The Detaxation of Overtime Hours: Lessons from the French Experiment

Pierre Cahuc, Stéphane Carcillo

The Detaxation of Overtime Hours: Lessons from the French Experiment

Pierre Cahuc, *Ecole Polytechnique (Paris), CREST, IZA, and CEPR*

Stéphane Carcillo, *Organization for Economic Cooperation and Development, Sciences Po (Paris), and IZA*

In October 2007, France introduced an exemption on the income tax and social security contributions that applied to wages received for hours worked overtime. The goal of the policy was to increase the number of hours worked. This article shows that this reform has had no significant impact on hours worked. Conversely, it has had a positive impact on the overtime hours declared by highly qualified wage earners, who have opportunities to manipulate the overtime hours they declare in order to optimize their tax situation since the hours they work are difficult to verify.

I. Introduction

In France, between October 1, 2007, and July 1, 2012, remuneration paid for hours worked overtime was exempted from income tax and a substantial portion of social security contributions both for the employee and the employer.[1] This detaxation was an essential plank of the economic

[1] Following the presidential election of May 2012, this detaxation was entirely abolished for firms with more than 20 employees starting July 1, 2012. After this

policy introduced after the presidential elections of May 2007. For France's new president, detaxation of overtime hours sounded the death knell of the Malthusian culture symbolized by the 35-hour workweek, the impact on employment of which was open to legitimate doubt.[2] The tax exemption on overtime hours looked like the ideal instrument for injecting dynamism into the French economy by giving an incentive to "work more to earn more."

In recent years, other European countries have adopted similar reforms in order to boost hours worked. Since 1996, Austria has exempted the extra rate paid for overtime from income tax, with a maximum of 10 hours per month. In Belgium, taxes and social security contributions on the extra overtime rate have been reduced since 2005.[3] Italy introduced a similar measure in 2008 but suspended it at the close of that year in the face of rising unemployment. Finally, Luxembourg has had in place exemptions from tax and social security payments for hours of paid work beyond the legal limit since the start of 2008.[4] While none of these countries have undertaken a reform as far-reaching as that of France, the view that detaxation of overtime hours is an effective means of increasing the number of hours worked appears to have convinced a significant number of policy makers in Europe. This idea is also beginning to spread in the United States, where some politicians propose eliminating the income tax on overtime pay.[5] Although detaxation of overtime hours is becoming popular among policy makers, it has never been evaluated as far as we know. The aim of our article is to contribute to filling this gap.

---

date, a small relief on employers' social contributions of €0.5 per overtime hour remains only for firms with fewer than 20 employees.

[2] See Artus, Cahuc, and Zylberberg (2007) and Chemin and Wasmer (2009).

[3] In Belgium, there has been a reduction of fiscal costs on the first 65 overtime hours per calendar year since July 1, 2005. This ceiling was raised to the first 100 hours for the year 2009, and since January 1, 2010, it is set at 130 hours. The advantage for the employee consists of a tax reduction, and for the employer it is in reduced social contributions on the extra rate for overtime hours. Hence, an important difference between the French and Belgian mechanisms is that the compulsory rate of tax deduction on overtime hours is at least as high as that on normal hours in Belgium, since the tax exemption applies only to the extra overtime rate, whereas in France it is the total remuneration for overtime hours, not just the extra rate, to which the exemption applies.

[4] In Luxembourg, from January 1, 2008, the base rate of remuneration for overtime hours (but not the extra rate) was no longer subject to income tax. Since January 1, 2009, the entire remuneration for overtime hours is exempt from tax and an exemption for social security contributions has been introduced, but only up to a limit of an overtime extra rate of 40%.

[5] See, e.g., the proposition of a governorship candidate in Iowa (http://www.youtube.com/watch?v=BFKLqc7fCe8) and the petition launched on rallycongress.com.

Economic analysis stresses that if taxation is to be efficient, it must define a tax base that the authorities can easily verify.[6] Now, in most cases, it is hard for a third party to verify the number of hours worked when employers and employees have a shared interest in not revealing it. And that is indeed the case with the tax exemption on overtime hours: employers and wage earners have a shared interest in paying and receiving as much remuneration as possible in the form of overtime hours, in order to benefit from the tax cut, without necessarily increasing the length of time actually worked. Opportunities to do so are many, since it is very hard for the fiscal authorities to check on how much time was really worked when the employee and the employer concert their declaration of an amount. This is the Achilles's heel of detaxation of overtime hours. This suggests that the impact of detaxation of overtime hours on hours effectively worked depends in large part on the verifiability of overtime hours. Hence, it is far from obvious that detaxation of overtime hours, costly in any case,[7] leads directly to an increase in hours worked.

Figure 1 displays the evolution of the average weekly number of paid overtime hours for the period 2003–9.[8] We see that paid overtime hours are more numerous after the introduction of the reform in 2007 than before. The level of paid overtime hours rose in 2007 and has remained relatively high since, while the economy was entering a deep recession.[9]

---

[6] This is so especially since the works of James Mirrlees (1971) and Agnar Sandmo (1981). For a recent overview of this topic, see Kleven, Kreiner, and Saez (2009).

[7] The official cost for 2008 is estimated at €4.4 billion, which represents the equivalent of 40% of the total budget of the French state for employment (http://www.vie-publique.fr/actualite/alaune/loi-faveur-heures-supplementaires-quel -bilan.html).

[8] We utilize the ongoing *Enquête Emploi* (Labor Force Survey), which seeks information from persons throughout the year and which began in January 2003. Before that date, the *Enquête Emploi* was based on interrogations that took place during the month of March every year. The data on overtime hours are not perfectly homogeneous over the span 2003–9, because persons who had not changed jobs since the previous interrogation were only asked about their hours exceeding the maximum during the first two interrogations (each person is queried once per trimester for 6 consecutive trimesters). Since the fourth trimester of 2006, questions about the number of overtime hours are asked at every interrogation. We have systematically verified that our results, derived from data covering the whole period 2003T1–2009T3, retain their validity for the subperiod 2006T4–2009T3.

[9] This increase in paid overtime hours might result from changed behavior in compiling tax declarations, prompted by the introduction of detaxation. In fact, surveys carried out on firms have revealed that a significant percentage of firms in which the workweek habitually exceeded 35 hours did not declare overtime hours prior to October 2007. This proportion may have shrunk after October 2007 (Chagny, Gonzales, and Zilberman 2010). The *Enquête Emploi* does not allow us to detect a significant growth of overtime hours linked to this type of behavior. We can ascertain it by studying the evolution of the declarations of paid over-
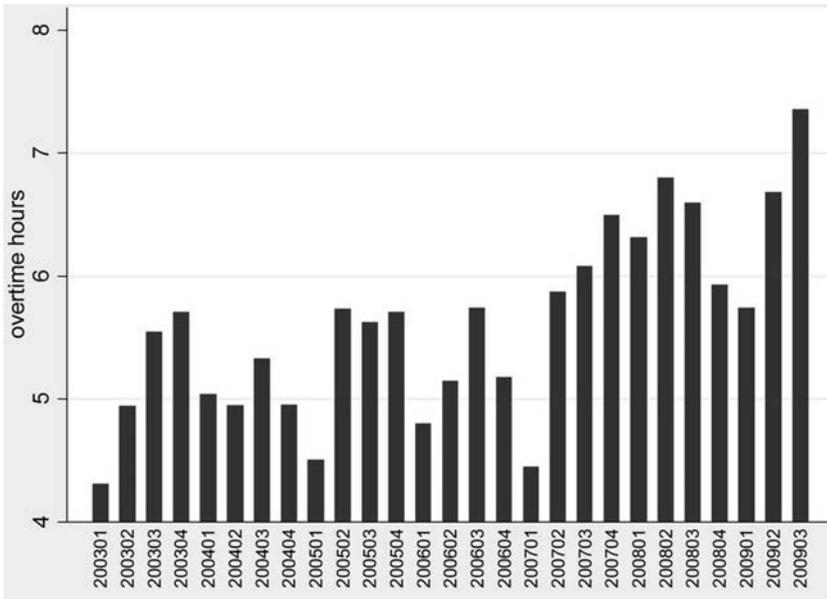
FIG. 1.—Average number per quarter of paid overtime hours per full-time employee; nonagricultural for-profit sector. SOURCE: *Enquête Emploi*.

The increase in paid overtime hours beginning in 2007 observed in figure 1 is not necessarily linked to the reform.[10] It might result from a more intensive utilization of overtime hours by firms that were avoiding hiring in anticipation of the onset of a recession. Moreover, even if the increase in overtime hours is indeed linked to the reform, it is possible that it did not entail a rise in hours actually worked. This scenario is plausible to the extent that a significant percentage of overtime hours worked is not explicitly remunerated.[11] Prior to October 2007, employees whose labor con-

---

time hours of persons who declare they work 39 hours both before and after October 2007. On average, a person who works 39 hours declares 0.09 paid overtime hours per week (with a standard deviation equal to 0.02) before October 2007 and 0.12 hours from October 2007 on (with a standard deviation equal to 0.01). The p-value linked to the null hypothesis of an equality of overtime hours before and after October 2007 is equal to 20%.

[10] Other statistical sources confirm this increase in paid overtime hours in 2007 (Chagny et al. 2010).

[11] The underdeclaration of overtime hours is a phenomenon observed in other countries. Shulamit Kahn and Carlos Mallo (2007) have estimated, for the United States, a model where employers and employees may have a shared interest in not declaring overtime hours to the authorities because of the costs associated with

tract stipulated a weekly duration of 35 hours were working 37 hours on average and were declaring only 0.4 paid overtime hours per week.[12] If the regulations governing hours worked had been rigorously respected, there ought to have been 2 paid hours per week.[13] Moreover, if the regulations had been followed to the letter, the correlation between the paid overtime hours and the hours worked by employees whose labor contract stipulates a workweek of 35 hours ought to be close to one. Before October 2007, however, it came to 0.39.[14] In substance, paid overtime hours and length of time worked frequently vary independently, and it is not at all obvious that an increase in paid overtime hours has direct repercussions on the duration of work.

In order to evaluate the impact of the detaxation, we compare the evolution of the paid overtime hours and the hours worked of two groups of individuals, one of which is affected by the reform and the other which is not. The treatment group is composed of employees who reside and work in France. The untreated group is composed of employees who reside in France but commute regularly and work abroad in regions adjoining the French border. These transborder workers (*travailleurs frontaliers*, literally "border workers") did not benefit from the detaxation of overtime hours. Hence, the overtime hours and hours worked of French employees who work in regions near those of the transborder workers ought to rise relative to those of the transborder workers, from the fourth quarter of 2007 on, if the reform really did have the effects anticipated and if other events did not modify the relative hours of the two groups of employees. In order to ensure the pertinence of the results obtained, we take into account the differences in economic situation between countries and the evolution of regulatory frameworks on both sides of the borders. We compare the evolution of the duration of work and overtime hours for the

---

entering overtime hours in the accounts and with the interpretation of the legal rules. The underdeclaration of overtime hours in Germany is documented by Thomas Bauer and Klaus Zimmerman (1999). David Bell and Robert Hart (1999) highlight a significant volume of unpaid overtime hours in the United Kingdom.

