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Abstract

It is widely proven that individuals that consume more alcohol are also much more likely to suffer from a working accident. However, this observed correlation may be due to other unobserved factors affecting both alcohol consumption and working accidents (such as the type of job). Thus, in this paper we establish the causal impact of alcohol consumption on working accidents by exploiting a reduction in Spanish bar opening hours that was introduced progressively throughout regions and time. We first show that the policy effectively reduced working accidents. Next, we explore the channels and show that excessive alcohol consumption (as proxied by hospitalization rates due to alcohol abuse) is also reduced as a result of the policy. Our paper is the first one to provide evidence that stricter closing times for bars causally reduce accidents at work. This is important from a policy point of view as working accidents stand as a very important determinant of productivity levels and entail very high costs in terms of health and disability.

1. Introduction

In this paper, we analyze the causal effect of a policy that reduced bar opening hours in Spain on alcohol consumption and workplace accidents. Our results show that reducing bar opening hours causes a decrease in both outcomes. Thus, we provide the first evidence on the existence of spill over effects of restricting the timing of alcohol sales on the probability of suffering from a working accident. The channel in which this relationship operates is through a reduction on alcohol consumption. We also show that these effects are heterogeneous among gender and economic sectors.

This analysis is important for several reasons: firstly, workplace accidents entail massive economic and social costs, affecting not only individuals involved in the accident but also the society as a whole. According to Takala et al. (2014) in 2012, 2.3 million individuals died worldwide due to workplace related accidents. For the different countries, this implied an average economic cost between 1.8% and 6% of their GDP. Secondly, we focus on a country, Spain, which stands at a relatively negative position with respect to its European neighbours regarding workplace safety. Tejedor (2006) examines differences in workplace accidents among EU15 countries for the years 1996 and 2003 and concludes that, in almost all outcomes, Spain was at the back tail of workplace safety standards. For instance, during the period analyzed, Spain was the country with the largest number of workplace accidents that required three or more days of sick leave to recover. Regarding mortal workplace accidents, Spain was behind the average in the EU15 and almost tripled the number of accidents in which at least one person dies with respect to countries such as Sweden or the UK. Finally, even if there exists a large body of literature that reports a strong positive correlation between alcohol consumption and workplace accidents (Van Charante et al. 1990, Zwerling et al. 1996, Wells 1999 amongst others), causality has not been established yet.

Our identification strategy is based on a policy that reduced bar opening hours from 6am to 2-3.30am in Spain. This represents a strong reduction on the number of hours that bars can remain open and, thus, may have affected both the number of hours that individuals sleep as well as the amount of alcohol that individuals drink at night. Both of these factors directly affect the current and future physical condition of workers and can, thus, lead to changes in the probability of suffering from a working accident. Thus, a policy that restricts the number of hours in which

these activities can take place can improve individual's physical condition leading to a lower number of working accidents.

However, individuals may also substitute their consumption in bars by a similar consumption in other areas (e.g. private parties, streets, etc.) so that neither the consumption of alcohol nor the number of working accidents would be affected by the policy.

Thus, we exploit the staggered implementation of the reduction in bar opening hours across regions in Spain in order to identify any causal effect of the policy on both alcohol consumption and working accidents. To be best of our knowledge, this is the first paper that reports reductions in alcohol consumption that lead to a drop in the probability of suffering from a working accident when bars are no longer allowed to remain open until sunrise.

Our paper also contributes to the literature that demonstrates how changes on the timing of alcohol sales reduce the consumption of alcohol by affected individuals (Wicki et al. 2011, Carpenter et al. 2009, Marcus et al. 2015, amongst others). Some of these papers also explore potential spill over effects of these policies such as impaired driver road crashes and driver breath alcohol (Chikritzhs et al. 2006), emergency ward admissions and suspected drunk driving (Ragnarsdottir et al. 2002), fatal traffic accidents (Lovenheim et al. 2011), total accidents, pedestrian accidents, single-vehicle accidents and multi-vehicle accidents (Raymond 1969), traffic crash injuries (Smith 1990), crime rates (Heaton 2012) and workplace absenteeism (Green et al. 2015). We contribute to this literature and provide evidence of another positive spill over effect (a reduction in workplace accidents) of policies that affect alcohol consumption. One important difference of our paper is that we focus on a restriction in bar opening hours while most of the previous literature considers policies that increase opening hours of alcohol selling establishments. Green et. al (2015) examine the effects of the same policy and find a reduction on the probability that a worker is absent from work as a result of the restriction in bar opening hours. We go one step further than the paper by Green et al. (2015) and focus on an outcome that has much stronger negative effects in terms of health and disability. Furthermore, we use population level data on everyone who suffered from a working accident, which allows us to better identify the effects (with respect to the use of survey data) and we also report the first stage impacts of the policy (on alcohol consumption) which was unexplored in Green et al. (2015).

2. Spanish Context

Spain is divided into 17 regions (Autonomous Communities). Each of these regions implemented the reduction in bar opening hours at some point between 1994 and 2011. Before the reform, bars in Spain were allowed to open until 6am. This was reduced to 2am-3.30am, depending on the region. The progression of these changes through time and regions can be observed in Table 1 and Figure 1 in the appendix[1]. Both the Table as well as the Figure show the exact timing of the introduction of the reduction in bar opening hours in each region. We can see that the reforms were very staggered over time so that there are no two regions implementing the change at the same time. Thus, in our identification strategy we will make use of this heterogeneous implementation of the reform in order to build a quasi-natural experiment with treatment and control regions.

