

Paper Number A002

Social Disparities in Alcohol Drinking in OECD countries

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ABSTRACT

Aims of the study: This study looks at social disparities in alcohol drinking patterns in OECD countries. It aims to identify which population groups are most likely to engage in, and which are most affected by, harmful drinking, and to examine how these disparities have evolved over time.

Data and Methods: National health survey data cover 20 OECD countries. The study examines three drinking patterns: (i) any alcohol drinking, (ii) hazardous drinking, and (iii) heavy episodic drinking (HED). The social dimension is successively measured by education level and socioeconomic status (SES). Logistic regression and concentration indexes are used to assess inequalities across countries and over time.

Results: Men and women who are more educated or have higher SES are more likely to be drinkers, but they often differ in their propensity to engage in higher-risk drinking behaviours. Highly educated women are more likely than those with less education to engage in hazardous drinking and HED, while the opposite is true for men in most countries examined. The analysis of disparities over time shows no major changes in social gradients, although rates of hazardous drinking across social groups appear to be converging in some countries.

Conclusion: Results highlight the population groups the most affected by harmful drinking, although social patterns of drinking tend to differ across countries, as they are largely the result of cultural and environmental influences, and of national policies. This study contributes to design appropriate health prevention policies, and helps policy makers to target population groups for strategies to reduce harmful drinking.

1. BACKGROUND

Harmful alcohol use is responsible each year for about 2.5 million premature deaths worldwide (WHO, 2011) from car accidents, violence, and suicides, or alcohol-related diseases. However, the impact of alcohol use on population health is complex to determine, as alcohol may both benefit –with a moderate use- (Bray, 2005; Stampfer et al., 2005) and harm people (Rehm et al., 2010a). In addition to health effects, harmful alcohol use has a considerable impact on employment, productivity and wages. There is also evidence that problem drinking reduces academic efficiency and therefore hinders the accumulation of human capital (Renna, 2007; Wolaver, 2007). Thavorncharoensap et al. (2009) estimated the economic burden of alcohol at between 0.45% and 5.44% of GDP in 12 countries.

From a public policy perspective, it is relevant to understand how far alcohol consumption and its harmful use forms spread and which groups of the population are the most affected by harmful drinking behaviours. Harmful alcohol use refers to any pattern of consumption that is dangerous for health. These patterns include (i) hazardous drinking which is defined as a consumption above a certain amount of alcohol, and (ii) heavy episodic drinking -also called binge drinking- which is related to large quantities of alcohol consumed over a short period of time. These patterns differ by age, gender, ethnicity, education, and socioeconomic status (SES). There is a vast international literature on this, but findings are not always consistent, largely due to the different measures of drinking used as outcomes in the analyses.

Disparities by age, gender and ethnicity

Alcohol consumption varies with age, following a U-inverted shape, starting by an increase at drinking initiation ages up to a consumption peak and thereafter a decrease at adult ages (Casswell et al., 2003; McKee et al., 2000). Similarly, harmful forms of consumption, like Heavy Episodic Drinking (HED), were found to be more prevalent in younger age groups (Kanny et al., 2011; Grittner et al. 2013).

Men are more often drinkers and consume more alcohol than women (Bloomfield et al., 2006). Gender differences in drinking are intertwined with educational and socioeconomic gradients in harmful drinking patterns (Bloomfield et al., 2006; Kuntsche et al., 2006; Huerta and Borgonovi, 2010; Grittner et al., 2013). However, the gender gap tends to narrow as women's drinking behaviours increasingly resemble men's, and overall drinking patterns in men and women tend to develop similarly. This trend should be viewed in the context of changes in cultural and social norms, including changes in women's social position in societies as well as new market forces (e.g. market products directed towards women).

There is also evidence of disparities in harmful drinking behaviours by ethnic group. In the US and Australia, although minorities tend to drink less frequently, some of the minority ethnic groups are more concerned by higher level of consumption (Kanny et al., 2011; Gray and Wilkes, 2010). In the UK, most minority ethnic groups (for instance, people from Pakistani, Bangladeshi and Muslim backgrounds) have higher rates of abstinence and lower drinking levels compared to people from white backgrounds, although drinking patterns vary both between and within minority ethnic groups (Hurcombe et al, 2010). These differences are associated with strong ethnic identity, strong family and local community ties, continuing links with the host country and maintaining religious values.

Relationship between education and alcohol consumption

The association between education and patterns of alcohol drinking is difficult to summarize as it varies by gender and with the choice of drinking outcome (e.g. any alcohol consumption vs. harmful consumption; frequency vs. quantity; etc.). For instance, there is evidence of a positive association between education and the frequency of consumption but also of a negative association between education and heavy drinking (Bloomfield et al., 2006; Caldwell et al., 2008; Casswell et al., 2003). Huerta and Borgonovi (2010) found a strong positive link between educational attainment and frequency of alcohol consumption as well as lifetime drinking problems in women, while they found no such association in men.

Bloomfield et al. (2006) and Kuntsche et al. (2006) showed that the prevailing pattern for men in a range of countries is that the less educated are more likely to be hazardous drinkers. The same is true for heavy episodic drinking (Bloomfield et al., 2006; Kerr et al., 2008). Conversely, for women, the higher educated are more likely to be hazardous drinkers (Helasoja et al., 2007; Bloomfield et al. 2006; Kuntsche et al., 2006), although evidence for a few countries show the reverse (Kuntsche et al., 2006, in the Czech Republic, Finland, Hungary, and Sweden).

Grittner et al. (2013) found on 33 countries that men and women with greater education are more likely to consume alcohol than their counterparts with less education. Concerning HED, results were more mixed. Education was negatively correlated with HED for men. Similarly, higher education leads to lower HED among women in higher income countries, whereas the opposite is true in lower income countries, possibly due to the diffusion of innovative patterns of HED among women. The authors suggest that high-SES women adopt men's behaviours and then they diffuse the new patterns of drinking to all classes of women, this diffusion being achieved in high income countries and being in process in low income countries.