[12] Here we take into consideration employees in the nonagricultural for-profit sector whose labor contract stipulates a workweek of 35 hours and who do not declare overtime hours offset by compensating rest time. The period assessed is 2003T1–2007T3, in other words, before the introduction of the reform.

[13] This does not necessarily mean that these hours are not paid. The monthly wage may include such hours as a result of an agreement between employee and employer not stipulated in the labor contract. Such hours may also be remunerated in the form of a performance bonus, despite such a bonus being forbidden and subject to judicial sanction.

[14] Again, we consider employees in the nonagricultural for-profit sector whose labor contract stipulates a workweek of 35 hours and who do not declare overtime hours offset by compensating rest time. The period assessed is 2003T1–2007T3, in other words, before the introduction of the reform.

same ensemble of workers before and after the reform, thus neutralizing any bias due to an eventual alteration of the composition of the groups. We also checked that other measures introduced at the same time as the detaxation of overtime hours, notably an income tax credit on mortgage interests and tax relief for inheritance and donations, did not affect the control and treated groups differently.

Ultimately, we find that the overtime hours of employees working in France rose, relative to those of the transborder employees, starting in the fourth quarter of 2007. This rise in overtime hours applies solely to highly qualified employees, who have many ways to manipulate the overtime hours they declare in order to achieve tax optimization because the length of time they work is particularly difficult to check on. Conversely, we detect no difference in the evolution of hours worked, whatever category of employee is considered. These results suggest that the upshot of the detaxation of overtime hours has essentially been tax optimization, with no real impact on the length of time worked. These results are confirmed using an alternate strategy. This time we compare the evolution of the duration of work by employees in very small firms, who benefited from the detaxation, and that of independent workers in similar sectors, who have not been directly affected by the detaxation of overtime hours. Again, we detect no difference in the evolution of hours worked across the two groups.

This article is organized as follows. Section II reviews the content of the regulations governing length of time worked and that of the reform of October 2007, which introduced detaxation of overtime hours. Section III is devoted to a theoretical discussion of the consequences of detaxation of overtime hours. We start by presenting a model that shows that detaxation of overtime hours does increase the length of time worked if the hours are perfectly verifiable, since the enhanced remuneration of overtime hours induced by the detaxation incentivates employees to work more. This is the objective of the reform. Yet, when the hours are totally unverifiable, detaxation of overtime hours leads to a diminution of the length of time worked, for it is possible to increase one's income by declaring fictive hours; this increase in income incentivates employees to work fewer hours if leisure is a normal good, a generally accepted hypothesis. Thus, in the intermediate case, pertinent from an empirical viewpoint, in which hours are imperfectly verifiable by the authorities, detaxation of overtime hours should have an ambiguous impact on length of time worked. Section IV describes the evolution of the declared overtime hours and the hours worked of employees for the period 2003–9 in order to highlight the specificity of this evolution in October 2007. Section V compares the evolution of the overtime hours and the length of time worked of individuals affected, and ones not affected, by the detaxation of overtime hours. Some concluding observations are offered in Section VI.

II. The Regulation of the Duration of Work and the Detaxation of Overtime Hours

A. Regulation of the Duration of Work before October 2007

Since January 1, 2000, France has lived with the 35-hour workweek regime,[15] as opposed to 39 hours previously. But the regulations governing time spent at work go far beyond the specification of the legal limit on work time. They comprise numerous mechanisms that form a complex ensemble of constraints and limits on the length of time effectively worked. Two of these are particularly important. They concern overtime hours and the annual lump sum of days.

By definition, every hour of work performed beyond the legal limit of 35 hours per week is an overtime hour. Until October 1, 2007, this entitled the worker to an increase in his or her remuneration varying between minimums of 10% to 50% of the normal hourly wage, according to the size of the firm (10% minimum in firms with at most 20 employees, 25% minimum beyond that), the sectoral agreements in place (which might dictate more favorable rates), and the number of hours worked (a minimum increase of 50% once past the threshold of 8 overtime hours per week). But working time could also be reckoned on an annual rather than a weekly basis. By agreements in place at the level of the sector, the firm, or the establishment, certain employees fall under a "modulated" regime, in which the duration of work may vary over all or part of the year but may not exceed 1,607 hours. Within this framework, hours worked in excess of this ceiling are considered overtime hours.

A range of mechanisms restricts the use of overtime hours. In the first place, the legislation provides for maximum durations of work: 10 hours per day (8 hours for night work and 12 hours maximum under a collective agreement) and 48 hours per week (without exceeding 44 hours on average over a period of 12 consecutive weeks). The principal mechanism is the annual quota, the volume of which is fixed at 220 hours by decree but which can be modified by a collective sectoral agreement and also by an agreement at the firm or plant level under certain conditions. The employer is required, in principle, to inform the inspector of labor and to obtain his permission on a case-by-case basis to have overtime hours performed in excess of the quota. Overtime hours also create an entitlement to a complex system of rest time, which in substance provides for extra holidays as a function of overtime hours worked: on the one hand, if a sectoral agreement provides for it, remuneration for overtime hours may be replaced by a compensatory rest period of equivalent length (and in this

---

[15] The date January 1, 2000, applied to firms with 20 employees or more; for the others, the 35-hour rule was imposed starting on January 1, 2002 (art. L.3121-10 of the labor code).

case the overtime hours do not count toward the annual quota); on the other hand, once the quota is exceeded, obligatory compensation is triggered in the form of a rest period equaling 50% of the duration of the hours worked in firms of 20 employees or less and 100% in firms with more than 20 employees (and 50% above the threshold of 41 hours or more).

Faced with such constraints, many employers prefer to pay "premiums" or "bonuses," which are often remuneration for undeclared overtime hours. Labor ministry investigations regularly reveal that the quantity of overtime hours really being worked is unknown.

In addition, in 2007, certain employees were governed by the arrangement specifying an annual lump sum of days. These were managers or nonmanagerial employees who enjoyed real autonomy in how they managed their time. In this case, a collective agreement covering a sector, a firm, or an establishment determined the number of days worked. Absent such an agreement, the upper limit of the lump sum is set by default at 218 days per year.

B. The Detaxation of Overtime Hours Introduced in October 2007

Thus in essence the regulation of working time in 2007 was characterized by a legal duration of 35 hours per week and by stringent limits on the utilization of overtime hours. The law "to promote work, employment, and purchasing power" (*travail, emploi, pouvoir d'achat*; hence "the TEPA law" or "the fiscal package law"), adopted on August 1, 2007, abolished none of the regulatory and administrative mechanisms limiting the use of overtime hours. All the law did is alter their cost, from October 1, 2007, on. In the first place, the TEPA law renders the rate of extra remuneration for overtime hours uniform, setting it at 25%, whatever the size of the firm (absent extended sectoral collective agreements or ones at the firm level providing for a different rate). This uniformization entailed an increase in the cost of an overtime hour for many firms with fewer than 21 employees, for which the rate of extra pay for overtime had previously been 10%. To offset this extra cost, flat-rate reductions in the social security contributions paid by employers on overtime hours were introduced: €1.5 per hour in firms with at most 20 employees and €0.5 for the rest. Next, the overtime hours performed by a private-sector or public-sector employee were exempted from income tax and wage-based social security contributions (up to a limit of 21.5% of the gross wage). The TEPA law was clearly intended to make the utilization of overtime hours attractive, especially for employees. Indeed, for workers only, overtime hours after the reform would yield 30%–50% more, after income tax, while for firms the impact on labor cost would be smaller and heterogenous depending on the number of employees and the wage level (see app. A). The overall marginal tax rate on overtime hours decreases strongly in all cases after the reform.

III. The Consequences of Detaxation: Some Theoretical Remarks

Prior to the TEPA law, the constraints that limited overtime hours led many employers to reward overtime work with premiums. With the tax burden on overtime removed, employers have an interest in abandoning this practice and paying for overtime hours, since that is a way to pay less tax. Detaxation of overtime hours may then lead to an increase in hours declared with no change in the length of time effectively worked. Previous studies by Dora Costa (2000) and Stephen Trejo (2003) show that increases in the rate of extra pay for overtime hours have no or little effect on the length of working time. The reason is that employers and employees focus on the overall "package," in which what counts is the sum total of hours worked and the total remuneration received, whatever its terms. This suggests that the impact of detaxation of overtime hours on hours effectively worked depends in large part on the verifiability of overtime hours, as we shall now show.

To show how the verifiability of hours worked affects the impact of detaxation of overtime hours on the length of time worked, we consider a labor market with workers of heterogeneous productivity. The productivity of a worker is measured by the parameter $\theta > 0$, the distribution of which is not degenerated in a single point of mass. A worker of productivity θ produces a quantity $\theta f(H)$, $f(0) = 0$, $f' > 0$, $f'' < 0$, when he works for duration H. The workers have identical preferences, represented by a utility function $U(C, L)$, quasi-concave and strictly increasing in relation to its two arguments: consumption C and leisure L, equal to total disposable time, L_0, reduced by the duration worked ($L = L_0 - H$). For the sake of simplicity, wage is the sole source of income for the workers, and taxable income, denoted by R_T, is taxed at a constant rate, denoted by $t \in (0, 1)$. The taxable income is equal to the gross income, denoted by R, minus the amount that can be deducted from the compensation of overtime hours.[16] We denote this amount by σ for each overtime hour, so that $R_T = R - \sigma \max(H - \bar{H}, 0)$, where $\bar{H}$ stands for the legal duration of work. The disposable income, equal to consumption, is equal to $R - tR_T$. Overtime hours are paid by the employer to the employee at rate $(1 + p)w$, where $p \geq 0$ is the legal proportional increase in the rate of pay for overtime hours. We are situated within a framework of partial equilibrium, which leaves out the impact of how the subsidies on overtime hours are financed.

We consider a labor market where competing firms offer contracts stipulating an hourly wage and a length of time to be worked. At labor market equilibrium, the contracts maximize the utility of employees under the

---

[16] We begin by considering the case where it does not make any difference whether it is firms or employees who pay taxes because wages are flexible and the labor market is competitive. The case where wages are rigid is discussed below.

constraint of null profit for firms. The allocation thus obtained is a Pareto optimum.

It is helpful to take two diametrically opposed cases in turn: in the first, overtime hours are perfectly verifiable by the authorities, and, in the second, they are totally unverifiable. The second case is the one habitually envisaged in the literature treating optimal taxation in the wake of the seminal contribution of Mirrlees (1971): the overall remuneration received by the employee is assumed to be verifiable, but the number of hours worked is not. In this framework, productivity θ is private information held by the firm and the employee and cannot be verified by third parties.

