

# Driven Out of Employment? The Impact of the Abolition of National Service on Driving Schools and Aspiring Drivers

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## Abstract

*Before 1997, compulsory military service was a way for many young French men to obtain their driving licence for free. After the abolition of compulsory conscription in 1997, this sex-based discrimination disappeared. We use this shock in its two dimensions. First, it was a supply shock, since we show the abolition induced a decline in the fraction of men holding a driving licence, particularly for men living in urban areas. Because the causal relation between holding a driving licence and employment is hard to demonstrate, we use this policy change as an instrument for the former. Some elements of our analysis show that employment and having a driving licence are closely related. However, we cannot fully demonstrate that our results are due to the lack of a driving licence in itself rather than due to other consequences of the abolition of national service (e.g. professional courses or the associated loss of experience). Second, it was a demand shock, since these men were forced to turn to driving schools. Here, we are able to show that the abolition of national service had a direct and uncontroversial effect on the (heavily regulated) driving schools industry. The demand shock resulted in increased rents. These rents translated into an increase in the number of driving schools, stable total employment, a decrease in average employment, no increase of total sales or value-added, no obvious decrease in profits per school, but an increase in wages paid to the teachers in those cities that had many young men. Hence, those who benefited from increased demand have been the instructors, in limited supply, not the incumbent schools or the consumers.*

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## 1. Introduction

A driving licence is clearly an important liberating asset, more particularly in dispersed countries, such as the United States. It is even more so in France, a country with wide geographical dispersion, because the cost of a driving licence (learning and test costs) is one of the largest in the world. The difficulty of obtaining this licence (largely because of its cost) has been a matter of much public debate, raising the problem of inequality of access for the poorest and the youngest part of the population. In this article, we study driving licences in relation with labour markets.

To do so, we use the 1997 abolition of national service. Before 1997, young French male adults had to do ten months' military service at the age of 18 or they could defer this until the end of their university education. A fraction among the conscripts had the opportunity to obtain their military driving licence (*Brevet de conduite militaire*), which could be converted into a civilian driving licence at the end of their national service. Many young French men therefore obtained their driving licence for free, whereas women were not offered such an opportunity. After the abolition of national service, this sex-based, albeit rarely noted, discrimination disappeared.

It therefore becomes possible to use the abolition of conscription to analyse the importance of having a driving licence on the labour market and the impact of the abolition on the structure of driving schools. These two topics, though apparently distant, are indeed tightly related, since the entry into the occupation of driving instructors, as well as the creation of a new driving school, are both strongly regulated. Hence, the abolition of national service constitutes both a large and potentially permanent (negative) supply shock of workers endowed with a driving licence on the labour market and a large and permanent (positive) demand shock for the driving school market. Therefore, we analyse both sides in turn.

The negative supply shock is a possible source for identifying the potential causal effect of possessing a driving licence on employment among different social and geographic groups. If it exists, this effect should come through either an extended set of accessible jobs or an extended set of possible jobs (those that require the use of a vehicle). If hardly any articles in the existing literature can be found on the subject, it may be because the problem is not seen as essential in many countries, but it may also come from data sources that do not collect information on the possession of a driving licence. In addition, solving the causality issue is potentially hard because possessing a driving licence is clearly endogenous in relation to employment: one person who has a talent for exams should also easily pass the driving licence tests as another diploma, and has therefore better chances to get a job, not because of the licence but because of their talent. Moreover, reverse causality is also an issue when examining the impact of having a driving licence on employment: having a job makes it easier to pay for your driving licence because of your earnings. As a consequence, it is essential to find good (exogenous) instruments for having a driving licence.

The positive demand shock is a potential source for identifying how operations of driving schools are run, in particular if the regulations that surround this industry have any effect. For instance, entry and profits should be affected after the abolition.

The first contribution of this article is to show that the decline in the number of conscripts caused a decrease in the number of young men having a driving licence after the reform. The fall is identified by comparing the relative driving licence rate between men and women, before and after the reform, within different age groups (difference in difference methodology, in fact a triple difference). In addition, because of the timing, the analysis has a flavor of regression discontinuity. Furthermore, it is also possible to identify those who were most affected, as measured by their socioeconomic background or their geographic environment (rural or urban). In particular, we show that individuals living in an urban environment were more affected than those living in a rural environment. This result is not necessarily surprising, since public transport, more widely available in urban areas, is a potential substitute for a licence.

The second contribution of our article is to analyse if having a driving licence helps in getting a job. After having shown that the reform provides a potential instrument for holding a driving licence, we use it in our employment IV regressions. Our OLS estimates, as well as our IV results, indeed show that employment and having a driving licence are closely related. But even though these IV regressions appear to be impeccable, reduced form analysis relating employment and our instrument do not convincingly show that those men directly affected by the reform had a lower employment rate when compared with their older peers and their equivalent in the previous generations. Whether the IV results can still be attributed to the lack of a driving licence in itself, to services the national service could provide (training, behavioural help, etc.) or to the loss in work experience associated with national service, our results cannot tell. The idea of using national service or its abolition to examine various economic outcomes is not new. It even has a long history, often associated with the name of Josh Angrist (see in particular Angrist 1998 and the associated methodological discussions in Angrist *et al.* 1996). Most analysts examine wages (see, among others, Bauer *et al.* 2009 for Germany), but Maurin and Xenogiani (2007) have looked at education and the abolition of national service, showing that university education was sometimes used to postpone national service indefinitely, and Herpin and Mansuy (1995) have looked at youth employment and national service.

The third and last contribution of our article is to analyse the impact of the reform on the driving schools industry. As the fraction of women and men differs widely at the local level, in particular in smaller rural towns, the 1997 abolition of conscription can be considered as a natural experiment: specifically as a shock on demand for the driving licence randomly distributed all over the country. All of a sudden, thousands of young men who could acquire their driving licence independently of driving schools now turned to them in droves, and the precise increase in demand depended on local

demography. Potential demand for driving schools increased. We examine the response to the shock from this regulated industry. Potential consequences are complex because of the web of regulations, both on schools and instructors. In any case, if the factors limiting supply are not too binding, employment and sales should increase in the cities facing a positive demand shock. However, this is not what appears to happen. Even though we observe the creation of new driving schools at a local level, average employment decreases, and there is no increase in total local employment or in total sales and profits. Over the period, prices remained steadily high and even increased, whereas wages also increased: driving instructors obviously captured the rents.