Relationship between socioeconomic status and alcohol consumption

The relationship between SES and alcohol consumption is complex. Some studies found that people with a less privileged socioeconomic background drink more, whereas others found the opposite. Inconsistencies between findings may be explained by the wide variety of definitions of drinking used (e.g. weekly or monthly frequency of heavy drinking) and by the variety of definitions of socioeconomic background used (e.g. income, occupation, employment status). A US study shows that concerning harmful drinking, HED is more prevalent among people with higher incomes. However once they engage in HED, people with lower incomes do so more frequently and consume larger numbers of drinks (Kanny et al., 2011). Nevertheless, most evidence from multiple countries converge to the result that men and women with higher incomes are more likely to consume alcohol (Kuntsche et al., 2006; Mc Kee et al. 2000; Casswell et al., 2003).

Aims of the study

A number of publications around the GENACIS¹ project have focused on social inequalities in alcohol drinking in an international perspective (Kuntsche et al., 2006; Bloomfield et al, 2012; Grittner et al 2013). However to our knowledge, there was no attempt to gauge and compare the size of inequality across countries. Besides, the SES dimension was generally approached by individual's educational attainment, while inequalities could be assessed along other dimensions like occupation or income. This study contributes to this research by gauging and comparing the size of social inequalities in 20 OECD countries, and measuring inequalities along new SES dimensions.

The aims of this paper are (a) to assess disparities in drinking patterns across age, gender, education and socioeconomic status in a cross-country comparative perspective, and (b) to assess whether these disparities have changed over time. This paper is made of five sections. Following Section 1 which gives insight into existing evidence for social disparities, Sections 2 and 3 describe the data and methods used in the analyses. Section 4 presents the findings, and Section 5 discusses the results providing some economic justifications, and presenting the limitations of the study.

¹ Gender, Alcohol, and Culture: an International Study

2. DATA

Data are gathered from several waves of national health and lifestyle surveys, or alcohol and drug use surveys, for 20 OECD countries: Australia, Canada, Chile, Czech Republic, England, Finland, France, Germany, Hungary, Ireland, Italy, Japan, Korea, New Zealand, Portugal, Slovak Republic, Slovenia, Spain, Switzerland, and the USA. The surveys used provide the most detailed information currently available on individual socio-demographic characteristics combined with alcohol drinking patterns, assessed either over the week prior to the interview in 9 countries (Australia, Canada, Czech Republic, Finland, Hungary, Japan, Slovak Republic, Slovenia, Switzerland) or based on questions on drinking frequency and quantity on a typical drinking day in the 11 remaining. Health interview surveys generally gather information on individual socio-demographic characteristics, living and working conditions, perceived and objective health status (e.g. acute and chronic diseases), related-health behaviours (e.g. smoking, drinking, physical activity, aspect of diet), utilisation of health services (e.g. doctor consultation, preventive screening). Table 1 presents the list of national surveys used and the number of waves available for each country.

Table 1. List of survey data

Country	Survey name	Available survey waves	Age	Frequency - Men	Frequency - Women
Australia	National Health Survey	1989-90, 1995, 2001, 2004-05, <u>2007-08</u>	age 25+	5950	6525
Canada	National Health Population Survey and Canadian Community Health Survey	1994/95, 2000/01, 2003, 2005, <u>2007/08, 2009/10</u>	age 25+	82050	97368
Chile	Servicio Nacional de Drogas y Alcohol (ex-CONACE)	<u>2008, 2010</u>	age 25-64	9808	13945
Czech Republic	European Health Interview Survey in the Czech Republic (EHIS)	<u>2008</u>	age 16+	716	781
England	Health Survey for England	1991- <u>2010, 2011</u> (every year)*	age 25+	6647	8289
Finland	Finrisk	1997, 2002, <u>2007</u>	age 25-74	3328	3478
France	Enquête Santé et Protection Sociale	2002, 2004, 2006, <u>2008, 2010</u>	age 25+	8233	8772
Germany	Epidemiological Survey on Substance Abuse	1995, 1997, 2000, 2003, <u>2006, 2009</u>	age 25-65	4836	5998
Hungary	European Health Interview Survey (EHIS)	<u>2009</u>	age 25+	1750	1981
Ireland	Survey on Lifestyle And Nutrition	1998, 2002, <u>2007</u>	age 25+	3181	4229
Italy	Multiscopo Aspect of Daily Life	2005,2006, 2007, 2008, <u>2009, 2010</u>	age 25+	31381	27171
Japan	National Survey on Alcohol Drinking and Lifestyle	<u>2003, 2008</u>	age 25+	2760	2732
Korea	Korean National Health and Nutrition Examination Survey	1998, 2001, 2005, <u>2008</u>	age 25+	5752	7453
New Zealand	National Health Survey	1996/97, 2002/03, <u>2006/07</u>	age 25+	4181	5506
Portugal	General Population Survey on Psychoactive Substances	<u>2007</u>	age 25-64	3232	3438
Slovak Republic	Európsky prieskum zdravia 2009 (EHIS)	<u>2009</u>	age 16+	2019	2246
Slovenia	Anketa o zdravju in zdravstvenem varstvu 2007 (EHIS)	<u>2007</u>	age 16+	729	816
Spain	Encuesta Nacional de Salud de Espana	<u>2006</u>	age 25+	10371	12473
Switzerland	Swiss Health Survey	1992, 1997, 2002, <u>2007</u>	age 25+	7422	8996
USA	National Health and Nutrition Examination Survey	1999/2000, 2001/02, 2003/04, 2005/06, <u>2007/08, 2009/10</u>	age 25+	4376	4422

Note: All survey editions were used for trends analysis while only the most recent years (underlined) are used for disparity analysis. Frequencies are related to the most recent years. (*) In England, the most recent data reporting hazardous drinking are 2001-2002 followed by 2011, and those reporting HED are 2010-2011.

