

# 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 increase the probability of 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 increase the probability of being exempted and to get access to more interesting forms of the national service. 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.

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. 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 at least a vocational 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. They are larger than the OLS estimates. The downward bias affecting OLS estimate 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 reform mostly affected sons of blue collar workers. 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 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 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.

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. The last section provides a statistical and econometric analysis showing the effect of the reform on the relative outcomes for men.

## 2 Literature Review

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. The implicit assumption is that the possibility of being drafted affects individual outcomes mostly through actual military service. The idea that the draft might have affected earnings via other channels than the veteran status is not new, however. In particular 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". L. Baskir and W. Strauss (1978) suggest that during the Vietnam War men went to college to avoid the draft. If this is true, then the draft must have affected earnings via this education channel and not only through veteran status. 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. This would introduce a negative bias in the estimates of the returns to veteran status".

In the existing literature there is evidence of positive earnings and employment gains for World War II veterans, whereas these are negative for the veterans of the war in Vietnam (Angrist 1990, Angrist 1995, Angrist 1998 and Angrist and Krueger 1995). Angrist (1990) uses the introduction of the draft lottery during the Vietnam War as a natural experiment, in order to get a better estimate of the effect of veteran status on earnings, corrected for selectivity. He uses social security data to first estimate the effect of draft eligibility on earnings and second to use an IV estimator. He finds a negative coefficient associated with veteran status in an earnings equation of the order of 15%. Angrist and Krueger (1994) exploit the fact that after 1942 men were drafted in chronological order of birth and thus they use quarter of birth as an

instrument for veteran status. They do not find any earnings premium for WWII veterans with a 2SLS method and conclude that the positive estimates of the WWII veteran premium are due entirely to non random selection into the army. Angrist (1998) makes use of the reductions in the volunteer armed forces, which began in 1987, and uses matching and regression techniques to reduce the selection bias of the military screening.

It should be emphasized that the impact of Veteran status corresponds to a strong experience which only affects a non random selection of each cohort. In contrast, the national service implies a risk of being called by the army, which is borne by everyone and, above all, which does not imply going through such a critical test as war.

In that sense, the study on Dutch data, by Imbens and Van der Klaauw (1995) is perhaps closer in spirit to our work than existing studies on veteran status. They estimate the effect of military service on earnings. They attempt to deal with the issue of selection into the Dutch military service due to both medical and psychological tests and the way exemptions from the army operate. In particular they talk about the possible link between education and the military service and argue that "another potential source of bias comes from the conditions for deferment or temporary exemptions which affect young men who are still in higher education". They use variation in aggregate military enrollment rates induced by policy variation to deal with selection. 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.

Bauer et al (2003) try to evaluate 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 suggest a discontinuity regression approach to avoid biased and inconsistent estimates of the effect of compulsory military service on wages.

Cipollone and Rosolia (2003) measure the strength of social interaction as determinants of educational choice. They use the event of an earthquake which hit Southern Italy and resulted in the relief from the military service granted to certain cohorts of men in the affected municipalities. Given that women are not directly affected by this relief, any change in the behaviour of this specific group of women is interpreted as the effect of social interaction. The variable of interest is men's and women's average years of schooling and the analysis is conducted at the

municipality level. They find a similar effect for men and women and interpret it as evidence of social interaction. This could also capture other type of factors, or even 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.

Overall the existing literature does not directly examine the issue we are analysing in this paper. Most existing studies are mainly concerned with the impact of veteran status on subsequent civilian earnings, while we are primarily analysing the impact of the abolition of compulsory national service on the educational choice, which is made before the national service.

### **3 The French Institutional Context and the Reform**

The paper considers individuals born from 1975 to 1979 and analyses the impact of the abolition of the national service by comparing the behaviors 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 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. Otherwise they are exposed to being called by the military administration. 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. If an individual has not been called by the age of 26 then he is exempted.

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). Married men whose wives are without resources, those who are in charge of a small child also belong to this group. Those in charge of a family enterprise of agricultural, commercial or craft character, directors of an enterprise for at least the last two years and whose absence during the national service would cause serious problems for their employees may as well be exempted.

Another type of exemptions are exemptions for compensation. It concerns war orphans, men whose father, 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 is that of administrative character. It 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. It also refers to Frenchmen who migrated to a different country bounded with France by a treaty of alliance or an agreement of defense and can show proofs of the completion of their military duties in the second country.

