Demand for Education and Labour Market Outcomes: Lessons from the Abolition of Compulsory Conscription in France

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Abstract

In this paper we examine the effects of the abolition of the compulsory conscription in France on the demand for education and labour market outcomes. The reform took place in 1997 and affected all men born after 1979. Before the reform, staying on in education was a way to defer the national service and facilitate exemption. After the reform, these specific incentives to stay on in education have disappeared and the relative cost of education for men has plausibly increased. As a matter of fact, our data reveal that the reform has been followed by a significant decrease in the number of years spent at school by male students, as well as in the proportion of male degree holders. In contrast, the reform had no significant effect on the demand for education for women. We use this exogenous variation in men's relative demand for education to provide IV estimates of the returns to education. These estimates are larger than standard OLS estimates.

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1 Introduction

France abolished compulsory conscription in November 1997. Specifically, the 1997 law abolished compulsory conscription for men born in 1979 and after. As a consequence the last Frenchmen who were subject to compulsory national service were born in 1978. Before 1997, any young Frenchmen was exposed to the risk of being called by the military administration to do a 10 months national service (16 months for specific forms of service).

The 1997 reform has reduced the set of alternatives after compulsory education. Also, it has modified the cost of staying on in education compared to the cost of direct entry into the labour market. As explained below, pursuing education was a mean to differ the national service, to get access to more interesting forms of the national service and to lower the stigmatization costs of obtaining a medical or psychological exemption. After the reform, these specific incentives to stay in education have disappeared and the relative cost of education for men has plausibly increased.

The main purpose of the paper is to test this hypothesis and to analyse the extent to which the reform has actually diminished men's demand for education. Also, our goal is to use the variation in men's demand for education induced by the reform to evaluate the impact of education on earnings at the entry into the labour market. Generally speaking, our method consists in comparing the changes in educational and labour market outcomes for men and women and testing whether the reform has been accompanied by a relative decline in men's outcomes.

Many studies in many countries and time periods have shown that individuals with relatively rich parents are more likely to pursue post-compulsory education and that, subsequently, better educated individuals earn higher wages. In the absence of experimental evidence, it is nevertheless very difficult to know whether these statistical relationships represent causal links or whether they simply reflect the fact that wages and education are both determined by the same unobserved circumstances and individuals' characteristics (see Card, 1999). Put differently, it is very difficult to determine the extent to which the higher wages earned by better educated workers are actually caused by their education and the extent to which the decision to pursue education is actually determined by individuals' resources and affected by the varia-

tions in the costs of education. Most interestingly, the recent abolition of the French military service provides us with a natural experiment which sheds some light on these old questions. The reform has produced a significant shift in the relative costs of education for males. Hence, it makes it possible to evaluate the responsiveness of the relative demand for education to exogenous changes in its costs and also to evaluate whether exogneous shifts in relative education are actually followed by shifts in relative earnings.

To anticipate the rest of the paper, the main findings may be summarized as follows:

1. When we compare behaviours before and after the reform by age groups, we observe a significant decline (-4 percent points) in the proportion of men pursuing education at age 18 to 22, but no significant shifts before age 18 nor after age 22. In contrast, we do not observe any significant shifts for women, regardless of their age. These results are consistent with the assumption that the reform has induced an increase in the relative cost of education for men and that the demand for education is significantly affected by the variations in its costs. A significant fraction of men born in 1979 would have left school later if they were born one or two years before.

2. When we focus on individuals who leave education at age 22 or before, we find that the relative decline in men's relative years of education is accompanied by a relative decline in the proportion of men with some degree. Also, the relative decline in men's educational credentials at the entry into the labour market is accompanied by a relative decline in their entry hourly wages.

3. Assuming that the reform affected men's relative entry wages mostly through affecting their relative education, we can use a dummy interacting the sex and the date of birth (before or after the reform) as an instrumental variable to identify the impact of education on earnings. Our IV estimates are significant at standard level and significantly larger than the OLS estimates. The IV estimates suggest that young workers earn at the entry into the labour market about 38% less than what they would have earned at the entry into the labour maket if they had spent one additional year of formal education. The downward bias affecting OLS estimates suggests a negative correlation between men's education and the unobserved determinants of wages. Individuals who enter the labour market with some degree receive wages which are lower than the wages that would have received individuals who enter the labour market without any

degree if they had decided to pursue education.

4. Our data show that the abolition of the national service mostly affected sons of blue collar workers. This is consistent with the assumption that the reform mostly impacted the students with the lowest propensity to pursue education. When we focus on the group of children whose father is a blue collar worker, we find that the reform had a negative and significant impact on both relative education and relative entry wages of men. In contrast, when we focus on the group of children whose father is a white collar worker, the reform has no impact on men's relative education nor on their relative entry wages. This result confirms that the national service affected entry wages mostly through affecting educational choices.

5. We provide additional estimates of the causal effect of education on entry wages using the subsample of men and a dummy interacting the occupation of the father (blue/white collar worker) and the date of birth (after/before reform) as an instrumental variable. The identifying assumption is that the reform affects sons of blue collars' relative entry wages mostly through affecting their relative education. We obtain the same type of results with this strategy as with the strategy which relies on the impact of the reform on men's relative outcomes: the IV estimates are significant at standard level and larger than the OLS estimates.

6. We also provide an evaluation of the causal impact of formal education on wages at each age, by analysing the difference between the variations in male relative wages for children of white collar workers and for children of blue collar workers, within each age group. This analysis suggests that each additional year of formal education causes a 15% increase in wages at each age. For example, the entry wages of French workers who enter the labour market at age 20 after four years years of post-compulsory formal education are about 30% larger than the wages that they would have earned at age 20 if they had entered into the labour market two years before, at age 18, after only two years of formal education.

All in all, our findings suggest that a significant fraction of students do not pursue education because of credit constraints, even though pursuing education would significantly increase their earning capacities. Improved access to the credit market would help these students (most of them come from low socio-economic background) to remain in education and obtain higher wages. In the last section of the paper, we build on our results and on a simple evaluation of the costs of military service for each conscript in order to discuss what would be the effect of such

policies. These calculations suggest that the possibility of obtaining a (zero interest rate) loan of 6,000 euros at age 18 (i.e., half of the minimum wage) in order to pursue education would increase the proportion of young adult participating in post-18 education until age 22 by about 4 percent points, i.e., an effect on the demand for education equivalent to that of the suspension of the military service. The financial helps for students wishing to continue their studies, which currently exist in France, are much lower and we argue that they should be simultaneously increased and focused on low-background students.

The paper is organised as follows. The following section provides an overlook of the literature on the effect of military service. The third section describes the French institutional context and the reform. Section 4 presents the data and provides a description of the changes in the proportion of men doing their military service across cohorts born from 1975 to 1979. Section 5 develops our theoretical framework. The issue is to define the parameters which may be identified by the comparison of the outcomes of men and women, before and after the reform. Sections 6 and 7 provide a statistical and econometric analysis showing the effect of the reform on the relative outcomes for men. Section 8 discusses some policy implications.

2 Related Literature

To the best of our knowledge, there is no literature on the impact of the abolition of the national service on the demand for education and labour market outcomes, although several countries have abolished compulsory conscription and passed on a professional army.

The existing literature mostly attempts to estimate the effect of veteran status (either of the Second World War- WWII, or the Vietnam War) on civilian earnings. Angrist (1990) uses the introduction of the draft lottery during the Vietnam War as a natural experiment, in order to get an estimate of the causal effect of veteran status on earnings. Using aggregate social security data, he finds a negative coefficient associated with veteran status in an earnings equation of about 15%. His results suggest that the veteran status does affect earnings mostly because it constitutes a poor substitute for civilian labour market experience and only marginally because of its direct effect on individuals' earnings capacity. Angrist and Krueger (1994) exploit the fact that after 1942 men were drafted in chronological order of birth and they use quarter of birth

as an instrument for veteran status. Using a 2SLS method, they find a negative effect of WWII veteran status on earnings and argue that the positive OLS estimates of the WWII veteran premium found in the literature are due entirely to non random selection into the army. Angrist (1998) uses aggregate data to estimate the effect of voluntary military service on earnings. He finds that the long run gain in terms of civilian earnings is negative for whites and is small for non whites. Generally speaking, the impact of veteran status on earnings in the US is difficult to interpret since it combines the pure effect of war, the loss of civilian labour market experience and the effect of the educational assistance program (G.I. Bill) designed to help members of the Armed Forces to adjust to civilian life after separation from service[1].

The compulsory national service under consideration in this paper does not render eligible to such specific programs and does not imply going through such a critical test as war[2]. In that sense, the study on Dutch data by Imbens and Van der Klaauw (1995) is closer in spirit to our work than existing studies on veteran status or the effect of WWII. They estimate the effect of Dutch military service on earnings, using aggregate data for the Netherlands. They use the variation in aggregate military enrolment rates induced by policy variation to deal with the issue of endogenous selection into the Dutch military service (due to both medical and psychological tests and the way exemptions from the army operate). Their results suggest a small negative impact of the army on earnings, which is of the order of 5%, ten years after serving the army. They compare this earning loss to the estimated returns to experience found in the literature for the Netherlands. They find that the earning losses associated with the military service can be interpreted as the consequence of the corresponding losses in labour market experience.