The use of different national surveys for several years may be a source of data heterogeneity across countries and over time, although all the variables are constructed in order to get the highest level of comparability across countries. A description of data availability and comparability is available on demand. International comparisons in alcohol consumption need to rely on a common measure of alcohol level. Each country has its own definition of a standard drink (how much pure alcohol it contains) and its own recommendation for harmful drinking limits (defined as number of glasses or amount of pure alcohol per week). No international consensus in drinking guidelines exists (Furtwaengler and de Visser, 2013). Despite this limitation, we tried as far as possible to derive comparable outcome measures using information on individual quantity and frequency of drinking provided in national health surveys. The derived outcome measures include:

- Drinking status, indicating whether people drank in the past 12 months or were abstainers. This variable is available over time in all countries.
- Hazardous drinking, corresponding, in this study, to a weekly amount of pure alcohol of 140 grams or more for women, and 210 grams or more for men. This measure refers to the limits above which people are at risk for their health as defined in a number of countries.
- HED, commonly called binge drinking, collected in most of national surveys through questions such as: In the past 12 months, how often did you have (n) or more drinks on one occasion? (where n corresponds to 5 drinks in Canada, Germany, and the US; 6 drinks in Chile, Czech Republic, France, Hungary, Ireland, Italy, Japan, New Zealand, Portugal, Slovak Republic, and Slovenia; 7 drinks for men and 5 drinks for women in Australia²; and 8 drinks for men and 6 drinks for women in Switzerland). Analyses focused on regular HED i.e. that happens at least once a week.

Socio-demographic variables

A range of individual characteristics is available and common to the national health surveys used herein. It includes gender, age, ethnicity, marital status, working status, education level and socioeconomic status (occupation-based or income level). Ethnicity is reported in England, New Zealand, and the US. Marital status is categorized into Married / Single / Other (divorced, separated, widow). Working status is defined as Working / Not working.

² The definition of HED in Australia is derived from the NHMRC 2001 Guidelines. The guideline has been updated and since 2009 the guideline has been: “For healthy men and women, no more than four standard drinks on a single occasion reduces the risks of alcohol related injury arising from that occasion”.

International standard classifications, such as ISCED for education and ISCO for occupation, were used to deal with the problem of data heterogeneity. Education level is recoded into three groups: low (ISCED 0, 1, 2) / medium (ISCED 3, 4) / high (ISCED 5, 6). An attempt was made to standardise different occupation-based socioeconomic status, by recoding professions as: lowest (unskilled manual) / middle-low (semi-skilled manual) / middle (skilled manual, non-manual) / middle-high (managerial technical) / highest (professional). Five-level occupation-based socioeconomic status variable was available or could be derived in Chile, England, France, Hungary, Italy, Japan, Portugal, Spain, and Switzerland. In countries for which an occupation-based social class variable could not be derived, household income was instead used as an indicator of socioeconomic status. These include Australia, Canada, Czech Republic, Finland, Germany, Ireland, Korea, New Zealand, Slovak Republic, Slovenia, and the USA. More information on data comparability is available on demand.

Since the focus is on the relationship between education and alcohol drinking, the analyses presented in this paper cover adults aged 25 and over, who have finished their education in order to account for reverse causality³. All analyses use sampling weights provided with the data. All analyses were undertaken with Stata 12.

3. METHODS

Assessing social disparities

Disparities in drinking patterns among population groups are analysed for the latest survey years available, separately for men and women, with logistic models adjusting for a range of covariates. In particular, we control for age (assuming a non-linear relationship), marital status, ethnicity (when available, i.e. in England, New Zealand, and the US), smoking status, occupation status, education attainment, socioeconomic condition and interaction terms between the latter and gender and between education and gender.

The common denominator for all analyses of social disparities in drinking patterns is the entire adult population. Adjusted probabilities of being an alcohol consumer, a hazardous and a heavy episodic drinker are derived separately for men and women according to education level and socioeconomic status (SES)

³ Analyses were initially conducted on population aged 16 and over for three countries (Czech Republic, Slovenia, and Slovak Republic). It was not possible to re-do the analysis on a restricted sample because of data access rights.

after fitting the statistical models. Adjusted probabilities are calculated for a typical individual aged 40 years-old and with all other covariates fixed at the sample mean.

Comparing disparities across countries

The use of logistic regressions described above provides an accurate picture of inequalities within countries. However that approach is less useful in comparisons across countries because of differences in the size and nature of socioeconomic groups in different settings. Therefore, to overcome this problem in cross-country comparison, inequalities in drinking patterns are assessed and gauged using the Concentration Index (CI) in relation to education level and the SES. In the case of binary outcomes (being or not a drinker), normalised CIs have been proposed to take into account the bounded nature of the health outcome (Wagstaff, 2005; Erreygers, 2009). In this paper, we present the Wagstaff's normalised CI.

Some argue that the CI is difficult to interpret and that the relative and absolute indexes of inequality (RII and AII) are more helpful for policy decision making. However, the calculation of these indexes relies on the linearity assumption of the social gradient. This means that moving up in the social ranking gradually increases (or decreases) the health outcome. The relationship between socioeconomic ranking and alcohol use does not meet the linearity assumption. Although some methods have been proposed to overcome this issue (Sergeant and Firth, 2006), they are less relevant when the socioeconomic ranking is not continuous, and even less when it is made of three categories.

Since the studied outcomes are negative health outcomes (e.g. being drinkers at risk), the education and socioeconomic ladders are ranked from the highest to the lowest level, in order to facilitate the interpretation of the CI. The CI is bounded between -1 and 1, with the sign indicating the direction of inequality -a positive index indicates that people with more education or higher SES are less likely to be alcohol consumers (or hazardous or heavy episodic drinkers)⁴, a zero value indicates no inequality, and a negative index indicates that people with more education or higher SES are more likely to be alcohol consumers (or hazardous or heavy episodic drinkers)⁵. It is worth noting that in the case of crossing curves, one could have zero inequality if, for example, inequality favoring the poor in one part of the distribution exactly offsets inequality favoring the rich in another.