## 2. Data and background

### *The Data*

Three data sources are used in our analysis. The first source comes from a nationwide survey conducted on an annual basis by a French private institute on car use (called ParcAuto, car fleet), the TNS Sofres (*Société Française d'Etudes par Sondages*). The annual sample includes about 7,000 households (10,000 questionnaires sent and a response rate of 70 per cent). The sampling plan is constructed in collaboration with the French national statistical office, INSEE (*Institut de la Statistique et des Etudes Economiques*), and is representative of the French population. The ParcAuto database, organized, maintained and used at INRETS, The French National Institute for Transport and Safety Research (*Institut National de Recherche sur les Transports et leur Sécurité*) since 1983, includes all the survey annual waves. We use this source for the years 1995–2002. It gives information on the date of birth, sex and holding of a driving licence for each individual. It also provides information on the income of the household and information on the place of residence. Unfortunately, information on the employment status of the individuals is not asked.

Therefore, we use a second source, the global transport survey for the Paris and *Ile de France* region (called EGT for *Enquête Globale Transport*), conducted in 1983, 1991 and 2001 by the Paris regional transport authority (DREIF, *Direction régionale de l'équipement d'Ile de France*). Each wave includes 23,000 individuals and 10,000 households. It provides information on household income, date of birth, sex, education level, activity status (student, employed, unemployed, retired), driving licence and the department of residence for each individual.

The third and last source of data is a French administrative file on firms, called SUSE (*Système Unifié de Statistiques d'Entreprises*, i.e. unified system of firms statistics) built by INSEE on an annual basis. The SUSE files 'unify' two sources of data: fiscal data coming from the French fiscal administration (*Direction générale des impôts*) on one hand and the EAE survey (*Enquête annuelle des entreprises*) on the other hand. It gives well-measured information

on employment, balance sheet data, in particular operating profit, value added, total wages and sales extracted from balance sheets. Finally, the SUSE files include information on the exact location at the 'city' level (French *commune*) of the firm. This variable will be matched with population data from the Census. The SUSE files include the three possible fiscal regimes that exist in France for firms' reports: the BIC regime (*Bénéfices Industriels et Commerciaux*, i.e. industrial and commercial incomes) for manufacturing, trade or craft activities that aim at making profits; the BNC regime (*Bénéfices non commerciaux*, i.e. non-commercial incomes) for individual professionals like physicians, lawyers, etc. and other regulated activities such as clerks or auctioneers; and finally, the BA regime (*Bénéfices agricoles*, i.e. farming incomes) for farming activities. The BIC regime comprises three categories that depend on annual sales: BRN (*Bénéfice réel normal*, i.e. standard real incomes) comprises some 800 different variables on firms and is compulsory for firms with turnover exceeding €763,000 (€230,000 for services); RSI (*Régime simplifié d'imposition*, i.e. simplified tax regime) comprises some 200 different variables for firms with a turnover between €76,300 and €763,000 (€27,000 and €230,000 for services), and finally, the micro-BIC regime is for firms with a turnover below €76,300 (€27,000 for services). We will use both BRN and RSI data in order to include almost all French driving schools. The sample period goes from 1992 to 2002. Along with the SUSE data, we use the Censuses conducted in France in 1990 and 1999. The match between SUSE and Census allows us to have a view of the economic outcomes of driving schools before and after the 1997 military reform at a local level.

### *The Driving Schools Industry*

The driving schools industry is heavily regulated. Regulations cover multiple dimensions. First, it is long and costly to become a driving school instructor. Second, entry is difficult. Third, the school presents the candidates and is therefore able to impose a minimum number of driving lessons (at least 20) that an aspiring driver has to take. Fourth, to become an instructor, one needs to get a State diploma called BEPECASER (*Brevet pour l'exercice de la profession d'enseignant de la conduite automobile et de la sécurité routière*). At least 600 hours of training are explicitly needed (and more if motorcycle and truck are added). But only 60 hours out of 600 take place in a driving school to learn the practical aspects, as the main part of lessons includes very formal issues such as reports, discussions, etc. The training costs amount to €5,000, and training lasts nine months. The exam counts at least three different steps over a six-month period! In 2006, 1,545 BEPECASER were delivered, and two candidates out of three passed the exam. In addition to the BEPECASER, a licence from the 'Préfet' (the regional representative of the State) must be obtained: this licence is valid for five years and must then be renewed.

In order to have the right to open a new driving school, one needs to have at least three-years' experience in teaching driving and to show 'an ability to run a firm' since 1999.

Finally, driving schools benefit from the non-written rule (but heavily suggested by instructors) that aspiring drivers should take at least 20 driving lessons. Even though there is no explicit regulations concerning the number of lessons to take before the exam, anecdotal evidence suggest that no driving school presents students with fewer than 20. Furthermore, the examiner usually (and illegally, in fact) asks the candidate how many lessons he or she took.

### *The 1997 Reform of National Service*

The discussions of a potential reform of the military service in France were initiated by President Jacques Chirac in 1996. The difficulties encountered by the French army during the Gulf War convinced him of its necessity. During the Gulf War, the French force (called Daguet) was stigmatized for its lack of mobility and its lack of autonomy from the American troops. It rapidly became clear that the large number of conscripts in the French force did not help. With French borders no longer under threat and changes in the relations with former colonies, a large army was no longer necessary. The need for a smaller, more mobile, and better performing professional army was being felt.

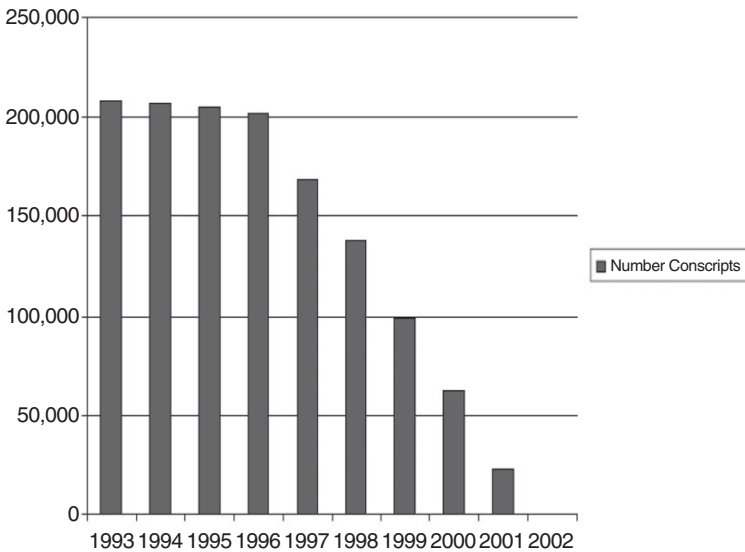
Even though the decision could have sparked a fierce political discussion, this debate never took place. The reform was never discussed despite its clear strategic character (Cluzel and Thibault 2004; Paquetteau 1997 among many others). Even the parties of the left, *a priori* the most hostile towards the idea of a professional army (especially the Communist Party, for whom conscription was a legacy of the French Revolution), did not really defend the existence of a national service, and they all favored a deep reform of compulsory conscription.