One obvious question that may be asked at this point is the reasons that each region had when taking the decision to implement the reduction in bar opening hours at a specific point in time. In order to understand why different reforms were implemented in such a wide time range it is important to be familiarized with the Spanish political structure. The 17 regional entities in Spain represent first-level political and administrative divisions. Therefore, these different regions can exercise their right to self-government (limited by the constitution and their regional statutes) and can decide on when to implement these types of reforms. It is important to point out that other related policies affecting bars and alcohol consumption (changes in taxation, etc.) can only be implemented at a national level. That is, apart from bar opening hours, other changes implemented in the considered time period were introduced homogenously in all regions at the same time and, therefore, will not impose a threat to our identification strategy.

The main aim of the implementation of these reforms was the reduction in the number of problems of social coexistence derived from the activity of bars. These problems referred to the noise, pollution and dirt that agglomerations of individuals generate. This is a notable difference with respect to similar policies studied in the literature (changes in the timing of alcohol sales) which main objective is the reduction in alcohol consumption.[2] Thus, because the decrease in

[1] Table 1 has been extracted from Green et al. (2015). We have slightly modified their original table by adding the regions that were not considered in their paper.

[2] The reasons provided to implement the reform are found in the regional legislation. The justification of these restrictive laws differs slightly between regions. Still, all regional laws explicitly mention the intention to reduce the number of social coexistence problems.

alcohol consumption was not the prime objective of the reduction in bar opening hours in Spain, we expect the potential endogeneity of the policy to be minimized. That is, our guess is that the timing of the implementation of the policy in each region will not be correlated to previous trends in alcohol consumption in that particular region. Furthermore, it is worth noticing that the policy was not systematically introduced by a concrete political party with a certain ideology. Table 2 in the appendix categorizes the regional political party at the moment of the implementation of the policy in each region. As it can be seen, there were 6 different political parties that implemented the policy; 8 of them can be considered as left wing parties while 9 of them are right wing parties. In any case, in the next section we will provide formal evidence of the exogeneity of the policy in our setting.

In order for the policy to be effective, at least two conditions need to be fulfilled: first, bar activity in the country has to be important so that a large number of individuals are potential affected by the reform. This condition is fulfilled in the case of Spain as the number of bars per inhabitant is very high with respect to other countries. According to Sans (2016) in 2016 Spain had around 260.000 bars. This corresponds to one bar for every 176 Spaniards and places Spain as the country with the highest number of bars per capita in the world.

Second, restrictions in bar opening hours should be imposed at a time range in which individuals are, in effect, spending time in bars so that forcing bars to close earlier would indeed affect the behaviour of Spanish citizens. This condition is also fulfilled as Spaniards nightlife extends until early in the following morning. For instance according to a report of the Drug Addiction Foundation (FAD) published in 2016, in 2004 66.3% of young individuals reported leaving bars after 3am. Therefore, this suggests that these late night life hours are common in Spain and that restricting bar opening hours until 2.30am or 3.30am affected a time range that was highly used by Spaniards.

3. Data and Strategy

3.1. Data

We make use of five different data sources in order to identify our effects of interest. The first one is register data from the Spanish Social Security administration which includes all individuals that experienced a working accident in Spain at some point between 1990 and 2011.

The large time span of the data allows us to include at least 4 years before and 4 years after the implementation of the policy in 16 of the 17 regions in Spain. The only exception is Catalonia that introduced the policy in 2011. Thus, in our analysis Catalonia will be used as a control region. The database contains information on all workplace accidents[3] that occurred in Spain for each of these years and has a total of 273.828 observations[4]. The database also includes information on the economic sector of the injured worker (industrial, construction or services sector[5]) and the gender of the worker. We collapse the individual data at the level of year, trimester and region following Oreopoulos et al. (2012). Thus, we transform the repeated cross sectional data into panel of working accidents in each region over time. As the number of employed individuals changes over time and across regions, we divide the data by the number of employed individuals in each region and time (employment data derived from Spanish National Institute of Statistics, INE). This allows us to generate a rate of workplace accidents per each region and time that we will use as our dependent variable.

In order to identify any effects of the restriction in bar opening hours on alcohol consumption we use a repeated cross sectional database from the National Institute of Statistics that includes all hospitalizations caused by alcohol consumption that occurred in Spain between 1990 and 2011.[6] We select the following alcohol-related diagnostics: Mental health disorder and dependency syndrome caused by alcohol consumption, liver diseases caused by alcohol consumption and alcohol poisoning. We consider individuals aged between 16 and 65 years old which represent a total of 870.061 observations. The database also includes information on gender. We follow a similar strategy than before and collapse the individual data at the level of year, trimester and region. We next divide it by the population aged 16-65 living in each region in each period of time in order to construct a hospitalization rate that will be also used as our second dependent variable.

Hospitalizations due to alcohol consumption represent an extreme outcome, so that any results

[3] Total workplace accidents include severe, very severe and mortal accidents. The number of mortal accidents is too small so as to do a separate analysis including only mortal accidents.

[4] It has to be noted that we do not have a personal identifier so that the database is not a panel but a repeated cross-section.

[5] Regarding the Agricultural sector, for some regions there are too few observations. Thus, we do not include it in our analysis.

[6] 95.5% of all Spanish hospitals are included in the database which implies a coverage of 99,5% of all hospitalizations that occur in Spain. It includes public and private hospitals as well as military centres (around 850 hospitals).

obtained regarding hospitalizations will be a lower bound effect of the policy over all alcohol consumers. Thus, we provide additional evidence on less extreme alcohol consumption behaviours by using data from the Spanish National Health Survey (ENS). The ENS is a survey that is periodically carried out in Spain by the Ministry of Health, Social Services and Equality (MSSSI). We have data for the years 1995, 1997, 2001, 2003, 2004, 2006 and 2007 for a total of 83.734 observations. The survey contains information on self-reported health status, life habits and health coverage. We focus our attention on the information regarding alcohol consumption. It is important to note that the ENS is not done on a yearly basis so that it will be more difficult to capture the impacts of the policy in a precise way. Thus, our preferred identification strategy to capture the impacts of the policy on alcohol consumption will be based on the hospitalizations data and results from the ENS will be shown in the robustness check section.
Some descriptive statistics of these databases are presented in Table 3 in the Appendix.

