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ABSTRACT

More Than a Ban on Smoking? Behavioural Spillovers of Smoking Bans in the Workplace*

Are workplace smoking bans (WSBs) more than a ban on smoking? We study whether WSBs influence smoking cessation and exert behavioural spillover effects on (i) a number of health behaviours, and (ii) on individuals not directly affected by the bans. Drawing upon quasi-experimental evidence from Russia (a country where about half of the population smokes), which introduced a WBS (in addition to a smoking ban on public places), and adopting a difference-in-differences (DiD) strategy, which compares employed individuals (exposed to the work and public place ban) to those unemployed (exposed only to the ban in public places), we document three sets of findings. First, unlike previous studies (focusing on smoking bans in public places), we find robust evidence that WSBs increase smoking cessation in 2.9 percentage points (pp) among men. Second, we find that upon the WSB, quitters are less likely to use alcohol (6.7pp reduction among men and 3.5 pp among women), reduce their alcohol consumption (10 percent among men) and increase their physical activity (in 4.3 percentage points among men). WSBs are found to influence health behaviours of those not directly affected by the reform, such as never smokers. Our findings are consistent with a model of joint formation of health behaviours, and suggest of the needs to account for a wider set of spillover effects when estimating the welfare effect of WSBs.

JEL Classification: I18, H75, L51

Keywords: joint behavioural formation, workplace smoking bans, behavioural spillovers, smoking, drinking, physical activity, healthy identity, Russia

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1 Introduction

Although canonical demand for health models conceptualise health behaviours as resulting from an individual evaluation of its costs and benefits (Grossman et al. 1983), limited research has focused on testing whether individuals evaluate each health behaviour (e.g., smoking) independently, or instead, whether a change in one specific behaviour modifies the costs of engaging in other behaviours (e.g., alcohol consumption, healthy eating, physical activity, etc). When behaviours are jointly formed, a change in one specific behaviour can exert behavioral spillovers on other behaviours (Truelove et al. 2014).

One way of testing for the presence of behavioural spillovers lies in examining whether interventions that attempt to change some specifically targeted behavior (e.g., smoking cessation) alter other non-targeted behaviours (e.g., physical activity or alcohol use), as well as non-targeted individuals as they were not engaging in such targeted behaviour (e.g., non-smokers) in the first place. The existence of behavioural spillovers has important implications in the evaluation of the welfare effects of policy interventions insofar as they call for the analysis of general equilibrium effects above and beyond those targeted behaviours (e.g., smoking bans target smoking).

A vast medical literature regards smoking as a behavioural risk to both individuals and population health. Smoking alone is responsible for 6 million deaths each year (WHO 2013). Workplace and public place smoking bans (WSBs and PPSBs, respectively) - alongside bans in advertising - take a prominent role among policies governments have articulated to help individuals cutting down on smoking. However, the evaluation of such smoking bans has so far disregarded the spillover effects they might produce on other health behaviour, and estimates of the causal effects of such interventions have not been

documented so far. Furthermore, most of the literature considers the effect of smoking bans in public places (Carpenter et al. 2011, Adda & Cornaglia 2010, Jones et al. 2015, Rong 2017, Anger et al. 2011), but not on the workplace. This is important as WSBs can influence smoking for a longer hours, and might add to the effect of other smoking bans in public places.

This paper examines evidence of behavioural spillovers of WSBs in Russia on a number of health behaviours in addition to smoking cessation, and on non-targeted individuals (e.g., those who do not change their behaviour as a result of the introduction of the ban: never and current smokers). We examine whether being exposed to different levels of smoking restrictions implies an exogenous variation in the probability to smoke. More specifically, we exploit the effects of the introduction of the 2013 WSB, the so-called tobacco control law in Russia, which banned smoking in all workplaces, from 2013, and in public places, from 2014. This feature allows us to identify causal effects using a difference-in-difference (DD) strategy considering that employed individuals were exposed to both bans, whereas unemployed individuals, whose health behaviours were not directly affected in 2013, were exposed to a later smoking ban in public places after 2014.

Our estimates suggest that, the introduction of the WSB leads to a reduction on the extensive margin of smoking behaviour by 2.9 percentage points among men, though no significant effects are found among women. However, we do not find any significant change in the number of cigarettes smoked daily.[1] More importantly, we estimate a reduction in alcohol use which differs by gender (6.7 and 3.5 percentage points respectively for men and women), and a decrease in consumption of 10% for men only. In addition, we find that the ban increased physical activity in 4.3 percentage points for men who quit smoking.

[1]Throughout the paper, we consider the effect on both extensive margins, defined as the probability of adopting a certain behaviour (e.g. prevalence of smoking), and intensive margins, defined as the quantity consumed by those who adopt that behaviour (e.g. consumption of cigarettes).

Next, given that the share of people that quit using alcohol is higher than that of those quitting smoking, we test whether smoking bans exhibited effects on individuals not directly affected by the ban (e.g., such as always or never smokers). Consistently with this hypothesis, we find a significant reduction of alcohol use also among never smokers that were indirectly exposed to the effects of the WSB by living with other household members who quit smoking after the ban. The contributions of this paper are as follows. First, this is the first non-experimental study examining behavioural spillovers (both positive and negative) in several health behaviours. Previous studies documenting the presence of such effects are mainly experimental, and do not distinguish between targeted and non-targeted individuals (always or never-smokers). Second, unlike most of the previous literature which relies on smoking bans in public places, we examine the effect of smoking bans in the workplace. Third, in this study we are able to take advantage of a major policy intervention exogenous to the individual choices, namely the introduction of a smoking ban, which was largely unexpected and treated as a quasi-natural experiment affecting the population as a whole. In particular, our empirical strategy exploits the different timing with which the ban was introduced at workplaces and public places in Russia, and the fact that different groups (i.e., employed and unemployed individuals) of the population were affected by different types of smoking bans.

Our findings contribute to a literature that so far suggests mixed evidence on the effects of bans on smoking. Indeed, previous studies found significant reductions in smoking behaviour in the USA, with stronger effects resulting from workplace smoking bans (Chaloupka & Saffer 1992, Evans et al. 1999). More recently, Adda & Cornaglia (2010), Jones et al. (2015), Rong (2017) found no effect, although some heterogeneous effects were detected across individuals depending on the intensity to the exposure to the ban (Anger

et al. 2011) and some temporal effects (Boes et al. 2015). Furthermore, no evidence of displacement to home smoking is reported (Carpenter et al. 2011). Among the other few studies focusing on the impact of workplace smoking bans, results suggest a decrease in the prevalence of smoking for those directly exposed to the restriction with respect to workers subject to minimal or no restrictions (Farrelly et al. 1999).

We offer evidence of the effect of smoking bans on health behaviours above and beyond intended effects on smoking behaviour, and its subsequent social multiplier effects (Cutler & Lleras-Muney 2010). We specifically argue that if spillovers are generalised, previous estimates suggesting a small correlation between health behaviours (Cutler & Glaeser 2005) might well be driven by unobservables. An alternative explanation lies in the presence of 'complementary behaviours' or, even "identity shifts" (Akerlof & Kranton 2000), and hence whether individuals modify their behaviour aspiring to keep some consistency between their actions and their identities. Truelove et al. (2014) argue that when people think about goals abstractly, they tend to act consistently with past behaviour.

Finally, this study draws on novel evidence from Russia, and focuses on the effect of WSBs. So far, the analysis of the effects of smoking bans mostly refers to the United States and Europe. Evidence from Russia is particularly relevant given that smoking prevalence is among the highest in the European Region (almost 40% of individuals smoked in 2010). Men exhibit an even higher prevalence (60%) while the prevalence for women is significantly smaller (20%) but showed a dramatic increase in the years before 2000, (Lunze & Migliorini 2013). Hence, Russia appears to be an important country where to examine the effect of WSBs on smoking and other health behaviours.

The remainder of the paper is organised as follows. The next section reports a brief summary of the related literature on health behaviours and behavioural spillovers. Section

three reports the data and empirical strategy. Section four displays the baseline estimates and section five is devoted to the robustness checks of our estimates. A final section concludes.

2 Behavioural Spillovers and Explanations

2.1 Behavioural Spillovers

Behavioural spillovers emerge when changes in one behaviour, give rise to changes in other behaviours. Behavioural spillovers can be driven by compensatory beliefs in the search for consistency in behavior. If individuals aim at attaining a specific abstract goal of ''being healthy", a change in a reference health behavior, such as smoking, might trigger the adoption of changes on other behaviours. Some authors coin this effect as the "foot in the door" effect (Bénabou & Tirole 2011). Health identity gives rise to expectations of action, ''behavioural standards" for individuals to follow, so that incoherence between expected and actual behaviours produce negative evaluative emotions (Stryker & Burke 2000), or negative effects on self-image (Bénabou & Tirole 2011). In contrast, identity congruent behaviours give rise to positive emotions. In the health realm some studies show that identity has shown to influence exercise (Anderson et al. 1998) as well as smoking and drinking (Storer et al. 1997).

Testing the effect of such spillovers requires either a careful experimental design or a quasi-natural experiment such as a policy interventions targeting one behaviour, and then examine effects on other behaviours (Thomas et al. 2016, Truelove et al. 2014).Similarly, identity explanations can spillover to individuals that have not engages in a specific behaviour such as smoking , but for whom not engaging in such behaviour is regarded as a

signal for healthy behaviour. Hence, smoking bans can signal that 'healthiness' of someones behaviour ought to be based on something more than just not smoking, as smoking in workplace is not anymore an individual choice.

2.2 Substitution and complementarity of health behaviours

Whether and how a change in a reference behaviour influences other healthy behaviours or not, depends on whether such changes in behaviour are substitutive or complementary in a specific environment. For instance, if behaviours are substitute, the presence of behavioural spillovers might give rise to 'licensing effects' (e.g., drink more, exercise less) which means that individuals adjust other behaviour as a result of changing some specifically targeted behaviour (smoking). Such negative spillover effects have been identified in environmental decision making (Nilsson et al. 2017) to explain the extent to which individuals engage in compensating behaviours (e.g, recycling) to reduce their feelings of guilt that result from engaging in non-environmentally friendly behaviours (e.g., driving). The latter set of behavioural processes are generally labelled as "compensatory beliefs" which explain, in the nutrition domain, dieters inconsistent behaviours when their behavioral goals (e.g., healthy eating) conflicts with other goals (e.g., experiencing please from food).

Consistently with a hypothesis of substitution, Gruber & Frakes (2006) find evidence of an effect of cigarette taxes on body weight, implying that reduced smoking leads to lower body weights, and similar effects are found in other studies (Baum 2009, Liu et al. 2010, Wildman & Hollingsworth 2012, Pieroni & Salmasi 2015). However, more recent studies that revisit such effects find no evidence of a link between smoking and obesity (Nonnemaker et al. 2009) or heterogeneous effects (Wehby & Courtemanche 2012, Wehby et al.

2012). In contrast, other studies document evidence of complementary behaviours. For instance, using a first difference model French et al. (2010) find that increasing frequency and intensity of alcohol use is associated with statistically significant yet quantitatively small weight gain. One explanation for this result lies in the existing complementarities between health behaviours (Dragone et al. 2016). Drinking has been typically shown to complement smoking behaviour Dee (1999), Picone et al. (2004), Yörük & Yörük (2011), Crost & Guerrero (2012), Pieroni, Lanari & Salmasi (2013), Businelle et al. (2013), Picone & Sloan (2003).

To our knowledge, there are two papers exploiting the effect of smoking bans which estimate the causal effect of smoking on drinking behaviour: Pieroni, Chiavarini, Minelli & Salmasi (2013) and Picone et al. (2004). More specifically, Pieroni, Chiavarini, Minelli & Salmasi (2013) examine the effects of the smoking ban on alcohol consumption. They find that the percentage of habitual drinkers of alcoholic beverages, typically consumed outside the home, decreased after the ban consistent with a complementary effect of alcohol intake on smoking. However, they measured the effect of smoking bans in bars and restaurants, which may be different from that of smoking bans at the workplace, on measures of drinking participation outside the home. In addition, their identification strategy relies on cross-sectional data where the year immediately before the introduction of the smoking ban was not available, casting doubts on the robustness of their estimated causal effects. Picone et al. (2004) exploited the introduction of smoking bans in the US, but among older individuals alone.

Finally, Courtemanche (2009) examines health behaviours influenced by smoking, physical activity and food consumption (number of grams of fat consumed per day; number of times that fruit and vegetables are consumed per week) . An explanation of these results

is that individuals who are exogenously induced to smoke less (or quit altogether) may experience a renewed sense of interest in their health, such as a healthier diet and exercise. In addition, people who are able to overcome their smoking addiction may gain in self-confidence and develop healthier habits (Sweet 2000). However, their evidence does not result from a causal quasi-experimental research design.

3 Data and Empirical Strategy

3.1 Data

We use data from the Russian Longitudinal Monitoring Survey (RLMS)[2], an ongoing longitudinal survey, with first wave in 1994, which collects information on a wide range of individual and household characteristics including detailed expenditure data. RMLS provides information about individual activities and health for household members aged 14 and older.