We compute the concentration index and its standard error using the Stata `concindc` command for the micro-data with a categorical welfare variable (Kakwani et al., 1997; Chen, 2007; O'Donnell et al., 2008).

⁴ This refers to pro-rich inequality i.e. the well-off have better health outcomes.

⁵ This refers to pro-poor inequality i.e. the worse-off have better health outcomes.

Analysing social disparities over time

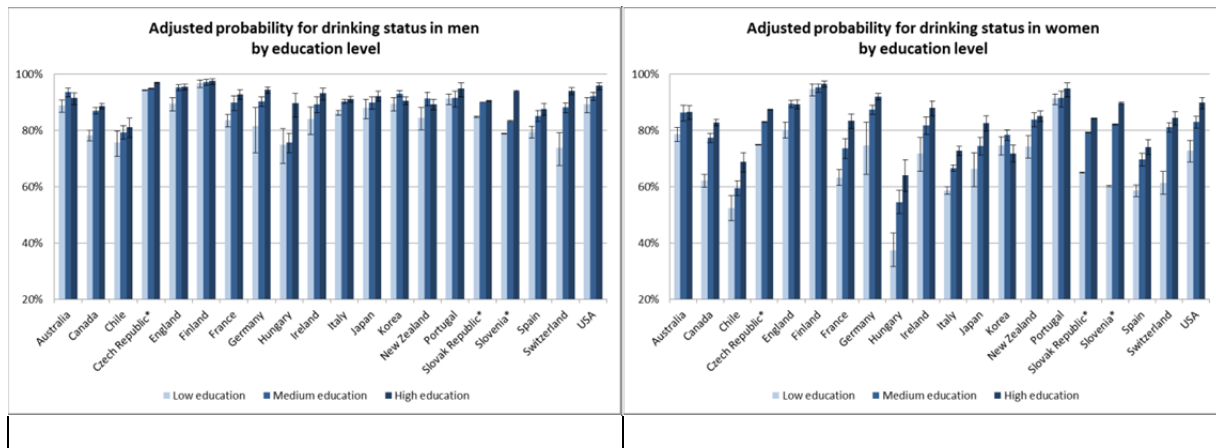
Time-trends in social inequalities in drinking patterns are examined with means of regression-based estimates. We introduce into the regression model -just described above- an interaction term between the social dimension variable (successively defined as education and SES) and the squared effect of the survey year. Thus, based on these regression estimates, adjusted probabilities of drinkers, hazardous drinkers, and HED, are computed for several years and among different socioeconomic groups.

4. RESULTS

This section describes disparities in alcohol consumption (drinking status, hazardous drinking, and HED) related to education level and SES, and presents cross-country comparisons using a summary measure, the concentration index. Disparities in drinking patterns are analysed for men and women separately, and based on the latest years available. Finally, this section presents findings of the evolutions in social disparities over time. For clarity purposes, we do not present the full set of results (available on request to the authors).

Figure 1 shows the adjusted probabilities for any alcohol drinking in the past 12 months by level of education in men and women, *all other things being equal*. In nearly all countries, for both genders, adults with higher education are more likely to consume alcohol than their lower-education counterparts. The same pattern is observed with SES. There are some exceptions. The educational gradient is not significant in Finnish adults and the socioeconomic gradient is not significant in Swiss men. Korea displays an unclear relationship between education and drinking status.

Figure 1. Adjusted probabilities for any alcohol drinking in the past 12 months by education level



Note: Rates correspond to adjusted probabilities of having consumed any alcohol in the past 12 months in people aged 25 and over. (*) people aged 16 and over in Czech Republic, Slovak Republic and Slovenia.

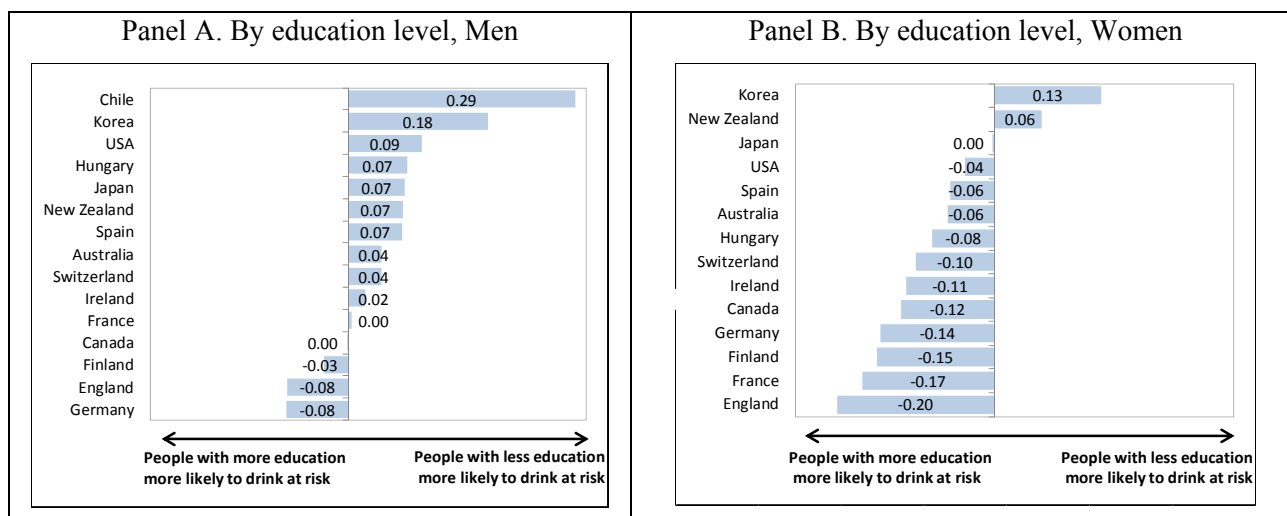
Source: OECD estimates on national survey data, most recent years.

