Evaluating the impact of Sunday trading deregulation[1]

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Abstract

During the past few decades a number of European countries lifted the regulations that restricted the opening hours of shops on Sunday. In this paper we examine the impact of Sunday trade deregulation on employment, expenditure, prices and market structure using a difference-in-difference empirical framework and data from 30 European countries over the period 1999-2013. The results exhibit significant heterogeneity across products and sectors. We find robust evidence of a positive overall impact on employment. Expenditure also increases, but not for all retail product categories. We find no evidence of a significant impact on prices. Our findings have important policy implications, particularly for governments that try to combat high unemployment in the aftermath of the economic crisis.

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1. Introduction

Over the last two decades many EU countries have recurrently debated the laws and regulations concerning retail opening hours and in particular Sunday opening. As a result of this debate many legal restrictions on opening hours have been relaxed, but still Sunday trading regulation varies widely across European countries. For example, in Sweden opening hours have been unrestricted for all stores since 1972, whereas in Germany it varies across parts of the country, as in 2006 the responsibility for opening hours was transferred from the federal to the state governments and many states have extended opening hours on weekdays and Saturdays, albeit with limited impact on Sunday opening. In France, although Sunday opening is generally not allowed, there are many exceptions as around 500 cities are declared as tourist towns and have been fully deregulated since 2009, while in Norway shops are generally not allowed to open on Sundays, except for the pre-Christmas period and for certain categories of shops (such as small groceries, florists and small petrol stations). Given this mixed picture across countries our aim in this paper is to investigate the European experience of the impact of Sunday trading deregulation.

Different groups have defended the existing laws for a variety of reasons. Religious organisations have sought to protect Sunday as a day of rest and spiritual pursuit. Labour unions defend these laws believing that it protects workers from working overtime, especially in societies with weak labour market institutions and enforcement mechanisms. Small and independent retailers generally support the regulations in order to insulate themselves from competition on the basis of opening hours from larger, more efficient retailers. Finally, many people see merit in the idea of a common rest day, as it is evidently desirable to coordinate leisure with friends and family, believing that many positive externalities can arise from enjoying free time collectively.

However, restricting Sunday trading also leads to various efficiency costs imposed on consumers, retail businesses and employees. Restricting trading hours impinges on consumer choice regarding when to shop, allows them less time to compare products and search for the best price and raises the opportunity cost of shopping time. Moreover, by narrowing the range of time available for shopping, it also forces consumers to shop concurrently leading to high congestion costs.

Restricting Sunday trading also imposes efficiency costs on retail businesses as it does not allow them to fully utilise their capital investments. Moreover, by not being able to open on

Sunday, retail shops may lose sales to other businesses that are allowed to operate on that day, such as cafes, restaurants and cinema theatres. Being able to operate on Sundays essentially provides businesses with an extra differentiation tool and allows them to match better the preferences and consumption patterns of their customers.

Finally, regulations restricting trading hours impose significant costs on some retail employees compared to others. Mandatory shop closure during Sundays is a disadvantage to those workers willing to fill non-traditional working hours, such as students or part-time workers (with women representing the largest fraction of those), while protecting those workers who are averse to work in such hours. This observation is far from meaningless at a time when youth unemployment is at historical highs across Europe, while in addition women labour force participation has been very low in many countries.

During the last two decades many European countries have deregulated Sunday trading. However, there is no systematic cross-country evidence on the impact of these changes, only country case studies.[4] We try to fill this gap by analysing the impact of deregulation in a difference-in-difference empirical framework using data from 30 European countries on retail prices, expenditure, employment and market structure over the period 1999-2013. We like to think that not only the conclusions of this research would be useful in informing current debates on this issue in countries like Greece[5] or France,[6] but in addition it will also provide estimates that would allow stakeholders to quantify the direction and the impact of various proposed changes on Sunday trading legislation.

Our results suggest that Sunday trade deregulation has a significant positive impact on employment, stemming both from new firms entering the market and from job creation in existing firms. Expenditure also increases as a result of deregulation, but not for all retail goods. Despite higher employment and hence higher labour costs, we find no significant impact on prices, which can be partly explained by the positive impact of deregulation on the number of firms competing in the market.

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[4] Although within-country studies clearly have advantages, we think that the cross-country empirical examination is fruitful policy analysis avenue in the case of EU countries as: a) very few EU countries have a federal regulation system (e.g. like Germany) that allow regulation to differ by well-defined administrative regions, b) it would be very hard to find consistent and homogenous information on regulation and outcome variables (such as employment, prices, revenues, number of firms etc.) across regions, c) it would be very difficult to tackle empirically the possible spillover effects from one region to another due to the differential legislation, and, d) there might be strong country-specific effects (e.g. strong religious sentiment against Sunday opening in a particular country) that could bias the outcome when transposed to a different country. In any case, we see the cross-country approach as a starting point of any careful empirical examination and a basic guide to policy making on a hotly debated issue.
[5] See, for example, the OECD (2013) Competition Assessment Review in Greece.
[6] See, for example, "France unveils reforms to kick-start economy", *Financial Times* (10 December 2014).

The rest of the paper is organised as follows. In Section 2, we review the theoretical and empirical literature that examines the impact of regulation of shopping hours and Sunday trading. Section 3 presents our empirical methodology, while Section 4 describes our data. Section 5 discusses the empirical results and discusses their implications. Section 6 concludes.

2. Literature review

The economic literature on regulation of shopping hours and Sunday trading focuses on four key issues: employment, prices, sales and market concentration.[7] We analyse each in turn.