Compulsory military service was broadly perceived by most citizens as a pure waste of time. This year off — away from civilian and social life — was all the more difficult to accept as it took place at a crucial moment, between the end of education and the entry into the labour market. Conscription was suspended in 1997, and the military administration stopped using conscripts in August 2001. According to the military administration, the number of conscripts stabilized in the early 1990s at roughly 200,000, implying that 40–50 per cent of each birth cohort was drafted for the national service. After Chirac's initiative in 1996, the number of conscripts declined rapidly from 202,000 in 1996 to almost zero in 2001 (see Figure 1).

### **3. Impact of the abolition on driving licences**

We first examine the fraction of men who used to obtain their driving licence while doing their national service. Unfortunately, no data are available from the French Ministry of Defense. However, the French Road Safety Agency has data on the number of B-type driving licences (the car driving licence, i.e. for vehicles lighter than 3.5 tons) delivered by driving schools between 1990

FIGURE 1  
Decline in the Number of Conscripts after 1997.



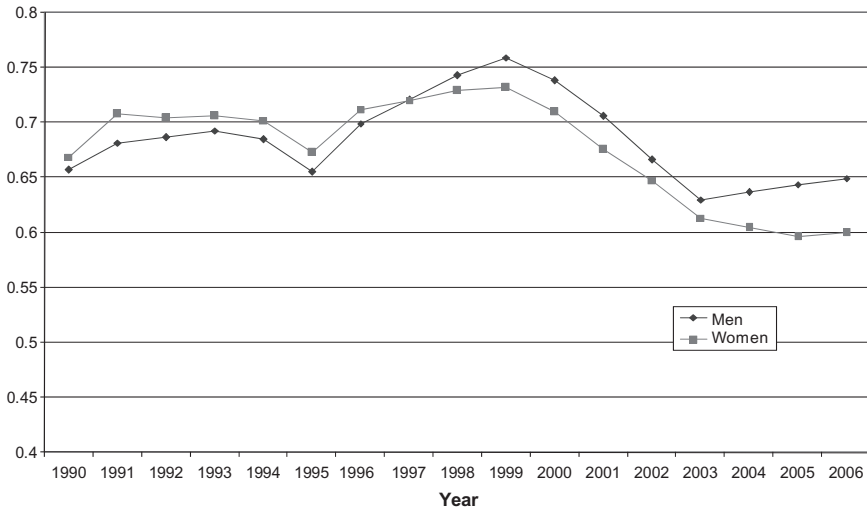
Source: French Ministry of Defense (from Maurin and Xenogiani 2007).

and 2006 (see Figure 2). Before 1997, more women than men used to get their driving licence from a driving school, but starting in 1997, the opposite occurred: more men than women got their licence through a driving school. Clearly, a fraction of men who in previous cohorts received their licence from the army had to turn to driving schools after the reform. Because the licence is expensive, the number of applicants is pro-cyclical. Since the fraction receiving the licence is essentially stable among those taking the exam, the decrease observed after year 2000 matches the cycle. Recent numbers show that the fraction is back to its level of the beginning of the 1990s, even though prices have been steadily increasing over the period.<sup>1</sup>

#### *Holding a Driving Licence: Results for France*

The first data source, the Car Fleet data set, was conducted every year between 1995 and 2002. Hence, we focus on the (representative) sample of those aged 18–23, either affected by the 1997 reform or not. More precisely, we label ‘post-reform’ those men born from 1978 on. Indeed, because the age at conscription was most often 19 or 20, Figure 1 shows that conscription started to fall with the 1977 generation (20 in 1997), but that the fall was *stronger* for the 1978 one (19 in 1997 or 20 in 1998). Therefore, we examine how the fraction of men aged 18–23 who hold a licence is affected by their generation of birth (born in 1978 or after versus before 1978). This change in fractions for men will be compared with that for women, who have not been directly affected by the abolition of national service. The basic equation is:

FIGURE 2  
Number of Driving Licences Delivered in Driving Schools Divided by the Number of People Aged 18–24 in France from 1990 to 2006.



Source: Road Safety Agency.

$$Licence_i = \alpha + \beta_0 sex_i + \beta_1 cohort_i + \beta_2 cohort_i * sex_i + \beta_3 income_i + \varepsilon_i$$

where *Licence* is equal to 1 if the individual has a driving licence, *cohort* measures if the individual is born in 1977 or before versus strictly after 1977, *sex* is an indicator equal to 1 if the individual is a man, and *income* is an indicator for low-income individuals, and finally  $\varepsilon$  is a statistical residual. It is estimated on individuals for the Car Fleet survey *aged between 18 and 23*. The coefficient on the interaction term, sex and cohort, tells us if men born after 1977 are less likely to have a driving licence. It is a difference-in-difference estimator (men born after 1977 — men born in 1977 or before) — (all those born after 1977 — all those born in 1977 or before).<sup>2</sup> Estimation results of this equation are not reported because the coefficients of interest yield estimates that are essentially not significantly different from zero. Therefore, we estimate variations on this basic equation. The following equation gives the modified specification:

$$Licence_i = \alpha + \beta_0 sex_i + \beta_1 cohort_i + \beta_2 cohort_i * sex_i + \beta_3 income_i + \beta_4 cohort_i * sex_i * income_i + \varepsilon_i$$

where the coefficient of interest is on the triple interaction (same difference-in-difference estimator as above, but for the two income categories that we analyse). This linear probability model is estimated by OLS. To give directly the coefficients of interest, we rewrite the equation as



TABLE 1  
The Effect of the Reform on Driving Licence (Low Income vs Mid-High Income)

	<i>Parameter</i>	<i>Standard error</i>
Constant	0.705**	(0.011)
Born before 1977	0.086**	(0.016)
Men born before 1977	0.031**	(0.017)
Men born after 1978	0.047**	(0.016)
Low incomes born before 1977	-0.078**	(0.017)
Low incomes born after 1978	-0.087**	(0.018)
Men × low incomes born before 1977	-0.022	(0.025)
Men × low incomes born after 1978	-0.059**	(0.027)
$R^2$		0.020
Number of observations		9,700

*Note:* Estimated by OLS. The dependent variable is an indicator for holding a driving licence. The low-incomes indicator is measured at the household level.

*Source:* ParcAuto (Car Fleet) Annual Surveys (1995–2002), from TNS SOFRES.

*Sample:* People aged 18–23.

