Can We Use Alsace-Moselle for Estimating the Employment Effects of the 35-Hour Workweek Regulation in France?[1]

Comment on Matthieu Chemin and Etienne Wasmer, "Using Alsace-Moselle Local Laws to Build a Difference-in-Differences Estimation Strategy of the Employment Effects of the 35-Hour Workweek Regulation in France", *Journal of Labor Economics*, 2009, vol. 27, n°4, p. 487-524.

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Abstract: Chemin and Wasmer's article (2009) finds that the 35-hour workweek did not create jobs. It exploits a natural experiment: three French departments ("Alsace-Moselle") enforced a reduction in working time of smaller magnitude because in this region firms could integrate two additional public holidays in their calculation, which exist for historical reasons. The 2009 article shows first that employees of this region endured indeed a smaller reduction in working time and second that this smaller reduction in working time was not followed by more unemployment or less job creation. While replicating this article, I discovered a coding error in the definition of firms' size that seriously undermines the results. Moreover, the article did not take into account that an important fraction of workers in the region were cross-border workers who were not directly subject to the reduction of working time. Correcting for the error in firm definition and excluding the cross-border workers from the sample calls into question the main hypothesis of the article. Reduction in working time, as measured with the French Labor Force Survey, was of similar magnitude in Alsace-Moselle as in the rest of France. Hence my replication cast doubts on the validity of this natural experiment for properly evaluating the impact of the reduction in working time policy on employment.

JEL classifications: J22; J23; J88

Keywords: Reduction in working time; Employment; Difference-in-differences; France; Replication

[1] I am very grateful to Matthieu Chemin and Etienne Wasmer for answering my questions and – in accordance with *Journal of Labor Economics* February 2009 data policy – for sharing their data and programs. I also thank the colleagues, friends and relatives who read this text for their advice and suggestions. However, I remain solely responsible for the shortcomings of my work. Statistical programs to reproduce the tables of my comment can be found here: http://olivier.godechot.free.fr/hoprubrique.php?id_rub=97#692.

Between 1997 and 2002, in order to reduce unemployment – among other objectives – the French socialist government led a negotiated reduction of working time policy (hereafter RWT), which decreased the legal weekly working time from 39 hours to 35 hours. This policy was followed by a heated debate on its efficiency. In the early 2000s, most scientific evaluations concluded that the policy as a whole created around 300,000 to 400,000 jobs (Gubian et al., 2003; Askenazy, 2013). However, those evaluations cannot precisely disentangle the effect of four components: quantitative reduction in working time, cuts in social contributions offered by the government as an incentive policy, wage moderation, and reorganization of work locally bargained against the RWT. Some researchers suspect the cuts in social contributions to be the main driver of the employment effect of the 35-hour policy.

Matthieu Chemin (corresponding author) and Etienne Wasmer (2009) provide a research design for testing the RWT net of the cuts in social contributions. Three French departments ("Alsace-Moselle") enforced a reduction in working time of smaller magnitude in this region because firms could integrate in their calculation two additional public holidays that exist there for historical reasons. The 2009 article shows first that employees of this region endured indeed a smaller RWT, and second, that this smaller RWT was not followed by more unemployment or less job creation. Therefore, these results "cast doubt on the effectiveness of this regulation" (p. 487). This study was recently put forward by some researchers as a proof of the inefficiency of the 35-hour policy (Assemblée Nationale, 2014; Cahuc & Zylberberg, 2016).

While replicating this article, I discovered a coding error in the definition of firms' size that seriously undermines the results. Moreover, the article did not take into account that an important fraction of workers in the region were cross-border workers who were not directly subject to the RWT. Correcting for the error in firm definition and excluding the cross-border workers from the sample leads to calling into question the main hypothesis of the article. RWT, as measured with the French Labor Force Survey, was of similar magnitude in Alsace-Moselle as in the rest of France.

My comment is organized as follows. In the first section, I summarize the strategy of the 2009 article. In the second section, I describe the coding error and analyze its consequence. In the third section, I show how results also change when taking into account cross-border workers. In the fourth section, I explain why the only regression out of eight that still holds is unlikely to identify the effect of the inclusion of the two local public holidays in Alsace-Moselle's RWT.

The 2009 article's strategy

The 2009 article seeks to assess the effect of the RWT in France by comparing its implementation in Alsace-Moselle and the rest of France. Indeed, the sub-regions ("departments") of Moselle (57), Bas-Rhin (67) and Haut-Rhin (68) maintain a specific legislation inherited from their annexation by the German Empire between 1871 and 1918, including two additional public holidays: Good Friday and St Stephen (26 December). During the implementation of the RWT, firms in Alsace-Moselle could integrate these two days (16 hours) in the calculation of the RWT. Thus, in this region, the reference annual working time could be aligned after the reform with that of the rest of the country (1596 hours) but starting from a lower pre-reform level: 1763 hours instead of

1778 hours. Or to put it differently, counting the two local public holidays as "two RWT days" enabled firms to reduce the working week to 35 hours and 21 minutes instead of 35 hours. On October 23, 2002, the labor court of Metz, seized by employees, has banned this practice. The article assumes that for a short period from the beginning of 2000 – when the 35-hour week became the legal norm in firms over 20 employees– to its invalidation by the labor court at the end of 2002, the RWT was milder in Alsace-Moselle than in the rest of France. If this hypothesis is correct, and if firms do not differ in any other dimensions, it is a natural experiment enabling the evaluation of the effects of RWT on employment. Moreover, as incentive tax cuts were the same on each side of the departmental limits, this evaluation neutralizes their suspected effect on the evolution of employment.

Let us note two crucial points: 1) the inclusion of the two additional local public holidays in the RWT calculation was not compulsory but left to local initiative; 2) the article does not provide any direct estimation of the magnitude of this strategy. Therefore, the article tries to prove indirectly the importance of this phenomenon through an analysis of working time evolution with the French Labor Force Survey (*Enquête Emploi,* hereafter LFS). However, as we do not know in the LFS whether firms enacted or not the RWT (not all occupations and firms were subjected to this policy), the article focuses on groups of employees most likely to be affected by the difference in RWT implementation. It distinguishes four groups: 1) occupations the most affected by RWT (all wage-earner occupations except teachers, clergy, and personal service occupations)[2] ; 2) firms above 20 employees for which the 35-hour become compulsory in January 2000; 3) four sectors (metallurgy and metal processing, construction, retail trade and repairs, hotels and restaurants) where Alsace-Moselle's departmental or regional collective agreements do not mention the two public holidays and where, therefore, employees could ignore their rights; and 4) affected "individuals" defined as the intersection of the three groups above.

With difference-in-differences (DD) regressions, the article shows first that RWT within these four groups was of smaller magnitude in Alsace-Moselle. Compared to the 1996-1998 pre-reform period, the usual weekly working hours in 2001-2002 had decreased in Alsace-Moselle by 0.38 hour (23 minutes) less both within affected occupations and affected firms, 0.54 hour less within affected sectors and 0.96 hour less within affected individuals (Table 1, models 1 and 4, line 2, and Table A2, models 1 and 4, line 2). Here, the DD strategy assumes that the difference in working time evolution is only due to the inclusion of the two Alsatian-Mosellane public holidays in the RWT. In order to account for possible unrelated local trends in working time that could also fuel this evolution, the article complements DD with triple differences (DDD). DDDs show a working time higher in Alsace-Moselle in 2001-2002 by 0.31 hour within affected firms, 0.46 hour within affected sectors and 0.75 hour within affected occupations or individuals (Table 1, models 3 and 6, line 5, and Table A2, models 3 and 6, line 5). Here, the DDD strategy assumes that the

[2] The list of affected occupations (French CS) published p. 503 is inaccurate and does not match the selection made in the programs and in the tables. It excludes not only self-employed occupations (CS 10 to 31) but also four categories of employees that indeed were not affected by RWT: professors and scientific professions (CS 34), school teachers and assimilated (CS 42), clergy and religious (CS 44) and personal services (CS 56).

local evolution of working time for unaffected groups would hold true also for the affected groups in the absence of RWT.

Given this significant or nearly significant (p=10.3% for DD firms and DDD sectors) eightfold test, the article considers that there is really a shock in Alsace-Moselle's working time and that this shock is indeed due to the inclusion of local public holidays in the calculation of the RWT. It can therefore analyze with the same methods the variation in the probability of being employed (Table 2) or unemployed (Table 3) and finds neither significant relative decrease in employment nor significant relative increase in unemployment in Alsace-Moselle. Even if the article remains cautious and stresses that the estimated effects of the RWT remains consistent with around 155,000 job creations in France, it concludes that there is no significant impact of the 35-hour reform on employment.

A coding error on the definition of two treated groups

While replicating the 2009 article, I discovered a coding error in the variable determining the affected firms. In the article's code, the use of a Stata instruction such as *big=(size>20)* led to allocate all the respondents for which the size of the firm is missing to the group of affected firms, especially the missing values of the four years (1996, 1997, 1999, 2000) for which the variable used *(EFEN)* is absent from the LFS files used for the article[3]. EFEN is also missing for 25% of the sample in 1998, 2000 and 2001 and for 43% in 2003 (Table GA2). As a whole, EFEN is missing for 62% of the sample. This error not only leads to an overestimation of the population within affected firms – 84% of the sample is ultimately classified as such instead of 70% (Cottet, 2010) – but also to an important temporal inconsistency, with 100% of the respondents classified in this category during four years out of eight. This double bias on an important variable defining treated and control groups of the DD and DDD estimations is likely to distort the results. Moreover, this variable is indeed important in the article's strategy. The beginning of the article emphasizes the difference between small and large firms as a key identifier of affected and unaffected groups (Figures 2 and 3), and the preliminary working paper was displaying a table based on affected firms as its first and main table of its demonstration (Chemin and Wasmer, 2007, Table 1). Moreover, the contrast between affected and unaffected firms (once the error corrected) is indeed a better predictor of the evolution in working time then the one between affected and unaffected occupations. Finally, in the empirical tables, the error not only affects the appendix table A2, but also Table 1 through the definition of the affected individuals group (models 4 to 7) and Table 4 on wage differentials (panel A and B, models 1 to 3).

