Impact of Italian smoking ban on business activity of restaurants, cafès and bars

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Abstract

In this paper, we estimate the economic impact of the Italian smoking ban of 2005 on some activities of the catering sector. We use the quasi-experimental design induced by the introduction of the smoking ban in Italy to compare sales, profits and employment in cafés and restaurants located in the treatment area relative to a control group in similar economies such as Spain and France, where no ban had yet been imposed. We selected a large sample of firms in these three countries from a unique European panel dataset, which collects comparable financial indicators extracted from balance sheets. Our study indicates that the Italian smoking ban had a slight negative impact on sales in cafés and restaurants but had no effect on profits, earnings or employment.

Keywords: Smoking ban, difference-in-differences, café and restaurant revenues

JEL classification: I10, I12, I18

1 Introduction

A prominent debate over smoke-free policies concerns their possible negative impact on cafés, restaurants, and other catering establishments. Although there is growing literature showing that these laws had no effect at all, and sometimes even produced slightly positive trends (see, review by Scollo et al. (2003)), it is surprising that all previous results are not based on official reports of business activity but rather on qualitative measures of economic trends extracted from questionnaire data (Scollo & Lal 2008).

In this paper we propose to fill this gap by exploiting the Amadeus Bureau van Dijk database (hereafter, Amadeus), a unique dataset on firms' balance sheets across private and public companies of Europe, which collects comprehensive raw information and financial indicators for firms in various economic sectors. Focusing on the short-run effects of the Italian anti-smoking law, which from 10 January 2005 banned smoking in all indoor public places[1], we selected a large sample of firms from the categories of cafés and restaurants, for which we extracted balance sheets information about revenues and employment from 2003 to 2007. We then compared the effects on sales, profits and earnings before and after the ban was introduced, in other such establishments across Italian borders, e.g. France and Spain, where no ban had yet been imposed.

We found that the anti-smoking policy had a negative and significant influence only on sales, whereas profits and earnings were unaffected. However, the magnitude of the negative changes in sales was not large enough to make questionable the positive consequences that the law in Italy in terms of reducing passive smoking (Tramacere et al. 2009), increasing quitting smoking (Federico et al. 2012, Buonanno & Ranzani 2013, Pieroni et al. 2012) and reducing tobacco consumption (Buonanno & Ranzani 2013, Pieroni et al. 2012). Our dataset also allowed us to investigate how sectoral employment reacted to the smoking ban, which is another crucial issue in the health economic literature. In accordance with previous results for this specific indicator, our estimates indicate that the application of smoking restrictions in cafés and restaurants did not affect employment from a statistical viewpoint.

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[1] The law was applied to bars, cafés and restaurants (except for a few cases where separate and regulated smoking areas were available), airports, railway stations, and in all common areas of public and private workplaces.

2 Data

Amadeus is a database of comparable balance sheet information for public and private companies across Europe, contains detailed information on about 19 million firms, and covers 46 countries in eastern and Western Europe. Using the sectors of the North American Industry Classification System ($NAICS$), we selected firms from Italy, Spain and France corresponding to full-service, limited-service restaurants, cafeterias, grill buffets and buffets, snack and non-alcoholic beverage bars and places where may be drunk.

We considered data from 2003, the first available year, to 2007, one year before the application of the anti-smoking law in France, collecting a sample of 32,445 observations. This yielded a panel dataset of 6,489 firms with comparable financial indicators regarding sales, revenues, taxation and employment. In particular, 1,023 observations were obtained for Italian cafés and restaurants, and 5,466 for ones in France and Spain.

Table 1 lists the outcomes of interest for our study. We used logarithmic transformation for sales and number of employees, because these variables are assumed to have log-normal distribution, and also because it allows us to interpret the coefficients of the model as the percentage change in outcomes due to the smoking ban and assigns lower weight to outliers. The signed pseudo logarithmic transformation, which is an approximation of the logarithmic transformation, was applied to profits and losses before taxes ($Profit$) and earnings before interest, taxes, depreciation and amortization ($Ebitda$), containing values lower than or equal to zero[2]. Lastly, we excluded outliers from the sample by dropping observations below 1% or above 99% of the empirical distribution of each variable analysed, and transformed all values into real terms by dividing each monetary indicator by the 2005 harmonized consumer price index.

3 Empirical strategy

We adopted a quasi-experimental approach to estimate the causal impact of the smoking ban on the economic outcomes of bars cafés and restaurants. We compared what happened to establishments in one treatment area (Italy) with comparable control areas (France and

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[2]The signed pseudo logarithmic transformation is adopted because both $Profit$ and $Ebitda$ were calculated from variables such as sales and costs, which have log-normal distributions and for this reason linear combinations of such variables also have log-normal distributions. The signed pseudo logarithmic transformation for a given variable y (e.g., $Profits$ and $Ebitda$) is defined as $asinh(y/2)/log(10)$.

