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# Regional difference-in-differences in France using the German annexation of Alsace-Moselle in 1870-1918\*

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## Abstract

In this paper, we describe the historical context of local laws in Alsace-Moselle, a region of France under the control of Germany between 1870 and 1918. We provide three examples of labor policies that can be evaluated thanks to this experience: welfare laws, regulation of working time and absenteeism, as well as preliminary investigations of the effect of those policies. We conclude in proposing additional examples of policy evaluations that could be based on a similar strategy.

**Keywords:** difference-in-difference, Alsace-Moselle, welfare reforms, regulation on hours, sickness leave reforms

**JEL Classification:** J01, J81, J83, K31, K32

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# 1 Introduction

The evaluation of labor market policies has been an expanding field in the last decades. This is partly due to the increasing availability of survey data and computing power, partly to the recognition that even complex phenomena such as the impact of laws and regulations on labor markets can be rigorously tested thanks to new empirical methodologies, such as the so-called difference-in-difference approaches (also called double differences).

In this approach, the outcome (education, access to employment, unemployment rate) of a treated group, that is, a group subject to a policy change, is compared to a control group, that is a group made of individuals (or any other unit of observation) as close as possible to the treated group, but unaffected by the treatment. The strategy of the researchers consists in finding a sudden change in policy and build a relevant comparison group. A recent paper by Imbens and Wooldridge (2008) discusses the issues associated with the choice of the groups and surveys the literature.

In countries with a federal structure such as the United States or Canada, it is straightforward to use this technique to evaluate policy changes. Indeed, many laws are specific to a state (for the US) or a province (for Canada). By comparing states experiencing a reform to states with no change, it is straightforward to obtain inference about the causal effects of the reform.<sup>1</sup> In contrast, researchers studying French labor laws typically face cases in which there is no geographical variance in policy changes since the main law is supposed to apply equally on all the French territory. Therefore, policy evaluation has to rely on other control groups. A consequence of this "universal" character of the law is that the evaluation of working time reduction in France—from 40 to 39 hours in 1982 and then to 35 hours in 1998-2000—has been made more difficult, in the apparent absence of regional differences.<sup>2</sup>

In this paper, we exploit a relatively unknown feature of French institutions: the Northeastern part of France (a region, Alsace, and a sub-region called a "département",

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<sup>1</sup>For instance, Card and Krueger (1995) survey their works on the minimum wage. In particular, they compared the effect of a change in the minimum wage in New Jersey on employment with the corresponding employment series in a neighbor state, Pennsylvania to infer the absence of a negative employability effect among teenagers. Autor et al. (2006) have exploited differences in the timing of reforms of employment protection legislation across states to estimate the employment effect of such deviations from the at-will doctrine. See also Autor et al. (2005) for a methodological discussion of the effect of regional cycles on the estimates. Black and Strahan (2001) have exploited differences in the timing of deregulation of the US banking system in order to infer about rent seeking behaviour and gender discrimination: they found that deregulation lead gender wage differences to vanish, at the expense of wages of men who declined after the deregulation.

<sup>2</sup>Researchers have however genuinely used the size of the firm, as Estevão and Sa (2006) (small firms were unaffected by the 35h workweek in 1998-2002), or the part-time/full-time status of employees as in Crépon and Kramarz (2002) in their evaluation of the reduction in working time in 1982 from 40h to 39h. Other techniques (namely, instrumental variables as in Crépon et al. 2007) have also been used to get round the problem of the endogeneity of the early transition to 35h for firms.

Moselle) has different institutions, and in particular has a different social security system. The reason is a purely historical one. Alsace-Moselle as it is called was part of Germany between 1870 and 1918. During that period, German laws fully applied. After the signature of the peace treaty in 1918, as a consequence of which Alsace-Moselle was returned to France, the German code became a local law (Droit Local), that is, a specific body of legislation mixing up the most favorable elements of the French law code and the German one.

Interestingly, there have been very few changes over time since 1918: people in Alsace-Moselle are strongly attached to their legal specificity. The central state, quite strong in France, has never been able to generate a unified law and even recognized officially the Alsace-Moselle specificity in a law text in 1924. Since then, many texts in the Civil Code and the Labor Code in France are amended with mentions of specific dispositions for the three “départements” of Bas-Rhin, Haut-Rhin (both of which make up Alsace) and Moselle (northeastern part of region Lorraine).

We can therefore use this unique historical accident to build difference-in-difference to evaluate the few reforms implemented in the rest of France differently from Alsace-Moselle. Alsace-Moselle can therefore be used as a control group, while the rest of France (which, by an abuse of language and without any meaning, we shall sometimes refer to France hereafter when there is no ambiguity) can be used as the treatment group.

In particular, we detail here three interesting institutional specificities:

- Reduction in working time: Alsace-Moselle has two days of vacation that do not exist in France, Easter Friday and Saint-Etienne (December 26). When the famous 35 hours reform was implemented between 1998 and 2002, employers in Alsace-Moselle first argued that these two days should be counted as part of the working time reduction and thus, incorporated in the number of additional vacation days provided by the 35 hours laws, approximately 18 annually.<sup>3</sup> Therefore, Alsace-Moselle experienced a 10% less stringent reduction in working time.
- Absenteeism and sickness leaves: Alsace-Moselle has a very generous regime for sick employees. Employers have to pay the full salary for the total duration of absence. Being sick is not even compulsory in order to benefit from the compensation: any fair cause is acceptable. In contrast, the rest of France has a less favorable regime: since 1945, social security covers 50% of the previous wage only after the 4th day of absence. In 1978, a law obliged all employers to give an allowance to sick and absent employees covering up to 90% of the previous wage, but only after the 11th day of absence, during 30 days and when the employees have more than three years of seniority. Therefore, Alsace-Moselle can again be considered as a control group

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<sup>3</sup>Employees could either work 35 hours per week, or keep working 39 hours as usual and get 20 additional vacation days).