The LFS contains other variables on firms' size that enable to overcome the problem of missing values, especially the interval variable TN, which is defined from 1996 to 2002. In appendix 1, I describe more extensively these variables. I construct a new variable defining affected firms (size≥20) and unaffected

[3] In Stata, missing values are ranked after + ∞. Therefore, the instruction *y=(x>20)* without any additional correction assigns all missing values in the large firms category (*i.e. y=1*). The problem of missing values is all the trickier that statistical programs differ in the way they rank missing values. In SAS, the missing values are ranked before − ∞. In R, the instruction *y=(x>20)* creates a dichotomous variable whose values are missing when the values of *x* are missing.

firms (size<20) as follows. For the period 1996-2002, I use the interval variable TN; for 2003, I use EFEN and if it is missing, then I use the subjective interval variable NBSALB. I systematically assign civil servants to the group of firms of 20 or more employees[4]. I also assign self-employed respondents with firm's size missing to the group of firms of less than 20 employees. Finally, the remaining missing values (as well as employees of 1996 and 1997 classified in firms with "0 employee") are excluded from the sample (9% are therefore excluded). This variable encoding firms with 20 or more employees amounted to 71% of respondents (Table GA4 in appendix). It is stable between 1996 and 2003, ranging between 71 and 73%, which is in line with other sources on firms' size in France (Cottet, 2010).

With this corrected variable for firm size, I replicate in Table G1 models 1 to 3 of Table A2 and models 4 to 6 of Table 1[5]. The results differ strikingly from that of the 2009 article. In column 1, the DD yields a negative and significant parameter (-0.24*, line 2), showing that within affected firms the RWT was in fact stronger in Alsace-Moselle than in the rest of France. The triple difference parameter is also negative. Although DD and DDD produce positive parameters for affected individuals (Table G1, model 4, line 2 and model 6, line 5), the latter are not significant and much smaller than in the initial table 1. Moreover, I checked whether these results are robust with other definitions of affected firms, based on EFEN only or TN only (Table GA3), or when I impute the remaining missing values (Appendix 2 and Table GA5). In all cases, I cannot reproduce the article's positive and significant results[6].

Table G1 approximately here

Taking into account the cross-border workers

Correcting for firm size leads to mixed and contradictory results. Four tests out of eight are rejected. However, I still find similar results for affected occupations and affected sectors. How can we account for these contradictory results? Askenazy (2013) criticized the 2009 article for not properly taking into account regional specificities such as cross-border workers and the presence of

[4] I introduce this correction because INSEE, the French statistical institute, usually uses for civil servants the size of the establishment rather than the size of the administration where RWT was indeed negotiated.

[5] I used the latest version of the *Emploi* survey for the years 1996-2003 distributed by the *Réseau Quetelet* (https://quetelet.casd.eu/fr/utilisateur/connexion, downloaded 23 September 2016). There are a few sample differences between the database used for the 2009 article and the one I use here, especially for 2003. In addition to the correction of the error on the size of firms, I introduce three changes in the variables used. I use in 2003 the department of residence, now available in the 2003 scientific-use-file version, instead of the department of work. This allows consistency with the choice made in the article for the years 1996-2002. I create an age interval variable out of the continuous age variable in order to avoid the fact that the definition of intervals for AG5 changes in 2003. In the 2009 article, the program which turned the department character variable into a numeric one led to the exclusion from the sample of 1,000 Corsican respondents whose department had been encoded by the code "2A" or "2B". I keep them here in my replication. I have checked that neither the different version of the database nor the three last amendments did introduce *per se* any substantial difference.

[6] Similarly, once the error on the firm's size corrected, I could not reproduce the Table 4 results (Panel A, model 1 to 3, p. 516) showing a significant decrease in Alsace-Moselle's hourly wages.

many German firms in this area. Indeed, the article does not account for cross-border workers, which constitute an important fraction of the working population in Alsace-Moselle (Buxeda, 2003; Cahuc and Carcillo, 2014). 12.4% of the workers of this region work abroad: 44% of them in Germany, 27% in Luxembourg and 27% in Switzerland. Alsace-Moselle concentrates half of France's cross-border workers. Because RWT was a policy specific to France during this period, those workers were not affected.

Figure G1 shows the evolution of working time within affected occupations for workers from Alsace-Moselle and the rest of France depending on their place of work. When one compares the working time of all workers (upper figure), Alsace-Moselle working time evolves clearly above that of the rest of France. However, when we decompose workers between cross-border workers and non-cross-border ones, we see that cross-border workers' working time increased, especially for the cross-border workers living in Alsace-Moselle. This reverse trend for an important fraction of Alsace-Moselle workers is likely to impact the overall trend. Hence, when excluding the cross-border workers, the difference in working time between Alsace-Moselle and the rest of France inverses. Alsace-Moselle is now either clearly below (in 2000 and in 2002) or at best at the same level in 2001[7].

Figure G1 approximately here

This first descriptive figure suggests that the RWT has been weaker in Alsace-Moselle, not because of the inclusion of two local public holidays in the calculation of RWT but simply because Alsace-Moselle has a very large fraction of cross-border workers who, by definition, have not been directly impacted by the French experience of RWT.

To confirm this suggestion, I replicate in Table G2 the article's Table 1 and A2. The negative effect observed previously in Table G1 for firms with more than 20 employees is maintained (model 7, line 2 and model 9, line 5). So are the non-significant results for affected individuals (model 4, line 2 and model 3, line 6) [8]. Moreover, the relative increase in working time in Alsace-Moselle in 2001-2002 in the affected occupations or sectors is greatly reduced or even reversed and loses all significance (model 1, line 2, model 10, line 2 and model 12, line 5). Out of the eight initial regressions used to prove the existence of a shock in working time in Alsace-Moselle, there's only one DDD left – affected occupations (model 3, line 5) – that still supports the article's hypothesis.

[7] The French reply (Chemin & Wasmer 2016) to my French comment (Godechot 2016) provides four figures plotting the difference in working time between Alsace-Moselle and the rest of France (excluding cross-borders workers) which try to prove the existence of a shock in Alsace-Moselle in 2001 and 2002. However, these figures are misleading, because contrary to the regression using the period 1996-1998 as the reference period, those figures adopt the year 2000 as the reference year. Yet, as figure G1 clearly shows, the RWT started in 1999 and clearly accelerated between January 1999 (date of LFS 1999) and March 2000 (date of LFS 2000). The so-called shock comes in fact from a difference in the rhythm of RWT between Alsace-Moselle and the rest of France. In the three departments, the reduction was first stronger between 1999 and 2000, then milder between 2000 and 2001, and then stronger again between 2001 and 2002. Cf. figures GA1.

[8] I also checked that a multiple imputation of missing values (Appendix 2) does not change the result (Table GA5).

Can we trust DDD on affected occupations for properly identifying the inclusion of two public holidays in RWT?[9]

The first reason for being skeptical of the quality of this identification has to do with the imprecision of the measurement tool for capturing such a little shock in working time. The French LFS asks respondents "What number of hours <M ...> usually works a week?" The respondents are very likely to answer this question with the most frequent (modal) weekly working time. They therefore discount from their answer neither the number of public holidays they enjoy during the year, nor the number of irregular RWT days or hours they were attributed during the year. Hence, the LFS captures neither the pre-reform difference in working time nor the inclusion of the two local public holidays for all the workers who enjoyed RWT though irregular RWT days or hours. It can only capture differences in RWT that were enacted through a reduction of the regular weekly working time. Yet, only 52% of the workers in 2001 covered by a RWT agreement enjoyed such a reduction (Afsa & Biscourp, 2003).

Moreover, even for the workers enjoying a reduction of the regular working week, the LFS lacks precision. In this survey, the usual weekly working time is recorded until 2002 with a whole number of hours. Hence, if the Alsatian-Mosellane respondent answers 35 hours and 21 minutes, as envisaged in the first section, the interviewer will round the whole to the closest integer. This would make the difference with the rest of France invisible. A visible difference in working time would then only come from a combination of a reduction in regular working week and overtime hours.

The second reason for being skeptical is that there is little evidence of the generality of the inclusion of the two local public holidays in the RWT calculation. The 2009 article oscillates on this point. Sometimes, it considers that all firms have included the two holidays (as shown by the test of equality with the "theoretical coefficient of 0.35" – p. 506). Sometimes it stresses that only some firms did: opportunistic firms in sectors where employees were unaware of their rights (p. 507). Hence, a proportion p of employees of Alsace-Moselle matches the case envisaged by the article. The overall effect on the Alsace-Moselle working time is $(0.35 \times p)$. 0.35 is the maximum effect that would be obtained if all firms, who do not have the obligation to do so, incorporated the two days in their countdown. We have yet no idea of the value of p. Imagine that $p = 20\%$ (*e.g.* all the four sectors suspected of opportunism), the aggregate effect for the three departments would be only of 0.07 hours. This effect would be very difficult to measure with the LFS, whose limitations I have highlighted.

LFS supplements dedicated to working time in 1995 and 2001 enable to make some progress for evaluating this proportion. Thanks to a precise analysis of the working schedule, they offer – on a smaller sample (21,000 workers) – a much more accurate estimate of the modal working week (Afsa and Biscourp, 2003; Afsa and Biscourp, 2004). Here again, I show that working time has evolved in the same way in Alsace-Moselle as in the rest of France (Table

[9] The French reply (Chemin, Wasmer, 2016) provides a new DDD regression yielding a positive significant parameter, where affected individuals are redefined as the intersection of affected occupations and affected sectors. All the arguments for being skeptical with the DDD on affected occupations hold true for this new affected intersection Cf. appendix 3.

GA7). The 2001 survey describes also workers covered by a RWT agreement. Overall, the implementation of the RWT was carried out similarly in the three departments and the rest of the country (Table G3 & Table GA8). When the RWT is in the form of a reduction of the day or week of work, there is no trace of a milder form in Alsace-Moselle.