Table 1: Description of outcome variables

Variable	Description	Empirical outcome
Sales	Total taxable sales	ln(Sales)
Employees	Number of employees	ln(Employees)
Profit	Profits and losses before taxes	signed pseudo ln(Profit)
Ebitda	Earnings before ITDA	signed pseudo ln(Ebidta)

Note: ITDA: interest, taxes, depreciation and amortization

Spain) before and after the smoking ban was introduced. We selected France and Spain as control groups because they had to similar economic conditions with respect to Italy and were about to apply a smoking ban a few years later (i.e., late reformers)[3]. For the latter reason, these countries represent a comparison group which is similar to Italy in both terms of observable macro-economic characteristics and attitudes toward public health (see Abramitzky & Lavy (2011) for a similar discussion). This is a crucial assumption in our empirical strategy because for purposes of identification, treatment and control groups should differ only according to the moment of the introduction of the ban. The only objection which may be made against this choice is that restaurants cafés and bars in the control group may anticipate the ban, for instance, by creating specific smoking areas in order to avoid the negative consequences on revenues immediately before the introduction of the ban in their countries. But also in this case, sales or revenues would only be affected for a very short time, and this effect would become negligible in time and across countries. Our basic assumption was also confirmed by the fact that descriptive evidence does not reveal any sharp changes in performance indicators across years in either treatment or control groups.

We measured the impact of the intervention as the difference between the variation in outcomes for treatment and control areas assuming that, in the absence of smoking regulations, changes in economic outcomes in Italy (i.e. early reformers) would not have been systematically different from those in restaurants cafés and bars in late reforming countries. This approach, called as difference-in-differences (DiD), is implemented here with a linear regression model. We then exploited the panel structure of our dataset to estimate firm-level fixed-effects models. The introduction of firm fixed effects allowed us

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[3]France introduced a smoking ban in restaurants bars and cafés in 2008, and Spain followed in 2012.

to control for specific unobservable heterogeneity. Formally, we write this as:

$$Outcome_{hit} = \gamma_i + \gamma_1 EarlyReformer_i + \gamma_2 SB_t + \gamma_3 (EarlyReformer \times SB)_{it} + \epsilon_{it} \quad (1)$$

where $Outcome_{hit}$ is the h economic outcome (for a full list, see Table 1) for firm i at time t; $EarlyReformer_i$ is a dummy variable with 1 identifying establishments in Italy and zero ones in France and Spain; and SB_t is a time dummy variable, which is 1 when observations were collected after the Italian ban (i.e., 2005). Parameters α_i represent firm-level fixed effects and ϵ_{it} is the idiosyncratic error term. Note that the treatment effect is identified by parameter γ_3 and that the inclusion of firm fixed effects leads dropping the $EarlyReformer_i$ variable when we estimate model (1).

However, the crucial assumption for identification with the DiD model is that treatment and control group outcomes should have a common trend in the pre-reform period. For this reason, we performed a robustness test by estimating a linear time-trend model using only firms from the pre-ban period and allowing for interaction of the linear trend with treatment. If no significant differences are found, we can conclude that both treatment and control groups were following the same trend before the smoking ban came into force. Also in this case, we control for firm-level fixed effects, and can briefly write:

$$Outcome_{hit} = \beta_i + \beta_1 \tau_t + \beta_2 (EarlyReformer \times \tau)_{it} + \mu_{it} \quad (2)$$

where τ_t indicates the pre-reform time trend (2003 and 2004 in our sample); β_1 measures the effect of the linear trend, and β_2 measures the interaction between the linear time trend and treatment and directly measures differences in specific treatment and control trends.

4 Main results

Table 2 shows the average values of the analysed outcomes for control and treatment groups in the pre- and post-ban periods. It also shows differences in mean outcomes between treatment and control groups. As Table 2 shows, there are no significant differences

between control and treatment groups before or after the smoking ban came into force, except in the case of profits. This performance indicator is significantly lower for the Italian treatment group with respect to those of the other countries. However, since in our specification we control for firm-level fixed effects this initial difference does not affect our strategy in any way.

Table 2: Restaurants cafés and bars outcomes in treatment and control countries

	Pre-ban period (2003-2004)			Post-ban period (after 2005)		
	Treatment	Control	Difference	Treatment	Control	Difference
Sales	1,675.58	1,606.51	69.07	1,831.75	1,759.21	72.54
			(73.540)			(75.084)
Employees	20.47	22.29	-1.82	21.95	24.05	-2.1
			(1.071)			(1.116)
Profit	25.98	70.36	-44.38***	47.95	95.08	-47.13***
			(3.741)			(4.099)
Ebitda	138.41	151.46	-13.05	163.04	174.51	-11.47
			(6.218)			(6.594)
Number of observations	2,046	10,932		3,069	16,398	

Notes: Sales, Profit and Ebitda economic outcomes are measured in Euro, at 2005 constant prices. Significant levels: p-value *** ≤ 0.01, ** ≤ 0.05.

