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Product Market Deregulation and Employment Outcomes: Evidence from the German Retail Sector

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Product Market Deregulation and Employment Outcomes: Evidence from the German Retail Sector*

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Abstract

This paper investigates the short- and medium-term effects of the deregulation of shop-opening hours legislation on retail employment in Germany. In 2006, the legislative competence was shifted from the federal to the state level, leading to a gradual deregulation of shop opening restrictions in most of Germany's sixteen federal states. The paper exploits regional variation in the legislation in order to identify the effect product market deregulation has on retail employment. We find robust evidence that the deregulation of shop closing legislation had negative effects on retail employment, with considerable heterogeneity in terms of the type of employment as well as establishment size. That is, the employment losses are most pronounced for small retail stores and are almost exclusively borne by full-time employees.

Key Words: Product market regulation; Employment; Retail trade

JEL Classification: J21, L51, L81

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1 Introduction

The poor job record in Europe between the beginning of the 1990's and the mid 2000's has aroused interest of many researchers. While early explanations focus on the role of strong labor market institutions as an impediment to job creation, more recent studies emphasize the relevance of product market regulation (Krueger and Pischke, 1997; Blanchard and Giavazzi, 2003). Referring to this literature, the deregulation of product markets is often mentioned as a promising means to boost employment growth, although some studies have shown that the post-liberalization path of employment can as well take unfavorable course (Moura et al., 2006).

This paper analyzes the employment effects of product market deregulation in the retail sector resulting from a reform of shop closing legislation in Germany in 2006 and 2007. To uncover these effects, we exploit regional variation in trading provisions amongst the German states. Within the realm of the reform of federalism (Föderalismusreform), adopted by the Federal Parliament and the Federal Council in 2006, legislative competence on shop closing laws was conferred upon the responsibility of the federal states. This initiative marked the beginning of a period of extensive deregulation, in which 14 of the 16 German federal states liberalized their trading provisions. The remaining two states, namely Bavaria and the Saarland, retained to the previously effective federal law.[1] This policy reform can be viewed as a natural experiment that can be used to identify the causal effect of the liberalization of shop closing laws.

The purpose of this study is to assess the effect of the liberalization of shop closing laws in 2006 and 2007 on the total level of employment in the German retail sector. Further, we analyze whether deregulation has heterogeneous effects on different subsets of retail employment. From a theoretical perspective, the sectoral employment effect of deregulation is ambiguous (Blanchard, 2006). As deregulation increases productivity, less employment is needed for a given level of output. Yet, if productivity increases come along with lower output prices, this leads to an increase in demand and output, eventually increasing labor demand. Therefore, the question how deregulation affects employment is ultimately of empirical nature.

Fiercer competition due to more liberal shop closing laws might not only affect the level of retail employment, but also the distribution of employment among the various retail categories. In particular, if the regulation benefits some establishment types and hence allows the creation of market inefficiencies, liberalization will lead to a decline of the inefficient formats, along with declines in employment. Our paper contributes to the literature by providing novel evidence on how deregulation has influenced the structure of the retailing sector.

The results indicate that the deregulation of shop closing legislation had a negative effect on retail sector employment in Germany. On average, our coefficient estimates suggest that liberalization is associated with a loss of 19,000 full-time equivalent jobs in Germany. We find that the employment losses are almost exclusively borne by full-time workers, while part-time employment was not affected. Further, we show that employment losses are concentrated among small establishments, accompanied by a decrease in the number of small retail stores, enhancing structural change.

[1] While Bavaria didn't pass any state legislation at all, the Saarland adopted a state law concerning shop opening times, which did not change provisions effective under federal law.

Given the intensity of the public debate on shop closing laws in Germany, the academic literature on this issue is relatively scarce and rather inconclusive. Täger et al. (2000) examine the implications of the federal reform of shop closing laws in 1996. The authors find that employment and turnover have developed positively, while competition among retailers has increased as a consequence of deregulation. In contrast, studies by Hilf and Jacobsen (1999; 2000) find that employment in the retail sector has not increased after the reform, but that working time arrangements of employees have worsened. Most importantly, the problem with existing studies is that they rely on a single source of variation in legal provisions to identify employment effects of deregulation. Thus, they suffer from a lack of an adequate control group that would help to eliminate the impact of confounding factors on employment changes in retail. Our study overcomes this problem by exploiting regional variation in trading provisions.