Disparities in risky drinking patterns

The degree of inequality in risky drinking along any social dimension is assessed by means of the concentration index. For information about levels of risky drinking patterns, adjusted probabilities of hazardous drinking and HED (similar as those in Figure 1) are displayed in Annex 1.

Figure 2 displays the concentration index for hazardous drinking by education level. For men, the pattern of disparity in hazardous drinking is mixed. Among 15 countries studied, England and Germany show significantly higher hazardous drinking rates in the more-educated, while the reverse is true in Chile, Korea, USA, Hungary, Japan, New Zealand, and Spain. For women, disparities in favour of the worse-off are observed in 12 of 14 countries. In particular, more-educated women are significantly more likely to be hazardous drinkers in England, France, Finland, Germany, Canada, Ireland, and Switzerland.

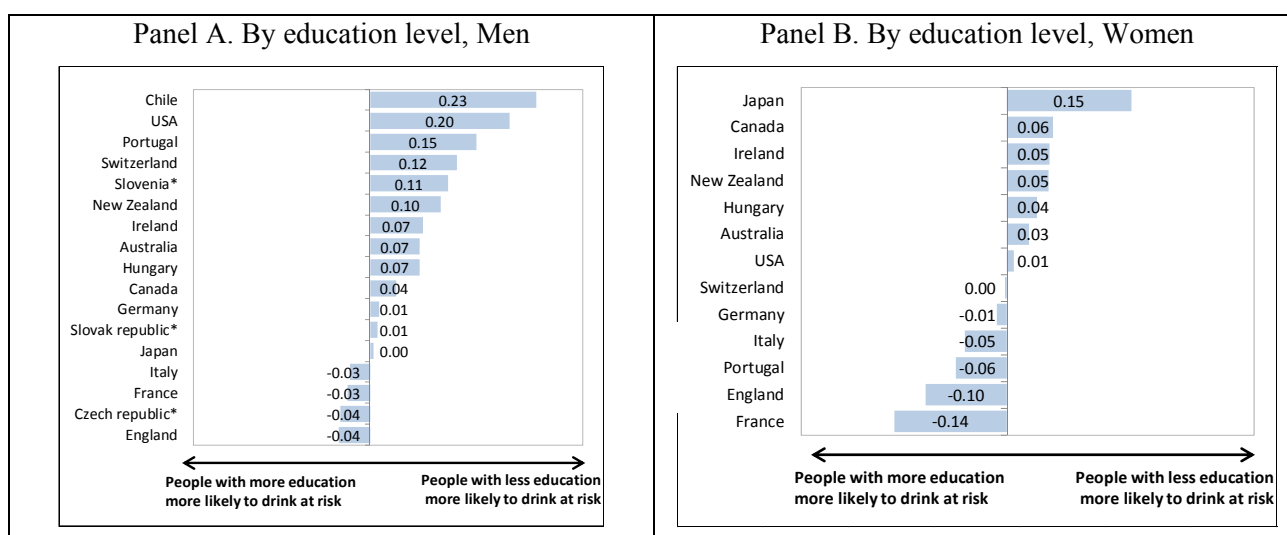
Figure 2. Concentration index for hazardous drinking by education level



Source: OECD estimates on national survey data, most recent years.

The educational gradient in HED is mild in a number of countries (Figure 3). Different patterns of social disparity in HED seem to emerge in men and women. Less educated men are more likely to engage in HED in most of the countries studied, especially in Chile, the US, Portugal, and Switzerland, whereas more-educated women are more at risk of HED, notably in England and France.

Figure 3. Concentration index for HED by education level

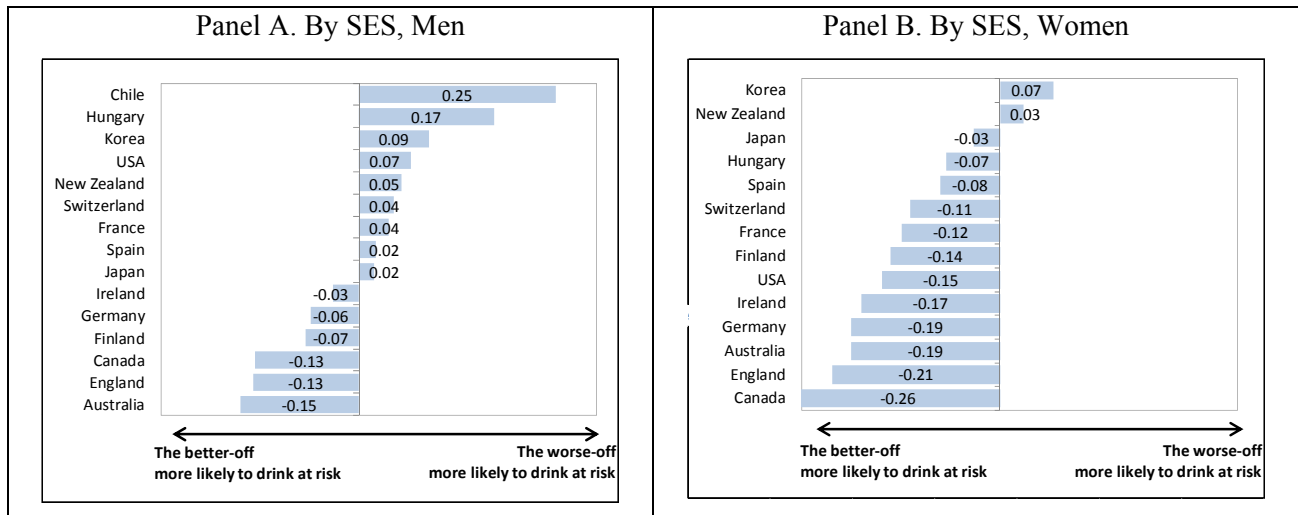


Note: (*) people aged 16 and over in Czech Republic, Slovak Republic and Slovenia.