Column (1) of Table 3 lists the effect of the Italian smoking ban on sales. The first parameter (SB) shows the estimated change in sales, before and after the application of the ban, which rose by about 13% over the period considered. The parameter (SB × Early reformers) represents the causal impact of the ban on sales, which increased by 3% less in Italy, when compared with the control group.

Column (2) presents the effects of the ban on number of employees. Employees in cafés, bars and restaurants increased by about 11% (SB) in Italy, France and Spain throughout the analysed period, and the estimated effect of the ban (SB × Early reformers) was negative (i.e., −3%) but not statistically significant.

Lastly, we also examined if the small but significant drop in sales also led to changes in profits and Ebitda. The results are listed in columns (3) and (4) of Table 2. They show how these indicators increased by about 21% and 11% respectively, and that the changes did not differ among firms in control and treatment groups.

To show the robustness of our estimates, we checked for the presence of a common

Table 3: Smoking ban effect on economic performance of restaurants cafés and bars

	Sales	Employees	Profit	Ebitda
	(1)	(2)	(3)	(4)
Smoking ban (SB)	0.13***	0.11***	0.21***	0.11***
	(0.005)	(0.004)	(0.015)	(0.011)
Smoking ban (SB) × Early reformers	-0.03*	-0.03	0.04	0.04
	(0.016)	(0.023)	(0.041)	(0.033)
Early reformers	-	-	-	-
Constant	7.09***	2.85***	0.96***	1.73***
	(0.003)	(0.003)	(0.009)	(0.006)
Observations	32405	31485	32035	29990
R-squared	0.04	0.04	0.01	0.01
Number of firms	6,481	6,297	6,407	5,998
Adj. R-squared	0.04	0.04	0.01	0.01

Note: Significant levels: p-value *** ≤ 0.01, ** ≤ 0.05, * ≤ 0.1.

time trend in the pre-ban period, as formalised in equation (2). The results are presented in Table 4. For each of the financial indicators analysed, we find evidence of a significant trend (see Linear trend in columns 1–4) in the pre-ban period, but none of differences among treatment and control groups. This test does not reject the baseline assumption of a common trend under the DiD identification, and allows us to conclude in favour of our identification strategy or at least not in contrast with it.

The results obtained from our estimates match the qualitative findings of Gallus et al. (2007) and Tramacere et al. (2009), who investigated using firm data surveys on smoking the behaviour of customers after the Italian smoking ban[4]. Results from these surveys reveal that 10% of Italians reported that they went to restaurants and cafés more frequently, with respect to 7% who declared that they had reduced eating out. These findings suggest that smoke-free legislation did not unfavourably affect bar, café and restaurant revenues, at least in Italy.

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[4]These surveys were conducted by DOXA, the Italian branch of the Gallup International Association (Gallus et al. 2006).

Table 4: Treatment-control differences in pre-ban time trends in restaurants cafés and bars economic outcomes

| | Sales | Employees | Profit | Ebitda |
	(1)	(2)	(3)	(4)
Linear trend	0.08***	0.04***	0.14***	0.10***
	(0.006)	(0.004)	(0.018)	(0.014)
Linear trend × Early reformers	-0.01	-0.03	-0.08	-0.06
	(0.021)	(0.030)	(0.052)	(0.042)
Early reformers	-	-	-	-
Constant	6.97***	2.80***	0.77***	1.59***
	(0.009)	(0.007)	(0.025)	(0.020)
Observations	12850	12594	12814	11996
R-squared	0.03	0.01	0.01	0.01
Number of firms	6,425	6,297	6,407	5,998
Adj. R-squared	0.03	0.01	0.01	0.01

*Note: Significant levels: p-value *** ≤ 0.01, ** ≤ 0.05, * ≤ 0.1.*

5   Conclusions

In this paper, we tested whether and to what extent restaurant, bar and café revenues were responsive to changes in anti-smoking regulations. To the best of our knowledge, this is the first study that, using official administrative data, estimates the impact of the smoking ban on sales, number of employees, earnings and profits of the hospitality sector in Europe. With respect to previous works, which used self-reported survey data, our estimates are not affected by measurement errors due to the tendency of owners to inflate reduced earnings or losses.

The anti-smoking legislation on bars cafés and restaurants which was enforced in Italy since 2005 gives us the possibility to adopt a quasi-natural experiment strategy. This reform, by prohibiting smoking in bars, cafés and restaurants, caused a change in the smoking habits of the Italian population and may have had consequences on the economic outcomes of restaurants, bars and cafés if, after its introduction smokers decided to reduce - or non-smokers not to increase - their habits of going to bars, cafés and restaurants. Our findings indicate that the smoking ban had a negative although very small effect on sales, a result which is in line with that found in Scottish pubs and restaurants by Adda

et al. (2006). However, the reduction was very limited, and does not contrast with the general findings of our work, i.e. that the smoking ban in Italy did not have significant effects on other financial indicators such as profits, Ebitda and number of employees.

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