2.1 Employment effect

The effect of deregulating trading hours on the level of employment is theoretically ambiguous. On the one hand, employment is expected to increase for those retailers that will open on Sunday. On the other hand, the increased competition due to Sunday opening may force some retailers to exit the industry and as a result employment may fall. The net effect will depend on the relative magnitude of these two effects.

The empirical literature provides strong evidence that lifting Sunday trading restrictions will increase employment. Burda and Weil (2005) studying Sunday trading restrictions (or blue laws as they are known in the USA), using a panel of states in the USA and individual data from the US Current Population Survey between 1969 and 1993, find that American blue laws reduce employment within the retail sector by 4.2%, which mainly comes at the cost of part-time employment. In a similar vein, Goos (2004) examines the same American Sunday trading restrictions using data from the quinquennial Economic Census of Retail Trade between 1977 and 1997. He finds that deregulation increases total employment by 4.4% to 6.4%. In addition, Skuterud (2005) performs a difference-in-differences study of the deregulation of the retail industry in Canadian provinces and finds that the relaxation and elimination of Sunday trading laws increased employment in deregulated industries by 5% to 12% between 1980 and 1998. He concludes that this increase was driven by an increase in

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[7] It is worth emphasising that arguments in favour of restrictions on Sunday opening based on positive externalities from communal leisure or for spiritual recreation have not been empirically examined formally as they are very difficult to quantify. Nonetheless, Gruber and Hungerman (2008) provide some interesting implicit evidence. They show that in the USA, when a state repeals its Sunday opening restrictions (blue laws), religious attendance and church donations fall. More interestingly, they find that repealing the "blue laws" leads to an increase in drinking and drug use and that this increase is found only among the initially religious individuals, who were affected by the blue laws.

threshold labour (i.e. increasing employment) that could not be met by simply increasing hours of existing employees. Finally, Bossler and Oberfichtner (2014) provide difference-in-difference evidence from Germany on the effect of deregulating weekday shop opening hours on employment in food retailing. They report a 3% to 4% aggregate employment effect driven mainly from an increase in part-time employment, while full-time employment was not affected.[8]

2.2 Price effect

Similarly, the effect of deregulation on prices is also theoretically ambiguous. On the one hand, if Sunday deregulation implies an increase in competition (due to extended operating hours allowing more time for consumers to search and compare prices) then we would expect prices to fall. Clemenz (1990), assuming that consumers do not have perfect knowledge about prices and must gather information, which may be costly, predicts that, if longer shopping hours facilitate price comparison, deregulation could reduce prices by encouraging competition among retailers. Similarly, De Meza (1984) uses the Salop model to propose that deregulation can induce more competition, resulting in lower travel costs as well as lower prices. On the other hand, more recent research that endogenises the choice of opening hours (i.e. given the maximum allowed by law, retailers choose when and for how long to operate), such as Inderst and Irmen (2005), shows that deregulation might lead to some shops being open longer hours than others, but also that both types of shops will charge higher prices.

The empirical evidence on this topic also seems mixed. Tanguay, Vallée and Lanoie (1995) study a deregulation of shop opening hours in Quebec and find that the deregulation resulted in increased prices at large stores and reduced prices at smaller outlets. The authors hypothesise that the deregulation lowered access costs for larger stores, shifting consumer demand and allowing them to raise prices, while smaller stores were forced to lower prices to compete. Reddy (2012) analyses the more recent changes in Germany and provides some evidence that liberalisation resulted in a fall in prices. On the contrary, Senftleben-König (2014), who also examines the recent changes in Germany, finds no robust impact on prices. Similarly, Burda and Weil (2005) analysing American blue laws find that retail prices were not significantly affected.

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[8] Interestingly enough, Senftleben-König (2014) using a similar methodology and the same data source from Germany reports a negative effect on employment (-1.5%) mainly due to reduced full time among small establishments.

2.3 Sales volume effect

The impact of deregulation on the volume of sales could be either neutral (consumers simply substitute away from purchases during the week and towards Sunday) or positive (consumers either spend more out of their income or redirect expenditure from other segments into retail). According to Pilat (1997), the deregulation in Sweden increased turnover by 5%. Goos (2004) finds that deregulation increases total revenue by 3.9% to 10.7% in the USA. Reddy (2012) and Senftleben-König (2014) find no impact on sales in Germany. Finally, Prodromidis, Petralias and Petros (2012) provide empirical evidence that the extension of operating hours that took place in Greece in 2005 had a positive impact both on turnover and quantity sold. Therefore, although not unanimous, the empirical evidence seems to point towards a positive impact on retail sales, without exploring the particular channels through which this effect arises (i.e. whether it is a cross-industry substitution effect or a pure expenditure growth effect).

2.4 Market concentration effect

Finally, the impact of deregulation on market concentration is the least explored of the four key issues in the literature. In theory, concentration could increase if large shops are in a better position to take advantage of the lifting of Sunday restrictions and hence take trade away from the smaller shops. However, such reasoning is overly simplistic, as opening hours is just one of the many strategic variables (in addition to price, location, advertising, personal advice or services for example) available to competitors to protect and expand their market share. Moreover, we would expect a negative impact on small stores that are substitutes for large stores (for example, a small boutique vs. a large department store), but a positive one for small stores that are complementary to the operation of large shopping centres (for example, a small bakery in a retail shopping mall or district).

