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Volume Title: NBER International Seminar on Macroeconomics 2008

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Volume Publisher: University of Chicago Press

Volume ISBN: 978-0-226-10732-5

ISSN: 1932-8796

Volume URL: <http://www.nber.org/books/fran08-1>

Conference Date: June 20-21, 2008

Publication Date: April 2009

Chapter Title: Regional difference-in-differences in France using the German annexation of Alsace-Moselle in 1870-1918

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Chapter URL: <http://www.nber.org/chapters/c8247>

Chapter pages in book: (p. 285 - 305)

Regional Difference-in-Differences in France Using the German Annexation of Alsace-Moselle in 1870–1918

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I. 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 and 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 that of a control group, that is, a group made up 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 building 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 United States) or a province (for Canada). When states experiencing a reform are compared to states with no change, it is straightforward to obtain inferences about the causal effects of the reform.¹ 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 to 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 the reduction in working time 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.²

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*, 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 the Lorraine region).

We can therefore use this unique historical accident to build difference-in-differences 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, whereas the rest of France (which, by an abuse of language and without any meaning, we shall sometimes refer to as 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: Good 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.³ Therefore, Alsace-Moselle experienced a 10% less stringent reduction in working time.
- Absenteeism and sick leaves: Alsace-Moselle has a very generous regime for sick employees. Employers have to pay the full salary for the total duration of an 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 fourth 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 eleventh day of absence, during 30 days and when the employees have more than 3 years of seniority. Therefore, Alsace-Moselle can again be considered as a control group, and the reform in France can be evaluated using difference-in-differences or even triple differences with respect to employees with less than 3 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 because of the existence of other regional specificities. As a matter of fact, there is at least a difference reflected in the map in figure 1. The three *départements* of Alsace-Moselle, labeled 57, 68, and 67 in the northeast corner of France, happen to be the only 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 homogeneous 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 the 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 groups.

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 (Sec. II), absenteeism laws (Sec. III), and hours worked (Sec. IV) and the specificities in the Alsace-Moselle regime.

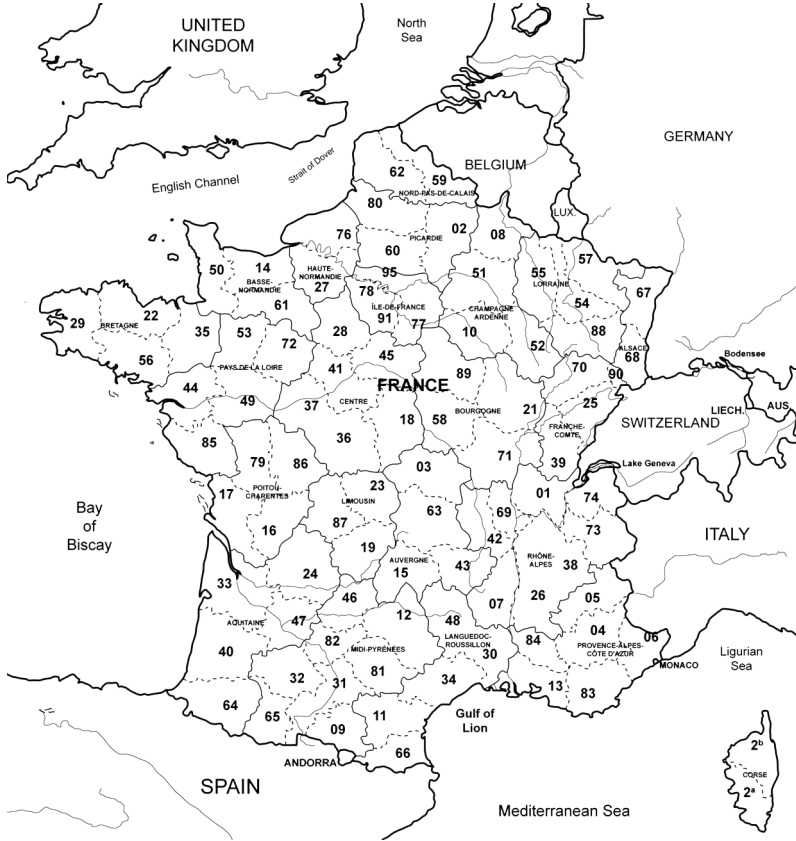


Fig. 1

For each experience, we show aggregate results on relevant and affected variables such as long-term unemployment, employment and unemployment, and the rate of absenteeism for both Alsace-Moselle and France, and we point out 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 into 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 V describes other legal specificities in Alsace-Moselle that could be used and presents conclusions.

