

Direction des Études et Synthèses Économiques

G 2012 / 05

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Document de travail



Institut National de la Statistique et des Études Économiques

INSTITUT NATIONAL DE LA STATISTIQUE ET DES ÉTUDES ÉCONOMIQUES

*Série des documents de travail
de la Direction des Études et Synthèses Économiques*

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We are grateful to Patrick AUBERT, Luc BEHAGEL, Pierre CAHUC, Andrew CLARK, David GRAY, Sandra MCNALLY, Philip OREOPOULOS, Corinne PROST. We also thank the participants at the CREST-LMI seminar (Malakoff, April 2011) and the INSEE-DEEE seminar (Malakoff, December 2011) for their stimulating remarks. All remaining errors are ours. Any opinions expressed here are those of the authors and not of INSEE.

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A scarred generation? French evidence on young people entering into a tough labour market

Abstract

The late 2000s recession has hit youth very hard, lowering the employment and wage prospects of the entrants into the labour market. In this paper, we address the question of the persistence of these adverse shocks faced by young people who enter into the labour market during an economic downturn, focusing on the French case.

Using the French Labour Force Surveys for the cohorts entering the labour market between 1982 and 2009 (which includes more than two entire business cycles), we find no long term effect on wage or employment of having entered the labour market during an economic crisis. "Unlucky" young people completing their studies during a recession have lower employment rates, are more often part-time and temporary workers, but catch-up with "lucky" one within 3 years.

This fast catch-up contrasts with results for other countries. Potential explanations for those differences are twofold: first, in France a large share of young entrants are paid at the minimum wage and, second, young people unemployment is high in France, so that unemployment at entry on the labour market may be less often used as a screening device by employers.

Keywords: Scarring effect, Business cycle, Initial labour market conditions

Peut-on parler de « générations sacrifiées » ? Entrer sur le marché du travail dans une période de mauvaise conjoncture économique

Résumé

La crise économique de la fin des années 2000 a beaucoup touché les jeunes entrants sur le marché du travail, réduisant leurs perspectives d'emploi et de salaire à court terme. Dans cette étude centrée sur la France, nous cherchons à savoir si les jeunes qui font face à une crise au moment d'entrer sur le marché du travail sont aussi pénalisés à long terme. À partir des données des enquêtes Emploi, nous étudions les cohortes sorties du système scolaire entre 1982 et 2009. Cette période comprend plus de deux cycles économiques complets. Après 4 ans, il n'y a pas de différence en termes d'emploi et de salaire entre les cohortes « chanceuses » entrées sur le marché du travail en période de bonne conjoncture économique et les cohortes « malchanceuses » entrées sur le marché du travail en période de crise économique.

Ce rattrapage est plus rapide en France que dans la plupart des autres pays. Deux raisons pourraient l'expliquer. Tout d'abord, les jeunes sont nombreux en France à être payés au salaire minimum quand ils entrent sur le marché du travail. Ensuite, le taux de chômage des jeunes est élevé en France : le temps passé au chômage en début de carrière n'est donc probablement que peu utilisé par les employeurs comme signal de la qualité des candidatures.

Mots-clés : Génération sacrifiée, Cycle économique, Conjoncture à l'entrée du marché du travail

Classification JEL : J30 - J21

1 Introduction

The current crisis has renewed the interest in the impact of business cycle fluctuations on labour markets. There has been a special focus on young people, and among them, on entrants into the labour market, who are hit very hard by the economic downturns. In France, the unemployment rate of young entrants (1-4 years of experience) rose dramatically by 3.8 percentage points between 2007 and 2010 whereas the unemployment rate of workers with more than 11 years of experience increased by 1.1 percentage points. This raises the question of the effect that economic conditions may have on young entrants into the labour market, that we address in this paper.

More precisely, we wonder if the effects of economic conditions at the entry into the labour market are persistent, or if they disappear after some years. In the literature, the existence of a persistent or very long-lasting effect is often referred to as a *scarring effect*, that we try to measure for the French case. In other words, we try to investigate if "unlucky" young people leaving school during a crisis catch up (in terms of employment and wage levels), after some years, with "lucky" ones, who entered the labour market during a boom.

Theoretical results on long-term effects of leaving school in a bad economy are not conclusive. Economic theory suggests some channels that could cause the adverse economic shock at the entry on the labour market to be persistent. Theoretical arguments are threefold. First, if one assumes that employers face uncertainty about worker productivity, they could use previous unemployment spells as a screening device in their hiring process. Thus, unemployment spells may be a persistent negative point in a career (signal effect theory). Second, skills accumulated by people facing a crisis during their early career may be lower than skills of people facing an economic boom, if we assume that skills deteriorate during a spell of non-employment or job mismatch (human capital theory). Finally, the effects of entering in a bad economy on wages depend on the nature of the wage negotiation. If inter-firm mobility is costly then initial wage will impact all the subsequent wages.

But adverse shocks could be overcome, especially in a flexible labour market. If young people experience unemployment during a crisis and quickly find good jobs when the economy recovers, they may not be stigmatized. Search theory suggests that job changes may be beneficial for wages. Moreover, in the implicit contract theory (Beaudry and DiNardo, 1991), costless mobility suggests that, when economic conditions improve, wages must be revised upward to prevent the worker from being bid away by other firms. In addition, the scarring effect of being unemployed during massive unemployment period is not clear-cut in the long-run.

Being unemployed in that period would send a less negative signal to employers than being unemployed during economic boom. In that context, a negative shock on the matching process could be overcome, especially if the labour market is sufficiently flexible, and economic cycles are quite short.

As theoretical arguments on long-term effects are ambiguous, empirical investigations can provide useful insights. In this respect, both short and long run effects of economic conditions at the entry into the labour market have been documented in numerous countries (Austria, Canada, Germany, Japan, Norway, Sweden and the U.S., see section 2 for references). Most of these papers find no long-term effect on unemployment and a longer catch-up process for wages. But this literature also shows that the existence and the extent of a scarring effect on wages varies greatly from one country to another. The diversity of national labour markets, and particularly the integration of school-leaving people into the labour force (see for example Genda, Kondo, and Ohta, 2010 for a comparison between Japan and the USA) could explain that variability. In France, only short run effects have been studied (Fondeur and Minni, 2004). Documenting the French case seems particularly interesting, because the French labour market greatly differs from the ones of the USA or other countries where the existing studies have been done. In particular, the French labour market is characterized by a high level of unemployment and a minimum wage. Therefore, employment is an important channel for labour market adjustments in the face of shocks.

In this paper, we present estimates of the long run effects of business cycle variations on both wage and employment profiles of young entrants. We do not find any evidence of a scarring effect in France. More precisely, our results are the following: an increase in the unemployment rate when leaving school lowers employment rate of young entrants during the first 3 years. It also rises the proportion of part-time and temporary workers. We do not find any significant effect on wages. We do not find any significant effect on the proportion of managers and professionals even during the first year.¹ Our results are very similar for men and women. Our results suggest that entering in a tough labour market and experiencing unemployment during the first years is not penalizing for the rest of the career. During an economic crisis being unemployed would send a less negative signal to employers, as the signal would be more noisy about intrinsic abilities. Finally potential experience or age may have a more important effect than real experience in determining wages, as we find no effect on wages for cohorts having longer unemployment spells.

The remainder of this paper is organized as follows. Section 2 summarizes the

¹Yet, the negative effect on employment during the first years could entail a positive selection effect in terms of composition of employed people. This could explain why we do not find any negative effect during the first years on wages or occupations.

main results of the literature on our subject. Section 3 describes our data, whereas sections 4 and 5 present the econometric model and our results. Section 6 proceeds to some robustness checks, and Section 7 presents a discussion of our results and concludes the paper.

2 Literature Review

There is an extensive literature addressing the question of the unemployment persistence or hysteresis, in a general manner (see for instance Arulampalam, Booth, and Taylor, 2000, Arulampalam, 2001 or Nilsen and Reiso, 2011) or with a specific focus on young workers (Gregg, 2001, Gregg and Tominey, 2005, Skans, 2010). Those papers find a high degree of persistence of unemployment: when a young person experiences a period of unemployment at the beginning of her career, she would suffer a wage loss for the remaining of her career (results remain even after using techniques for controlling for unobserved heterogeneity).

But the focus of these papers is quite different from our own. They compare the labour market performances of unemployed and employed young people having left school within the same year while we are interested in comparing young people having left school at different years, with different economic conditions. A large body of literature focuses on this latter topic. Our paper is thus mainly related to this literature, which focuses on short and long-term consequences of leaving school in a bad economy. The results of this last stream of literature are more contrasted across countries. Previous papers usually do not find persistent effects on employment, while results concerning the persistence of the effect on wages differ according to the country and the population under scrutiny.

Biewen and Steffes (2010) point out to a potential explanation that reconciles the two literatures. Using the German Socio-Economic Panel, they show that the "disadvantage from having been unemployed in the previous period is high when unemployment is relatively low and low when unemployment is relatively high. This is consistent with the hypothesis that employers see unemployment as a stigma and do so especially when the conditions to find a job are relatively good. On the other hand, if unemployment is relatively high, the stigma connected to it is lower because it is a more widespread phenomenon".

The remainder of this section presents in details the main conclusions of the literature devoted to the long-term consequences on wages and employment of the labour market conditions at entry. We focus here on the notion of catch-up: the number of years after which young people who faced high unemployment rate

at entry succeed in catching-up (in terms of employment and wage levels) with young people who entered the labour market facing a low unemployment rate. If the catch-up process is never completed, even after 15 or 20 years on the labour market, there is a permanent scarring effect.

2.1 The effect on the employment rate is generally not persistent

There is a part of literature consistent with an effect of the unemployment rate at entry on future employment rates quickly fading. After three years, some authors find no effect of the business cycle at labour market entry on employment rates (Oreopoulos, von Wachter, and Heisz, 2012 on Canadian male college graduates data between 1982 and 1999; Genda, Kondo, and Ohta, 2010 on the United States between 1986 and 2005).

Yet, some studies find a persistent effect. The catch-up occurs after 6 years according to Stevens (2007) on low and medium-skilled male German workers between 1980 and 1995. Genda, Kondo, and Ohta (2010) find a permanent effect on their analysis period for low-skilled Japanese workers: a 1 percentage point rise in the unemployment rate at entry reduces the likelihood of employment for low-skilled Japanese people by 3-4 percentage points for over 12 years. Raaum and Roed (2006) using Norwegian data from 1993-2000, find a persistent effect on employment rate of business cycle during adolescence (a 5 percentage point rise in local unemployment rate between 16 and 19 year old increases the unemployment rate of 1.5 percentage point during their 25-36 years year old). This effect is not limited to a particularly disadvantaged group.