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 conducted each year from  $t = 1991$  to  $t = 2002$  by the French Statistical Office. The 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 as 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  $t$  (not reported). We find that about two thirds were in education. Regarding the remaining third, about one third is unemployed, one third holds a temporary contract and one third a regular 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 Theoretical Framework

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 (option *MW*), (2) additional education first, military service, and then entry into the labour market (option *EMW*). In theory, they had two supplementary options: (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.

Students choose among these options by comparing their discounted values. 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  $i$ ,

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

where  $\delta$  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  $c_{S1} > c_{S2}$ <sup>1</sup>.

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,

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<sup>1</sup>For the sake of simplicity, we do not take explicitly 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  $(1-p)c_{S2} + pw_1$ .

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

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<sup>2</sup>.

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,

$$V_{WMW}^b(i) - V_{MW}^b(i) = w_{0i} - c_T + (1 - \delta)c_{S1} - \delta(1 - \delta)L_{0i}^b,$$

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,

$$V_{MW}^b(i) - V_{EMW}^b(i) = c_E - \Delta c_S - \delta u_i^b,$$

where  $u_i^b = \delta L_{1i}^b - L_{0i}^b$  represents the impact of education on discounted labour market outcomes. Two cases can be identified:

If  $c_E > \delta u_i^b + \Delta c_S$  then the cost of education is too high and the student chooses option *MW*. If  $c_E < \delta u_i^b + \Delta c_S$  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

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<sup>2</sup> 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  $c_E$ .

discounted values can be written

$$\begin{aligned} V_W^a(i) &= L_{0i}^a, \\ V_{EW}^a(i) &= -c_E + \delta L_{1i}^a, \end{aligned}$$

where  $L_{1i}^a$  ( $L_{0i}^a$ ) 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.  $c_E < u_i^a$ , where  $u_i^a = \delta L_{1i}^a - L_{0i}^a$  represents the impact of education on discounted earnings after the reform.

Before the reform, male (female) students stay on education if and only if  $u_i^b > \frac{c_E - \Delta c_S}{\delta}$  ( $u_i^b > c_E$ ). After the reform, male and female stay on education if and only if  $u_i^a > c_E$ . 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.

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.

## 6 Econometric Model- Results

Regarding the first step, the main issue is to separate the effect of the reform  $\Delta c_E$  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  $\Delta c_E$  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  $F_u(\cdot | f)$  the distribution function of  $u_i^b$  conditional on  $f^3$ , the proportion of men ( $f = 0$ ) who stay on in education before the reform is  $1 - F_u(c_E - \Delta c_E | f = 0)$  while the proportion of men who stay in education after the reform is  $1 - F_u(c_E - \Delta u | f = 0)$ . Similarly the proportion of women who stay in education before (after) the reform is  $1 - F_u(c_E | f = 1)$  ( $1 - F_u(c_E - \Delta u | f = 1)$ ). Within this framework, the variation in the probability of being on education for men may be written,

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

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

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

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.

## 6.1 Impact of the reform on educational outcomes

Figure 1 shows the proportion of men 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 in this 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 focuses on 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

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<sup>3</sup>  $f$  is a gender dummy, equal to 1 for females and equal to zero for men.

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 two generations born before the reform than for the generation born after 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. These results suggest that a significant fraction of the male population who left school before age 18 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 characterized by relative low returns to education and our data confirm that they belong to the set of students who leave school before 20.

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 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). In other words the reform has more an impact on the timing of leaving education before the age of 23 rather than the probability of leaving before that age.

## 6.2 Impact on labour market outcomes

In this section, we provide an evaluation of the returns to education 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. Thus 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,  $T_i$  a dummy indicating whether he was born before or after the reform,  $f_i$  a dummy indicating the sex of the worker and  $\varepsilon_i$  represents the unobserved characteristics of worker  $i$ . For now, we assume that the national service, as such, has no significant effect on wages<sup>4</sup>. We will provide simple tests of this assumption in the next section.

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<sup>4</sup>For example, Bauer, Bender and Schmidt (2003) talk about soft skills which might be learned during the

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 ability and unobserved returns (i.e., between  $\eta_i$  and  $\varepsilon_i$ ), the true effect of  $E_i$  on  $\ln w_i$  (i.e.,  $\alpha$ ) 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

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military service.