All in all, the existing literature suggests that periods of military service as such have no significant impact on the individuals' earning capacity, the main effect on individuals' earnings being through losses of labour market experience. By comparing the effects of the abolition of

[1] Angrist and Krueger (1994) use education among their controls in order to deal with the possibility that the military might affect earnings via the education channel (G.I.Bill). Bound and Turner (1999) use the structure of the draft during WWII and the changing manpower requirements needed by the army to estimate the effect of WWII veteran status on education. They find a small positive gain in terms of educational attainment for WWII veterans.

[2] A related paper by Bauer et al (in progress) evaluates the impact of military service on labour market outcomes in Germany. They use a change in the law regarding the conscription in Germany (which defined a cohort of people who did not have to serve the army) to develop a discontinuity regression approach and provide consistent estimates of the effect of compulsory military service on wages.

the military service on different subgroups of young men (i.e., sons of white versus blue collar), we will end up with a very similar conclusion, meaning that the military service, as such, has no significant impact on the earning capacities of male workers. The main focus of the paper is not on this issue, however. The basic assumption of this paper is that the existence of the compulsory national service affects the relative cost of education and, through that, the decision to pursue post-compulsory education[3]. Hence, we are primarily interested in analysing the impact of the abolition of compulsory national service on educational choices. If our assumption holds true, the abolition of the French national service provides us with a natural experiment which makes possible to shed light on the returns to post-compulsory education as well as on the sensitivity of the demand for education to exogenous variation in its cost[4].

3 Institutional background

The paper considers individuals born from 1975 to 1979 and analyses the impact of the abolition of the national service by comparing the behaviours of those born before 1978 and those born in 1979. The 1997 law abolished compulsory conscription for men born in 1979 and after. Hence, the last Frenchmen who have been exposed to the national service were born in 1978. Furthermore, given that the military administration finally stopped using conscripts in August 2001, Frenchmen born in 1978 (1977) have been exposed to the risk of conscription only until age 23 (24).

Individuals born from 1975 to 1978 have done their military service from 1993 to 2001. They had several options. The first one is the standard military service (duration 10 months). A slightly different option is service in the police or civil security forces (10 months). There

[3] The idea that the draft might affect earnings via other channels than the veteran status is not new. Angrist (1990) says that "it may be that the draft has affected education attainment and other career choices along with its effect on the military service". Baskir and Strauss (1978) suggest that during the Vietnam War men went to college to avoid the draft. Angrist and Krueger (1994) mention that "there is evidence that during the Vietnam War, college educated men from wealthy families managed to avoid the military service, whereas less educated-low income men were unable to do so".

[4] Recent papers using large scale natural experiment for identifying the returns to education include chino and Winter-Ebmer (2004) and Oeropoulos (2004). Ichino and Winter-Ebner (2004) compare Germans and Austrians people with Swiss and Swedish people born in the thirties and the same groups born before or after that period. Assuming that the war affected earnings only through loss of education, they provide IV estimates of the returns to education using the 1930- 1939 cohort in Austria and Germany as the instrument. Oeropoulos (2004) focuses on the impact of changes in minimum school leaving ages.

exists the additional option of civil forms of national service, i.e. forms designed to meet needs other than the defense or police ones (10 months). Other possibilities include service overseas and technical assistance services (16 months). These types of national service typically involve teaching or doing research in institutions which are dependent of the ministry of defense. Finally, there is a special form of the national service for the conscientious objectors (20 months).

The French government defines every year the number of positions as well as the skills required for the young people to be incorporated in the services of the national police (or civil security) force or in overseas services and scientific assistance services. Generally speaking, a university degree is required (i.e., four years of college or more) for overseas or scientific services.

All French men have the right of deferment of the national service until the age of 22 without any specific justification. After the age of 22 and up to the age of 26, they need to be pursuing their studies in order to obtain additional deferment. In theory, individuals employed under an indefinite term contract (or under a fixed-term contract of more than six months) can also benefit from a two years deferment. In practise, in the French context, obtaining a long-term contract at the entry into the labour market is much more difficult than pursuing education (especially for non-educated students) and pursuing education was by far the easiest way to defer the national service[5].

The main source of exemption concerns young persons who fail to pass the medical and psychological tests of the army. It should be emphasized that the implicit cost of failing these tests and being exempted was much higher for non-educated young persons than educated ones, since having been able to do the national service was one of the only signal that non-educated persons had the opportunity to send to potential employers. Within this context, pursuing education was also a way to decrease the stigmatization cost associated with failing the tests (voluntarily or not) and obtaining an exemption.

Other possible exemptions concern young people recognised as main wage earners in the family (i.e. those who have the responsibility of one or several persons who do not have sufficient financial resources). Another type of exemptions concerns war orphans, men whose father,

[5] As discussed below, we observe actually very few transitions from indefinite term contracts to the national service. The vast majority of persons doing the national service were still in the educational system one year before.

mother, sister or brother is declared as "dying for France", or died during a military action or an order of the public authority or public safety. The last type of exemption refers to those with double nationalities, who can certify that they lived in a different country between the age 18-21 and are in line with the law regulations in that second country, regarding their national service.

According to the administrative records, about 200,000 young men did their national service in 1995 or 1996, meaning about 55% of a birth cohort. The number diminishes from 200,000 to 0 between 1996 and 2001.

4 Data and Descriptive Statistics

We use the French Labour Force Surveys (LFS) conducted each year from $t = 1991$ to $t = 2002$ by the French Statistical Office. The annual LFS sample is a representative sample of the French population age 15 or more ($N = 150,000$, sampling rate=1/300). The survey provides information on the date of birth, sex and educational level of each respondent, as well s the occupation of their father. Also it provides information on the past $(t-1)$ and present (t) activity status of each respondent, i.e., whether s/he is employed, unemployed, still on education, on the military service or without specific activity.

Table 1 shows the proportion of male respondents doing the military service, by age group and birth cohorts. Comfortingly, the proportion is very close to zero for individuals whose reported date of birth is 1979 and also for individuals observed in 2002. This is consistent with the fact that the national service was actually abolished for cohort 1979 and suspended for all cohorts at the end of year 2001. For each age group, we also observe a decline in the proportion of individuals doing their military service across birth cohorts. The decline is modest between cohorts 1975 and 1976, but significant between cohorts 1977 and 1978. It confirms that the reform has been implemented progressively, with cohort 1976 being only marginally affected and cohorts 1977 and 1978 more significantly affected.

It is possible to analyse the transitions between the different activity status using the available information on the past situation of individuals. Table 2 shows that only about 4% of the male respondents who were doing their military service at t-1 are on education at t. The vast majority of individuals do not go back to education after the military service. One year after the military

service, most young men are in the labour market. A small fraction is still in the national service, plausibly those who are doing their service overseas or in technical assistance institutions. It should be noted that the transition rate from military service to labour market (or to education) is stable across cohorts.

We have also analysed the activity at $t-1$ of individuals who are doing their national service at t. We find that about 67% were in education, while about 18% were unemployed, 7% hold a temporary contract and 8% a permanent contract. These figures confirm that the vast majority were either in education or waiting for their call by the military administration with weak attachment to the labour market.

5 The model

Before the abolition of the military service, French students aged 18 had two basic options: (1) military service first, and then entry into the labour market, (2) additional education first, military service, and then entry into the labour market. In theory, they had two supplementary options: (3) military service first, additional education, and then entry into the labour market, (4) entry into the labour market, then military service, and then re-entry into the labour market. We observe only few such transitions in the data, however.

In appendix 10.2, we express the discounted values of the four different options as a function of the cost of education (c_E), the costs of military service with or without education (c_{S1} and c_{S2}) and the impact of education on discounted earnings before and after the reform. Assuming that students choose among the different options simply by comparing their discounted values, we explore the conditions under which male and female students chose to pursue education before and after the reform.

Denoting u_i^b (u_i^a) the impact of education on discounted earnings for student i before (after) the reform, we show that male students chose to pursue education before (after) the reform if and only if $u_i^b > c_E - \Delta c_E$ ($u_i^a > c_E$) where Δc_E represents the impact of postponing the military service on the discounted costs of male students[6]. In contrast, the condition under which female students chose to pursue education is similar before and after the reform, namely

[6] Δc_E is expressed as a function of the discount rate and of the cost of military sercice in appendix C.

$u_i^b > c_E$ before the reform and $u_i^a > c_E$ after the reform.