Our sample includes individuals with age between 18 and 65 - i.e. the threshold for retirement - in the time period from 2010 to 2014. We selected this sample because the first Russian smoking ban was implemented in workplaces and, as discussed in the next section, we use employment status to define our treatment and control groups. In addition, we decided to include only years after 2010 because Russia introduced in 2009 a minimum price for alcoholic beverages[3], and after 2015 prices of alcoholic beverages were cut by a great extent to disincentivize illegal consumption of alcohol, that became extremely usual among Russian drinkers due to the continuous increases in prices after

[2]Source: Russia Longitudinal Monitoring survey, RLMS-HSE, conducted by National Research University ''Higher School of Economics" and OOO ''Demoscope" together with Carolina Population Center, University of North Carolina at Chapel Hill and the Institute of Sociology of the Federal Center of Theoretical and Applied Sociology of the Russian Academy of Sciences. (RLMS-HSE websites: http://www.cpc.unc.edu/projects/rlms-hse, http://www.hse.ru/org/hse/rlms)

[3]In addition, in 2010, the Higher School of Economics (HSE) began to fund the RLMS. Supplementary funding came from the University of North Carolina, implying a significant increase in sample size.

2009. These sudden variations in alcohol prices can influence both smoking and other health behaviours beyond the introduction of smoking bans and for this reason we decided to focus on a period of time where prices did not show important discontinuities.

We proxy prices by means of unit values, that have been extensively employed in the literature as a proxy of prices, though it also embeds an average quality choice component. Unit values are estimated as the ratio between household expenditure and quantity purchased for a specific item. In addition it is possible to obtain relative unit values, dividing absolute unit values by the unit value of total expenditure. We obtained information about household expenditure and quantity purchased for a wide range of durable and non durable items from the RLMS survey on household expenditure for the years 2001 to 2017. This survey links information about smoking and other health behaviours to information on expenditure and quantity purchased at the household level.

We present descriptive evidence of price variations for tobacco products and alcoholic drinks in Figures 1-2.

Figures 1-2 show the variation in relative prices of cigarettes and alcoholic drinks in Russia from 2000 to 2017. Prices are calculated, as already explained, using unit values. Looking at cigarettes prices, we can see how since 2010 they have been constantly raised for the entire population, as an additional effort to reduce smoking. The increasing trend in cigarettes prices justifies our approach using the DiD strategy in order to isolate the effect of bans. Looking at relative prices for alcoholic beverages we can notice how it is possible to observe two years, i.e. 2009 and 2015, where prices either increased or fell suddenly. The 1-st of January 2010 order nr. 17 of the Federal authority for the control of the alcohol market, dated 30 November 2009, set a minimum price of 89 roubles (about 1.5 US dollars) for a 0.5-l bottle of vodka in Russia. The price of vodka was subsequently increased during

following years, reaching 220 roubles (about 3 US dollars), until 2015 when it was cut by 16% as a way to reduce illegal drinking. Since this variations in prices may impact differently our treatment and control groups, modifying alcohol consumption beyond the effect of the smoking ban, we decided to use for analysis only the years included between 20010 and 2014, where alcohol prices remained stable. Finally, descriptive statistics for other variables of interest in our analysis are shown in Table A.1.

3.2 Empirical Strategy

3.2.1 Estimating the effect of smoking on other behaviours

Our empirical strategy aims at estimating the effect of anti-smoking legislation on other health behaviours, such as drinking habits and physical exercise. We use an identification strategy exploiting the introduction of a comprehensive tobacco control law in Russia in 2013. The policy was implemented to reduce tobacco use among Russians by: (i) banning smoking in public places including workplaces (WSB), housing block stairwells, buses and commuter trains and within 15 mt of train stations and airports; and (ii) requiring graphic health warnings on cigarette packs and prohibit advertising, promotion and sponsorship of tobacco products. One interesting feature of this legislation is that, although it has been in force since June, 1 2013, the ban on smoking in restaurants, hotels and trains came into effect on June, 1 2014. One could exploit the differential implementation of bans to estimate their impact on smoking and other health behaviours, but the simple pre-post comparison may lead us to biased estimates. There may be other factors, like cigarette and alcohol prices, or the introduction of graphic health warnings varying after 2013, that are responsible for variations in smoking and other behaviours.

In order to identify the effect and account for these confounders, we propose a DiD

strategy where we exploit both the differential implementation of smoking bans and the fact that not all individuals in the population were exposed to the same level of smoking restrictions. We can identify a first period, including years before 2013, where no regulation on smoking was in place, a second period, from 2013 to 2014, when the first part of the law banning smoking in workplaces - excluding bars, restaurants and trains - was implemented, and a third period, after 2014, when also the ban in public places was implemented. The different types and timings of smoking bans introduced in Russia after 2013 allows us to define treatment and control groups on the basis of the level of exposure to smoking restrictions. Employed individuals are first exposed to smoking bans in workplaces and then also to smoking bans in public places, whereas unemployed individuals are exposed only to smoking bans in public places after 2014. In this way we are able to define the former as our treatment group and the latter as a control group to estimate the additional effect of workplace smoking bans, provided that the introduction of smoking bans did not affect the probability to be employed. To account for this effect we decided to select only individuals who declared to be always in the same employment condition when interviewed, defining both an unbalanced and a balanced sample of individuals. The latter sample is used to be sure that individuals do not change their employment status between interviews.

Our final specification is the following:

$$Y_{it} = \alpha_1 T_{it} \times post_t + \sum_{j=1}^{J} \alpha_j X_{it} + l_i + m_t + \epsilon_{it} \tag{1}$$

where Y_{it} describes our outcomes of interest, measuring: (i) smoking status, in terms of participation ($S_{it} = 1$ if individual i at time t smokes) and intensity ($S_{it} =$ average number

of cigarettes smoked daily by individual i at time t), (ii) alcohol participation ($Y_{it} = 1$ if individual i at time t had at least one alcoholic drink during the last month), (iii) alcohol consumption (Y_{it} = the natural logarithm grams consumed daily for individual i at time t). Our variable recording drinking participation and consumption is further split into wine, beer and spirits, to account for possible heterogeneous effects on these categories, (iv) participation in physical activity ($Y_{it} = 1$ if individual i at time t participated in any physical activity during the last 12 months), (v) physical activity intensity (Y_{it} = number of times per month or minutes per time of physical activity for individual i at time t). $T_{it} \times post_t$ identifies the effect of the treatment, taking value of 1 for employed individuals after 2013 and 0 for either employed individuals before 2013 and for unemployed individuals, who never changed their employment status before and after 2013. In this specification we include individual (l_i) and time specific fixed effects (m_t) and a vector of covariates at individual level, X_{it}, for detailed descriptive statistics, see Table A.1. The main effect of interest is α_1, the coefficient capturing the causal effect of T_{it} on Y_{it}.

The DiD model relies on the common trend assumption to ensure identification of causal effects. In other words it must be that if there were not a smoking ban after 2013, health behaviours for employed individuals would have faced the same change as health behaviours of unemployed ones. We test this assumption estimating the following equation:

$$Y_{it} = \gamma_1 + \sum_{j=2}^{J} \eta_j (Lag_j)_{it} + \sum_{k=1}^{K} \mu_k (Lead_k)_{it} + \lambda_i + \psi_t + \xi_{it} \tag{2}$$

From equation 2 we can estimate a case-event study where η_j and μ_k are parameters associated to lags and leads, defined as in Clarke & Schythe (2020), and can be interpreted

as post-ban and anticipatory effects, respectively. λ_i and ψ_t represent individual-specific and year fixed effects. The common trend assumption can be tested by proving that leads coefficients are not significantly different from zero, in which case we can conclude that treated and control individuals have the same pre-ban behaviour with respect to health behaviours. Moreover, we can use post-treatment coefficients (i.e., lags) to see whether the effect grows or fades as time passes.

4 Results

4.1 The panel case-event study

Figures 3-5 show empirical evidence of lags and leads, estimated from equation 2, for the main health behaviours of interest. Looking at smoking participation, Figure 3, we can see that the pre-trend assumption is met, since all lead coefficients are not statistically different from 0, but we can observe a decrease in the probability to smoke after 2013 only for employed men, but not for employed women. No significant variations are observed when focusing on the number of cigarettes smoked. Looking at Figure 4 we can also observe that, again the common trend assumption is not violated and that employed men after 2013 experience a decrease in the probability to drink, especially connected to beer and spirits. The same does not happen for women. We find similar results when looking at drinking intensity, measured by the grams of alcohol consumed monthly. Figure 4 shows that, when looking at men, leads are not significantly different from zero, implying that the common trend assumption holds also for these outcomes. In addition we find evidence of a decrease in alcohol consumption in general, that is driven by a decrease in wine consumption. Looking at women the common trend assumption is not met,

apart that for the grams of spirits consumed, where we also observe a significant decrease after 2013. Figure 5 shows the case-event study for health behaviours connected with exercising. We can observe from these figures, how, for both men and women there is evidence of a common trend before 2013, and we find evidence of a significant increase in the probability to exercise for both men and women, but not for other variables measuring physical activity intensity. Since we proved that common trend assumptions are generally met, except that for some outcomes connected to women drinking habits, we now move the discussion to the main findings from equation 1.

4.2 Main estimates

Tables 1-4 contain the main DiD estimation results. These estimations are ran on the unbalanced panel[4]. The number of observations in the sample is around 50,000 and in each regression the following control variables are included: gender, age, age square, education and marital status. We present the results separate for men and women. The main outcomes of interest are smoking, drinking participation, drinking consumption, and exercising. While the former is the main target of the smoking ban, the latter show the spillover effects of the ban on other health behaviours, that is the main contribution of this paper.

The impact of introducing a smoking ban is negative and significant on the probability of smoking among men. Looking at Table 1 (column 1) we can see that the smoking ban reduces significantly the percentage of smokers by 2.9 percentage points, given an average percentage of 57.4% among men. We do not observe any effect on women, where the average percentage is already significantly lower (18.3%). Table 1 (column 2) shows that

[4]See Tables C.1-C.4 in Appendix C for estimations on the balanced panel

no effect is reported on the average number of cigarettes neither for men (17.5) nor for women (11.9). Overall, the smoking ban effect appears to be to reduce the likelihood of smoking only among men but not to reduce the number of cigarettes among those who continue to smoke.

In Tables 2-4 we present the results of the investigation of the spillover effects of the ban on other health behaviours. The hypothesis we want to test is whether a restriction that influences a specific health behaviour (smoking in this case) also has an effect on other health behaviours, and if so in which direction. It is in fact possible that a compensatory mechanism is triggered whereby individuals who quit an unhealthy behavior undertake another. Or it is possible that quitting a negative behaviour increases awareness of the importance of a healthy lifestyle and therefore pushes in that direction. In particular, on alcohol there is a complementary effect that leads us to think that this second hypothesis is the most accredited.

Table 2 shows estimated coefficients of the smoking ban on drinking participation, considering various types of alcoholic beverages. According to our estimates the smoking ban decreases the percentage of drinkers by 6.7 percentage points, given an average percentage of 49% among men, and by 3.5 percentage points, given an average percentage of 39% among women. Focusing on drinking categories (columns 2-4) we find significant and negative effects of the smoking ban on beer and spirits participation and no effect on wine, for both men and women. Given the coefficients for beer and spirits (respectively -0.0659 and -0.0156 for men, -0.0340 and -0.0121 for women) it seems that the negative impact of the ban on drinking is driven by those who drink beer. The effect on drinking is confirmed if we look at alcohol consumption (Table 3), measured through the grams of alcohol consumed on average by respondents: column 1 shows that the smoking ban

reduces the grams of alcohol consumed per capita by 10.44%. We do not find any significant effect on the consumption of each alcoholic beverage, neither for men nor for women (except for an increase in spirits grams for women, which however is difficult to interpret given the small number of observations available).

Table 4 shows estimates when physical activity participation or intensity are considered as outcomes. The main estimates show no effect of the smoking ban on physical activity participation neither on the times per week and minutes per time of physical activity. We do find a significant effect when we look specifically at spillover inside the household, that are presented in Section 5.

4.3 Heterogeneous effects

Heterogeneous effects are shown in Figures B.1-B.3. In each figure we report heterogeneous effects on four dimensions (age, education, status of residency, and family type) for a specific set of outcomes (smoking, drinking, physical activity). For each figure, two versions are reported: one for men on the left and one for women on the right.

We split the population in three subgroups to identify whether the effect of the smoking ban changes according to the age and, if yes, which age class is the most affected. The first age class include individuals from 18 to 29 years, the second age class individuals from 30 to 49 years and the third one individuals from 50 years to 64 years. The reference class age is 18-29 and the coefficients plotted in Figures B.1-B.3 represent the additional effect of belonging to one of the other classes with respect to the reference one. Regarding education, the reference category is people who only attended primary school and the other classes are the following: secondary school, vocational school, university, and post graduate education. As for status of residency, we consider as reference category people

who live in a oblastnoy center (regional center) and other categories are the following: town, urban-type settlement (pgt) and rural. Finally, as for family type we distinguish between single people, people who are married or live together (family type I), and those who are divorced and not remarried, widower or widow, or married but not living together (family type II).