The existing empirical evidence does not indicate any significant negative effect. Goos (2004) finds that deregulation increased the number of shops by 1% to 2% in the USA. In Australia there appears to be no relationship between the proportion of small retail businesses and the stringency of trading hours regulation in each state and deregulation does not appear to have had any deleterious effect on the viability of small retail businesses (Productivity Commission, 2011). We should bear in mind, however, that the effect of Sunday trading deregulation on concentration is by definition a long run effect that is much harder to identify empirically than the short run effects on prices, sales or employment.

3. Data

To assess the European experience over the last two decades, we started by first constructing a Sunday trading regulation indicator. The Sunday trading indicator takes values from 1 (least restrictive) to 5 (most restrictive), as you can see in Table 1, with the different grades mirroring the variation in regulation that we observe across EU countries. Our indicator focuses exclusively on the regulations concerning Sunday trading, whereas other indicators, such as the OECD product market regulation (PMR) indicator,[9] incorporate variations across countries regarding the maximum allowed opening hours on weekdays and Saturdays, alongside Sundays.[10]

[Table 1]

We then collected detailed information and rated each country's regulation concerning Sunday trading over time (see the Appendix for detailed country information). Figure 1 presents the evolution of the Sunday regulation indicator for thirty European countries (EU-27, Norway, Iceland and Switzerland) from 1999 until 2013. Notice two important patterns. First, the level of regulation varies across EU countries. In our estimation framework this will be controlled for by the inclusion of country-sector fixed effects. Second, the trend across Europe is clearly towards liberalising Sunday opening hours' restrictions. All countries that during the last two decades have changed Sunday trading regulation (Germany, Denmark, Spain, Finland, France, Italy, Portugal) have moved towards a less restrictive regime. In our empirical framework we essentially examine the experience of the countries that changed Sunday trading regulation compared to those that did not.

[Figure 1]

To evaluate the impact of the changes on Sunday trading regulation we also collected panel data on price level indices (EU27=100), real expenditure per capita (in PPS_EU27), real gross domestic product per capita (as a proxy for income), number of employees and number of firms from Eurostat[11] for three products (food, clothing & footwear and household furnishing, equipment and maintenance) and sixteen four digit retail sectors.[12] The choice of

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[9] In particular, the sub-question related to the regulation of shop opening hours.

[10] In addition, the OECD PMR indicator is less useful empirically as it is published once every five years, which limits the precision of the timing of the regulation change. Nevertheless, there is a considerable correlation between the two indicators (correlation coefficient = 0.51 for 2013).

[11] Eurostat (2015), *Purchasing power parities* (database), *Annual detailed enterprise statistics for trade* (database) and *Structural Business Statistics* (database), http://epp.eurostat.ec.europa.eu/ (accessed 6 January 2015).

[12] The sixteen retail sectors are: other retail sale in non-specialized stores; other retail sale of food, beverages and tobacco in specialized stores; retail sale in non-specialized stores with food beverages or tobacco predominating; retail sale of alcoholic and other beverages; retail sale of books, newspapers and stationery; retail sale of bread, cakes, flour and sugar

the three products was made under the assumption that they represent goods with different durability and thus purchase frequency (non-durable, semi-durable and durable, respectively). For example, one less day of shopping per week would disturb more the short cycle of food purchases that usually take place at least once a week for a given household, compared with the purchases of appliances, which typically take place much rarer. Hence, we expect food to respond more in the short run to changes in regulation than appliances, whereas clothing should fall somewhere in between. Table 2 below presents some summary statistics on the data.

[Table 2]

4. Empirical methodology

Our empirical analysis is based on the following difference-in-difference specification:

$$\ln Y_{jct} = \alpha_{jc} + \alpha_t + \beta(\text{Sunday Regulation})_{ct} + \gamma Z_{ct} + \varepsilon_{jct} \qquad (1)$$

The dependent variable in (1) is the logarithm of the variable of interest in product (or sector) j in country c in year t. Time fixed effects (α_t) and sector-country (α_{jc}) fixed effects control for global trends and sector-country time-invariant characteristics, respectively, whereas, Z_{ct}, includes additional controls (such as GDP per capita). The main variable of interest, *Sunday Regulation$_{ct}$*, is a binary indicator variable that takes the value one in the years after the change in Sunday trading rules in country c.

This estimation framework constitutes a difference-in-difference model, where countries that deregulate are the "treated" group, while non-reforming countries (that did not change their regulation) are the "control" group. Due to the inclusion of sector-country and time fixed effects, the impact of regulation on the dependent variable is identified from countries that changed their Sunday trading regulation and measures the effect of regulation in reforming countries, compared to the general evolution of the dependent variable (for example, prices or expenditure) in non-reforming countries.

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confectionery; retail sale of clothing; retail sale of electrical household appliances; retail sale of fish, crustaceans and molluscs; retail sale of footwear and leather goods; retail sale of fruit and vegetables; retail sale of furniture, lighting equipment and household articles; retail sale of hardware, paints and glass; retail sale of meat and meat products; retail sale of textiles; retail sale of tobacco products.

The fixed effect specification allows us to control for time-invariant sector-country differences that may influence both regulation and the dependent variable (prices, expenditure or employment). Furthermore, the specification also accounts for common global trends, such as the boom period during the early '00 or the effects of the recent recession related to the financial crisis. Inclusion of these fixed effects allows for the most conservative possible estimation of the effects of Sunday opening deregulation.