2.2 A longer catch-up process for wages

The catch-up for wages seems to be longer than for employment, and even never occur in some countries. Three studies find a catch-up about 6 years after the labour market entry (Genda, Kondo, and Ohta, 2010 on the United States: after 6 years; Oreopoulos, von Wachter, and Heisz, 2012: between 6 and 10 years according to the national or regional specification; Stevens, 2007: between 4 (federal state model) and 6 (regional planning model) years). Other studies find strong permanent effects, with a 1 percentage point rise in the national unemployment rate entailing a permanent wage loss (Mansour, 2009 and Kahn, 2010 on the NLSY79; Genda, Kondo, and Ohta, 2010 for Japanese men without college edu-

cation; Brunner and Kuhn, 2010 on Austria males data, 1975-2005, IV estimates of 6.5%).

2.3 Channels

Oreopoulos, von Wachter, and Heisz (2012) find that the dynamic adjustment process is characterized by an increased mobility across employers and industries and improvements in average firm characteristics. Brunner and Kuhn (2010) find that workers who enter during a recession are initially assigned to lower quality jobs/tasks, and this initial assignment creates wage persistency because part of the human capital accumulated during the initial job is occupation or industry specific. They also find that mechanisms unrelated to productivity, such as downwardly rigid wage contracts, also play an important role in generating persistent wage differences across entry cohorts. Eventually, Kwon, Milgrom, and Hwang (2010), using Swedish data on white collar workers during the period 1970-1990, investigate the explanations of a potential lifetime loss. They find that those who enter the labour market during a crisis get promoted more slowly. Thus, their wage path has a slower slope.

2.4 Studies on French data

In France, effects of downturns seem to be strong on employment in the short run. Between 1990 and 1994, which corresponded with a strong economic slowdown period in France, the unemployment rate of young people (15-24) increased from 15.4% to 22.3%, whereas the total unemployment rate went up from 8% to 10.8%. Ponthieux (1997) compares mean wage of young entrants of one year of potential experience and the mean wage of all French employed workers in 1991 and 1995. She finds that mean wage of young entrants was 45% lower than the mean wage in 1995, whereas it was 35% lower than the mean wage in 1991. Her results are year specific. Fondeur and Minni (2004) find also that both employment and wages of the young overreacted to crises in France during the 1980s and the 1990s. Yet, the effects of the business cycle seem to be stronger on employment than on wages.

Ananian and Calavrezo (2012) address the question of potential medium-term effects of entering the labor market in bad economic conditions (up to 5 years after entering into the labor market), for a specific period (1995-2002) based on administrative registers (the "panel DADS"). They find that young people who faced an unfavourable labour market conditions at their entry into the labour

market catch-up within 3 years with those who faced a favourable labour market conditions.

In our paper we focus on the first 15 years of potential experience. As far as we know, our paper provides the first contribution to the analysis of long-run effects of the business cycle on labour market careers using French data.

3 Data and descriptive statistics

3.1 Data

3.1.1 Business cycle indicator

We use as the indicator of economic conditions at entry the unemployment rate of young men/women (15-24 years old) the year following their school-leaving decision (see Figure 1). We do not use the unemployment rate of the school-leaving year, since leaving school occurs mainly during the second semester, and entry into the labour market usually occurs during the following Fall and Winter, (see Coudin and Befy, 2007). Economic conditions in the year following the school leaving year therefore seem to be a more accurate indicator of the economic conditions at entry.

We focus on cohorts having left school after 1982. Before 1982, total unemployment rate as well as young entrants unemployment rate trended upward. We prefer to estimate our models on less trended indicators (see Figure 1). Indeed, we focus on scarring effects due to business cycles and not to structural evolutions (*i.e* structural increase in unemployment between cohorts entering into the labour market before and after the 1980s). Furthermore, in most of our regressions, we include year dummies, in order to control for a possible spurious correlation between our variables of interest and unemployment rate due to common temporal pattern.

Figure 1: Unemployment rate of young entrants in the labour force, men and women (cohorts: 1982-2009, unemployment rate: 1983-2010)

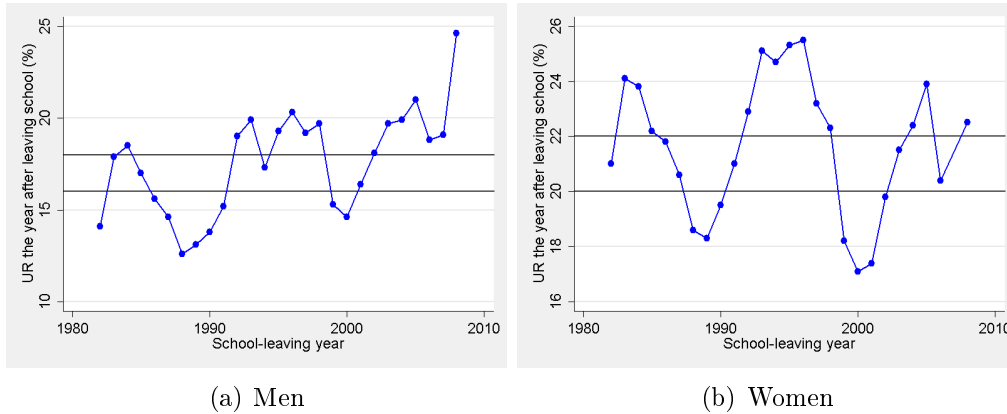
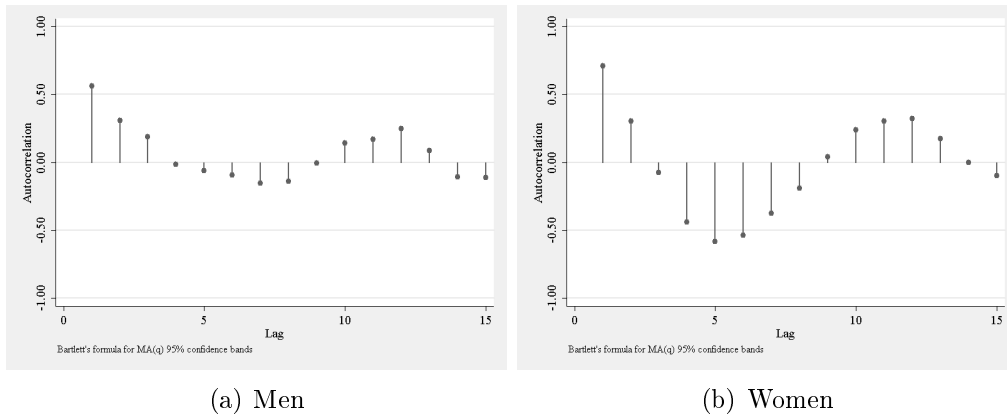


Figure 2: Autocorrelation of our unemployment indicator



France experienced 4 major increases in unemployment during our period of interest: 1983-1986, 1993-1999, 2003-2006 and since 2008. The youth unemployment rate varied dramatically between two successive years during certain subperiods, *e.g.* by more than 5 percentage points between 1992 and 1993, and between 1999 and 2000.

As in other countries, France has high unemployment persistence (see Figure 2). Growth Domestic Product and unemployment do not exhibit exactly the same patterns although both are obviously correlated, because the productivity cycle in France is quite long. To better capture the situation faced by people entering the labour market, we therefore retain an indicator of the tightness of the latter. We

therefore focus on scarring effects of leaving school and facing a high unemployment rate, rather than facing negative or very low growth rate.

3.2 Labour Force Surveys

We use the French Labour Force Surveys, from 1990 to 2010.² We mainly focus on French young people, with 1 to 15 years of potential experience, and who left school between 1982 and 2009. In this paper, leaving school corresponds to completing studies or dropping out from school. We differ in this respect from other papers published on the scarring effect in that they consider the year when one gets her first paid job, and not when she leaves school. They usually retain this definition due to the use of administrative data, with no available information on school-leaving year. This provides an arguably very endogenous indicator of the year of entry. We have better information, as we know the school-leaving year of the person. The remaining source of potential endogeneity would be due to changes in school-leaving decisions according to the business cycle. We showed in a companion paper Gaini, Leduc, and Vicard (2012) that only few people remain longer at school during economic downturns than what would otherwise have been the case, and that these changes are not likely to bias our estimations.

Our main variables of interest are the employment status³ (employed versus non employed), the monthly wage in logarithm (not corrected by the number of worked hours) and the monthly earned income in logarithm. The earned income equals the monthly wage if the person is working and 0 otherwise.⁴

We begin with graphically comparing wages across cohorts and years as descriptive statistics. We therefore proceed with a normalization to adjust for the evolution of the mean wage. More precisely, we deflate wages by the ratio of the mean wage in 2010 to the mean wage of the year.⁵

²Labour Force Surveys were carried out annually in March from 1990 to 2002. Since 2003 they are carried out quarterly. We reweight observations in order to have the same number of individuals each year, and we include year dummies in the different models, which take into account potential breaks in the data. Finally, LFS have a rotative panel design and we only retain the first observation for each interviewee in order to avoid intra-individual correlation.

³Employment status in the French LFS is the employment status during a referenced week. We extrapolate this employment status to calculate the monthly earned income

⁴When we focus on earned income, we impute missing wages using the hot-deck method. If not, we would over-weight people with no earned income and bias our estimations. Wages are missing because either the person did not report her wage, or she is self-employed. Because earned income can be zero for unemployed people, we also do not use $\log(\text{earned income})$, which is not defined, but $\log(\text{earned income}+1)$ instead.

⁵Mean wages are computed on our population of interest, *i.e.* young men or women with 1

$$w_{it}^n = w_{it} \cdot \frac{\bar{w}_{2010}}{\bar{w}_t}$$

Finally, we need to correct the potential experience variable. Potential experience is computed as the difference between the current year and the school-leaving year. As illustrated in Appendix A.1, the size of a given school-leaving cohort was not the same in the raw data for different levels of potential experience. In the raw data, apprenticeship is considered as an "in studies" period in the 1983-1989 and 2003-2010 surveys, whereas it is not in the 1990-2002 surveys. To deal with this discrepancy, we implement the correction usually applied by the French National Institute of Statistics using the same convention in all surveys. We corrected data so that the school-leaving age takes into account the apprenticeship as an "in studies" period. After the correction, the size of a given leaving cohort was approximately the same for different levels of potential experience (Appendix A.1).