Source: OECD estimates on national survey data, most recent years.

In line with findings on education-related disparities, Figure 4 shows a mixed pattern of SES-related disparities in hazardous drinking for men, and a clearer pattern for women. Men with higher-SES are significantly more likely to be hazardous drinkers than those with lower-SES in six of 15 countries (Australia, Canada, England, Finland, Germany, and Ireland), while women with higher-SES are more likely to be hazardous drinkers than lower-SES women in 11 of 14 countries.

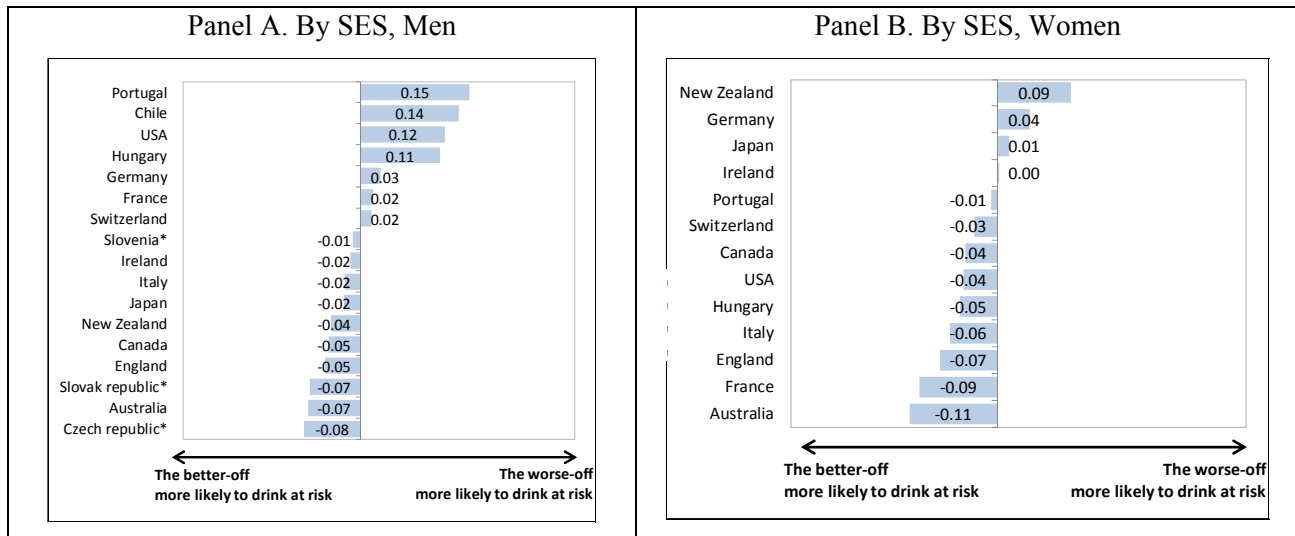
Figure 4. Concentration index for Hazardous drinking by SES



Source: OECD estimates on national survey data, most recent years.

The SES-related gradient in HED is mild in both men and women, and no clear pattern emerges in the set of countries studied (Figure 5), except that men with higher SES are more likely to engage in HED in Australia, Czech Republic, and Slovak Republic, whereas they are less at risk of HED in Chile, Hungary, Portugal, and USA. Women with higher SES are more at risk of HED in some countries, notably in Australia, England, and France.

Figure 5. Concentration index for HED by SES



Note: (*) people aged 16 and over in Czech Republic, Slovak Republic and Slovenia.

Source: OECD estimates on national survey data, most recent years.

Time-trends in social inequalities

The analysis of trends over time reveals no major changes in education and SES gradients in (any) alcohol drinking, but with exceptions for Finland and Switzerland. Finland displays an increasing rate of any alcohol drinkers in the less educated and the lower-SES women. Switzerland shows a decreasing rate among the less educated. The complete set of trends in social disparities by education level and by SES is available on demand.

Trends in social gradients in hazardous drinking show: narrowing social disparities in six countries with decreasing rates of hazardous drinkers among the more educated and/or better off (England, Finland Germany, Ireland, Switzerland, and New Zealand). In contrast, increasing social disparities are observed among women in England with rates of hazardous drinkers growing among the more educated (up to 2002).

No major trends were found in disparities in HED, but again with some exceptions. Ireland, which has the highest proportions of binge drinkers, displayed a remarkable trend of narrowing social disparities. In contrast, social disparities have been increasing in Germany, New Zealand, and the United States (men only), with the worse-off increasingly at risk over time compared to other SES groups (although education-related inequalities in HED narrowed in Germany at the same time).

5. DISCUSSION

Results show that men and women who are more educated or have higher socioeconomic status are more likely to be alcohol drinkers, but they often differ in their propensity to engage in higher-risk drinking behaviours. Highly educated women are more likely than those with less education to engage in hazardous and HED, while the opposite tends to be observed in men in the countries examined. The analysis of disparities over time shows no major changes in social gradients, although rates of hazardous drinking across social groups appear to be converging in some countries.

Social patterns of drinking tend to differ across countries, as they are largely the result of cultural and environmental influences, and of government policies in place in the countries concerned. Social norms shape drinking behaviours: they determine when, in what contexts and how often people drink, and what levels of drinking are considered acceptable (SIRC, 1998). For instance, in wine-producing countries wine is traditionally consumed with meals (popular in rural areas) whereas in northern European countries wine drinking is associated with modern living styles and is an element of social life (popular in urban areas) (Simpura and Karlsson, 2001).