3.2. Identification strategy

We employ a difference-in-differences (DD) framework, exploiting differences in the timing of adoption of the policy across Spanish regions in order to identify the causal effects of the reduction in bar opening hours. The following model is estimated both for alcohol consumption as well as for workplace accidents:

$$A_{tr} = \beta_0 + \beta_1 Treat_{tr} + \beta_2 RegionFE_r + \beta_3 TimeFE_t + \beta_4 TrimesterFE_t + \beta_5 Region\ Specific\ Time\ Trend_{tr} + \varepsilon_{tr}$$

In this specification A_{tr} stands for workplace accidents for every 100.000 employed individuals as well as for hospitalizations caused by alcohol consumption for every 100.000 individuals. This information varies across regions, r, and over time, t, which is captured in trimesters. When we analyze outcomes related to the self-reported information on alcohol consumption from the health survey, the dependent variables are no longer rates but dummy variables of the form daily/weekly/monthly consumption of wine, whisky, etc.
Our variable of interest in the regression above is *Treat.* This is a dummy variable that is equal to 1 for the regions and time periods where the policy has already been adopted and zero otherwise.

Additionally, year, trimester and region fixed effects are included. We present results both including and excluding from the regression linear region specific time trends. These are calculated by interacting the dummy variables for each region with a linear time trend. The time trend equals 1-4 for the different trimesters of the first year, 5-8 for the different trimesters of the second year and so forth. We do not include further control variables but estimate separate regressions for specific sub-groups of the population (by gender, economic sector, etc). Standard errors are clustered at the level of the region but, as there are only 17 regions, we use a wild bootstrap procedure in order to correct for the small number of clusters.

As mentioned above, we believe endogeneity is not really a problem in this setting as the policy was introduced due to reasons other than high alcohol consumption patterns (noise, etc..). However, in order to formally check for the inexistence of differential trends between the treated and control regions prior to the introduction of the policy, we also estimate an event study model. In the event study models, we include in the regression three additional dummy variables that capture the trend of the outcome variable one, two and three years before the implementation of the policy.[7]

4. Results

We first focus on the results that analyze the impact of the reduction in bar opening hours on workplace accidents and next comment on the results for alcohol consumption.

4.1. Workplace Accidents

The main results for workplace accidents are reported in Table 4 in the Appendix. The table has two panels: Panel A presents the main results of the difference-in-difference model while Panel B includes the event study design which controls for any pre-existing trends. Regressions in both panels are estimated for everyone as well as separate regressions are performed for woman, man, workers in the industrial, construction and service sectors. As mentioned above results are presented including and excluding linear region specific time trends.

We can see in the first panel that all the coefficients for our diff-diff models (treatment variable)

[7] We only present the regressions estimating with 3 *Pre* dummy variables that account for the trend of the outcome 1, 2 and 3 years before the implementation of the policy. Nevertheless we have run regressions with several other specifications and the results were consistent.

are negative suggesting that reductions in bar opening hours causally reduced the number of working accidents. More specifically the coefficient is negative and statistically significant for men and workers in the construction and service sectors. Thus, for men the policy reduced the number of working accidents in 2.67 per 100.000 employed men. When we compare the size of the effect with the mean of working accidents in the sample (which is 37.51 for men) we can see that the policy caused a reduction in workplace accidents by 7.1% for men. The policy had a stronger effect for workers in the construction sector as it implied a reduction in working accidents by 17.73%. Also, for the services sector the reduction in working accidents was by 7.01%.

Panel B reports the results of the event study design and, as predicted, we can see that there is no evidence of endogeneity of the timing of the introduction of the policy. All the coefficients of the variables that capture the trends in the outcome variable three, two and one year before the introduction of the policy are insignificant. This provides reliable evidence that regions that introduced the policy did not have a different trend in working accidents in the years prior to the adoption of the policy than the trend in regions that did not implement the policy. Thus, our estimates capture the causal effect of reducing bar opening hours on accidents at work.

4.2. Channel (Alcohol Consumption)

The reduction in working accidents resulting from reduced bar opening hours could be explained by individuals drinking less alcohol and, thus, being in better shape to work and to avoid an accident while working. However, there could be also alternative explanations that do not entail a reduction in alcohol consumption. For example, individuals could drink the same amount than before (although in a shorter period of time) but because they go to sleep earlier and get more hours of rest, they could also be in better shape the next day and, thus, avoid having accidents while working. Therefore, in this section we try to assess whether the reduction in working accidents can be attributed (at least partly) to a reduction in alcohol consumption or to other alternative explanations that do not imply changes in alcohol consumption.

We focus on the hospitalization rate caused by alcohol consumption as our proxy of excessive alcohol consumption. Table 5 in the Appendix shows that all the coefficients of the diff-diff variable (*Treat*) are not significant. However, as individuals typically stay out until late only during

the weekends, we restrict our data to hospitalizations that occur only on Saturdays and Sundays in order to get closer to the identification of the effects of the reduction in bar closing hours.[8] The logic behind this is that during the weekends the proportion of hospitalizations caused by alcohol consumption in bars during late hours should be higher with respect to the other days of the week. The results are presented in Table 6 in the Appendix and we can see that all coefficients of the difference-in-difference regressions are now negative and a number of them are also significant (Panel A). Interestingly, we find that the policy reduced excessive alcohol consumption particularly for men, which is the same group that showed significant reductions in working accidents. More specifically, we estimate that the reduction in bar opening hours reduced hospitalizations due to excessive consumption of alcohol by 24.21% for men.

Panel B of Table 6 presents the event study results. Again, we find no evidence of endogeneity of the policy implementation.