A number of empirical studies has analyzed the employment effect of product market regulations in the retail sector on employment outcomes in other countries. For the Canadian labor market, Skuterud (2005) has analyzed employment effects of changes in shop closing legislation by exploiting differences in provisions on Sunday trading across Canadian provinces. At the aggregate level, he finds evidence of modest employment gains, and decomposes this effect into positive threshold labor and sales effects and a negative effect on employment resulting from increased labor productivity. In a similar approach, Goos (2004) examines the impact of shop closing hours on employment and product markets in the United States. Using a difference-in-difference strategy, he shows that deregulation increases employment by 4.4 to 6.4 percent. Burda and Weil (2005) use changes in regulatory regimes in the period 1969-1993 to identify the employment effect of blue laws in the U.S.. They find that Sunday closing regulation significantly reduces employment inside and outside the retail sector, with part-time employment being particularly affected. A robust effect of blue laws on wages, prices and labor productivity was not found in the study.

In addition to shop closing laws, competition in the retail sector is restricted by entry barriers for large establishments. Bertrand and Kramarz (2002) examine zoning laws in the French retail sector, which regulate the entry of large firms in the market. They find that this policy had a sizable negative effect on retail employment, estimating that in absence of these laws, employment could have been approximately 10% higher. In a similar vein, Viviano (2008) finds that lower entry barriers for large stores lead to higher employment, which is almost exclusively created in large stores. Yet, at least in the medium term, she does not find a significant negative employment effect of deregulation on small shops.

The remainder of the paper is organized as follows. In the subsequent section, we describe the institutional background of the recent liberalization of shop closing legislation in Germany. In section 3, we present the estimation strategy, discuss identification issues and provide an overview of the data used in the analysis. The econometric analysis is conducted in section 4, followed by a number of robustness checks in section 5. Section 6 concludes.

2 Legislation

One sector which is traditionally highly regulated in many European countries is the retail sector. After decades in which a strict regulation of trading hours was the norm, they were at least partially liberalized in some European countries and recently also in Germany.

In the past decades, the legislative power regarding shop opening hours lay with the federal government. Since 1956, the "Law concerning Shop Closing Time" (Gesetz über den Ladenschluss, LSchlG) restricted opening hours of retail stores from 7 am to 6:30 pm on weekdays and from 7 am to 2 pm on Saturdays.[2] On public holidays and Sundays, shop opening was generally prohibited. Despite a lively debate on the usefulness of restrictions of shop opening hours, the law was not fundamentally changed for three decades.[3] With the introduction of the "service evening", allowing retail stores to open until 8:30 pm on Thursdays, the deregulation process began in 1989. Further relaxations followed in 1996 and 2003, according to which shops could open their doors between 6 am and 8 pm on all weekdays and Saturdays.

In June and July 2006 the Federal Parliament and the Federal Council adopted the reform of federalism, as part of which the legislative competence on shop closing issues was conferred upon the federal states. This marked the beginning of a period of extensive deregulation, in which 14 of the 16 German federal states liberalized their trading provisions. Berlin was the first state to pass a law in November 2006, with 13 other federal states following soon. Mecklenburg-West Pomerania was the last of the states to liberalize closing laws, doing so in July 2007. Only Bavaria and the Saarland adhered to the initial regulation. The new state laws differ with respect to the scope of liberalization. While nine out of 14 states abolished any restriction on opening hours on weekdays and on Saturdays, the remaining five retained some provisions. Also, regulations on Sunday trading differ across states. Detailed information on the enforcement dates of the state laws as well as on the provisions on shop opening is given in Table 1.

At the time, the legislative changes were subject to contentious political and public debate. With respect to the reform's costs and benefits, the most controversial issue was its expected labor demand effect.[4] Proponents viewed the deregulation as a means to boost sales and to create more jobs. These expectations were backed by a report of the expert advisory board (Deutscher Bundestag, 1995) and a simulation by the ifo institute, according to which an extension of shop opening hours from 6.30 pm until 10 pm would create 50.000 additional full-time jobs (1995, p. 328). In contrast, opponents of the reform feared a reduction of employment and a shift towards more part-time and casual workers.

The goal of our analysis is to investigate whether the deregulation of shop opening hours restrictions has caused the creation of additional employment. To do so, we compare employment outcomes in federal states which lifted restrictions with federal states that did not. Yet, the estimated employment effect is only unbiased if the federal states are randomly assigned to the treat-

[2] For a comprehensive overview of the history of shop closing laws, see Täger et al. (1995) and Spiekermann (2004)

[3] Several amendments concerned the exemption of certain store types (gas stations), specific locations (train stations, airports) as well as specific dates (Saturdays in the advent season) from shop closing laws.

[4] Further arguments relate to the coordination of leisure, the protection of small retailers from large outlets and the need to meet changing consumer demands.