However, one may argue that using only a binary indicator for regulation might bias upwards any evidence of the impact of Sunday regulation changes. We tackle this possibility head-on by distinguishing between countries that have introduced substantial changes in their regulation (for example, Italy that moved from 3 to 1 in 2012) and countries that introduced less significant changes (for example, Germany from 5 to 4 in 2006). Following Card and Kruger (1994), we also construct a Sunday regulation index:

$$\text{Sunday regulation index}_{ct} = \frac{\underset{t}{Max}\left(\text{Sunday Regulation}\right)_{ct} - \text{Sunday Regulation}_{ct}}{\text{Sunday Regulation}_{ct}} \quad (2)$$

When the country has not changed its Sunday regulation, the regulation index takes a value of zero. If instead the country has changed its Sunday regulation, the index takes larger values the more significant the reform is. This index takes advantage not only of the different timing of the deregulation across countries, but also of the widespread variation of the reforms that have taken place.

5. Results and discussion

Table 3 presents the results for the price indices and expenditure on the three products (food, clothing & footwear and household appliances).[13] The first two columns use the price index for each of these products as the dependent variable. In column 1, where we use the binary indicator for Sunday regulation, none of the coefficients are statistically significant, indicating that the countries that experience a change in regulation did not experience any differential impact on the price growth of these products compared to the control group. A similar picture emerges from column 2, where we use the Sunday regulation index. None of

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[13] All reported standard errors are based on a generalized formula, along the lines of White's method of heteroskedasticity-consistent standard errors, allowing for country-product or country-sector level clustered heteroskedasticity and autocorrelation (Bertrand et al., 2004).

the coefficients are statistically significant except for clothing and footwear, indicating an increase in price growth of 0.05%.[14] Hence, Sunday trading deregulation does not seem to impose any significant downward pressure on price growth.

The next two columns use real expenditure per capita as the dependent variable. Both column 3 and 4 indicate that the only product significantly affected was food, where its expenditure increased between 0.14% (when using the Sunday regulation index) and 12.5% (when using the binary indicator for regulation). Therefore, non-durables expenditure, such as food, seems to positively respond to Sunday opening. But is this increase a genuine new expenditure or simply a re-direction from other segments?

In the last two columns we use the per capita expenditure share for these products (over the overall expenditure) to examine whether the increased expenditure was the result of consumers redirecting expenditure from other segments into these products or not. Results in columns 5 and 6 seem to indicate that, holding expenditure fixed, there was some substitution away from other sectors and into food, but the magnitude of this effect is rather small (between 0.11% and 11.5%). Therefore, Sunday liberalisation seems to have a genuine positive effect on expenditure, but not across all products, which is only partly attributed to attracting expenditure from other segments.

[Table 3]

Table 4 presents the results on the impact of Sunday trading deregulation on employment and market concentration for the sixteen four-digit retail sectors using the binary indicator for Sunday regulation changes. Table 5 presents exactly the same regressions but utilises the Sunday regulation index. In the first column of both tables we examine the net impact on employment. Five sectors in column 1, Table 4, and six out of the sixteen sectors in column 1, Table 5, experience a significant positive net impact on employment, with only three sectors having a negative net impact on employment. Results are not only statistically, but also economically significant: if one multiplies the estimated coefficients in Table 4, column 1, with the number of persons employed in these sectors for the treated countries before the change in legislation, the *net* increase in the number of people employed due to the Sunday trading deregulation is 59,685 people, or 47,035 people if you consider only the sectors with a statistically significant coefficient. This represents a 7% to 9% increase in employment for the reforming countries.

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[14] Estimated coef.× mean value of Sunday Regulation Index = 0.029 × 0.016

In the next two columns we also examine the impact on employment, but now controlling for the number of firms in each sector. In other words, we examine whether, conditional on firms' entry and exit decisions, surviving firms increase or decrease their hiring in countries that deregulated, compared to countries that did not change their Sunday regulation. Column 2 in Table 4 indicates that in all five sectors with a positive impact there was also a positive increase in employment for the firms already in the market, whereas the three sectors that experienced a decrease in net employment also experienced a reduction in the employees in the firms that remained in the market. A similar picture emerges also from column 2 in Table 5. Therefore, as also indicated in the literature review, there is evidence that Sunday trading deregulation leads to heterogeneous results whereby some sectors decrease, but also a significant number of sectors increase employment by pushing existing firms to hire more employees.

The last column in both tables examines the impact on market concentration by looking at the impact of deregulation on the number of firms in each sector.[15] Four (Table 4, column 3) and three (Table 5, column 3) out of sixteen sectors have a positive and significant coefficient indicating that the number of firms in these sectors increased as a result of Sunday deregulation, compared to only two sectors that experienced a reduction in the number of firms and hence an increase in concentration. Evaluated at the pre-treatment sample mean of the number of firms in the treated countries the coefficients in Table 4, column 3, imply a *net* increase of 1% in the number of firms or some 1,728 new firms entering the market. Unfortunately, we do not have data on the market shares or the size of these firms that would allow us to say whether sales moved towards larger firms or not. However, the fact that there is a significant entry of new firms for many of these retail sectors seems to indicate that the Sunday trading deregulation stimulates openness and competition in the market.