3.3 Descriptive statistics

We compare employment, wage and earned income trajectories for cohorts entering in the labour market in adverse conditions with cohorts entering in favourable labour market conditions. We first compare cohorts entering the labour market at successive years but with very different economic conditions. We then divide our cohort sample (cohorts 1982-2009) in three groups according to the economic conditions the year following graduation or departure from the academic system, and we compare the two "extreme" groups: school-leavers when the 15-24 year-old unemployment rate is below 16% for men and school-leavers when it is above 18% for men, and below 20% and above 22% for women (see Figure 1). Finally, we compare cohorts facing persistent economic conditions, i.e. facing 5 years of persistent high or persistent low unemployment at entry.

to 15 years of potential experience on the labour market.

3.3.1 1990-1991 ("favourable entry") vs 1992-1993 ("unfavourable entry")

Figure 3 displays comparisons for cohorts 1990-1991 ("favourable entry") versus cohorts 1992-1993 ("unfavourable entry")⁶. In 1991 and 1992, the youth unemployment was historically low at around 15%. The year 1993 corresponds to an unexpected recession, with a drop of -0,7% of GDP, followed by a quick recovery, but with no decline in the unemployment rate. The unemployment rate remained above its 1991 level until 1999 (see Figure 1).

As a consequence of this economic environment, male 1990-1991 cohorts have a first year employment rate 8 percentage points higher than men cohorts 1992-1993, whereas the corresponding difference is 5 percentage points for women. Despite these huge differences, the gap between both cohorts vanishes after 3 years. Between 8 and 10 years of potential experience, the gap is reversed for men, and, after 10 years, employment rates are quite similar.

As for the wage, there is no visible gap, at short or medium terms. A selection effect due to unemployment could however overcome a negative effect of the economic conditions for cohorts 1992-1993, at least for the three first years. Earned income combines employment and wage gaps. Cohorts 1990-1991 have a higher earned income during the first three years. For men, the gap is reversed between 8 and 10 years of labour market experience, and there is no more gap after 10 years. For women, the gap is reversed between 16 and 17 years of experience.

⁶In this paper, standards errors are calculated as if the sample selection was based on a simple random sampling

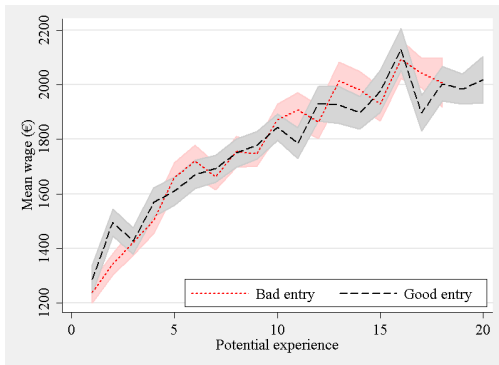
Figure 3: Generations: 1990-1991 ("favourable entry") vs 1992-1993 ("unfavourable entry")



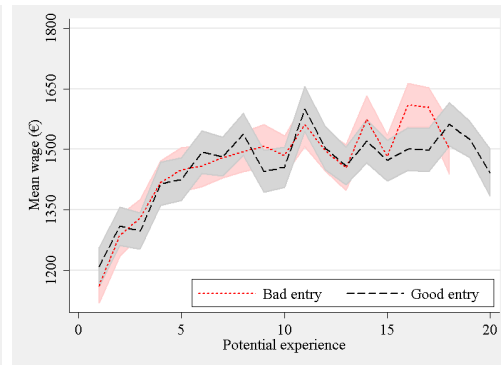
(a) Employment rate - Men



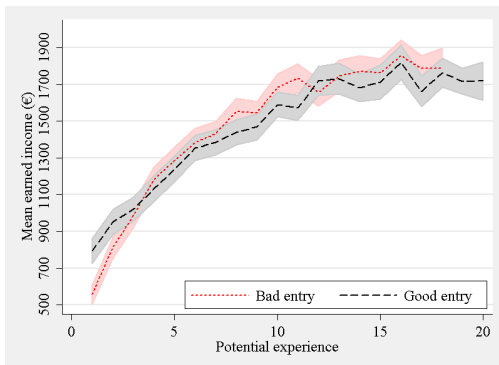
(b) Employment rate - Women



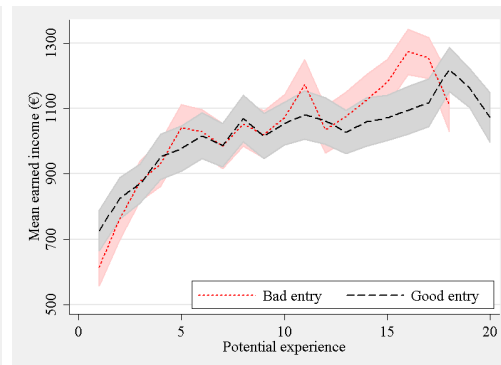
(c) Mean relative wage - Men



(d) Mean relative wage - Women



(e) Mean earned income - Men

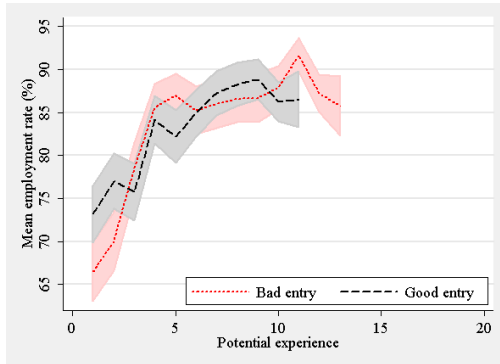


(f) Mean earned income - Women

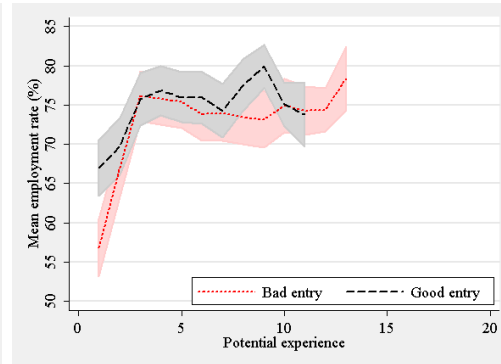
3.3.2 1997-1998 ("unfavourable entry") vs 1999-2000 ("favourable entry")

Figure 4 displays comparisons for cohorts 1997-1998 ("unfavourable entry") versus cohorts 1999-2000 ("favourable entry"). Beginning of 1998, the French economy was booming: the French growth rate reaches around 3.5% from 1999 to 2001, before a new slow down took place from 2002 on. As a consequence, cohorts who entered the labour market in 1999-2000 have a first year employment rate higher than cohorts who entered the labour market in 1997-1998 (8 percentage points for men, 10 percentage points for women). But this gap vanishes after 3 years, which is the sign of a quick catch-up process. The 1999-2000 cohorts also earn a higher wage than the 1997-1998 cohorts during their first year on the labour market, but this wage gap vanishes after 4 years for men and after 2 years for women. Earned income profiles display a similar pattern.

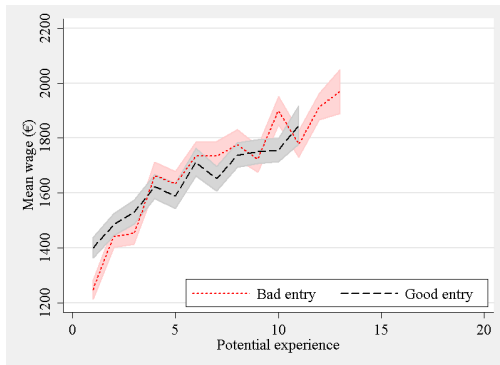
Figure 4: Generations: 1997-1998 ("unfavourable entry") vs 1999-2000 ("favourable entry")



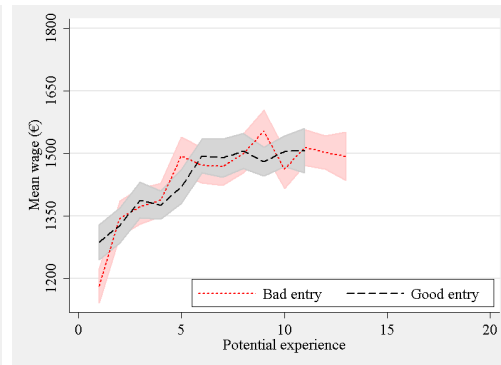
(a) Employment rate - Men



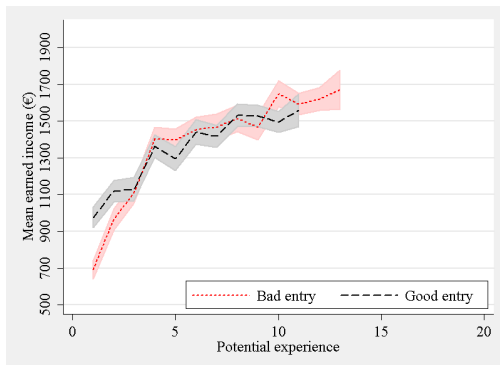
(b) Employment rate - Women



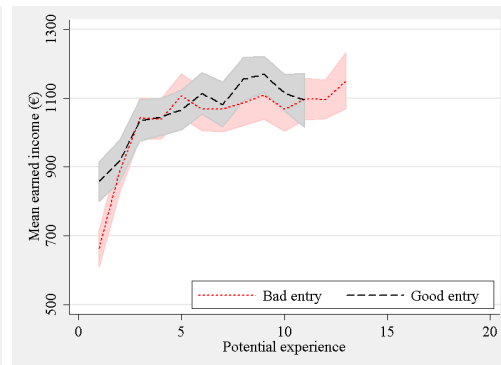
(c) Mean relative wage - Men



(d) Mean relative wage - Women



(e) Mean earned income - Men



(f) Mean earned income - Women

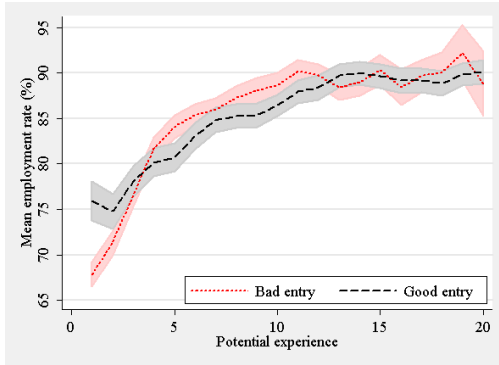
3.3.3 "Lucky" vs "unlucky" cohorts of the sample

Until now, we focused on specific cohorts, who entered the labour market during successive years but with very different economic conditions: the problem with such comparisons is that it could be too specific. This section gives a more complete picture, comparing cohorts on the whole period 1982-2009. Figure 5 displays comparisons men/women for cohorts entering the labour market with an unemployment rate higher than 18%/22% ("unfavourable economy") and with an unemployment rate lower than 16%/20% ("favourable economy").