II. 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 for

an allowance amounting to a large fraction of the minimum legal wage. This was called the RMI, and it was organized by law number 88-1088, December 1, 1988. A natural question for labor economists is whether this welfare program had disincentive 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*).⁴ For instance, in the main city in Alsace (Strasbourg), the allowance for an eligible person (single) amounts to 65% of his or her gross minimum wage (Kintz 1989).⁵

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).⁶ Consequently, after 1988, cities in Alsace-Moselle have a direct incentive not to give this *aide sociale*, as emphasized by Woehrling. 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.

A. 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 1 presents long-term (more than 2 years) average unemployment rates in France and Alsace-Moselle, before and after 1989 (for individuals more than 25 years old). We used the *Enquête Emploi*, the major French labor survey, from 1982 to 2002 to calculate the ratio of the total number of people unemployed for more than 2 years and more than 25 years old divided by the total number of active individuals more than 25 years old in the area concerned and the time frame concerned.⁷ Active individuals are defined as the sum of employed individuals and unemployed individuals (as well as soldiers of the military contingent) more than 25 years old. For example, the long-term unemployment rate in the rest of France before 1989 (averaged over the period 1982–89) is equal to 3.46%, as seen in row 1, column 1. The numbers in row 3 and column 3 are first differences. For example, the average long-term unemployment rate between 1982 and 1989 is 1.12 percentage points higher in the rest of France than in Alsace-Moselle as visible in row 3, column 1.

Table 1

Long-Term (More than 2 Years) Average Unemployment Rates in France and Alsace-Moselle before and after 1989 (More than 25 Years Old)

	1982–89 (1)	1990–2002 (2)	Difference (3)
Rest of France	3.46	4.49	1.03
Alsace-Moselle	2.34	2.54	.20
Difference	1.12	1.95	.83***

Note: The significance of the difference-in-differences coefficient is estimated through the bootstrap method. One hundred samples were randomly drawn with replacement from the original sample. The difference-in-differences coefficient was thus estimated 100 times. The difference-in-differences coefficient was never less than zero. Figures are long-duration (more than 2 years) average unemployment rates for individuals more than 25 years old. They represent the ratio of the total number of people unemployed for more than 2 years and more than 25 years old divided by the total number of active individuals more than 25 years old in the area concerned and the time frame concerned. Active individuals are defined as the sum of employed individuals and unemployed individuals (and soldiers of the military contingent) more than 25 years old. The numbers in the Difference row and column are first 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.

***Significant at 1%.

First 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 of 1.95 percentage points) provides a misleading estimate of the impact of the RMI: the rest of France might have been systematically different from Alsace-Moselle because of time-constant unobserved heterogeneity. Similarly, comparing unemployment rates in the rest of France before and after 1989 (an increase of 1.03 percentage points) 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 as a result of, for example, its poor economic conjuncture at the time.

Only the difference-in-difference coefficient of row 2, column 2 (comparing the 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 a geographical area with itself, before and after 1989, whereas 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 as a result of 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.⁸ This seems to support the “inactivity trap” argument: individuals may have less incentive to seek a low-paying job when it does not increase disposable income by a dramatic amount compared to welfare payments.

B. 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 groups 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 factors inherent 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, since 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 the short-term unemployment rate. This is defined by the unemployment rate of individuals less than 2 years out of a job. Unemployment insurance in France pays a sizable 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 in 2008 to qualify for RMI payments.⁹ Table 2 is exactly the same as table 1, except for short-term unemployment rates. One may see 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 applies only to individuals above 25 years old, whereas *aide sociale* in

Table 2
Short-Term (Less than 2 Years) Average Unemployment Rates in France
and Alsace-Moselle before and after 1989 (More than 25 Years Old)

	1982–89 (1)	1990–2002 (2)	Difference (3)
Rest of France	6.98	9.52	2.54
Alsace-Moselle	5.67	8.35	2.68
Difference	1.31	1.17	–.13