Table G3 approximately here

However, the regulatory specificity might appear when the RWT is materialized in the form of - irregular - days off (Table G3, lines 4-8). In Alsace-Moselle, the respondents affected by the measure reported significantly more often between 14 and 20 days off (33% in Alsace-Moselle versus 22% elsewhere) and significantly less often 21 days and more (6% versus 16%). Much of this difference is due to the lower frequency of the 22 RWT days, which are the exact number of annual RWT days for people working 40 hours per week all year: 1% answers 22 days in the three departments versus 4 % beyond the departmental boundaries. Logically enough, Alsatian-Mosellane respondents state more often 20 days off (8% versus 4% in the rest of France), a differential that presumably refers to the inclusion of two holidays in the count. Although the limited size of the sample calls for caution, we can recognize in this distribution gap the effect of the Good Friday and St Stephen. However, this probable inclusion concerns only 12% of the employees with irregular RWT days off in the three departments (and therefore 4% of employees under a RWT agreement in this region). Perhaps the same mechanism is there to work for other forms of RWT – overrepresented in Alsace-Moselle – such as time savings accounts or an all inclusive number of days (*forfait*) for managers and professionals. But even including these people, the proportion of employees subject to a milder version of the RWT would remain modest.

Therefore, given those two arguments, I suspect that the remaining significant DDD on affected occupations is most likely to capture unobserved heterogeneity. The various French regions have different economic specializations (for instance car industry in Alsace-Moselle) and are subject to specific shocks (local, national, international) that lead to divergent trends in working time. Here the DDD hypothesis according to which the local trend in working time in the control group (unaffected occupations) would hold true in the treated group (affected occupations) in the absence of treatment is highly questionable. For trusting this hypothesis, treated and control group need to be, apart from the treatment, as similar as possible. Here, the control group is a heterogeneous mixture of housekeepers, self-employed workers (whose working times are impacted by very local trend in activity), and teachers (whose working time is impacted by state's employment policy). It is not very likely to inform on the local evolution in working time of Alsace-Moselle's wage-earners, especially those working in the car industry.

Moreover Alsace-Moselle is not the only region where we find such a relative increase. As proposed in the 2009 article (p. 509), I replace Alsace-Moselle by successively one of the twenty other French regions. This falsification exercise yields regional DDD parameters higher than the Alsatian-Mosellane one in five cases, including one (Aquitaine) that is significant (Figure GA2). If in Aquitaine the significant parameter is clearly produced by unobserved heterogeneity, it can also be the case in Alsace-Moselle.

Conclusion

According to this work, it appears that the RWT - measured by the French Labor Force Survey - was milder in Alsace-Moselle not because 100% of employees experienced a RWT 9% milder but because 12% of employees (cross-border workers) did not experience any RWT. I also find, as in the 2009 article, that Alsace-Moselle has not experienced significantly higher unemployment than the rest of France. But we cannot conclude anything with this result, since the RWT has been basically similar[10].

Could we use the cross-border phenomenon as an alternative natural experiment? This could be a direction for future research, but it seems *a priori* very narrow. The initial research design of the 2009 article had the advantage of targeting a purely quantitative difference in the working time and made the plausible hypotheses that other things could be considered equal beyond the departmental limit (although as I have shown this was not true). On the contrary, the national border separates economies and institutional systems that are very different. It is not clear what one would then ultimately identify. Moreover, in order to estimate accurately the global employment effect, one would need to control very precisely for evolution in economic activity not just in bordering countries, but also in bordering regions (Saarland, Rhineland-Palatinate and Bade-Württemberg for Germany, Basel-Stadt, Basel-Land, Jura, Vaud and Geneva for Switzerland, Liguria for Italy).

Although Mathieu Chemin and Etienne Wasmer have set up an innovative research design using Alsace-Moselle as a source of exogenous regional variation that could enable to study the impact of public policies in France, unfortunately in this case the modesty of the exogenous shock, the lack of precision of the measurement tool and the substantial amount of local unobserved heterogeneity makes it very difficult to use this design in order to evaluate the effect of 1998-2000 RWT laws on job creation.

[10] It should be noted that when I estimate the DD employment regression for unskilled workers in affected occupations, I do find significantly less employment in Alsace-Moselle (the article only estimates DDD employment regressions in its table 2 on unskilled workers in affected occupations – "skilled" and "unskilled" headers are inverted in the table 2 and 3). However, I cannot conclude anything from this result either, because, precisely, Alsace-Moselle cannot serve here as a natural experiment enabling to identify the effects of RWT.

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Table G1. Replication of Table A2 (col. 1-3) and Table 1 (col. 4-6) after correcting for firms' size

	Dependent variable : number of weekly hours usually worked					
	DD Affected firms	DD Unaffected firms	DDD Firms	DD Affected individuals	DD Unaffected individuals	DDD individuals
	(1)	(2)	(3)	(4)	(5)	(6)
Alsace-Moselle×(2003)	-0.1928	-0.2905	-0.2087	-0.1473	-0.2195	-0.2189
	[0.340]	[0.406]	[0.434]	[0.651]	[0.361]	[0.361]
Alsace-Moselle×(2001,2002)	**-0.2407***	0.1889	0.2024	**0.0727**	-0.1436	-0.1435
	[0.139]	[0.269]	[0.276]	**[0.284]**	[0.097]	[0.098]
Alsace-Moselle×(1999,2000)	-0.2310	0.2789	0.2862	-0.1498	-0.0651	-0.0656
	[0.141]	[0.357]	[0.381]	[0.357]	[0.226]	[0.227]
Affected group×Alsace-Moselle×(2003)			0.0263			0.1016
			[0.226]			[0.597]
Affected group×Alsace-Moselle× (2001,2002)			**-0.4336**			**0.2284**
			[0.354]			**[0.245]**
Affected group×Alsace-Moselle×(1999,2000)			-0.5038*			-0.0191
			[0.261]			[0.173]
Year fixed effects (8)	Yes	Yes	Yes	Yes	Yes	Yes
Department of residency fixed effects(95)	Yes	Yes	Yes	Yes	Yes	Yes
Control variables(14)	Yes	Yes	Yes	Yes	Yes	Yes
Occupation fixed effects (31)	Yes	Yes	Yes	Yes	Yes	Yes
Affected group × Year fixed effects (8)	No	No	Yes	No	No	Yes
Affected group × Department fixed effects (95)	No	No	Yes	No	No	Yes
Affected group × Occupation fixed effects (31)	No	No	Yes	No	No	Yes
Observations	304,195	122,807	427,002	36,904	390,098	427,002
R2	0.198	0.382	0.373	0.279	0.366	0.365
Sample	Firm size ≥20	Firm size <20	Firm size ≠*n.a.*	Individuals affected	Ind. Unaffected	Firm size ≠*n.a.*

Note: Weighted OLS. *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are in square brackets, clustered at the department level. The coefficients of interest are highlighted in bold. Affected Individuals are the affected occupations working in affected sectors and in affected firms (20 employees and more). I use the following variables as control variables: diploma (7 categories), age (5 categories), household size (continuous, capped at 5) and gender. Categories are detailed in Table GA1 in appendix.
Sample: Active people, working full time, whose occupation, household size, diploma and age are not missing and for which the sampling weight is not missing and above 0.
Source: *Emploi* survey (1996-2002 and 2003 (FPR)).

Table G2. Replication of Table 1 and Table A2 after correction for firms' size and exclusion of cross-border workers

	Dependant variable : number of weekly hours usually worked					
Panel A: Replication of Table 1	DD Affected occupations	DD Unaffected occupations	DDD Occupation	DD Affected Individuals	DD Unaffected individuals	DDD individuals
	(1)	(2)	(3)	(4)	(5)	(6)
Alsace-Moselle×(2003)	-0.3927	-1.0643*	-1.0430	-0.6343	-0.4877*	-0.4882*
	[0.384]	[0.616]	[0.658]	[0.760]	[0.260]	[0.260]
Alsace-Moselle×(2001,2002)	**-0.0607**	-0.5835***	-0.5232**	**0.0866**	-0.1686	-0.1685
	[0.082]	[0.202]	[0.235]	**[0.363]**	[0.105]	[0.106]
Alsace-Moselle × (1999,2000)	0.0073	-0.2422	-0.2231	-0.0687	-0.0172	-0.0177
	[0.164]	[0.624]	[0.632]	[0.413]	[0.256]	[0.256]
Affected group × Alsace-Moselle×(2003)			0.6604			-0.0986
			[0.934]			[0.746]
Affected group × Alsace-Moselle × (2001,2002)			**0.4736****			**0.2728**
			[0.200]			**[0.309]**
Affected group × Alsace-Moselle × (1999,2000)			0.2402			0.0187
			[0.490]			[0.207]
Year fixed effects (8)	Yes	Yes	Yes	Yes	Yes	Yes
Department of residency fixed effects(95)	Yes	Yes	Yes	Yes	Yes	Yes
Control variables(14)	Yes	Yes	Yes	Yes	Yes	Yes
Occupation fixed effects (31)	Yes	Yes	Yes	Yes	Yes	Yes
Affected group × Year fixed effects (8)	No	No	Yes	No	No	Yes
Affected group × Department fixed effects (95)	No	No	Yes	No	No	Yes
Affected group × Occupation fixed effects (31)	No	No	Yes	No	No	Yes
Observations	370,414	90,135	460,549	36,613	388,156	424,769
R2	0.168	0.391	0.362	0.282	0.368	0.366
Sample	Affected occupations	Unaffected occupations	All	Individuals affected	Ind. Unaffected	Firm size ≠*n.a.*