[Tables 4 and 5]

6. Conclusions

During the last two decades many European countries have deregulated Sunday trading. Yet, there is no systematic cross-country evidence on the impact of these changes. In this

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[15] Ideally we would like to have the sales or market share for each of these firms to measure changes in concentration, but such data is not available. For this reason we utilise the number of firms as a proxy for the changes in market structure (entry and exit) as a result of deregulation.

paper we try to fill this gap by analysing the impact of deregulation in a difference-in-difference empirical framework using data from 30 European countries on retail prices, expenditure, employment and concentration over the period 1999-2013. First, we find significant and robust evidence of a positive overall impact on employment, stemming both from the creation of jobs by new market entrants, but also from existing firms hiring more people. Second, we find that turnover in some, but not all, retail goods increases and that this effect is not solely driven by a substitution effect across retail products. Third, we document a net increase on average in the number of firms across sixteen four digit retail sectors. Fourth, we find no significant impact on the price indices for the three product categories that we analysed.

Future research should concentrate on the aspects that we consider to be the limitations of this paper. First, we used price level indices for a broad category of products. Given the heterogeneity of the results even across these broad categories, the impact of deregulation on prices of particular products could also vary significantly. It would be thus instructive to focus the analysis on particular important products, such as food staples (e.g. bread, milk). In addition, to examine the claim of small shopkeepers that such deregulation provides large chain shops with an advantage requires data not only on the number of firms but also on their market shares.

Despite the data limitations, we believe that our findings have important policy implications. First, Sunday deregulation can be a powerful tool to reduce unemployment, which is particularly important today where in many countries the unemployment rate is particularly acute among new entrants to the labour market, while growing share of the unemployed are without a job for more than a year. Providing employment opportunities in times of high unemployment has also strong spill-over impact, alleviating the "hysteresis" effect, where the skill base of the labour force erodes due to prolonged absence from the labour market, which in turn reduces the economy's potential output.

Second, the increase of turnover due to deregulation in some product categories could also improve the financials of retail enterprises. Even though opening a shop on Sunday as well implies increase of the costs that vary with opening hours, such as wages and energy, the shop's fixed costs (e.g. rent, interest payments) are spread over higher turnover. The overall impact for the financials of the enterprises may not necessarily be positive; however deregulation gives the entrepreneurs the chance to test this proposition in practice.

Lastly, the lack of impact on prices can be seen as reassuring for governments contemplating Sunday trade deregulation. The need for more employees could in principle lead to higher prices, with the shops passing the increased labour cost to the consumers. However, this effect seems to be offset by the increased competition in the markets that keeps prices down.

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Appendix: Sunday trading regulation information by country

The Appendix provides some more information on the rationale behind the scores of the Sunday trading regulation indicator, given to the countries in the sample. The sample of countries can be divided in two groups - treatment and control - depending on whether the Sunday trading regulation changed during the period of examination.

The control group contains 23 countries, where the Sunday trading regulation essentially did not change between 1999 and 2013. In 13 of these countries (Bulgaria, the Czech Republic, Estonia, Hungary, Ireland, Iceland, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia and Sweden), the Sunday trading has been unrestricted from before 1999.

In ten more countries, while the regulation also remained essentially unchanged, some restrictions on Sunday trading were left intact. Out of this group, in four countries - Cyprus, Luxembourg, Malta and the UK - the regulations were relatively lax from the start of the examination period. In particular, the restrictions on Sunday trading in the UK were relaxed in 1994, with the restrictions varying across the country, from fully deregulated in Scotland to allowing stores larger than 280 m^2 to open only for five hours on a Sunday in Wales. In Luxemburg, most shops have been allowed to open for specific hours on Sunday, with certain store categories (such as bakeries, butchers and cake shops) and specific local areas granted more leeway. In Cyprus in the summer, the shops have been obliged to close for a few hours on Sunday (between 2pm and 5pm). In Malta, in contrast, there have been restrictions on opening during the night hours, as the shops in general have been allowed to open from 4am to 10pm, although exceptions have applied depending on the area and the type of shop.

Restrictive regulatory framework without any change during that period has been the case for six countries in the sample - Austria, Belgium, Greece, the Netherlands, Norway and Switzerland. In Austria, the governors of federal provinces can overrule the general ban on opening stores on Sunday, yet they have not taken advantage of this option. Quite restrictive has been also the framework in Belgium, Greece, the Netherlands and Switzerland, where the shops could open for a limited number of Sundays, with exceptions applying for tourist areas and certain kinds of shops. In the case of Switzerland, the exception has applied also to very small shops, which has also been the case in Norway, where food shops and petrol stations of less than 100 m^2 have faced no restrictions on Sunday opening, with the larger shops opening for the last three Sundays before Christmas.

The treatment group, where Sunday trading regulation changed during the examined period, includes seven countries - Denmark, Finland, France, Germany, Italy, Portugal and Spain. In Denmark, the regulation changed from being very restrictive up until the mid 2000s to being fully deregulated from 1 October 2012, with a transition period between 1 July 2010 - 1 October 2012, when the shops were allowed to open for 30 Sundays a year. In Finland, the Sunday opening was fully deregulated for stores with a commercial floor area of less than 400 m^2, starting from December 2009, with the larger venues staying open for a limited number of hours in November and December. In France, the regulations were relaxed in 2009, when Paris, Marseille, Lille and about 500 more cities were classified as tourist areas and as such have enjoyed derogation from the Sunday trading restrictions. In Germany, the responsibility to regulate the opening hours was transferred to the state governments in 2006, with 14 out of 16 states opting to extend the trading hours. Sunday trading was changed in seven out of the fourteen states but only in a very limited way (either extending the number of Sundays or extending the number of hours). In Italy, the 1998 Bersani reform allowed the shops to open for 8 Sundays per year, lifting the limits on the trading hours in municipalities with high inflow of tourists, while the 2011 reforms liberalised the Sunday opening hours, starting from 1 January 2012. In Portugal, while Sunday trading in the previous decade varied between different part of the country, with the start of the structural reforms programme in 2011, the Sunday trading regulation was relaxed, with some restrictions remaining regarding the opening hours at night.

