodies contain very little actual fat. This misclassification, however, is unlikely to result in systematic differences in BMI across genders that are specific for Nordic countries, which would explain the gender differences shown in Figure 7. However, there are potentially also reporting errors involved in self-reported data of height and weight in that females tend to underestimate their body weight, which underestimates BMI, while on the other hand this may be counteracted by that males tend to overestimate their height which also underestimates BMI (Cawley, 2004; Ljungvall et al., 2013). According to the available data, the majority of males in all Nordic countries are overweight or obese, which is not the case for females. Obesity is also more prevalent among males in Nordic countries as a whole, although not specifically in Finland.

Figure 7: Overweight and obesity by gender, 2010



Source: OECD 2014.

Figure 8 shows the prevalence of obesity in two periods, 1989-1995 and 2008-2010. For the period 1989-1995, the Swedish figures are from 1989, Icelandic figures from 1990, Danish figures from 1994, and both Finnish and Norwegian figures are from 1995. For the time period 2008-2010, the Norwegian figures are from 2008, while the others are from 2010. Due to a scarcity of the measured overweight and obese populations, meaningful comparisons with other countries are difficult to the point of not being meaningful and are thus not included. However, within Nordic countries, it can be said that all of the countries have seen a marked increase in body weight in the past few decades, with males generally having a greater prevalence of both overweight and obesity than females.

Figure 8: Obesity, 1989-1995 and 2008-2010

Source: OECD 2014.

4 Discussion

This paper provides a descriptive analysis of the level of and change in cigarette smoking, excessive alcohol consumption and body weight in Nordic countries, and also compares the Nordic countries with non-Nordic OECD countries. Health behaviors are of interest because: a) they are key health risk factors that underlie the general health of the population, as well as several important chronic diseases; b) they differ significantly across countries; and c) their time pattern differs (i.e., the prevalence of cigarette smoking generally decreases, alcohol-consumption patterns are more mixed and vary between types of alcohol consumed, and obesity generally increases). Because these three health behaviors figure prominently as health risk factors and typically have long lags, they also say something about tomorrow's demand for health services in contrast to direct measures of health, such as mortality and morbidity. These behaviors also indicate the degree of avoidable ill-health of populations from a public-health perspective.

Our results show that average prevalence of daily smokers is significantly lower for Nordic countries compared to non-Nordic countries. Four out five Nordic countries are below the non-Nordic average, and the fifth Nordic country (Norway) is almost exactly at the non-Nordic average of smoking. However, for alcohol consumption and obesity, it is difficult to see a clear difference between Nordic countries and non-Nordic countries; Nordic countries also share a general trend in alcohol consumption and obesity with non-Nordic countries. Sweden ranks relatively low on all three health behaviors, while alcohol consumption is relatively high in Finland and Denmark. Smoking rates are relatively high in Norway, while the obesity rate is high in Iceland and Finland. It should be pointed out that those results are based on aggregate numbers and that measurement errors are present that may be serious to different extent across countries. For example, alcohol consumption statistics are based on sales data within countries which does not include free private import of alcohol from other countries. One may also expect that countries with high prices and low availability like Norway and Sweden have higher import of alcohol from neighboring countries with lower prices. Another measurement problem is that tobacco consumption is based on cigarette smoking while there are also other forms of tobacco consumption and tradition of tobacco intake may differ across countries. For example, in Sweden there is a habit of consuming snus which partly may explain the low numbers on cigarette smoking

in Sweden. The countries are also homogeneous to a different degree, and with increased immigration, the behavior of subgroups is going to be important.

We conclude that while the Nordic populations are often perceived to be relatively homogeneous in terms of economic, cultural and political factors, there are interesting differences in health behaviors across these Nordic countries. The roots of those differences are probably many. For example, studies have shown Danish views on health policy to be more liberal than those in Sweden and Finland, stressing the importance of individual responsibility and autonomy, while the two others emphasize social relations, common values and equality a greater extent. This focus on the obligation of society is also true of Norway that was deemed the least liberal when it came to views on private vs public responsibility for health (Vallgård 2007, 2011). Thus it is not clear how ideologically homogeneous the Nordic countries are, and specifically how much such similarities set them apart from the rest of the world. For example, England has been found to resemble the Scandinavian countries as much as they resemble each other. That undermines the idea of a highly specific Nordic ideology in this regard (Vallgård 2010). However, these differences, and differences across other dimensions need to receive greater focus in health economics research. In view of this and the perceived homogeneity of the Nordic countries with respect to hard-to-measure factors such as cultural and political factors, this may be a worthwhile research front to move forward.

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