These results can be interpreted as the policy causally reducing excessive consumption of alcohol which, in turn, decreased the number of accidents at work. The effect of the policy is stronger for men both for the reduction in the consumption of alcohol as well as for the reduction in working accidents and we provide evidence that the timing of the implementation of the policy was exogenous with respect to previous regional trends in alcohol consumption and working accidents.

4.3. Heterogeneous Effects

Apart from the baseline results reported above, we have implemented some additional regressions along several characteristics of the regions. Table 7 in the Appendix lists the regions included in any of the groups that we have created to explore potential heterogenous effects. First, we divide the regions according to the sector of activity that employs the highest percentage of their population[9]. Table 8 in the Appendix shows that regions with the highest

[8] Hospitalizations that occurred on Saturday's and Sunday's are more likely to include individuals that went out to bars on Friday and Saturday night. Additionally we have run alternative regressions considering only Fridays and/or Mondays. The results are consistent with the ones on hospitalizations during the weekend but have lower significance levels.

[9] We generate this list by taking the mean of occupied individuals per economic sector from 1990 to the second quarter of 2007. We explicitly want to exclude time periods affected by the Great Recession as all the treated regions implemented the policy before the Great Recession. We present the results for the 7 regions with highest percentage of workers employed in the industrial, construction and services sector. Additionally we have also

percentage of individuals working in the service sector are mostly affected by the policy. Next, we study whether regions with a left/right wing governing party at the time of the adoption of the policy show stronger effects. The results, which can be seen in Table 9 in the Appendix, show that there are no big differences between these two groups of regions so that the colour and ideology of the governing party at the regional level is not a determinant factor to ensure the success of the policy. Finally, we divide the regions according to the time of the year in which the policy was implemented. We group autumn and winter on the one hand and spring and summer, on the other hand. It could be argued that in hot seasons the policy could prove to be less effective as individuals could easily stay in the streets after the reduced closing times. However, as shown in Table 10 in the Appendix, this is not the case as there are no significant differences between these two groups of regions.

Thus, the heterogeneity results show that the effects of the policy were quite homogenous across different regional characteristics. The only important case to mention is stronger results in regions that have a strong specialization in the service sector. This could be due to the higher incidence of the tourism industry inside the service sector. It is easy to think that the amount of touristic activity in a region is highly positively correlated with the number of bars in that region, which could explain why the results of the policy are stronger in those regions.

5. Robustness Checks

We have run a number of regressions to test the consistency of our results. For example, we have divided the medical diagnoses that are included in the hospitalization variable used in the baseline regressions into smaller groups. We have run regressions for each of the smaller diagnoses groups and the coefficients are all negative although they lose significance because of the smaller number of observations (hospitalization episodes) when we include less conditions.

Finally, we explore the impact of the reform on self-assessed alcohol consumption using data from the Spanish National Health Survey. We use as outcomes dummy variables on the frequency of consumption of alcoholic drinks, tobacco and others. We estimate the same model than in the baseline results. Consistent with the results found with the hospitalizations data, we can see in Table 11 that all the diff-diff coefficients are negative. Furthermore, the coefficients for daily

estimated the same regressions considering 4, 5 and 6 regions with highest percentage of workers employed in the industrial, construction and services sector and the results are consistent.

and weekly consumption of wine are also significant. Consistent with the hospitalization and working accidents results, the effects are also stronger for men.

The regressions for the consumption of whisky, liquor, aperitifs and mixed drinks on a daily, weekly and monthly basis as well as the probability of smoking daily are also negative but non-significant. We probably do not have enough observations to identify significant effects for the consumption of these stronger alcoholic drinks with survey data and we cannot identify the very short-term effects of the policy as the survey is not implemented every year. Thus, even if pointing in the same direction, our estimates using data from the Health Survey are more imprecise than the hospitalization results.

6. Conclusions

In this paper we provide the first causal estimate on the effects of a policy that reduced bar opening hours on workplace accidents and alcohol consumption. We find that the policy causally decreased working accidents through the reduction of the consumption of alcohol. Thus, we expand on previous literature that focused on the impact of similar policies on different outcomes (such as fatal traffic accidents (Lovenheim et al. 2011), crime rates (Heaton 2012) or workplace absenteeism (Green et al. 2015), among others) by looking at a previously unexplored outcome, working accidents. Accidents at work stand as an important determinant of future health and disability rates and represent an estimated economic cost between 1.8% and 6% of the country's GDP. Thus, it has much deeper economic and social impact than absenteeism or crime rates.

In order to identify the effects we exploit the staggered implementation of the reduction in bar opening hours across Spanish regions over time between 1990 and 2011. Before the reforms, bars were allowed to remain open until 6am while the reform reduced opening times until 2-3.30am, depending on the region.

Furthermore, we also provide evidence that the reduction in working accidents is partly driven by a reduction in the excessive consumption of alcohol. In order to do that we proof that the policy causally reduces hospitalization rates due to excessive consumption of alcohol.

We use rich administrative data from the Social Security administration in Spain for both working accidents as well as hospitalization rates which allows us to include the universe of individuals that suffer from a work accident or a hospitalization episode.

Further inspection of the data shows that the policy has stronger impacts on men (for both outcomes) as well as for individuals working in the service and construction sectors.

We believe that our results are important from a policy perspective because, by showing the existence of positive spillover effects, they provide guidance for policy makers considering the introduction of these types of reforms.