Figure 1: Map of France

and the reform in France can be evaluated using difference-in-difference, or even triple differences with respect to employees with less than three years of seniority.

- Welfare policies: since 1908, all municipalities in Alsace-Moselle must provide assistance to impoverished citizens. This system was generalized to all of France in 1989 under the name RMI (Revenu Minimum d’Insertion), which is basically a subsistence income. Observers argued that the introduction of the RMI allowed municipalities in Alsace-Moselle to reduce their subsidies by one French Franc for each Franc of the national subsidy. Therefore, welfare recipients in Alsace-Moselle were left unaffected by the RMI reform and hence can be used as a control group.

Of course, one may argue that Alsace-Moselle is *different* due to the existence of other regional specificities. As a matter of fact, there is at least a difference reflected in the following map. Alsace-Moselle, represented by the three ”départements” labelled 57, 68 and 67 in the top east corner of France, happen to be the only to be ones with a border with Germany. And this is of course not a random allocation in space!

This has at least one undesirable consequence for researchers: since the pattern of trade between Germany and France is not homogenous on the French territory but instead very dependent on the distance to the border as any gravity model predicts, it is quite likely that Alsace-Moselle is disproportionately affected by German economic cycle when it differs from the French economic cycle. In such a case, any comparison of “before and after” in Alsace-Moselle and the rest of France will be contaminated by such spillover effects.

To solve for this difficult issue, we will need to do several additional comparisons with unaffected groups in both Alsace-Moselle and the rest of France, that is, falsification exercises or equivalently triple differences, by combining the difference-in-differences results of the affected and unaffected.

In this paper, we will emphasize the richness and the diversity of the applications one can develop to better evaluate French labor policies. We present in the next three sections the three reforms in reverse order: welfare and subsistence income (**Section 2**), absenteeism laws (**Section 3**) and hours worked (**Section 4**) and the specificities in the Alsace-Moselle regime. For each experience, we show aggregate results on relevant and affected variables such as long-term unemployment, employment and unemployment, absenteeism rate for both Alsace-Moselle and France, and point out to the validity or invalidity of common wisdom of the effect of each of the three labor policies. In a series of companion papers, we go deeper in the analysis and are more specific about the various possible effects of each policy. However, the purpose of the current paper is simply to expose our idea of the Alsace-Moselle identification strategy and how fruitful it can be. **Section 5** describes other legal specificities in Alsace-Moselle that could be used and concludes.

## 2 A welfare policy: the minimum income

In 1989, the French Parliament voted a very important law: any citizen above 25 years and below some income level became eligible to an allowance amounting to a large fraction of the minimum legal wage. This was called the RMI (revenu minimum d’insertion) and it was organized by the law n° 88-1088, December First 1988. A natural question for labor economists is whether this welfare program had disincentives effects and generated more long-term unemployment. This is a tricky question for empiricists given the huge amount of self-selection and heterogeneity.

By chance for econometricians, a very similar system (“aide sociale”) at the city level existed in Alsace Moselle since 1908 (*lois locales des 30 mai 1908 et du 8 novembre 1909*)<sup>4</sup>. For instance, in the main city in Alsace (Strasbourg), the allowance for an eligible person (single) amounts to 65% of the gross minimum wage (Kintz, 1989).<sup>5</sup>

After the introduction of the French RMI in 1989, municipalities in Alsace-Moselle may still give an allowance to poor individuals, but this allowance reduces by the same token the RMI given by the state (Woehrling, 2002).<sup>6</sup> Consequently, after 1988, cities in

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<sup>4</sup>[http://www.lexisnexis.com/fr/droit/search/runRemoteLink.do?bct=A&risb=21\\_T4090933869&homeCsi=303228&A=0.7883780303835484&urlEnc=ISO-8859-1&&dpsi=0ARX&remotekey1=DOC-ID&remotekey2=685\\_EN\\_AL0\\_64685FASCICULEEN\\_1\\_PRO\\_018548&service=DOC-ID&origdpsi=0ARX&level=1&duRemote=true](http://www.lexisnexis.com/fr/droit/search/runRemoteLink.do?bct=A&risb=21_T4090933869&homeCsi=303228&A=0.7883780303835484&urlEnc=ISO-8859-1&&dpsi=0ARX&remotekey1=DOC-ID&remotekey2=685_EN_AL0_64685FASCICULEEN_1_PRO_018548&service=DOC-ID&origdpsi=0ARX&level=1&duRemote=true)

<sup>5</sup>According to Kintz (1989), there are in Alsace-Moselle 13 000 covered persons by the subsidies for an amount of near 3 millions euros.

<sup>6</sup>The amount of RMI given is equal to a minimum revenue of approximately 450 euros minus income.

Alsace Moselle have a direct incentive not to give this “aide sociale”, as emphasized by Woehrling (2002). Poor individuals qualify for welfare payments in Alsace Moselle and the rest of France after 1988, but only in Alsace Moselle before 1988. This provides an opportunity for a difference-in-difference analysis before and after 1988, between Alsace Moselle and the rest of France, in order to evaluate the impact of the RMI.