Table 1: Deregulation of shop opening hours legislation

Federal State	Introduction	Weekday	Saturday	Sunday	Scope
Baden-Wurttemberg	06. March 2007	0 am - 12 pm	0 am - 12 pm	3 × 5 hrs	.71
Bavaria	-	6 am - 8 pm	6 am - 8 pm	4 × 5 hrs	-
Berlin	14. November 2006	0 am - 12 pm	0 am - 12 pm	8 × 7 hrs	.72
Brandenburg	29. November 2006	0 am - 12 pm	0 am - 12 pm	6 × 7 hrs	.72
Bremen	01. April 2007	0 am - 12 pm	0 am - 12 pm	4 × 5 hrs	.71
Hamburg	01. January 2007	0 am - 12 pm	0 am - 12 pm	4 × 5 hrs	.71
Hesse	30. November 2006	0 am - 12 pm	0 am - 12 pm	4 × 6 hrs	.71
Lower Saxony	01. April 2007	0 am - 12 pm	0 am - 12 pm	4 × 6 hrs	.71
Mecklenburg-West Pomerania	16. November 2006	0 am - 10 pm	0 am - 10 pm	4 ×	.69
North Rhine-Westphalia	21. November 2006	0 am - 12 pm	0 am - 12 pm	4 × 5 hrs	.71
Rhineland-Palatinate	29. November 2006	6 am - 10 pm	6 am - 10 pm	4 × 5 hrs	.14
Saarland	15. November 2006	6 am - 8 pm	6 am - 8 pm	4 × 5 hrs	-
Saxony	16. March 2007	6 am - 10 pm	6 am - 10 pm	4 × 6 hrs	.14
Saxony-Anhalt	30. November 2006	0 am - 12 pm	0 am - 8 pm	4 × 5 hrs	.66
Schleswig-Holstein	01. December 2006	0 am - 12 pm	0 am - 12 pm	4 × 5 hrs	.65
Thurangia	29. November 2006	0 am - 12 pm	0 am - 20 pm	4 × 6 hrs	.66
Federal law before reform	01. June 2003	6 am - 20 pm	6 am - 20 pm	4 × 5 hrs	-

Note: Information on legislation is compiled from law texts. The scope of deregulation is equal to the percentage change in hours which shops are allowed to open according to new state legislation.

ment and the control group. When using policy changes as natural experiments, this condition is often not met, as new policies are likely to be implemented where the gain from the change is greatest. If deregulation is endogenously determined by economic and social conditions, and these are correlated with the outcome variables of interest, the estimates will be biased.

The law change that we exploit in our analysis exhibits several notable particularities that are suggestive of exogeneity. First, it appears that the decision of the state of Bavaria to adhere to the federal law was made rather accidentally. Before the reform, the Bavarian minister of economic affairs had emphasized Bavaria's pioneering role in the deregulation of shop closing laws (Issig, 2006). Yet, the vote in the caucus which decided on the extensions resulted in a standoff as Prime Minister Edmund Stoiber had left the meeting early (Bovensiepen, 2006). As a consequence, Bavaria adhered to the restrictive closing laws that were effective under Federal Law and decided to observe experiences made by other states before taking further action.

Second, some shop closing laws are subject to revision after new governments have been elected. In Northrine-Westphalia, for instance, the social-democrat-green coalition government enforced reduction of opening hours to 10 pm on Saturdays (instead of 12 pm) as well as additional restrictions on Sunday shopping in 2013. Finally, liberalization opponents have repeatedly made efforts to take legal actions against state-level closing laws. The Christian churches in Berlin filed suits against plans to liberalize Sunday shopping throughout December, pleading constitutionally guaranteed Sunday rest. The Federal Constitutional Court ruled in favor of the liberalization opponents (BVerfG, 2009). Both political and judicial amendments of the shop closing laws indicate that the deregulation decisions of states is largely independent of their socio-economic background and that they thus can be considered to be exogenous.

3 Empirical Strategy and Data Description

3.1 Empirical Strategy

The quasi-experimental setting described in the previous section allows us to use a difference-in-difference strategy in order to gauge the causal effect of deregulation on employment in the retail sector. While the majority of federal states passed laws to deregulate shop opening hour restrictions in the years 2006 and 2007, two states adhered to federal law. The first group comprises the treatment group and the latter the control group. In the analysis, we contrast employment outcomes before and after the deregulation in the treatment group. The control group of non-deregulating states is needed to extract employment trends in the retail sector common to all federal states, as they would otherwise falsely be attributed to the extension of shop opening hours.

In order to identify the employment effect of deregulation, we estimate models for the following dependent variables, defined as shares over total employment and calculated for each district d located in state s at time t: (i) employees in the retail sector, (ii) full-time/part-time employees in the retail sector, and (iii) employees small, medium or large establishments. Further, we generated a dependent variable which reflects the number of small, medium and large shops in district d at time t. For each of these variables, represented by Y_{dst}, we estimate difference-in-difference models of the following type:

$$Y_{dst} = \alpha_{ds} + \beta_1 T_{st} + \beta_2 X_{dst} + \gamma_t + \epsilon_{dst}. \tag{1}$$

Employment variables are expressed as natural logarithms. T_{st} denotes an indicator variable equal to one if a district is located in a state s which has deregulated its shop closing law at time t and zero otherwise. Thus, β_1 is the parameter of interest and reflects the differential employment effect due to the deregulation of shopping hours.