\* Statistically significant at the 0.10 level; \*\* statistically significant at the 0.05 level.

TABLE 2  
The Effect of the Reform on Driving Licence (Urban vs Rural Areas)

	<i>Parameter</i>	<i>Standard error</i>
Constant	0.688**	(0.014)
Born before 1977	0.111**	(0.020)
Men born before 1977	0.051**	(0.020)
Men born after 1978	0.065**	(0.020)
Living in a urban area and born before 1977	-0.075**	(0.018)
Living in a urban area and born after 1978	-0.026	(0.018)
Men living in a urban area and born before 1977	-0.037	(0.026)
Men living in a urban area and born after 1978	-0.057**	(0.026)
$R^2$		0.02
Number of observations		9,700

*Note:* Estimated by OLS. The dependent variable is an indicator for holding a driving licence. The low-incomes indicator is measured at the household level.

*Source:* ParcAuto (Car Fleet) Annual Surveys (1995–2002), from TNS SOFRES.

*Sample:* People aged 18–23.

\* Statistically significant at the 0.10 level; \*\* statistically significant at the 0.05 level.

$$\begin{aligned}
 Licence_i = & \alpha + \beta_0(born \leq 1977)_i + \beta_1(born \leq 1977)_i * male_i \\
 & + \beta_2(born \geq 1978)_i * male_i + \beta_3(born \leq 1977)_i * low-income_i \\
 & + \beta_4(born \geq 1978)_i * low-income_i \\
 & + \beta_5(born \leq 1977)_i * low-income_i * male_i \\
 & + \beta_6(born \geq 1978)_i * low-income_i * male_i + \varepsilon_i
 \end{aligned}$$

Results of this equation are presented in Table 1.<sup>3</sup> Table 2 presents equivalent results contrasting urban areas and rural areas rather than low-income versus mid-high income individuals. Finally, Table 3 presents results equivalent to those of Table 1, restricting attention to individuals living in urban areas.

TABLE 3  
The Effect of the Reform on Driving Licence in Urban Areas (Low Income vs  
Mid-High Income)

	Parameter	Standard error
Constant	0.685**	(0.015)
Born before 1977	0.079**	(0.021)
Men born before 1977	0.014	(0.022)
Men born after 1978	0.026	(0.021)
Low incomes born before 1977	-0.083**	(0.022)
Low incomes born before 1977	-0.056**	(0.023)
Men × low incomes born before 1977	-0.007	(0.032)
Men × low incomes born after 1978	-0.070**	(0.036)
R <sup>2</sup>		0.01
Number of observations		6,080

Note: Estimated by OLS. The dependent variable is an indicator for holding a driving licence. The low-incomes indicator is measured at the household level.

Source: ParcAuto (Car Fleet) Annual Surveys (1995–2002), from TNS SOFRES.

Sample: People aged 18–23 living in an urban area.

\* Statistically significant at the 0.10 level; \*\* statistically significant at the 0.05 level.

Results show that those affected by the reform are young men living in a low-income family, as well as young men living in urban areas.<sup>4</sup> Indeed, as expected, the effect of the abolition is negative. Interestingly, income plays a role, a rather unsurprising outcome given the price of getting trained. More surprisingly maybe, the effect seems stronger in urban areas; a reflection, we believe, of the necessity in France to have a car in all rural areas. France is a very dispersed country, in comparison for instance with the UK. Without a car, in most rural or semi-urban locations, life is virtually impossible. Hence, irrespective of the price, getting trained to obtain a driving licence is a necessity. By contrast, in urban zones, public transport is more widely available and provides a simple substitute for driving a car.

#### *Holding a Driving Licence: Results in Ile de France*

Because our first source of data has no information on employment, we use our second source — the global transport survey — that analyses transport for Paris and its surrounding region (the Greater Paris Region called *Ile-de-France*). The Greater Paris Region is a wide area with a diverse set of towns and diverse social environments. First, dividing Paris and the suburbs is not fully adequate, since the suburbs themselves are extremely diverse. Distance to the centre is not even a good summary statistic. In particular, cities relatively close to Paris sometimes have a very bad connection to the centre. Conversely, some cities far away from Paris are well connected (both highways and public transport, in particular by train and by the Regional Express Network, RER). By contrast, some cities in the Grande Couronne (the part of the region further from Paris) can be quite rural. However, we will still compare Paris with the suburbs. The data comprise now three survey

years: 1983, 1991 and 2001. Hence, we estimate individual's probability of holding a driving licence indicator with a *complete* set of 'survey year'-age-sex interactions using the following specification:

$$\begin{aligned} Licence_i = & \alpha + \beta_1(age < 25)_i * survey_i + \beta_2(age \geq 25)_i * survey_i \\ & + \beta_3(age < 25)_i * survey_i * male_i + \beta_4(age \geq 25)_i * survey_i * male_i + \varepsilon_i \end{aligned}$$

where *survey* captures the survey year and *age* captures the age at survey. Again, the coefficients of interest come from the triple interactions. The model is estimated by OLS. Table 4 shows the resulting estimates for two different age groups: 23–24 and 27–30.<sup>5</sup> We also analyse outcomes for different income categories and places of residence. We only report a fraction of these results. All regressors are shown in the table. In particular, indicators are included for men aged 23–24 in 1983, 1991, 2001 as well as for men aged 25 and above. The F-test in the last line tests for the equality of the two differences of interest  $A = B$ ;  $A$  being the coefficients on men aged 25 and above (the exact age categories depend on the column) in 2001 minus that for men aged 23–24 in the same year;  $B$  being the same difference for the year 1991.<sup>6</sup> Essentially, we expect to see a much smaller effect for men aged 23–24 in year 2001 because those men were not at risk of being drafted in contrast with all other categories. Indeed, for all categories of men aged 23 and 24, the probability of having a driving licence is smaller in 2001, after the abolition of national service than before, in 1991, in comparison with older, but still young, men.

Interestingly, this result also holds for those coming from families with mid-to-high incomes, and is slightly weaker for those coming from low-income families. Finally, it is present for those living in the *Ile-de-France* region but not in Paris. However, there is only a mild effect for those who live in the city of Paris.