## 2.1 Methodology and results

In this paper, we will present simple averages of unemployment rates in Alsace-Moselle and the rest of France, before and after 1988. Table 2-1 presents long-term (more than 2 years) average unemployment rates in France and Alsace Moselle, before and after 1989 (for individuals aged more than 25 years old). We used the “Enquête Emploi” from 1982 to 2002 to calculate the ratio of total number of unemployed people for more than 2 years and aged more than 25 years divided by the total number of active individuals in the area concerned and the time frame concerned of more than 25 years old.<sup>7</sup> Active individuals are defined as the sum of employed individuals, unemployed individuals (and soldiers of the military contingent) of more than 25 years old. For example, the long-term unemployment rate in the rest of France before 1989 (averaged over the period 1982 to 1989) is equal to 3.46 percent as visible in Row (1), Column (1). The numbers in the “Difference” row and column are simple differences. For example, the long-term unemployment rate is 1.12 percentage point higher in the rest of France than in Alsace-Moselle.

Simple differences with Alsace-Moselle provide a misleading impression of the impact of the RMI on long-term unemployment rates. Comparing long-term unemployment rates in the rest of France to the one in Alsace Moselle after 1989 (an increase in 1.95 percentage point) provides a misleading estimate of the impact of the RMI: the rest of France might have been systematically different from Alsace Moselle, due to time constant unobserved heterogeneity. Similarly, comparing unemployment rates in the rest of France before and after 1989 (an increase in 1.03 percentage point) provides a misleading estimate of the impact of the RMI: it might be that the rest of France would have witnessed an increase in its long-term unemployment rate even without the RMI, due for example to its poor economic conjuncture at the time.

This is only the difference-in-difference coefficient of Row (2), Column (2), comparing long-term unemployment rate in the rest of France to the one in Alsace Moselle, before and after 1989, captures the causal impact of the RMI. The underlying assumption is that “geographic time constant unobserved heterogeneity” is controlled for by comparing

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<sup>7</sup>Number of individuals in a certain category were obtained by summing the appropriate weight “extri”. As <http://www.jourdan.ens.fr/grenet/Econometrie/Codes.pdf> highlights, “the “Enquête emploi” interviews approximately one over 300 persons. To obtain results consistent with the total population, one has to weigh results by the variable “extri””.

a geographical area with itself, before and after 1989, while common macroeconomic trends are captured by comparing the rest of France to Alsace Moselle.

The number in the bottom right corner is a difference-in-difference estimate, comparing the rest of France to Alsace-Moselle, before and after 1989. It shows that the long-term unemployment rate increased by 0.83 percentage point due to the implementation of the RMI. This economically significant result has to be tested statistically. The significance of the difference-in-difference coefficient was estimated through the bootstrap method and we found it to be significant at the 1% level.<sup>8</sup> This seems to support the “inactivity trap” argument: individuals may have less incentives to seek for a low-paying job when it does not increase disposable income by a dramatic amount compared to welfare payments.

## 2.2 Falsification exercises

The main assumption, upon which a difference-in-difference estimation implicitly relies, is commonly called the “common time effects” assumption. It means that to interpret causally the difference-in-difference coefficient, one needs to assume that the treatment and the control group are on the same time trend. In other words, the rest of France would have evolved the same way Alsace-Moselle did, had the RMI not been implemented. This is a strong assumption, considering some inherent factors to Alsace Moselle.

We address this concern by performing two falsification exercises. The intuition of these falsification exercises is to look at categories of individuals knowingly not affected by the RMI. These individuals should not show differences in the rest of France compared to Alsace Moselle, before and after 1989, as they are not affected by the RMI. Any significant difference-in-difference would be evidence of different trends between the rest of France and Alsace Moselle, violating the “common time effects” assumption.

First, we look at short-term unemployment rates. This is defined by the unemployment rate of individuals less than 2 years out of a job. Unemployment insurance in France pays a sizeable fraction of the last work income during 2 years. After 2 years, the amount of unemployment insurance significantly drops. Individuals less than 2 years out of a job are thus not likely to qualify for the RMI. Indeed, income has to be less than a mere 464,05 euros in 2008<sup>9</sup> to qualify for RMI payments. Table 2-2 shows exactly the same table as Table 2-1, but for short-term unemployment rates. One may see

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<sup>8</sup> A hundred samples were randomly drawn with replacement from the original sample. The difference-in-difference coefficient was thus estimated a hundred times. None of the time was the difference-in-difference coefficient less than 0.

<sup>9</sup> We collected the RMI threshold for each year from the original legal texts. For example, the RMI threshold was 2000F or 304.90 euros in 1989.

[http://www.legifrance.gouv.fr/jopdf/common/jo\\_pdf.jsp?numJO=0&dateJO=19881213&numTexte=&pageDebut=15547&pageFin=](http://www.legifrance.gouv.fr/jopdf/common/jo_pdf.jsp?numJO=0&dateJO=19881213&numTexte=&pageDebut=15547&pageFin=)

The RMI threshold was 464,05 euros in 2008.



that the difference-in-difference coefficient is a mere -0.13 percentage point. According to the same bootstrap method, this coefficient is not significant. From this table, one may conclude that nothing significant happened for short-term unemployed individuals, earning unemployment insurance and thus not eligible for RMI payments, as expected.