Figure B.1 reports the estimates and CI of the impact of the ban on smoking behaviours, for men and for women. The positive effect of the smoking ban in reducing the incidence of smoking seems to be evenly spread among age classes Figure B.1 shows that the WSB has no significant additional effect on people older than 30 while it reduces the percentage of smoker in the first age class by 0.0328. Among the oldest people, the WSB does not reduce the percentage of smokers but it decreases the number of cigarettes per capita (-1.13 in the age class 50-65). No heterogeneous effect on smoking behaviour is reported for women, confirming the null effect already reported in the main estimates.

Looking at the other heterogeneity dimensions, we observe that the effect of the ban is homogeneous across education and that it reduces the percentage of smokers in particular among those who live in a town. The family type does not affect the effectiveness of the smoking ban. No heterogeneous effect on smoking behaviour is reported for women also for the other dimensions of heterogeneity, confirming once again the null effect already reported in the main estimates. We do not observe remarkable heterogeneous effects for the number of cigarettes smoked neither for men nor for women.

Once we have highlighted that the effect of the ban on smoking is stronger for those who live in town, we proceed to verify whether the behavioral spillover effects are also greater in the same categories.

In Figure B.2, we look at whether the smoking ban has an effect on the percentage of

people drinking. The percentage of drinkers is around 49% for men, and 38% for women. If we look at the age, the smoking ban affects men of different age classes differently. Overall, the percentage of people who drink decreases more among the oldest (-5.34 percentage points in the age class 50-65). Looking separately at wine, beer, and spirits, we see that the WSB decreases the share of beer drinkers in the same age classes observed when looking at drinking in aggregate. The chart on the right side shows that for women the greater effectiveness of the smoking ban in reducing drinking is in the youngest age class. This is true for wine and beer, while no effect is reported for spirits. The result on the youngest is consistent with the fact that it is easier to change habits when they are not deeply consolidated. If we look at the other dimensions of heterogeneity for men, we find no evident effects across levels of education

For women, the education level matters for drinking in general and for wine: high-educated women are less likely to drink wine as a consequence of the smoking ban (-1.58 percentage points). As far as the status of residency and the family type are concerned (third and fourth part of the panel), the smoking ban does have an impact in decreasing the percentage of male and female drinkers especially when they live in town. Rural areas are less affected. Being in a couple does not increase the success of the smoking ban in reducing drinking, however we show in Section 5 that there are significant spillover effects in the household among members who are not directly affected by the ban but who live with someone who quit smoking after its introduction.

When we look at heterogeneous effects in drinking consumption, Figure B.2 shows that the level of education plays a role in determining the effectiveness of the WSB. In particular higher educated males drink a lower amount of wine as a result of the introduction of the WSB, and higher educated women drink less beer. Another interesting

finding is that while for drinking participation, living in town decreases the likelihood of drinking beer, when we look at consumption then living in town implies a higher amount of beer consumed. The easiest interpretation is that subjects who quit drinking beer in town are those who used to consume less of it. The last outcome we look at is physical activity (Table B.3), where we can see again a higher increase in the probability of doing physical activity for males with post-graduate education. Males living alone (Family type II), after the WSB, do physical activity significantly more times than individuals in other family conditions.

We can conclude that the effect of the WSB seems to be heterogeneous by gender, and education level both when looking at smoking and drinking participation. In particular the WSB seems to encourage males with high education to behave in a more virtuous way.

5 Spillover effects on quitters and on other household members

To investigate the presence of spillover effects on other behaviours based on the change in smoking behaviour following the ban, we separately analysed the effect of the ban on the following subjects: quitters (subjects who quit smoking following the smoking ban), never smokers who live with a quitter, current smokers who live with a quitter.

Figure 6 shows the results. In the first panel of the figure, we see that the effect of the smoking ban on the percentage of people who drink alcohol is driven by the effect on quitters, among both men and women. This is particularly true for beer and spirits which are the two products on which the main estimates showed the greatest effect.

However, we can see a reduction in beer drinking for men and women who keep smoking after the introduction of hte WSB, and a reduction in spirits drinking for men and

women who never smoked. Both these categories (i.e. current smokers and never smokers) are not directly affected by the ban since we do not observe a change in their smoking behaviour but are effected in their drinking behaviour, showing the importance of detecting behavioural spillover effects on other household members.

The second panel of the figure highlights an interesting result on drinking consumption. In fact, if the first panel, and the main estimates, do not highlight the effect of the ban on the percentage of wine drinkers, in the second panel we can see that never smokers who live with a quitter decrease the grams of wine they consume. It is therefore possible that the ban as a whole does not act only on individuals directly affected or on the probability of drinking wine but on the quantity of wine consumed by people living with someone who quit smoking. In the last set of charts, we look at the effect of ban on physical activity participation and intensity. In contrast with the results in the main estimates, here we find a positive significant impact on quitters, and a positive impact also on subjects who do not smoke but live with a quitter. The significant effect is on the probability of exercising and the length of their exercise sessions. What we can conclude from Figure 6 is that limiting the analysis of the effects of smoking bans to the individuals directly affected would be reductive. In fact, this section shows that the ban has spillover effects in the household and that even subjects indirectly influenced by the ban change some of their health behaviors.

6 Robustness

In this section, we document the results of a battery of robustness checks to test the sensitivity of our results with respect to the definition of the sample or the inclusion of key variables in the model.

First, we check the robustness of our results restricting to the balanced sample. In fact, in the unbalanced sample there could be subjects who changed their status between employed and unemployed when not interviewed. Upon doing that, we find that the magnitude of the effects of the smoking ban on smoking behaviour is even larger (column 1, Table C.1). The coefficients on drinking participation (Table C.2 confirm those obtained on the unbalanced sample, in terms of direction and significance: the magnitude is slightly greater for all of them except for the coefficient of the smoking ban on the percentage of male drinkers, which is slightly lower. If we look at the grams of alcohol consumed, the main results, which show a significant decrease in the quantity consumed, are not confirmed on the balanced sample (Table C.3). This might be due to the fact that self-reported quantities are potentially biased by measurement errors. We do not find any significant results in none of the two samples for the last set of outcomes (i.e. physical activity, times per week and minutes per time of exercising).

Second, we test how our results change when we exclude from our sample individuals who start smoking. In the main estimates, the reduction in the percentage of smokers may in fact be due to a reduction in the number of people who start smoking or to a reduction in people who smoked at the time of the introduction of the smoking ban. By reducing the sample to quitters, we test the robustness of our results by analyzing only those who fall into the second category. All the results reported in Tables C.5 - C.8 are aligned with those of the main estimation. In particular, we see negative significant coefficients on smoking and drinking participation and no effects on drinking consumption and exercising.

Third, we have checked whether our results change if we include in the model regional linear trends C.9 - C.12. This should allow us to account for possible trends at the regional

level that could affect the outcomes (i.e. like variations in prices and other unobservables). The main results on smoking and drinking are robust to the inclusion of regional trends and also the reduction in the quantity of alcohol consumed is confirmed (column 1, Table C.11).

Fourth, we next provide evidence of how robustness our results are to the inclusion in the model of unit values of alcohol and tobacco. This allows us to check whether the results could be biased due to changes in relative prices rather than as for the effect of the ban C.13 - C.16.

Finally, we test whether the WSB exerts a heterogeneous effects based on the number of hours worked and the habit of the subjects eating in a restaurant or at home. Firstly, we check whether individuals were more likely to work more than eight hours a day and eating out after the introduction of the smoking ban for the treated group (Figure D.1 in Appendix D. Once we show this, we test if the introduction of the ban at the workplace has a greater effect on the subjects most exposed to the ban itself. Importantly, we find that treated individuals exposed to the ban for longer hours have the strongest decrease in smoking (Figure D.2) and alcohol consumption (Figure D.3). Eating out reduces the effect of the smoking ban on workplaces on drinking (Figure D.3): this is consistent with the fact that eating out offers people an incentive to drink alcohol which counterbalances the reduction obtained by the ban.

As final check, in Figure D.4 we checked that the trend of the probability of being employed (for men and women) has not been affected by the WSB: this is particularly important to support our identification strategy in which the employment status determines treatment and control group. In addition, we checked the same on two placebo outcomes (Figure D.5): the probability of being single, the tobacco unit value, and the

alcohol unit value.

7 Conclusion

Drawing on a major WSB implemented in Russia, a country where about half of the population smokes, not only discouraged smoking participation but exerted behavioural spillovers on alcohol use, and physical activity, as well as on both non smokers and current current smokers who live with a quitter. Our estimates suggest robust evidence of the effect of WSB both on other health behaviours and on individuals not directly exposed to the ban. More specifically, unlike previous studies (focusing on smoking bans in public places), we find robust evidence that WSB give increase smoking cessation in 2.9 percentage points (pp) among men. Yet, after the WSB, quitters are less likely to use alcohol (6.7pp reduction among men and 3.5 pp among women), reduce their alcohol consumption (10 percent among men) and increase their physical activity (in 4.3 percentage points among men). This result has major policy implications in measuring the welfare effects of smoking bans. They suggest that even when smoking bans might change the specific health behaviour they target (smoking), they can exert additional spillover effects on other related health behaviours. More specifically,we find that smoking bans affected not only smokers' health behaviours, but also those directly unaffected by the reform, namely never smokers or smokers who did not quit but lived in a household with other smokers.

Our findings suggest that studies estimating the effects of smoking bans on smoking alone are likely to underestimate its health related effects as they tend to disregard presence of behavioural spillovers altering healthy identities. This evidence can be explained either both by changes in health related identity (which is adjusted after marginal changes

in the acceptability of related health behaviours), or licensing effects. More specifically, they point towards a joint formation of healthy behaviours. Finally, our results from Russia contrast with that of other countries, and suggest that the effect of smoking bans might be heterogeneous depending on the smoking prevalence. Smoking bans might be more effective the larger the share of the population smoking before the ban.

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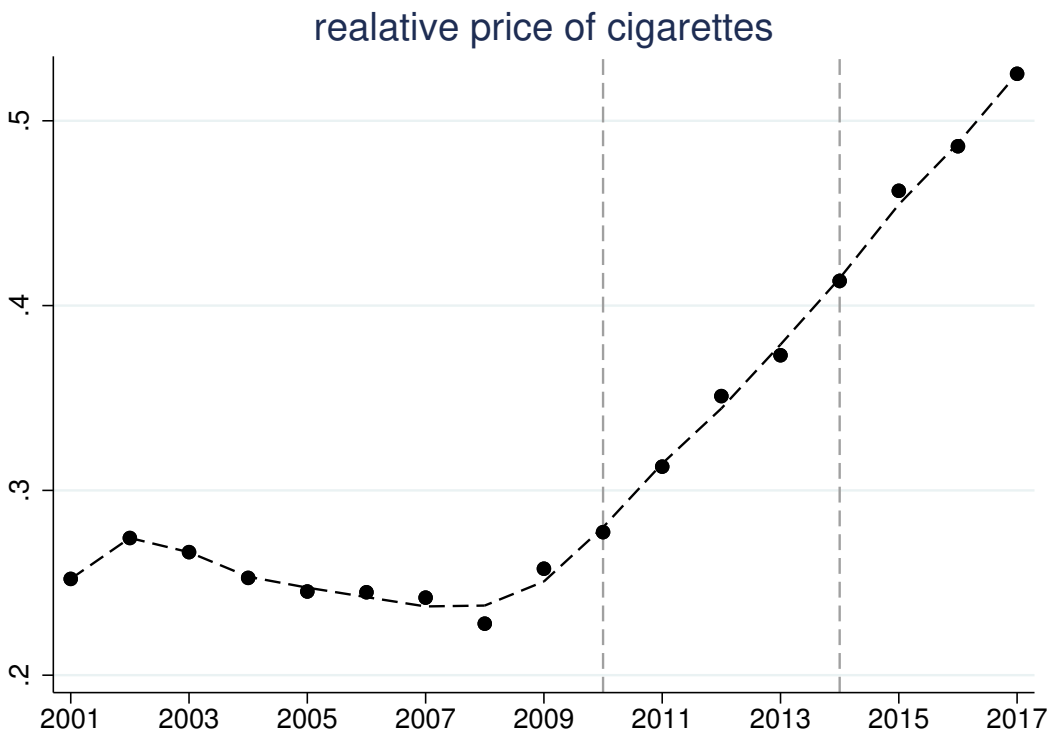
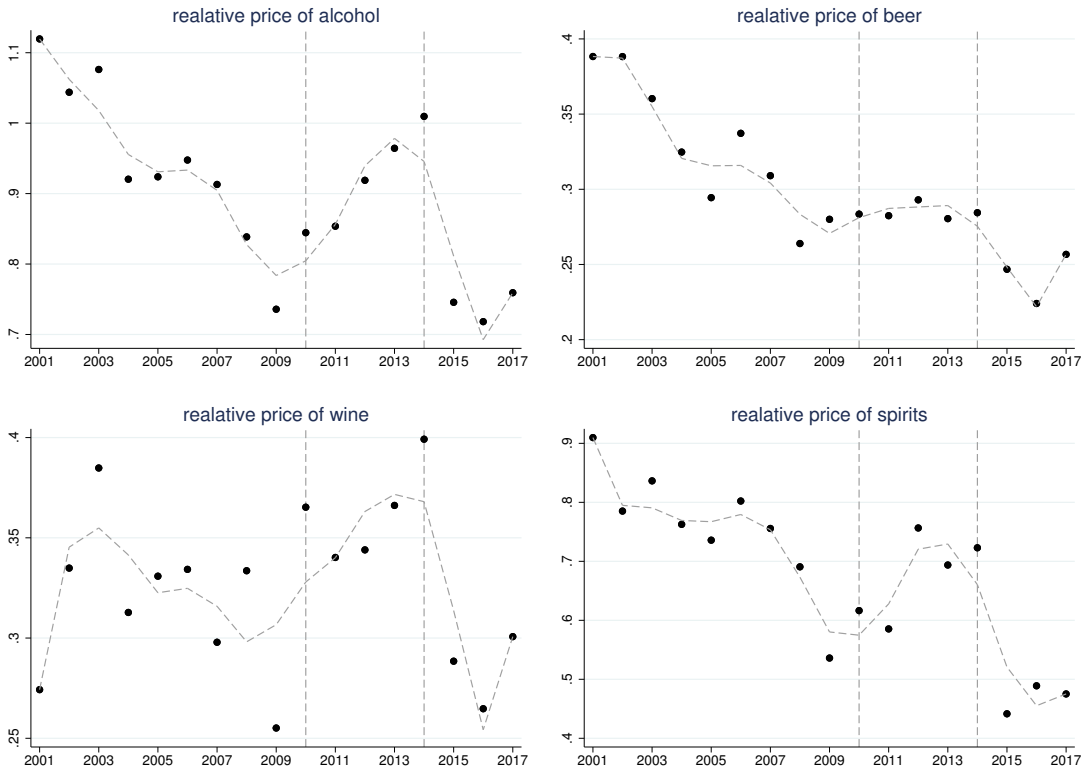