#### 4. Using the abolition as a supply shock: driving licence and employment

In the following, we analyse the causal effect of having a driving licence on employment. First, as clearly appears from the above analysis, men from the earliest generations were the only ones affected by the abolition of national service. Given the dates of surveys (1983, 1991, 2001), men aged 23–24 in 2001 were affected, whereas men aged 25 and above were not. Hence, we focus on this discontinuity and contrast the impact of age, sex and year of the survey on employment and holding a driving licence using the same specification as above but *excluding the potential instrument* ( $age \geq 25$ ) \* male \* (survey = 2001):

$$\begin{aligned} Employment_i = & \alpha + \gamma licence_i + \beta_1(age < 25)_i * survey_i + \beta_2(age \geq 25)_i * survey_i \\ & + \beta_3(age < 25)_i * survey_i * male_i \\ & + \beta_4(age \geq 25)_i * survey_i * male_i + \varepsilon_i \end{aligned}$$

TABLE 4  
Driving Licences and National Service

	Age 23-30		Age 23-24 and 27-30		Age 23-30 for low-income individuals		Age 23-30 for middle-high income individuals		Age 23 to 30 living out of Paris	
	Estimate	Std err	Estimate	Std err	Estimate	Std err	Estimate	Std err	Estimate	Std err
Intercept	0.7162	0.0113	0.7187	0.0134	0.5072	0.0236	0.8014	0.0120	0.7158	0.0124
Age <25 in 1991	-0.0497	0.0222	-0.0522	0.0233	0.0906	0.0407	-0.0847	0.0257	-0.0634	0.0241
Age ≥25 in 1991	0.0230	0.0154	0.0322	0.0187	0.0726	0.0300	0.0443	0.0171	0.0337	0.0168
Age <25 in 1983	-0.0806	0.0226	-0.0832	0.0236	-0.1753	0.0513	-0.0729	0.0235	-0.0438	0.0244
Age ≥25 in 1983	-0.0745	0.0159	-0.0571	0.0193	-0.1386	0.0387	-0.1034	0.0164	-0.0565	0.0175
Age <25 in 2001	0.0019	0.0242	-0.0006	0.0251	0.1652	0.0468	-0.0581	0.0268	-0.0241	0.0266
Men × (year 1983) × (age <25)	0.1828	0.0289	0.1828	0.0287	0.3301	0.0818	0.1119	0.0287	0.1628	0.0311
Men × (year 1991) × (age <25)	0.1851	0.0283	0.1851	0.0282	0.1617	0.0493	0.1999	0.0334	0.2178	0.0305
Men × (year 1983) × (age ≥25)	0.2468	0.0162	0.2247	0.0200	0.3414	0.0467	0.2197	0.0159	0.2404	0.0178
Men × (year 1991) × (age ≥25)	0.1544	0.0151	0.1486	0.0185	0.2471	0.0278	0.0850	0.0173	0.1565	0.0163
Men × (year 2001) × (age ≥25)	0.1378	0.0165	0.1523	0.0195	0.2354	0.0365	0.0871	0.0173	0.1556	0.0181
Men × (year 2001) × (age <25)	0.0354	0.0303	0.0354	0.0301	-0.0206	0.0579	0.0618	0.0337	0.0993	0.0327
R <sup>2</sup>	0.05		0.05		0.09		0.05		0.05	
Number of observations	10,240		7,679		2,939		7,301		8,309	
F-test, p-value	7.98	0.0047	9.74	0.0018	3.69	0.055	6.91	0.0086	5.34	0.0209

Note: The F-test is for the equality of (Men in 2001 with age above or equal to 25 minus Men in 2001 with age 23 and 24) with the same difference in 1991.  
Source: Enquête Transport Ile de France (1983, 1991, 2001).

TABLE 5  
Employment and Driving Licences (OLS)

	<i>Age 23–30</i>	
	<i>Estimate</i>	<i>Std err</i>
Intercept	0.5976	0.0111
Driving licence	0.2423	0.0097
Age <25 in 1991	-0.1163	0.0206
Age ≥25 in 1991	-0.0579	0.0131
Age <25 in 1983	-0.0467	0.0210
Age ≥25 in 1983	-0.0404	0.0138
Age <25 in 2001	-0.2223	0.0226
Men × (year 1983) × (age <25)	0.0717	0.0285
Men × (year 1991) × (age <25)	-0.0209	0.0280
Men × (year 1983) × (age ≥25)	0.1391	0.0162
Men × (year 1991) × (age ≥25)	0.1174	0.0150
Men × (year 2001) × (age <25)	0.0174	0.0298
$R^2$		0.11
Number of observations		10,240

*Source:* Enquête Transport Ile de France (1983, 1991, 2001).

Table 5 shows the OLS effect of having a driving licence on employment on the entire population with age between 23 and 30. The coefficient on this variable is strongly positive and significant. This is true irrespective of the way the age groups are constructed. It is true in Paris or outside, for the low-income as well for persons with a larger income. Of course, this is not our last word, because, as already mentioned several times, holding a driving licence is endogenous in this regression: indeed, employment may well help in holding a driving licence because employment may well buy the lessons needed to obtain the licence (reverse causality). This explains why we present in Table 6 our IV results, using an indicator for men aged 25 and above in 2001 as our instrument. We also present in Appendix Table A1 the reduced form regression of employment on our exogenous variables, including the instrument.

The estimates from Table 6 show a significant (and potentially causal) effect of holding a driving licence on being employed. The effect is strong, stronger than in the OLS results, as usual. The magnitude of the effects may be considered as slightly too large, for reasons that we will try to identify in the next paragraph. It is also much more imprecise than the OLS estimate, again a usual feature of IV estimates. However, it is very stable across groups.

To assess if we identified a fully causal effect, we examine the reduced-form equation. The results of Appendix Table A1 show the effect of the instrument on employment. The  $F$ -test statistics computed at the bottom of the table is similar to that computed in Table 4. In fact, the estimates presented here do not fully support the conclusion that the instrument is correlated with the outcome (the instrument is in fact captured by the difference between the two differences of the effect for males above 25 with that of males aged 23 and 24, for the year 2001 and for the year 1991, respectively).<sup>7</sup> Or, put another way,

TABLE 6  
Employment and Driving Licences (IV)