Within this framework, the reform may be interpreted as a positive shock to the cost of education Δc_E which has affected male students only. Before the reform, some male students are faced with relatively high cost of education compared to the returns (i.e., $u_i^b < c_E$), but choose nevertheless to stay on education in order to avoid the cost of not postponing the military service (i.e., $u_i^b > c_E - \Delta c_E$). After the reform, the cost of not postponing the military service disappears and these male students may choose a direct entry into the labour market.[7]

From an empirical point of view, our first purpose is to evaluate whether men's relative demand for education has actually declined after the reform, as predicted by the theory. Our second purpose is to use this specific exogenous shift in men's relative demand for education to identify the true impact of education on earnings.

5.1 Econometric Model

Regarding the first step, the main issue is to separate the effect of the reform Δc_E from the effect of any variation in the return to education $u_i^a - u_i^b = \Delta u$ that may have occurred during the period under consideration. Our identifying strategy relies on the fact that Δc_E affects male only, while any variations in the return to education plausibly affects male and female simultaneously.

Assuming that u_i^a may be written $u_i^b + \Delta u$ and denoting $F_u(. \mid f)$ the distribution function of u_i^b conditional on the gender dummy f, the proportion of men ($f = 0$) who stay on in education before the reform is $1 - F_u(c_E - \Delta c_E \mid f = 0)$ while the proportion of men who stay in education after the reform is $1 - F_u(c_E - \Delta u \mid f = 0)$. Similarly the proportion of women who stay in education before (after) the reform is $1 - F_u(c_E \mid f = 1)$ $(1 - F_u(c_E - \Delta u \mid f = 1))$. Within this framework, the variation in the probability of being on education for men may be written,

$$\Delta \Pr(E = 1 \mid f = 0) = F_u(c_E - \Delta c_E \mid f = 0) - F_u(c_E - \Delta u \mid f = 0)$$

[7] Most interestingly, the group of students impacted by the reform are precisely those that would be the most directly impacted by any public reform decreasing the cost of post-compusory education.

while the variation of being in education for women ($f = 1$) may be written,

$$\Delta \Pr(E = 1 \mid f = 1) = F_u(c_E \mid f = 1) - F_u(c_E - \Delta u \mid f = 1).$$

The best case is clearly when we observe a non-negative shift in the demand of education for women and a negative shift for men. In such a case, we do not need to specify the distribution function of the individual returns to education u_i to test whether $\Delta c_E > 0$ or not. Specifically, the non-negative shift for female may be interpreted as $\Delta u \geq 0$ and the negative shift for male as $\Delta c_E > \Delta u \geq 0$, which is what is needed. The next section tests these assumptions using the French labour force surveys.

6 The Impact of the Reform on the Distribution of Education and Entry Wages

Figure 1 shows the proportion of men who are still in education by age groups, for the cohorts born between 1975 and 1980. It reveals a very significant negative shift after the reform for the 19 and 20 years' old. The proportion of men of these age groups who are in education is about 5 points smaller in 1979 than before 1979. There exist a smoother negative shift for the 21 and 22 years' old. In contrast, there exist no significant shift for the 23 years' old nor for the 16 and 17 years' old (not shown here). Regarding women, we do not observe any significant shifts except a smooth and marginally significant shift for the 21 and 22 years' old (Figure 2).

Table 3 allows us to compare the proposrtion of men and women in education for the individuals born in 1975-1976 and 1979, i.e. the two cohorts observed before the ultimate decline of the national service induced by the reform and the cohort just after the reform. The table confirms that the proportion of men aged 18-22 who are still in education is significantly less important (-3.8 percent points) for the generation born after the reform than for the two generations born before the reform. In contrast, we do not observe any significant shift for men aged 16-17 or 23. Similarly, we do not observe any significant changes for women[8]. These results suggest that a

[8] In the early eighties, an earthquake hit Southern Italy and resulted in the relief from the military service granted to certain cohorts of men in the affected municipalities. Cipollone and Rosolia (2003) show that this exemption has been accompanied by an increase in the demand of education of both men and women, which is

significant fraction of the male population who left school before age 23 after the reform would have spent several additional years in the educational system in the absence of the reform.

Table 4 confirms the decline in men's relative probability of pursuing formal education after compulsory education. For each age group, it shows an OLS regression where the dependent variable is a dummy indicating whether the respondent is still in education and the independent variables a dummy indicating the sex of the respondent, a dummy indicating the date of birth and a dummy interacting sex and date of birth (its value is 1 for men born in 1979). The estimated coefficient of the interaction variable is negative and significant at the 1% for the 18-22 age group. It is negative and marginally significant for the 16-17 age group and close to zero and not significant for the group of respondents aged 23.

From a theoretical point of view, the subgroup of the population affected by the reform satisfies $c_E - \Delta c_E < u_i^b < c_E$: before the reform, the students of this subgroup are faced with relatively high cost of education compared to the returns (i.e., $u_i^b < c_E$), but choose nevertheless to stay on education in order to avoid the additional cost of not postponing the military service (i.e., $c_E > c_E - \Delta c_E$). After the reform, the cost of not postponing the military service disappears and this subgroup of students choose a direct entry into the labour market. This subgroup of students are plausibly characterized by relative low discount rates and our data confirm that they belong to the set of students who leave school before 23.

The reform has diminished men's probability of pursuing formal education after age 18 and the next question is whether this shift has influenced their relative academic credentials at the entry in the labour market. Table 5 focuses on the persons who were born in 1975-1976 and 1979, who are observed in the labour market at t, who were in education or in military service at $t-1$ and who were no more than 22 years' old during their last year of education (i.e., at $t-1$ if they were in education at that date, or at $t-2$ if they were in military service at $t-1$). The table provides an OLS analysis of three basic educational outcomes as a function of the sex, the date of birth (1975-1976 versus 1979) and a dummy interacting the date of birth and the sex (i.e. indicating whether the observation corresponds to a man born after the reform). The outcomes

different from what we find and which they interpret as evidence of the strengh of social interaction. This could also capture other type of factors, specifically an impact of the earthquake on the labour market or the economies of the municipalities concerned, which affects men and women in the same way.

under consideration are a dummy indicating whether the individual left school at age 18 or after, the number of years of schooling and a dummy indicating whether the individual has at least a vocational degree. The results confirm a significant decline in men's relative educational level after the reform.

Overall, the reform has not affected men's relative probability of leaving school before age 23, but it has significantly diminished men's relative number of years of education at the entry into the labour market and men's relative probability of having some degree within the group of individuals who leave school before age 23.

6.1 Impact on entry wages

In this section, we provide an evaluation of the returns to education at the entry into the labour market by comparing the differences in labour market outcomes between men and women, before and after the reform. The reform may be interpreted as a positive shock to the cost of education for males. We use this source of variation in the distribution of educational outcomes to identify the impact of education on labour market outcomes.

To achieve identification, we assume that the wage of worker i at the entry in the labour market may be written,

$$\ln w_i = \alpha E_i + \beta T_i + \gamma f_i + \varepsilon_i$$

where E_i is a dummy indicating whether the worker has continued in any post compulsory formal education education, T_i a dummy indicating whether he was born before or after the reform, f_i a dummy indicating the sex of the worker and ε_i represents the unobserved characteristics of worker i as well as the unobserved circumstances that have affected his/her entry wage. For now, we assume that the national service, as such, has no significant effect on individuals' earning capacity. We will provide simple tests of this assumption in the next section.

Using the same notation as in the previous section, the decision to pursue education is given by

$$(E_i = 1) \text{ if and only if } \ln(u_i) \geq Z \ln(c_E - \Delta c_E) + (1 - Z) \ln(c_E),$$

where Z denotes the interaction between T_i and f_i.

Hence, we have,

$$(E_i = 1) \text{ if and only if } \phi + \theta Z + \eta_i > 0,$$

where $\eta_i = \ln(u_i)$ and $\theta = \ln(c_E) - \ln(c_E - \Delta c_E)$.

Assuming that there exists a correlation between unobserved circumstances and unobserved returns to education (i.e., between η_i and ε_i), the true effect of E_i on $\ln w_i$ (i.e., α) cannot be identified through standard OLS regression. In contrast, it can plausibly be identified using Z as an instrumental variable. Given the reform and given our model of wages determination, Z affects education and thus affects earnings only insofar as it affects education.

Table 6 focuses on individuals born in 1975, 1976 or 1979, who are employed at t, who were still in education or military service at $t-1$ and who have left school before age 23. As shown above, the reform has not affected the composition of this subgroup, but it has significantly diminished the relative level of education of the men within this group. Given this fact, it is possible to evaluate the impact of education on earnings using the reform as an instrumental variable. The first column of the table shows the reduced form regression and confirms that the decline in men's relative education has been accompanied by a significant decline in their relative hourly wages at the entry into the labour market. Specifically, it reveals a 12% decline in the relative hourly wages of men after the reform (-12%). The second and third column show an OLS and an IV regression of (log) hourly wage on education, using the number of years of schooling as a measurement of education. The OLS regression reveals that every additional year of education increases hourly wages by 20%. The IV regression provides an estimate of the return to formal education which is significant at standard level and about twice as large as the OLS estimate. It suggests that young workers earn at the entry into the labour market about 38% less than what they would have earned at the entry into the labour maket if they had spent one additional year of formal education. The columns 4 and 5 replicate the analysis using a dummy indicating whether the individual left school after 18, as a measure of education. These results confirm that the years after the end of compulsory schooling have a very significant impact on hourly wage and that this impact is underestimated by OLS estimators. The same

diagnosis holds true when we use a dummy indicating whether the respondent has some degree[9] as an independent variable (columns 6 and 7). The effect is less precisely estimated, however.