FIGURE 1: THE EVOLUTION OF SUNDAY TRADING REGULATION INDICATOR

Graphs by country
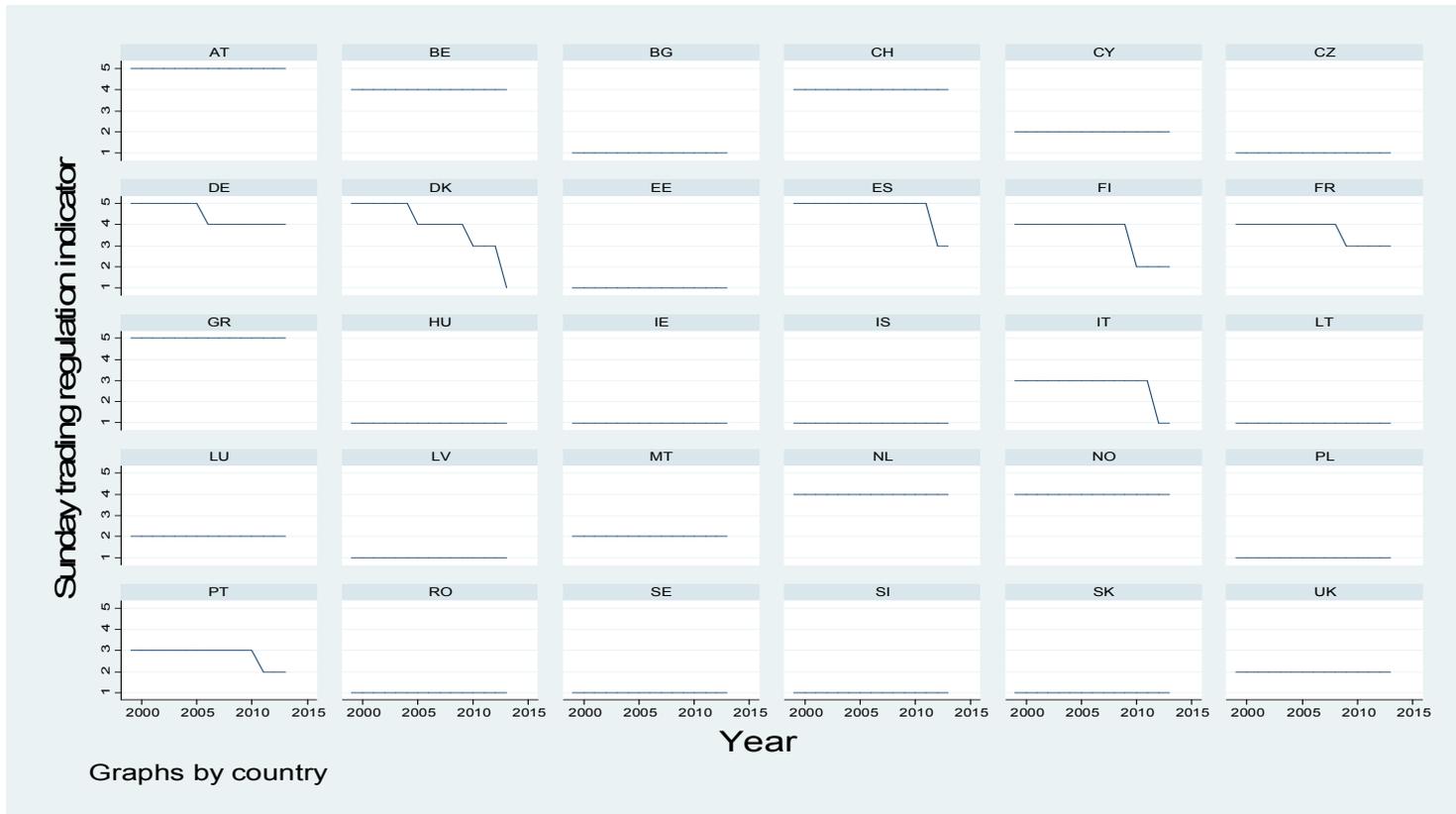
Notes: The figure presents information on the evolution of Sunday trading regulation indicator across 30 European countries.
Source: Authors' estimates based on the Sunday trading regulation indicator constructed using information from the OECD PMR indicator on regulation of shop opening hours and legislation search in secondary sources on timing and extent of reforms.

TABLE 1 - SUNDAY TRADING REGULATION INDICATOR

Scale	Description
1	No restriction
2	Restrictions on large shops and/or on the working hours on Sundays
3	Varies significantly across parts of the country, depending on local regulation
4	Shops can only open for limited number of Sundays, with limited variability across regions
5	Shops are not allowed to open on Sundays

Source: Authors' categorization based on the OECD product market indicator on regulation of shop opening hours and legislation search in secondary sources on timing and extent of reforms.