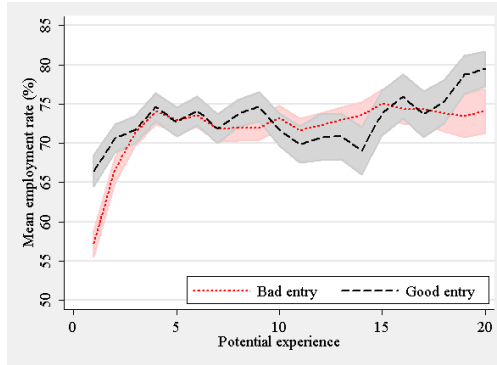
Cohorts entering the labour market in a bad economy have a lower employment rate during the first 4 years. But the catch-up process is quickly completed. For men, from 5 to 12 years on the labour market, unlucky cohorts even have a greater employment rate than lucky ones. This could be easily explained by a business cycle effect: young entrants entering during economic downturns would face an economic boom when they have 8-10 years of potential experience (see figure 2). It is therefore crucial to control for current economic conditions.

There is no systematic differences concerning mean wages. Earned income profiles are therefore similar to employment ones, but differences between cohorts last a little bit longer for women (Figure 5, e and f). Looking at different percentiles of the wage distribution, there is no visible effect on wages for men. For women, there is a small negative effect at the bottom and the median of the wage distribution until 7/8 years of potential experience are obtained (Figure 5, g and h). Appendix A.3 displays additional figures, outlining that employment and wage levels 5, 10 and 15 years after school leaving are unrelated to the economic condition when leaving school. The correlation, if any, is positive between unemployment rate when leaving school and employment rate or mean wage after 5, 10 or 15 years.

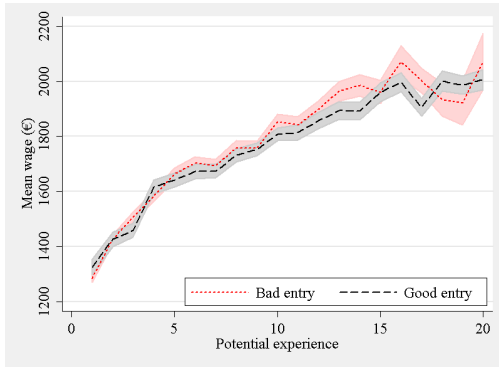
Figure 5: Generations: 1982-2009 "Lucky" vs "unlucky"



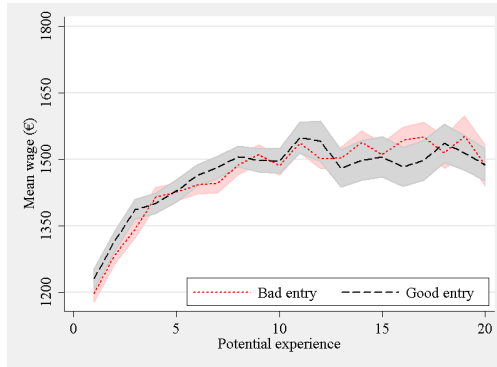
(a) Employment rate - Men



(b) Employment rate - Women



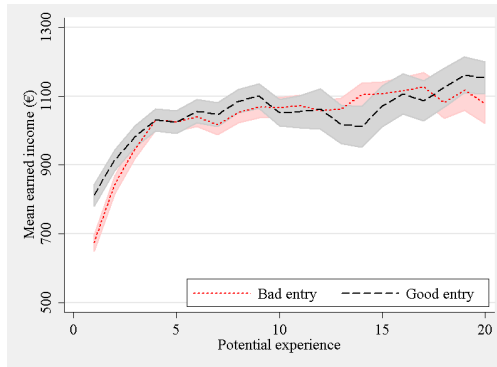
(c) Mean relative wage - Men



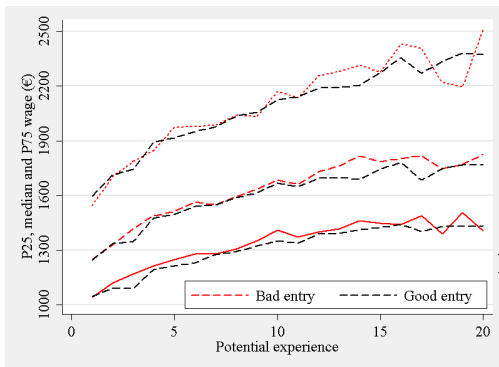
(d) Mean relative wage - Women



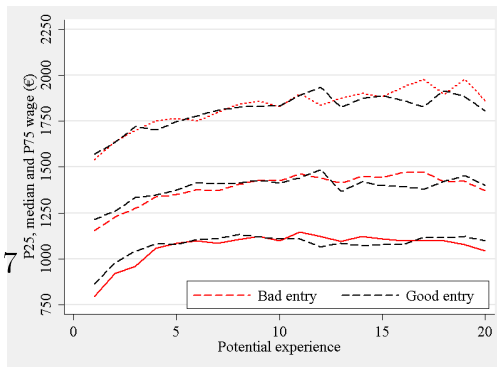
(e) Mean earned income - Men



(f) Mean earned income - Women



(g) P25, median and P75 wage - Men



(h) P25, median and P75 wage - Women

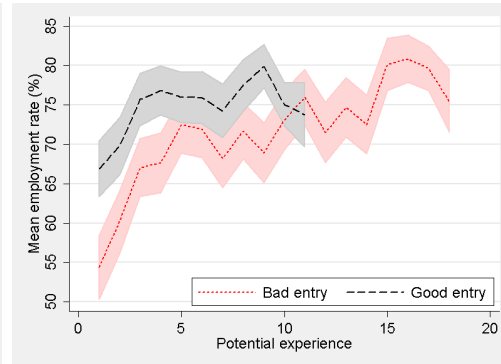
3.3.4 1992-1993 ("unfavourable entry") vs 1999-2000 ("favourable entry")

Finally, we compare (see Figure 6) cohorts leaving school in 1992-1993 who faced a high unemployment rate at entry and during the following 5/6 years (from 1992 to 1998) with cohorts 1999-2000 who faced a low unemployment rate at entry and during the following 2/3 years (from 1999 to 2002). Differences in employment rate, mean wage and earned income until about 5 years of experience were expected as we compare cohorts persistently facing different economic conditions during their first years of experience. Interestingly, even for these cohorts we find no differences in the long run. One exception is for the female employment rate, probably due to cohort effects in terms of participation (positive trends in participation over time and increase in education for cohorts 1999-2000).

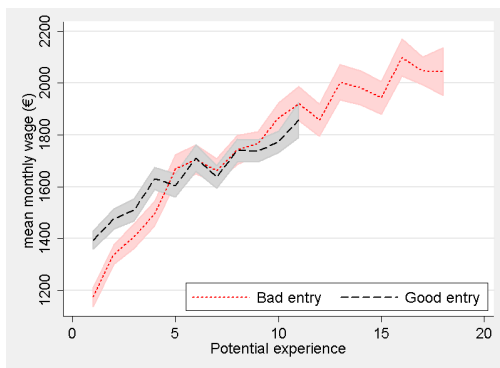
Figure 6: Generations: 1992-1993 ("unfavourable entry") vs 1999-2000 ("favourable entry")



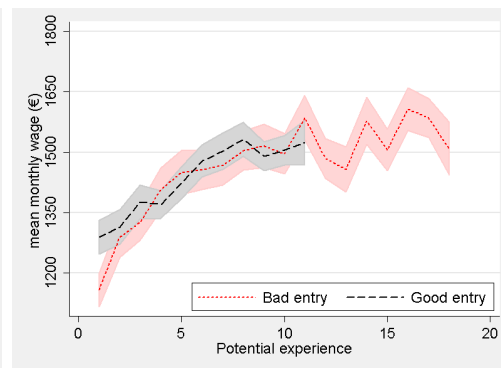
(a) Employment rate - Men



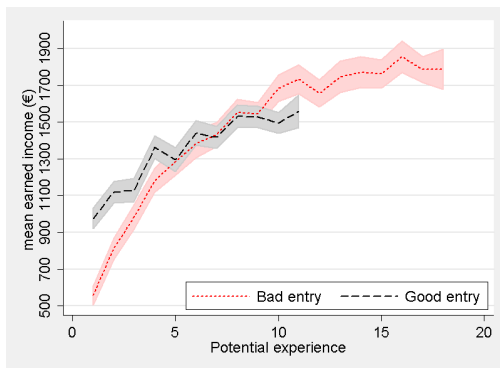
(b) Employment rate - Women



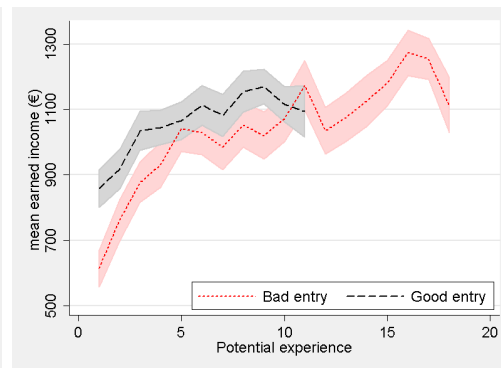
(c) Mean relative wage (log) - Men



(d) Mean relative wage (log) - Women



(e) Earned income - Men



(f) Earned income - Women

4 Econometric model

This section presents the econometric model and the main identification assumptions. The model investigates how the initial economic situation impacts the long-run labour market situation. The key variables of interest ($y_{c,t}$) are the employment rate⁷, the monthly wage in logarithm and the monthly earned income in logarithm at a national level. We focus on national specifications because, in contrast to the United States, regional unemployment rates evolve in France very similarly across regions. Thus a French regional model would not be well identified. Moreover, we do not have the information in the French LFS about the region in which young people were living at the end of their studies.