Despite these cultural differences, the analyses show common social disparities among countries. Men and women with more education and higher SES are more likely to be alcohol drinkers in the past 12 months in virtually all the countries studied. However, men and women with higher socioeconomic position differ in their propensity to engage in risky drinking behaviours in about half of countries. Higher educated women are more likely than those with less education to engage in hazardous and heavy episodic drinking, while the opposite is true for men in most of the countries examined. This opposite gradient between genders is observed in Australia, France, Hungary, Germany, Ireland, Japan, New Zealand, Portugal, Slovenia, Spain, Switzerland, and USA, (whatever the drinking dependent variable is). Some countries show greater degrees of inequality than others. Among the different concentration indexes reported herein, larger inequalities in men are found in Chile, Korea, and USA. Respectively, larger inequalities in women are found in Australia, Canada, and France.

Justifications of findings

Several reasons for these disparities among population groups are suggested in the literature, such as social and cultural norms, individual's affluence, women's social position, and environmental influences. Men and women consume alcohol in different ways, often with greater and more frequent consumption in men. However, women sometimes drink more than men in early adulthood, partly because they mature earlier (Ahlström and Österberg, 2005). However, drinking patterns change with parenthood, especially in women.

Other relevant predictors of alcohol drinking are related to education level and SES. People with higher socioeconomic status, and thus with higher incomes, tend to consume more alcohol and more frequently than those who are less affluent as alcohol is more affordable for them. Affluence and alcohol prices are important determinants of consumption. Another reason for the positive relationship between wealth and drinking is sometimes suggested: since people in lower-SES tend to have worse health than their higher-SES counterparts (OECD, 2011), they may consume less alcohol because of health problems.

The association between the social dimension and hazardous and heavy episodic drinking patterns varies between genders. Regarding men, those with lower education and lower SES are more likely to be affected by hazardous and heavy episodic drinking than their counterpart in higher education and higher SES. This result is in line with most findings on inequalities in unhealthy lifestyle habits (e.g. smoking, physical inactivity, unhealthy diet, obesity), with a range of explanations including health information, time preferences, health investment choice. In addition, part of social inequalities in alcohol consumption may find some explanations in the geographical distribution of alcohol outlets. Density of alcohol outlets has been shown to be higher in more disadvantaged urban areas in Australia, New Zealand, and the United States (Livingston, 2011; Berke et al., 2010; Romley et al., 2007). Also, high outlet density is associated with higher levels of alcohol consumption (Campbell et al, 2009; Popova et al, 2009), with poorer non-injury health outcomes (Tatlow et al, 2000; Theall et al, 2009), and with higher rates of alcohol-related harms (e.g. injuries, violence, car accidents, domestic violence and child abuse) (Fone et al. 2012),

In contrast, for women, the social gradient tends to be reverse: women in higher education and higher SES tend to engage more in hazardous drinking and HED. Women with higher education who end up taking better-paid jobs involving higher degrees of responsibility may drink more heavily because they have more stress, and more frequent occasions of socializing and going out with colleague. Besides, these occasions being typically in masculine work environment, they are confronted to higher limits of drinking (Com-Ruelle et al., 2008). We tested this assumption on French data by disentangling women in high socioeconomic position in masculine work environment (in managerial /technical occupations) versus women in high socioeconomic position in non-masculine environment (in teaching /arts / health occupations). Findings confirm the hypothesis, showing that women with high SES in managerial / technical occupations are more likely to drink heavily compared to women with high SES in teaching /arts / health occupations. Other reasons for the positive association between the social dimension and hazardous drinking in women may be found in the greater social acceptability of alcohol use and abuse among women with high-SES compared to those with low-SES; and more exposure to alcohol use during formative years, greater postponement of childbearing and its responsibilities among the better educated (Huerta and Borgonovi, 2010). Another explanation is that women in high SES may want to imitate men's

behaviours, and adopt HED as an innovative lifestyle -like it was for smoking some years ago-. It is often seen that women in high SES who adopt the innovation are then likely to diffuse it to other social groups (Grittner et al. 2013). We may thus expect that female social inequalities in heavy drinking will resemble male inequalities in the future.

Implications of results

Despite the complex relationships between socioeconomic backgrounds and alcohol consumption, it is clear that people in lower socioeconomic groups and ethnic minority groups are more affected by alcohol-related harms. Evidence from a number of countries converges in that sense, showing that the worst-off have higher rates of alcohol-related problems and mortality than the better-off (OECD et al, 2007), even for the same level of drinking (Mäkelä and Paljarvi, 2008; Grittner et al., 2012). These disparities - observed for equal alcohol consumption- are possibly the results of other social or environmental dimensions surrounding problems such as health education, or access to health care.

Limitations of the study

Findings presented in this paper do not go without limitations. Survey-based data on alcohol consumption are likely affected by measurement bias including underreporting by surveyed respondents, and selection bias in survey sampling. Drinking levels reported in surveys have been shown to account for only 40-60% of alcohol sales (Midanik, 1982; WHO, 2011). A major determinant of such discrepancy is the underreporting by respondents in surveys (Boniface and Shelton, 2013; Meier et al. 2013; Rehm et al., 2010b; Ely et al., 2001). Selection bias may affect household-based surveys that may under-sample groups of people with high alcohol consumption (e.g. students, alcohol dependent people), and may not include at all groups that are most at risk of harmful drinking (e.g., homeless, people in institutions) (Meier et al. 2013). Another source of bias in survey data is the assumed size and strength of a standard drink that may greatly differ for different respondents. Some studies propose approaches to correct the underreporting bias in alcohol survey data (Rehm et al., 2010b) although methods developed so far do not permit to correct for an unevenly distributed underreporting bias. Some evidence suggest that underreporting bias may be larger in hazardous drinkers (Townshend & Dukat, 2002; Lemmens et al., 1988), and that non-response bias is higher among heavy drinkers (Zhao et al. 2009, Studer et al. 2013).