OLS estimate. It suggests that the true effect of every additional year of education is a 38% increase in the entry hourly wage. 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<sup>5</sup> 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 (apprenticeship programme, *contrat de qualification*, *stage d'insertion*, etc). In these cases employers are expected to provide vocational training and are allowed to pay wages which are much lower than the minimum wage. Specifically the entry wages paid to young workers in apprenticeship programmes or those holding a *contrat de qualification* vary across occupations and industries but can be as low as 25% of the minimum wage. This is the reason why our estimated returns to formal education are 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. 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.

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<sup>5</sup>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.

### **6.3 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 hourly wages. To test this assumption, we are going to use the fact that this reform has mostly affected sons of blue collars. Table 7 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 much less affected by the reform than sons of blue collar workers. Table 8 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 9 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 (not reported here).

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 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 10 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 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 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 and increase the probability of being exempted. 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 and significant and larger than the OLS estimates. The downward bias affecting the OLS estimates suggests that young men entering the labour market without any degree have higher wages than those that would have received individuals who stay on in education, had they decided to enter the labour market without any further education. Additional investigations show that the reform had an impact mostly for children of blue 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. Moreover 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 it has sharply affected both relative education and relative wages within the group of children of blue collar workers). These results are consistent with our assumption that the national service did not affect earnings via channels other than education.

## References

- [1] Angrist, J., (1990), "Lifetime Earnings and the Vietnam Era Draft Lottery: Evidence from Social Security Administrative Records"? *The American Economic Review*, Vol. 80, No. 3, June 1990, pp. 313-336.
- [2] Angrist, J., (1998), "Estimating the Labor market Impact of Voluntary Military Service using Social Security Data on Military Applicants", *Econometrica*, Vol. 66, No. 2, March 1998, pp. 249-288.
- [3] Angrist, J., (1995), "Using Social Security Data on Military applicants to Estimate the Effect of Voluntary Military Service on Earnings", NBER Working Paper No. 5192, July 1995.
- [4] Angrist, J., G. Imbens and D. Rubin, (1996), "Identification of Causal Effects Using Instrumental Variables", *Journal of the American Statistical Association*, Vol. 91, No. 434 (June 1996), pp. 444-455.
- [5] Angrist, J. and A. Krueger, (1994), "Why do World War II Veterans Earn More than Nonveterans?", *Journal of Labor Economics*, Vol. 12, No. 1, January 1994, pp. 74-97.
- [6] Baskir, L., and W. Strauss, (1978), "Chance and Circumstance: The Draft, the War, and the Vietnam Generation", New York: Alfred A. Knopf, 1978.
- [7] Bauer, T., S. Bender and C. Schmidt, (2003), "Evaluating the Labor Market Effects of Compulsory Military Service: a Regression- Discontinuity Approach".
- [8] Card., D., (2000), "Estimating the Return to Schooling: Progress on some Persistent Econometric Problems", NBER Working Paper No. 7769, June 2000.
- [9] Cipollone, P. and A. Rosolia, (2003), "Endogenous Social Interactions in Schooling: Evidence from an Earthquake", Bank of Italy, Research department, February 2003.
- [10] De Tray, D., (1982), "Veteran Status as a Screening Device", *The American Economic Review*, Vol. 72, No. 1, March 1982, pp. 133-142.

- [11] Cutright, P., (1974), "The Civilian Earnings of White and Black Draftees and Nonveterans", *American Sociological Review*, Vol. 39, No. 3, June 1974, pp. 317-327.
- [12] Herpin N., and M. Mansuy, (1995), "Le rôle du Service National dans l'insertion des Jeunes", *Economie et Statistique*, No. 283-284, 1995- 3/4.
- [13] Imbens, G., and J. Angrist, (1994), "Identification and Estimation of Local Average Treatment effects", Vol. 62, No. 2 (March 1994), pp.467-475.
- [14] Imbens, G., and W. Van Der Klaauw, (1995), "Evaluating the Cost of Conscription in the Netherlands", *Journal of Business and Economic Statistics*, April 1995, Vol. 13, No. 2.
- [15] Mangum, S., and D. Ball, (1989), "The Transferability of Military- Provided Occupational Training in the Post- Draft Era", *Industrial and Labor Relations Review*, Vol. 42, No. 2, January 1989, pp. 230-245.