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Appendix

Table 1. Implementation of the policy accross regions and time[10]

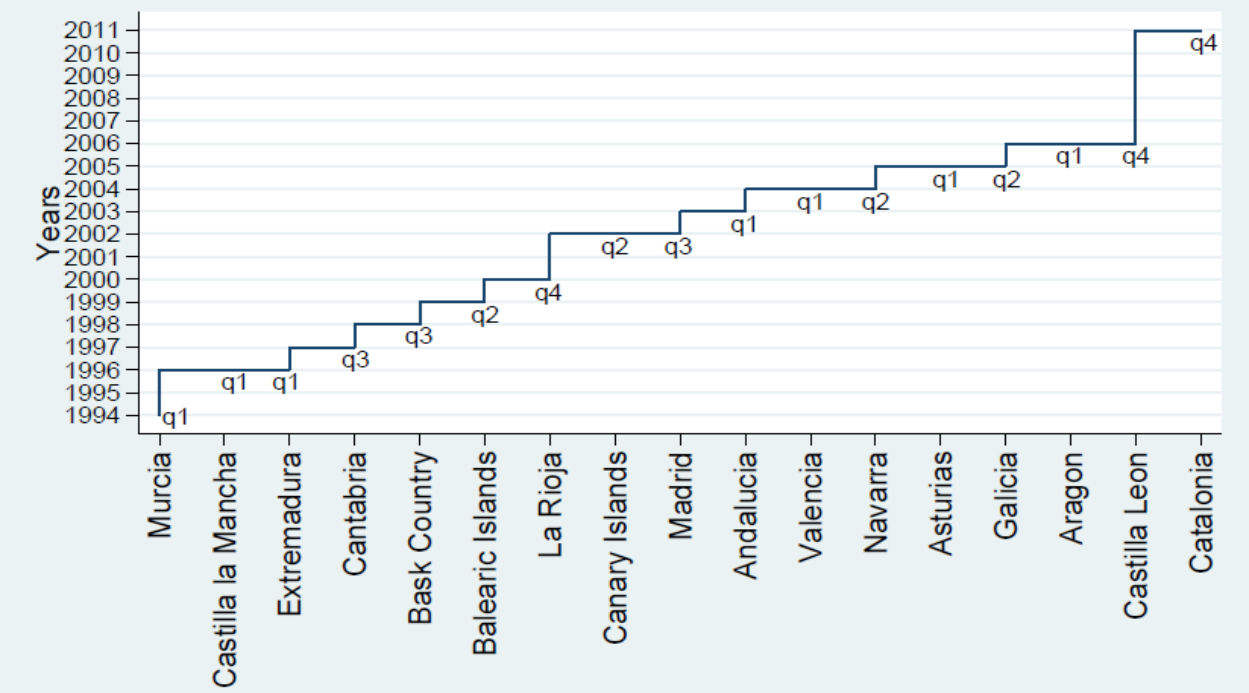
Regions in Spain (CCAA)	Law came into force	Law	Closing time
Andalucía	1st quarter 2003	Ley 13/1999, de 15 de diciembre, de Espectáculos Públicos y Actividades Recreativas de Andalucía (BOE núm. 15, de 18 de enero), modificada por la Ley 10/2002, de 21 de diciembre (BOE núm. 14, de 16 de enero de 2003).	3:00am*
Aragon	1st quarter 2006	Ley 11/2005, de 28 de diciembre, reguladora de los espectáculos públicos, actividades recreativas y establecimientos públicos de la Comunidad Autónoma de Aragón (BOE núm. 23, de 27 de enero).	3:30am*
Canary Islands	2nd quarter 2002	Ley 1/1998, de 8 de enero, de Régimen Jurídico de los Espectáculos Públicos y Actividades Clasificadas (BOE núm. 27, de 31 de enero). Corrección de errores en BOE núm. 68, de 20-03-98 y modificada por la Ley 2/2002, de 27 de marzo (BOE núm. 97, de 23 de abril).	3:30am
Cantabria	3rd quarter 1997	Decreto 72/1997, de 7 julio. Establece el régimen general de horarios de establecimientos y espectáculos públicos y actividades recreativas. Consejería Presidencia. BO. Cantabria 23 julio 1997, núm. 146.	2:00am
Comunidad de Madrid	3rd quarter 2002	Ley 17/1997, de 4 de julio, de Espectáculos Públicos y Actividades Recreativas (BOE núm. 98, de 24 de abril de 1998), modificada por la Ley 24/1999, de 27 de diciembre (BOE núm. 48, de 25 de febrero de 2000), por la Ley 5/2000, de 8 de mayo (BOE núm. 126, de 26 de mayo) y por la Ley 5/2002, de 27 de junio (BOE núm. 176, de 24 de julio).	3:00am**
Castilla Leon	4th quarter 2006	Ley 7/2006, de 2 de octubre, de espectáculos públicos y actividades recreativas de la Comunidad de Castilla y León (BOE núm. 272, de 14 de noviembre).	3:00am
Castilla la mancha	1st quarter 1996	Orden de 4 de enero de 1996, que regula el horario general de los espectáculos públicos y actividades recreativa.	1.30am or 2.30am ****
Catalunya	4th quarter 2011	Orden INT/358/2011, de 19 de diciembre, por la que se regulan los horarios de los establecimientos abiertos al público, de los espectáculos públicos y de las actividades recreativas sometidos a la Ley 11/2009, de 6 de julio, de regulación administrativa de los espectáculos públicos y de las actividades recreativas, y a su Reglamento.	2:30am
Extremadura	3th quarter 1996	Orden de 16 septiembre 1996. Espectáculos públicos y actividades recreativas. Horarios de apertura y cierre de los establecimientos. Consejería presidencia y trabajo. D.O. Extremadura 19 septiembre 1996, núm. 109.	1:30am or 2:30am ****
Galicia	2nd quarter	Orden de 16 de junio de 2005 por la que se determinan los horarios de apertura y cierre de espectáculos y establecimientos	2:30am

[10] Table extracted from Green et al. (2015) and slightly modified by the authors in order to include some missing regions in the original Green et al. (2015 Table).