A. Verifiable Hours Worked

We assume that hours worked are verifiable by the authorities. Denoting the hourly wage by w, the labor cost has the expression

$$wH + pw \max(H - \bar{H}, 0).$$

Assuming that their wage is the sole source of income for the workers, consumption is equal to the total wage received by the employee net of taxes,

$$wH + pw \max(H - \bar{H}, 0) - t\left[wH + (pw - \sigma)\max(H - \bar{H}, 0)\right].$$

For each type of worker θ, the duration of work and the equilibrium wage maximize utility under the null profit constraint, which is written as

$$\theta f(H) = wH + pw \max(H - \bar{H}, 0).$$

Using the last two relations, it is apparent that the consumption of an employee of productivity θ may be written as

$$C(\theta, H) = \theta f(H) - t\left[\theta f(H) - \sigma \max(H - \bar{H}, 0)\right].$$

In consequence, the equilibrium duration of work for workers of productivity θ maximizes

$$U[C(\theta, H), L_0 - H].$$

It is immediately clear that tax exemptions on overtime hours can increase hours worked because they reduce the tax rate on marginal hours when workers work more than the legal duration of work. Actually, in theory, the tax exemption has an ambiguous impact on the length of time worked: it causes an income effect, which may dominate the substitution effect. But in practice this income effect is weak to the extent that the volume of overtime hours is itself generally weak in relation to total volume of hours worked. In consequence, it is likely that the substitution

effect dominates and that overall the subsidy has a positive impact on hours worked.

So far, we have addressed the case where wages are flexible. If wages are downward rigid, hours are determined by labor demand, represented by the null profit constraint. In that case, detaxation of overtime hours increases hours worked only if it reduces taxes paid by employers. Hence, overall, when overtime hours are verifiable, detaxation of overtime hours is likely to have a positive impact on hours worked.

B. Unverifiable Hours Worked

We now assume that the overall remuneration of the worker is verifiable but that the quantity of hours worked is not. Let us denote by $\tilde{H}$ the number of hours declared by employees to the authorities.

The (verifiable) labor cost becomes

$$w\tilde{H} + pw \max(\tilde{H} - \bar{H}, 0).$$

The null profit condition yields

$$\theta f(H) = w\tilde{H} + pw \max(\tilde{H} - \bar{H}, 0).$$

Consequently, the consumption of an employee of productivity θ is equal to the total wage received by the employee net of taxes:

$$C(\theta, H) = \theta f(H) - t\left[\theta f(H) - \sigma \max(\tilde{H} - \bar{H}, 0)\right].$$

It is immediately apparent that increasing the number of declared hours above the legal duration of work allows the employee to pay less tax. To maximize the subsidy they receive, employees and employers then have an interest in stating the highest possible number of overtime hours compatible with the maximum authorized duration of work, or with a ceiling duration, beyond which fictive overtime hours could be detected by the authorities. In France, in most firms, the legal annual quota of 220 hours is an upper limit, meaning that the maximal amount of fictive hours that could be reported every week is about 4 hours, notably for those who do not work any real overtime hours. An increase in the subsidy for overtime hours is equivalent to an increase in nonwage income, independent of hours worked, the impact of which on the length of time worked is negative if leisure is a normal good, which is generally the case.[17] Hence, when

[17] Notice that the tax on marginal hours does not depend on the subsidy σ because the tax function is linear. When the tax function is not linear, the sign of the impact of the subsidy on the marginal tax rate depends on the sign of the second derivative of the tax function. Since most taxes are linear or piecewise linear, it makes sense to assume linear tax functions from an empirical perspective.

overtime hours are unverifiable, it is likely that detaxation of overtime hours has a negative impact on hours worked.

This result, obtained when the hourly wage is perfectly flexible, remains valid in the presence of a floor under the hourly wage.[18] Nonetheless, the presence of an hourly wage floor may impose a supplementary limit on the length of time worked that can be declared to the authorities, since they, knowing the total remuneration, can verify that the declared length of time worked does indeed correspond to an hourly wage higher than the authorized floor. So the presence of a wage floor limits the opportunities for tax optimization when hours worked are unverifiable. At the limit, for employees paid the minimum legal or conventional wage, there is no margin for maneuver to reduce the hourly wage and detaxation of overtime hours gives rise to no optimization. This situation corresponds to the case studied above, where the minimum wage is binding and hours are verifiable. On the whole, these lines of reasoning show that the impact of the detaxation of overtime hours on the effective length of time worked depends largely on the verifiability of time worked, which varies with categories of workers, and also on the degree of wage rigidity, which generally varies with wage level.

IV. The Data

We use the Labor Force Survey (*Enquête Emploi*) carried out by INSEE (the French national institute of statistics). Each quarter, around 70,000 persons (residing in 45,000 residences) are queried, which represents a sampling rate of residences of around 1/600th. This survey is ongoing. Every person (older than age 15) in each residence selected is queried once per quarter for 6 consecutive quarters.

The *Enquête Emploi* is the sole coherent source currently available for analyzing the impact of the detaxation of overtime hours. For one thing, it tracks the duration of time worked continuously since 2003. For another, the queries regarding the length of time worked are very detailed.[19] Overtime hours worked during the week preceding each interview are declared at the time of the interview, and the distinction is made between those that are remunerated and those that are compensated by rest days; total hours worked are also recorded, and information is supplied about all kinds of holidays or absences that might have affected the volume; many characteristics of the wage earner (age, family situation, region, education, job

---

[18] Note that the model has some interesting predictions on the reactions of hourly wages. These are not analyzed further here because there are large measurement errors on hourly wages in the *Enquête Emploi* that we use in the empirical part of the article.

[19] They are presented in app. B.

held, type of labor contract, payment of premiums, etc.) and of the firm for which he or she works are also included in the survey (especially the size of the firm and the sector in which it is active).[20]

We have selected individuals having a full-time paid job in the nonagricultural for-profit sector, with a work duration less than 70 hours per week, whose work schedules have not been interrupted by a strike, by time off for training, by illness, by a period of partial unemployment, by a business closure, or by maternity. We have eliminated employees who work under the lump-sum-of-days regime, as most managers do. For this category, it is not so much the weekly duration of work that is sensitive to detaxation as it is the total number of days worked during the year. We have likewise eliminated persons working under a modulation agreement, or one of annualized working time, for whom the length of time worked may temporarily exceed the legal duration without triggering overtime hours. We have excluded the unemployed and the retired (who may sometimes have had some paid activity during the reference week of the survey), interns, and persons with contracts supported in the context of some employment policy, as well as salaried executives, seasonal workers, and those working for individual employers whose schedules fall under very specific constraints.

[20] Other administrative sources issuing from administrative declarations or surveys of heads of firms include information on overtime hours since the fourth quarter of 2007. Examples include the annual declarations of company data (DADS) and the recapitulatory statement of social security contributions (BRC) filled out by firms monthly or trimestrially when social security contributions are paid. These two sources have been compiled starting with the fourth quarter of 2007 in order to follow in detail the paid overtime hours (for the DADS) or to deduct the reduction of social security contributions to which firms and employees are entitled on overtime hours starting on that date (for the BRC). But, however reliable they may be, they contain no information on periods prior to October 2007, and they therefore cannot serve as a basis for the evaluation of the mechanism introduced by the TEPA law. As for surveys of firms, such as the Acemo (*Activité et conditions d'emploi de la main d'oeuvre*) and Ecmoss (*Coût de la main d'oeuvre et la structure des salaires*, available from 2005 on for overtime hours), they constitute the instrument for tracking overtime hours until 2007. However, the information only covers firms of 10 employees or more (around 80% of the nonagricultural for-profit sector). Now the recent measurements of overtime hours have demonstrated that recourse to them evolves with the size of the firm, which makes it difficult to infer the behavior of very small firms. Moreover, these surveys tend to be affected by underdeclaration, especially on the part of firms resorting to overtime hours with great regularity. Such firms have had a strong incentive to declare their hours when surveyed starting in October 2007, so as not to reveal any discrepancy with the statements of social security contributions that permit them to benefit from detaxation. On these matters, see the "Report to Parliament" on the putting into effect of article 1 of the law of August 21, 2007, to promote work, employment, and purchasing power relative to the exemptions from charges on overtime hours (http://www.ladocumentationfrancaise.fr/rapports-publics/094000050/index.shtml).
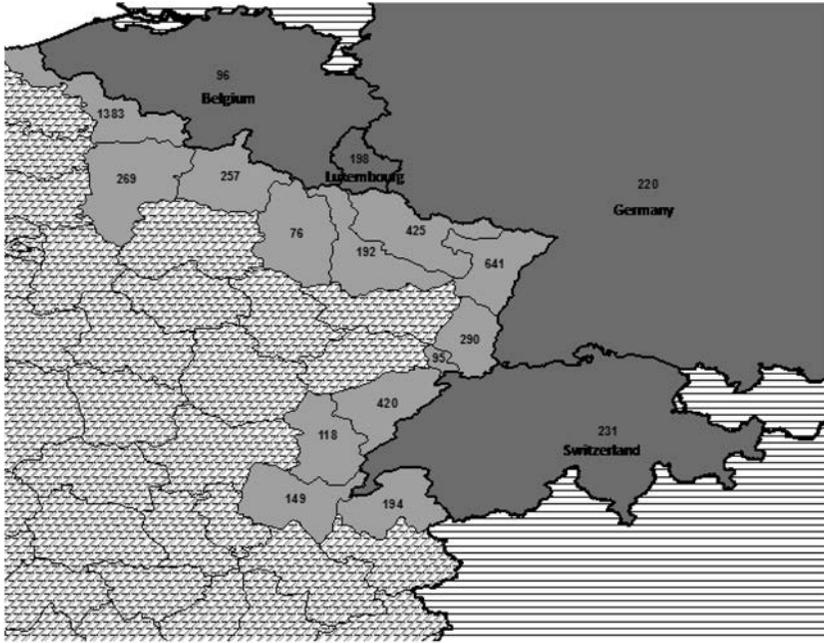
Fig. 2.—Number of observations for people working in France in every department near the northern and eastern French borders (light gray) and for individuals working abroad (transborder workers, dark gray).

Our analysis of the impact of the reform is focused on transborder workers and individuals working in France near the northern and eastern borders, and it deals only with individuals queried before and after October 2007,[21] as explained in more detail below. These restrictions allow us to have 31,054 observations, of which 4,509 are for individuals working and living in France near the northern and eastern borders and 745 are for individuals working abroad near these regions but living in France. Figure 2 shows how these observations are spread along the French border.

It appears that paid overtime hours are on average worked by men to a greater extent than by women, by employees under age 50 more than by seniors, and more often among laborers and the intermediate professions than among managers and white-collar employees (see app. D, which displays descriptive statistics for the individuals queried before and after October 2007). Among persons who declare their wage level, it is espe-

[21] Individuals queried both before and after October 2007 were queried from the third quarter of 2006 at the earliest and up to the end of 2008 at the latest, since they are followed for 18 months in the Labor Force Survey.

cially in the vicinity of the median wage (equaling around 1.6 times the minimum wage) that the weekly averages of overtime hours are highest.

V. The Impact of the Reform

To pinpoint the impact of the detaxation of overtime hours, we compare the evolution of the paid overtime hours and the hours worked for two groups of individuals, one that is affected by the reform and the other that is not. Our first strategy for pinpointing the impact of the reform consists of a comparison between transborder employees, those who reside in France but work abroad in bordering regions, and employees who reside and work in France near the border. We start by discussing this strategy and then go on to present the results.

In the next stage, we use an alternative identification strategy, where we focus on individuals working in France: we compare the evolution of the duration of work of independent workers who do not employ anyone, and thus are not affected by detaxation, with that of employees who work in very small firms.