All estimates include a vector of district dummies, α_{ds}, which control for mean differences in retail employment across districts. Furthermore, the regressions include year dummies, γ_t, that control for aggregate time shocks. In extensions to this specification, we augment the model by time-varying district characteristics, X_{dt}, which potentially confound employment in retail. Further, we enrich the model by linear as well as quadratic district-specific time trends in order to allow for deviations from the common trend assumption. Then, the identification of the deregulation effect results from whether the law change led to deviations from pre-existing trends.

As the analysis employs multiple time periods, inference based on the traditional treatment of standard errors can be misleading due to serial correlation (Bertrand et al., 2004). Furthermore, the employment outcomes vary at the district level, while the regressor of interest varies only at group level, which results in downward-biased standard errors (Moulton, 1986). To address these concerns, we follow the proposition by Angrist and Pischke (2009) and use Huber-White robust standard errors clustered at state level. This allows for an arbitrary autocorrelation process of the error terms within the states over the years, reducing the bias in the standard errors.

The key identifying assumption of equation (1) is that in absence of deregulation, there would

be no significant difference in the evolution of employment between the treatment and the control group. To test the validity of the identifying assumption, we compare pre-deregulation trends in retail employment in the treatment and the control group. If retail employment has evolved similar in both groups before the treatment, it is likely that differences in the development after the treatment can be attributed solely to deregulation. Figure 1 depicts the average share of retail employment in overall employment in the treatment and the control group between 2003 and 2010.

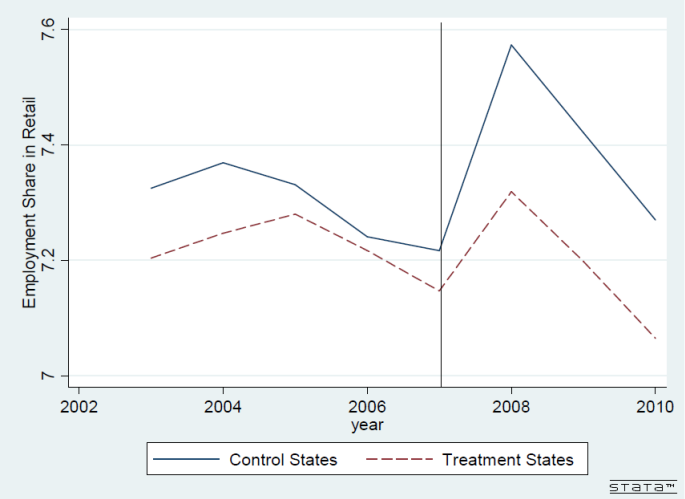

Figure 1: Employment shares in retail

Notes: Employment shares are calculated from the Establishment History Panel (BHP).

The data reveal a parallel increase in the employment share between 2003 and 2004, before retail employment decreases in both groups until 2007. After the deregulation of shop opening hours, marked by the vertical line in the figure, employment shares in both groups increase first and then decrease again. Although only descriptive, the figure presents evidence for a similar trend of the retail employment shares in both groups. Yet, it bears notice that also in the post-treatment period, employment developments do not differ markedly. The validity of the identifying assumption is further tested in section 5, where we perform several placebo experiments.

3.2 Data Description

The primary data source that we use for the analysis is the Establishment History Panel (BHP) for the period from 2003 to 2010. The BHP is a 50 percent sample of all establishments in Germany with at least one employee liable to social security as of the 30th June of a given year, stratified by establishment size. The dataset comprises detailed information on the employment and wage structure of establishments (for details, see Dorner et al. 2010). Furthermore, the BHP contains information on the district in which an establishment is active as well as its industry affiliation. We express firm level employment in terms of full-time equivalents (FTE) and aggregate the infor-

mation at the district level. Thus, we construct a panel with district-year observations.[5] In order to enable analyses of effect heterogeneity, we additionally calculate district employment stratified according to working-time (full-time vs. part-time) and establishment size. As the dataset does not include information on sales volume or floor size, stores are grouped according to their number of employees. We follow the classification of Viviano (2008) and define firms as small if they have up to five employees, as medium when there are more than five but less than sixteen employees, and as large when there are sixteen employees or more.