	2005	públicos en la Comunidad Autónoma de Galicia.	
Murcia	1st quarter 1994	Circular No 2/1994, sobre horario de cierre para los establecimientos públicos, espectáculos y fiestas para la comunidad autónnoma de la región de Murciao. (B.O.E. 15-3-1994)	2:30am or 3:30am****
Navarra	2nd quarter 2004	Ley Foral 2/1989, de 13 de marzo, Reguladora de los Espectáculos Públicos y Actividades Recreativas (BOE núm. 84, de 8 de abril), modificada por la Ley Foral 26/2001, de 10 de diciembre (BOE núm. 39, de 14 de febrero de 2002). 27 de octubre de 2003, 656/2003 Decreto Foral (BON145 de 14/11/2003), entrada en vigor 1 de abril de 2004.	3:30am**
Comunidad Valenciana	1st quarter 2004	Ley de las Cortes Valencianas 4/2003, de 26 de febrero, de los Espectáculos Públicos, Actividades Recreativas y Establecimientos Públicos (BOE núm. 81, de 4 de abril). Ley 4/2003, de 26 de febrero, Orden de 19 de diciembre de 2003, entrada en vigor en 2004.	3:30am
Balearic Islands	2nd quarter 1999	Ley 7/1999, de 8 de abril, de Atribución de Competencias a los Consejos Insulares de Menorca y de Eivissa WE Formentera en materia de Espectáculos Públicos y Actividades Recreativas (BOE núm. 124, de 25 de mayo).	3:00am
La Rioja	4th quarter 2000	Ley 4/2000, de 25 de octubre, de Espectáculos Públicos y Actividades Recreativas. (BOE núm. 287, de 30 de noviembre).	3:30**
Pais Vasco	3rd quarter 1998	Ley 4/1995, de 10 de noviembre, de la Comunidad Autónoma del País Vasco, sobre normas reguladoras de Espectáculos Públicos y Actividades Recreativas (BOE núm. 230, de 1 de diciembre). 210/1998 de 28 de Julio 1998.	2:00am*
Asturias	1st quarter 2005	Ley 8/2002, de 21 de octubre, de Espectáculos Públicos y Actividades Recreativas. (BOE núm. 278, de 20 de noviembre). Decreto 90/2004, de 11 de noviembre, por el que se regula el regimen de horarios de los establecimientos, locales e instalaciones para espectáculos públicos y actividades recreativas en el Principado de Asturias.	3:30am*

* Fridays and Saturdays are allowed to stay open for an hour more.
** Fridays and Saturdays are allowed to stay open for half an hour more.
***Friday, Saturdays and the eve of holidays are allowed to stay open for half an hour more
****The first is the winter opening times, the second the summer opening times.

Figure 1. Implementation of the policy across regions and time.



Source : Own elaboration by the authors.

Table 2. Political party at the moment of the policy implementation.[11]

Regions	Year	Political Party in power
Andalucía	1st quarter 2003	PSOE
Aragon	1st quarter 2006	PSOE
Asturias	1st quarter 2005	PSOE
Balearic Islands	2nd quarter 1999	PSOE
Canary Islands	2nd quarter 2002	CC
Cantabria	3th quarter 1997	PP
Castile Leon	4th quarter 2006	PP
Castile La Mancha	4st quarter 1996	PSOE
Catalonia	4th quarter 2011	CIU
Valencia	1st quarter 2004	PP
Extremadura	1st quarter 1996	PSOE
Galicia	2nd quarter 2005	PSOE
Madrid	3th quarter 2002	PP
Murcia	1st quarter 1994	PSOE
Navarra	2nd quarter 2004	UPN
Bask Country	3th quarter 1998	EAJ-PNV
La Rioja	4th quarter 1998	PP

Table 3. Descriptive statistics. Workplace accidents, hospitalizations caused by excessive alcohol consumption and self-reported consumption of alcohol (survey data).

	Workplace accidents		Hospitalizations caused by excessive alcohol consumption		Self-reported consumption of alcohol (survey data)	
	Distribution in %	Obs.	Distribution in %	Obs.	Distribution in %	Obs.
Man	87.38	258.902	68.10	592.536	44.65	46.348
Woman	12.62	37.400	431.09	592.525	55.35	37.385
Industry	25.34	64.983	X	X	X	X
Construction	20.87	53.528	X	X	X	X
Services	53.79	137.926	X	X	X	X

[11] Left wing parties are in blue, while right wing parties are in red.

Table 4. Results: Workplace accidents for every 100.000 employed individuals.

	Total		Woman		Man		Industry		Construction		Services	
Panel A: Difference-in-Difference												
Treat	-2.16**	-1.68	-1.07	-0.77	-2.67*	-2.19	-0.18	0.89	-5.73*	-6.36**	-1.98**	-1.52*
	(1.103)	(1.095)	(0.780)	(0.870)	(1.392)	(1.389)	(7.212)	(2.165)	(3.161)	(2.929)	(0.880)	(0.907)
Panel B: Event Study Design												
Pre3	1.31	0.38	0.53	0.04	1.83	0.75	0.11	0.20	1.07	-0.22	0.67	0.06
	(1.011)	(0.628)	(1.295)	(0.000)	(1.300)	(0.740)	(0.000)	(1.070)	(3.493)	(1.613)	(0.759)	(0.461)
Pre2	1.52	0.62	0.75	0.28	2.08	1.02	0.39	0.59	2.18	0.76	0.08	-0.51
	(1.380)	(1.065)	(0.919)	(0.659)	(1.864)	(1.340)	(1.520)	(1.681)	(2.643)	(2.735)	(0.834)	(0.778)
Pre1	1.15	0.24	1.13	0.66	1.37	0.30	-0.05	0.27	-0.79	-2.34	0.78	0.20
	(1.318)	(0.889)	(0.979)	(0.746)	(1.729)	(1.087)	(0.417)	(2.220)	(2.055)	(2.754)	(1.083)	(0.974)
Treat	-1.26	-1.35	-0.50	-0.48	-1.48	-1.65	-0.08	1.18	-5.23	-6.93*	-1.62	-1.58
	(1.361)	(1.416)	(1.105)	(1.254)	(1.618)	(1.675)	(0.000)	(2.599)	(3.585)	(3.887)	(1.169)	(1.189)
Region FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Trim FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Region Specific Time Trend	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Mean Pre-Policy	27,96	9,56	9,56	9,56	37,51	37,51	31,35	31,35	35,88	35,88	21,68	21,68
Observations	1,496	1,496	1,496	1,496	1,496	1,496	1,496	1,496	1,496	1,496	1,496	1,496

Wild Bootstrap standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

Table 5. Results: Hospitalizations caused by excessive alcohol consumption for every 100.000 individuals.