A. Transborder Employees and Employees Working in France

Unlike employees who live and work in France, transborder workers have not benefited from the detaxation of overtime hours. So the overtime hours and the hours worked of French employees ought to rise relative to those of transborder workers, beginning in the fourth quarter of 2007, if the reform really did have the effects anticipated and if other events have not altered the relative hours of the two groups of employees.

Let us first provide some details about taxes and social contributions paid by employees who live and work in France and transborder workers. The detaxation of overtime hours effectively concerns a portion of social security contributions and income tax. Employees working in a neighboring country pay their social security contributions there (European Community regulation no. 1408/71, dated June 14, 1971), and thus they do not benefit from the reduction in social security contributions on overtime hours, which represents over three-quarters of the total amount of the exemption. Hence, the detaxation of overtime hours always entails a more significant reduction of compulsory withholdings for employees working in France than for transborder workers.

As for the income tax, which represents one-quarter of the tax relief, it is paid in France if the employee has the fiscal status of *travailleur frontalier* (transborder worker), meaning he or she resides not far from the border and returns home sufficiently often (with the exception of persons working in Luxembourg or in the canton of Geneva who pay their taxes abroad). Transborder workers who pay their income tax in France only received confirmation that they could benefit from the detaxation of overtime

hours at mid-2009 at the earliest (i.e., after the end of our sample), after the minister for the budget answered a question from a member of parliament.[22] Indeed, since October 2007, the tax code has not mentioned transborder workers in the scope of detaxation because the very definition of overtime hours worked abroad differed across countries and was unclear, as well as the way to declare these hours. Hence, there was no way transborder workers could know when and how they could eventually claim the tax relief until this indeterminacy was explicitly cleared up, which was only done by a circular of January 2010 (*Bulletin officiel des impôts no. 7*, January 14, 2010) following the decision of the minister. This circular states that the benefit of the detaxation applies to transborder workers beginning on October 1, 2007. In any case, even if some transborders anticipated that this law would apply eventually, they would still have been in a different situation from workers in France since they pay social contributions abroad.

Even if transborder workers did not benefit from detaxation of overtime hours until January 2010, a range of events might affect the paid overtime hours and the hours worked of the two groups, independently of the detaxation of overtime hours, as follows.

(i) The transborder workers might differ from those who work in France. These differences might have to do not just with observable characteristics,[23] like educational level, age, or family situation, but also with nonobservable ones, like motivation to work or personal ambition. Such differences can lead to different reactions to the economic situation and diverging evolutions in the duration of work and overtime hours. The *Enquête Emploi*, which collects information on every individual for 6 consecutive quarters, allows us to take into account the heterogeneity of observable and nonobservable characteristics, constant over time, among transborder workers and workers in France, by estimating the impact of the reform with regresssions that include fixed individual effects. Summary statistics of observable characteristics in both groups are presented in appendix F.

(ii) The economic situation might be different in France and in neighboring countries. To take this phenomenon into account, we integrate variables measuring the economic situation in each country, and we compare the hours of transborder workers with those of employees working in departments (administrative-territorial units) of France adjacent to the French border, in order to compare employees working in homogeneous geographic zones. We focus on individuals working in the North and North-

---

[22] Response of the minister to the "Question orale sans débat" no. 707 asked by Mr. Francis Hillmeyer, Député of the Haut-Rhin department (JO de l'Assemblée Nationale, June 3, 2009, 4773).

[23] These characteristics are presented in table F1.

east of France and transborders working in Belgium, Luxembourg, Germany, and Switzerland. We omit Italy and Spain because there are very few transborder workers in these countries.[24]

(iii) Fiscal reforms might influence the overtime hours and the hours worked in the bordering countries. Such reforms might have an impact on the length of time worked of persons residing in France who work abroad. This might be the case when social security contributions, systematically paid in the country where the job is held, are modified. This might also be the case for persons working in Luxembourg or in the canton of Geneva, for in these cases taxes are paid in the country where the job is held. We have verified that no reform introduced in a neighboring country has led to a reduction in obligatory withholdings on hours of work in excess of the legal or conventional duration of work as significant as in France.

(iv) The composition of the two groups of workers might evolve over time, especially in a period of recession. The *Enquête Emploi* allows us to resolve this problem, since it collects information on every individual during 6 consecutive quarters. It is therefore possible to compare the evolution of the duration of work and overtime hours for the same ensemble of workers before and after the reform, thus neutralizing any bias due to an eventual alteration of the composition of the groups. In order to make sure that variations in the length of time worked and overtime hours do not arise from job changes, we check the robustness of the results by restricting ourselves to a sample of individuals who kept the same job.[25]

(v) The TEPA law included several other tax measures that could have influenced working time behaviors differently across groups: an income tax credit on mortgage interest, a tax relief for inheritance and donation (to children), a lower tax on wealth, and a lower threshold for the so-called tax shield (see app. C for a detailed presentation of these measures). These new tax breaks could have decreased working time, thus counteracting the impact of detaxation of overtime. This could be a problem in evaluating the impact of the detaxation of overtime hours if these breaks affected significantly and differently the control and treated groups. A close scrutiny of these additional measures reveals that this cannot be the case.

- First, all these measures applied equally to those working in France and to transborders (who pay their income and inheritance taxes in France).

---

[24] There are only six observations for transborders working in Italy and six observations for transborders working in Spain.

[25] This choice also excludes individuals who change jobs across countries, which could potentially affect the evaluation of the reform. However, in our sample only six individuals changed the country where they work over the corresponding period.

- Second, as shown in appendix C, these additional measures concerned de facto each year only a very small fraction of the population. Moreover, the concerned individuals are less likely to work overtime; these people generally have wages well above the median wage or at the top end of the income/wealth distribution, while the detaxation of overtime hours concerns a large population paid below or around the median wage.
- Third, this small fraction of beneficiaries is not necessarily more frequently found among transborders, because both groups are similar in many characteristics that are key to benefiting from these measures:

  (*a*) The difference in age across groups, which is very small (39 for transborders, 37 for the treated), could not explain significant differences in the death probability of a parent.
  (*b*) The socioeconomic backgrounds of both groups, which are very close (see tables F2 and F3 in app. F), could not induce significant differences in family tranfers.
  (*c*) The probability to move and buy a house is low and not different either (actually only 1.03% of transborders in our sample did change residence within 12 months after October 2007, against 0.92% for the treated group).

Overall, these additional measures concern a very small portion of the population likely to work overtime and are unlikely to have benefited transborders more than workers in France. In particular, we checked that this is the case for the tax credit on mortgage interest introduced by the TEPA law, which is the additional measure with the strongest potential incidence: the probability of being a home owner for employees working in France did not change at all between before October 2007 and after October 2007 compared to that of transborder employees.

1. Identifying the Impact of Detaxation on Hours Worked and Overtime Hours

The evaluation of the impact of the detaxation of overtime hours is realized through estimating the benchmark equation

$$Y_{ict} = b_0 + b_1(D_t \times F_i) + b_2 D_t + b_3 X_{ct} + v_i + \varepsilon_{it}, \qquad (1)$$

where Y_{ict} designates the duration of work or the paid overtime hours of individual i employed in country c on date t; D_t is a dummy variable equal to zero before October 1, 2007, and to one subsequently; F_i is a dummy variable equal to one for wage earners employed in France and to zero for transborder workers; X_{ct} is a variable representing the quarterly economic situation, measured, according to the specifications, by the business cli-

mate or by the share of exports of goods and services in the GDP of country c at date t (quarterly indicators of the OECD); v_i is a fixed individual effect; and ε_{it} is a random factor of null average.

To make sure that the estimated effect of the treatment reflects an actual break from trend rather than a preexisting trend, a time trend interacted with the dummy for the treatment group is added to the benchmark equation (1). The coefficient b_1 measures the difference in variation after and before October 2007 between the hours of work (or the overtime hours) of wage earners employed in France and transborder workers. In the context presented above, the coefficient b_1 measures the impact of the detaxation of overtime hours on the duration of work or on overtime hours. We also study the effect of detaxation on the probability to work overtime hours by considering the case where Y_{ict} equals one if the individual concerned is paid overtime hours and equals zero otherwise.

2. Identifying the Impact of Detaxation on Tax Optimization

In line with our theoretical part, it is also worth analyzing the behavior of wage earners whose duration of work is a priori difficult to verify. In this perspective, it is enlightening to look at the "gap" variable, equal to the difference between work duration and the number of overtime hours declared to the authorities. A decrease in the gap variable corresponds to an augmentation of overtime hours greater than the augmentation of hours really worked. As predicted by the theoretical model, in the presence of tax optimization, which induces individuals to report fake overtime hours, the gap variable should drop when overtime hours are detaxed. This drop should be larger when work duration is more difficult to verify by the authorities. There should be no drop when work duration is perfectly verifiable. Therefore, the difference between the gap of employees whose hours of work are difficult to verify and that of other employees whose hours of work are easily verifiable should decrease for workers who work in France compared to transborder workers. This triple-differences strategy allows us to evaluate the potential impact of the detaxation of overtime hours by comparing the behavior of individuals among the group of French workers, taking transborder workers as a control group.

To choose the group of workers whose hours of work are difficult to verify, we rely on the observation that it is harder to check on the hours worked by employees who enjoy greater autonomy in the scheduling of their work. In France, authorities verify hours on the basis of documents provided by firms. The reliability of these documents can be checked at the workplace by labor inspectors. Laborers generally work at a given place,[26] where they have a closely regulated duration of work, frequently

---

[26] "Laborers" comprises skilled and unskilled blue-collar workers in the manufacturing, transportation, storage, and craft industries.

recorded by time clocks or registered on books filled in on a daily basis at the workplace. The hours of about 67% of these employees are systematically controlled and registered by their supervisors.[27] This gives the authorities some basis to check the reliability of the overtime hours reported to the administration. By contrast, the hours of work of only about 30% of managers, technicians, professionals, supervisors, and those employed in the intellectual and artistic professions, who can work in various places, sometimes even at home, are controlled by their supervisors. Hence, their hours are much more difficult to verify by the authorities.

Indeed, simple descriptive statistics on individuals working in France show that managers, technicians, professionals, supervisors, and those employed in the intellectual and artistic professions did behave differently from laborers before and after October 2007. In order to focus on individuals whose potential optimization behavior is observable, we select those who reported overtime hours after October 1, 2007. Table 1 reports the overtime hours, the hours worked, and the gap variable for employees working in France, present both before and after the reform in our sample, and declaring paid overtime hours after October 1, 2007. The two first columns display the value of these variables before and after October 1, 2007. The third column shows that the difference between hours declared to the authorities and hours worked by employees whose hours of work are hard to verify who have declared overtime hours since October 1, 2007, has increased considerably from that date on. More than three-quarters of the increase in their overtime hours declared is not matched by any increase in their length of time worked. Table 1 shows, on the other hand, that there is no decrease in the gap between the duration worked and the overtime hours declared to the authorities for laborers who have declared overtime hours starting in October 2007.