Panel B: Replication of Table A2	DD Affected firms	DD Unaffected firms	DDD Firms	DD Affected sectors	DD Unaffected sectors	DDD sectors
	(7)	(8)	(9)	(10)	(11)	(12)
Alsace-Moselle×(2003)	-0.4855*	-0.5373*	-0.4979	-0.4368	-0.6190	-0.6215
	[0.251]	[0.294]	[0.334]	[0.291]	[0.374]	[0.374]
Alsace-Moselle×(2001,2002)	**-0.2755****	0.1580	0.1719	**0.0806**	-0.2560*	-0.2581*
	[0.125]	[0.277]	[0.288]	**[0.214]**	[0.140]	[0.141]
Alsace-Moselle×(1999,2000)	-0.1994	0.3258	0.3404	0.2058	-0.0965	-0.0968
	[0.165]	[0.403]	[0.431]	[0.302]	[0.231]	[0.232]
Affected group×Alsace-Moselle×(2003)			0.0305			0.1854
			[0.231]			[0.462]
Affected group×Alsace-Moselle× (2001,2002)			**-0.4358**			**0.3354**
			[0.316]			**[0.280]**
Affected group×Alsace-Moselle×(1999,2000)			-0.5256*			0.3116**
			[0.278]			[0.121]
Year fixed effects (8)	Yes	Yes	Yes	Yes	Yes	Yes
Department of residency fixed effects(95)	Yes	Yes	Yes	Yes	Yes	Yes
Control variables(14)	Yes	Yes	Yes	Yes	Yes	Yes
Occupation fixed effects (31)	Yes	Yes	Yes	Yes	Yes	Yes
Affected group × Year fixed effects (8)	No	No	Yes	No	No	Yes
Affected group × Department fixed effects (95)	No	No	Yes	No	No	Yes
Affected group × Occupation fixed effects (31)	No	No	Yes	No	No	Yes
Observations	302,543	122,226	424,769	86,347	374,202	460,549
R2	0.199	0.383	0.375	0.435	0.332	0.362
Sample	Firm size ≥20	Firm size <20	Firm size ≠*n.a.*	Sectors affected	Sect. Unaffected	All

Note: Weighted OLS. Robust standard errors are in square brackets, clustered at the department level.. *** p<0.01, ** p<0.05, * p<0.1. The coefficients of interest are highlighted in bold. Affected occupations are the following 2-digit PCS: 33, 35-38, 43, 45-55, 62-69; Unaffected occupations, the PCS 10-31, 34, 42, 44, 56. Affected sectors (NAFG36 variable) count the sectors *F5-métallurgie and transformation des métaux*, *H0-construction*, *J3-commerce of détail and réparations, P1-hôtels and restaurants*. Affected Individuals are the affected occupations working in affected sectors and in affected firms (20 employees and more). I use the following variables as control variables: diploma (7 categories), age (5 categories), household size (continuous, capped at 5) and gender.

Sample: Active people, working full time in France (cross-border workers excluded from the sample) whose occupation, household size, diploma and age are not missing and for which the sampling weight is not missing and above 0.

Source: *Emploi* survey (1996-2002 and 2003 (FPR)).

Table G3. RWT in Alsace-Moselle and in the rest of France among workers covered by a RWT agreement

	Alsace-Moselle		Rest of France		Differential	
Variables	Mean	Obs.	Mean	Obs.	Gross	Net
Average number of weekly hours worked calculated from the detailed working schedule	36.95	398	37.95	5,387	-1.00***	-0.72**
	(6.81)		(6.7)		[0.35]	[0.34]
Type of RWT (multiple choice question)						
1. Daily reduction (shorter days) (%)	34.1	414	27.4	5,718	6.64***	5.18
					[2.28]	[3.55]
2. Reduction by one half-day per week or by one day every 2 weeks (%)	27.5	414	24.4	5,718	3.16	2.57
					[2.19]	[2.07]
3. Supplementary days off	30.4	414	37.7	5,718	-7.28***	-4.46
					[2.46]	[4.77]
among which number of days off	12.82	126	13.40	2,154	-0.58	-0.47
	(5.94)		(7.81)		[0.71]	[0.59]
among which between 1 and 13 days off (%)	61.9	126	62.3	2,156	-0.39	-2.11
					[4.44]	[2.97]
among which between 14 and 20 days off (%)	32.5	126	22.0	2,156	10.51***	12.04***
					[3.83]	[1.80]
among which between plus of 21 days off (%)	5.6	126	15.6	2,156	-10.02***	-9.82***
					[3.27]	[1.81]
4. Time-saving account (%)	10.9	414	7.8	5,718	3.12**	3.26
					[1.38]	[2.99]
5. Early retirement thanks to RWT (above 55 years) (%)	0.2	414	0.002	5,718	0.22**	0.29
					[0.09]	[0.25]
6. Modulation, annualization (reduction during some periods, increase during others) (%)	7.0	414	7.5	5,718	-0.50	-1.60
					[1.34]	[2.62]
7. All inclusive number of days ("forfait") (%)	9.9	414	8.5	5,718	1.45	2.21***
					[1.42]	[0.83]
8. Other forms of RWT (%)	3.6	414	4.1	5,718	-0.49	-0.98
					[1.01]	[2.06]

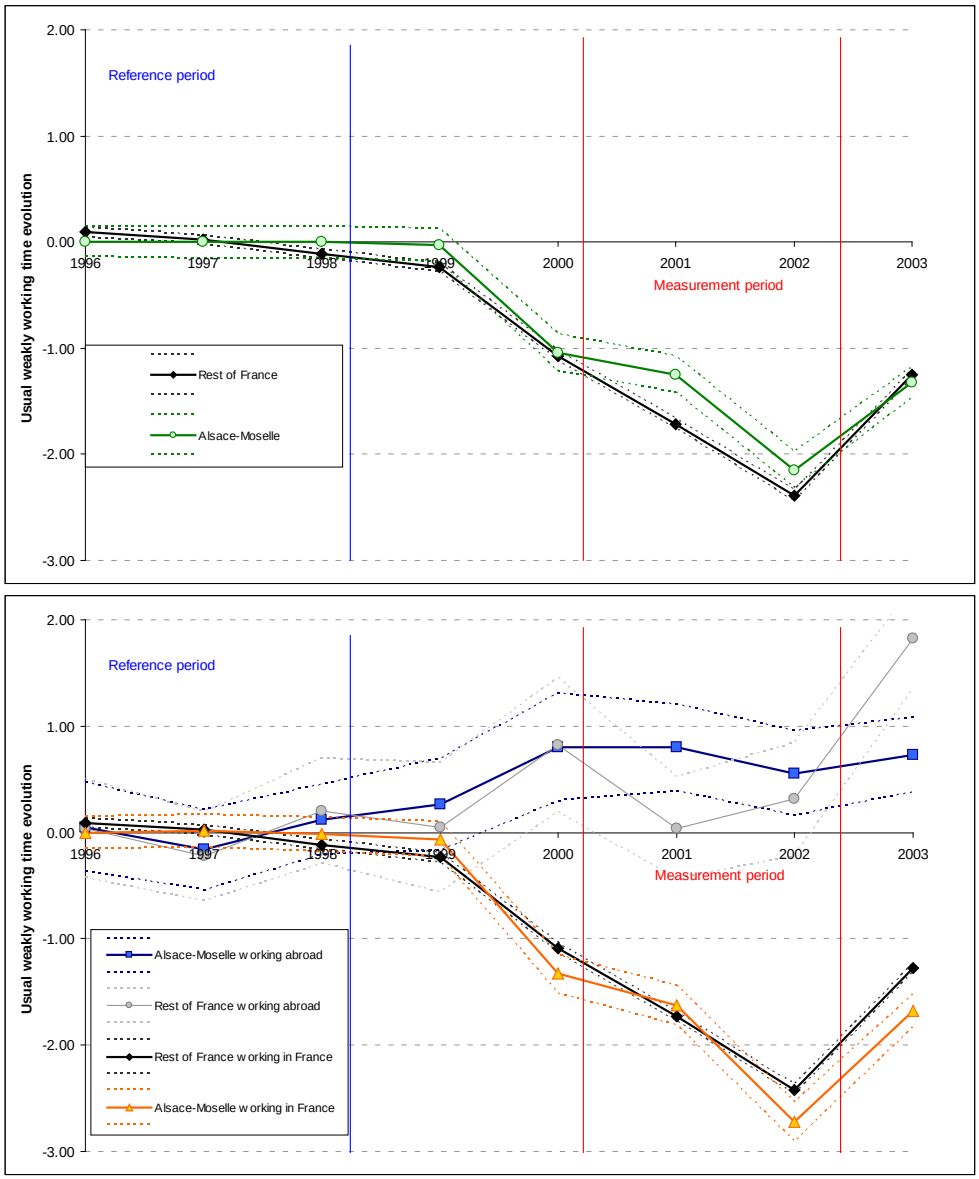
Note: In columns 2 to 5, I present the means or the proportions and the number of observations of the variables described in the first column. If the variable is continuous, I also display the standard deviation in parentheses. In the penultimate column, I calculate the difference in means or in proportions between Alsace-Moselle and the rest of France (common standard error in brackets). I test its significance with a simple Student test. In the last column, I calculate a net differential thanks to weighted OLS models. I use the following variables as control variables: diploma (7 categories), age (5 categories), household size (continuous, capped at 5) and gender.

Each line corresponds to a different model. The dependent variable is described in the first column. I also checked for dichotomous variable that the logistic regressions yield similar results than the linear probability levels used here. Robust standard errors are in square brackets, clustered at the department level.. *** p<0.01, ** p<0.05, * p<0.1.

Sample: Workers, working full time in France (cross-border worker excluded from the sample) covered by a RWT agreement, whose occupation, household size, diploma and age are not missing and for which the sampling weight is not missing and above 0.

Source: *Emploi* survey 2001; LFS supplementary surveys on working time *Emploi : durée du travail - 2001.*

Figure G1. Evolution of working time in Alsace-Moselle and in the rest of France among affected occupations depending on the place of work



Note: The evolution (weighted) of the usual weekly working time is compared to its 1996-1998 average level (*i.e.* 0 corresponds to the average working time between 1996 and 1998). The 90% confidence interval of the mean is plotted with dotted lines.
Sample: Active people, working full time in affected occupations, for which occupation, household size, diploma and age are not missing and for which the sampling weight is not missing and above 0.
Source: *Emploi* survey (1996-2002 and 2003 (FPR)).

Appendices

Appendix 1. Variables for firm size in French LFS

The French LFS includes several variables on the number of employees in the respondent's firm: EFEN, TN and in 2003 NBSALB (Table GA2).

EFEN, the variable used for the 2009 article, is a "variable extracted from SIRENE (the French administrative repertory of establishments)". In the standard files distributed by the *réseau Quetelet*, this variable is available only for 1998 and 2003. The 2009 article is based on an enhanced version of the LFS where this variable is also available for 2000 and 2001. When INSEE can correctly match information given by the respondents on their firm with the administrative repertory, the firm size is a variable of good quality. However, the difficulty of this match leads to a substantial proportion of missing values: 25% for the years 1998, 2001 and 2002 and 43% for 2003 (in 2003, the survey changed significantly).