Note: The significance of the difference-in-differences coefficient is estimated through the bootstrap method. One hundred samples were randomly drawn with replacement from the original sample. The difference-in-differences coefficient was thus estimated 100 times. The difference-in-differences coefficient was less than zero 77% of the time. According to the bootstrap method, this difference-in-differences coefficient is thus insignificantly different from zero. Figures are short-duration (less than 2 years) average unemployment rates for individuals more than 25 years old. They represent the ratio of the total number of people unemployed for less than 2 years and more than 25 years old divided by the total number of active individuals more than 25 years old in the area concerned and the time frame concerned. Active individuals are defined as the sum of employed individuals and unemployed individuals (and soldiers of the military contingent) more than 25 years old. The numbers in the Difference row and column are first 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.

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 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.

III. Absenteeism

A. Legal Texts

The general regime in France of paid sick leave was organized by a governmental text from 1945, the *Ordonnance n° 45/2454 du 19 octobre 1945*.¹⁰ In the original text, after a 3-day initial period during which no indemnity is

Table 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)

	1982–89 (1)	1990–2002 (2)	Difference (3)
Rest of France	5.55	4.52	-1.03
Alsace-Moselle	3.81	2.87	-.94
Difference	1.74	1.65	-.09

Note: The significance of the difference-in-differences coefficient is estimated through the bootstrap method. One hundred samples were randomly drawn with replacement from the original sample. The difference-in-differences coefficient was thus estimated 100 times. The difference-in-differences coefficient was less than zero 72% of the time. 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 the total number of people unemployed for more than 2 years and between 16 and 25 years old divided by the total number of active individuals between 16 and 25 years old in the area concerned and the time frame concerned. Active individuals are defined as the sum of employed individuals and unemployed individuals (and soldiers of the military contingent) between 16 and 25 years old. The numbers in the Difference row and column are first 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.

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 3 months was eligible for the indemnity during 6 months of absence). In 1978, a major law obliged employers to introduce a more generous scheme for people with at least 3 years of seniority within the firm. The supplementary compensation (called *indemnisation complémentaire*) must be paid after the eleventh day of the sick leave (the social security compensation still starts after the fourth day). And the supplementary compensation makes the total payment at the level of 90% of the previous wage during 30 days. After the 30-day period, the total payment reverts to 66% of the previous wage.¹¹

In contrast, the local law of Alsace-Moselle guarantees (1) *the full salary payment by the employer* in case of any absence independent of one's will (which is a fairly broad definition) and (2) no initial period during which no compensation is given: all days must be paid.¹²

B. Questions

A natural question is whether the generosity of the sick 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 to determine whether the existence of an additional seniority right has reduced the incentives to quit the firm.

C. 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 4 presents percentages of workers absent last week because of sickness for individuals with more than 3 years' tenure (the number of individuals working less than the usual number of hours worked because of sickness divided by the number of employed individuals). For example, the absence rate due to sickness in the rest of France before 1978 (averaged over the period 1976–78) is equal to 4.26%, as seen in row 1, column 1. The numbers in row 3 and column 3 are first differences. For example, the absence rate due to sickness is 0.85 percentage point lower in the rest of France than in Alsace-Moselle, before 1978.

Table 4

Proportion of Employees Absent Because of Sickness in France and Alsace-Moselle before and after 1979 (More than 3 Years' Tenure)

	1976–78 (1)	1979–89 (2)	Difference (3)
Rest of France	4.26	3.36	-.90
Alsace-Moselle	5.11	3.33	-1.78
Difference	-.85	.03	.88***

Note: Figures are percentages of workers absent last week because of sickness for individuals with more than 3 years' tenure (the number of individuals working less than the usual number of hours worked because of sickness divided by the number of employed individuals). The numbers in the Difference row and column are first 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. One hundred samples were randomly drawn with replacement from the original sample. The difference-in-differences coefficient was thus estimated 100 times. The difference-in-differences coefficient was never less than zero.

***Significant at 1%.

However, as in the previous cases, first differences between France and Alsace-Moselle provide a misleading impression of the impact of policy change. The difference-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, whereas 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 after the implementation of the 1978 law. The coefficient is significant according to the same bootstrap method described in the previous section. This result supports the view that employees tend at least marginally to take more “sick days” with a more generous absence law.