To shed more light on the differences in behavior of workers whose duration of work is hard to verify and those whose work duration is easier to verify, we estimate the following equation:

$$Y_{ict} = b_0 + b_1(D_t \times F_i) + b_2 D_t + b_3 X_{ct} + b_4(D_t \times O_i) \qquad (2)$$
$$+ b_5(D_t \times F_i \times O_i) + v_i + \varepsilon_{it},$$

where notations are the same as in equation (1) and where O_i is a dummy variable equal to one for managers, technicians, professionals, supervisors, and those employed in the intellectual and artistic professions and to zero for laborers. Other types of workers are excluded from the sample when

---

[27] *Enquêtes sur les conditions de travail*, 2005, http://travail-emploi.gouv.fr/IMG /xls/A1R5_Le_controle_des_horaires.xls.

Table 1
Overtime Hours and Hours Worked for Employees Working in France and Declaring Paid Overtime Hours after October 1, 2007

	Before October 1, 2007 (1)	After October 1, 2007 (2)	After−Before (3)	p-Value (4)	N (5)
Managers, technicians, supervisors, professionals, and the intellectual or artistic professions:					
Overtime hours (a)	1.258	2.860	1.602		
	(.171)	(.232)	(.288)	.0000	631
Hours worked (b)	41.04	41.30	.261		
	(.430)	(.292)	(.519)	.6157	631
Gap = (b − a)	39.78	38.44	−1.341		
	(.424)	(.258)	(.497)	.0072	631
Laborers:					
Overtime hours (a)	1.543	2.896	1.354		
	(.098)	(.114)	(.151)	.0000	2,047
Hours worked (b)	38.81	40.03	1.221		
	(.140)	(.137)	(.196)	.0000	2,047
Gap = (b − a)	37.26	37.13	−.133		
	(.112)	(.094)	(.146)	.3629	2,047

NOTE.—Weekly number of overtime hours and of hours worked by full-time employees of the non-agricultural for-profit sector. Average value for individuals interrogated before and after October 2007 who have declared overtime hours after October 2007. Null hypothesis: after-before difference is equal to zero. The variable gap is the difference between hours of work and overtime hours declared to the authorities. "Laborers" comprises skilled and unskilled blue-collar workers in the manufacturing, transportation, storage, and craft industries. Standard deviations are in parentheses.

this equation is estimated. The behavior of workers whose hours are difficult to verify, relative to those whose hours can be verified more easily, is captured by the triple-differences coefficient b_5.

3. Results

We begin by presenting the impact of detaxation on hours worked and overtime hours. Then we provide evidence on tax optimization.

The first row of table 2 shows the difference between the overtime hours of wage earners working in France and transborder workers before and after October 1, 2007 (coefficient b_1 of eq. [1]). The second row shows the difference between the hours worked of wage earners working in France and transborder workers. The first column presents the results for the benchmark equation, without controlling for the economic situation and without time trends. The second and third columns take into account differences in economic situation represented by two alternative measures: the economic climate reported by the OECD quarterly surveys (col. 2) and the share of exports in the gross domestic product of each

Table 2
Impact of the Detaxation of Overtime Hours for All Full-Time Employees:
Estimates of the Difference-in-Differences Coefficient of Equation (1)

	(1)	(2)	(3)	(4)	(5)	(6)
Overtime hours (a)	.436*	.433*	.382*	.444*	.443*	.423*
	(.242)	(.242)	(.243)	(.246)	(.246)	(.246)
Hours worked (b)	.183	.182	.151	.238	.238	.223
	(.311)	(.311)	(.312)	(.315)	(.315)	(.316)
Gap = (b − a)	−.252	−.251	−.231	−.206	−.205	−.200
	(.277)	(.277)	(.278)	(.281)	(.281)	(.281)
Probability of overtime	.037	.037	.029	.039	.038	.035
	(.030)	(.030)	(.030)	(.031)	(.031)	(.031)
Economic situation	No	Climate	Export	No	Climate	Export
Time trend	No	No	No	Yes	Yes	Yes

NOTE.—Shown are regressions with individual fixed effects. Sample is nonagricultural for-profit sector. Control group is transborder employees. Observations = 5,254, of which 4,509 are for the treatment group and 745 are for the control group. The first column presents the results for the benchmark equation, without controlling for the economic situation and without time trends. The second and third columns take into account differences in economic situation represented by two alternative measures: the economic climate reported by the OECD quarterly surveys (col. 2) and the share of exports in the gross domestic product of each bordering country (col. 3). In cols. 4–6, a time trend interacted with the dummy for the treatment group is added to the previous specifications. Gap: difference between hours worked and overtime hours. Probability of overtime: equals one if the individual reports overtime hours and equals zero if the individual does not report overtime hours. Economic situation: share of exports in GDP or business climate from quarterly OECD database. Robust standard deviations are in parentheses.
  * Significant at the 10% level.

bordering country (col. 3). In columns 4–6, a time trend interacted with the dummy for the treatment group is added to the previous specifications.[28]

As a whole, table 2 shows that there is no significant difference in the evolution of the durations of work of employees working in France and transborder employees (third row of table 2). Conversely, the number of overtime hours declared by the employees working in France increases, relative to that of transborder employees, at the 10% level of confidence. However, as shown by the fourth row of table 2, the reform did not increase the probability to report overtime hours, and the third row shows that the difference between changes in overtime hours and hours worked is not statistically significant. Table 2 shows that the results are very stable across specifications.

Our theoretical framework suggests that the reform may have a different impact on workers whose duration of work is hard to verify and on those whose work duration is verified more easily. From this perspective, it is worth analyzing in greater depth the behavior of wage earners whose duration of work is a priori difficult to verify. Table 3, which reports the results of the estimation coefficient b_1 of equation (1), for employees whose duration of work is hard to verify, indicates that the detaxation of overtime

---

[28] These results, as well as the following, remain qualitatively the same when we exclude individuals who have only been queried once before or after the reform. Hence, they are unlikely to stem from potential measurement errors.

Table 3
Impact of the Detaxation of Overtime Hours for Full-Time Employees Whose Hours Are Less Verifiable: Estimates of the Difference-in-Differences Coefficient of Equation (1)

	(1)	(2)	(3)	(4)	(5)	(6)
Overtime hours (a)	.743*	.747*	.665	.784*	.784*	.748*
	(.446)	(.446)	(.449)	(.466)	(.466)	(.466)
Hours worked (b)	−.607	−.608	−.632	−.519	−.526	−.518
	(.561)	(.561)	(.566)	(.578)	(.576)	(.581)
Gap = (b − a)	−1.350**	−1.355**	−1.297**	−1.303**	−1.310**	−1.266**
	(.605)	(.604)	(.610)	(.629)	(.628)	(.631)
Probability of overtime	.071**	.072**	.055	.076**	.076**	.068*
	(.036)	(.036)	(.037)	(.037)	(.037)	(.038)
Economic situation	No	Climate	Export	No	Climate	Export
Time trend	No	No	No	Yes	Yes	Yes

NOTE.—Shown are regressions with individual fixed effects. Sample is nonagricultural for-profit sector. Employees whose hours are hard to verify comprise teaching and the scientific professions, media professions, arts and entertainment, administrative and commercial managers of firms, engineers, professionals, foremen and supervisors. Observations = 1,143, of which 954 are of the treatment group and 189 are of the control group. The control group is transborder employees in similar positions. The first column presents the results for the benchmark equation, without controlling for the economic situation and without time trends. The second and third columns take into account differences in economic situation represented by two alternative measures: the economic climate reported by the OECD quarterly surveys (col. 2) and the share of exports in the gross domestic product of each bordering country (col. 3). In cols. 4–6, a time trend interacted with the dummy for the treatment group is added to the previous specifications. Gap: difference between hours worked and overtime. Probability of overtime equals one if the individual reports overtime hours and equals zero if the individual does not report overtime hours. Economic situation = share of exports in GDP or business climate from quarterly OECD database. Robust standard deviations are in parentheses.
  * Significant at the 10% level.
  ** Significant at the 5% level.

hours led to more overtime hours for these employees without having any impact on their hours worked.

The number of overtime hours increases more for these employees, around 0.7 hours as opposed to 0.4 for all types of employees (see table 2). The probability to report overtime hours also increases significantly for employees working in France relative to transborder workers. It is striking to note that for those wage earners whose duration of work is a priori difficult to verify, paid overtime hours of those working in France grew compared to those of the transborder employees, whereas their hours worked did not increase in absolute terms relative to those of the transborder employees. Accordingly, as shown by the third row of table 3, the difference between changes in hours worked and reported overtime hours declined for those working in France relative to the transborder employees. This effect, which is significant at the 5% level of confidence, is sizable, since it amounts to about 1.3 hours per week. Indeed, this is a very large effect compared to the average number of reported overtime hours before the reform, which amounts to 0.2 per week for this category of workers. Table 3 shows that these results are very stable across specifications, including different measures of the economic situation and time trends. Overall, table 3 indicates that the detaxation of overtime hours led

to more overtime hours for categories of employees whose duration of work is hard to verify without having any impact on their hours worked.

Table 4, which reports the triple-differences coefficient of equation (2), indicates that the optimizing behavior of workers whose duration of work is hard to verify is indeed very different from that of laborers. Although nonsignificant, the triple-differences coefficient associated with overtime hours is positive and that associated with hours of work is negative, indicating that workers whose hours of work are difficult to verify reported more overtime hours and worked fewer hours than laborers after the reform in France compared with bordering regions. It is likely that the triple-difference coefficients on hours and on overtime hours are not significant because the number of observations is more limited than in table 2, where we did not focus on any particular subgroup. However, the triple-differences coefficient for the gap variable, which is significant at the 5% level, indicates that the difference in the gap variable of workers whose working hours are hard to verify and that of laborers working in France decreased by 1.3 hours per week compared with transborder workers. Hence, the reform has had a very different impact on workers whose hours are hard to verify and on those whose hours are easier to verify. The former increased their overtime hours without increasing their actual working time, whereas, for the latter, overtime hours and hours of work changed by the same amount, as shown by estimations not reported here. This sug-

Table 4
Impact of the Detaxation of Overtime Hours for Employees Whose Hours Are Less Verifiable Compared to Laborers (Skilled and Unskilled Blue-Collar Workers in Manufacturing, Transportation, Storage, and Craft Industries): Estimates of the Triple-Differences Coefficient of Equation (2)

	(1)	(2)	(3)	(4)	(5)	(6)
Overtime hours (a)	.680	.702	.625	.692	.707	.673
	(.548)	(.548)	(.550)	(.551)	(.551)	(.550)
Hours worked (b)	−.641	−.626	−.684	−.612	−.606	−.626
	(.691)	(.692)	(.693)	(.691)	(.691)	(.691)
Gap = (b − a)	−1.321**	−1.327**	−1.309**	−1.304**	−1.313**	−1.298**
	(.654)	(.653)	(.654)	(.660)	(.659)	(.659)
Economic situation	No	Climate	Export	No	Climate	Export
Time trend	No	No	No	Yes	Yes	Yes

NOTE.—Shown are regressions with individual fixed effects. Sample is nonagricultural for-profit sector. Employees whose hours are hard to verify comprise teaching and the scientific professions, media professions, arts and entertainment, administrative and commercial managers of firms, engineers, professionals, foremen and supervisors. Observations = 3,496, of which 2,904 are for the treatment group and 592 are for the control group. Control group is transborder employees in similar positions. The first column presents the results for the benchmark equation, without controlling for the economic situation and without time trends. The second and third columns take into account differences in economic situation represented by two alternative measures: the economic climate reported by the OECD quarterly surveys (col. 2) and the share of exports in the gross domestic product of each bordering country (col. 3). In cols. 4–6, a time trend interacted with the dummy for the treatment group is added to the previous specifications. Gap: difference between hours worked and overtime hours reported to the administration. Economic situation: share of exports in GDP or business climate from quarterly OECD database. Robust standard deviations are in parentheses.