In order to construct the time-varying district characteristics that are used as control variables, we match information on the number of arrivals and overnight stays as well as on disposable income in district d and time t. These time series are provided by the German Federal and State Statistical Offices. In the Establishment History Panel, districts are defined following a time-consistent definition of 412 administrative districts in West Germany according to the territorial status of 2008. To make the data from the Federal Statistical Offices consistent with this classification, six districts in Saxony-Anhalt have to be excluded from the analysis.[6]

Table 2 presents summary statistics of the dependent variables employed in the analysis, separated by treatment and control group (column (1) and (2)). Column (3) indicates whether the mean differences between the two groups are statistically significant. The average fraction of district employment in retail amounts to approximately 8.2% of the overall working population in both the treatment and the control states. This number also comprises those working in out-of-store retail environments (e.g. mail order business and markets) as well as employment in second hand stores. As neither of these retail types is bound to shop closing laws they are excluded in the analysis, reducing the retail employment share to 7.78% and 7.83%, respectively.[7] As part-time employees are overrepresented in the retail sector relative to the overall working-time structure, the retail employment share declines again by 0.9 percentage points when employment is expressed in full-time equivalents. For none of the aggregate employment measures, there are significant differences between control and treatment states.

Table 2 also depicts employment shares disaggregated by establishment size and working-time arrangement. Within the respective groups, employment is relatively evenly distributed across the different establishment types. Yet, in the control states, significantly more workers are employed in medium size establishments, while the reverse is true for large stores. Notably, there are also significant mean differences between the two groups in their respective fraction of part-time employees.

[5] In order to calculate FTE employment, we weigh employment according to a worker's employment status: Employees are assigned a weight of 1 if they work full-time, a weight of $\frac{24}{39}$ if they work in major part-time and $\frac{16}{39}$ if they work in minor part-time (Dauth, 2010).

[6] Within the realm of several district reforms, county boundaries were redrawn in some East German states. In most cases, this does not pose a problem, because districts were merged together. Yet, in Saxony-Anhalt, boundaries were redrawn in a way such that some former districts cannot be matched 1:1 to new ones.

[7] For the same reasons, gas stations and pharmacies are excluded.

Table 2: Summary statistics of dependent variables in the pre-liberalization period

	Control (1)	Treatment (2)	Difference (3)
Entire retail sector			
total employment	8.19	8.21	-.02
	(.108)	(.057)	(.117)
total emp. less 525 & 526	7.78	7.83	-.05
	(.085)	(.054)	(.106)
total FTE emp. less 525 & 526	6.85	6.92	-.07
	(.083)	(.052)	(.104)
By size (less 525 & 526)			
small estbl. (<5 empl.)	2.32	2.30	.02
	(.026)	(.020)	(.037)
medium estbl. (6-15 empl.)	1.96	1.89	.07**
	(.027)	(.018)	(.036)
large estbl. (>16 empl.)	2.52	2.68	-.14*
	(.083)	(.040)	(.084)
By work-type (less 525 & 526)			
full-time employment	3.92	3.87	.05
	(.060)	(.035)	(.069)
FTE part-time employment	2.94	3.05	-.11**
	(.032)	(.024)	(.045)

Notes: Number of observations: 1648. Variables are expressed as the fraction of full-time equivalent district employment. Standard deviations in parentheses.

4 Results

4.1 Initial Estimates

Table 3 shows the results for the initial regression of the log fraction of all workers employed in retail. The regression reported in column (1) includes the deregulation dummy as well and year and district fixed effects, which are highly significant in most instances. Due to the large number of district fixed effects and time trends included, we only report the result on the variable of interest.[8] The coefficient in column (1) is negative and statistically significant at the 5% level.

In order to control for potentially confounding factors, we augment the model with additional covariates that might influence the development of employment in the retail sector. As discussed in section 3.2, six districts in Saxony-Anhalt have to be excluded once covariates are added to the model. To see whether the mere exclusion of these districts changes the result obtained in column (1) significantly, we repeat the regression with the restricted sample. As can be seen, the size of the coefficient decreases marginally and the standard error does not change. It is therefore reasonable to assume that any changes in the size or significance of the estimate on the deregulation dummy will stem from the inclusion of additional control variables rather than from the sample restriction itself.

Retail sector employment might be positively affected by tourists, as they create additional

[8]The results are available from the author upon request.

Table 3: Employment effects of deregulation, baseline results

Dependent Variable: FTE Retail Empl. Share (log)	(1)	(2)	(3)	(4)	(5)	(6)
Deregulation	-.019**	-.018**	-.019**	-.019**	-.017***	-.016***
	(.008)	(.008)	(.008)	(.008)	(.003)	(.005)
Tourism	no	no	.040	.044	.009	.020
			(.042)	(.035)	(.020)	(.014)
Disposable Income	no	no	no	.085	.171	.133
				(.083)	(.124)	(.273)
District × time trends	no	no	no	no	yes	yes
District × time^2 trends	no	no	no	no	yes	yes
R^2	.890	.891	.891	.891	.950	.956
N	3296	3248	3248	3248	3248	3248

All regressions include district and year fixed effects. The explanatory variable "Tourism" is proxied by the log number of overnight stays in time t in district d. Robust standard errors in parentheses are clustered at the federal state level. *Significant at 10%, * at 5%, ** at 1%.

purchasing power in a region. We test this hypothesis by including the number of overnight stays of visiting foreigners in district d at time t. The positive, albeit insignificant, coefficient in column (3) verifies this conjecture. However, the inclusion hardly alters the point estimate on the coefficient of interest. In the next column, we additionally augment the regression by a measure of disposable income in district d in time t. The coefficient on the deregulation variable remains unaltered and the results indicate that disposable income is positively associated to employment in retail, although the coefficient is statistically not different from zero.