Table 1: Proportion of Men in the Military Service

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

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

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

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

<i>Panel A:</i>		<i>In employment at t</i>		
	<i>Pr(some Degree)</i>	<i>Pr(in education after 18)</i>	<i>Years of schooling</i>	
<i>Male=1 × Birth Cohort=1979</i>	-0.077 (.036)	-.085 (.033)	-.297 (.137)	
<i>Nb Observations</i>	3357	3362	3362	

<i>Panel B:</i>		<i>In the labour Market at t</i>		
	<i>Pr(Some Degree)</i>	<i>Pr(in education after 18)</i>	<i>Years of schooling</i>	
<i>Male=1 × Birth Cohort=1979</i>	-.067 (.031)	-.057 (.026)	-.209 (.112)	
<i>Nb Observations</i>	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

<i>Dependent Variable: Log Hourly Wage</i>							
	<i>Reduced Form</i>	<i>Model 1</i>		<i>Model 2</i>		<i>Model 3</i>	
		<i>OLS</i>	<i>IV</i>	<i>OLS</i>	<i>IV</i>	<i>OLS</i>	<i>IV</i>
<i>Intercept</i>	3.33 (.018)	-.562 (.082)	-4.31 (2.425)	2.41 (.024)	1.63 (.519)	2.92 (.020)	1.76 (.797)
<i>Birth Cohort=1979</i>	.121 (.029)	.096 (.015)	.136 (.033)	.085 (.015)	.111 (.025)	.038 (.017)	-.002 (.042)
<i>Male=1</i>	-.042 (.025)	.005 (.015)	.096 (.062)	-.004 (.015)	.067 (.050)	-.022 (.017)	.153 (.124)
<i>Some Degree</i>	...	...	...	...	...	.577 (.019)	2.10 (1.04)
<i>Schooling&gt;17</i>	...	...	...	1.025 (.022)	1.867 (.559)	...	...
<i>Years of Schooling</i>	...	.195 (.004)	.380 (.120)	...	...	...	...
<i>Male=1</i> $\times$ <i>Birth Cohort=1979</i>	-.125 (.040)	...	...	...	...	...	...
<i>Nb Observations</i>	2876	2876	2876	2876	2876	2874	2874
<i>R-squared</i>	.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: Proportion of Men in the Military Service

<i>Age</i>	<i>Sons of Blue Collar Workers</i>	<i>Sons of White Collar Workers</i>
	<i>1975-1976</i>	<i>1975-1976</i>
<i>18</i>	.001 (.001)	0 0
<i>19</i>	.064 (.007)	.017 (.005)
<i>20</i>	.084 (.008)	.029 (.007)
<i>21</i>	.07 (.007)	.046 (.008)
<i>22</i>	.089 (.008)	.064 (.01)
<i>23</i>	.109 (.009)	.093 (.012)
<i>24</i>	.054 (.007)	.056 (.01)
<i>25</i>	.011 (.003)	.022 (.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 8: The Effect of the Reform on Mens' Relative Level of Education at the Entry into the Labor Market, by Father's Socioeconomic Status

<i>Panel A:</i>		<i>Children of Blue Collar Workers</i>		
	<i>Pr(Some Degree)</i>	<i>Pr(in education after 18)</i>	<i>Years of schooling</i>	
<i>Male=1 × Birth Cohort=1979</i>	-0.118 (.037)	-0.105 (.034)	-0.468 (.133)	
<i>Nb Observations</i>	3590	3590	3590	

<i>Panel B:</i>		<i>Children of White Collar Workers</i>		
	<i>Pr(Some Degree)</i>	<i>Pr(in education after 18)</i>	<i>Years of schooling</i>	
<i>Male=1 × Birth Cohort=1979</i>	-0.032 (.054)	-0.038 (.040)	-0.083 (.197)	
<i>Nb Observations</i>	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 9: The Effect of the Reform on Men's Relative Wage at the Entry into the Labour Market, by Father's Socioeconomic Status