** Significant at the 5% level.

gests that the reform has had a positive impact on the overtime hours declared by highly qualified wage earners because of the leeway they have to manipulate the overtime hours they declare in order to minimize their taxes.

4. Robustness Checks

Our results might be driven by workers who change jobs. In particular, it is possible that individuals whose hours are difficult to verify moved from jobs or sectors where overtime hours are few to jobs where overtime hours are more commonly used. To check whether this is the case, we restrict the sample to the individuals who stay in the same job over the whole period. Table 5 shows that restricting the analysis to workers who stay in the same job does not change our results for the benchmark equation (1). For these workers, the reform also increases overtime hours but not hours worked.

Another concern is that the discrepancy in the results on hours worked and on overtime hours might stem from differences in the standard deviations in the two variables. The effect of the tax reform on overtime hours and hours worked could be equal, but the large standard deviation in hours worked with respect to that of overtime hours could imply that the estimated effect on overtime hours is more significant than the estimated effect on hours worked. This is a plausible issue since the standard deviation of hours worked is larger than that of overtime hours, as shown in table F1 in appendix F. In order to deal with this issue, we estimate the impact of the reform on the log of hours worked and on the log of overtime hours (more precisely, $\log(1 + \text{overtime hours})$).[29] Estimates not reported here (but available from the authors) show that the results are similar to those obtained with the previous estimations carried out on the number of hours instead of on the log of hours.

The results might be driven by differences in the composition of the control group and the treatment group. It is shown in appendix F that these groups are similar along several important dimensions. However, it turns out that there are more workers in firms with no more than 20 employees in the treatment group than in the control group (24% and 12%, respectively). In order to deal with this issue, we reweighted the sample to match the share of employees in firms with no more than 20 employees

[29] The logarithmic transformation is suitable when the data cover a wide range of values, as is the case for hours worked. This transformation squeezes the bigger values and stretches smaller values. The standard deviation of the log of hours worked is equal to 0.114 (instead of 4.907 in level). The standard deviation of $\log(1 + \text{overtime hours})$ is equal to 0.546 (instead of 2.112 in level). Thus, the difference between standard deviations is smaller in log than in level. Moreover, the standard deviation of $\log(1 + \text{overtime hours})$ is larger than that of the log of hours, whereas the standard deviation of hours is larger than that of overtime hours.

Table 5
Impact of the Detaxation of Overtime Hours for Full-Time Employees Whose Hours Are Less Verifiable and Who Do Not Change Job over the Whole Period: Estimates of the Difference-in-Differences Coefficient of Equation (1)

	(1)	(2)	(3)	(4)	(5)	(6)
Overtime hours (a)	.747*	.750*	.671*	.790*	.789*	.754*
	(.447)	(.447)	(.450)	(.467)	(.467)	(.467)
Hours worked (b)	−.533	−.534	−.554	−.443	−.449	−.437
	(.559)	(.559)	(.564)	(.576)	(.574)	(.579)
Gap = (b − a)	−1.279**	−1.285**	−1.224**	−1.233**	−1.239**	−1.192*
	(.604)	(.603)	(.608)	(.628)	(.626)	(.629)
Probability of overtime	.071**	.072**	.055	.076**	.076**	.068*
	(.036)	(.036)	(.037)	(.037)	(.037)	(.038)
Economic situation	No	Climate	Export	No	Climate	Export
Time trend	No	No	No	Yes	Yes	Yes

NOTE.—Shown are regressions with individual fixed effects. Sample is nonagricultural for-profit sector. Employees whose hours are hard to verify comprise teaching and the scientific professions, media professions, arts and entertainment, administrative and commercial managers of firms, engineers, professionals, foremen and supervisors. Observations = 1,112, of which 924 are for the treatment group and 188 are for the control group. Control group is transborder employees in similar positions. The first column presents the results for the benchmark equation, without controlling for the economic situation and without time trends. The second and third columns take into account differences in economic situation represented by two alternative measures: the economic climate reported by the OECD quarterly surveys (col. 2) and the share of exports in the gross domestic product of each bordering country (col. 3). In cols. 4–6, a time trend interacted with the dummy for the treatment group is added to the previous specifications. Gap: difference between hours worked and overtime hours. Probability of overtime: equals one if the individual reports overtime hours and equals zero if the individual does not report overtime hours. Economic situation: share of exports in GDP or business climate from quarterly OECD database. Robust standard deviations are in parentheses.
* Significant at the 10% level.
** Significant at the 5% level.

in the treatment group with that of the control group. We find that the estimates obtained with this sample are similar to those obtained with the original sample.[30]

Another concern is the generalizability of the results to French workers who do not belong to our treatment group, that is, those who live away from the border. Table F1 in appendix F shows that the characteristics of our treatment group are not different from those of the rest of French workers who live away from the frontier. Moreover, in order to check the generalizability of our central result according to which the gap variable (equal to the difference between hours of work and overtime hours reported to the authorities) of individuals whose hours of work are hard to verify decreased between before and after October 1, 2007, we analyzed

---

[30] It is possible that the results obtained for the sample of all full-time workers in the nonagricultural for-profit sector might hide some heterogeneity in the behavior of some groups of workers who have been affected differently by the reform. In particular, as noted above, the reform provided some more slight advantages to workers employed in firms with no more than 20 employees. Unfortunately, we do not have enough observations to check whether the reform had a different impact across workers employed in firms with no more than 20 employees and other workers.

whether this variable evolved differently for individuals belonging to our treatment group and for other individuals working in France (but not near the border) between before and after October 1, 2007. Thus, we ran a difference-in-differences estimation with two groups: our treatment group on the one hand and other individuals working in France on the other hand. The results (not reported here) show that individuals belonging to our treatment group and other individuals working in France did not behave differently.

Finally, it is not certain that changes in overtime hours in treatment and control groups around the time of the reform are truly unusual. To deal with this issue, we implement a placebo test by running the same regressions as in table 3 but in October 2006 and October 2008 instead of October 2007. The results, available from the authors, show that the changes in hours worked and overtime hours observed in October 2007 do not show up in October 2006 or October 2008. In particular, reported overtime hours and hours worked of individuals working in France and transborder employees did not evolve differently, contrary to what is observed in October 2007.

In sum, the comparison of the evolution of the length of time worked of wage earners employed in France and that of transborder workers indicates that the detaxation of overtime hours has had no significant effect on length of time worked. This result holds good for all categories of employees, whatever their socioprofessional classification or their wage level. Conversely, detaxation of overtime hours has increased the number of overtime hours declared by relatively highly qualified employees, whose duration of work is particularly hard to verify.

B. Employees of Very Small Firms and Independent Workers

1. An Alternative Strategy of Identification

In order to ensure the robustness of the foregoing results concerning the impact of detaxation on length of time worked, we apply the same difference-in-differences method as before, but we now select different treatment and control groups. As opposed to the previous strategy, we now consider only individuals working in France. The treatment group comprises wage earners in very small firms, with a single employee, and the control group comprises independent workers who do not employ wage earners. If the detaxation of overtime hours has really had an impact on the duration of work of employees, we ought to observe a rupture, starting in October 2007, in the difference of duration of work of wage earners in very small firms, who are concerned by the reform, and independents workers without employees, who are not directly concerned. Obviously, this strategy allows us to analyze the impact of the reform on hours of work but not on overtime hours to the extent that independent workers do not report overtime hours.

Applying the same selection criteria as for our main sample (eliminating individuals with a work duration over 70 hours per week, retaining ones whose work schedules have not been interrupted, etc.), we have 2,066 observations for individuals queried before and after October 2007, including 1,311 observations for independent workers and 755 for employees in very small firms.

Comparison of the evolution of the duration of work between these two groups does not necessarily make it possible to identify a causal impact of detaxation on the duration of work. Several different factors might affect the hours worked of these two groups, independently of the detaxation of overtime hours:

(1) For one thing, the independents might have individual characteristics and specific working conditions that cause them to react differently to the economic situation than employees do. In order to limit these differences, we compare independents not employing a wage earner with wage earners in firms having just one employee.[31] Moreover, we also study separately two families of trades within which economic conditions are more homogeneous: first, independent craftsmen and wage-earning laborers in the craft sector and, second, independent retailers and retail employees.[32] We thus verify that the length of time worked has not varied differently between employees and independents within these two families since 2003. Finally, we continue to take account of the heterogeneity of observable and nonobservable characteristics, which do not change over time, between independents and employees by including fixed individual effects. Summary statistics of observable characteristics among employees and independent workers are presented in appendix G.

(2) As in the case of the transborder workers, the composition of the two groups might evolve over time. A reform occurring in 2008, which created the easily accessible and fiscally advantageous status of auto-entrepreneur (self-entrepreneur), might have facilitated the transition from the status of wage earner to that of independent. To take account of these changes, we confine ourselves to individuals who change neither their status nor their job during the period, while following the same ensemble of workers before and after the reform.

(3) Other reforms might have influenced the durations of work of the two groups independently. We have identified none of sufficient importance for the period preceding and following the reform of 2007, the fis-

[31] Some characteristics of these independents and employees are presented in tables G1–G3.

[32] We compare the change in the duration of work in occupations for which the data are sufficiently abundant. Other occupations, like the liberal professions or the health professions, cannot be studied because of the lack of a sufficient number of observations in our sample, either among employees or among independents.

cal regime having been globally stable over the whole of the period.

(4) Finally, by reducing the labor cost of wage earners, the detaxation of overtime hours might give them an advantage over independents. In consequence, the detaxation of overtime hours might reduce the duration of work of the independents, who might lose market share to wage earners. This effect can only be slight inasmuch as the detaxation of overtime hours has only a slight effect on the cost of labor. Still, this does create a risk of overestimating the impact of detaxation on the length of time worked.

The impact of the reform is evaluated by estimating an equation similar to equation (1) for hours worked.