D. Falsification Exercises and Robustness

The main assumption, on which a difference-in-difference estimation implicitly relies, is commonly called the “common time effects” assumption. The rest of France could have evolved differently than 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 5. We expect no significant difference-in-difference

Table 5

Proportion of Employees Absent Because of Sickness in France and Alsace-Moselle before and after 1979 (Less than 3 Years' Tenure)

	1976–78 (1)	1979–89 (2)	Difference (3)
Rest of France	3.26	2.27	–.99
Alsace-Moselle	3.78	2.44	–1.34
Difference	–.52	–.17	.35

Note: Figures are percentages of workers absent last week because of sickness for individuals with less than 3 years' tenure (the number of individuals working less than the usual number of hours worked because of sickness divided by the number of employed individuals). The numbers in the Difference row and column are first 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. One hundred samples were randomly drawn with replacement from the original sample. The difference-in-differences coefficient was thus estimated 100 times. The difference-in-differences coefficient was less than zero in 26% of the cases.

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 change caused some more sick days in France, despite a general decline (see the negative time differences in the tables) due to more controls by the administration, the firms themselves, or macroeconomic conditions: it is likely that the fear of unemployment that surged at that time reduced the willingness of exposed employees to abuse the system.

There is an additional mechanism 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 for another job in which they would lose all seniority. Table 6 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 points, meaning that fewer employees look for a job. This result is further reinforced by table 7. 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 3 years of tenure wanted to take advantage of the law by increasing

Table 6

Proportion of Employees Looking for Another Job in France and Alsace-Moselle before and after 1979 (More than 3 Years' Tenure)

	1976–78 (1)	1979–89 (2)	Difference (3)
Rest of France	12.17	6.89	-5.28
Alsace-Moselle	8.83	4.80	-4.03
Difference	3.34	2.09	-1.25***

Note: The significance of the difference-in-differences coefficient is estimated through the bootstrap method. One hundred samples were randomly drawn with replacement from the original sample. The difference-in-differences coefficient was thus estimated 100 times. The difference-in-differences coefficient was never less than zero. Figures are percentages of workers looking for another job with more than 3 years' tenure. The numbers in the Difference row and column are first 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.

***Significant at 1%.

Table 7

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)

	1976–78 (1)	1979–89 (2)	Difference (3)
Rest of France	3.68	12.53	8.85
Alsace-Moselle	3.84	13.06	9.22
Difference	–.16	–.53	–.36 ^{***}

Note: The significance of the difference-in-differences coefficient is estimated through the bootstrap method. One hundred samples were randomly drawn with replacement from the original sample. The difference-in-differences coefficient was thus estimated 100 times. The difference-in-differences coefficient was never less than zero. 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 first 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.

^{***}Significant at 1%.

their tenure over 3 years, and this reduced the average turnover in the French economy.

IV. The 35-Hours Reform

In this section we make use of another difference between France and Alsace-Moselle. In Alsace-Moselle there are two holidays unrecognized elsewhere in the country: Saint-Etienne (Saint Stephen's Day, December 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*, or RTT in French), the switch to a 35-hour workweek between 1998 and 2002. The general regime for France was as follows. After 2 years of internal negotiation about working time between 1998 and 2000, all firms with more than 20 employees had to switch to the 35-hour workweek in 2000 or annualize the hours worked and therefore give workers 20 holidays. All firms between 10 and 19 employees had 2 additional years (until 2002) to switch to 35 hours or to give workers 20 holidays. Firms with fewer than nine 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's 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 2 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 (2005) 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).