Our specification includes an interaction of the indicator of economic condition (the unemployment rate the year following the school-leaving year: UR_c) with the potential experience (e) which characterizes how the initial effect varies with time spent on the labour market (the catch-up process, namely $g(e)$). More precisely, we interact unemployment rate at entry and linear trends of potential experience, allowing for changes in slope at 3, 6, 9 and 12 years of experience.⁸

$$\begin{aligned}
 y_{c,t} &= \alpha + \omega_t + f(e) + g(e) \cdot UR_c + X_c \cdot \beta + u_{c,t} \\
 u_{c,t} &= \epsilon_c + \eta_{c,t} \\
 e &= t - c \\
 e &= 1, \dots, 15; c = 1982 \dots, 2009; t = 1990 \dots, 2010
 \end{aligned}$$

$$\begin{aligned}
 f(e) &= \gamma_1 \cdot e + \gamma_2 \cdot (e - 3) \cdot \mathbf{1}[e \geq 3] + \gamma_3 \cdot (e - 6) \cdot \mathbf{1}[e \geq 6] \\
 &\quad + \gamma_4 \cdot (e - 9) \cdot \mathbf{1}[e \geq 9] + \gamma_5 \cdot (e - 12) \cdot \mathbf{1}[e \geq 12]
 \end{aligned} \tag{1}$$

$$\begin{aligned}
 g(e) &= \delta_0 + \delta_1 \cdot e + \delta_2 \cdot (e - 3) \cdot \mathbf{1}[e \geq 3] + \delta_3 \cdot (e - 6) \cdot \mathbf{1}[e \geq 6] \\
 &\quad + \delta_4 \cdot (e - 9) \cdot \mathbf{1}[e \geq 9] + \delta_5 \cdot (e - 12) \cdot \mathbf{1}[e \geq 12]
 \end{aligned}$$

We estimate equation 1 using OLS, on aggregated data at the entry cohort level and separately for men and women. Using an aggregated modelisation emphasizes the source of identification, which basically relies on inter-cohorts variations. We

⁷We also use logarithm of employment rate as dependent variable. It does not change our results.

⁸In the literature, less flexible specifications are generally assumed, e.g. linear specification - $g(e) = e$ (Kahn, 2010). Oreopoulos, von Wachter, and Heisz (2012), who uses dummies for experience, is an exception. As in Genda, Kondo, and Ohta (2010), we also estimated a model with three years of grouped dummies to control for potential experience instead of linear trends with changes in slope. This specification does not change our results.

use robust standard errors clustered by cohorts. We therefore authorize correlations between the different observations of one cohort (ϵ_c), in a more flexible way than expressed in equation 1. We use the Bias Reduced Linearization method to estimate standard errors since we just have 28 clusters (see Bell and McCaffrey, 2002).

We include a year fixed effects ω_t in order to control for the economic situation in the current year and for patterns in women participation. Note that this model implicitly assumes that only initial economic conditions can be persistent.

For identification purposes, it is necessary that $E(\epsilon_c|UR_c, e, \omega_t, X_c) = 0$. Therefore, the main identification assumption is that cohorts only differ by the economic conditions at entry into the labour market.⁹ Cohorts entering the labour market between 1985 and 1995 are increasingly qualified (a well-known phenomenon called "démocratisation scolaire" in French) so we also control for average "skill-level" of the cohort (X_c) with 6 variables.¹⁰

The parameters of interest are $\delta_0, \delta_1, \delta_2, \delta_3, \delta_4$ and δ_5 : they describe the persistence of the initial shock experienced by young people when they enter the labour market. We expect δ_0 to be negative, reflecting the initial negative employment or wage effect of entering the labour market during a recession (corresponding to a high unemployment level). More precisely, as we regress the employment rate between 1 and 15 years of experience on the youth unemployment rate at 1 year of experience, δ_0 non negative would indicate a very strong changes in the participation rate the first year after leaving-school. We expect δ_1 to δ_5 to be positive or zero, reflecting the potential catch-up process.

A selection effect could also occur if only the more productive workers leave school during economic downturns. To explore this potential issue, we first instrumented the unemployment rate when leaving school by the unemployment rate at 16 years (note that the mandatory schooling age is 16 in France). Because the unemployment rate when leaving school is crossed with a (piecewise linear) function of potential experience in our regression, we have 6 potentially endogenous regressors, so we indeed instrument by the unemployment rate at 16 years crossed with the same (piecewise linear) function of potential experience. They provide exogeneous intruments, but that are unfortunately weak.¹¹ The F-stat of the six first-stage

⁹More precisely, the key identification hypothesis is that systematic unobservable differences between cohorts are not correlated with unemployment rate at the entry into the labour market.

¹⁰More precisely, we include as a control the share of young entrants without degree, with junior high school ("Brevet des collèges"), with basic vocational ("CAP" or "BEP"), with high school or advanced vocational ("Baccalauréat") or with some college ("Baccalauréat + 2 ans") and with university ("Diplôme supérieur").

¹¹They also provide a very local estimation (comparable to a LATE - local average treatment

equations are usually very low (under 5), and always lower than the usual threshold indicating weak instruments (this usual threshold is 10), for men as for women, so that we cannot use these instruments. This result is not surprising when one looks at the cyclical nature of the unemployment rate (Figure 1). We also restrict our sample to young people who have left school between 16 and 18.¹² In this case, the F-stat of the six first-stage equations are, as expected, greater than without selection on the school leaving age: between 6 and 11 for men, and between 10 and 15 for women (because the autocorrelation of the unemployment rate is higher for them, see Figure 2). The instruments remain weak, and, consequently, standard errors of our parameter of interest (δ_0 to δ_5) are very large. For these reasons, we do not show the IV estimates, which are available upon request from the authors.

In a companion paper (Gaini, Leduc, and Vicard, 2012), we also directly investigate this potential selection effect due to the endogeneity of the school leaving year to the business cycle. We find a negative significant but very weak effect of the unemployment rate on the probability of leaving school at a given age. A huge crisis, i.e. a 10 percentage points increase in the current young unemployment rate, entails a decrease in the probability of leaving school between 0.6 percentage point (for a probability of leaving-school equals to about 20% at age 21) and 2.9 percentage points (for a probability of leaving-school equals to about 30% at age 23).

Finally, another crucial assumption of our econometric model is that the only persistent shock individuals face is the economic conditions at entry. Economic conditions at other moments of the career may have an immediate effect on employment or wage, controlled by the year dummies; but not a persistent effect. We could write a more general model where economic conditions one year and τ years after the end of the studies may have persistent effect on employment and wages (see equation 2). We tried to estimate such a model for $\tau = 4$ and $\tau = 7$, but the estimates are very imprecise (large standard errors) due to the fact that unemployment at entry into the labour market and 4 or 7 years afterward are strongly correlated (statistical multicollinearity).

$$y_{c,t} = \alpha + \omega_t + f(e) + g(e) \cdot UR_c^1 + h(e) \cdot UR_c^\tau + X_c \cdot \beta + u_{c,t} \quad (2)$$

$$e \geq \tau$$

effect - in the evaluation literature), because the unemployment rate at 16 is a good predictor of the unemployment rate when leaving school for those young people who anticipate to leave school early, but a bad predictor for those who plan to stay a long-time at school.

¹²Note however that this selection is potentially endogeneous to the business cycle when the school leaving decision is itself linked to the business cycle.

5 Results

Tables 1 and 2 display the coefficient estimates for the regression (1) on men and women with respectively employment rate, monthly wage and earned income as dependent variable.¹³ Because our coefficients of interest are difficult to interpret on their own, we also graphically illustrate initial entry conditions effects. More precisely, we graph gaps in employment, log wages and log earned income for a 1 percentage point gap in youth unemployment one year after leaving school (see Figures 7, 8, 9 for men and women). Same graphics are available in Appendix (see Figure 19) until 20 years of experience.

¹³We also run regressions on other outcomes to measure the quality of the jobs: having a permanent or a full-time contract and being a professional or a manager, see section 5.5.

Table 1: OLS results on employment, monthly wage and earned income with 3-years grouped trends (main specification, men)

	(1)	(2)	(3)
	Employment	Wage (log)	Earned income (log)
15-24 Unemployment rate - UR(δ_0)	-1.439*** (0.349)	-0.00892* (0.00517)	-0.116** (0.0462)
UR * Exp. 1 to 15 (δ_1)	0.475*** (0.147)	0.00320 (0.00231)	0.0369* (0.0191)
UR * Exp. 3 to 15 (δ_2)	-0.474** (0.215)	-0.00346 (0.00306)	-0.0427* (0.0237)
UR * Exp. 6 to 15 (δ_3)	0.0534 (0.150)	-0.000841 (0.00192)	0.0177 (0.0129)
UR * Exp. 9 to 15 (δ_4)	-0.0960 (0.173)	0.00520** (0.00243)	-0.00390 (0.0165)
UR * Exp. 12 to 15 (δ_5)	0.0677 (0.102)	-0.00339** (0.00145)	-0.00255 (0.0112)
Education controls	Yes	Yes	Yes
Experience controls	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
R^2	0.8823	0.9142	0.9135
Observations	286	286	286

Standard errors in parentheses (clustered at the cohort level, with a bias-reduced linearization to account for the small number of clusters)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2: OLS results on employment, monthly wage and earned income with 3-years grouped trends (main specification, women)

	(1)	(2)	(3)
	Employment	Wage (log)	Earned income (log)
15-24 Unemployment rate - UR(δ_0)	-2.081*** (0.387)	-0.0110 (0.00723)	-0.154*** (0.0272)
UR * Exp. 1 to 15 (δ_1)	0.728*** (0.185)	0.00191 (0.00273)	0.0526*** (0.0130)
UR * Exp. 3 to 15 (δ_2)	-0.678** (0.264)	-0.0000437 (0.00413)	-0.0471** (0.0193)
UR * Exp. 6 to 15 (δ_3)	-0.246 (0.185)	-0.00316 (0.00298)	-0.0210 (0.0147)
UR * Exp. 9 to 15 (δ_4)	0.432*** (0.123)	0.000467 (0.00233)	0.0314*** (0.00941)
UR * Exp. 12 to 15 (δ_5)	-0.0897 (0.179)	0.00469* (0.00255)	-0.00210 (0.0128)
Education controls	Yes	Yes	Yes
Experience controls	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
R^2	0.7760	0.7966	0.7840
Observations	286	286	286