	Age 23-30		Age 23-24 and 27-30		Age 23 to 30 for low income individuals		Age 23 to 30 for middle-high income individuals		Age 23 to 30 living out of paris	
	Estimate	Std err	Estimate	Std err	Estimate	Std err	Estimate	Std err	Estimate	Std err
Intercept	0.1261	0.1085	0.1868	0.1140	0.0874	0.1122	0.1766	0.1962	0.0831	0.1083
Driving licence	0.8465	0.1384	0.8036	0.1436	0.8240	0.1821	0.8089	0.2323	0.8939	0.1367
Age <25 in 1991	-0.0474	0.0288	-0.0795	0.0299	-0.0501	0.0444	-0.0310	0.0410	-0.0159	0.0324
Age ≥25 in 1991	-0.0330	0.0164	-0.0720	0.0192	-0.0152	0.0308	-0.0291	0.0175	-0.0310	0.0179
Age <25 in 1983	0.0409	0.0317	0.0074	0.0331	0.0678	0.0761	0.0236	0.0371	0.0164	0.0312
Age ≥25 in 1983	0.0434	0.0251	-0.0047	0.0266	-0.0408	0.0600	0.0462	0.0376	0.0332	0.0252
Age <25 in 2001	-0.1846	0.0279	-0.2145	0.0283	-0.2529	0.0534	-0.1398	0.0379	-0.1228	0.0325
Men × (year 1983) × (age <25)	-0.0387	0.0419	-0.0309	0.0416	-0.0177	0.1133	-0.0396	0.0425	-0.0339	0.0428
Men × (year 1991) × (age <25)	-0.1328	0.0416	-0.1248	0.0413	-0.1097	0.0650	-0.1404	0.0607	-0.1373	0.0466
Men × (year 1983) × (age ≥25)	-0.0100	0.0390	0.0347	0.0393	0.1410	0.0829	-0.0307	0.0543	0.0124	0.0390
Men × (year 1991) × (age ≥25)	0.0241	0.0276	0.0626	0.0298	0.0453	0.0556	0.0147	0.0283	0.0194	0.0287
Men × (year 2001) × (age <25)	-0.0040	0.0353	-0.0025	0.0342	0.0606	0.0681	-0.0401	0.0419	-0.0870	0.0407
R <sup>2</sup>	0.04		0.06		0.07		0.03		0.05	
Number of observations	10,240	7,679		2,939		7,301		8,309		

Source: Enquête Transport Ile de France (1983, 1991, 2001).

the employment probability for those directly affected by the abolition — young men aged 23–24 at the 2001 survey — does not look worse than that for the previous generations, in comparison with their older peers. In fact, employment outcomes in 2001 are worse for both young men and women. But the difference with those men aged 25 and above looks similar to what happened in the previous cohorts.

As a result, even though our IV estimates are positive, they may still be contaminated by endogeneity. The instrument that we have used does not fully reflect employment opportunities, as seen from the driving licence viewpoint. Indeed, a good instrument is such that all the effects of national service should go through the endogenous variable, that is holding a driving licence. Unfortunately, there are some elements of doubt. For instance, professional courses were offered for the low educated during the military service. The drafted also learnt how to live with constraints. In contrast, Maurin and Xenogiani (2007) have shown that university students were tempted to do additional years of education to postpone, and eventually avoid, national service. They also showed that this was mostly true for a fraction of the students, those with relatively bad prospects within the university system, who left before completing college. Hence, national service was potentially bad for a fraction of those young who lost a year or more within the university system. It was also potentially harmful for those who went since they essentially lost a year of real work experience.

To conclude this section, national service had a negative impact on the probability of having a driving licence for young men. Even though employment is associated with having a licence, the instrument generated by this quasi-experiment does not have all the desirable properties of an unquestionable instrument. Therefore, we cannot definitely conclude that a driving licence increases employment probabilities.

## **5. Using abolition as a demand shock: employment in driving schools**

Another noteworthy effect of the abolition of national service in France is its effect on the driving schools industry. As explained earlier, this industry is heavily regulated both in terms of entry of new schools as well as in terms of supply of new instructors. Indeed, because the fraction of women and men among the young is likely to differ widely at a local level, we can use the 1997 abolition of conscription as a natural experiment, specifically as a shock on demand for driving licences, randomly distributed all over the country. All of a sudden, thousands of young men who previously could acquire their driving licence independently of driving schools now turned to them, and the increase in demand depended on local (random) demography.

Our data encompass almost all driving schools in France (see Section 2 above). However, because we have access to data on firms and not to data on establishments, small independent firms and groups with multiple establishments cannot be distinguished in the SUSE file; both are equally considered

as firms. This can affect our results. Indeed, multi-establishment firms are considered in our data as ‘normal’ firms, but have a very large turnover, employment, wages, etc., and are located in the city where their head office is situated. Obviously, the evolution of such groups has simply no meaning at a local level, in particular when compared with ‘small’ driving schools located in a single city. In order to eliminate these groups from our analysis, we concentrate on firms with a turnover below 500,000 French francs (around 75,000 euros). Results are robust when considering firms below 1 million French francs (around 150,000 euros). Also, in order to remain at a local level, we do not include driving schools located in the three largest French cities, namely Paris, Lyon and Marseille.

The equation that we estimate has the following specification:

$$y_{ct} = \alpha + \beta_1 trend_{t < 1997} + \beta_2 trend_{t \geq 1997} + \beta_3 trend_{t < 1997} * young_{c,1999} \\ + \beta_4 trend_{t \geq 1997} * young_{c,1999} + \beta_3 trend_{t < 1997} * ymales_{c,1999} \\ + \beta_4 trend_{t \geq 1997} * ymales_{c,1999} + \lambda_c + \varepsilon_{ct}$$

where  $y$  denotes city-level variables — number of driving schools, total and average sales of these schools, total and average operating profit, total and average value added, total and average employment, and total and average wages, where  $trend$  denotes a linear trend,  $young$  denotes the fraction of young in the city,  $ymale$  denotes the fraction of young men within the young (20–34 years),  $\lambda$  a city fixed-effect, and  $\varepsilon$  denotes a statistical residual. The results are presented in Tables 7–9 (Table 9 being a robustness test without the  $young$  variables). Because new driving schools may open in response to the demand shock implied by the abolition of national service, we analyse two sets of outcomes. In Table 7, we first examine the extensive response to the shock, that is the number of driving schools. We also examine how each driving school fared before and after the shock. Hence, we compute average outcomes in the city. Then, because the city is the right market to study, we focus on total outcomes in this market.

Most importantly, and as expected, results in Table 7 show that in cities with a larger fraction of men among the young in the years following 1997, new driving schools were created in larger numbers. Because of this entry of new schools in cities with many young males, as argued above, it is essential to contrast average outcomes — to capture how each school fares — with total outcomes in the city — to capture how the total size of rents evolved. These driving schools, old and new, had decreasing average employment while average wages paid in these driving schools strongly increased in cities with many young males (Table 7). At the same time, total employment across schools operating in the city did not increase in cities with more young men (Table 8). In addition, more surprisingly, driving schools did not fare better (no significant increase in average or total operating profits, added value or even sales) again in cities with more young men.