A. *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 14,400 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:

$$\text{unemployment}_{it} = \alpha_i + \beta_t + \gamma(\text{Alsace-Moselle}) \times (2000-2002)_{it} + u_{it}, \quad (1)$$

where i corresponds to an employment zone, t is the quarter of observation between 1999 and 2006, α_i are employment zone fixed effects, and β_t are quarter fixed effects. Alsace-Moselle is a variable equal to one if the employment zone is in the region Alsace or the *département* Moselle. The variable 2000–2002 is equal to one if the year of observation is during the time of a differential application of the 35 hours. Hence, $(\text{Alsace-Moselle}) \times (2000-2002)$ is a variable equal to one 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 8, we present the difference-in-difference coefficient γ for different samples and specifications, where standard errors are clustered at the region level.¹³ Since unemployment is between 0% and 100%, a difference-in-difference coefficient of 0.9 in column 1 means, in principle, an increase of 0.9 percentage point of unemployment in Alsace-Moselle relative to France caused by 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; second, its magnitude is large: if the effect of 35 hours was linear, a 10% difference in the application of 35 hours would mean 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

Table 8
Impact of the Milder Version of the 35-Hours Reform in Alsace-Moselle in 2000
on Unemployment Rates

	Quarterly Unemployment Rate by Employment Zone, 1999–2006			
	(1)	(2)	(3)	(4)
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 \times (2000–2)	.90 (3.54) ^{***}	.84 (3.06) ^{***}	.50 (1.55)	.44 (1.23)
Treatment \times (2003–6)	2.37 (4.39) ^{***}	2.07 (3.66)	1.14 (1.71)	.84 (1.18)
Quarter fixed effects	Yes	Yes	Yes	Yes
Employment zones fixed effects	Yes	Yes	Yes	Yes
Observations	10,440	10,170	870	600
R^2	.93	.93	.95	.96

Note: Robust t -statistics are in parentheses, clustered at the level of regions. There are 22 regions, 95 *départements*, and 348 employment zones. The dependent variable is the quarterly unemployment rate by employment zone. The treatment variable is equal to one 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 (including Metz, Sarrebourg in Moselle, Saverne-Sarre-Union, Molsheim-Schirmeck, Selestat-Sainte-Marie-aux-Mines, Guebwiller, Thann-Cernay, and Altkirch in Alsace). The control group is either France without Alsace-Moselle or the rest of Lorraine. Lorraine is the second-closest region to Germany. It includes Moselle. The rest of Lorraine is therefore Lorraine without Moselle. Treatment \times (2000–2) is a variable equal to one if the employment zone is in the treatment region between 2000 and 2002. This is the difference-in-differences variable of interest. Treatment \times (2003–6) is a variable equal to one if the employment zone is in the treatment region between 2003 and 2006. Quarter fixed effects are included in all columns.

^{***}Significant at 1%.

that the reform had created 400,000 jobs in France, that is, only 2–3 percentage points.

The problem here is the German cycle: during the period of interest (i.e., 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 8 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.

Columns 2–4 illustrate pretty well the problem generated by local and regional cycles in our identification strategy. In column 2, we replicate exactly the same difference-in-difference analysis for employment zones in Alsace-Moselle farther away from the German border. We keep only the zones in Alsace-Moselle that have no direct border with Germany and are at least 70 kilometers (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.

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 because of the geographical, historical, cultural, and 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 γ 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.

B. *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 differences in the 35-hours reform between Alsace-Moselle and the rest of France. In Chemin and Wasmer (2008), on the basis of the French labor force surveys over the relevant period, we used three sets of unaffected groups. The first one was based on the size of the firm: very small firms (between zero and nine employees) were unaffected, and small firms (10–19 employees) were affected by the reform 2 years after the firms with more employees. The second one was based on occupations unaffected by the 35-hours reform, such as the self-employed, farmers, *profession libérales* such as doctors, business owners, and merchants. The third one was based on a careful reading of the 528 collective agreements by sector: a fraction of them were specific to Alsace-Moselle (*Convention Collectives Locales*), and a subfraction 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 whereas double differences are always significant. This is suggestive of a marginal or null effect of the working time reduction reform.

V. Conclusion

This paper has shown how simple difference-in-difference coefficients may shed light on the 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 *départements* of France may provide these control groups with some of the relevant policies.

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

1. 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 testing for the effect of individual incentives to borrow more and therefore become overindebted.

2. 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.