The LFS also provides TN, an interval variable on firm's size (9 intervals), which is available from 1996 to 2002. Although INSEE warns that this variable does not always come from true administrative data and that it is also partly coded thanks to an automatic program based on occupation, profession and sector, its quality seems good. For instance, in 1998, 99.8% of employees working in firms of 20 or more employees according to EFEN were also classified in the same group according to TN. What is more, TN helps to classify half of the 22% missing values of EFEN. There is, however, an anomaly for the years 1996 and 1997 with very low rates of missing values and abnormal fraction of workers classified in firms with 0 employees (overestimating then the weight of the self-employed workers – about 10%). But the combination of missing values and firms with 0 employees is stable over the period and amounts to 24 to 28% of the respondents, which may justify to group those two last items for a first test of the variable (Table GA2).

Finally, NBSALB is an interval variable (9 intervals) only available in 2003 that is filled directly by the respondent. It could help to complete missing information on EFEN for this year. This subjective variable is a little less reliable than administrative information from the SIRENE file. However, it is likely that respondents do not err when they say they work in a firm of more (or less) than 20 employees.

Before building out of those three variables my own size of firm variable, I have first replicated the 2009 article's table A2 (models 1 to 3) on affected firms. I have restricted the analysis to years where the information is available and have excluded missing values as it is usual in such type of analysis: I use therefore EFEN for the years 1998, 2001, 2002 and 2003 and TN for the years 1996-2002 (Table GA3).

Contrary to the findings of the 2009 article, my analysis shows first that working time in affected firms has significantly more decreased in Alsace-Moselle (-0.4 hour with EFEN in model 1, line 2, -0.2 hour with TN in the model 4, line 2). It also shows that the differential in working time between large and small firms in 2001-2002 is significantly greater in Alsace-Moselle than elsewhere (-0.45 to -0.5 hours, model 3 and 6, line 5).

Appendix 2. Imputation of firm's size missing values

The reply (Chemin & Wasmer 2016) to my French comment criticizes my results on firms for not taking into account the selection bias due to the exclusion of missing values. It rejects TN because it claimed it was of poor quality and it proposes to impute the missing values of EFEN (62% of the sample) with nothing but age, diploma, household size, gender and occupation. Based on this imputation, it displays a DDD regression on affected firms with a positive and significant coefficient (p. 5).

I am very skeptical of this result. First, rejecting TN on the one hand, whose quality is in fact good (cf. appendix 1), and preferring to impute 62% of missing values on the other hand with a very limited number of variables is very arbitrary. Second, I tried to replicate the reply's method and was not able to find its results (Table GA5, model 1, line 5). The imputation technique used in the reply is far from clear. I did not have access to the reply's code and I was not able to exactly figure out the precise model. In order to approach its method, I did 20 multiple imputations with the Stata package *mi* of the EFEN variable where with OLS regression I predict EFEN with age, diploma, household size, gender and occupation. The imputation technique adds to the OLS average prediction random errors drawn from the distribution of errors. Multiple imputations (here 20) enable to account for the variability in the way of drawing random errors. Based on this first imputation, I then impute 20 big firms dummies (size>20). Following Rubin[11], I finally estimate a final regression based on the 20 multiple regressions, which adjusts coefficients and standard errors for the variability between imputations. Contrary to the result displayed in the reply, this estimation yields a negative and non significant coefficient (Table GA5, model 1, line 5).

In order to check how much my own firm size variable could be affected by a selection bias due to the small proportion (only 9%) of its missing values, I have also imputed them with the same technique (table GA5 model 2 to 13). In order to have the best fit, I imputed them with log interval regression, where I use, as independent variables, age (5 dummies), diploma (7), household size, gender, occupation (31) as above and also year (8), department (95), and sector (37). The final multiple imputations do not produce any positive and significant coefficient either. It is true that the positive coefficients in the first panel for affected firms (model 2, line 2) and individuals (model 5, line 2) for DD estimates compared to the negative or null coefficients produced in table G1 (model 1 and 4, line 2) do indicate some selection bias in table G1. But here, the selection bias coming from the exclusion of missing values is totally justified. Indeed, the firm's size of cross-border workers is generally missing. And cross-border workers do bias the estimation of Alsace-Moselle's working time evolution. Once the cross-border workers are excluded from the panel, estimates with or without imputed missing values yield very close results (Table G2 versus Table GA5, Panel B).

[11] Rubin, D. B. 1987. *Multiple Imputation for Nonresponse in Surveys*. New York: Wiley.

Appendix 3. Discussion of the alternative affected intersection

The reply (Chemin & Wasmer 2016) to my French comment provided an alternative DDD estimation for affected individuals. This group is constituted as the intersection of affected occupations and affected sectors and yields indeed a significant DDD coefficient (cf. table GA6, model 3, line 5).

All the qualitative and quantitative reasons for being skeptical of the positive and significant DDD estimates in model 3 of table G2 hold true also for this new regression. Especially, the DDD effect is also driven by the DD on the unaffected group (table GA6, model 2, line 2). The hypothesis of a common trend in working time during the 1999-2000 period (stated p. 502) is also rejected (table GA6, model 3, line 6). Moreover, the DDD positive and significant parameter seems to be driven mainly by the evolution of working hours in small firms that were not affected by the RWT (table GA6, model 4, line 4), especially for wage-earners in non-professional and non-managerial occupations, whose usual working week was the most impacted by the RWT (table GA6, model 5, line 4). Finally, as previously, Alsace-Moselle is not the only region that yields DDD positive and significant results. Picardie, Brittany, and Aquitaine also yield positive significant coefficients (Figure GA3). Therefore, it is unlikely that this new regression really captures the inclusion of the two local public holidays.

Table GA1. Descriptive statistics

	Alsace-Moselle			Reste of France		
	Mean	Standard deviation	Obs.	Mean	Standard deviation	Obs.
Usual number of weekly hours worked (All workers)[a]	37,0	10,2	30 783	37,5	11,2	533 726
Usual number of weekly hours worked (full time workers)	39,9	7,7	25 690	40,5	9,1	441 237
Number of hours worked during the week before the survey (full time)	36,7	13,6	24 991	37,4	14,2	426 199
Usual number of weekly hours worked (interview after an Alsace-Moselle public holiday)[b]	40,7	9,1	218	40,9	10,0	4 134
Number of hours worked during the week before (interview after an Alsace-M. holiday)[b]	28,4	15,9	169	35,5	13,5	3 072
Proportion of workers in firms affected by RWT (≥20 employees) (%)	73,5	44,1	22 597	71,1	45,3	404 405
Proportion of workers in sectors affected by RWT (%)	21,7	41,2	25 690	18,7	39,0	441 237
Proportion of workers in occupations affected by RWT (%)	84,1	36,6	25 690	80,4	39,7	441 237
Proportion of affected individuals (*i.e.* in affected firms, sectors and occupations) (%)	10,8	31,0	22 597	8,5	27,9	404 405
Age: 15–24 years (%)	9,3	29,0	25 690	7,2	25,9	441 237
25–39 years (%)	43,6	49,6	25 690	41,5	49,3	441 237
40–49 years (%)	28,9	45,3	25 690	29,8	45,7	441 237
50–59 years (%)	16,9	37,5	25 690	19,9	39,9	441 237
60 years & more (%)	1,3	11,2	25 690	1,6	12,6	441 237
Gender (0=female, 1=male) (%)	63,8	48,1	25 690	60,5	48,9	441 237
Household size	3,0	1,2	25 690	3,0	1,2	441 237
Diploma: 3 years of college and more *(>Bac+2)* (%)	9,9	29,8	25 690	12,2	32,7	441 237
2 years of college *(Bac+2)* (%)	12,4	33,0	25 690	12,5	33,1	441 237
High school (*Bac)* (%)	14,1	34,8	25 690	14,1	34,8	441 237
Professional secondary education (*BEP, CAP*) (%)	37,2	48,3	25 690	30,9	46,2	441 237
General secondary education *(BEPC)* (%)	4,8	21,3	25 690	7,3	26,0	441 237
No diploma or primary education (*CEP*) (%)	21,6	41,2	25 690	23,0	42,1	441 237
Missing diploma (%)	0,01	1,1	25 690	0,01	1,1	441 237
Employed (Yes: 1, 0: No) (%)[c]	46,6	49,9	71 146	43,5	49,6	1 377 076
Unemployed (1 if unemployed, 0 employed %) [d]	8,0	27,1	36 011	10,4	30,6	668 063
Hourly wage (in francs)	60,7	43,6	20 665	60,7	114,1	334 103
Logarithm of hourly wage	4,0	48,2	20 665	4,0	50,0	334 103

Sample: General sample: Active people, working full time, for which occupation, household size, diploma and age are not missing and for which the sampling weight is not missing above 0. Special samples: a) All active people ; b) 2003 full time workers responding in 2003 the week after the Holy Friday or the one after the 26 December ; c) Active or inactive people ; d) Active (working or unemployed) people.
Source: *Emploi* survey (1996-2002 and 2003 (FPR)).

Table GA2. Available variables on firms' size in *Emploi* survey

Variable	Year	Mean	Standard deviation	Missing	Size ≥ 20	Size≥ 20 (*n.a.* excluded)	Number of observations
	1998	5 094,44	24 132,22	23%	50%	64%	49 273
EFEN (A)	2001	4 675,12	21 815,84	24%	49%	64%	51 997
(enhanced files)	2002	4 818,48	22 857,74	25%	49%	65%	51 181
	2003	4 684,50	21 790,33	43%	35%	61%	104 896
EFEN (B)	1998	5 085,77	24 110,67	23%	50%	64%	49 382
(standard files)	2003	4 651,72	21 405,06	46%	33%	61%	112 591
Sample		Missing excluded		All		*n.a.* excluded	All

		Missing	No employee	Missing or No employee	Size ≥ 20	Size≥ 20 (*n.a.* or 0 excluded)	
	1996	1%	25%	26%	53%	72%	51 460
	1997	0%	27%	27%	52%	72%	49 298
	1998	11%	14%	24%	55%	73%	49 382
TN (B)	1999	16%	11%	27%	53%	73%	49 495
	2000	17%	11%	28%	52%	72%	51 381
	2001	18%	11%	28%	52%	72%	52 073
	2002	18%	10%	28%	52%	73%	51 247
NBSALB (B)	2003	29%	7%	36%	46%	64%	112 591
Sample				All		*n.a.* or 'no employee' excluded	All

EFEN: Number of employees in the firm (according to survey documentation, « variable coming from SIRENE (an administrative repertory of establishments) »).