Second, we look at individuals between 16 and 25 years old. The RMI only applies to individuals above 25 years, whereas “aide sociale” in Alsace Moselle applies to individuals of more than 16 years old. This means that individuals between 16 and 25 years old were never affected by the RMI in France, and were always affected by the “aide sociale” in Alsace Moselle. There should be no significant difference-in-difference coefficient of unemployment rates for these individuals between the rest of France and Alsace Moselle, before and after 1989. One may see from Table 2-3 that the difference-in-difference coefficient is a mere -0.09 percentage point. According to the same bootstrap method, this coefficient is not significant. From this table, one may conclude that nothing significant happened for short-term unemployed individuals between 16 and 25 years old, not affected by the RMI in the rest of France, as expected.

These two falsification exercises confirm that the “common time effects” assumption might hold. They reinforce the confidence one may have in the main result that the RMI caused unemployment.

## 3 Absenteeism

### 3.1 Legal texts

The general regime in France of sick-paid leave was organized by a governmental text from 1945, the *Ordonnance n° 45/2454 du 19 octobre 1945*.<sup>10</sup> In the original text, after a 3-days initial period during which no indemnity is paid, half of the previous wage of the employee was paid by the social security administration with minor seniority conditions (essentially everyone having worked at least 60 hours in the last three months was eligible to the indemnity during six months of absence). In 1978, a major law obliged the employers to introduce a more generous scheme for people with at least three years of seniority within the firm. The supplementary compensation (called *indemnisation complémentaire*) must be paid after the 11th day of the sick leave (the Social Security compensation still starts after the 4th day). And the supplementary compensation makes the total payment at the level of 90% of the previous wage during 30 days. After the 30

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[http://www.legifrance.gouv.fr/jopdf/common/jo\\_pdf.jsp?numJO=0&dateJO=20080117&numTexte=64&pageDebut=00907&pageFin=00907](http://www.legifrance.gouv.fr/jopdf/common/jo_pdf.jsp?numJO=0&dateJO=20080117&numTexte=64&pageDebut=00907&pageFin=00907)

The RMI threshold is updated every year, following closely the consumption price index (L’Horty and Parent, 1999).

<sup>10</sup>[http://www.legislation.cnaf.fr/textes/ord/TLR-ORD\\_452454\\_19101945.htm#art79](http://www.legislation.cnaf.fr/textes/ord/TLR-ORD_452454_19101945.htm#art79)

days period, the total payment reverts to 66% of the previous wage.<sup>11</sup>

In contrast, the local law of Alsace Moselle guarantees: first, *the full salary payment by the employer* in case of any absence independent of one's will - which is a fairly broad definition; second, no initial period during which no compensation is given: all days must be paid.<sup>12</sup>

## 3.2 Questions

A natural question is whether the generosity of the seek-leave compensation could have generated a surge in absenteeism. The question can be addressed at two levels: is it the case that in Alsace Moselle, absenteeism has always been higher, and is it the case that the transition, in France, to a more generous system, has encouraged absenteeism relative to Alsace-Moselle where no change took place in 1978 since the existing regime was uniformly more generous. Finally, the group of employees with less than 3 years of tenure can be used as an additional control group, since they are unaffected by the 1978 law. A last exercise we can provide is whether the existence of an additional seniority right has reduced the incentives to quit the firm.

## 3.3 Methodology and results

Close to the spirit of the previous section, we will present simple averages of absence rates in Alsace-Moselle and the rest of France, before and after 1978, to illustrate the basic intuition of a difference-in-difference analysis. Table 3-1 presents percentages of workers absent last week because of sickness for individuals with more than 3 years tenure (number of individuals working less than the usual number of hours worked because of sickness divided by number of employed individuals). For example, the absence rate due to sickness in the rest of France before 1978 (averaged over the period 1976 to 1978) is equal to 4.26 percent as visible in row 1, column 1. The numbers in the "difference" row and column are simple differences. For example, the absence rate due to sickness is 0.85 percentage point higher in the rest of France than in Alsace-Moselle, before 1978.

However, as in the previous cases, simple differences between France and Alsace-Moselle provide a misleading impression of the impact of policy change. The difference-

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<sup>11</sup>Also note that the 30 days period in the 90% regime is augmented by 10 additional days for each period of 5 years worked in the firm (that is, 40 days in the 90% regime for employees between 3 and 8 years of seniority, 50 days of seniority is between 8 and 13 years, etc...). This compensation scheme has not changed or only marginally since 1978. See the law at <http://www.ctip.asso.fr/garanties/incap/396.html>.

<sup>12</sup>Article 63 of the Code de Commerce Local and Article 616 du Code Civil Local which became after the recodification of May First, 2008 of L 1226-24 et L 1226-23 of Code du Travail. E.g., [http://www.ddtefp57.travail.gouv.fr/inspection/information/droit\\_local/droit\\_local.htm](http://www.ddtefp57.travail.gouv.fr/inspection/information/droit_local/droit_local.htm) See Grisey-Martinez and Dagonne (2008, Fasc. 667) for a detailed discussion and a list of clear abuses of this fairly generous regime.

in-difference estimate however can capture the causal impact of the absence law, again because "geographic time constant unobserved heterogeneity" is controlled for by comparing a geographical area with itself, before and after 1978, while common macroeconomic trends are captured by comparing the rest of France to Alsace Moselle.

The number in the bottom right corner then shows that the absence rates due to sickness increased by 0.88 percentage point, due to the implementation of the 1978 law. The coefficient is significant according to the same bootstrap method described in the previous Section. Thus result supports the view that employees tend at least marginally to take more "sick days" with a more generous absence law.