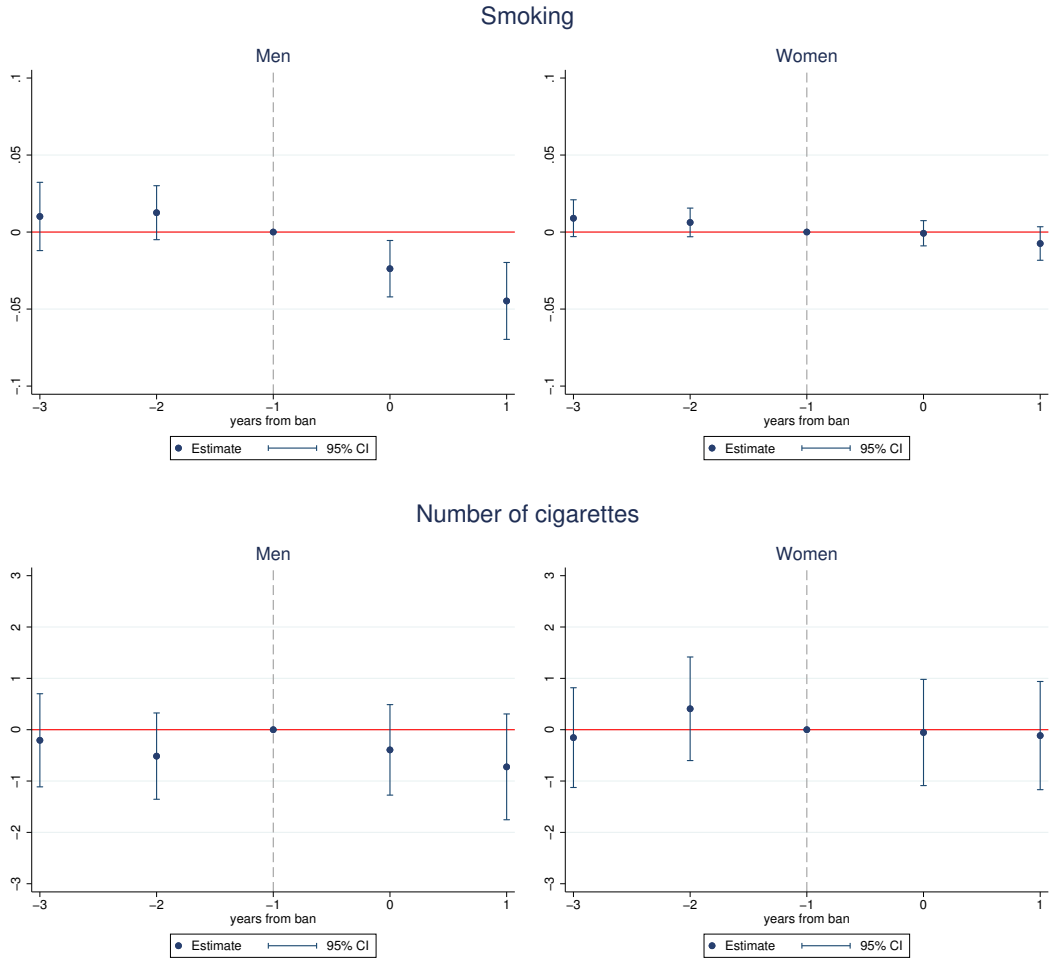
Notes: The figure plots year-specific average values for the unit value for tobacco products divided by the unit value for all goods. Unit values are obtained from the Survey on Household Expenditures, that is part of the RLMS, that allows us to calculate unit values for a wide range of product at the household level as the ratio between household expenditure and quantity.

Figure 1: Time trends for relative price of cigarettes.



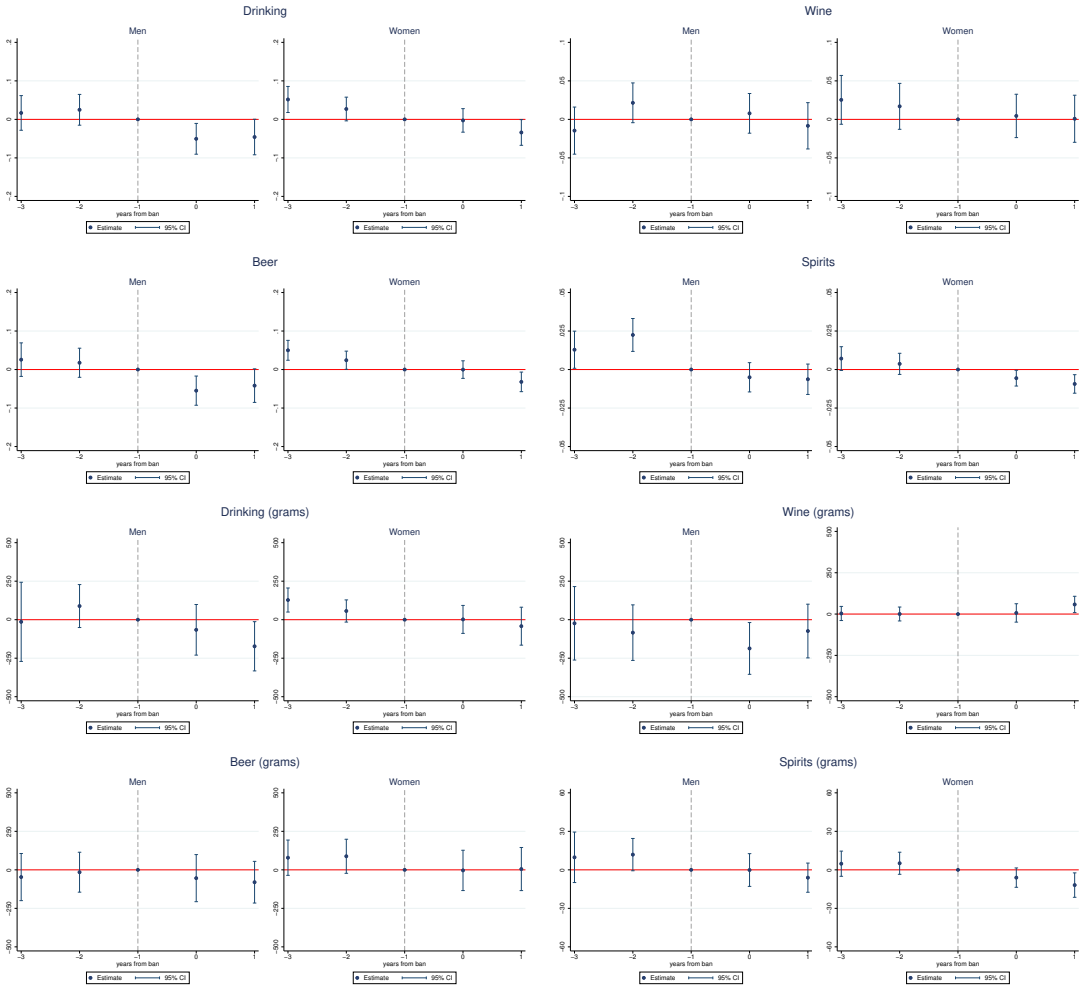
Notes: The figure plots year-specific average values for the unit value for beer (panel a), wine (panel b) and spirits (panel c) divided by the unit value for all goods. Unit values are obtained from the Survey on Household Expenditures, that is part of the RLMS, that allows us to calculate unit values for a wide range of product at the household level as the ratio between household expenditure and quantity.

Figure 2: Time trends for relative prices of (i) alcohol, (ii) wine, (iii) beer and (iv) spirits.



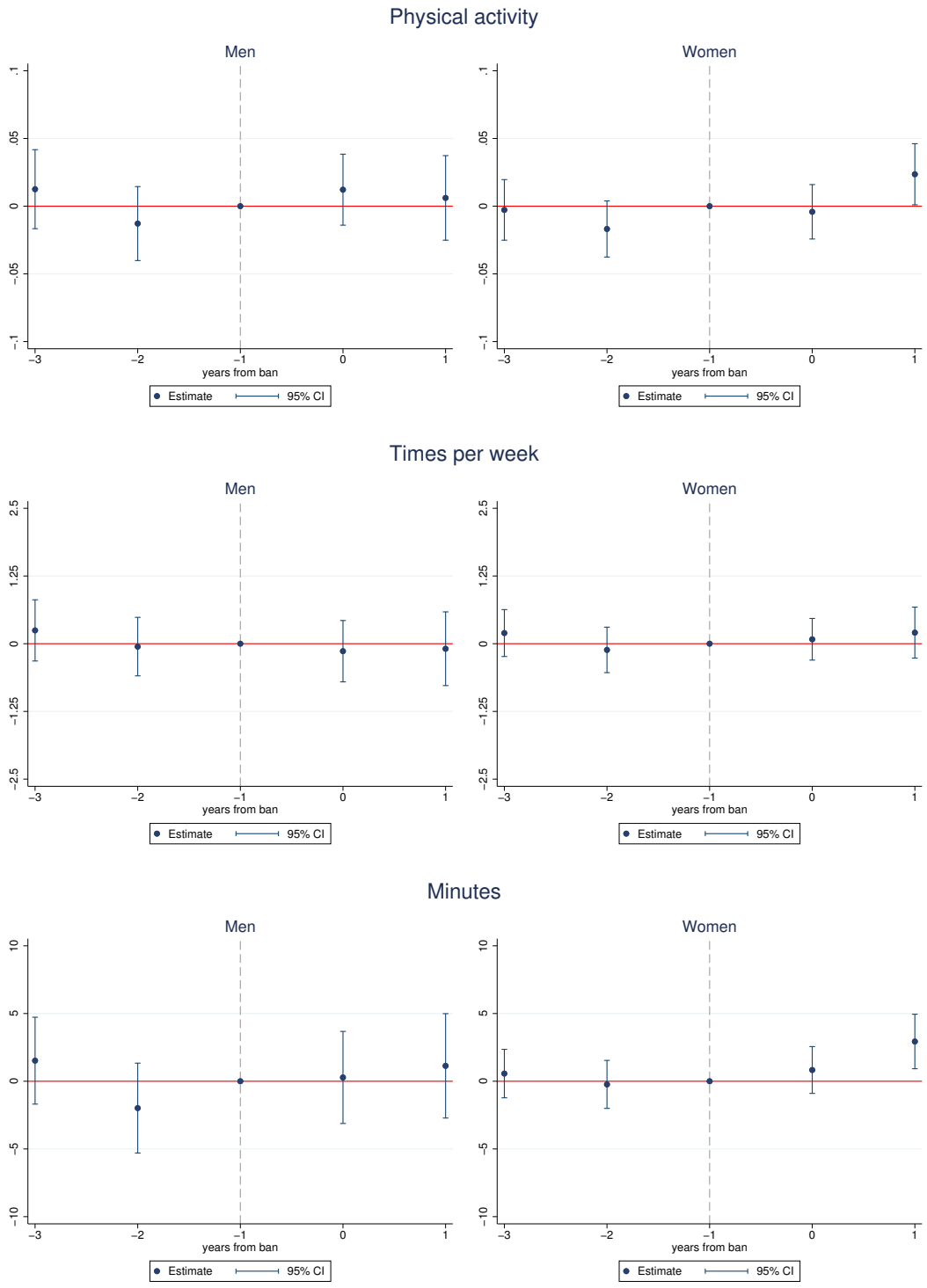
Notes: The figure plots lags and leads, estimated from equation 2, for the main health behaviours presented above, dots represent point estimates, vertical bars represent 95% confidence intervals. The year 2012 was chosen as the reference category.

Figure 3: Event study: smoking and number of cigarettes



Notes: The figure plots lags and leads, estimated from equation 2, for the main health behaviours presented above, dots represent point estimates, vertical bars represent 95% confidence intervals. The year 2012 was chosen as the reference category.