TABLE 2 - SUMMARY STATISTICS

Variable	Mean	SD	10th percentile	50th percentile	90th percentile	Min	Max	Observations
ln(Price index)$_{jct}$	4.562	0.247	4.193	4.603	4.816	3.691	5.271	1350
Sunday Regulation$_{ct}$	0.073	0.261	0	0	0	0	1	1350
Sunday Regulation Index$_{ct}$	0.048	0.264	0	0	0	0	4	1350
ln(Expenditure)$_{jct}$	6.659	0.694	5.546	6.782	7.442	4.134	7.800	1350
ln(Employment)$_{jct}$	8.210	2.137	5.313	8.315	10.895	0	14.051	5500
Sunday Regulation$_{ct}$	0.072	0.258	0	0	0	0	1	5500
Sunday Regulation Index$_{ct}$	0.036	0.166	0	0	0	0	2	5500
ln(Number of Firms)$_{jct}$	6.903	2.055	4.078	7.052	9.513	0	11.491	5500
ln(Number of Firms)$_{jct}$	6.804	2.153	3.871	6.991	9.494	0	11.491	5649
Sunday Regulation$_{ct}$	0.073	0.261	0	0	0	0	1	5649
Sunday Regulation Index$_{ct}$	0.037	0.168	0	0	0	0	2	5649

Notes: The above table provides summary statistics on the key variables used in Tables 3-5.
Source: Authors' calculations based on the Eurostat data on purchasing power parities and structural business statistics.

TABLE 3 - THE IMPACT OF SUNDAY DEREGULATION ON PRICES AND EXPENDITURE

	(1)	(2)	(3)	(4)	(5)	(6)
Estimation method	OLS	OLS	OLS	OLS	OLS	OLS
Dependent variable	$\ln P_{jct}$	$\ln P_{jct}$	$\ln Expenditure_{jct}$	$\ln Expenditure_{jct}$	$\ln ShareExpenditure_{jct}$	$\ln ShareExpenditure_{jct}$
Sunday Regulation$_{ct}$*Food	-0.012		0.125***		0.115***	
	(0.015)		(0.037)		(0.028)	
Sunday Regulation$_{ct}$*Appliances	0.008		0.027		0.017	
	(0.017)		(0.042)		(0.031)	
Sunday Regulation$_{ct}$*Clothing	0.032		-0.013		-0.022	
	(0.028)		(0.040)		(0.032)	
Sunday Regulation Index$_{ct}$*Food		0.002		0.089***		0.070***
		(0.011)		(0.031)		(0.024)
Sunday Regulation Index$_{ct}$*Appliances		0.007		0.033		0.014
		(0.009)		(0.025)		(0.016)
Sunday Regulation Index$_{ct}$*Clothing		0.029***		-0.003		-0.022
		(0.009)		(0.028)		(0.021)
log(real income per capita)$_{ct}$	0.523***	0.524***	1.293***	1.287***	0.663***	0.651***
	(0.073)	(0.072)	(0.151)	(0.149)	(0.152)	(0.150)
Country-Product FE	yes	yes	yes	yes	yes	yes
Time FE	yes	yes	yes	yes	yes	yes
Observations	1,350	1,350	1,350	1,350	1,350	1,350
Clusters	90	90	90	90	90	90

Notes: The dependent variable is the logarithm of the PPP adjusted price indices (EU27=100) in columns 1 and 2, the real expenditure per capita in columns 3 and 4 and the share of real expenditure per capita in columns 5 and 6. Sunday regulation is a binary indicator that takes the value of one when the country changed its regulation regarding Sunday opening hours. Sunday regulation index is calculated as follows: (max regulation indicator-current regulation indicator)/current regulation indicator. Standard errors clustered at the country-product level are reported in parenthesis below coefficients: *significant at 10%; **significant at 5%; ***significant at 1%.
Source: Authors' calculations based on the Eurostat purchasing power parities dataset and the Sunday regulation indicator.

TABLE 4 - THE IMPACT OF SUNDAY DEREGULATION ON EMPLOYMENT AND CONCENTRATION

	(1)	(2)	(3)
Estimation method	OLS	OLS	OLS
Dependent variable	lnEmployment$_{ct}$	lnEmployment$_{ct}$	lnNumber of Firms$_{jct}$
Sunday Regulation$_{ct}$* Other retail sale in non-specialized stores	0.138	-0.243	0.687***
	(0.118)	(0.163)	(0.136)
Sunday Regulation$_{ct}$* Other retail sale of food, beverages and tobacco in specialized stores	0.377***	0.247***	0.258**
	(0.091)	(0.065)	(0.111)
Sunday Regulation$_{ct}$* Retail sale in non-specialized stores with food beverages or tobacco predominating	0.170***	0.149***	0.042
	(0.031)	(0.040)	(0.061)
Sunday Regulation$_{ct}$* Retail sale of alcoholic and other beverages	0.294***	0.127***	0.295***
	(0.090)	(0.041)	(0.111)
Sunday Regulation$_{ct}$* Retail sale of books, newspapers and stationery	-0.588***	-0.188***	-0.784***
	(0.125)	(0.050)	(0.238)
Sunday Regulation$_{ct}$* Retail sale of bread, cakes, flour and sugar confectionery	0.251**	0.104***	0.292
	(0.118)	(0.038)	(0.179)
Sunday Regulation$_{ct}$* Retail sale of clothing	0.163***	0.092**	0.140***
	(0.040)	(0.038)	(0.045)
Sunday Regulation$_{ct}$* Retail sale of electrical household appliances	-0.605***	-0.309***	-0.579***
	(0.051)	(0.074)	(0.102)
Sunday Regulation$_{ct}$* Retail sale of fish, crustaceans and molluscs	0.083	0.053	0.060
	(0.124)	(0.086)	(0.111)
Sunday Regulation$_{ct}$* Retail sale of footwear and leather goods	0.067	0.038	0.059
	(0.042)	(0.034)	(0.047)
Sunday Regulation$_{ct}$* Retail sale of fruit and vegetables	0.144	0.092	0.106
	(0.161)	(0.119)	(0.118)
Sunday Regulation$_{ct}$* Retail sale of furniture, lighting equipment and household articles	0.081	0.026	0.112*
	(0.097)	(0.090)	(0.059)
Sunday Regulation$_{ct}$* Retail sale of hardware, paints and glass	0.065	0.023	0.084
	(0.049)	(0.049)	(0.108)
Sunday Regulation$_{ct}$* Retail sale of meat and meat products	0.007	0.025	-0.031
	(0.088)	(0.073)	(0.053)
Sunday Regulation$_{ct}$* Retail sale of textiles	-0.168*	-0.188***	0.042
	(0.095)	(0.064)	(0.082)
Sunday Regulation$_{ct}$* Retail sale of tobacco products	-0.255	-0.113	-0.216
	(0.279)	(0.093)	(0.342)
ln(real Income per capita)$_{ct}$	0.467**	-0.031	0.998***
	(0.187)	(0.138)	(0.213)
ln(Number of Firms)$_{jct}$		0.508***	
		(0.035)	
Country-Sector FE	yes	yes	yes
Time FE	yes	yes	yes
Observations	5500	5500	5649
Clusters	447	447	448