### 3.4 Falsification exercises and robustness

The main assumption, upon which a difference-in-difference estimation implicitly relies, is commonly called the "common time effects" assumption. The rest of France could have evolved differently Alsace-Moselle did, had the absence law not been implemented.

We address this concern by performing a falsification exercise. We look at employees with less than 3 years of tenure —those unaffected by the 1978 regime change— in Table 3-2. We expect no significant difference-in-difference coefficient for these individuals. This is indeed the case: the difference-in-difference coefficient is 0.35 percentage point and according to the same bootstrap method, it is not significantly different from zero. This falsification exercise confirms that the "common time effects" assumption might hold and reinforces the confidence one may have in the main result that the 1978 caused some more sick days in France, despite a general decline (see the negative time differences in the tables) due either to more controls by the administration, the firms themselves, or to macroeconomic conditions: it is likely that the fear of unemployment which surged at that time reduced the willingness of exposed employees to abuse from the system.

There is an additional mechanisms through which the 1978 law may operate: it might be that employees, being more dependent on their seniority rights after 1978 in the rest of France, would pursue less actively the search of another job where they would loose all seniority. Table 3-3 shows the proportion of employees looking for another job in France and Alsace Moselle before and after 1979 (with more than 3 years tenure). The difference-in-difference coefficient is a significant -1.25 percentage point, meaning that less employees look for a job. This results is further reinforced by Table 3-4. This table shows the proportion of employees looking for another job with better working conditions (hours, arduousness, distance) in France and Alsace Moselle before and after 1979 (with more than 3 years tenure, conditional on looking for a job).

It might therefore well be the case that eligible employees with more than three years of tenure wanted to take advantage of the law by keeping their increasing their tenure over 3 years and this reduced the average turnover in the French economy.

## 4 The 35 hours reform

In this section we make use of another difference between France and Alsace-Moselle. There are, in Alsace-Moselle, two holidays unrecognized elsewhere in the country: Saint-Etienne (Saint Stephen’s Day, Dec. 26) and Vendredi Saint (Good Friday).

These two days had a particular role when France experienced its large regulation shock, the reduction in working time (RWT, *réduction du temps de travail* ou *RTT* in french), the switch to a 35 hours workweek between 1998 to 2002. The general regime for France was as follows. After 2 years of internal negotiation about working time between 1998 and 2000, all firms above 20 employees had to switch, in 2000, to the 35 hours week or annualize the hours worked and therefore give workers 20 days of holidays. All firms between 10 and 19 employees had two additional years (until 2002) to switch to 35 hours or to give workers 20 days of holidays. Firms below 9 employees have so far been unaffected by the reform.

However, when the RWT took effect, firms in Alsace-Moselle decided that both extra holidays (Saint Stephen and Good Friday) should be counted as part of the working time reduction, or *les jours de RTT* as they are commonly known, because the main text law organizing the 35 hours did not have any mention about the specificity of Alsace-Moselle.

The application of the RWT has therefore been less favorable in Alsace-Moselle than in the rest of France, by 16 hours or by two days per year. This difference lasted until employees’ recourses began to be examined by various legal courts in the subsequent years. On October 23 2002, the local council (called prud’hommes de Metz) stated that “December 26 must be considered a bank holiday as per the special dispositions of the local laws in Alsace-Moselle, this day cannot be counted as a reduction of working time (RWT)”. See in particular Grisey-Martinez for an analysis of several litigations related to the way *les jours de RTT* were counted in firms in Alsace-Moselle. The difference in hours worked before and after was documented in Chemin and Wasmer (2008).

### 4.1 Employment by travel-to-work area (Zones d’Emploi)

The simplest idea is to verify whether a milder application in Alsace-Moselle of the 35 hours between 2000 and 2002 had a differential impact on regional unemployment or unemployment in local areas. We exploit such data at a quite disaggregate level, the Zones d’Emploi, which are the equivalent of travel-to-work areas: there are 348 such areas in France for which we have quarterly unemployment data for each of those areas between 1999 and 2006, for a total of approximately 14400 observations. Among these 348 areas, 17 are in Alsace-Moselle, for a total of 510 observations.

The simplest idea would therefore be to run a regression of the following form:

$$unemployment_{it} = \alpha_i + \beta_t + \gamma(alsace - moselle) * (2000 - 02)_{it} + u_{it} \quad (1)$$

where  $i$  corresponds to an employment zone,  $t$  is the quarter of observation between 1999

and 2006.  $\alpha_i$  are employment zone fixed effects,  $\beta_t$  quarter fixed effects. Alsace-Moselle is a variable equal to 1 if the employment zone is in the region Alsace or the department Moselle. (2000-02) is a variable equal to 1 if the year of observation is during the time of a differential application of the 35 hours. Hence, (Alsace-Moselle)\*(2000-02) is a variable equal to 1 if the employment zone is in Alsace or Moselle in the relevant period. As additional controls, we also have a variable reflecting "being in Alsace-Moselle after 2003", for reasons that will appear more clearly in the next paragraphs.

In Table 4-1, we present the difference-in-difference coefficient  $\gamma$  for different samples and specifications, where standard errors are clustered at the region level.<sup>13</sup> Since unemployment is between 0 and 100 (in percent) a diff-in-diff coefficient of 0.9 in Column (1) means, *in principle*, an increase of 0.9 percentage points of unemployment in Alsace-Moselle relative to France due to a milder application of the 35 hours reform. This is a surprising coefficient: first the sign is positive, which would mean that the 35 hours reform did work and *reduced unemployment* with statistical significance; and second its magnitude is large: a 10% difference in the application of 35 hours would mean, if the effect of 35 hours was linear, that the overall effect of 35 hours is no less than 9 percentage points of unemployment! This is a number that is by far **above** any number put by the promoters of the reform themselves: at most they argued that the reform had created 400 000 jobs in France, that is only 2 to 3 percentage points.