Figure 4: Event study: drinking participation and consumption.



Notes: The figure plots lags and leads, estimated from equation 2, for the main health behaviours presented above, dots represent point estimates, vertical bars represent 95% confidence intervals. The year 2012 was chosen as the reference category.

Figure 5: Event study: Physical activity

Table 1: Effect of smoking bans on smoking behaviour.

	Smoker	Number of cigarettes
	Men	
	(1)	(2)
SB_{WP}	-0.0291**	-0.3650
	(0.012)	(0.359)
Constant	0.3265	3.3550
	(0.229)	(7.226)
Mean of Y	0.574	17.54
SD of Y	0.494	8.078
Observations	23,014	12,666
Number of idind	8,345	5,087
	Women	
SB_{WP}	-0.0014	-0.2903
	(0.005)	(0.397)
Constant	0.4118	14.3074
	(0.259)	(12.331)
Mean of Y	0.183	11.86
SD of Y	0.386	6.651
Observations	26,246	4,579
Number of idind	9,182	1,955

*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on smoking participation and consumption. Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*

Table 2: Effect of smoking bans on drinking participation.

	Drinking	Wine	Beer	Spirits
			Men	
	(1)	(2)	(3)	(4)
SB_{WP}	-0.0673***	-0.0059	-0.0659***	-0.0156***
	(0.016)	(0.010)	(0.015)	(0.004)
Constant	-0.0154	-0.5063	0.4396	0.0840
	(0.491)	(0.336)	(0.411)	(0.107)
Mean of Y	0.490	0.104	0.441	0.00895
SD of Y	0.500	0.306	0.497	0.0942
Observations	22,906	22,996	22,928	23,021
Number of idind	8,327	8,342	8,332	8,347
			Women	
SB_{WP}	-0.0346***	-0.0068	-0.0340***	-0.0121***
	(0.012)	(0.011)	(0.009)	(0.003)
Constant	-0.7203*	-1.5846***	1.0866***	-0.1232
	(0.435)	(0.460)	(0.393)	(0.081)
Mean of Y	0.387	0.254	0.200	0.00756
SD of Y	0.487	0.435	0.400	0.0866
Observations	26,191	26,226	26,224	26,257
Number of idind	9,177	9,179	9,181	9,187

*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on drinking participation and consumption for the following categories: all,wine, beer and spirits (panels a and b). Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*

Table 3: Effect of smoking bans on drinking consumption.

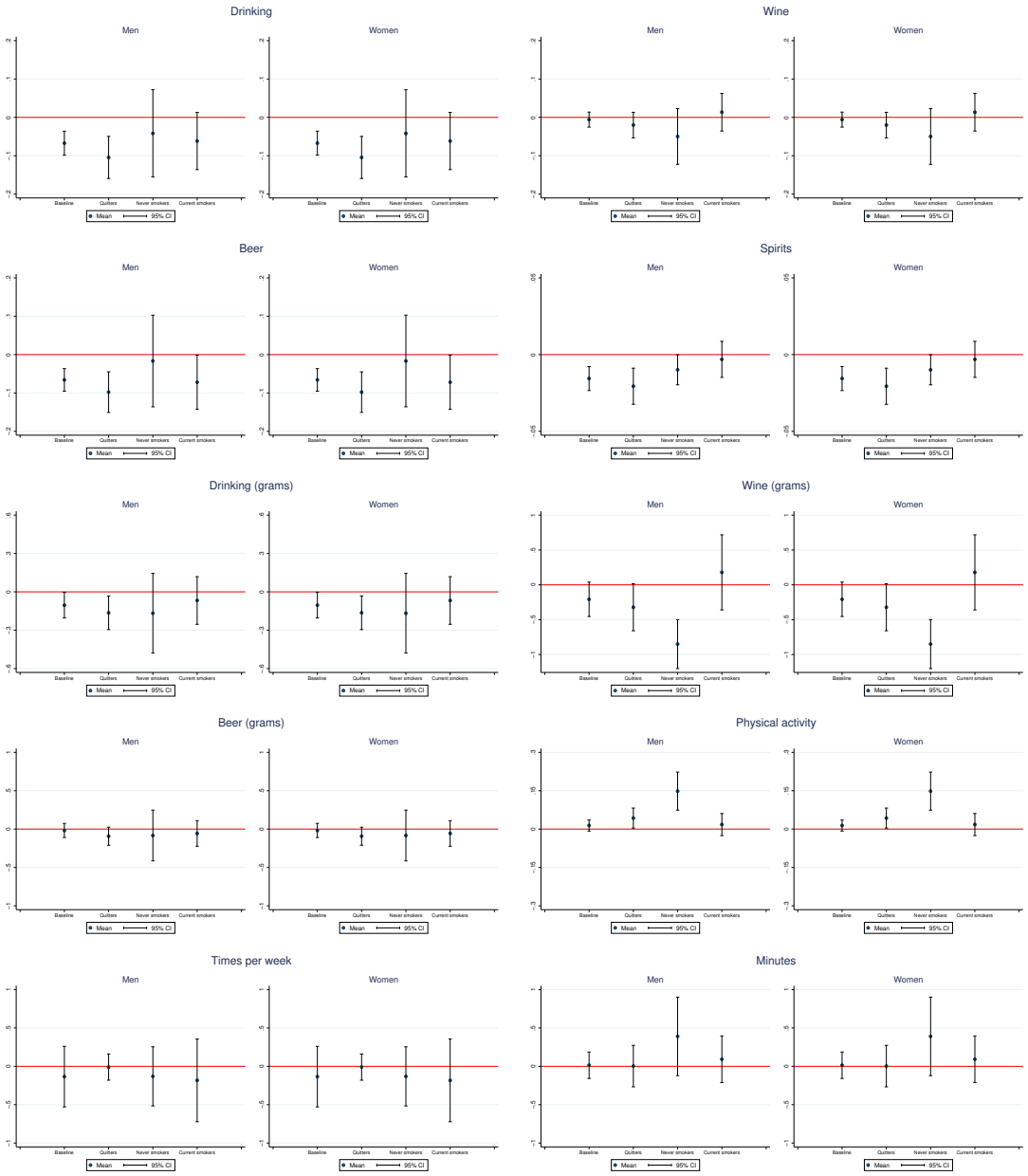
	Drinking (grams)	Wine (grams)	Beer (grams)	Spirits (grams)
			Men	
	(1)	(2)	(3)	(4)
SB_{WP}	-0.1044**	-0.2081*	-0.0176	0.9873
	(0.051)	(0.126)	(0.047)	(0.738)
Constant	5.5393***	10.4127***	5.1195***	36.5286**
	(0.962)	(3.169)	(1.008)	(14.038)
Mean of Y	6.720	5.735	6.765	6.995
SD of Y	0.708	0.696	0.602	0.879
Observations	11,432	2,454	10,303	211
Number of idind	5,436	1,743	4,991	184
			Women	
SB_{WP}	-0.0360	0.0559	-0.0317	1.8725**
	(0.045)	(0.053)	(0.053)	(0.855)
Constant	5.0087***	2.7467*	4.9163***	66.0672***
	(1.366)	(1.430)	(1.729)	(18.135)
Mean of Y	5.978	5.457	6.314	6.675
SD of Y	0.832	0.613	0.628	0.857
Observations	10,061	6,882	4,894	226
Number of idind	5,140	4,022	2,807	205

*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on drinking consumption for the following categories: all,wine, beer and spirits (panels a and b). Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*

Table 4: Effect of smoking bans on physical activity.

	Physical activity	Times per week	Minutes
		Men	
	(1)	(2)	(3)
SB_{WP}	0.0140	-0.1243	0.0145
	(0.011)	(0.113)	(0.088)
Constant	0.3373	-1.0405	5.8073***
	(0.365)	(2.288)	(2.141)
Mean of Y	0.136	2.284	4.243
SD of Y	0.342	0.808	0.746
Observations	23,022	3,139	3,150
Number of idind	8,345	1,979	1,983
		Women	
SB_{WP}	0.0117	-0.0713	0.0363
	(0.008)	(0.098)	(0.068)
Constant	0.1491	-0.9012	1.7063
	(0.261)	(2.810)	(2.130)
Mean of Y	0.122	2.321	3.994
SD of Y	0.328	0.781	0.723
Observations	26,247	3,295	3,307
Number of idind	9,182	2,083	2,090

*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on physical activity participation and intensity - number of times and times per week. Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*



Notes: The figure plots spillover effects of the smoking ban on drinking participation and consumption, and on physical activity on quitters and on household members living with a quitter. We excluded the graph on spirits consumption due to lack of observations.

Figure 6: Drinking: spillover effects on quitters and on other never and current smokers household members

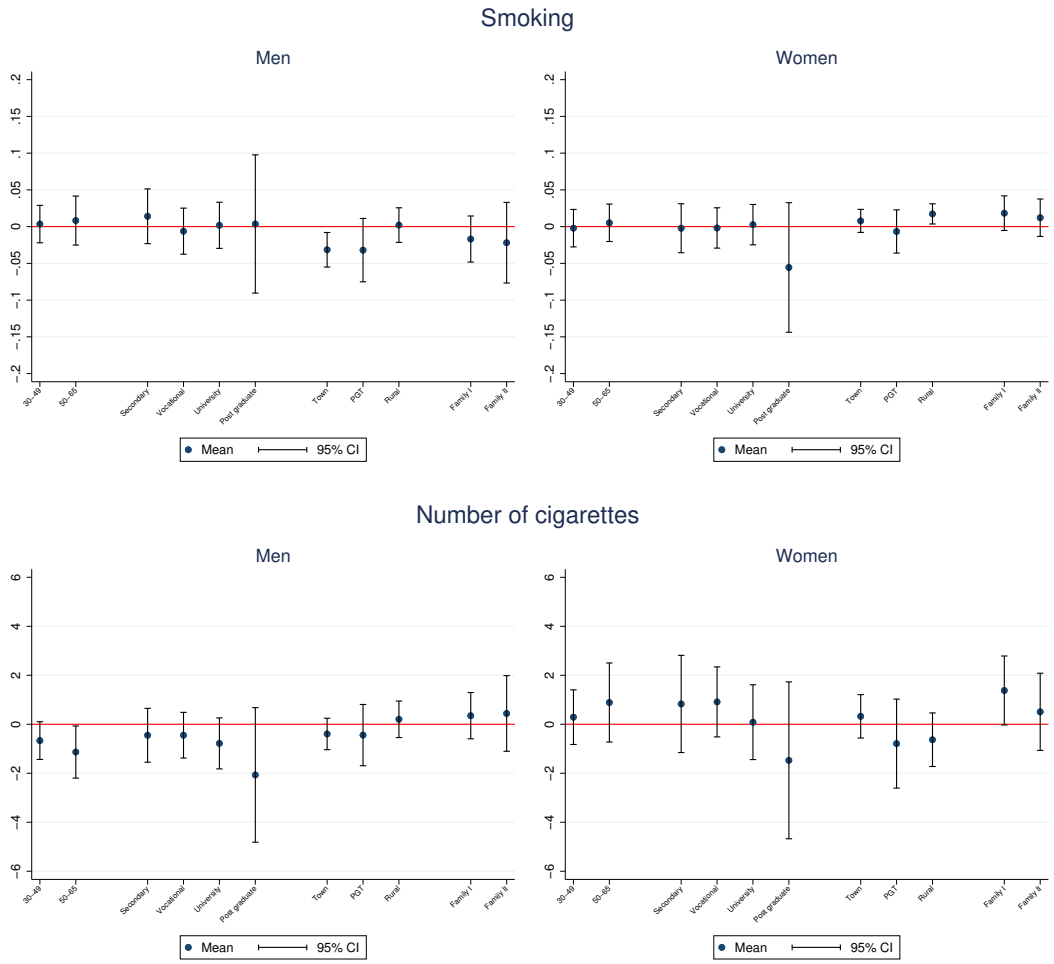
Appendix A

Table A.1: Descriptive statistics.