In column (5), the model is augmented by a full set of district-specific linear time trends. The precision of the estimates is increased considerably, with the size of standard error being more than halved. The absolute value of the coefficient decreases only slightly and becomes significant at the 1% level. Adding quadratic trends in column (6) hardly alters the point estimate. The coefficient suggests the share of retail employment decreased by 1.6% as a consequence of the reform. Yet, is this an economically significant impact? Evaluated at the overall sample mean for the fraction of retail employment in overall employment (6.85%), the point estimate translates into an average effect of approximately 0.11 percentage points of the working population or about 19,000 full-time equivalent jobs in the deregulating federal states.[9]

In the remainder of the paper, results are presented for the last three specifications, which include the covariates, district-specific linear or quadratic time trends, as they provide the most robust estimates of the deregulation effect.

4.2 Heterogeneity by Establishment Size

The aggregate result obtained in the previous section may mask heterogeneous employment patterns across different subsets of retail employment. Therefore, we estimate the model described

[9]The working populaiton in the average treated district amounted to 60,762 FTE workers in the pre-liberalization period. A decrease of this population by 0.11 percentage points implies a reduction of 61 FTE jobs per district and adds up to 19,000 full-time equivalent jobs in the treated states.

in section 3.1 for different subsamples of total retail employment. In a first step, we allow for heterogeneity of effects along the margin of establishment size.

Table 4: Employment effects of deregulation, results by establishment size

	Panel A: Dep. Var.: Empl. Share (log)			Panel B: Dep. Var: Number of Shops (log)		
	(1)	(2)	(3)	(1)	(2)	(3)
			Small Establishments			
Deregulation	-.014**	-.011*	-.013**	-.035***	-.016**	-.017**
	(.007)	(.006)	(.005)	(.009)	(.007)	(.007)
R^2	.962	.976	.981	.994	.997	.998
			Medium Establishments			
Deregulation	.018	.006	.005	.002	.001	.004
	(.012)	(.006)	(.008)	(.012)	(.014)	(.013)
R^2	.886	.927	.938	.957	.970	.974
			Large Establishments			
Deregulation	-.057	-.029	-.020	-.015	.031	.036
	(.028)	(.013)	(.022)	(.024)	(.023)	(.027)
R^2	.846	.925	.947	.951	.971	.977
Add. Controls	yes	yes	yes	yes	yes	yes
District × time trends	no	yes	yes	no	yes	yes
District × time^2 trends	no	no	yes	no	no	yes

Notes: N=3254. Each cell reports the coefficient on the treatment variable for one regression. All regressions include district and year fixed effects. Standard errors in parentheses are clustered at the federal state level. * Significant at 10%, ** at 5%, *** at 1%.

Although shop closing regulations were most often designed for religious reasons and in order to protect retail employees, they tend to favor small retailing units (Pilat, 1997). First, restrictive opening hours reduce returns on investment. As large retailers have higher investments in real estate and inventories, they are more heavily affected by regulation. Second, in the presence of closing laws, consumers have less time to drive to larger stores that are often located outside city centers, even if there are price differences between the formats (Tanguay et al., 1995). Third, due to the need for threshold labor, i.e. the need for one person to be employed at all times a shop is open, it is more costly for small retailing units to extend opening hours than for large ones (Nooteboom, 1982). Therefore, fiercer competition due to more liberal opening hours is likely to benefit larger stores.

Table 4 depicts the results for small, medium and large establishments and reveals considerable heterogeneity across the different sizes. In line with our expectations, deregulation has led to a significant decrease of employment in small retail stores. The negative coefficient suggests that after deregulation, the share of employment in small establishments has decreased by 1.3%. It is worth noting that the employment losses have been accompanied by a significant decrease of the overall number of small shops (see top part of Panel B). In contrast, employment in medium and large establishments has not been affected by deregulation.

4.3 Heterogeneity by Working Hours

A further question which deserves attention is whether deregulation differentially affects full-time and part-time employment. Table 5 depicts the estimation results for the labor demand effect of deregulation separately for full-time and part-time employees. Following the format of earlier equations, all models include the deregulation indicator variable and and a full set of district and time dummies, with alternate specifications containing additional controls and linear or quadratic time trends.