The problem here is the German cycle: during the period of interest that is after 2000, Germany entered a recession. This had presumably adverse consequences on unemployment in France and the negative effect was presumably concentrated in the regions and areas closest to Germany. This is indeed almost surely the case since more than 70,000 people are "transfrontaliers", that is residents of France working in Germany. As a matter of fact, inspection of the second reported coefficient in Column (1) in Table 4-1 reveals that after 2003, where Alsace-Moselle and France were in principle affected equally by the 35 hours reform, unemployment in Alsace-Moselle rose by an additional 2 percentage points relative to France.

The next columns (2) to (4) illustrate pretty well the problem generated by local and regional cycles in our identification strategy. In Column (2), we replicate exactly the same diff-in-diff analysis for employment zones in Alsace-Moselle further away from the German border. We only keep the zones in Alsace-Moselle that have no direct border with Germany and are at least 70km (or 1 hour by car) from the border. We argue that this restricts the extent of transborder effects. See the note in the table for the selected regions. The idea is that such zones are probably less affected by the German economic cycle than employment zones closest to the German border. As it appears in the Table, this is indeed the case to some extent. The 0.9 coefficient of Column (1) is now smaller and reaches 0.84.

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<sup>13</sup>There are 22 regions in France. We tried to cluster by travel-to-work area or by departement, without any major change in the significance: t-stat did not vary much.

However, the biggest change occurs when we introduce a different control group. Columns (3) and (4) use Lorraine without Moselle as a control group. Lorraine is the region next to Alsace. It is fairly close to Germany too. But Lorraine without Moselle (the “rest of Lorraine”) was not concerned by the two additional days of vacation and their suppression in 2000. It was however affected by the German cycle to some extent.

The rest of Lorraine is in principle a better control group for Alsace and Moselle, as for the geographical, historical, cultural, industrial similarities between the two regions. There are also many “transfrontaliers” in the rest of Lorraine. Only 29 employment zones are now included in Column (3). The reported  $\gamma$  coefficient in this case is now half of what it was in Columns (1) and (2). Moreover, it is no longer significant even at the 10% level.

## 4.2 Partial conclusion

The conclusion here is that triple differences, once again, are needed, where an additional control group is a group of workers unaffected by difference in the 35 hours reform between Alsace-Moselle and the rest of France. In Chemin and Wasmer (2008), based on the French labor force surveys over the relevant period, we used three sets of unaffected groups. The first one was based either on the size of the firm (very small firms (between 0 and 9 employees) were unaffected, small firms (10 to 19 employees) were affected by the reform two years after the firms with more employees. The second one was based on occupations unaffected by the 35 hours reform, such as self-employed, farmers, “profession libérales” like doctors, business owner and merchants. The third one was based on a careful reading of the 528 collective agreements by sector: a fraction of them was specific to Alsace-Moselle (Convention Collectives Locales) and a sub-fraction of them mentioned explicitly the two additional days. Employees in those sectors covered by these agreements were therefore treated as a control group since it was likely that the 35 hours shock was identical in those sectors in Alsace-Moselle and in the rest of France. In all cases, we found that triple differences coefficients are not significant while double difference are always significant. This is suggestive of a marginal or null effect of the working time reduction reform.

## 5 Conclusion

This paper has shown how simple difference-in-difference coefficient may shed light on important, and previously unexplored, impact of public policies. The results presented in this paper are only simple descriptive statistics and the next step is naturally to use regression models that may control for other important variables.

We contribute to the literature on evaluation of public policies by emphasizing a methodology based on previously unexplored geographical differences. In France, many

public policies are left without proper evaluation, simply because most of the policies in France are implemented nationally. Researchers thus lack appropriate control groups. This paper shows that accidental historical events in some departments of France may provide these control groups for some of the relevant policies.

Beyond the differences in social security, we suggest that researchers interested by the evaluation of other policies should investigate two other major differences between Alsace-Moselle and France:

- first, the law on personal bankruptcies. The concept of personal bankruptcies for all individuals - not only business owners - existed much earlier in Alsace-Moselle than in France. This potentially allows to test for the effect of individual incentives to borrow more and therefore become over-indebted;
- second, the law regulating the creation and the administration of associations. It is more difficult to create an association but they have more autonomy. This may have affected the accumulation of social capital and other aspects of local life.

**Table 2-1: Long-term (more than 2 years) average unemployment rates in France and Alsace Moselle before and after 1989 (more than 25 years old)**

	1982-1989	1990-2002	Difference
Rest of France	3.46	4.49	1.03
Alsace Moselle	2.34	2.54	0.20
Difference	1.12	1.95	0.83***

The significance of the difference-in-differences coefficient is estimated through the bootstrap method. 100 samples were randomly drawn with replacement from the original sample. The difference-in-differences coefficient was thus estimated 100 times. None of the time was the difference-in-differences coefficient less than 0. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Figures are long duration (more than 2 years ) average unemployment rates for individuals more than 25 years old. They represent the ratio of total number of unemployed people for more than 2 years and aged more than 25 years divided by the total number of active individuals in the area concerned and the time frame concerned of more than 25 years old. Active individuals are defined as the sum of employed individuals, unemployed individuals (and soldiers of the military contingent) of more than 25 years old. The numbers in the "Difference " row and column are simple differences. The number in the bottom right corner is a difference-in-differences estimate, comparing the rest of France to Alsace-Moselle, before and after 1989.