Variable	Modality	Obs	%	Mean	Std dev
Smoking	No	69,340	0.64		0.48
	Yes	69,340	0.36		0.48
Average number of cigarettes		69,387		5.58	9.00
Drinking	No	69,116	0.57		0.5
	Yes	69,116	0.43		0.5
Grams		69,116		348.26	625.29
Beer	No	69,195	0.69		0.47
	Yes	69,195	0.31		0.47
Grams		69,195		278.39	554.23
Wine	No	69,283	0.81		0.4
	Yes	69,283	0.19		0.4
Grams		69,283		58.59	163.66
Spirits	No	69,362	0.99		0.1
	Yes	69,362	0.01		0.1
Grams		69,362		11.12	180.47
Physical exercise	No	69,347	0.87		0.33
	Yes	69,347	0.13		0.33
Times per week		69,284		1.7	5.87
Minutes per time		69,284		10.03	33.93
Gender	Men	69,387	0.44		0.5
	Women	69,387	0.56		0.5
Age		69,387		39.99	13.21
Married	No	69,340	0.45		0.5
	Yes	69,340	0.55		0.5
Education	Primary	69,205	0.14		0.34
	Secondary	69,205	0.18		0.38
	Vocational School	69,205	0.42		0.49
	University	69,205	0.25		0.44
	Post graduate	69,205	0.1		0.09
Resident in	Oblastnoy	69,387	0.48		0.49
	Town	69,387	0.27		0.44
	Rural	69,387	0.25		0.44
Employed	No	69,337	0.34		0.47
	Yes	69,337	0.66		0.47
Hours worked		69,337		112.54	95.6
Had a wage	No	69,337	0.34		0.52
	Yes	69,337	0.66		0.52
Price of cigarettes		67,800	18.36		23.67

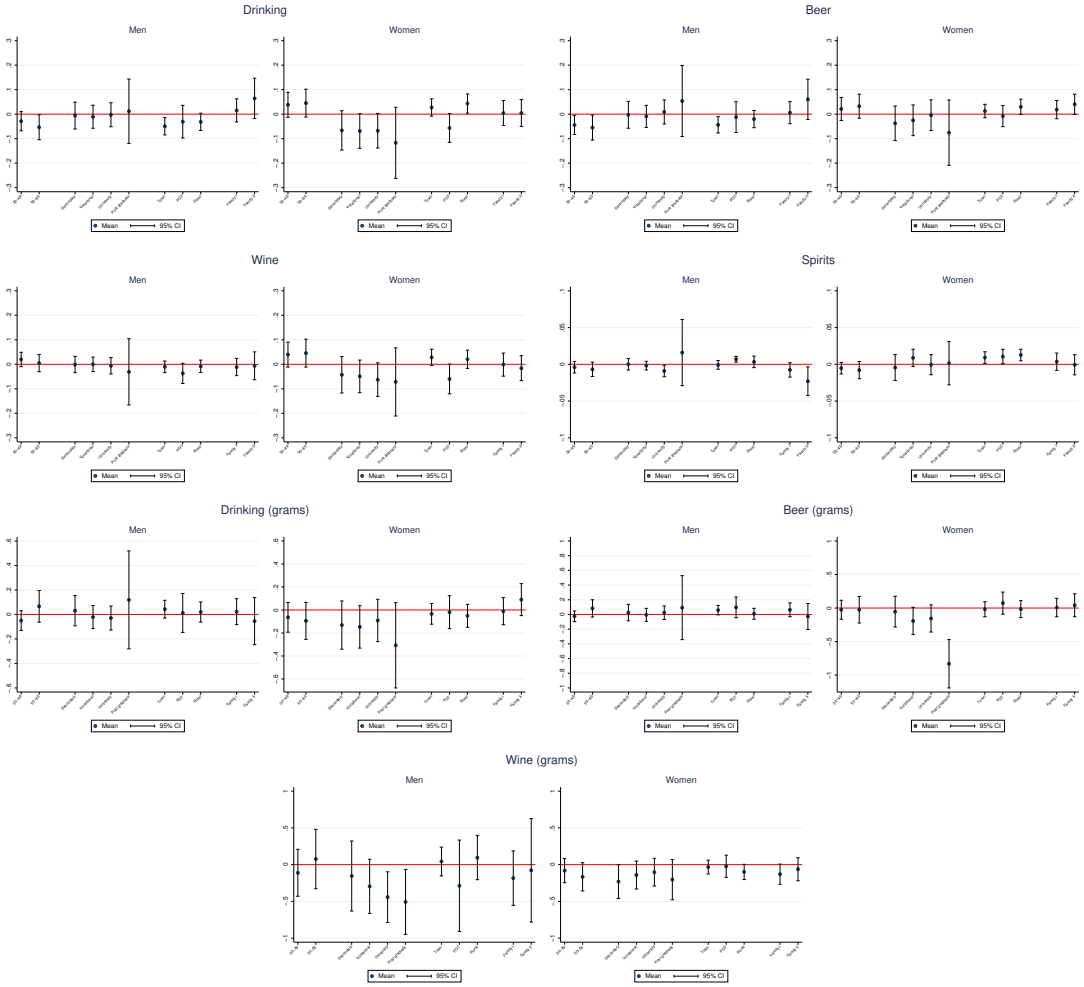
Notes: This Table provides the list, number of observations, %, arithmetic mean and standard deviation of all health behaviours and control variables of interest. Years: 2009-2014. Population age: 17-65. Unbalanced sample.

Appendix B



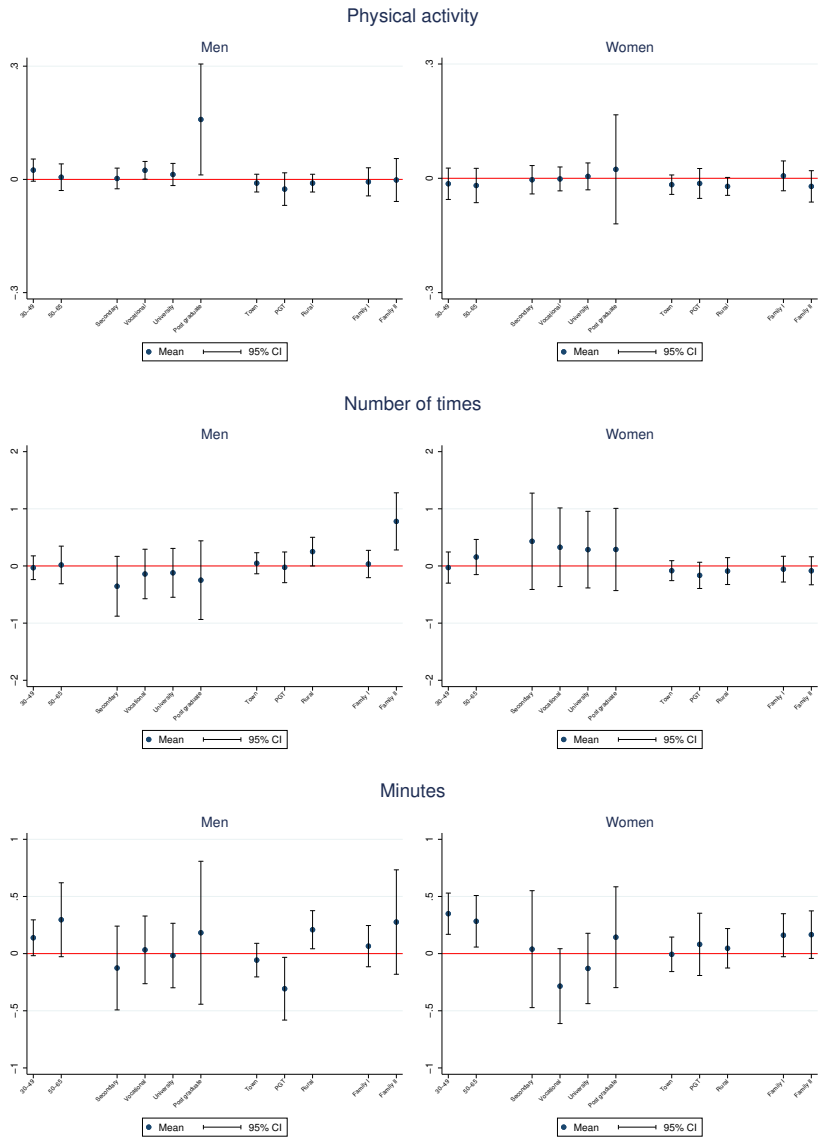
Notes: The figure plots heterogeneous effects of the smoking ban on smoking participation and consumption considering the following heterogeneity dimensions: age, education, residence status, and family type.

Figure B.1: Heterogeneity: smoking participation and consumption



Notes: The figure plots heterogeneous effects of the smoking ban on drinking participation and consumption considering the following heterogeneity dimensions: age, education, residence status, and family type. We excluded the graph on spirits consumption due to lack of observations.

Figure B.2: Heterogeneity: drinking participation



Notes: The figure plots heterogeneous effects of the smoking ban on physical activity participation and intensity considering the following heterogeneity dimensions: age, education, residence status, and family type.

Figure B.3: Heterogeneity: drinking consumption

Appendix C

Table C.1: Effect of smoking bans on smoking behaviour - balanced sample.

	Smoker	Number of cigarettes
	Men	
	(1)	(2)
SB_{WP}	-0.0372**	-0.2280
	(0.016)	(0.460)
Constant	0.0174	23.9214*
	(0.382)	(13.336)
Mean of Y	0.566	17.89
SD of Y	0.496	8.301
Observations	9,263	4,912
Number of idind	1,986	1,212
	Women	
SB_{WP}	0.0029	-0.2984
	(0.006)	(0.579)
Constant	0.2742	4.8554
	(0.247)	(17.637)
Mean of Y	0.161	11.90
SD of Y	0.368	6.447
Observations	11,907	1,838
Number of idind	2,560	467

*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on smoking participation and consumption. Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*

Table C.2: Effect of smoking bans on drinking participation - balanced sample.

	Drinking	Wine	Beer	Spirits
			Men	
	(1)	(2)	(3)	(4)
SB_{WP}	-0.0649***	0.0038	-0.0722***	-0.0110**
	(0.022)	(0.013)	(0.021)	(0.006)
Constant	-0.7953	-0.6228	-0.2851	-0.2775
	(0.811)	(0.565)	(0.746)	(0.190)
Mean of Y	0.460	0.0937	0.412	0.00786
SD of Y	0.498	0.291	0.492	0.0883
Observations	9,217	9,254	9,224	9,261
Number of idind	1,986	1,986	1,986	1,986
			Women	
SB_{WP}	-0.0400***	0.0001	-0.0415***	-0.0147***
	(0.015)	(0.013)	(0.011)	(0.004)
Constant	-1.1019	-2.6231***	1.9339***	-0.1823
	(0.750)	(0.825)	(0.545)	(0.142)
Mean of Y	0.372	0.242	0.192	0.00679
SD of Y	0.483	0.428	0.394	0.0821
Observations	11,885	11,900	11,900	11,914
Number of idind	2,561	2,561	2,561	2,561

*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on drinking participation for the following categories: all, wine, beer and spirits. Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*

Table C.3: Effect of smoking bans on drinking consumption - balanced sample.

	Drinking (grams)	Wine (grams)	Beer (grams)	Spirits (grams)
			Men	
	(1)	(2)	(3)	(4)
SB_{WP}	-0.0275	-0.1757	0.0131	1.9881**
	(0.073)	(0.208)	(0.065)	(0.917)
Constant	4.1954**	16.7324***	3.8374**	74.6260***
	(1.814)	(4.645)	(1.904)	(25.264)
Mean of Y	6.701	5.728	6.758	7.063
SD of Y	0.715	0.710	0.598	0.876
Observations	4,379	883	3,941	73
Number of idind	1,442	538	1,332	59
			Women	
SB_{WP}	-0.0849	0.0736	-0.1034*	0.2795
	(0.055)	(0.067)	(0.061)	(1.628)
Constant	6.1799***	5.3380**	3.4252	62.1034**
	(2.062)	(2.188)	(2.149)	(27.291)
Mean of Y	5.953	5.436	6.297	6.657
SD of Y	0.831	0.609	0.635	0.782
Observations	4,359	2,963	2,056	96
Number of idind	1,623	1,346	922	83

*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on drinking consumption for the following categories: all, wine, beer and spirits (panels a and b). Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*

Table C.4: Effect of smoking bans on physical activity - balanced sample.

	Physical activity	Times per week	Minutes
		Men	
	(1)	(2)	(3)
SB_{WP}	0.0083	-0.2138	0.0312
	(0.015)	(0.140)	(0.133)
Constant	-0.2597	-1.0064	7.0784***
	(0.508)	(3.377)	(2.648)
Mean of Y	0.118	2.279	4.210
SD of Y	0.323	0.810	0.752
Observations	9,266	1,114	1,116
Number of idind	1,986	555	554
		Women	
SB_{WP}	0.0066	-0.0879	0.0802
	(0.009)	(0.092)	(0.088)
Constant	0.5935	-3.6713	1.5860
	(0.644)	(4.807)	(3.348)
Mean of Y	0.107	2.324	3.958
SD of Y	0.309	0.779	0.722
Observations	11,912	1,305	1,307
Number of idind	2,561	643	645

*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on physical activity participation and intensity - number of times and times per week. Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*

Table C.5: Effect of smoking bans on smoking behaviour - only quitters.

	Smoker	Number of cigarettes
	Men	
	(1)	(2)
SB_{WP}	-0.0202**	-0.3086
	(0.010)	(0.397)
Constant	0.2304	5.2837
	(0.171)	(7.609)
Mean of Y	0.578	17.99
SD of Y	0.494	8.080
Observations	19,831	10,992
Number of idind	7,578	4,402
	Women	
SB_{WP}	-0.0044	-0.2296
	(0.004)	(0.445)
Constant	0.4883**	11.8860
	(0.227)	(13.664)
Mean of Y	0.153	12.49
SD of Y	0.360	6.756
Observations	24,257	3,595
Number of idind	8,704	1,556

*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on smoking participation and consumption. Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*

Table C.6: Effect of smoking bans on drinking participation - only quitters.