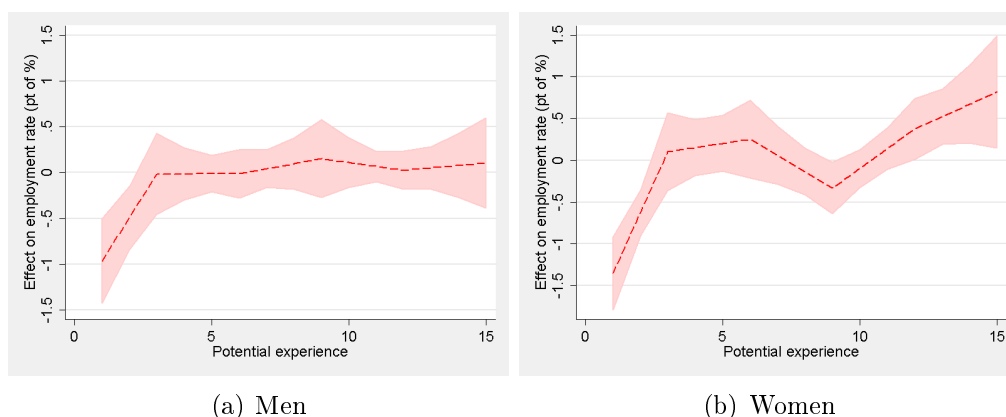
Standard errors in parentheses (clustered at the cohort level, with a bias-reduced linearization to account for the small number of clusters)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

5.1 On the employment

Figure 7 displays the employment rate profile for a 1 percentage point difference in youth unemployment. We find that a 1 percentage point increase in youth unemployment entails a decrease in the probability of being employed by about -1.0 percentage point the first year for men and by -1.3 percentage points for women. But the gap quickly decreases, and it vanishes within 3 years of potential experience (see Figure 7). For women, we find a positive effect after 12 years of potential experience. This latter could be due to the smaller number of cohorts on which we run the estimation, *i.e.* 20 cohorts between 1 to 8 years of potential experience *vs.* 12 to 16 cohorts between 12 to 15 years of potential experience (see Figure A.2).

Figure 7: Employment probability gap for a 1 percentage point difference in unemployment - spline specification (generations: 1982-2009; years: 1990-2010)

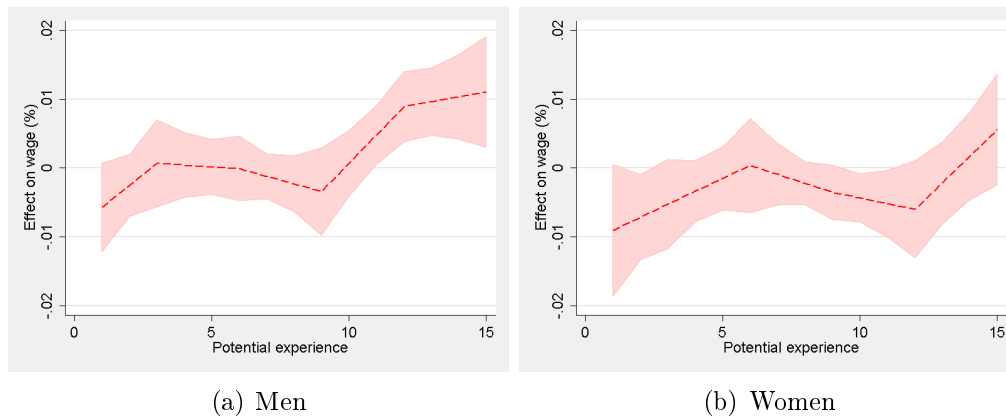


5.2 On the monthly wage

Figure 8 displays the log wage gap profile for a 1 percentage point difference in youth unemployment. Up until 10 years of potential experience, there is no gap for men in monthly wages due to differences in initial unemployment rate. After 10 years we find a positive and statistically significant gap of about 1% (more exactly 0.01 log point) in favor of people having higher initial unemployment rate. Yet, we have fewer observations for higher potential experiences. For women there is a negative gap until 5 years of potential experience. An increase of 1 percentage point in unemployment entails a decrease in the wage at entry of about 1%. This negative effect seems to be a little bit persistent even if not statistically significant.

Note that selection in employment could entail an under-estimation of effects on wages if only the more productive get employed during economic downturns.¹⁴

Figure 8: Wage percentage gap for a 1 percentage point difference in unemployment - spline specification (generations: 1982-2009; years: 1990-2010)

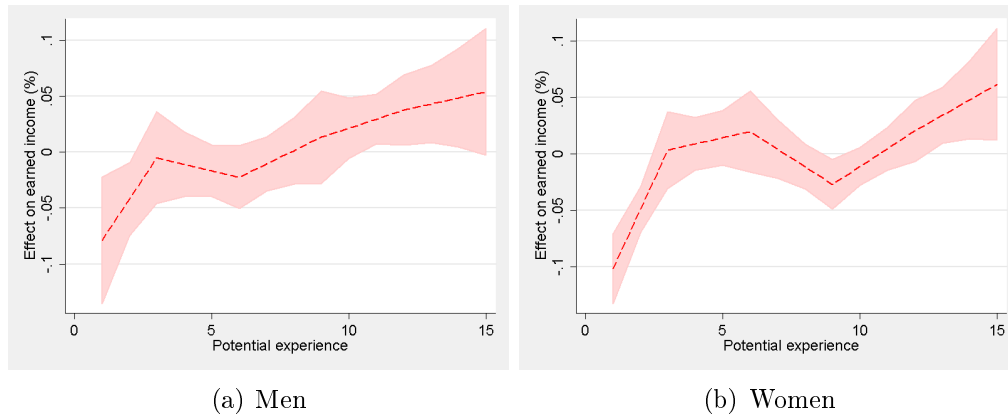


5.3 On the earned income

Figure 9 displays the log earned income gap profile for a 1 percentage point difference in youth unemployment. A 1 percentage point increase in unemployment at the point of entry into the labour market entails a decrease in monthly earned income during the first year of about -7% for men and -10% for women. This represents about 48/69 euros per month for men/women during the first year and about 26/39 euros per month for men/women during the second year. But catch-up rapidly occurs, and there is no difference anymore after 3 years of potential experience. During these 3 years, the average earned income loss for each unemployment point is about 890 euros for men and 1300 for women. We find again a positive effect for highest levels of experience.

¹⁴We do not correct for the selection in employment due to the lack of good instruments. Anyway, as negative effects on employment vanish in 3 years, selection effects are not likely to bias our results of no persistent effect on wage.

Figure 9: Earned income percentage gap for a 1 percentage point difference in unemployment - spline specification (generations: 1982-2009; years: 1990-2010)



5.4 Relaxing hypothesis of homogenous effect by education level

We estimate our main model on two subsamples depending on the level of education: low education level vs high education level.¹⁵ Figures 10, 11, 12 display the results. We find also a rapid catch-up and no long-term gap due to differences in initial unemployment rate, whatever the education level is. In the short run, high-educated women seem to be more affected than the other groups by adverse shocks on employment and wages.

¹⁵To be accurate, low education level corresponds to no degree, junior high school degree or basic vocational degree and high education level corresponds to some college degree or university degree.

Figure 10: Effect of a 1 percentage point difference in unemployment on employment rate - different education level subsamples (generations: 1982-2009; years: 1990-2010)

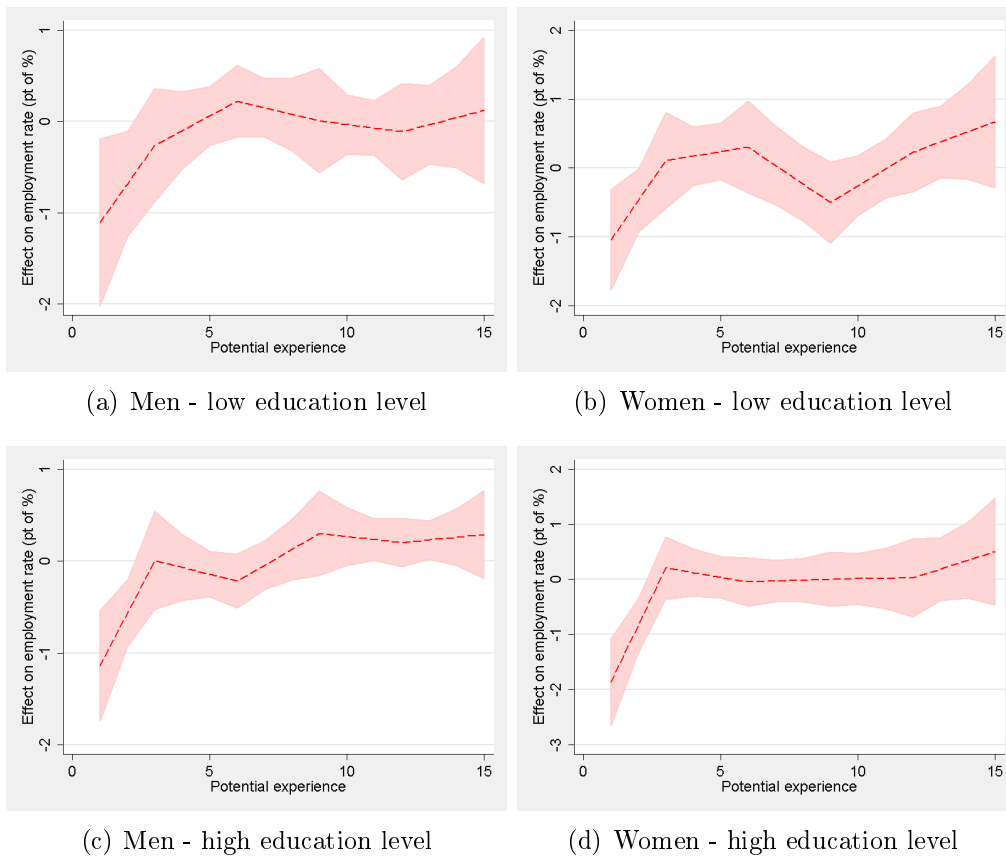


Figure 11: Effect of a 1 percentage point difference in unemployment on wage - different education level subsamples (generations: 1982-2009; years: 1990-2010)