With respect to both our OLS and IV estimates, it should be emphasized that the vast majority of young workers who enter the labour market with no formal qualifications are hired under specific labour contracts (*contrat de qualification, stage d'insertion, etc).* In these cases, employers are assumed to provide on-the-job training and are allowed to pay wages which are much lower than the minimum wage (see appendix 10.1 for a brief description of these contracts). Specifically the entry wages paid to young workers under specific labour contracts vary across occupations and industries but can be as low as 25% of the minimum wage. In other words, French institutions do not bound the initial return to formal education to be small and it should not be a surprise to find that they are large. Our estimates are actually larger than what one typically finds when one does not focus on new entrants. When we compare older workers with and without formal education, the estimated returns to education are possibly biased by the fact that those without formal education have received more on-the-job training, at the beginning of their occupational career. By focusing on the new entrants, we are plausibly in a better position to identify the true effect of formal education.

A comparison between our OLS and IV estimates reveals a downward bias in the former[10]. This suggests a negative correlation between men's education and the unobserved determinants of their wages. Men who enter the labour market without any degree receive wages which are on average higher than the wages that would have received individuals who pursue education if they had decided to enter the labour market without pursuing education[11].

[9] This is a dummy variable equal to one if the respondent has at least a vocational degree and zero if he has less than a vocational qualification.

[10] This downward bias is plausibly attribuable to errors in the measurement of education. Another plausible explanation is that the IV estimate represents the causal effect of education on a group of individuals who have higher-than-average marginal returns to schooling.

[11] Card and Lemieux (2001) also find IV estimates of the return to education that are as big, or bigger, than the estimated OLS return. Their identification strategy is based on the fact that men from Quebec are significantly less likely to have the WWII veteran status than men coming from the rest of Canada and have received significantly less help for pursuing education (through an equivalent to the US G.I. Bill paid to Canadian WWII veterans). Ichino and Winter-Ebmer (2004) and Oeropoulos (2004) find higher IV estimates too.

6.2 Robustness check using the impact of the reform on the relative outcomes of sons of blue collar workers

The previous subsection implicitly assumes that the national service as such has no effect on wages. A very simple way to test this assumption is to regress the entry wages of male workers on their age, educational level and on a dummy indicating whether they were doing the national service the year before or whether they were still on education. These regressions, reported in table 7 do not show any significant impact of the national service on entry wages, regardless of whether we focus on the sons of blue collar workers or on the sons of white collar workers. Assuming that the exemption from the military service is exogenous to wages, this result is clearly consistent with the assumption that the national service as such has no significant impact on wages.

A second possible test uses the fact that this reform has mostly affected sons of blue collars. Table 8 focuses on cohorts born just before the reform and shows that that the proportion of sons of white collar workers doing their national service is significantly smaller than the corresponding proportion of sons of blue collar workers, especially before age 22. In other words, inequalities in educational opportunities across sons of white and blue collar workers induced significant inequalities in the probability of doing the national service: sons of white collar workers were about two times more likely to obtain deferments and exemptions than sons of blue collar workers. Given this fact, sons of white collar workers have plausibly been significantly less affected by the reform than sons of blue collar workers. Table 9 shows the impact of the reform on the relative education of men, separately for children of white collar workers and those of blue collar workers. Most interestingly, it shows that the reform had a very strong impact on the relative education of sons of blue collar workers, but no no significant impact on the relative education of sons of white collar workers.

This result provides a means to test whether the abolition of the national service, as such, has an effect on entry wages. If this assumption was true, we should observe a shift in the relative entry wage of men within the group of children of white collar workers, even though their relative education has not changed, following the reform. Table 10 shows no such impact. In contrast, the data confirm the existence of a significant decline in men's relative hourly wages

within the group of children of blue collar workers.

All in all, the reform affected neither the relative education nor the relative entry wages of sons of white collar workers, while it affected negatively both the relative education and relative entry wages of sons of blue collar workers. These results are consistent with the assumption that the national service affected men's relative entry wages mostly through affecting their relative education.

The fact that the reform affected mostly sons of blue collar workers suggests an alternative strategy to identify the effect of education on entry wages, i.e., by focusing on men and using the impact of the reform on relative education of sons of blue collar workers as a source of identification. Table 11 confirms that the reform had a significant and negative impact on the relative education of sons of blue collar workers (column 1) and that this impact has been accompanied by a significant and negative impact on their relative entry wages (column 2). The two last columns show the corresponding OLS and IV regressions. Comfortingly, the IV estimates obtained with this second strategy are close to those obtained with the first one.

7 The Impact of Education on Wages

The reform of the national service has induced a significant shift in male relative demand for formal education. This exogenous shock has allowed us to show that formal education increases significantly entry wages, that is, it produces plausibly a significant amount of human capital. However this does not necessarily mean that formal education produces more human capital than on-the-job training.

The entry wages of young French workers who enter the labour market at age 20, after four years of post-compusory education, are significantly higher than the entry wages they would have earned at age 17 after only one year of post-compulsory education. But it is not clear whether their entry wages are higher than the wages that they would have earned at age 20 after one year of post-compulsory education *and* three years of work under a labour contract with some on-the-job training. Put differently, the main question is whether formal education really increases wages within each age group and whether it does shift the distribution of wages across the life cycle.

In theory, the reform of the national service alone does not allow us to answer this question. This is because it has affected *simultaneously* mens' number of years of education *and* men's number of years of labour market experience within each cohort. As shown above, it has *decreased* men's number of years of education at the entry into the labour market, but, subsequently, it has also *increased* their number of years of experience at each age (because they do not spend one year in the national service anymore). Given this reality, the variation in male relative wages within each age group cannot be interpreted as a pure effect of formal education. This variation is a mix of the (negative) effect of the decrease in formal education and the (positive) effect of the increase in labour market experience.

In practice, the reform still provides an interesting tool because it has mostly affected the demand for education for the sons of blue collar. Within each age group, the reform has increased the relative number of years of experience of sons of white collar without modifying their relative education. In contrast, the reform has increased the number of years of experience of sons of blue collar and decreased their number of years of education. Given this fact, within each age group, the difference between the variations of male relative wages for children of white collar and for children of blue collar workers provides an estimate of the pure impact of formal education.

Table 12 considers workers age 16-23, born in 1975-1976 or 1979, and compares the variations in the gender wage gap for children of white collar and for children of blue collar workers. The first column shows the impact of the reform on the relative wages of men among children of white collar workers. It shows a 10% increase in their relative wages after the reform[12]. This is consistent with the fact that they enter into the labour market sooner and have more labour market experience at each age. The second column provides the same analysis for children of blue collar. It shows a much smaller (not significantly different from zero) 2.3% increase in their relative wages after the reform. This suggests that the positive wage effect of the increase in their relative labour market experience has been almost entirely cancelled out by the negative wage effect of the decrease in their relative education. The last column considers simultaneously all children and confirm a significant 7.5% increase in the gender gap for children of white collar workers compared to children of blue collar workers.

[12] This 10% impact can actually be interpreted as the causal effect of early labour market experience on wages.

Assuming that the reform has had a similar impact on the labour market experience of sons of white collar and blue collar workers, this increase in the relative gender gap provides a direct evaluation of the effect of formal education on wages within each age group. Given that the positive impact of the reform has plausibly been larger for sons of blue collar, this evaluation can actually be considered as a lower bound for the true effect of formal education.

According to table 9, the reform has induced a 0.47 increase in the average number of years of education for sons of blue collar worker while, according to table 11**,** it has induced a 7.5% ceteris paribus increase in their wages. Taken together, these results suggest a 15% wage net impact for each supplementary year of education.

Table 12 only provides a reduced-form analysis of the effect of formal education. In theory, it is not possible to provide the corresponding structural analysis because we have no precise information on the number of years of formal education for people who have left school for more than one year nor on the vocational degrees that have been obtained through formal education rather than through on the job training[13].

Nevertheless, when we regress wages on a dummy indicating whether the worker is a high-school graduate using a dummy interacting the birth cohort, the occupation of the father and the gender as an instrumental variable, we end up with an IV estimate of the impact of high-school graduation of about 80% (not reported). Assuming that it takes about three to five years of formal education to obtain this degree, this IV result is consistent with our initial evaluation of a 15% impact for each year of formal education. The IV effect is not very precisely estimated, however (significant at the 15% level only).