Notes: Sunday regulation is a binary indicator that takes the value of one when the country changed its regulation regarding Sunday opening hours. Standard errors clustered at the country-sector level are reported in parenthesis below coefficients: *significant at 10%; **significant at 5%; ***significant at 1%.
Source: Authors' calculations based on the Eurostat Structural Business Statistics dataset and the Sunday trading regulation indicator.

TABLE 5 - THE IMPACT OF SUNDAY DEREGULATION ON EMPLOYMENT AND CONCENTRATION (Sunday Regulation Index)

	(1)	(2)	(3)
Estimation method	OLS	OLS	OLS
Dependent variable	$\ln Employment_{ct}$	$\ln Employment_{ct}$	$\ln Number\ of\ Firms_{ct}$
Sunday Regulation Index$_{ct}$ * Other retail sale in non-specialized stores	0.217**	-0.077	0.600**
	(0.087)	(0.132)	(0.256)
Sunday Regulation Index$_{ct}$* Other retail sale of food, beverages and tobacco in specialized stores	0.375**	0.277**	0.191*
	(0.150)	(0.107)	(0.113)
Sunday Regulation Index$_{ct}$* Retail sale in non-specialized stores with food beverages or tobacco predominating	0.183***	0.201***	-0.033
	(0.052)	(0.060)	(0.069)
Sunday Regulation Index$_{ct}$* Retail sale of alcoholic and other beverages	0.292**	0.119*	0.264**
	(0.141)	(0.063)	(0.125)
Sunday Regulation Index$_{ct}$* Retail sale of books, newspapers and stationery	-0.623***	-0.137	-0.952***
	(0.235)	(0.146)	(0.258)
Sunday Regulation Index$_{ct}$* Retail sale of bread, cakes, flour and sugar confectionery	0.159	0.070	0.173
	(0.099)	(0.060)	(0.138)
Sunday Regulation Index$_{ct}$* Retail sale of clothing	0.207***	0.145***	0.120**
	(0.045)	(0.038)	(0.057)
Sunday Regulation Index$_{ct}$* Retail sale of electrical household appliances	-0.577**	-0.207	-0.724***
	(0.281)	(0.173)	(0.235)
Sunday Regulation Index$_{ct}$* Retail sale of fish, crustaceans and molluscs	0.145	0.127	0.033
	(0.119)	(0.109)	(0.065)
Sunday Regulation Index$_{ct}$* Retail sale of footwear and leather goods	0.113***	0.101***	0.022
	(0.042)	(0.038)	(0.048)
Sunday Regulation Index$_{ct}$* Retail sale of fruit and vegetables	0.155	0.149	0.010
	(0.177)	(0.155)	(0.098)
Sunday Regulation Index$_{ct}$* Retail sale of furniture, lighting equipment and household articles	0.161	0.118	0.083
	(0.138)	(0.116)	(0.069)
Sunday Regulation Index$_{ct}$* Retail sale of hardware, paints and glass	0.055	0.049	0.011
	(0.068)	(0.055)	(0.075)
Sunday Regulation Index$_{ct}$* Retail sale of meat and meat products	0.120	0.135	-0.030
	(0.121)	(0.097)	(0.058)
Sunday Regulation Index$_{ct}$* Retail sale of textiles	-0.219**	-0.193*	-0.053
	(0.110)	(0.101)	(0.054)
Sunday Regulation Index$_{ct}$* Retail sale of tobacco products	-0.107	0.022	-0.151
	(0.397)	(0.166)	(0.333)
ln(real Income per capita)$_{ct}$	0.475**	-0.009	0.961***
	(0.186)	(0.137)	(0.214)
ln(Number of Firms)$_{jct}$		0.511***	
		(0.035)	
Country-Sector FE	yes	yes	yes
Time FE	yes	yes	yes
Observations	5500	5500	5649
Clusters	447	447	448

Notes: The Sunday Regulation index is calculated as follows: (max regulation indicator-current regulation indicator)/current regulation indicator. Standard errors clustered at the country-sector level are reported in parenthesis below coefficients: *significant at 10%; **significant at 5%; ***significant at 1%.
Source: Authors' calculations based on the Eurostat Structural Business Statistics dataset and the Sunday trading regulation indicator.