<i>Dependent Variable: Log Hourly Wage</i>		
	<i>Children of Blue Collar Workers</i>	<i>Children of White Collar Workers</i>
<i>Intercept</i>	3.28 (.024)	3.45 (.031)
<i>Birth Cohort=1979</i>	.156 (.037)	.090 (.051)
<i>Male=1</i>	.002 (.031)	-.083 (.043)
<i>Male=1</i> × <i>Birth Cohort=1979</i>	-.201 (.050)	.020 (.072)
<i>Nb Observations</i>	1911	746
<i>R-squared</i>	.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 10: An Alternative IV Estimation of the Effect of Education on Entry Wages

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

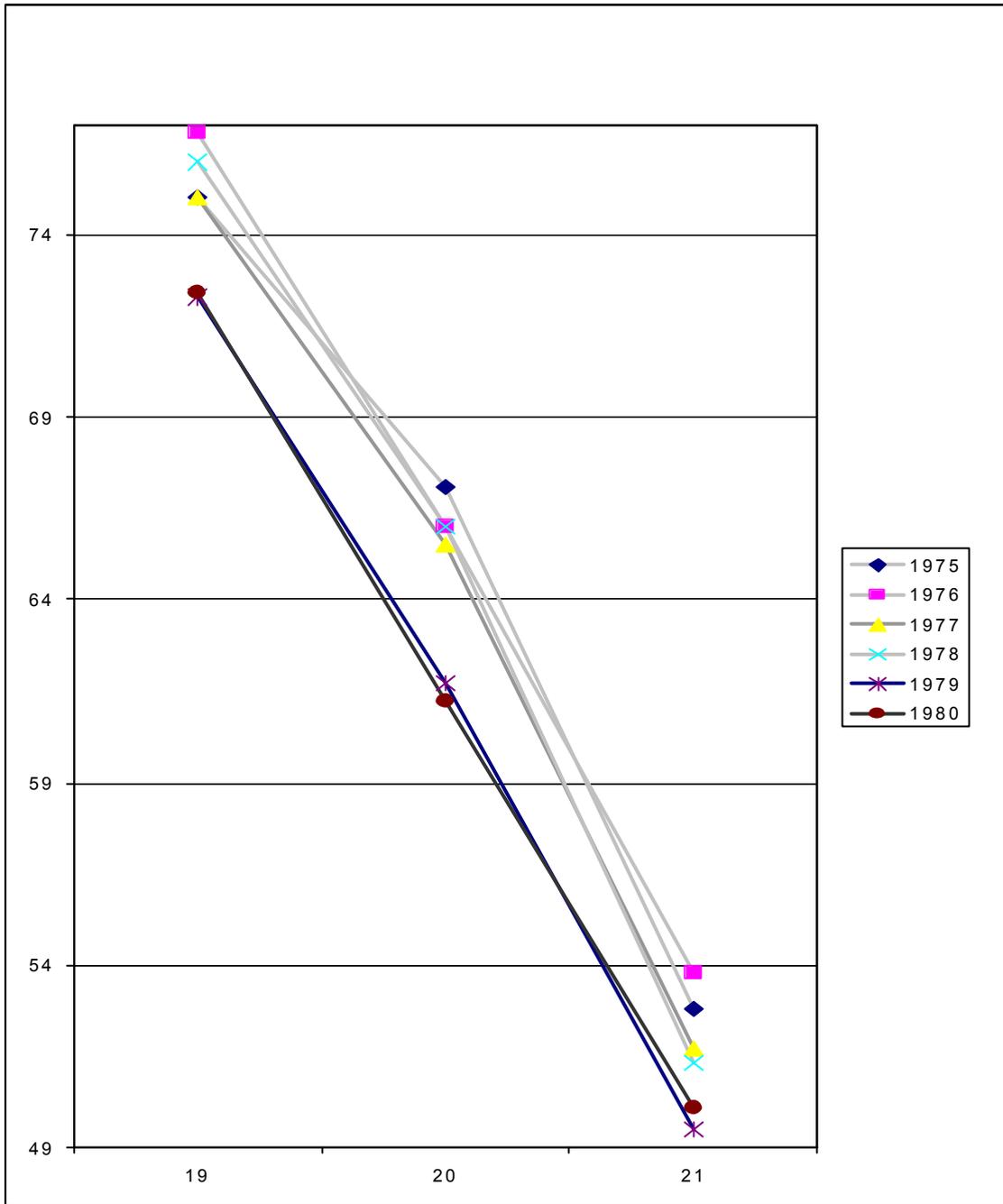


Figure 1: Percentage of Men in Education, by Age and Birth Cohort

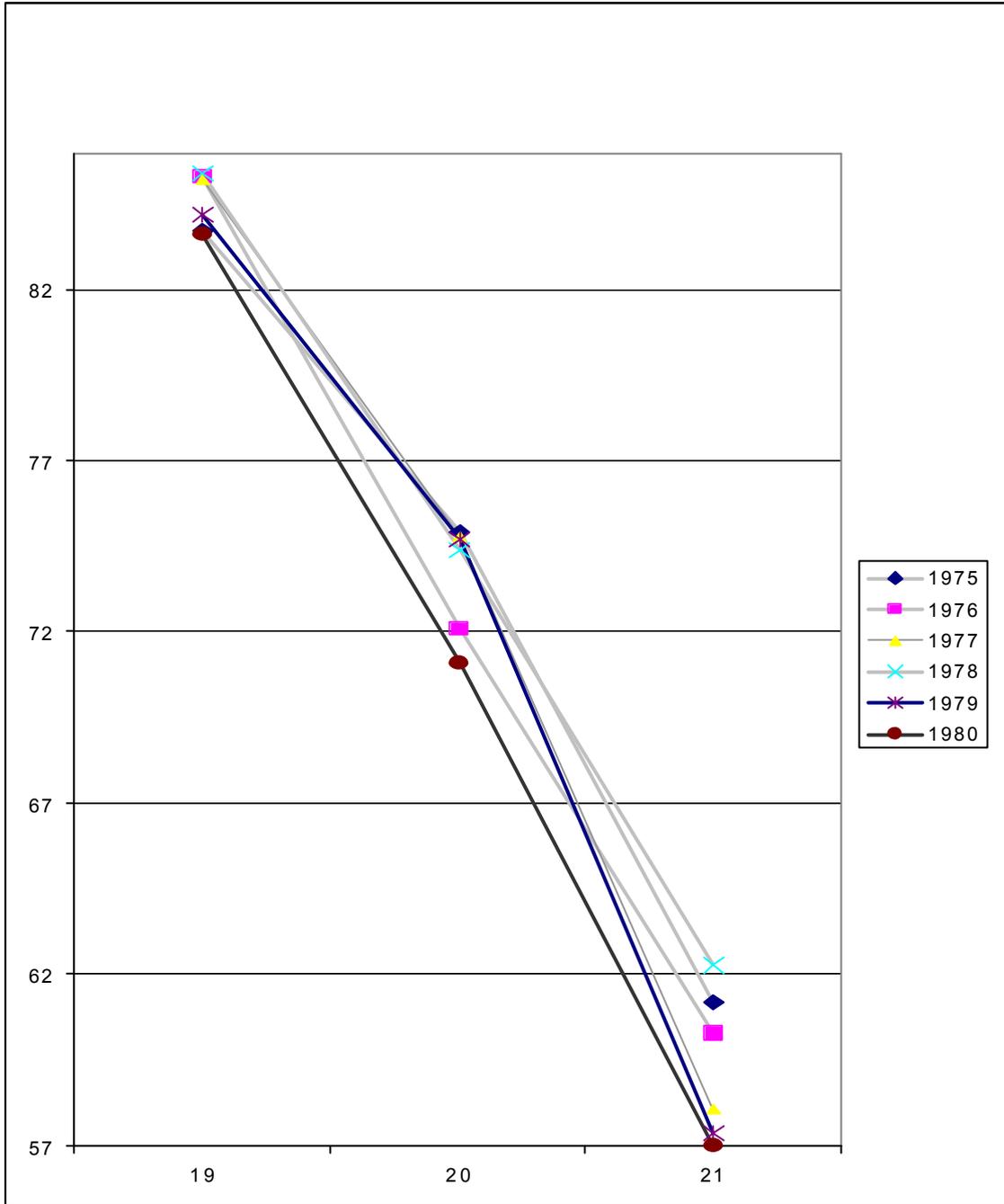


Figure 2: Percentage of Women in Education, by Age and Birth Cohort