8 Discussion

Generally speaking, our paper suggests that the returns to education are significant and that the decision to pursue education is strongly dependent on credit constraints. One simple way to increase the demand for education is to provide financial help to young students from low socio-economic background families, typically by improving their access to the credit market.

[13] In France, most vocational degrees can be obtained either through formal education (in *Lycées Professionnels)* or through on-the-job training (under specific labor contracts such as the *Contrats de Qualification* for instance). See details in Appendix A.

It is difficult to be more specific without evaluating the cost c_s of the military service. The conscripts received only some symbolical remuneration, but they were provided free medical care, food and accomodation. In 1996 the cost of these different provisions was about 40,000 FF per conscript, which was equivalent to half of the French minimum wage. Put differently, the situation of a conscript can be thought of as roughly equivalent to that of someone in low-skill employment, but receiving only half of the corresponding wage. Hence, assuming that the conscripts did not suffer from costs other than the missing wages, the costs of military service for each conscript was about half of the minimum wage, meaning about 6,000 euros. Within this framework, the possibility of defering the national service is equivalent to the possibility of obtaining a loan of 6,000 euros at age 18 in order to pursue education. Our data suggest that such a possibility increased the proportion of young adult participating in post-18 education until age 22 by about 4 percent points.

Most interestingly, these findings are in line with the recent evaluation of the Education Maintenance Allowance (EMA) introduced in 15 Local Education Authorities (LEA)[14] in England in September 1999. This policy was meant to raise participation, retention and achievement in post compulsory education among 16-18 year olds. It consists of a means-tested allowance paid to 16-18 years olds (either directly to them or to their parents) from lower income families[15]. An extended evaluation of the EMA was undertaken by a consortium of research organisations (Centre for Research in Social Policy, the National Centre for Social Research, the Institute for Fiscal Studies and the Institute for Employment Research). The main conclusions are that the policy increased post-16 education participation by on average 3.8 percentage points (5.9 percent points among eligible). The maximum weekly allowance ranges between 30 and 40 pounds per week. If the full amount was awarded, this would be equivalent to 1030 French Francs per month, that is one sixth of the French minimum wage. Hence, we end up with the same significant impact on education by providing an annual allowance equivalent to about one sixth of the minimum wage or by providing a three years loan equivalent to one half of the annual

[14] The selection of LEA areas to participate in the EMA pilots was not random. Urban areas with relatively high levels of deprivation, low post-compulsory education participation and low levels of attainments in year 11. Other LEA's with similar characteristics were chosen as the control areas.

[15] There were variations (four different models- variants) in the weekly amount young people received (as a function of family income), the amount of retention and achievement bonuses and to whom the allowance it was paid (young person or his parents).

minimum wage.

In France there exist already several types of financial help to young individuals who wish to continue their education. However, these are usually much smaller than the amount calculated above. In particular, allowances for secondary education (*bourses du second degré*) are provided to about 23% of the students in junior high-school, but only offer a maximum amount of 393 euros per year. Given our results, this seems much lower than the minimum amount that would be necessary to have a significant effect on education participation. Thus this financial help should be more important and more focused on youngsters from disadvantaged background.

9 Conclusion

Compulsory conscription in France was abolished in November 1997. The law defined that only men born until the end of 1978 would have to serve the army. Thus all Frenchmen born after 1979, did not do the national service.

From a theoretical point of view, the suspension of the military service has diminished men's incentive to continue education. Before the reform, staying on in education was actually a means to defer the national service, to get access to more interesting forms of the national service and to diminish the stigmatization costs of obtaining an exemption. As a matter of fact, we find that the reform has been followed by a significant decline in the proportion of men in education at age 18-22, with no significant change before 18 or after 22. We do not find any significant change for women. Assuming that the reform has affected men's relative wages at the entry into the labour market only through relative education, we use the interaction between a gender dummy and date of birth (after/ before 1979) as an instrumental variable to identify the effect of various education outcomes (that is, years of schooling, the probability of having some degree and the probability of leaving education after 18) on entry wages. The IV estimates are positive, significant and larger than the OLS estimates.

Additional investigations show that the reform had an impact mostly for children of blue collar workers. In contrast, the reform has not significantly affected education for the children of white collar workers. We use this variation across the two groups of men to provide an additional IV estimator for the returns to education. The results obtained with this second strategy are

consistent with those obtained with the first one.

Given that the reform has not significantly affected education for the children of white collar workers, we provide a test for the existence of a direct impact of the national service on earnings by comparing the entry wages of men and women of this group, before and after the reform. As it turns out, we find no change in the relative wage of men within the group of children of white collar workers. The reform has affected neither the relative education nor the relative wages of men within this group (while is has sharply affected both relative education and relative wages withing the group of children of blue collar workers). These results are consistent with the assumption that the national service did not affect earnings via channels other than education.

Generally speaking, our findings suggest that the impact of formal education on wages are significant, but that the decision to pursue education remains strongly dependent on credit constraints. Improved access to the credit market would plausibly help students from low socio-economic background to remain in education and obtain higher wages. According to our evaluations, the financial helps for French students wishing to continue their studies should be simultaneously increased and focused on low-background students.

10 Appendix

10.1 Appendix A: The French Institutional Framework

The French educational system is organised as follows. Pre-school education consists of the nursery school (*école maternelle*) for children aged 3-5. Primary education consists in five grades from the age of 6 and until the age of 10. Secondary Education lasts in total seven years, from the 6th to the 18th grade (terminal class). It consists of two levels: the lower secondary education (undertaken in establishments called *collèges* for 4 years) and the upper secondary education (in establishments called *lycée*) which has a duration of three to four years. Upper secondary education has three main branches: general and technological education (3 years) and vocational education (4 years). General and technological education is held in *lycées* for general and technological education (*Lycées d'Enseignement Général et Technologique*, LEGT) and lead to the general and technological *baccalauréats*. *Baccalauréat* is the national diploma which is required for attending universities and other institutions of tertiary education, such as the *Grandes Ecoles*.

The main vocational degrees are the *certificat d'aptitude professionnelle* (CAP), the *Brevet d'études professionnelles* (BEP) and the *Baccalauréat Professionnel*. The *Baccalauréat Professionnel* corresponds to the longest track : it requires a minimum of four years education and opens the door to some university tracks. CAP and BEP corresponds to shorter track. They can be obtained in two years.

Generally speaking, there are two routes for preparing vocational degrees: either on-the-job (with periods of training supervised by the *Centre de Formation des Apprentis*) or at school in *lycée professionnel* (LEP).

According to the French Labor survey, the vast majority of pupils are still in the general track (i.e., in *collèges* or LEGT) at age 15 or 16. Specifically, at age 15, 47% are in the 9th grade (normal age), 46% are in the 8th or 7th grades (one or two years behind), while about 4% are in the 10th or 11th grades (one or two years ahead). One year later, at age 16, 54% are one or more years behind while about 37% are normal age or ahead. At age 16, the proportion who are on the vocational track is still relatively small (about 6%). In contrast, at age 17, about 15% of the individuals are still in the school system, but on a vocational track. These data show that

the entry into the vocational track begins mostly after the end of compulsory school at the age of 17 and concerns mostly individuals who have already been held back one or two grades.

Vocational education can also be pursued on the job. At age 16, very few young individuals are on the labour market while, at age 17, about 5% hold one of the labour contracts proposed to young non-educated entrants. There are several types of labour contracts for young entrants into the labour market which combine work and training. The most common ones are the *contrats de qualification* and the *contrats d'apprentissage.* They correspond to full-time, fixed term, labour contracts during which the young worker is paid from 30% to 75% of the minimum wage (depending on his/her age and on the occupation). Periods of training are supervised by *Centre de Formation des Apprentis* and represent about 25% of the total duration of the labour contracts. Other such labour contracts for young non-educated entrants include *contrats d'orientation*, *contrats d'adaptation et formation.* We should also mention the *contrats jeunes en entreprise* and the *contrats emploi jeune.* These contracts concern young non-educated workers, but do not include specific periods of training. The wage paid to the young worker cannot be below the minimum wage, however.

10.2 Appendix B: A Model

This appendix describes the model under which the abolition of the national service can be intrepreted as a positive shock Δc_E to the cost of education c_E and provides an expression of Δc_E as a function of the cost of the national service for each conscript and of the discount rate.

Before the abolition of the military service, French students aged 18 had four options: (1) military service first, and then entry into the labour market (option MW), (2) additional education first, military service, and then entry into the labour market (option EMW), (3) military service first, additional education, and then entry into the labour market (option MEW), (4) entry into the labour market, then military service, and then re-entry into the labour market (WMW). We observe only few such transitions in the data, however.