Table 5: Employment effects of deregulation, results by working-time arrangement

Dep. Var: Empl. Share (log)	(1)	(2)	(3)
	Full-time Employment		
Deregulation	-.035***	-.029***	-.027***
	(.010)	(.007)	(.010)
R^2	.870	.940	.958
	Part-time Employment		
Deregulation	.002	-.005	-.002
	(.007)	(.005)	(.004)
R^2	.914	.957	.969
Add. Controls	yes	yes	yes
District × time trends	no	yes	yes
District × time^2 trends	no	no	yes

Notes: N=3254. Each cell reports the coefficient on the treatment variable for one regression. All regressions include district and year fixed effects. Standard errors in parentheses are clustered at the federal state level. * Significant at 10%, ** at 5%, *** at 1%.

The results in the top part of the table show that the adverse effect of the deregulation is mainly borne by full-time employees. The estimated coefficients is highly significant and suggests that full-time employment has decreased by 2.7%. Evaluated at the average fraction of full-time employment in retail (3.92%), the coefficient suggests that full-time employment has decreased by 0.01 percentage points of the working population, which is equivalent to the aggregate effect. In contrast, the point estimates for part-time employment are smaller in absolute values and are not significantly different from zero. It is worth noting that the employment losses experienced by full-time workers are likely to come along with a decrease in bargaining power of retail workers, eventually affecting labor market rents and wages (Boylaud and Nicoletti, 2001).

4.4 Discussion of the Results

So far, our analysis presents evidence that the deregulation of shop closing laws in Germany has led to a significant decrease in employment in the retail sector. This result is consistent with Moura et al. (2006), who illustrates a number of cases in which sectoral employment decreases after deregulation. Particularly, this occurs if liberalization solely leads to a decrease in inefficiencies and

associated excessive employment levels, whilst post-liberalization output booms are lacking. What are the underlying developments in the German retail sector which explain these results?

The liberalization of shop closing laws enables a new dimension of competition along the margin of opening hours. As discussed in section 4.2, from a theoretical perspective, this favors large establishments, leading to heterogeneous adjustment of opening hours depending on store size (Wenzel, 2010). Additionally, if consumers have a taste for evening shopping, e.g. because this spares them more 'valuable' time on Saturdays, demand may be drawn away from small to large establishments. Therefore, it may be expected that deregulation reduces employment in small stores and/or the overall number of these inefficient formats.

As the BHP does not contain information on actual opening hours, we cannot inspect the issue of heterogeneous opening hours extension. Yet, evidence from an earlier reform of the shop closing legislation in 1996 suggests that, indeed, size is an important determinant of whether stores actually use the leeway of extending opening hours beyond the existing level (Täger et al., 2000). Our results on employment are in line with the theoretical predictions, as we show that employment losses are concentrated among small establishments, while larger stores are unaffected.

This begs the question, why these negative developments are not counteracted by employment creation in medium and large establishments, if these formats benefit from deregulation. Theoretically, at the level of the firm that extends shop opening hours, the effect on employment is ambiguous (Gradus, 1996). On the one hand, the mere need for one person to be employed at all times during which an establishment is opened increases the demand for retail labor. Further, if longer shopping hours are accompanied by higher sales, employment will increase more. Yet, to the extent that longer opening hours increase average efficiency, fewer workers are needed and employment decreases. Our results suggest that in Germany, the extension of opening hours has rather led to a redistribution of employment within the firm towards evening hours than to the creation of new employment.

Interestingly, the results obtained in our analysis are at odds with the majority of existing studies on employment effects of shop closing deregulation in other countries (Burda and Weil, 2005; Skuterud, 2005; Goos, 2004). What are the reasons for this discrepancy? One potential factor that is likely to dampen labor demand is that Germany exhibits significantly higher labor costs than the Unites States. First, higher marginal costs of labor decrease the fraction of stores for which an extension of opening hours is profitable. Second, those shops that do decide to open longer will increase their labor demand relatively less or even not at all, if there is scope for redistribution of employment over the workday. Indeed, McKinsey (1997) show that stores of identical formats employ significantly less staff in Europe than in the U.S. and tend to compete on prices rather than on service.

5 Robustness Checks

Before concluding, we perform several robustness checks of our main result, that the deregulation of shop closing hours significantly reduced employment in retail in Germany. The results of

these checks are depicted in Table 6, where the baseline estimate for the aggregate effect of the deregulation on retail employment is reproduced in row 1 for comparison.

5.1 Placebo Experiments

One threat to the identification strategy applied in our analysis is that the negative employment effects observed in the deregulating states might be driven by policies other than the liberalization of shop closing laws, only indirectly affecting employment in retail. To test this hypothesis, we estimate a model according to equation (1), where the dependent variable is the share of employment in the hotel sector, a service sector very similar to retail trade (Bertrand and Kramarz, 2002). If the estimated coefficient for the hotel sector is positive, the differential development of retail employment would falsely be attributed to the deregulation effect, but would rather result from different policies affecting overall employment. Row 2 reports estimates for the hotel sector. The coefficients are positive and do not differ significantly from zero, confirming that the results obtained in Table 3 are specific to the retail sector.