TN : Number of employees in the firm (9 intervals variable) (« This variable is not really calculated but codified with automatic programs thanks to occupation, profession, sectors... or hand matching in regional directions »)

NBSALB: *Number of employees in the Firm* (Answer to « B31. How many employees work in your firm? »). This interval variable is answered by persons interviewed.

Sample: Active people, working full time, for which occupation, household size, diploma and age are not missing and for which the sampling weight is not missing and above 0.

Source: (A) Excerpt of *Emploi* survey used for the 2009 article. (B) *Emploi* survey (1996-2002 and 2003 (FPR)) distributed by the *réseau Quételet*, downloaded the 23 September 2016.

Table GA3. Replication of Table A2 (models 1 to 3) with EFEN and TN

	Dependent variable : number of weekly hours usually worked			
Panel A (Size of firm=EFEN)	DD Affected firms	DD Unaffected firms	DD Firms' size unavailable	DDD Firms (size=. in excluded)
	(1)	(2)	(3)	(4)
Alsace-Moselle×(2003)	-0.4673*	-0.1974	-1.0340***	-0.1967
	[0.247]	[0.227]	[0.265]	[0.226]
Alsace-Moselle×(2001,2002)	**-0.4011****	0.1250	0.7136**	0.1030
	[0.164]	[0.194]	[0.292]	[0.203]
Affected group×Alsace-Moselle×(2003)				-0.2569
				[0.297]
Affected group×Alsace-Moselle× (2001,2002)				**-0.5020****
				[0.119]
Year fixed effects (4): 1998, 2001, 2002, 2003	Yes	Yes	Yes	Yes
Department of residency fixed effects(95)	Yes	Yes	Yes	Yes
Control variables(14)	Yes	Yes	Yes	Yes
Occupation fixed effects (31)	Yes	Yes	Yes	Yes
Affected group × Year fixed effects (4)	No	No	No	Yes
Affected group × Department fixed effects (95)	No	No	No	Yes
Affected group × Occupation fixed effects (31)	No	No	No	Yes
Observations	111 231	64 593	81 523	175 824
R2	0.222	0.389	0.357	0.365
Sample	EFEN≥ 20	0≤EFEN <20	EFEN=.	EFEN≠.

Panel B (Size of firm=TN)	DD Affected firms	DD Unaffected firms	DD Firms *n.a. or* size=0	DDD Firms (size=(0,.) excluded)
	(5)	(6)	(7)	(8)
Alsace-Moselle×(2001,2002)	**-0.2025***	0.4357***	0.5703**	**0.4308****
	[0.117]	[0.139]	[0.287]	**[0.143]**
Alsace-Moselle×(1999,2000)	-0.1605	0.2912	0.2850	0.2991
	[0.169]	[0.262]	[0.405]	[0.271]
Affected group×Alsace-Moselle× (2001,2002)				-0.6302***
				[0.125]
Affected group×Alsace-Moselle×(1999,2000)				**-0.4507****
				[0.149]
Year fixed effects (7): 1996-2002	Yes	Yes	Yes	Yes
Department of residency fixed effects(95)	Yes	Yes	Yes	Yes
Control variables(14)	Yes	Yes	Yes	Yes
Occupation fixed effects (31)	Yes	Yes	Yes	Yes
Affected group × Year fixed effects (7)	No	No	No	Yes
Affected group × Department fixed effects (95)	No	No	No	Yes
Affected group × Occupation fixed effects (31)	No	No	No	Yes
Observations	187 472	71 030	95 834	258 502
R2	0.224	0.393	0.398	0.344
Sample	TN≥ 20	0<TN<20	TN *in* (0, .)	TN ≠(0, .)

Note: Weighted OLS. *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are in square brackets, clustered at the department level. The coefficients of interest are highlighted in bold. I use as control variables: diploma (7 categories), age (5 categories), household size (continuous, capped at 5) and gender.
Sample: Active people, working full time, for which occupation, household size, diploma and age are not missing and for which the sampling weight is not missing and above 0.
Source: (A) Excerpt of *Emploi* survey used for the 2009 article. (B) Emploi survey (1996-2002) distributed by the *réseau Quételet*, downloaded the 23 September 2016.

Table GA4. Distribution of my size of firm variable constructed out of available information

Year	Missing	Size < 20	Size ≥ 20	Size ≥ 20 (*missing excluded from sample*)	Observations
1996	11%	25%	65%	72%	51 460
1997	11%	24%	64%	73%	49 298
1998	6%	28%	66%	70%	49 382
1999	10%	26%	64%	71%	49 495
2000	10%	26%	64%	71%	51 381
2001	11%	26%	63%	71%	52 073
2002	11%	25%	64%	71%	51 247
2003	4%	28%	68%	71%	112 591
All	9%	26%	65%	71%	466 927

Note: I construct a variable for the size of firm as follows. For the 1996-2002 years, I use the variable TN; for the year 2003, I use EFEN and if values are missing, I use NBSALB. I systematically put civil servant into the group of firms with more than 20 employees. Self-employed persons working in firms for which the size is missing are added to firms with less than 20 employees. Remaining missing values (as well as employees working in « no employee » firms in 1996 and 1997, apparently overrepresented) are excluded from the sample.
Sample: Active people, working full time, for which occupation, household size, diploma and age are not missing and for which the sampling weight is not missing and above 0.
Source: *Emploi* survey (1996-2002 and 2003 (FPR)).

Table GA5. Replication of Table A2 (models 1-3) and Table 1 (models 4-6) with multiple imputations (20) of missing values

	Dependant variable : number of weekly hours usually worked						
	Panel A. All full time workers						
	DDD firms according to reply	DD affected firms	DD unaffected firms	DDD firms	DD affected individuals	DD unaf-fected individuals	DDD individuals
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Alsace-Moselle×(2003)	-0.5041*	-0.2319	-0.3569	-0.2782	-0.2234	-0.27	-0.2691
	[0.261]	[0.305]	[0.344]	[0.37]	[0.6]	[0.32]	[0.32]
Alsace-Moselle×(2001,2002)	0.2321	**0.2073**	0.3408	0.3558	**0.7433**	0.1776	0.1779
	[0.211]	**[0.26]**	[0.25]	[0.26]	**[0.476]**	[0.181]	[0.182]
Alsace-Moselle × (1999,2000)	0.1336	-0.0105	0.2824	0.2989	0.0313	0.0881	0.0878
	[0.332]	[0.191]	[0.3]	[0.325]	[0.322]	[0.243]	[0.244]
Affected group × Alsace-Moselle×(2003)	0.1406			0.0538			0.0755
	[0.377]			[0.227]			[0.586]
Affected group × Alsace-Moselle × (2001,2002)	**-0.0077**			**-0.1401**			**0.5572**
	[0.238]			**[0.363]**			**[0.358]**
Affected group × Alsace-Moselle × (1999,2000)	-0.0859			-0.3			-0.0184
	[0.312]			[0.186]			[0.174]
Year fixed effects (8)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Department of residency fixed effects(95)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables(14)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Occupation fixed effects (31)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Affected group × Year fixed effects (8)	Yes	No	No	Yes	No	No	Yes
Affected group × Department fixed effects (95)	Yes	No	No	Yes	No	No	Yes
Affected group × Occupation fixed effects (31)	Yes	No	No	Yes	No	No	Yes
Observations	458,547	466,927		466,927	466,927		466,927
	Panel B. Excluding cross-border workers						
		(8)	(9)	(10)	(11)	(12)	(13)
Alsace-Moselle×(2003)		-0.4864*	-0.5896**	-0.5478*	-0.6215	-0.5105**	-0.511**
		[0.249]	[0.263]	[0.302]	[0.719]	[0.247]	[0.247]
Alsace-Moselle×(2001,2002)		**-0.252***	0.1149	0.1282	**0.0096**	-0.1593	-0.1595
		[0.132]	[0.259]	[0.263]	**[0.351]**	[0.1]	[0.101]
Alsace-Moselle×(1999,2000)		-0.1734	0.3076	0.321	-0.1286	-0.0042	-0.0046
		[0.169]	[0.349]	[0.377]	[0.35]	[0.244]	[0.244]
Affected group×Alsace-Moselle×(2003)				0.0775			-0.0569
				[0.235]			[0.693]
Affected group×Alsace-Moselle× (2001,2002)				**-0.3676**			**0.1887**
				[0.309]			**[0.294]**
Affected group×Alsace-Moselle×(1999,2000)				-0.4811**			-0.0611
				[0.234]			[0.161]
Year fixed effects (8)		Yes	Yes	Yes	Yes	Yes	Yes
Department of residency fixed effects(95)		Yes	Yes	Yes	Yes	Yes	Yes
Control variables(14)		Yes	Yes	Yes	Yes	Yes	Yes
Occupation fixed effects (31)		Yes	Yes	Yes	Yes	Yes	Yes
Affected group × Year fixed effects (8)		No	No	Yes	No	No	Yes
Affected group × Department fixed effects (95)		No	No	Yes	No	No	Yes
Affected group × Occupation fixed effects (31)		No	No	Yes	No	No	Yes
Observations		460,549		460,549	460,549		460,549

Note: Weighted OLS. Robust standard errors are in square brackets, clustered at the department level.. *** p<0.01, ** p<0.05, * p<0.1. Affected individuals are the affected occupations working in affected sectors and in affected firms (20 employees and more). I use the following variables as control variables: diploma (7 categories), age (5 categories), household size (continuous, capped at 5) and gender. Categories are detailed in Table GA1 in appendix.

In order to impute firm's size missing value, I use multiple imputation techniques (20) with log-interval regression with age, diploma, household size, gender, occupation, year, department, and sector as independent regressions. Here, interacting all variables with affected groups and unaffected groups enable to multiple estimate jointly in one regression respectively models 2 and 3, 5 and 6, 8 and 9, and 11 and 12.

Sample: Active people, working full time in France (cross-border worker excluded from the sample), whose occupation, household size, diploma and age are not missing and for which the sampling weight is not missing and above 0.