Because supply was limited, the total number of instructors should have stayed fixed in a city. However, some obviously decided to quit their former



TABLE 7  
Average Outcomes in Cities

Variable	Number of driving schools		Average operating profit		Average value-added		Average employment		Average sales		Average wages	
	Estimate	Std err	Estimate	Std err	Estimate	Std err	Estimate	Std err	Estimate	Std err	Estimate	Std err
Trend 1992–1997	0.551	0.110	-0.263	2.408	-8.036	5.712	-0.520	0.252	-11.071	8.558	1.602	1.105
Trend 1997–2002	-0.525	0.178	-3.739	3.889	10.672	9.225	0.797	0.406	10.958	13.820	-2.724	1.778
Trend 1992–1997 × (fraction young in 1999)	1.638	0.118	-1.436	2.574	-22.369	6.104	-0.847	0.269	-27.577	9.145	1.205	1.134
Trend 1997–2002 × (fraction young in 1999)	-1.035	0.197	1.188	4.297	21.333	10.193	0.904	0.449	19.498	15.270	-1.327	1.897
Trend 1992–1997 × (fraction men among the 20–34 in 1999)	-1.763	0.204	0.606	4.456	23.335	10.570	1.358	0.465	30.938	15.835	-4.317	2.039
Trend 1997–2002 × (fraction men among the 20–34 in 1999)	1.436	0.331	9.078	7.216	-21.507	17.116	-1.852	0.754	-16.237	25.642	7.591	3.301
R <sup>2</sup>	0.820		0.477		0.747		0.701		0.757		0.536	

Note: The first five regressions use 10,505 observations; the last has 9,056.  
Sources: SUSE, 1992 to 2002. Census 1990 and 1999.

TABLE 8  
Total Outcomes in Cities

Variable	Total operating profit		Total value-added		Total employment		Total sales		Total wages	
	Estimate	Std err	Estimate	Std err	Estimate	Std err	Estimate	Std err	Estimate	Std err
Trend 1992–1997	0.633	4.102	17.828	11.167	0.628	0.496	42.793	17.931	12.962	7.444
Trend 1997–2002	-5.663	6.624	-5.503	18.033	-0.046	0.801	-25.391	28.957	-2.637	12.022
Trend 1992–1997 × (fraction young in 1999)	-1.425	4.384	81.298	11.933	4.252	0.530	147.010	19.161	62.260	7.955
Trend 1997–2002 × (fraction young in 1999)	10.991	7.320	-0.780	19.926	-2.022	0.886	-42.737	31.996	-6.201	13.284
Trend 1992–1997 × (fraction men among the 20–34 in 1999)	-0.545	7.590	-72.110	20.662	-3.105	0.918	-149.258	33.179	-53.570	13.775
Trend 1997–2002 × (fraction men among the 20–34 in 1999)	8.152	12.291	18.720	33.459	1.012	1.487	80.267	53.727	11.543	22.306
R <sup>2</sup>	0.415		0.819		0.793		0.811		0.815	

Note: The first four regressions use 10,505 observations; the last has 9,056.  
Sources: SUSE, 1992–2002; Census 1990 and 1999.

TABLE 9  
Average Outcomes, Robustness

Variable	Number of driving schools		Average operating profit		Average value-added		Average employment		Average sales		Average wages	
	Estimate	Std err	Estimate	Std err	Estimate	Std err	Estimate	Std err	Estimate	Std err	Estimate	Std err
Trend 1992–1997	1.174	0.105	-0.800	2.229	-16.309	5.293	-0.830	0.233	-21.489	7.929	2.082	1.016
Trend 1997–2002	-0.941	0.170	-3.292	3.620	18.463	8.596	1.120	0.378	18.566	12.877	-3.254	1.651
Trend 1992–1997 × (fraction men among the 20–34 in 1999)	-2.119	0.208	0.900	4.434	27.754	10.527	1.520	0.463	36.795	15.770	-4.616	2.022
Trend 1997–2002 × (fraction men among the 20–34 in 1999)	1.703	0.338	8.829	7.195	-25.537	17.083	-2.010	0.752	-20.834	25.591	7.927	3.286
$R^2$	0.812		0.477		0.747		0.701		0.751		0.536	

Note: The first five regressions use 10,505 observations; the last has 9,056.

Sources: SUSE, 1992–2002. Census 1990 and 1999.

employers to create new driving schools (with no employee besides themselves and therefore no wage information). As a consequence, to fight against quits, employers increased wages in order to retain employees (Table 7). At the same time, total wages paid in the city did not increase, a reflection of stable total city employment. Hence, operating profit did not increase for those schools that kept their instructors while new schools had to pay for the fixed costs of opening a driving school (equipment, in particular). Indeed, profits did not increase for the average school, as well as summed over all schools in the city. This phenomenon is obviously a direct consequence of the driving schools industry regulations: as it is long and costly to become an instructor, supply cannot respond to demand shocks as it should have, had the industry been more competitive.

Furthermore, total sales should have grown in cities where the fraction of young men is large around 1997, which is not what we observe. A first explanation could be that some young people turned to the multi-establishment driving schools (that we did not keep in our analysis file). Another explanation could be that the emergence of new driving schools induced a decrease in prices. For instance, new driving schools offered lower prices in order to attract customers. Indeed, driving schools are a typical case of occupational licensing, where reputation drives the market: old driving schools that could prove the quality of their learning can demand higher prices, whereas new ones must first earn their reputation and set lower prices. Driving school prices can vary widely, usually from 500 to 1,000 euros in urban areas, sometimes more in more rural areas. Unfortunately, we have no hint on the evolution of prices in our data, at the level of the city, to corroborate such hypotheses. In fact, a look at price indices as well as quantity indices shows exactly the contrary. Prices increased steadily over the period with no clear slowing down in the years surrounding the abolition. Then, prices increased quite rapidly after 2000. Furthermore, volume indices show a clear maximum in 1999 and a steady decrease onwards (until 2007). Evidently, despite the demand shock, despite the opening of new schools, prices increased and the number of persons getting their licences decreased, as is clearly shown in Figure 2.

To check for the interpretation that new driving schools captured the male manna, we present the following evidence. First, Figure 3 shows the number of driving schools for every year of data. And the numbers are striking and self-explanatory. The peak in opening is exactly in 1997. Before and after that date, the number of new schools is always (much) lower. To further understand the specificities of the 1997 wave of new driving schools, Table 10 contrasts the distribution of profits and employment of the 'abolition of national service' wage with the one just preceding, the 1996 wave. Clearly, among the new schools of 1997, there are many more 0 employee schools confirming our above hypothesis. Furthermore, the profit distribution of the 1997 wave is shifted to the right; these firms are more profitable in the year of their creation, 1997, than the 1996 wave (also in the year of their creation). The abolition of national service was manna for this wave.

FIGURE 3  
New Driving Schools.