For each student i observed before (b) the reform, we denote L_{1i}^b (L_{0i}^b) the discounted value of entering the labour market with (without) additional education. Using these notations, the discounted values of the different options may be written for student i,

$$
\begin{aligned}
V^b_{MW}(i) &= -c_{S1} + \delta L^b_{0i}, \\
V^b_{EMW}(i) &= -c_E - \delta c_{S2} + \delta^2 L^b_{1i}, \\
V^b_{MEW}(i) &= -c_{S1} - \delta c_E + \delta^2 L^b_{1i}, \\
V^b_{WMW}(i) &= w_{0i} - c_T - \delta c_{S1} + \delta^2 L^b_{0i},
\end{aligned}
$$

where δ is the discount rate, w_{0i} the wages of i without education, c_T the cost of entry into the labour market (i.e., the time and effort spent to find a first job) while c_E reflects the cost of education and c_{S1} (c_{S2}) the cost of doing the military service without (with) additional education. We can plausibly assume $c_{S1} > c_{S2}$ [16].

Conditional on staying on in education, the trade-off between education first (before the military service) and education after the military service is given by,

$$V^b_{EMW}(i) - V^b_{MEW}(i) = -c_E(1-\delta) + \Delta c_S.$$

where $\Delta c_S = c_{S1} - \delta c_{S2}$ is the cost of *not postponing* the military service. The fact that we do only observe very few transitions from military service to education (i.e. ,very few MEW) may be interpreted as meaning that the discounted cost of not postponing the military service is actually larger than the cost of not postponing education (i.e., $\Delta c_S > (1-\delta)c_E$). In the remainder, we assume that this condition holds true[17].

Conditional on not pursuing education, the trade off between military service first and military service after a first entry into the labour market is given by,

$$V^b_{WMW}(i) - V^b_{MW}(i) = w_{0i} - c_T + (1-\delta)c_{S1} - \delta(1-\delta)L^b_{0i},$$

[16] For the sake of simplicity, we do not take explicitely into account the fact that pursuing education is a way for being exempted from military service and c_{S2} may be understood as an expected cost which takes into account the possibility of exemption. Specifically, if p denotes the probability of being exempted from military service after some education and w_1 the wage of educated workers at the entry into the labour market, c_{S2} could be rewritten $(1-p)c_{S2} + pw_1$.

[17] Given that $c_{S1} > c_{S2}$, it is sufficient to assume that the cost of military service c_{S2} is larger than the cost of education c_E.

The fact that the vast majority of students choose to do their military service before entering the labour market may be interpreted as meaning that the transition cost c_T is larger than the gains of postponing the military service. For the sake of simplicity, we assume that this condition holds true.

Within this framework, the basic trade-off is between pursuing education or not pursuing education before the military service and the entry into the labour market. We have,

$$V^b_{MW}(i) - V^b_{EMW}(i) = c_E - \Delta c_S - \delta u^b_i,$$

where $u^b_i = \delta L^b_{1i} - L^b_{0i}$ represents the impact of education on discounted labour market outcomes.

Two cases can be identified:

If $c_E > \delta u^b_i + \Delta c_S$ then the cost of education is too high and the student chooses option MW. If $c_E < \delta u^b_i + \Delta c_S$ then the cost of education is sufficiently low (and the cost of not postponing military service sufficiently high) for the student to choose education first (option EMW).

After the reform (a), students have only two options: (1) direct entry into the labour market (W) or (2) education first, and then entry into the labour market (EW). The corresponding discounted values can be written

$$\begin{aligned} V^a_W(i) &= L^a_{0i}, \\ V^a_{EW}(i) &= -c_E + \delta L^a_{1i}, \end{aligned}$$

where L^a_{1i} (L^a_{0i}) represents the discounted value of entering the labour market with (without) additional education after the reform.

In such a case, the student chooses education if and only if the cost of education is smaller than the return to education, i.e. $c_E < u^a_i$, where $u^a_i = \delta L^a_{1i} - L^a_{0i}$ represents the impact of education on discounted earnings after the reform.

Before the reform, male (female) students stay on in education if and only if $u^b_i > \frac{c_E - \Delta c_S}{\delta}$ ($u^b_i > c_E$). After the reform, male and female stay on education if and only if $u^a_i > c_E$. Hence, the

reform may be interpreted as a positive shock to the cost of education $\Delta c_E = c_E - \frac{c_E - \Delta c_S}{\delta} = \frac{1-\delta}{\delta}(\frac{\Delta c_S}{1-\delta} - c_E)$ which has affected male students only. Before the reform, some students are faced with relatively high cost of education compared to the returns (i.e., $u_i^b < c_E$), but choose nevertheless to stay on education in order to avoid the cost of not postponing the military service (i.e., $c_E > \delta u_i^b + \Delta c_S$). After the reform, the cost of not postponing the military service disappears and these students may choose a direct entry into the labour market.

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Table 1: Proportion of Men in the Military Service

Age	*1975*	*1976*	*1977*	*1978*	*1979*
18	.002	0	.005	.001	.001
	(.002)	0	(.002)	(.001)	(.001)
19	.055	.035	.032	.029	.002
	(.007)	(.006)	(.005)	(.005)	(.001)
20	.071	.059	.038	.044	.003
	(.008)	(.007)	(.006)	(.006)	(.002)
21	.073	.053	.062	.031	.002
	(.008)	(.007)	(.007)	(.006)	(.001)
22	.067	.095	.042	.047	.001
	(.008)	(.009)	(.006)	(.007)	(.001)
23	.111	.107	.094	.04	0
	(.01)	(.01)	(.009)	(.007)	0
24	.059	.05	.011	.002	0
	(.008)	(.007)	(.004)	(.002)	0
25	.021	.0067	0	0	0
	(.021)	(.003)	0	0	0

Source: French Labour Force Survey (1991- 2002)
Sample: men born between 1975 and 1979.
Note: standard errors in brackets.
Interpretation: 5.5% of the men born in 1975 were in military service at age 19. Age is the age reached by the end of the year (i.e., the 31st December of the year of the survey)

Table 2: Distribution of Activity Status of Men One Year After the National Service, by Cohorts of Birth

Year of Birth	*Present Situation of those who were in the Military Service at the Last Survey*			
	Work	*Unemployment*	*Education*	*Military Service*
1975-1976	.590	.249	.045	.110
	(.016)	(.014)	(.007)	(.011)
1977-1978	.576	.279	.038	.095
	(.022)	(.02)	(.009)	(.013)

Source: French Labour Force Survey (1991- 2002)
Sample: men born between 1975 and 1978, who were in the military service at the last survey (t-1).
Note: standard errors in brackets.
Interpretation: 59% of the men who were born in 1975-1976 and who were in the military service at the last survey, are working at the present survey.

Table 3: Proportion of Men and Women in Education

	Age Groups		
Year of Birth	*16-17*	*18-22*	*23*
Panel A: Men			
1975-1976	.937	.651	.297
	(.004)	(.005)	(.01)
1977-1978	.937	.64	.294
	(.004)	(.005)	(.01)
1979	.933	.613	.296
	(.005)	(.007)	(.015)
Panel B: Women			
1975-1976	.968	.721	.337
	(.003)	(.005)	(.01)
1977-1978	.976	.722	.354
	(.003)	(.005)	(.011)
1979	.977	.716	.333
	(.004)	(.006)	(.015)

Source: French Labour Force Survey (1991- 2002)
Sample: men born between 1975 and 1979
Note: standard errors in brackets.
Interpretation: When we focus on respondents aged 18 to 22, the proportion of men in education is 3.8 points larger for cohorts 1975-1976 (65.1) than for cohort 1979 (61.3).

Table 4: The Effect of the Reform on Mens' Relative Probability of Being in Education, by Age Groups

Independent Variables	*Age Groups*		
	16-17	*18-22*	*23*
Intercept	.967	.720	.337
	(.003)	(.004)	(.010)
Birth Cohort=1979	.010	-.005	-.004
	(.005)	(.007)	(.017)
Male=1	-.031	-.070	-.040
	(.004)	(.006)	(.014)
Male=1 × Birth Cohort=1979	-.014	-.034	.002
	(.007)	(.010)	(.025)
Nb Observations	14,363	35,853	6,522
R-squared	.01	.01	.01

Source: French Labour Force Survey (1991- 2002)
Sample: Individuals born in 1975, 1976 or 1979.
Note: standard errors in brackets.
Interpretation: The first column focuses on individuals aged 16-17. The age is the age reached by the end of the year, the 31st December. The dependent variable is a dummy indicating whether the respondent is in education. The coefficients correspond to OLS estimators. The second column focuses on individuals aged 18-22 and the third column on individuals aged 23.