Appendix

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

Table A1 examines the relationship between the milder reform in Alsace-Moselle in 2000 and workers' behavior. 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,

Table A1

Impact of the Milder Version of the 35-Hours Reform in Alsace-Moselle in 2000 on Workers (EPCV 1996–2003)

	Number of Weekly Hours Worked (1)	Would You Prefer to Work Less if Your Wage Did Not Change? (2)
Alsace-Moselle × post-2000	.488 (1.37)	.0783 (2.26)**
<i>Département</i> fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Observations	7,642	7,594
R ²	.02	

Note: Robust *t*-statistics are in parentheses, clustered at the level of *département*. The dependent variable in col. 1 is the number of hours worked per week. The dependent variable in col. 2 is the willingness to work less if the salary was to remain constant. Alsace-Moselle is a variable equal to one if the employment zone is in the region Alsace or the *département* Moselle. Post-2000 is a variable equal to one if the year of observation is after 2000. Alsace-Moselle × post-2000 is a variable equal to one if the employment zone is in Alsace or Moselle after 2000. This is the difference-in-differences variable of interest.

**Significant at 5%.

that is, 0.36 hour per week. This is quite close to the measured coefficient, which is 0.49, although with marginal significance. In our companion paper, we find, using a larger data set—the labor force survey—that the coefficient is actually closer to 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.

Endnotes

We thank our discussants John Abowd and Chris Pissarides as well as conference participants, and Francis Kramarz, Sébastien Roux, Philippe Askenazy, and Laurent Bach.

1. For instance, Card and Krueger (1995) survey their work 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 neighboring state, Pennsylvania, to infer the absence of a negative employability effect among teenagers. Autor, Donohue, and Schwab (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, Donohue, and Schwab (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 U.S. banking system in order to infer about rent-seeking behavior and gender discrimination. They found that deregulation led gender wage differences to vanish, at the expense of wages of men, which declined after the deregulation.

2. Researchers, however, have genuinely used the size of the firm, as Estevão and Sa (2006) (small firms were unaffected by the 35-hour workweek in 1998–2002), or the part-time/full-time status of employees as in Crépon and Kramarz (2004) in their evaluation of the reduction in working time in 1982 from 40 hours to 39 hours. Other techniques (namely, instrumental variables as in Crépon, Leclair, and Roux 2007) have also been used to get around the problem of the endogeneity of the early transition to 35 hours for firms.

3. Employees could either work 35 hours per week or keep working 39 hours as usual and get 20 additional vacation days.

4. This information was found in the Lexis Nexis database. Lexis Nexis is a searchable archive of content from newspapers, magazines, legal documents, and other printed sources (<http://www.lexisnexis.com/fr>). In France, they publish the *JurisClasseurs*, which compile analyses of legal texts by experts. An article is called a *fascicule*. Here we used fasc. 670 written by Patrick Kintz in 1989.

5. According to Kintz (1989), in Alsace-Moselle there are 13,000 persons covered by the subsidies, for an amount of nearly €3 million.

6. The amount of RMI given is equal to a minimum revenue of approximately €450 minus income.

7. The number of individuals in a certain category was 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.’”

8. A hundred samples were randomly drawn with replacement from the original sample. The difference-in-difference coefficient was thus estimated 100 times. The difference-in-difference coefficient was never less than zero.

9. We collected the RMI threshold for each year from the original legal texts. For example, the RMI threshold was F 2,000 or €304.90 in 1989 (http://www.legifrance.gouv.fr/jopdf/common/jo_pdf.jsp?numJO=0&dateJO=19881213&numTexte=&pageDebut=15547&pageFin=). The RMI threshold was €464.05 in 2008 (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).

10. http://www.legislation.cnav.fr/textes/ord/TLR-ORD_452454_19101945.htm#art79.

11. Also note that the 30-day period in the 90% regime is augmented by 10 additional days for each period of 5 years worked in the firm (i.e., 40 days in the 90% regime for employees with between 3 and 8 years of seniority, 50 days of seniority 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>.

12. Article 63 of the *Code de Commerce Local* and article 616 of the *Code Civil Local*, now called L 1226–24 and L 1226–23 of *Code du Travail*, after a global recoding of the French laws on May 1, 2008 (http://www.ddtefp57.travail.gouv.fr/inspection/information/droit_local/droit_local.htm). See Grisey-Martinez and Dagherne (2008) for a detailed discussion and a list of clear abuses of this fairly generous regime.

13. There are 22 regions in France. We tried to cluster by travel-to-work area or by *département*, without any major change in the significance: *t*-statistics did not vary much.

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