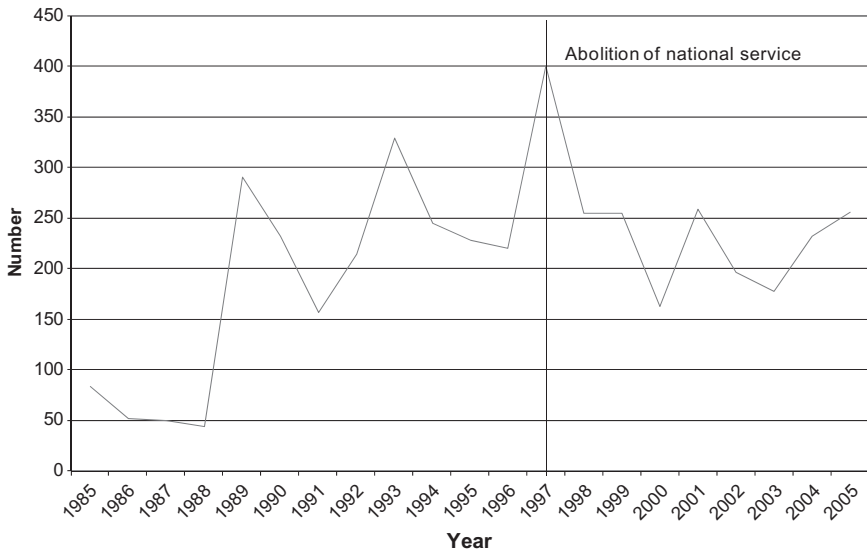


TABLE 10  
New Schools: the 1997 Experience

	<i>Born in 1997</i>		<i>Born in 1996</i>	
	<i>Operating profit</i>	<i>Employment</i>	<i>Operating profit</i>	<i>Employment</i>
Mean	0.672	1.898	-3.070	2.145
Standard deviation	22.379	2.508	12.403	2.245
95%	23	6	12	7
90%	14	5	9	5
75% Q3	6	3	3	2.5
50% median	1	1	-2	2
25% Q1	-4	0	-8.5	1
10%	-12	0	-16	0
5%	-19	0	-23	0
Number of observations	372	372	200	200

*Note:* The first two columns present statistics for driving schools created in 1997 (without missing information on profits). The last two present statistics for driving schools created in 1996 (also with information on profits).

*Source:* SUSE.

More generally, these results tend to show that the specific regulations that weigh on the driving schools industry in France did not allow them to absorb the *potential* flow of new young customers after 1997. Worse still, it obviously discouraged some likely customers. One can clearly question the justification of such regulations for a profession that remains basically one of tutoring, with no particular technical knowledge or practice that would be especially difficult or take long to acquire.

## 6. Conclusions

Compulsory conscription in France was abolished in November 1997. Before the reform, military service was a way for a fraction of French men to obtain a driving licence for free. After the reform, this opportunity disappeared. We find that the reform was followed by a significant decline in the relative proportion of men possessing a driving licence. These findings suggest that a substantial fraction of men would have had a driving licence had they been born just a few years earlier. This policy change provides us with two types of shocks, a *negative* supply shock on potential workers possessing a driving licence and a *positive* demand shock for the driving schools.

Using the abolition as a source of (negative) supply shocks, we show that they are, at first blush, a reasonable instrument to analyse the causal impact of having a driving licence on employment. We end up with estimates suggesting that possessing a car driving licence is an important asset in job search for people living in urban areas. Even though relatively cheap means of transportation, such as public transport, are available, having a licence is useful within many jobs. However, the estimated effects are large, and inspection of the reduced form of the equation (employment on the exogenous variables) casts doubt on the validity of the instrument.

Using the abolition as a source of positive demand shocks, we examine the driving schools industry, as thousands of young men who used to pass the driving test in the army should have turned to driving schools after 1997. This industry is characterized by entry restrictions due to the limited supply of instructors, organized by the system itself (the industry and the regulator) and the limits on the potential for entry of new schools. Matching administrative data on firms with the population census at different dates, we show that the number of driving schools increased in those cities with lots of young men. The number of new driving schools increased in 1997 more than in any preceding or following year. Wages also increased for those who did not (or could not) create their own school. This was a way used by incumbents to prevent establishment of competing driving schools. However, total sales, total profits or value-added did not increase. National prices increased, and value indices decreased after 1999. All potential drivers did not show up at the doors of the driving schools. In many respects, when the abolition of national service was a real ‘manna’ for driving schools and driving instructors, the industry did not make the best use of it.

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## Notes

1. Our estimation strategy will take care of this potential negative trend common to men and women by taking differences-in-differences.

2. By taking the difference between men and women, we get rid of the year effects, and therefore of the downward trend observable in Figure 2 in the fraction of persons getting a licence, a trend similar for men and women.
3. Note that our estimated equation is an equivalent but slightly rearranged version of the base equation that delivers the coefficients of interest directly, since the male indicator is fully interacted with the 'strictly after 1977' indicator and 1 minus this indicator (similarly for the low-income indicator).
4. Unfortunately, the data are not accessible any more at this point, and there is no way to re-estimate the model in other forms. In particular, these estimates do not show the associated *F*-statistics that would be necessary to assess the significance of the differenced effects. Hence, we use the results as indication that something is happening for the low-income men living in urban areas. However, such tests will be performed in our analysis of the Ile de France region.
5. Other groupings give identical results. They are available from the authors.
6. We also computed the test comparing 2001 with 1983. Results are very similar and therefore omitted. They are available from the authors.
7. Taking 1983 rather than 1991 does not change any of the conclusions.

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## Appendix

TABLE A1  
Reduced Form: Employment and National Service

	Age 23–30	
	Estimate	Std err
Intercept	0.7323	0.0114
Age <25 in 1991	-0.0895	0.0225
Age ≥25 in 1991	-0.0135	0.0156
Age <25 in 1983	-0.0274	0.0229
Age ≥25 in 1983	-0.0196	0.0161
Age <25 in 2001	-0.1830	0.0245
Men × (year 1983) × (age <25)	0.1160	0.0293
Men × (year 1991) × (age <25)	0.0240	0.0287
Men × (year 1983) × (age ≥25)	0.1989	0.0164
Men × (year 1991) × (age ≥25)	0.1548	0.0153
Men × (year 2001) × (age ≥25)	0.1166	0.0167
Men × (year 2001) × (age <25)	0.0259	0.0306
$R^2$		0.06
Number of observations		10,240
$F$ -test, $p$ -value	0.71	0.399

*Note:* The  $F$ -test is for the equality of (Men in 2001 with age above or equal to 25 minus Men in 2001 with age 23 and 24) with the same difference in 1991.

*Source:* Enquête Transport Ile de France (1983, 1991 and 2001).