Table 5: The Effect of the Reform on Mens' Relative Level of Education at the Entry into the Labor Market

Panel A:	*In employment at t*		
	Pr(some Degree)	*Pr(in education after 18)*	*Years of schooling*
Male=1 × Birth Cohort=1979	-.077	-.085	-.297
	(.036)	(.033)	(.137)
Nb Observations	3357	3362	3362
Panel B:	*In the labour Market at t*		
	Pr(Some Degree)	*Pr(in education after 18)*	*Years of schooling*
Male=1 × Birth Cohort=1979	-.067	-.057	-.209
	(.031)	(.026)	(.112)
Nb Observations	4857	4863	4863

Source: Labour Force Surveys (1991- 2002)
Sample: individuals born in 1975, 1976 or 1979, who have left education by the age of 23, and are in employment (or the labour market) at t, in education or military service at t-1.
Note: standard errors in brackets.
Interpretation: The first column shows the result of an OLS regression where the dependent variable is a dummy indicating that the respondent has at least a vocational degree and the independent variables are a dummy indicating the sex of the respondent, a dummy indicating whether s/he was born in 1979 and a dummy interacting the sex of the respondent and the birth cohort. We only report the estimated coefficient of the interaction variable. The dependent variable for column 2 (column 3) corresponds to a dummy indicating whether the respondent left school at 18 or more (the number of years of schooling).

Table 6: An IV Estimation of the Effect of Education on Entry Wages

	Dependent Variable: Log Hourly Wage						
	Reduced Form	*Model 1*		*Model 2*		*Model 3*	
		OLS	*IV*	*OLS*	*IV*	*OLS*	*IV*
Intercept	3.33	-.562	-4.31	2.41	1.63	2.92	1.76
	(.018)	(.082)	(2.425)	(.024)	(.519)	(.020)	(.797)
Birth Cohort=1979	.121	.096	.136	.085	.111	.038	-.002
	(.029)	(.015)	(.033)	(.015)	(.025)	(.017)	(.042)
Male=1	-.042	.005	.096	-.004	.067	-.022	.153
	(.025)	(.015)	(.062)	(.015)	(.050)	(.017)	(.124)
Some Degree	...	...	...	...	...	.577	2.10
						(.019)	(1.04)
Schooling>17	...	...	...	1.025	1.867	...	...
				(.022)	(.559)		
Years of Schooling	...	.195	.380	...	...	...	...
		(.004)	(.120)				
Male=1	-.125			...	...	...	...
× Birth Cohort=1979	(.040)						
Nb Observations	2876	2876	2876	2876	2876	2874	2874
R-squared	.0133	.4564	.0495	.4349	.1481	.2558	

Source: French Labour Force Survey (1991- 2002)
Sample: individuals born in 1976, 1977 or 1979, who have left education by the age of 23, and are in employment at t, in education or military service at t-1.
Note: standard errors in brackets.
Interpretation: the first column shows the results of an OLS regression where the dependent variable is the log of the hourly wage and the independent variables are dummy indicating the sex of the respondent, a dummy indicating whether s/he was born in 1979 and a dummy interacting the sex of the respondent and the birth cohort. Column 2 [4 (6)] shows the results of an OLS regression on the sex of the respondent, the dummy variable indicating whether s/he was born in 1979 and a variables on the years of schooling [a dummy for more that 17 years of schooling (a dummy indicating whether the respondent has some degree)]. Column 3 (5, 7) shows the results of an IV regression where the education variables have been instrumented by the dummy interacting the sex of the respondent and the birth cohort.

Table 7: An Analysis of the Effect of the Military Service on Entry Wages

Dependent Variable: Log Hourly Wage			
	Sons of Blue Collar Workers	*Sons of White Collar Workers*	*All workers*
Intercept	1.713 (.168)	1.075 (.296)	1.506 (.149)
Age	.078 (.008)	.106 (.013)	.087 (.007)
High School Degree	.074 (.033)	.037 (.076)	.059 (.032)
Vocational Degree	.050 (.038)	.033 (.097)	.041 (.037)
Military Sercive at t-1	.005 (.025)	.031 (.049)	.019 (.038)
Military Sercive at t-1 x Son of Blue Collar Worker	—	—	-.006 (.040)
Observations	675	367	1042
R-squared	.2323	.2037	.2192

Source: French Labour Force Survey (1991- 2002)
Sample: Individuals born in 1975, 1976 or 1979, who are in employment at t, they are between 20 and 26 years old and they were either in the military service or in education at period t-1.

Table 8: Proportion of Men in the Military Service

	Sons of Blue Collar Workers	*Sons of White Collar Workers*
Age	*1975-1976*	*1975-1976*
18	.001	0
	(.001)	0
19	.064	.017
	(.007)	(.005)
20	.084	.029
	(.008)	(.007)
21	.07	.046
	(.007)	(.008)
22	.089	.064
	(.008)	(.01)
23	.109	.093
	(.009)	(.012)
24	.054	.056
	(.007)	(.01)
25	.011	.022
	(.003)	(.007)

Source: French Labour Force Survey (1991- 2002)
Sample: men born between 1975 and 1979.
Note: standard errors in brackets.
Interpretation: The first two columns focus on the sons of blue collar workers, whereas the last two focus on the sons of white collar workers. 6.4% of the sons of blue collar workers born in 1975 or 1976 were in military service at age 19. Age is the age reached by the end of the year (i.e., the 31st December of the year of the survey)

Table 9: The Effect of the Reform on Mens' Relative Level of Education at the Entry into the Labor Market, by Father's Socioeconomic Status

Panel A:	*Children of Blue Collar Workers*		
	Pr(Some Degree)	*Pr(in education after 18)*	*Years of schooling*
Male=1 × Birth Cohort=1979	-.118	-.105	-.468
	(.037)	(.034)	(.133)
Nb Observations	3590	3590	3590
Panel B:	*Children of White Collar Workers*		
	Pr(Some Degree)	*Pr(in education after 18)*	*Years of schooling*
Male=1 × Birth Cohort=1979	-.032	-.038	-.083
	(.054)	(.040)	(.197)
Nb Observations	1200	1200	1200

Source: French Labour Force Survey (1991- 2002)
Sample: individuals born in 1975, 1976 or 1979, who have left education by the age of 23, and are in employment (or the labour market) at t, in education or military service at t-1.
Note: standard errors in brackets.
Interpretation: The first column shows the result of an OLS regression where the dependent variable is a dummy indicating that the respondent has at least a vocational degree and the independent variables are a dummy indicating the sex of the respondent, a dummy indicating whether s/he was born in 1979 and a dummy interacting the sex of the respondent and the birth cohort. We only report the estimated coefficient of the interaction variable. The dependent variable for column 2 (column 3) corresponds to a dummy indicating whether the respondent left school at 18 or more (the number of years of schooling). Panel A shows the results for the children of blue collar workers and panel B those for the children of white collar workers.

Table 10: The Effect of the Reform on Men's Relative Wage at the Entry into the Labour Market, by Father's Socioeconomic Status

	Dependent Variable: Log Hourly Wage	
	Children of Blue Collar Workers	*Children of White Collar Workers*
Intercept	3.28	3.45
	(.024)	(.031)
Birth Cohort=1979	.156	.090
	(.037)	(.051)
Male=1	.002	-.083
	(.031)	(.043)
Male=1	-.201	.020
× Birth Cohort=1979	(.050)	(.072)
Nb Observations	1911	746
R-squared	.0148	.0170

Source: French Labour Force Survey (1991- 2002)
Sample: individuals born in 1976, 1977 or 1979, who have left education by the age of 23, and are in employment at t, in education or military service at t-1.
Note: standard errors in brackets.
Interpretation: this table shows the results of an OLS regression where the dependent variable is the log of the hourly wage and the independent variables are a dummy indicating the sex of the respondent, a dummy indicating whether s/he was born in 1979 and a dummy interacting the sex of the respondent and the birth cohort. The first column shows the results for the children of blue collar workers whereas column 2 shows those for the children of white collar workers.

Table 11: An Alternative IV Estimation of the Effect of Education on Entry Wages

	Dependent Variable: Years of Schooling	*Dependent Variable: Log Hourly Wage*		
	(First Stage)	*(Reduced Form)*	*OLS*	*IV*
Years of Schooling	...	...	.202 (.006)	.309 (.111)
Father Blue Collar=1 × *Birth Cohort=1979*	-.498 (.230)	-.154 (.068)	...	...
Nb Observations	1455	1455	1455	1455
R-squared	.0529	.0178	.4788	.3496

Source: French Labour Force Survey (1991- 2002)
Sample: men born in 1975, 1976 or 1979, who have left education by the age of 23, and are in employment at t, in education or military service at t-1.
Note: standard errors in brackets.
Interpretation: The first column shows the result of an OLS regression where the dependent variable is the number of years of schooling and the independent variables are a dummy indicating whether the respondent is the son of a blue collar worker, a dummy indicating whether he was born in 1979 and a dummy interacting father's occupation dummy and the birth cohort. We only report the estimated coefficient of the interaction variable. The coefficient is significant at standard level and negative which means that we observe a decline in blue collar workers' sons' relative educational level at the entry into the labour market. Column 2 shows the results of the reduced form equation where the dependent variable is the log hourly wage. The independent variables are the ones described above. The last two columns show the results from the OLS and IV estimation. In the IV estimation years of schooling have been instrumented by the interaction between the father's occupation dummy and the birth cohort.