Source: In model 1, excerpt of *Emploi* survey used for the 2009 article. Other models, *Emploi* survey (1996-2002 and 2003 (FPR)).

Table GA6. DD, DDD and DDDD with the new intersection group

Panel A: DD and DDD with new intersection group	Dependant variable : number of weekly hours usually worked		
	DD New affected intersection	DD New unaffected intersection	DDD new intersection
	(1)	(2)	(3)
Alsace-Moselle×(2003)	-0.5662	-0.5488**	-0.5497**
	[0.481]	[0.263]	[0.262]
Alsace-Moselle×(2001,2002)	**0.2098**	-0.2312*	-0.2326*
	[0.155]	[0.128]	[0.129]
Alsace-Moselle × (1999,2000)	0.2359	-0.0736	-0.0748
	[0.182]	[0.268]	[0.268]
Affected group × Alsace-Moselle×(2003)			0.0127
			[0.442]
Affected group × Alsace-Moselle × (2001,2002)			**0.4702****
			[0.183]
Affected group × Alsace-Moselle × (1999,2000)			0.3533***
			[0.121]
Year fixed effects (8)	Yes	Yes	Yes
Department of residency fixed effects(95)	Yes	Yes	Yes
Control variables(14)	Yes	Yes	Yes
Occupation fixed effects (31)	Yes	Yes	Yes
Affected group × Year fixed effects (8)	No	No	Yes
Affected group × Department fixed effects (95)	No	No	Yes
Affected group × Occupation fixed effects (31)	No	No	Yes
Observations	66,637	393,912	460,549
R2	0.194	0.365	0.357

Panel B: DDDD with new intersection group	DDDD All	DDDD Non-manager wage earners
	(4)	(5)
Alsace-Moselle×(2001,2002)	0.0019	-0.3466
	[0.393]	[0.209]
Affected intersection × Alsace-Moselle × (2001,2002)	**0.7264**	**1.0430****
	[0.615]	**[0.444]**
Affected firms × Alsace-Moselle × (2001,2002)	-0.3024	0.0689
	[0.442]	[0.161]
Affected firms × affected intersection × Alsace-Moselle × (2001,2002)	**-0.3251**	**-0.8056****
	[0.928]	**[0.333]**
Year fixed effects (8)	Yes	Yes
Department of residency fixed effects(95)	Yes	Yes
Control variables(14)	Yes	Yes
Occupation fixed effects (31)	Yes	Yes
Affected intersection, firms or (intersection × firms) × Year FE	Yes	Yes
Affected intersection, firms or (intersection × firms) × Department FE	Yes	Yes
Affected intersection, firms or (intersection × firms) × Occupation FE	Yes	Yes
Affected intersection, firms or (intersection × firms) × Alsace-Moselle × 2003	Yes	Yes
Affected intersection, firms or (intersection × firms) × Alsace-Moselle × (1999,2000)	Yes	Yes
Observations	424,769	327,698
R2	0.379	0.149

Note: Weighted OLS. Robust standard errors are in square brackets, clustered at the department level.. *** p<0.01, ** p<0.05, * p<0.1. Affected intersection group contain the affected occupations working in affected sectors. I use the following variables as control variables: diploma (7 categories), age (5 categories), household size (continuous, capped at 5) and gender. Categories are detailed in Table GA1 in appendix.
Sample: Active people, working full time in France (cross-border worker excluded from the sample), whose occupation, household size, diploma and age are not missing and for which the sampling weight is not missing and above 0. In model 5, the sample is restricted to wage-earners in non-professional and non-manager occupations (CS>39).
Source: *Emploi* survey (1996-2002 and 2003 (FPR)).

Table GA7. Replication of Table 1 and Table A2 with working time supplementary surveys (after correcting for firms' size and exclusion of cross-border workers)

	Dependent variable: Weekly working time calculated from the detailed daily schedule					
Panel A: Replication of Table 1	DD Affected occupations	DD Unaffected occupations	DDD Occupation	DD Affect-ed Individu-als	DD Unaf-fected individuals	DDD individuals
	(1)	(2)	(3)	(4)	(5)	(6)
Alsace-Moselle× 2001	-0,042	2,798	2,987	0,739	0,513	0,506
	[0,296]	[1,845]	[1,849]	[1,506]	[0,612]	[0,613]
Affected group × Alsace-Moselle × 2001			-3,005			0,125
			[1,819]			[1,874]
Year fixed effects (2): 1995 and 2001	Yes	Yes	Yes	Yes	Yes	Yes
Department of residency fixed effects(95)	Yes	Yes	Yes	Yes	Yes	Yes
Control variables(14)	Yes	Yes	Yes	Yes	Yes	Yes
Occupation fixed effects (31)	Yes	Yes	Yes	Yes	Yes	Yes
Affected group × Year fixed effects (2)	No	No	Yes	No	No	Yes
Affected group × Department fixed effects (95)	No	No	Yes	No	No	Yes
Affected group × Occupation fixed effects (31)	No	No	Yes	No	No	Yes
Observations	20 774	5 383	26 157	1 996	21 861	23 857
R2	0,113	0,442	0,326	0,198	0,339	0,3346
Sample	Affected occupations	Unaffected occupations	All	Individuals affected	Ind. Unaf-fected	Firm size *≠n.a.*

Panel B: Replication of Table A2	DD Affected firms	DD Unaffected Firms	DDD Firms	DD Affected sectors	DD Unaffected sectors	DDD sectors
	(7)	(8)	(9)	(10)	(11)	(12)
Alsace-Moselle× 2001	0,062	1,497	1,595	0,651	0,405	0,387
	[0,518]	[1,386]	[1,369]	[0,817]	[0,661]	[0,670]
Affected group × Alsace-Moselle × 2001			-1,530			0,264
			[1,491]			[1,355]
Year fixed effects (2): 1995 and 2001	Yes	Yes	Yes	Yes	Yes	Yes
Department of residency fixed effects(95)	Yes	Yes	Yes	Yes	Yes	Yes
Control variables(14)	Yes	Yes	Yes	Yes	Yes	Yes
Occupation fixed effects (31)	Yes	Yes	Yes	Yes	Yes	Yes
Affected group × Year fixed effects (2)	No	No	Yes	No	No	Yes
Affected group × Department fixed effects (95)	No	No	Yes	No	No	Yes
Affected group × Occupation fixed effects (31)	No	No	Yes	No	No	Yes
Observations	16 677	7 180	23 857	5 060	21 097	26 157
R2	0,228	0,3214	0,347	0,317	0,317	0,332
Sample	Size Firms ≥20	Firm size<20	Firm size *≠n.a.*	Sectors affected	Sect. Unaf-fected	All

Note: Weighted OLS. Robust standard errors are in square brackets, clustered at the department level.. *** p<0.01, ** p<0.05, * p<0.1. Affected occupations are the following 2-digit PCS: 33, 35-38, 43, 45-55, 62-69; Unaffected occupations, the PCS 10-31, 34, 42, 44, 56. Affected sectors (NAFG36 variable) count the sectors *F5-métallurgie and transformation des métaux*, *H0-construction*, *J3-commerce of détail and réparations, P1-hôtels and restaurants*. Affected Individuals are the affected occupations working in affected sectors and in affected firms (20 employees and more). I use the following variables as control variables: diploma (7 categories), age (5 categories), household size (continuous, capped at 5) and gender. Categories are detailed in Table GA1 in appendix.

Sample: Active people, working full time in France (cross-border worker excluded from the sample), whose occupation, household size, diploma and age are not missing and for which the sampling weight is not missing and above 0.

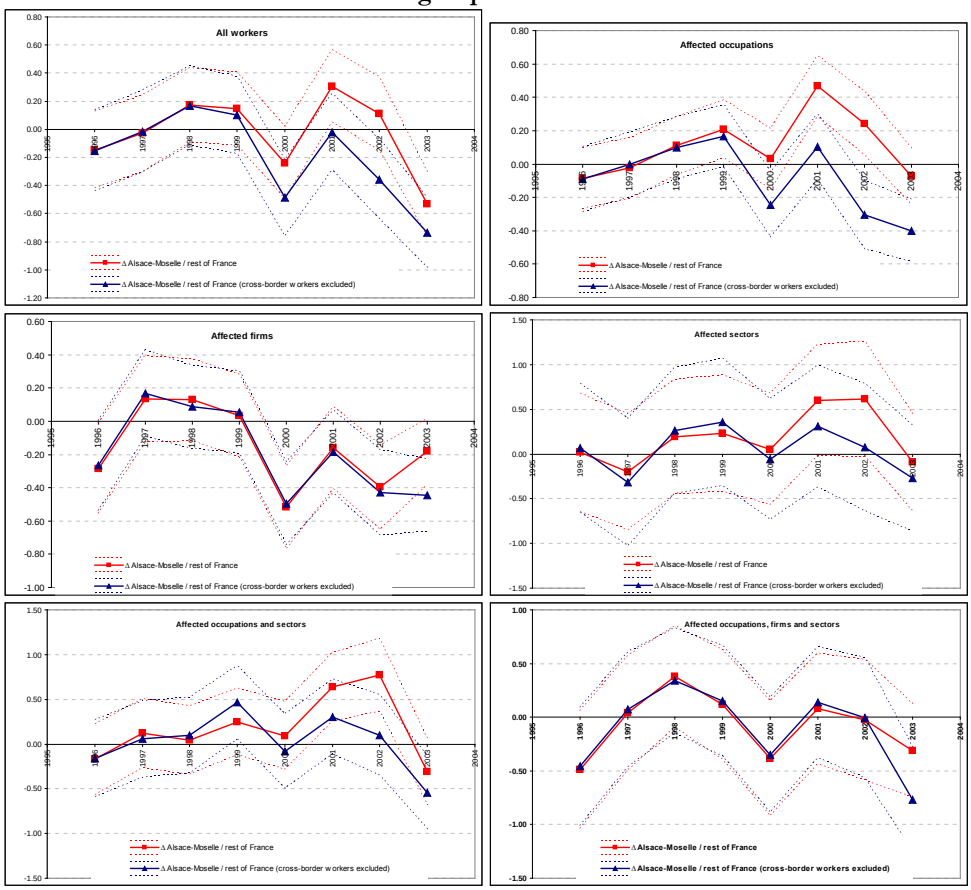
Source: *Emploi* survey 1995 and 2001; French labor force supplementary surveys on working time: *Emploi : durée du travail - 2001* and *Emploi : temps of travail - 1995*.