**Table 2-2: Short-term (less than 2 years) average unemployment rates in France and Alsace Moselle before and after 1989 (more than 25 years old)**

	1982-1989	1990-2002	Difference
Rest of France	6.98	9.52	2.54
Alsace Moselle	5.67	8.35	2.68
Difference	1.31	1.17	<b>-0.13</b>

The significance of the difference-in-differences coefficient is estimated through the bootstrap method. 100 samples were randomly drawn with replacement from the original sample. The difference-in-differences coefficient was thus estimated 100 times. 77% of the time was the difference-in-differences coefficient less than 0. According to the bootstrap method, this difference-in-differences coefficient is thus insignificantly different from 0. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Figures are short duration (less than 2 years ) average unemployment rates for individuals aged more than 25 years. They represent the ratio of total number of unemployed people for less than 2 years and more than 25 years old divided by the total number of active individuals in the area concerned and the time frame concerned of more than 25 years. Active individuals are defined as the sum of employed individuals, unemployed individuals (and soldiers of the military contingent) of more than 25 years. The numbers in the "Difference" row and column are simple differences. The number in the bottom right corner is a difference-in-differences estimate, comparing the rest of France to Alsace-Moselle, before and after 1989.

**Table 2-3: Long duration (more than 2 years) average unemployment rates in France and Alsace Moselle before and after 1989 (between 16 and 25 years old)**

	1982-1989	1990-2002	Difference
Rest of France	5.55	4.52	-1.03
Alsace Moselle	3.81	2.87	-0.94
Difference	1.74	1.65	<b>-0.09</b>

The significance of the difference-in-differences coefficient is estimated through the bootstrap method. 100 samples were randomly drawn with replacement from the original sample. The difference-in-differences coefficient was thus estimated 100 times. 72% of the time was the difference-in-differences coefficient less than 0. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Figures are long duration (more than 2 years ) average unemployment rates for individuals more than 16 and less than 25 years old. They represent the ratio of total number of unemployed people for more than 2 years and aged between 16 and 25 years divided by the total number of active individuals in the area concerned and the time frame concerned between 16 and 25 years old. Active individuals are defined as the sum of employed individuals, unemployed individuals (and soldiers of the military contingent) between 16 and 25 years old. The numbers in the "Difference " row and column are simple differences. The number in the bottom right corner is a difference-in-differences estimate, comparing the rest of France to Alsace-Moselle, before and after 1989.

**Table 3-1: proportion of employees absent due to sickness in France and Alsace Moselle before and after 1979 (more than 3 years tenure)**

	1976-1978	1979-1989	Difference
Rest of France	4.26	3.36	-0.90
Alsace Moselle	5.11	3.33	-1.78
Difference	-0.85	0.03	<b>0.88***</b>

Figures are percentages of workers absent last week because of sickness for individuals with more than 3 years tenure (number of individuals working less than the usual number of hours worked because of sickness divided by number of employed individuals). The numbers in the "Difference" row and column are simple differences. The number in the bottom right corner is a difference-in-differences estimate, comparing the rest of France to Alsace-Moselle, before and after 1989. The significance of the difference-in-differences coefficient is estimated through the bootstrap method. 100 samples were randomly drawn with replacement from the original sample. The difference-in-differences coefficient was thus estimated 100 times. None of the time was the difference-in-differences coefficient less than 0. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

**Table 3-2: proportion of employees absent due to sickness in France and Alsace Moselle before and after 1979 (less than 3 years tenure)**

	1976-1978	1979-1989	Difference
Rest of France	3.26	2.27	-0.99
Alsace Moselle	3.78	2.44	-1.34
Difference	-0.52	-0.17	<b>0.35</b>

Figures are percentages of workers absent last week because of sickness for individuals with less than 3 years tenure (number of individuals working less than the usual number of hours worked because of sickness divided by number of employed individuals). The numbers in the "Difference" row and column are simple differences. The number in the bottom right corner is a difference-in-differences estimate, comparing the rest of France to Alsace-Moselle, before and after 1989. The significance of the difference-in-differences coefficient is estimated through the bootstrap method. 100 samples were randomly drawn with replacement from the original sample. The difference-in-differences coefficient was thus estimated 100 times. In 26% of cases the difference-in-differences coefficient was less than 0. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

**Table 3-3: proportion of employees looking for another job in France and Alsace Moselle before and after 1979 (more than 3 years tenure)**

	1976-1978	1979-1989	Difference
Rest of France	12.17	6.89	-5.28
Alsace Moselle	8.83	4.80	-4.03
Difference	3.34	2.09	<b>-1.25***</b>

The significance of the difference-in-differences coefficient is estimated through the bootstrap method. 100 samples were randomly drawn with replacement from the original sample. The difference-in-differences coefficient was thus estimated 100 times. None of the time was the difference-in-differences coefficient less than 0. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Figures are percentages of workers looking for another job with more than 3 years tenure. The numbers in the "Difference" row and column are simple differences. The number in the bottom right corner is a difference-in-differences estimate, comparing the rest of France to Alsace-Moselle, before and after 1989.