Panel A: Difference-in-Difference						
	Total		**Woman**		**Man**	
Treat	-0.95	0.64	0.31	0.13	0.63	1.55
	(4.186)	(1.995)	(1.437)	(1.868)	(2.437)	(3.162)
Panel B: Event Study Design						
Pre3	-2.32	0.10	0.02	-0.01	-0.51	0.79
	(4.749)	(1.902)	(0.000)	(1.991)	(5.409)	(3.682)
Pre2	-6.45	-1.45	-1.81	-1.20	-3.50	-1.03
	(8.257)	(3.755)	(2.713)	(2.310)	(5.133)	(5.283)
Pre1	-0.95	0.64	0.31	0.13	0.63	1.55
	(4.186)	(1.995)	(1.437)	(1.868)	(2.437)	(3.162)
Treat	-0.83	1.18	0.49	0.39	1.35	2.46
	(4.910)	(2.810)	(2.162)	(2.005)	(3.918)	(3.566)
Region FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Trim FE	YES	YES	YES	YES	YES	YES
Region Specific Time Trend	NO	YES	NO	YES	NO	YES
Mean Pre-Policy	18,64	18,64	14,43	14,43	31,00	31,00
Observations	1,496	1,496	1,496	1,496	1,496	1,496

Wild Bootstrap standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

Table 6. Hospitalizations caused by excessive alcohol consumption during weekends for every 100.000 individuals.

Panel A: Difference-in-Difference						
	Total		**Woman**		**Man**	
Treat	-0.36*	-0.18	-0.25	-0.08	-0.46**	-0.25*
	(0.201)	(0.117)	(0.180)	(0.083)	(0.236)	(0.149)
Panel B: Event Study Design						
Pre3	0.14	0.21	0.20	0.25	0.07	0.18
	(0.219)	(0.195)	(0.204)	(0.177)	(0.208)	(0.213)
Pre2	0.07	0.17	-0.01	0.06	0.06	0.19
	(0.168)	(0.159)	(0.000)	(0.165)	(0.151)	(0.187)
Pre1	-0.08	0.04	-0.18	-0.09	-0.04	0.12
	(0.436)	(0.223)	(0.232)	(0.165)	(0.714)	(0.330)
Treat	-0.34	-0.07	-0.26	-0.04	-0.44	-0.12
	(0.397)	(0.203)	(0.376)	(0.175)	(0.411)	(0.242)
Region FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Trim FE	YES	YES	YES	YES	YES	YES
Region Specific Time Trend	NO	YES	NO	YES	NO	YES
Mean Pre-Policy	1,35	1,35	1,01	1,01	1,90	1,90
Observations	1,496	1,496	1,496	1,496	1,496	1,496

Wild Bootstrap standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

Table 7. Groups of regions included in the heterogeneous results.

Highest % of individuals employed in industry	Highest % of individuals employed in construction	Highest % of individuals employed in services
Aragon (25%)	Andalucía (13%)	Andalucía (64%)
Cantabria (21%)	Balearic Islands (14%)	Balearic Islands (73%)
Catalonia (28%)	Canary Islands (13%)	Canary Islands (74%)
Valencia (24%)	Cantabria (12%)	Catalonia (59%)
Navarra (30%)	Castile la Mancha (15%)	Extremadura (59%)
Bask Country (29%)	Extremadura (14%)	Madrid (74%)
La Rioja (31%)	Murcia (12%)	Bask Country (60%)

Left	Right	Spring & Summer	Autumn & Winter
Andalucía	Canary Islands	Andalucía	Cantabria
Aragon	Cantabria	Aragon	Castile Leon
Asturias	Castile Leon	Asturias	Madrid
Balearic Islands	Catalonia	Balearic Islands	Bask Country
Castile la Mancha	Valencia	Canary Islands	La Rioja
Extremadura	Madrid	Castile la Mancha	
Galicia	Navarra	Catalonia	
Murcia	Bask Country	Valencia	
	La Rioja	Extremadura	
		Galicia	
		Murcia	
		Navarra	

Table 8. Heterogeneous effects: 7 regions with highest percentage of workers employed in the industrial, construction or services sector.[12]