	Drinking	Wine	Beer	Spirits
			Men	
	(1)	(2)	(3)	(4)
SB_{WP}	-0.0732***	-0.0161	-0.0644***	-0.0162***
	(0.018)	(0.011)	(0.017)	(0.005)
Constant	0.1086	-0.3739	0.5363	0.0826
	(0.547)	(0.367)	(0.455)	(0.116)
Mean of Y	0.500	0.107	0.450	0.00913
SD of Y	0.500	0.309	0.497	0.0951
Observations	19,738	19,818	19,757	19,837
Number of idind	7,561	7,575	7,566	7,581
			Women	
SB_{WP}	-0.0336***	-0.0095	-0.0302***	-0.0107***
	(0.012)	(0.011)	(0.009)	(0.002)
Constant	-0.8849**	-1.4765***	0.7451*	-0.1350
	(0.439)	(0.471)	(0.392)	(0.087)
Mean of Y	0.375	0.251	0.187	0.00727
SD of Y	0.484	0.434	0.390	0.0850
Observations	24,205	24,238	24,234	24,265
Number of idind	8,697	8,700	8,701	8,708

*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on drinking participation for the following categories: all,wine, beer and spirits. Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*

Table C.7: Effect of smoking bans on drinking consumption - only quitters.

	Drinking (grams)	Wine (grams)	Beer (grams)	Spirits (grams)
			Men	
	(1)	(2)	(3)	(4)
SB_{WP}	-0.0898	-0.1613	-0.0180	1.0483
	(0.055)	(0.129)	(0.050)	(0.791)
Constant	5.7080***	10.1683***	5.4403***	30.8570*
	(0.991)	(3.448)	(1.034)	(16.423)
Mean of Y	6.718	5.721	6.764	7.008
SD of Y	0.712	0.695	0.604	0.892
Observations	9,979	2,164	8,982	181
Number of idind	4,885	1,552	4,475	158
			Women	
SB_{WP}	-0.0263	0.0704	-0.0431	0.6023
	(0.048)	(0.056)	(0.059)	(0.565)
Constant	3.7046**	2.2819	3.0996	44.5377***
	(1.621)	(1.478)	(2.166)	(15.200)
Mean of Y	5.944	5.442	6.299	6.621
SD of Y	0.833	0.613	0.633	0.849
Observations	9,088	6,315	4,273	204
Number of idind	4,754	3,731	2,521	188

*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on drinking consumption for the following categories: all, wine, beer and spirits. Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*

Table C.8: Effect of smoking bans on physical activity - only quitters.

	Physical activity	Times per week	Minutes
		Men	
SB_{WP}	0.0155	-0.1233	0.0099
	(0.012)	(0.145)	(0.099)
Constant	0.3474	-1.1057	7.0089***
	(0.399)	(2.354)	(2.118)
Mean of Y	0.139	2.290	4.233
SD of Y	0.346	0.804	0.752
Observations	19,838	2,768	2,778
Number of idind	7,578	1,782	1,788
		Women	
SB_{WP}	0.0129	-0.1305	0.0368
	(0.008)	(0.079)	(0.071)
Constant	0.0305	-0.4574	2.4154
	(0.285)	(3.014)	(2.160)
Mean of Y	0.124	2.319	3.996
SD of Y	0.329	0.781	0.724
Observations	24,255	3,057	3,067
Number of idind	8,703	1,950	1,956

*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on physical activity participation and intensity - number of times and times per week. Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*

Table C.9: Effect of smoking bans on smoking behaviour - regional trends.

	Smoker	Number of cigarettes
	Men	
	(1)	(2)
SB_{WP}	-0.0227*	-0.3780
	(0.012)	(0.372)
Constant	0.1734	3.9336
	(0.310)	(8.120)
Mean of Y	0.574	17.54
SD of Y	0.494	8.078
Observations	23,014	12,666
Number of idind	8,345	5,087
	Women	
SB_{WP}	0.0016	-0.3553
	(0.006)	(0.408)
Constant	0.6215**	19.1841
	(0.283)	(15.009)
Mean of Y	0.183	11.86
SD of Y	0.386	6.651
Observations	26,246	4,579
Number of idind	9,182	1,955

*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on smoking participation and consumption. Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*

Table C.10: Effect of smoking bans on drinking participation - regional trends.

	Drinking	Wine	Beer	Spirits
			Men	
	(1)	(2)	(3)	(4)
SB_{WP}	-0.0619***	-0.0002	-0.0626***	-0.0160***
	(0.017)	(0.010)	(0.016)	(0.005)
Constant	-0.4434	-0.4658	0.0078	0.0010
	(0.608)	(0.384)	(0.532)	(0.128)
Mean of Y	0.490	0.104	0.441	0.00895
SD of Y	0.500	0.306	0.497	0.0942
Observations	22,906	22,996	22,928	23,021
Number of idind	8,327	8,342	8,332	8,347
			Women	
SB_{WP}	-0.0230*	0.0004	-0.0272***	-0.0102***
	(0.013)	(0.011)	(0.010)	(0.003)
Constant	-1.0012**	-1.6569***	0.8482*	-0.1079
	(0.499)	(0.514)	(0.472)	(0.104)
Mean of Y	0.387	0.254	0.200	0.00756
SD of Y	0.487	0.435	0.400	0.0866
Observations	26,191	26,226	26,224	26,257
Number of idind	9,177	9,179	9,181	9,187

*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on drinking participation for the following categories: all, wine, beer and spirits. Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*

Table C.11: Effect of smoking bans on drinking consumption - regional trends.

	Drinking (grams)	Wine (grams)	Beer (grams)	Spirits (grams)
		Men		
	(1)	(2)	(3)	(4)
SB_{WP}	-0.1080**	-0.1394	-0.0133	0.4555
	(0.051)	(0.128)	(0.047)	(0.568)
Constant	6.4467***	19.2022***	6.0117***	-78.5560
	(1.228)	(4.310)	(1.237)	(73.535)
Mean of Y	6.720	5.735	6.765	6.995
SD of Y	0.708	0.696	0.602	0.879
Observations	11,432	2,454	10,303	211
Number of idind	5,436	1,743	4,991	184
		Women		
SB_{WP}	-0.0352	0.0522	-0.0245	3.9201***
	(0.045)	(0.054)	(0.054)	(1.332)
Constant	7.1087***	4.1095**	6.9910***	93.5529***
	(1.615)	(1.662)	(1.984)	(6.587)
Mean of Y	5.978	5.457	6.314	6.675
SD of Y	0.832	0.613	0.628	0.857
Observations	10,061	6,882	4,894	226
Number of idind	5,140	4,022	2,807	205

*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on drinking consumption for the following categories: all,wine, beer and spirits. Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*

Table C.12: Effect of smoking bans on physical activity - regional trends.

	Physical activity	Times per week	Minutes
		Men	
SB_{WP}	0.0167	-0.1108	0.0847
	(0.011)	(0.100)	(0.092)
Constant	0.0713	3.4296	5.8746**
	(0.451)	(2.621)	(2.476)
Mean of Y	0.136	2.284	4.243
SD of Y	0.342	0.808	0.746
Observations	23,022	3,139	3,150
Number of idind	8,345	1,979	1,983
		Women	
SB_{WP}	0.0113	-0.0422	0.0422
	(0.008)	(0.077)	(0.074)
Constant	0.2102	0.0385	2.3897
	(0.284)	(3.668)	(2.267)
Mean of Y	0.122	2.321	3.994
SD of Y	0.328	0.781	0.723
Observations	26,247	3,295	3,307
Number of idind	9,182	2,083	2,090

*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on physical activity participation and intensity - number of times and times per week. Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*

Table C.13: Effect of smoking bans on smoking behaviour - controlling for prices.

	Smoker	Number of cigarettes
	Men	
	(1)	(2)
SB_{WP}	-0.0287**	-0.3818
	(0.013)	(0.399)
Constant	0.0007	4.4651
	(0.232)	(7.422)
Mean of Y	0.574	17.54
SD of Y	0.494	8.078
Observations	17,600	9,583
Number of idind	7,370	4,378
	Women	
SB_{WP}	0.0016	0.1300
	(0.006)	(0.457)
Constant	0.3298	3.8869
	(0.297)	(14.190)
Mean of Y	0.183	11.86
SD of Y	0.386	6.651
Observations	20,276	3,360
Number of idind	8,167	1,635

*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on smoking participation and consumption. Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*

Table C.14: Effect of smoking bans on drinking participation - controlling for prices.

	Drinking	Wine	Beer	Spirits
			Men	
	(1)	(2)	(3)	(4)
SB_{WP}	-0.0742***	-0.0063	-0.0701***	-0.0117**
	(0.019)	(0.011)	(0.018)	(0.005)
Constant	-0.2714	-0.4629	0.2838	0.0783
	(0.620)	(0.425)	(0.509)	(0.147)
Mean of Y	0.490	0.104	0.441	0.00895
SD of Y	0.500	0.306	0.497	0.0942
Observations	17,560	17,603	17,568	17,607
Number of idind	7,359	7,369	7,362	7,371
			Women	
SB_{WP}	-0.0175	-0.0031	-0.0238**	-0.0084***
	(0.014)	(0.012)	(0.011)	(0.003)
Constant	-0.1915	-1.3514***	1.6200***	-0.0715
	(0.497)	(0.519)	(0.359)	(0.086)
Mean of Y	0.387	0.254	0.200	0.00756
SD of Y	0.487	0.435	0.400	0.0866
Observations	20,248	20,269	20,268	20,282
Number of idind	8,159	8,164	8,165	8,167

*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on drinking participation for the following categories: all,wine, beer and spirits. Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*

Table C.15: Effect of smoking bans on drinking consumption - controlling for prices.

	Drinking (grams)	Wine (grams)	Beer (grams)	Spirits (grams)
			Men	
	(1)	(2)	(3)	(4)
SB_{WP}	-0.0806	-0.2257*	-0.0228	0.2773
	(0.061)	(0.136)	(0.057)	(0.962)
Constant	5.7966***	12.7951**	5.7513***	48.8398
	(1.246)	(5.165)	(1.260)	(63.864)
Mean of Y	6.720	5.735	6.765	6.995
SD of Y	0.708	0.696	0.602	0.879
Observations	8,630	1,831	7,772	144
Number of idind	4,620	1,395	4,228	126
			Women	
SB_{WP}	-0.0250	0.1293**	-0.0692	3.0100*
	(0.052)	(0.060)	(0.059)	(1.682)
Constant	5.2682***	2.8737*	4.4857**	108.4264**
	(1.576)	(1.671)	(2.057)	(50.094)
Mean of Y	5.978	5.457	6.314	6.675
SD of Y	0.832	0.613	0.628	0.857
Observations	7,647	5,208	3,733	165
Number of idind	4,308	3,319	2,303	151

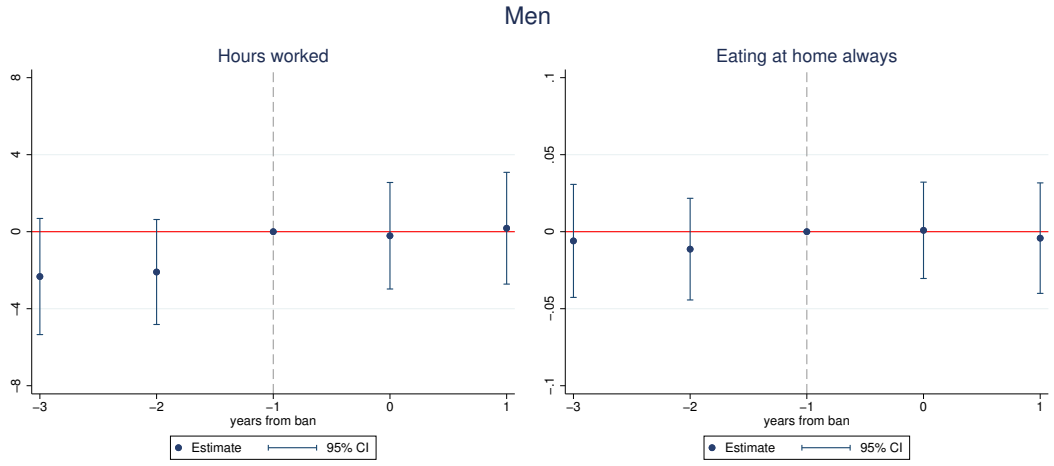
*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on drinking consumption for the following categories: all,wine, beer and spirits. Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*

Table C.16: Effect of smoking bans on physical activity - controlling for prices.