Table 12: The Gender Wage Gap Before and After the Reform by Social Background

Dependent Variable: Log Hourly Wage			
	Children of White Collar Workers	*Children of Blue Collar Workers*	*All workers*
Male=1	.097	.023	.097
x *Birth Cohort=1979*	(.037)	(.018)	(.035)
Male=1 x Low=1	—	—	-.075
x Birth Cohort=1979			(.039)
Observations	1630	6006	7636
R-squared	.3387	.4458	.4265

Source: French Labour Force Survey (1991- 2002)
Sample: Individuals born in 1975, 1976 or 1979, who are in employment at t and are not older than 23. The regressions in columns 1 and 2 include a dummy indicating the sex of the respondent, a dummy indicating whether s/he was born in 1979 and a dummy interacting the sex of the respondent and the birth cohort (the.coefficient of this variables is reported in the table). Column three includes the same set of regressors augmented by a dummy indicating whether the respondent is the child of a blue collar worker and a full set of interactions between the gender dummy, the 1979 birth dummy and the dummy indicating the father's occupation.

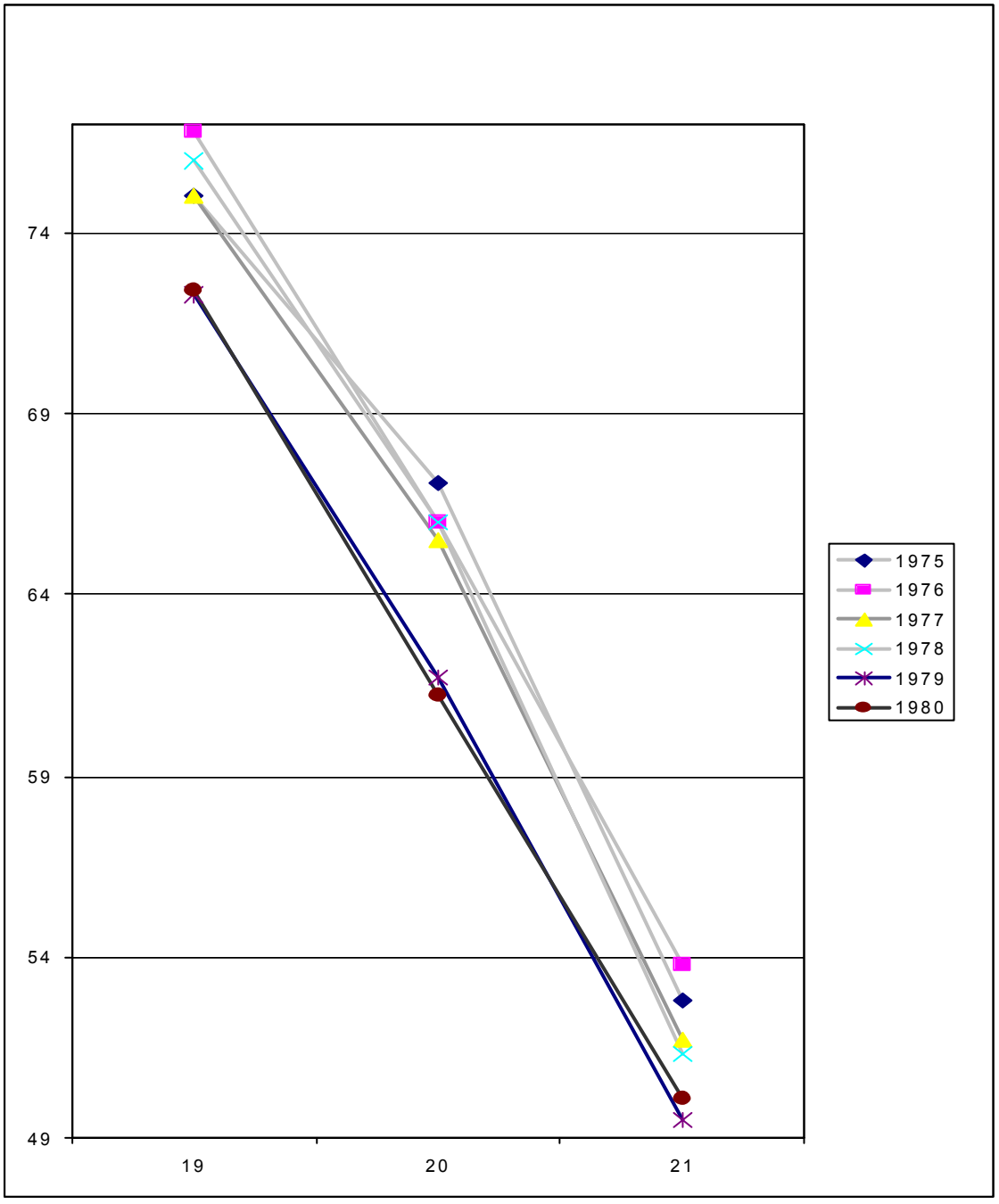

Figure 1: Percentage of Men in Education, by Age and Birth Cohort

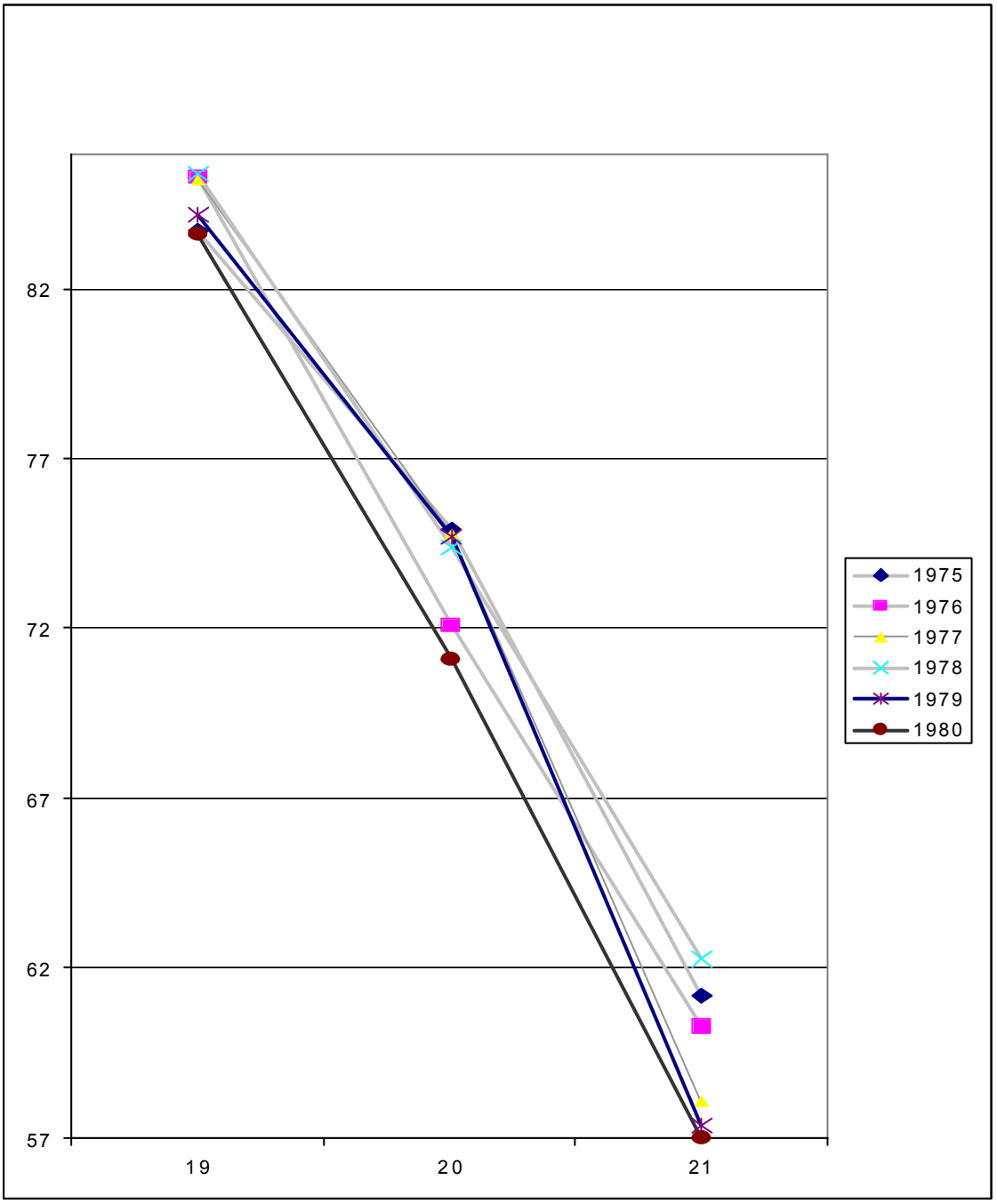

Figure 2: Percentage of Women in Education, by Age and Birth Cohort