Difference-in-Difference	Woman		Man		Industry		Construction		Services	
Highest % of individuals employed in the industrial sector										
Workplace Accidents										
Treat	-0.15	0.56	-2.28	-1.04	-5.12*	-4.04	-3.82	-5.27	-1.16	-0.16
	(0.560)	(1.966)	(1.734)	(1.704)	(2.919)	(3.043)	(2.454)	(3.432)	(0.881)	(0.946)
Hospitaliza-tions										
Treat	-0.57	-0.14	-1.00	-0.50	X	X	X	X	X	X
	(0.575)	(0.241)	(0.710)	(0.353)	X	X	X	X	X	X
Highest % of individuals employed in the construction sector										
Workplace Accidents										
Treat	-0.80	-0.30	-1.90	-1.24	1.33	1.80	-11.49*	-11.29*	-2.29	-1.55
	(2.275)	(1.490)	(4.378)	(4.161)	(4.248)	(4.026)	(6.766)	(6.646)	(2.689)	(3.271)
Hospitaliza-tions										
Treat	-0.19	-0.16	-0.32	-0.24	X	X	X	X	X	X
	(0.168)	(0.142)	(0.272)	(0.211)	X	X	X	X	X	X
Highest % of individuals employed in the services sector										
Workplace Accidents										
Treat	-2.60	-1.57	-6.09***	-4.81	-6.08	-4.08	-10.08	-13.85***	-4.64***	-3.91
	(1.603)	(1.792)	(2.160)	(3.624)	(3.798)	(4.313)	(6.648)	(4.914)	(1.647)	(2.780)
Hospitaliza-tions										
Treat	-0.56	-0.19**	-0.83	-0.43***	X	X	X	X	X	X
	(0.515)	(0.093)	(0.594)	(0.154)	X	X	X	X	X	X
Region FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Trim FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Region Specif-ic Time Trend	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Observations	616	616	616	616	616	616	616	616	616	616

[12] We have run the same regressions for the 4, 5 and 6 regions with highest percentage of workers in the industrial, construction or services sector. The results are consistent with the ones presented above.

Table 9. Heterogeneous effects: regions that adopted the policy with a right or left wing party in the regional government.

Difference-in-Difference	Woman		Man		Industry		Construction		Services	
Left										
Workplace Accidents										
Treat	-2.27**	-2.11**	-2.68	-2.65	4.38	4.36	-7.00	-7.20	-2.72	-2.34*
	(1.132)	(1.026)	(2.839)	(2.019)	(3.488)	(3.473)	(6.546)	(5.868)	(1.817)	(1.239)
Hospitalizations										
Treat	-0.03	-0.04	-0.13	-0.12	X	X	X	X	X	X
	(0.091)	(0.100)	(0.152)	(0.152)	X	X	X	X	X	X
Region FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Trim FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Region Specific Time Trend	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Observations	704	704	704	704	704	704	704	704	704	704
Right										
Workplace Accidents										
Treat	-0.04	0.76	-2.87*	-1.82	-4.67**	-3.45*	-5.05*	-6.02**	-1.17	-0.33
	(0.962)	(1.596)	(1.665)	(1.564)	(2.325)	(1.966)	(2.681)	(2.850)	(1.050)	(1.253)
Hospitalizations										
Treat	-1.07	-0.77	-2.67*	-2.19	X	X	X	X	X	X
	(0.780)	(0.870)	(1.392)	(1.389)	X	X	X	X	X	X
Region FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Trim FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Region Specific Time Trend	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Observations	792	792	792	792	792	792	792	792	792	792

Wild Bootstrap standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

Table 10. Heterogeneous effects: regions that implemented the policy during spring/summer or autumn/winter.

Difference-in-Difference	Woman		Man		Industry		Construction		Services	
Spring and Summer										
Workplace Accidents										
Treat	-1.56*	-1.31	-2.17	-1.54	1.63	3.79	-5.39	-7.05	-2.15*	-1.38
	(0.891)	(0.798)	(2.232)	(1.946)	(2.900)	(3.024)	(5.095)	(5.311)	(1.209)	(0.972)
Hospitalizations										
Treat	-0.46	-0.13	-0.75	-0.35	X	X	X	X	X	X
	(0.438)	(0.147)	(0.594)	(0.241)	X	X	X	X	X	X
Region FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Trim FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Region Specific Time Trend	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Observations	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056	1,056
Autumn and Winter										
Workplace Accidents										
Treat	0.53	0.54	-3.36	-3.24*	-4.01	-4.73	-6.83*	-5.74	-1.33*	-1.46
	(3.842)	(1.625)	(2.213)	(1.751)	(3.340)	(3.196)	(3.690)	(3.734)	(0.676)	(1.200)
Hospitalizations										
Treat	-0.10	-0.13	-0.45*	-0.51	X	X	X	X	X	X
	(0.085)	(0.105)	(0.275)	(0.445)	X	X	X	X	X	X
Region FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Trim FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Region Specific Time Trend	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES
Observations	440	440	440	440	440	440	440	440	440	440

Wild Bootstrap standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

Table 11. Effects of the policy on self-reported alcohol consumption. National Health Survey.

	Total		Woman		Man	
Daily Wine Consumption						
Treat	-0.02	-0.04*	-0.01	-0.02*	-0.03*	-0.06**
	(0.012)	(0.021)	(0.013)	(0.014)	(0.018)	(0.030)
Weekly Wine Consumption						
Treat	-0.01	-0.04	-0.00	-0.03	-0.03**	-0.06
	(0.010)	(0.028)	(0.017)	(0.020)	(0.012)	(0.037)
Monthly Wine Consumption						
Treat	-0.00	-0.03	0.01	-0.02	-0.02	-0.05
	(0.013)	(0.034)	(0.011)	(0.024)	(0.016)	(0.043)
Weekly Whisky Consumption						
Treat	0.001	-0.001	0.002	0.000	-0.001	-0.001
	(0.003)	(0.009)	(0.002)	(0.001)	(0.009)	(0.012)
Monthly Whisky Consumption						
Treat	-0.01	0.00	-0.01	-0.01	-0.02	0.02
	(0.021)	(0.030)	(0.011)	(0.008)	(0.042)	(0.043)
Daily smoker						
Treat	-0.01	-0.01	-0.00	-0.01	-0.02	-0.01
	(0.007)	(0.012)	(0.015)	(0.012)	(0.017)	(0.012)
Region FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Trim FE	YES	YES	YES	YES	YES	YES
Region Specific Time Trend	NO	YES	NO	YES	NO	YES
Observations	78,570	78,570	43,300	43,300	35,269	35,269

Wild Bootstrap standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.10

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