As a second test, we prepone the timing of the liberalization by two years. In this case, a coefficient significantly different from zero would indicate that the evolution of retail employment has evolved differently in the treatment and the control group, but due to some other reason than the liberalization. The placebo experiment is presented in row 3 and reveals that the estimated policy effect is not different from zero.

5.2 Definition of Treatment

We next consider the robustness with respect to an alternative definition of the treatment variable. So far, the treatment was reflected by a dummy variable which indicated whether a federal state had deregulated its shop closing laws or not. However, as discussed in section 2, there is some variation in the scope of deregulation between the states. To incorporate this additional variation, we estimate a specification, where the treatment variable is a measure of the deregulation intensity. Specifically, the variable reflects the percentage change in hours that shops are allowed to open according to new state legislation. The treatment intensity takes values between zero (for non-deregulating states) and 0.72 for the states with the most liberal regulations (see Table 1). The coefficient estimates reported in row 4 are consistent with the baseline result.

5.3 Dependent Variable

So far, the retail employment variables used in our analysis were expressed as fractions of overall employment. Hence, also changes in the overall working population influence the dependent variables. Further, employment evolutions in retail influence both the nominator and the denominator. To address this issue, we re-estimate the model and express retail employment in levels instead of shares and as the fraction of the overall working age population, respectively. For the level of retail employment (row 5), the result is identical to the baseline estimate in the fully specified model. The

Table 6: Robustness checks

	(1)	(2)	(3)
1. Baseline estimtes from Table 3	-.019**	-.017***	-.016***
	(.008)	(.003)	(.005)
2. Placebo: Estimates for the hotel sector	.022	.018*	.015
	(.015)	(.010)	(.011)
3. Placebo: Pre-ponement of timing	.009	.015	.018
	(.006)	(.013)	(.013)
4. Treatment intensity	-.015	-.021**	-.018**
	(.018)	(.008)	(.007)
5. Log employment	-.036***	-.013**	-.016***
	(.012)	(.005)	(.005)
6. Retail as a fraction of working age population	-.026***	-.011***	-.014**
	(.007)	(.004)	(.006)
7. Calculate std. errors according to Donald and Lang	-.019**	-.017***	-.016***
	(.009)	(.006)	(.005)
8. Weight by district population	-.002	-.015***	-.014**
	(.007)	(.004)	(.006)
Add. Controls	yes	yes	yes
District × time trends	no	yes	yes
District × time^2 trends	no	no	yes

Notes: N=3254. Each cell reports the coefficient on the treatment variable for one regression. All regressions include district and year fixed effects. If not reported differently, standard errors are clustered at the federal state level. * Significant at 10%, ** at 5%, *** at 1%.

coefficient for retail employment as the fraction of the working age population (row 6) is slightly smaller than the baseline but remains significant at the 5% level.

5.4 Standard Errors

In our baseline restults, we have always reported robust standard errors that are clustered on state level, allowing for an arbitrary autocorrelation process of the error terms within the states over the years. For reliable inference, the number of clusters is required to be large. Although Bertrand et al. (2004) find that rejection rates behave reasonably well in the case of about 20 groups, we additionally confirm the robustness of our results by employing the two-step procedure proposed by Donald and Lang (2007). This method of calculating standard errors is efficient even if the number of groups is relatively small. The coefficient estimated under this procedure, depicted in row 7, remains statistically significant. In row 7, we weight the observations by the repsective district population in order to account for heteroscedasticity in the error term. Reassuringly, the estimated coefficient is only slightly smaller than the baseline estimate.

6 Conclusion

This paper presents empirical evidence that product market regulation affects labor market outcomes. The case studied is the deregulation of shop closing laws, introduced in Germany in 2006 and 2007. This reform conferred the legislative power regarding shop opening issues upon the responsibility the federal states. We exploit regional variation in trading provisions to identify the effect of deregulation on employment outcomes.

Our empirical results suggest that employment in the retail sector declined as a consequence of deregulation. In line with theoretical predictions, we show that employment losses are concentrated among small establishments, while medium and large size establishments are unaffected by the law change. Further, we find evidence that the decreases in employment were mainly borne by full-time employees.

This study advances the literature on product market regulation, focusing on employment outcomes in the German retail sector. Comparing our results to existing studies, the findings suggest that in any debate on the employment effect of deregulation, it seems crucial to account for the circumstances and conditions of the specific case, as the post-liberalization path may vary considerably among sectors and countries (Blanchard, 2006; Moura et al., 2006). A number of related issues, such as the impact of deregulation on prices, sales, productivity as well as spillover effects on other industries calls for further empirical investigation.

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