**Table 3-4: proportion of employees looking for another job with better working conditions in France and Alsace Moselle before and after 1979 (more than 3 years tenure, if looking for a job)**

	1976-1978	1979-1989	Difference
Rest of France	3.68	12.53	8.85
Alsace Moselle	3.84	13.06	9.22
Difference	-0.16	-0.53	<b>-0.36***</b>

The significance of the difference-in-differences coefficient is estimated through the bootstrap method. 100 samples were randomly drawn with replacement from the original sample. The difference-in-differences coefficient was thus estimated 100 times. None of the time was the difference-in-differences coefficient less than 0. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. Figures are percentages of workers looking for another job with better working conditions (hours, arduousness, distance) with more than 3 years tenure, if looking for a job. The numbers in the "Difference" row and column are simple differences. The number in the bottom right corner is a difference-in-differences estimate, comparing the rest of France to Alsace-Moselle, before and after 1989.

**Table 4-1: Impact of the milder version of the 35 hours reform in Alsace-Moselle in 2000 on unemployment rates**

	(1)	(2)	(3)	(4)
Quarterly Unemployment Rate by Employment Zone 1999-2006				
Treatment group	Alsace-Moselle	Alsace-Moselle far from border	Alsace-Moselle	Alsace-Moselle far from border
Control Group	Rest of France	Rest of France	Rest of Lorraine	Rest of Lorraine
(treatment)*(2000-2002)	0.90 (3.54)***	0.84 (3.06)***	0.50 (1.55)	0.44 (1.23)
(treatment)*(2003-2006)	2.37 (4.39)***	2.07 (3.66)	1.14 (1.71)	0.84 (1.18)
Quarter Fixed Effects	Yes	Yes	Yes	Yes
Employment Zones Fixed Effects	Yes	Yes	Yes	Yes
Observations	10440	10170	870	600
R-squared	0.93	0.93	0.95	0.96

Robust t statistics in parentheses, clustered at the level of department. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. There are 22 regions, 95 departments and 348 Employment Zones. The dependent variable is the Quarterly Unemployment Rate by Employment Zone. The treatment variable is equal to 1 if the employment zone belongs to one of the treatment regions. In this table, there are two alternative treatment regions: Alsace-Moselle, or employment zones in Alsace-Moselle but far from border with Germany. (include: METZ, SARREBOURG in Moselle, SAVERNE-SARRE-UNION, MOLSHEIM-SCHIRMECK, SELESTAT-SAINTE-MARIE-AUX-MINES, GUEBWILLER, THANN-CERNAY, ALTKIRCH in Alsace). The control group is either France without Alsace-Moselle, or Rest of Lorraine. Lorraine is the second closest region to Germany. It includes Moselle. Rest of Lorraine is therefore Lorraine without Moselle. Finally, (Treatment)\*post2000 is a variable equal to 1 if the employment zone is in the treatment region after 2000. (Alsace-Moselle far from border) is a variable equal to 1 if the employment zone is in the region Alsace or the department Moselle but far from the border

This is the Difference-in-Differences variable of interest. post(2000+3rd quarter) is a variable equal to 1 if the year of observation is after 2000 plus the 3rd quarter. 30 Quarter Fixed Effects are included in columns (1), (2) and (3). Only 7 and 11 Quarter Fixed Effects are included in Columns (4) and (5), which restrict the sample to observations in 1999-2001 and 1999-2002. 348 Employment zones Fixed Effects are included in all columns.

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## 6 Appendix

We briefly document the identification strategy of the 35 hours. This is however not central here, but a full and thorough check can be found in a companion paper (Chemin and Wasmer 2008) using the labour force survey. The microeconomic data used here is instead the “*Enquêtes permanentes sur les conditions de vie, Indicateurs sociaux d’octobre - Fichier historique 1996-2003*”.

Table A-1 examines the relationship between the milder reform in Alsace Moselle in 2000 and workers behaviour. In column (1), the dependent variable is the number of hours worked per week. Workers in Alsace-Moselle actually worked more than their counterparts in the rest of France after the reform, relative to before. The theoretical coefficient is 2 days per year, that is, 0.36 hours per week. This is quite close from the measured coefficient, which is 0.49, although with marginal significance. In our companion paper, we find, using a larger dataset - the labor force survey - that the coefficient is actually closer from 0.36 and significant at the 5% level.

We ran another check with this survey: the dependent variable in column (2) is the willingness to work less if the salary was to remain constant. The finding is that after the reform, it is more frequent to find more workers ready to work less in Alsace Moselle after 2000 compared to the rest of France. This means that the 35 hours reform was indeed milder in Alsace Moselle in 2000. This is confirmation that there were different effects of the 35 hours reform in Alsace Moselle and in the rest of France in 2000.

**Table A-1: Impact of the milder version of the 35 hours reform in Alsace-Moselle in 2000 on workers (EPCV 1996-2003)**

	(1)	(2)
	Number of weekly hours worked	Would you prefer to work less if your wage did not change?
(Alsace-Moselle)*post2000	0.488 (1.37)	0.0783 (2.26)**
Department Fixed Effects	Yes	Yes
Year Fixed Effects	Yes	Yes
Observations	7642	7594
R-squared	0.02	

Robust t statistics in parentheses, clustered at the level of department. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%. The dependent variable in column (1) is the number of hours worked per week. The dependent variable in column (2) is the willingness to work less if the salary was to remain constant. Alsace-Moselle is a variable equal to 1 if the employment zone is in the region Alsace or the department Moselle. Post2000 is a variable equal to 1 if the year of observation is after 2000. (Alsace-Moselle)\*post2000 is a variable equal to 1 if the employment zone is in Alsace or Moselle after 2000. This is the Difference-in-Differences variable of interest.