Although an alternative data source existed, it was not adapted for the purpose of this study. WHO produces aggregate estimates of adult per capita alcohol consumption (APC) including recorded consumption -based on sales, tax, international trade, and survey data- and unrecorded consumption adjusting for homemade or illegally produced alcohol, smuggled alcohol, alcohol for industrial and

medical use, and tourist consumption. The latter accounts for nearly 30% of total worldwide adult consumption. These aggregate APC estimates provide the most reliable information to determine broad national trends and draw country profiles of alcohol consumption. However, their aggregate nature does not permit identification and examination of individual patterns of drinking.

Differences in reporting alcohol consumption are suspected with relation to social and educational backgrounds. People with less education would be more likely to underreport alcohol consumption, which would lead to an over-estimation of the drinking problem in those with more education. Analyses of disparities in alcohol drinking –measured from interview surveys- along the social dimension may be affected by these differences in reporting. Hence, some caution should be taken with the results we present and their interpretation.

Conclusion

Despite these limitations, the analyses presented in this paper give some insights into differences in drinking patterns across population groups in OECD countries in the light of cultural, social, and environmental influences. Such analyses help to identify which population groups are most likely to engage in, and which are most affected by, hazardous and heavy episodic drinking, and to understand how disparities in drinking evolved over time. This work contributes to designing appropriate policy strategies to reduce harmful drinking, and provides clear indications on what groups are of a higher priority in the targeting of alcohol policies.

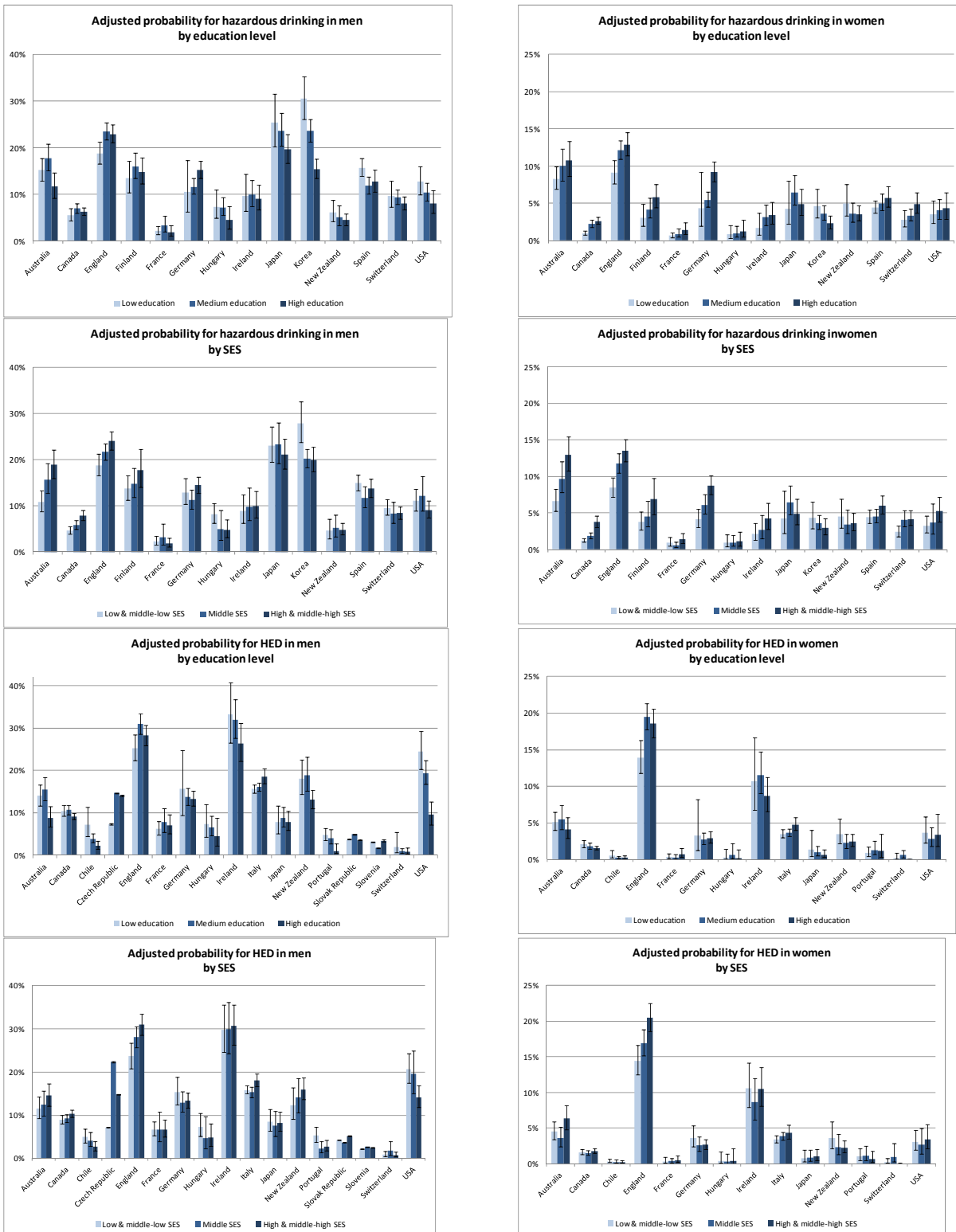
Future developments of this work could try to explore these cross-country differences by examining how national features influence these inequalities. Further progress could investigate to what extent national policies related to minimum age, alcohol pricing, advertisement ban, location and time restriction for selling alcohol, can play a role on the level and disparities of alcohol consumption.

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Annex 1 – Probability of hazardous drinking and HED



Note: Rates correspond to adjusted probabilities of having consumed any alcohol in the past 12 months in people aged 25 and over. (*) people aged 16 and over in Czech Republic, Slovak Republic and Slovenia.
 Source: OECD estimates on national survey data, most recent years.