Table GA8. RWT in Alsace-Moselle and in the rest of France

Variables	Alsace-Moselle Mean	Alsace-Moselle Obs.	Rest of France Mean	Rest of France Obs.	Differential Gross	Differential Net
Panel A. All full time workers (cross-border workers excluded)						
Usual number of weekly hours worked according to *Emploi* survey 1995	41,47	909	41,50	14 776	-0,03	0,19
	(8,50)		(9,10)		[0,31]	[0,22]
Usual number of weekly hours worked according to *Emploi* survey 2001	39,14	922	39,83	15 736	-0,69**	-0,09
	(8,33)		(8,87)		[0,30]	[0,11]
1995-2001 evolution	-2,32***		-1,66***		-0,66	-0,36*
	[0,39]		[0,10]		[0,43]	[0,19]
Average number of weekly hours worked calculated from the detailed working schedule 1995	40,45	629	41,3	10 743	-0,85*	-0,73**
	(9,53)		(11,02)		[0,45]	[0,30]
Average number of weekly hours worked calculated from the detailed working schedule 2001	39,1	856	40,07	13 929	-0,98***	-0,22
	(10,39)		(10,5)		[0,37]	[0,25]
1995-2001 evolution	-1,35***		-1,23***		-0,12	0,44
	[0,53]		[0,14]		[0,58]	[0,42]
RWT agreement in the establishment in 2001 (%)	48,8	922	40,0	15 736	8,8***	7,14***
					[1,66]	[1,57]
Respondent concerned by the RWT in 2001 (%)	44,9	922	36,3	15 736	8,56***	7,20***
					[1,63]	[1,90]
Panel B. All full time workers benefitting in 2001 from a RWT agreement (cross-border workers excluded)						
Average number of weekly hours worked according to *Emploi* survey	36,70	414	37,09	5 718	-0,39*	-0,20
	(4,36)		(4,32)		[0,22]	[0,18]
Average number of weekly hours worked calculated from the detailed working schedule	36,95	398	37,95	5 387	-1,00***	-0,72**
	(6,81)		(6,7)		[0,35]	[0,34]
Enjoys an effective RWT – if the type of RWT *in* (1,4,5,6,7,8) (%).	70,4	243	60,5	2 922	9,83***	10,74***
					[3,25]	[3,23]
Cannot choose the RWT days or the RWT half days – if the type of RWT *in* (2,3) (%).	34,9	235	27,7	3 446	7,23**	3,27*
					[3,03]	[1,93]
Use of free time liberated by the RWT (multiple choice question)						
1. You enjoy no extra free time (%)	10,1	414	9,5	5 718	0,63	0,82
					[1,50]	[1,01]
2. You rest (%)	30,0	414	32,9	5 718	-2,91	-2,72
					[2,39]	[3,79]
3. You have personal leisure (%)	55,6	414	56,6	5 718	-1,05	-0,48
					[2,52]	[2,3]
4. You have another job (%)	0,2	414	0,4	5 718	-0,14	-0,18
					[0,31]	[0,22]
5. You attend classes or get professional training (%)	1,0	414	0,9	5 718	0,11	0,000
					[0,47]	[0,19]
6. You get involved in non-profit associations (%)	3,6	414	3,1	5 718	0,52	0,45
					[0,89]	[0,86]
7. You get involved in social life (%)	1,9	414	1,3	5 718	0,62	0,59
					[0,59]	[0,99]
8. Does not answer on free time (%)	17,6	414	18,4	5 718	-0,73	-1,58
					[1,97]	[3,28]
Has to work in order to compensate for having public holidays off (%)	5,8	414	6,0	5 718	-0,22	-0,38
					[1,21]	[1,52]

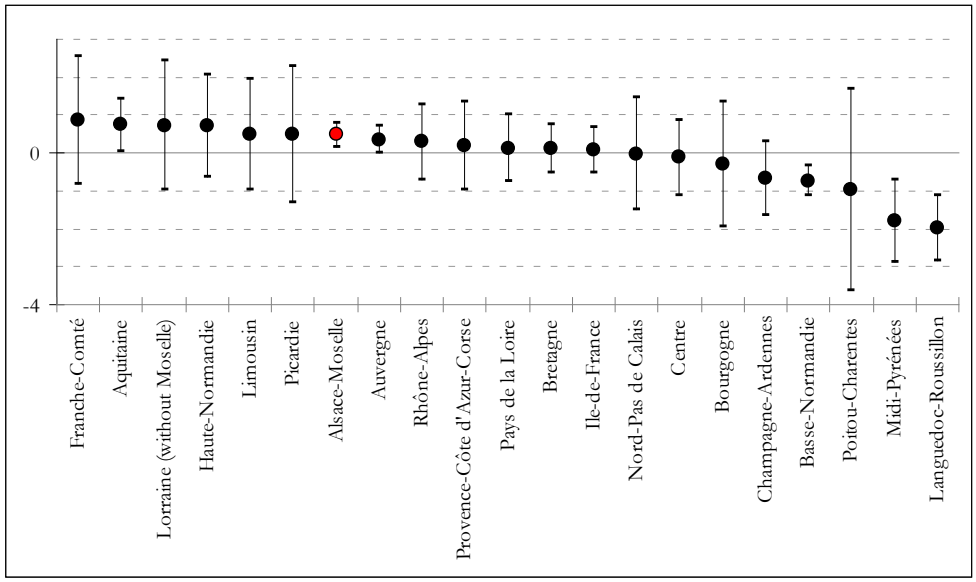
Note: In columns 2 to 5, I present the means or the proportions and the number of observations of the variables described in the first column. If the variable is continuous, I also display the standard deviation in parentheses. In the penultimate column, I calculate the difference in means or in proportions between Alsace-Moselle and the rest of France (common standard error in brackets). I test its significance with a simple Student test. In the last column, I calculate a net differential thanks to weighted OLS models. I use the following variables as control variables: diploma (7 categories), age (5 categories), household size (continuous, capped at 5) and gender. Categories are detailed in Table GA1 in appendix.
Each line corresponds to a different model. The depending variable is described in the first column. I also checked for dichotomous variables that the logistic regressions yield similar results than the linear probability levels used here. Robust standard errors are in square brackets, clustered at the department level.. *** p<0.01, ** p<0.05, * p<0.1.
Sample: Active people, working full time in France (cross-border worker excluded from the sample), whose occupation, household size, diploma and age are not missing and for which the sampling weight is not missing and above 0.
Source: *Emploi* survey 1995 and 2001; French labor force supplementary surveys on working time *Emploi : durée du travail - 2001* and *Emploi : temps of travail - 1995*, distributed by the *réseau Quételet*, downloaded the 23 and the 30 September 2016.

Figures GA1. Evolution of the working time differential between Alsace-Moselle and the rest of France in various affected groups



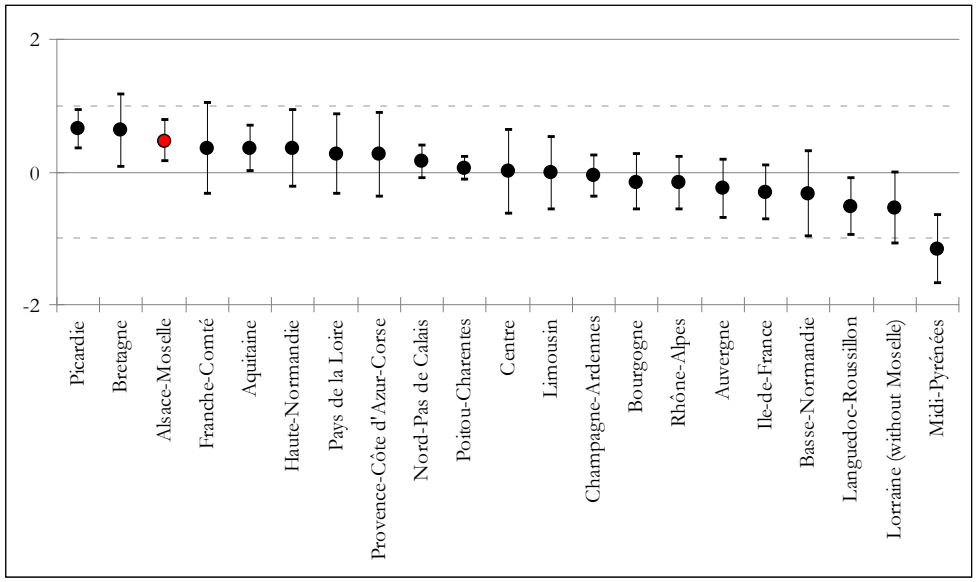
Note: Evolution (weighted) of the weekly working time differential between Alsace-Moselle and rest of France. 0 corresponds to the average differential between 1996 and 1998. The 90% confidence interval of the mean is plotted with dotted lines.
Sample: Active people, working full time in affected occupations, for which occupation, household size, diploma and age are not missing and for which the sampling weight is not missing and above 0.
Source: *Emploi* survey (1996-2002 and 2003 (FPR)).

Figure GA2. Distribution of parameters when replacing Alsace-Moselle with any other French region in Table G2 model 3.



Note: I plot the parameters and their 90% confidence interval obtained when I replace in model 3 of Table G2 Alsace-Moselle with any other 20 French regions.
Sample: Active people, working full time in France (cross-border worker excluded from the sample), for which occupation, household size, diploma and age are not missing and for which the sampling weight is not missing and above 0.
Source: *Emploi* survey (1996-2002 and 2003 (FPR)).

Figure GA3. Distribution of parameters when replacing Alsace-Moselle with any other French region in Table GA6 model 3.



Note: I plot the parameters and their 90% confidence interval obtained when I replace in model 3 of Table GA6 Alsace-Moselle with any other 20 French regions.
Sample: Active people, working full time in France (cross-border worker excluded from the sample), for which occupation, household size, diploma and age are not missing and for which the sampling weight is not missing and above 0.
Source: *Emploi* survey (1996-2002 and 2003 (FPR)).