2. Results

Table 6 shows that the difference between the duration of work of independent workers without employees, on the one hand, and the duration of work of employees who work in firms with a single employee, on the other hand, remains stable over the whole period. Indeed, there is no increase in the relative duration of work of the employees beginning in the fourth quarter of 2007, as shown by the estimated value of coefficient b_1 of equation (1) and its standard deviation. The first column concerns the ensemble of employees in very small firms and independents not employing a wage earner. For these two groups, there is no significant difference in the evolution of the duration of work before and after the reform of 2007. The second column displays the results when a time trend interacted with the dummy for the treatment group is added to the previous specification. Columns 3 and 4 show the results when the dependent variable is the log of hours. Results are stable across specifications. These results are confirmed by comparison with two distinct groups, those

Table 6
Impact of the Detaxation of Overtime Hours on Hours Worked of Wage Earners in Firms with One Employee: Estimates of the Difference-in-Differences Coefficient of Equation (1)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Hours worked	−.268	−.260	−.006	−.006	−.026	−.035	−.818	−.862
	(.351)	(.351)	(.008)	(.008)	(.487)	(.488)	(.851)	(.844)
Time trend	No	Yes	No	Yes	No	Yes	No	Yes
Observations	2,066	2,066	2,066	2,066	912	912	559	559
Employees	755	755	755	755	285	285	63	63
Independent	1,311	1,311	1,311	1,311	627	627	496	496

NOTE.—Shown are regressions with individual fixed effects. Samples are from the nonagricultural for-profit sector. Control group is independent workers without employees. Columns 1 and 2: all employees and independent workers; dependent variable is hours worked. Columns 3 and 4: all employees and independent workers; dependent variable is log of hours worked. Columns 5 and 6: employees and independent workers in the craft sector; dependent variable is hours worked. Columns 7 and 8: employees and independent workers in the retail sector; dependent variable is hours worked. Robust standard deviations are in parentheses.

who work in the craft sector and those who work in the retail sector. Columns 5 and 6 concern the craft sector. Columns 7 and 8 concern the retail sector. In these two sectors, there is no significant difference in the evolution of the duration of work as between employees and independents.

Finally, these results confirm the absence of an effect of the reform of October 2007 on the duration of work obtained previously by comparing employees working in France and those working abroad. The detaxation of overtime hours has had no detectable impact on the length of time worked.

VI. Conclusion

The detaxation of overtime hours introduced in October 2007 was intended to allow individuals in France to work more so as to earn more. The evaluation conducted in this article indicates that the detaxation of overtime hours has not, in fact, had any significant impact on hours worked. Conversely, it has indeed had a positive impact on paid overtime hours, which create an entitlement to tax reductions. Thus, the detaxation of overtime hours appears not to have fully met its aim: while the wage earners concerned have indeed benefited from a spike in their remuneration thanks to detaxation, that has not, on average, come about through working more. Detaxation is a costly measure for the public purse, without any ascertained impact on hours worked.

This evaluation has focused on the impact of the measure on hours. Other dimensions could be explored, for example, employment or employee motivation. The fact that hours worked do not increase after October 2007 suggests, however, that the measure must have had a very limited effect on employment.

Appendix A

Impact of the Detaxation on Earnings and Labor Cost

Table A1
Impact of the Detaxation of Overtime Hours on Monthly Net Earnings and Labor Costs (in Euros) for 4 Overtime Hours per Week at the Minimum Wage (€1,056 Net as of January 2010), for Single Person, with No Children, Working in a Firm with 20 or Fewer Employees

At the Minimum Wage:	Before	After	After − Before
Additional cost for employer (I)	+192	+193	0
Additional earnings for employee (II)	+93	+145	+52
Wedge (I − II)	100	48	−52

NOTE.—Calculations include mandatory extra pay on overtime (increased for small firms from October 2007), employees' and employers' social security contributions (decreased from October 2007), income tax exemption for employees (applicable from October 2007), and the impact of additional earnings on in-work tax credit for employees where applicable.

Table A2
Impact of the Detaxation of Overtime Hours on Monthly Net Earnings and Labor Costs (in Euros) for 4 Overtime Hours per Week at the Minimum Wage (€1,056 Net as of January 2010), for Single Person, with No Children, Working in a Firm with More than 20 Employees

At the Minimum Wage:	Before	After	After − Before
Additional cost for employer (I)	+223	+214	−9
Additional earnings for employee (II)	+111	+145	+34
Wedge (I − II)	112	69	−43

Note.—Calculations include mandatory extra pay on overtime (increased for small firms from October 2007), employees' and employers' social security contributions (decreased from October 2007), income tax exemption for employees (applicable from October 2007), and the impact of additional earnings on in-work tax credit for employees where applicable.

Table A3
Impact of the Detaxation of Overtime Hours on Monthly Net Earnings and Labor Costs (in Euros) for 4 Overtime Hours per Week at 1.6 Times the Minimum Wage (€1,689 Net as of January 2010), for Single Person, with No Children, Working in a Firm with 20 or Fewer Employees

At 1.6 × the Minimum Wage:	Before	After	After − Before
Additional cost for employer (I)	+384	+410	+26
Additional earnings for employee (II)	+213	+334	+121
Wedge (I − II)	171	76	−95

Note.—Calculations include mandatory extra pay on overtime (increased for small firms from October 2007), employees' and employers' social security contributions (decreased from October 2007), income tax exemption for employees (applicable from October 2007), and the impact of additional earnings on in-work tax credit for employees where applicable.

Table A4
Impact of the Detaxation of Overtime Hours on Monthly Net Earnings and Labor Costs (in Euros) for 4 Overtime Hours per Week at 1.6 times the Minimum Wage, for Single Person, with No Children, Working in a Firm with More than 20 Employees

At 1.6 × the Minimum Wage:	Before	After	After − Before
Additional cost for employer (I)	+436	+427	−9
Additional earnings for employee (II)	+242	+341	+99
Wedge (I − II)	195	87	−108

Note.—Calculations include mandatory extra pay on overtime (increased for small firms from October 2007), employees' and employers' social security contributions (decreased from October 2007), income tax exemption for employees (applicable from October 2007), and the impact of additional earnings on in-work tax credit for employees where applicable.

Appendix B

Questions Relating to the Duration of Work in the *Enquête Emploi*

Persons interrogated in the *Enquête Emploi* who have worked during the reference week must describe their professional activity. After ques-

tions about holidays that may have been taken during this period, the following questions relating to the duration of work are asked:

Question B46a (variable EMPHSC): "Have you worked overtime (or complementary) hours, paid or not?"

Question B46b (variable EMPHNH): "How many overtime (or complementary) hours?"

Question B46c (variable EMPHRE): "Of these overtime (or complementary) hours, how many are or will be remunerated?"

Question B46d [if the overtime hours were not all remunerated] (variable EMPHRC): "And how many have created or will create an entitlement to compensatory rest?"

Question B47a (variable EMPAFF): "Was your schedule affected by the following causes?"* [several possible answers]

1. Partial unemployment, bad weather?
2. Time spent on training?
3. Strike, labor conflict?
4. No, by none of the above factors.

Question B47b (variable EMPAFC): "How many hours or days of partial unemployment or bad weather?"

Question B47c (variable EMPAFA): "How many hours or days of training?"

Question B47d (variable EMPAFG): "How many hours or days of strike or labor conflict?"

Question B48a (variable EMPNBH): "During the week Monday to Sunday (dates), how many hours did you put in at your principal job (not counting ordinary hours or days off, or exceptional ones, or legal holidays, bridges, make-up time, personal unpaid time off, partial unemployment, training, strike, labor conflict)?"

Appendix C

Presentation of the Additional Tax Measures Introduced by the TEPA Law

1. Income Tax Credit on Mortgage Interest

The law created a tax credit equivalent to 40% of interest payments the first year, then 20% for the 4 following years, with an annual limit of €3,750 for single persons and €7,500 for couples plus €500 per dependent during the first 5 years. This measure concerns only the purchase of the main residence from August 22, 2007, with no retroactivity (it was abolished January 1, 2011). Actual beneficiaries in 2008: 1.3% of house-

holds in 2008 and 3.5% cumulated in 2009.[33] Only 25% of people buying their main residence have income below the median wage.[34]

2. Relief from Inheritance Tax

TEPA extended the inheritance tax relief to the surviving spouse, increased the level of tax-free donation per child or disabled persons from €50,000 to €150,000, and introduced smaller discounts for siblings. The number of exempted estates would increase approximately from 85% to 95% with the reduction of inheritance tax introduced by TEPA. This measure would benefit approximately 100,000 households each year among the wealthiest only (0.4% of all households). The number of donations to children and grandchildren in 2007 represented 2% of households,[35] 50% of which were classed as independent workers, farmers, and CEOs.[36]

3. Lower Tax on Wealth (ISF)

The abatement on the main residence was increased from 20% to 30% for the solidarity tax on wealth (ISF). The law also included a 75% reduction of ISF with a limit of €50,000 for taxpayers who invest in small companies or give to private research foundations. In 2008, 2.1% of tax payer estates were above €770,000 in 2008 (this changed to €1.3 million in 2012).

4. Lowering the Tax Shield

The law lowered the tax shield from 60% to 50% beginning in 2008: no one can pay more than 50% of his or her annual income in taxes (this was abolished in 2012, starting January 1, 2013). About 0.05% of tax payers benefited from this measure every year.

[33] http://www.performance-publique.budget.gouv.fr/farandole/2012/pap/pdf /Jaune2012_logement.pdf.
[34] http://www.insee.fr/fr/ffc/ipweb/ip1291/ip1291.pdf.
[35] http://piketty.pse.ens.fr/fichiers/enseig/memothes/Memoire2011Goupille .PPD.pdf.
[36] http://www.insee.fr/fr/ffc/ipweb/ip1127/ip1127.pdf.

Appendix D
Statistics on Hours Worked and Overtime Hours

By Gender

Table D1
Average Number of Hours over the Week by Gender for Individuals Queried Both before and after October 2007

	(1)	(2)	(3)
Men	39.18	.57	.24
	(5.08)	(2.18)	(1.37)
Women	37.88	.22	.20
	(3.88)	(1.24)	(1.16)
Total	38.76	.46	.23
	(4.76)	(1.93)	(1.31)
Observations	31,054	31,054	28,774

NOTE.—Sample is nonagricultural for-profit sector, person working full-time. Column 1, total hours worked by the employees; col. 2, paid overtime hours by employees; col. 3, overtime hours creating entitlement to compensatory rest by employees. Standard deviations are in parentheses.

By Age

Table D2
Average Number of Hours over the Week by Age for Individuals Queried Both before and after October 2007

Age	(1)	(2)	(3)
15–29	38.40	.57	.25
	(4.40)	(2.15)	(1.39)
30–39	39.00	.49	.25
	(4.91)	(1.95)	(1.35)
40–49	38.96	.46	.25
	(5.04)	(2.00)	(1.38)
50–59	38.57	.26	.15
	(4.50)	(1.42)	(1.02)
60+	39.00	.23	.06
	(5.12)	(1.37)	(.46)
Observations	31,054	31,054	28,774

NOTE.—Sample is nonagricultural for-profit sector, person working full-time. Column 1, total hours worked by the employees; col. 2, paid overtime hours by employees; col. 3, overtime hours creating entitlement to compensatory rest by employees. Standard deviations are in parentheses.