	Physical activity	Times per week	Minutes
		Men	
SB_{WP}	0.0105	-0.1440	0.0739
	(0.012)	(0.128)	(0.107)
Constant	0.5471	-1.0073	6.5540***
	(0.451)	(2.696)	(2.274)
Mean of Y	0.136	2.284	4.243
SD of Y	0.342	0.808	0.746
Observations	17,607	2,408	2,412
Number of idind	7,371	1,617	1,617
		Women	
SB_{WP}	0.0101	-0.0288	0.0186
	(0.009)	(0.096)	(0.087)
Constant	0.4005	-2.4018	-0.2274
	(0.319)	(3.673)	(2.859)
Mean of Y	0.122	2.321	3.994
SD of Y	0.328	0.781	0.723
Observations	20,275	2,566	2,575
Number of idind	8,164	1,700	1,704

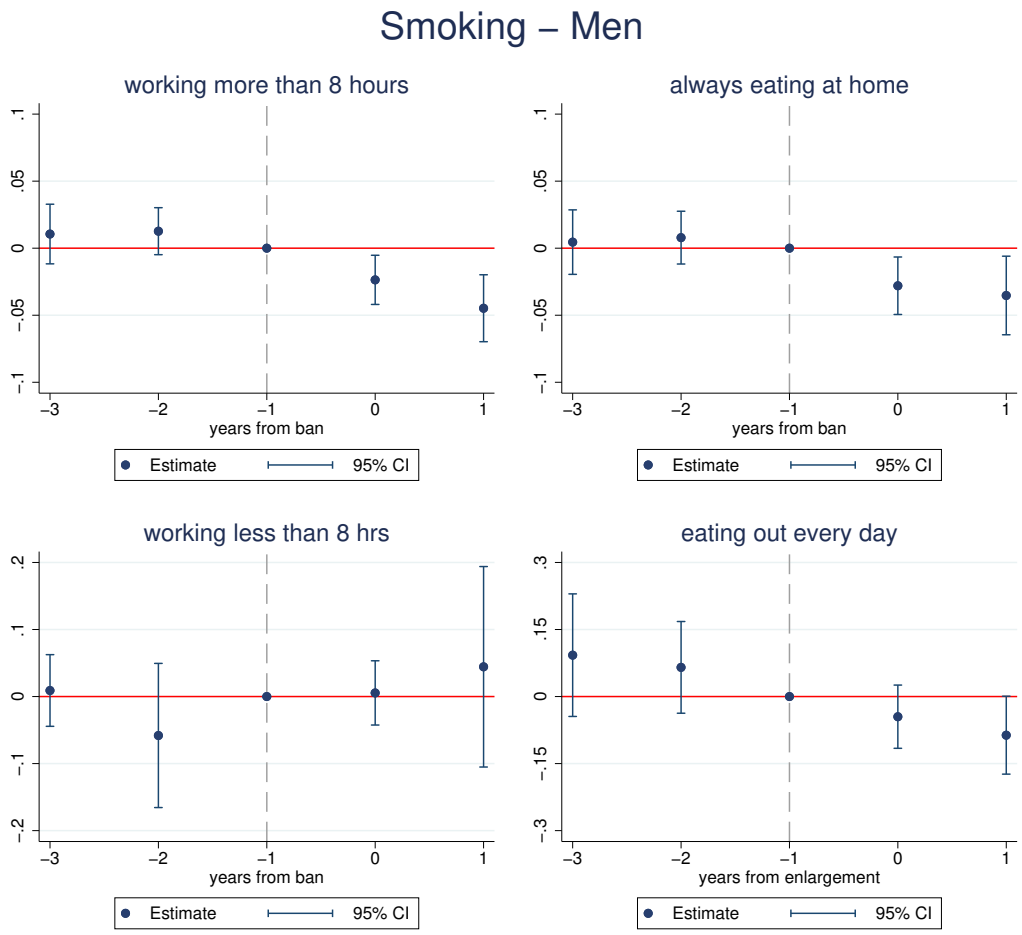
*Notes: All specifications are estimated using OLS and include individual- and year-specific fixed effects, and control for age, marital status, level of education and geographic area characteristics (i.e., living in an oblastnoy, town or rural area). The table shows DiD estimates for the effect of smoking bans in workplaces on physical activity participation and intensity - number of times and times per week. Standard errors clustered at individual level. Significant levels: *** p<0.01, ** p<0.05, * p<0.1*

Appendix D



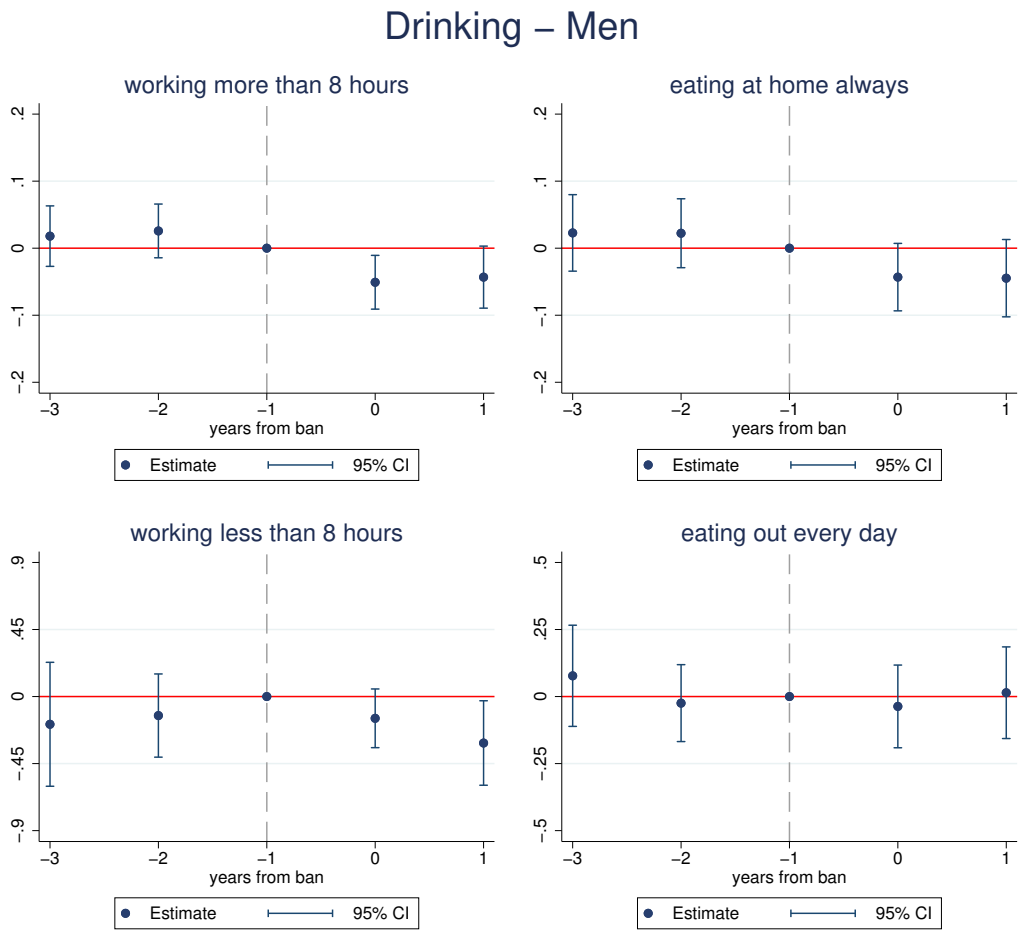
Notes: The figure plots lags and leads, estimated from equation 2, for the main health behaviours presented above, dots represent point estimates, vertical bars represent 95% confidence intervals. The year 2012 was chosen as the reference category.

Figure D.1: Event study: hours worked and eating out frequency



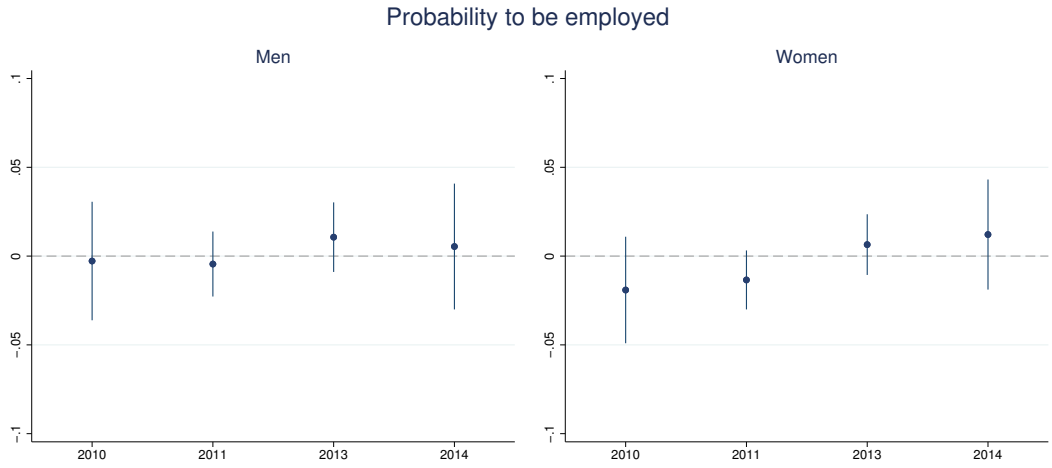
Notes: The figure plots lags and leads, estimated from equation 2, for the main health behaviours presented above, dots represent point estimates, vertical bars represent 95% confidence intervals. The year 2012 was chosen as the reference category.

Figure D.2: Event study: smoking by hours worked and eating out frequency



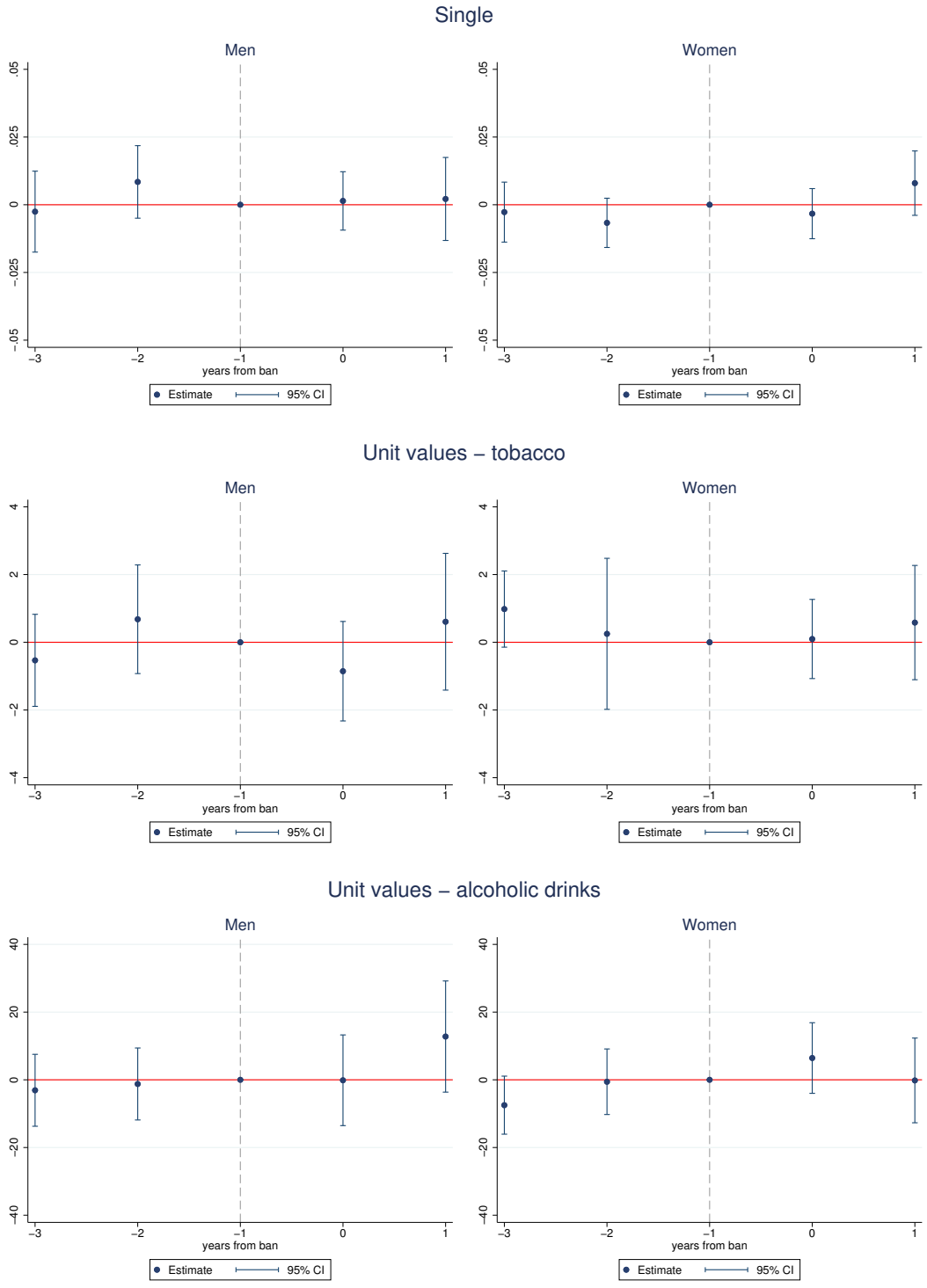
Notes: The figure plots lags and leads, estimated from equation 2, for the main health behaviours presented above, dots represent point estimates, vertical bars represent 95% confidence intervals. The year 2012 was chosen as the reference category.

Figure D.3: Event study: drinking by hours worked and eating out frequency



Notes: The figure plots coefficients associated to years obtained from a regression that has as outcome variable the probability to be employed for men (panel a) and women (panel b) separately, and as covariates: age, age squared, marital status and education. Dots represent point estimates, vertical bars represent 95% confidence intervals. The year 2012 was chosen as the reference category.

Figure D.4: The effect of smoking bans on employment status



Notes: The figure plots coefficients associated to years obtained from a regression that has as outcome variable the probability to be employed for men (panel a) and women (panel b) separately, and as covariates: age, age squared, marital status and education. Dots represent point estimates, vertical bars represent 95% confidence intervals. The year 2012 was chosen as the reference category.

Figure D.5: The effect of smoking bans on placebo outcomes