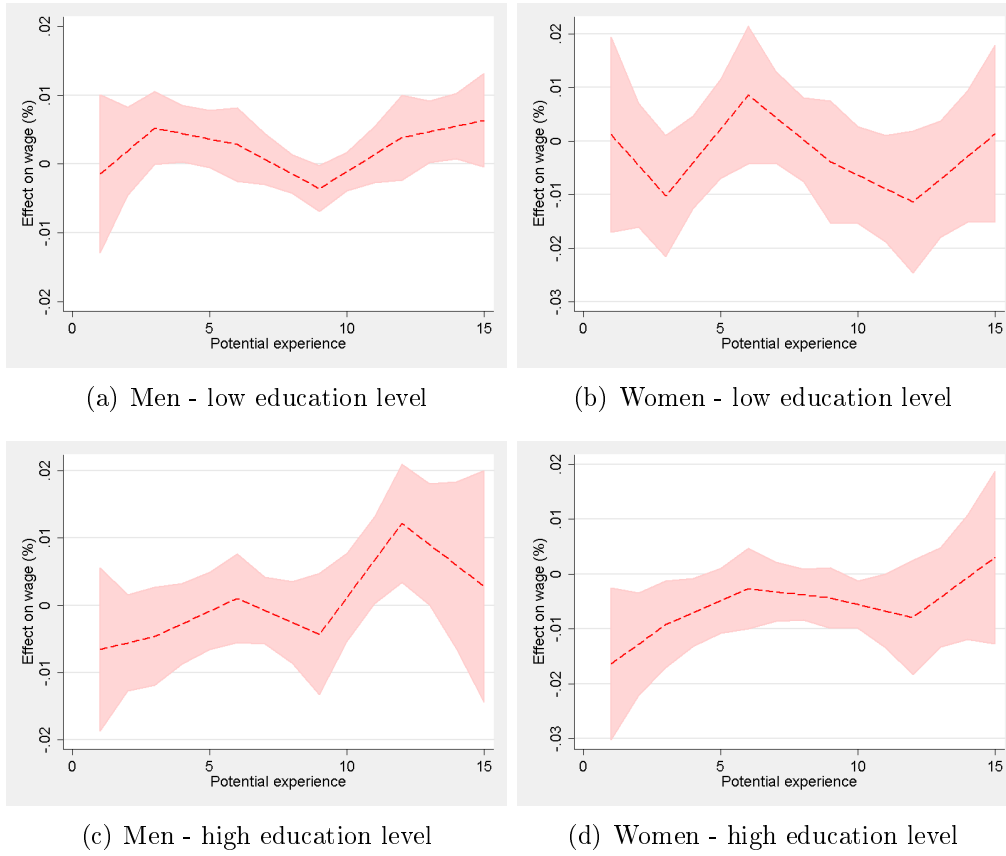
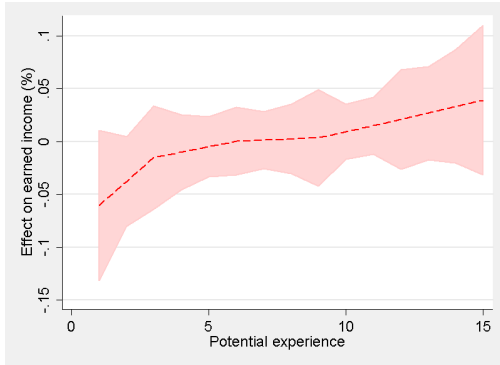
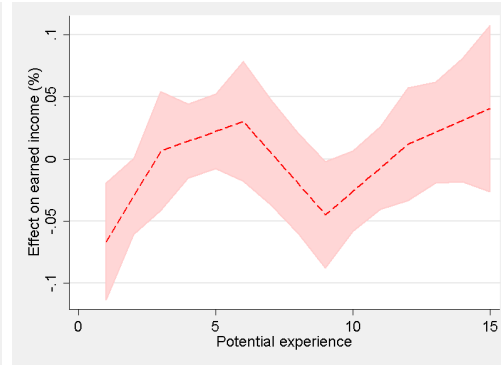


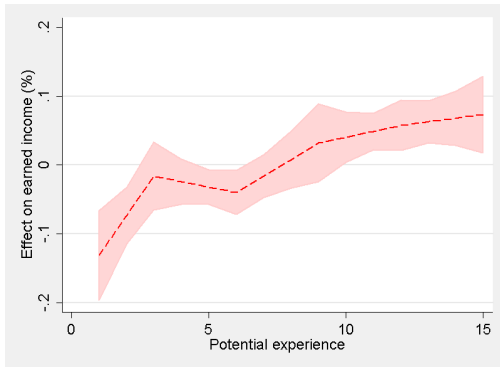
Figure 12: Effect of a 1 percentage point difference in unemployment on earned income - different education level subsamples (generations: 1982-2009; years: 1990-2010)



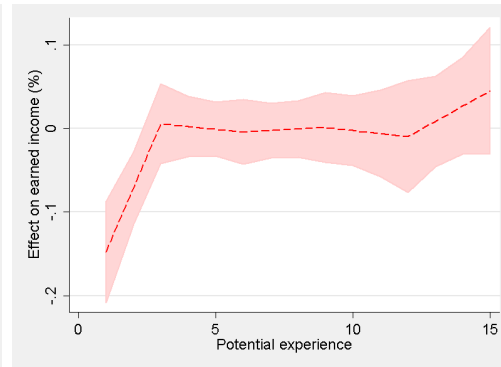
(a) Men - low education level



(b) Women - low education level



(c) Men - high education level



(d) Women - high education level

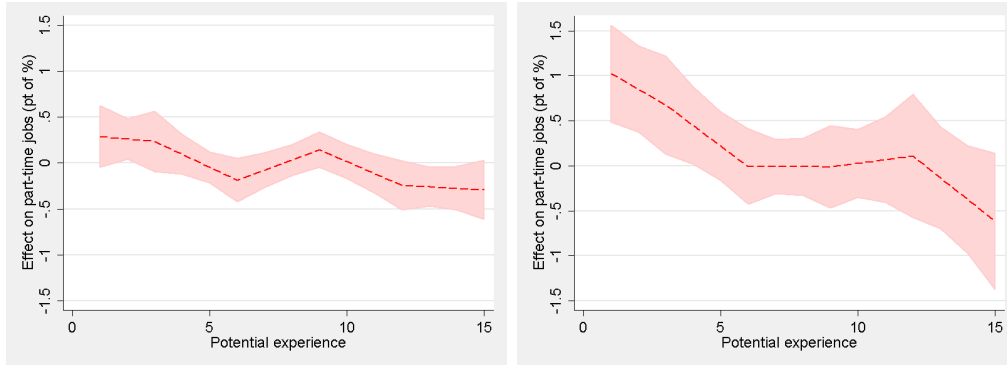
5.5 On other outcomes

We run additional regressions to further investigate the effects of leaving school in a tough labour market. We consider both the probabilities to have a part-time contract and to have a permanent one, conditional on being employed, see graphical results in Figures 13.

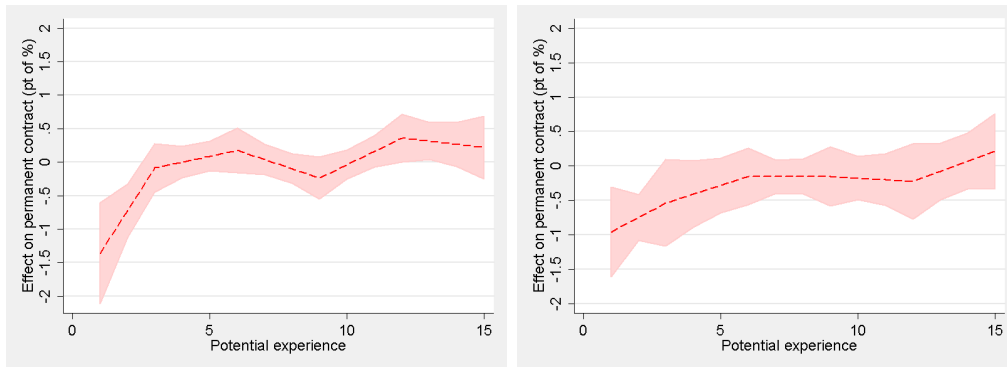
We find that men are not more likely to have a part-time contract if they face adverse conditions at entry. For women, there is a positive effect of about 0.8 percentage point for a 1 percentage point increase in youth unemployment. This effect vanishes within 5 years of experience. These results are consistent with our prior results of a wage penalty only for women. Yet, neither the effect on wages nor the effect on part-time contracts persists beyond the first 5 years of potential experience. Concerning permanent contracts, we find that a 1 percentage point increase in youth unemployment entails a decrease in the probability of having a permanent contract – conditional on being employed – of 1.3 percentage points for men and 0.9 for women. These gaps vanish after 3 years. Unfavourable labour market conditions therefore affect the quality of the jobs during the first years on the labour market. It seems that these effects are only temporary. This suggests that even workers facing unemployment spells or being under-employed at entry succeed in finding full-time permanent contracts after few years. Finally, we do not find significant effects on the probability of being a manager or a professional¹⁶ (see Figure 13 e and f.)

¹⁶Manager or Professional is "cadre ou profession intellectuelle superieure" or CS=3 in French.

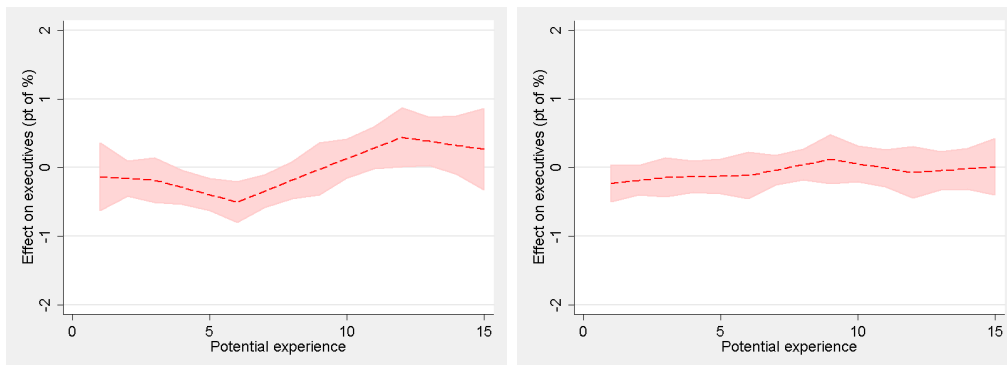
Figure 13: Effect of a 1 percentage point difference in unemployment on other outcomes - spline specification (generations: 1982-2009; years: 1990-2010)



(a) Part of part-time job in employment - Men (b) Part of part-time job in employment - Women



(c) Prob. of having a permanent contract - Men (d) Prob. of having a permanent contract - Women



(e) Prob. of being a professional or a manager - Men (f) Prob. of being a professional or a manager - Women

6 Robustness Checks

We run robustness checks for the three main outcomes: employment rate, log wages and log earned income.