By Socioprofessional Category

Table D3
Average Number of Hours over the Week by Socioprofessional Category for Individuals Queried Both before and after October 2007

	(1)	(2)	(3)
Shopkeepers and craftsmen	42.92	.63	.18
	(7.67)	(2.70)	(1.13)
Managers and highly intellectual professions	44.51	.16	.23
	(6.29)	(1.22)	(1.50)
Intermediate professions	39.16	.36	.29
	(4.72)	(1.68)	(1.41)
White-collar employees	37.47	.23	.20
	(3.56)	(1.33)	(1.19)
Laborers	38.23	.71	.21
	(4.34)	(2.40)	(1.24)
Observations	31,054	31,054	28,774

NOTE.—Sample is nonagricultural for-profit sector, person working full-time. Column 1, total hours worked by the employees; col. 2, paid overtime hours by employees; col. 3, overtime hours creating entitlement to compensatory rest by employees. Standard deviations are in parentheses.

By Level of Net Wage

Table D4
Average Number of Hours over the Week by Level of Net Wage for Individuals Queried Both before and after October 2007

	(1)	(2)	(3)
Less than 1.1 Smic	37.01	.34	.16
	(3.40)	(1.65)	(1.03)
1.1–1.3 Smic	37.74	.45	.21
	(3.66)	(1.77)	(1.22)
1.3–1.5 Smic	38.25	.48	.25
	(4.30)	(1.87)	(1.40)
1.5–1.7 Smic	39.56	.56	.22
	(4.92)	(2.15)	(1.28)
1.7–2 Smic	40.70	.60	.26
	(5.64)	(2.43)	(1.42)
2–2.3 Smic	41.72	.48	.32
	(5.64)	(2.11)	(1.52)
2.3–2.6 Smic	41.24	.46	.28
	(5.72)	(2.01)	(1.62)
2.6–3 Smic	41.47	.38	.29
	(5.44)	(1.91)	(1.52)
3–3.5 Smic	42.09	.25	.14
	(5.68)	(1.64)	(.90)
More than 3.5 Smic	45.16	.24	.36
	(7.53)	(1.63)	(1.83)

Table D4 (*Continued*)

	(1)	(2)	(3)
Total	38.76	.46	.23
	(4.76)	(1.93)	(1.30)
Observations	31,054	31,054	28,774

NOTE.—Sample is nonagricultural for-profit sector, person working full-time. Smic = legal minimum wage. Column 1, total hours worked by the employees; col. 2, paid overtime hours by employees; col. 3, overtime hours creating entitlement to compensatory rest by employees. Standard deviations are in parentheses. Individuals are queried on their wage only twice over 6 quarters. This table is based on the assumption that the wage remains constant between the two interrogations.

Appendix E

Evolution of Overtime Hours Creating Entitlement to Compensatory Rest

Table E1 shows that the only significant change in the number of overtime hours creating entitlement to compensatory rest from October 2007 on is observed for the ensemble of employees in the nonagricultural for-profit sector. Nonetheless, there is no significant change for employees who declare paid overtime hours. This means that the increase in paid overtime hours observed beginning in October 2007 has not been matched by a diminution in the number of overtime hours creating entitlement to compensatory rest. We also observe an absence of significant change for overtime hours creating entitlement to compensatory rest for laborers, engineers, managers, teachers, scientists, and arts and entertainment professionals.

Table E1
Number of Overtime Hours Creating Entitlement to Compensatory Rest

Compensated Overtime Hours	Before October 2007 (1)	After October 2007 (2)	After October 2007 − Before October 2007 (3)	p-Value (4)	N (5)
All employees	.232	.203	−.028	.059	28,774
	(.011)	(.010)	(.015)		
Employees declaring overtime hours after October 1, 2007	.578	.498	−.081	.3040	2,724
	(.061)	(.049)	(.078)		
Employees declaring more overtime hours after October 1, 2007 than before that date	.566	.473	−.093	.2779	2,316
	(.064)	(.057)	(.085)		
Engineers, managers, teachers, scientists, and arts and entertainment professionals	.262	.223	−.033	.3059	7,515
	(.024)	(.022)	(.033)		

Table E1 (*Continued*)

Compensated Overtime Hours	Before October 2007 (1)	After October 2007 (2)	After October 2007 − Before October 2007 (3)	*p*-Value (4)	*N* (5)
Laborers	.183	.161	−.022	.3177	10,581
	(.015)	(.015)	(.022)		

NOTE.—Sample is nonagricultural for-profit sector, person working full-time. Null hypothesis: Before October 2007 − after October 2007 difference is equal to zero. *N* = number of observations. Standard deviations are in parentheses.

Appendix F

Statistics on Transborder Employees

Table F1
Characteristics of Transborder Employees and Employees Working in France near the Border, Individuals Queried Both before and after October

	Transborder Employees	Employees Working in France Near the Border	Employees Working Elsewhere in France
Male (%)	78.8	68.0	67.1
Age	39.96	38.19	38.63
	(9.90)	(10.76)	(10.80)
Years in education	12.70	13.07	13.29
	(2.74)	(2.97)	(3.02)
Number of children	.88	.74	.76
	(1.08)	(.98)	(.97)
Hours worked	42.57	38.60	38.69
	(4.65)	(4.75)	(4.72)
Overtime hours	.55	.54	.44
	(2.18)	(2.08)	(1.90)
Small firms (%)	14.3	24.6	25.2
Observations	745	4,509	25,800

NOTE.—Sample is nonagricultural for-profit sector, person working full-time. Education: number of years of education. Number of children: number of children below age 18 in the household. Weekly number of overtime hours and hours worked. Small firms: percentage of individuals working in firms with fewer than 20 employees. Standard deviations are in parentheses.

Table F2
Occupational Category of the Fathers of Transborder Employees and Employees Working in France near the Border, Individuals Queried Both before and after October 2007

	Transborder Employees (%)	Employees Working in France (%)
Farmers	4.3	4.6
Craftsmen, traders, independent workers, CEOs	7.5	11.1
Managers, engineers, media, and intellectual professions	7.6	4.0
Technicians, supervisors, school teachers	15.6	13.1

Table F2 (*Continued*)

	Transborder Employees (%)	Employees Working in France (%)
Employees and laborers	62.7	62.1
Inactive (other than retired)	.4	1.0
For those working:		
Salaried workers	87.9	83.4
Independent and CEO	12.1	16.5
Observations	745	4,509

Note.—Sample is nonagricultural for-profit sector, person working full-time. Occupation at the time the queried individuals finished their initial education. For those working: the breakdown refers to fathers not inactive or unemployed.

Table F3

Occupational Category of the Mothers of Transborder Employees and Employees Working in France near the Border, Individuals Queried Both before and after October 2007

	Transborder Employees (%)	Employees Working in France (%)
Farmers	1.2	2.6
Craftsmen, traders, independent workers, CEOs	1.9	4.4
Managers, engineers, media, and intellectual professions	.1	.9
Technicians, supervisors, school professors	5.4	6.3
Employees and laborers	36.6	37.0
Inactive	52.7	47.2
For those working:		
Salaried workers	93.1	85.8
Independent and CEO	5.0	9.3
Observations	745	4,509

Note.—Sample is nonagricultural for-profit sector, person working full-time. Occupation at the time the queried individuals finished their initial education. For those working: the breakdown refers to mothers not inactive or unemployed.

Appendix G

Statistics on Independent Workers

Table G1

Characteristics of Independents without Employees and Employees in Firms with a Single Employee, Individuals Queried Both before and after October 2007

	Employees	Independents
Male (%)	68.7	75.1
Age	36.82	43.67
	(11.41)	(9.80)
Years in education	13.51	13.37
	(3.43)	(3.55)
Number of children	.84	.91
	(1.01)	(1.12)

Table G1 (*Continued*)

	Employees	Independents
Hours worked	39.83	49.41
	(6.63)	(8.87)
Observations	755	1,311

NOTE.—Sample is nonagricultural for-profit sector, person working full-time. Education: number of years of education. Number of children: number of children below age 18 in the household. Hours worked: weekly number of hours worked. Standard deviations are in parentheses.

Table G2
Characteristics of Independents Without Employees and Employees in Firms with a Single Employee in the Craft Industry, Individuals Queried Both before and after October 2007

	Employees	Independents
Male (%)	97.9	83.1
Age	33.08	43.36
	(11.76)	(8.87)
Education	11.91	12.44
	(2.37)	(3.00)
Number of children	.93	.98
	(.97)	(1.13)
Hours worked	38.13	48.59
	(4.95)	(8.05)
Observations	285	627

NOTE.—Sample is nonagricultural for-profit sector, person working full-time. Number of children: number of children below age 18 in the household. Hours worked: weekly number of hours worked. Standard deviations are in parentheses.

Table G3
Characteristics of Independents without Employees and Employees in Firms with a Single Employee in the Retail Sector, Individuals Queried Both before and after October 2007

	Employees	Independents
Male (%)	33.3	65.9
Age	40.86	44.66
	(13.1)	(10.56)
Education	13.83	13.18
	(2.76)	(3.41)
Number of children	.41	.86
	(.80)	(1.04)
Hours worked	39.74	50.87
	(6.84)	(9.66)
Observations	63	496

NOTE.—Sample is nonagricultural for-profit sector, person working full-time. Education: number of years of education. Number of children: number of children below age 18 in the household. Hours worked: weekly number of hours worked. Standard deviations are in parentheses.

References

Artus, Patrick, Pierre Cahuc, and André Zylberberg. 2007. Temps de travail, revenu et emploi. Rapport du Conseil d'Analyse Economique no. 688. Paris: La documentation française.

Bauer, Thomas K., and Klaus F. Zimmermann. 1999. Overtime work and overtime compensation in Germany. *Scottish Journal of Political Economy* 46, no. 4:419–36.

Bell, David N. F., and Robert A. Hart. 1999. Unpaid work. *Economica* 66, no. 262:271–90.

Chagny, Odile, Lucie Gonzales, and Serge Zilberman. 2010. Recours aux heures supplémentaires et complémentaires et rachats de jours de RTT durant les premiers mois de mise en oeuvre des lois relatives au pouvoir d'achat. DARES-Analyse, no. 029, Ministère du travail, de la solidarité et de la fonction publique.

Chemin, Matthieu, and Etienne Wasmer. 2009. Using Alsace-Moselle local laws to build a difference-in-differences estimation strategy of the employment effects of 35-hour workweek regulation in France. *Journal of Labor Economics* 27, no. 4:487–524.

Costa, Dora L. 2000. Hours of work and the Fair Labor Standards Act: A study of retail and wholesale trade, 1938–1950. *Industrial and Labor Relations Review* 53, no. 4:648–64.

Kahn, Shulamit, and Carlos Mallo. 2007. Why do firms violate overtime regulations? The role of costs of compliance. Working paper, School of Management, Boston University.

Kleven, Henrik J., Claus T. Kreiner, and Emmanuel Saez. 2009. Why can modern governments tax so much? An agency model of firms as fiscal intermediaries. NBER Working Paper no. 15218, National Bureau of Economic Research, Cambridge, MA.

Mirrlees, James A. 1971. An exploration in the theory of optimum income taxation. *Review of Economic Studies* 38, no. 114:175–208.

Sandmo, Agnar. 1981. Tax evasion, labour supply, and the equity-efficiency trade-off. *Journal of Public Economics* 16, no. 3:265–88.

Trejo, Stephen J. 2003. Does the statutory overtime premium discourage long workweeks? *Industrial and Labor Relations Review* 56, no. 3:530–51.