6.1 Controlling for heterogenous effects of current economic conditions by level of potential experience

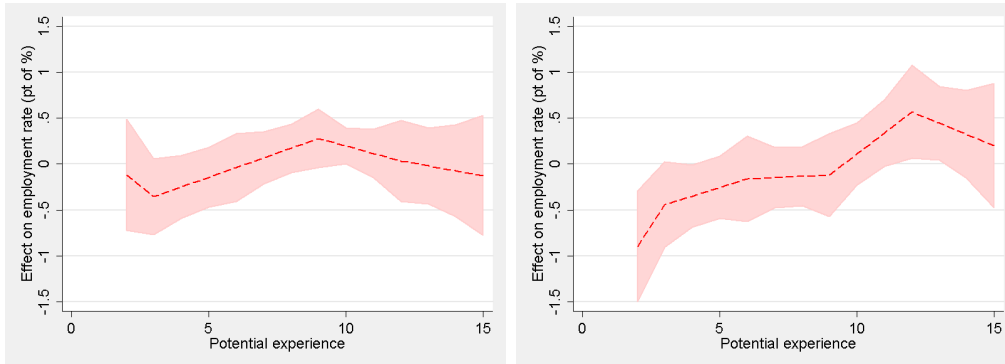
Specification 1 can be seen too constrained, since it implies the same effect at all level of experience for current economic conditions. We now estimate a more flexible specification by introducing in our main specification an effect of current economic conditions which depends on the potential experience. More precisely, we replace year dummies by an indicator of current economic conditions (15-24 unemployment rate¹⁷) and its interaction with potential experience allowing for change in slope at 3, 6, 9 and 12 years of potential experience ($h(e)$ function). Our specification becomes the following:

$$y_{c,t} = \alpha + h(e) \cdot UR_t + f(e) + g(e) \cdot UR_c + X_c \cdot \beta + u_{c,t} \quad (3)$$

Current unemployment rate and year following the school-leaving year unemployment rate are highly correlated for the first years of potential experience because of a high-level of unemployment persistence. Standard-errors are therefore bigger than those in our main specification. We estimate the model for experience between 1 and 15 years and we also graphically represent employment, wage and earned income catch-up from the second potential experience year (see Figure 14). We find no effect on the long-run of unemployment rate the year following the school leaving-year on our interest outcomes. Note that positive effects for the highest levels of experience on wage for women and on employment rate for men are less pronounced. These positive effects in our main specification were probably due to imperfect control of current economic conditions.

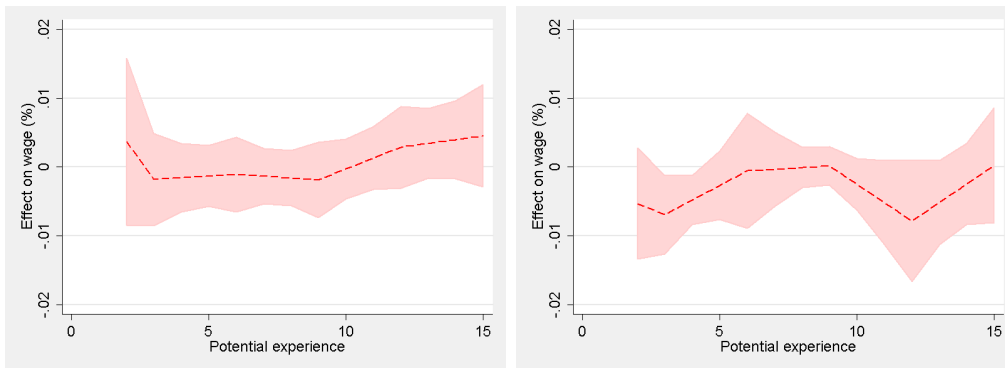
¹⁷We obtain same results with overall unemployment rate.

Figure 14: Effect of a 1 percentage point difference in unemployment - current UR control (generations: 1982-2009; years: 1990-2010)



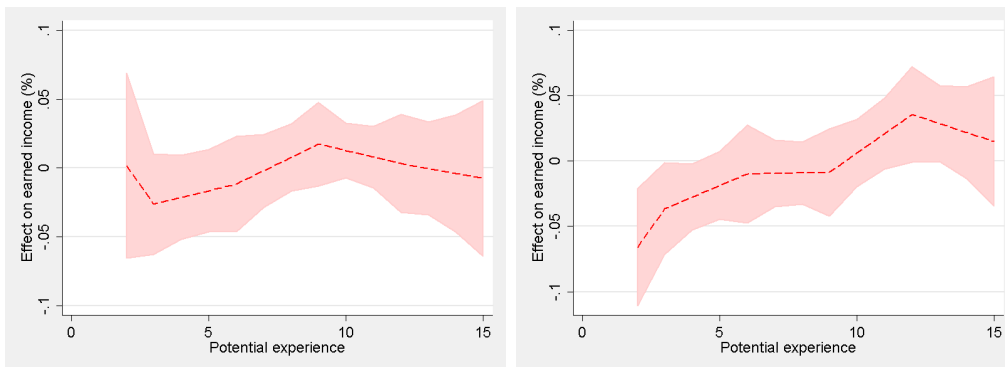
(a) Employment rate - Men

(b) Employment rate - Women



(c) Mean wage - Men

(d) Mean wage - Women



(e) Earned income - Men

(f) Earned income - Women

6.2 Controlling or not for cohort characteristics: education levels and cohort size

We show that our main results are robust to the exclusion of education and cohort size controls as covariates (tables 3, 5, 7 for men and 4, 6, 8 for women, respectively for employment, wage and earned income in Appendix A.4). More precisely, the main specification includes in the regression the shares of the cohorts having no degree, with junior high school degree, with basic vocational degree, with high school or advanced vocational ("Baccalauréat") degree, with some college degree and with university degree. The education controls are significant, but their exclusion do not change the significativity or magnitude of our coefficients of interest. We also control for the cohort size that turns to be not significant in any of our regressions.

6.3 Other robustness checks

In this section, we describe the other robustness checks that we performed. Due to space constraints, we do not report here the regression results. They are available upon request from the authors.

Sensitivity to the period of observation First we performed the estimation on different subperiods to check the sensitivity of our results to the period analyzed. We restricted the sample to cohorts entering the labour market between 1982 and 1995 to run the regression on a balanced panel (all cohorts being observed between 8 and 15 years of experience). We also restricted the sample to all cohorts entering between 1990 and 2009 to look at a period following the "démocratisation scolaire". We also performed an estimation of the scarring effect using a longer period of time - 20 years instead of 15 years (see appendix A.5 for the results), although results may be less accurate because of fewer observations to estimate the scarring effect from 15 to 20 years of potential experience (see appendix A.2). Our results of no long term scarring effects remain.

Alternative indicator for the business cycle In our main model, we focus on the effects of facing bad economic conditions at entry. Yet, business cycle is viscous and we want to check whether cohorts facing repeated bad economic conditions, i.e. persistent bad/good economic conditions during their first years of experience, do not suffer from persistent scarring effects. Descriptive statistics comparing cohorts 1992-1993 leaving school at the beginning of a persistent downturn and cohorts

1999-2000 leaving school at the beginning of an economic boom of 3 years do not reveal any persistent scarring effect, see Figure 6. To go beyond these descriptive statistics, we run regressions with an alternative indicator for the business cycle taking into account economic conditions during the first years of experience: the unemployment level during the first three years or during the first five years on the labour market (instead of the first year only). We still do not find any scarring effect. We did not use GDP as indicator for the business cycle because it does not precisely reflect the economic conditions on the labour market (*e.g.* from 1994 to 1998, the unemployment rate remains at a high level, although the GDP growth rate is back to its level before the 1993 crisis).

7 Discussion and conclusion

The main finding of this paper is that leaving school in a tough labour market in France has no long-term effect on the labour market performance, whatever the variable considered: the employment rate, the wage, the earned income, the proportion of part-time or temporary workers, or the proportion of managers and professionals. Workers seem to be able to overcome the short-run adverse shocks in terms of employment, wage or job quality. Furthermore, the catch-up process is completed quite quickly. After 3 years, there is no more difference in labour market performance between different cohorts whatever their initial labour market conditions and the cumulative loss in terms of earnings is relatively small. French young people therefore seem to manage to overcome adverse shocks more quickly than young people in other countries. In this section, we discuss the theoretical implications of these results and explore some potential explanations to the French pattern.

As noted earlier in the introduction, economic theory suggests two main channels that could entail a persistence of the adverse economic shock at the entry: signal effect theory and human capital theory. Our result of an absence of a scarring effect suggests that neither of these two channels plays a role during crisis.

First, focusing on signal effect theory, our results suggest that employers probably do not use previous unemployment spells as a screening device in their hiring process. Eriksson and Rooth (2011) show with a field experiment in the Swedish labor market that being unemployed immediately after graduation or between two previous jobs has no negative effect on contemporary job search outcomes. They also find a clear positive effect of the labor market experience. They conclude that "recruiting employers care more about the job applicants' positive characteristics (i.e. labor market experience) than their negative characteristics (i.e. history of

unemployment)". Moreover, being unemployed in a crisis period would send a less negative signal to employers than being unemployed during an economic boom. As a lot of young people are in the same situation, the signal about "abilities" is potentially noisier. Employers may rely less on it in the hiring process and more on diploma signal for example. In this respect, it seems that facing periods of unemployment during economic downturns is not stigmatizing for young entrants (see also Biewen and Steffes, 2010).

Yet, even if employers are not stigmatizing young people with unemployment spells, the entrants facing adverse economic conditions could be penalized (at least as far as wage is concerned) because of lower actual experience. The human capital theory suggests that there are both returns to education and to experience. The skills accumulated by people facing a crisis during their early career may be lower than the skills of people facing an economic boom for two reasons: skills could deteriorate during a spell of non-employment, and people do not accumulate actual experience during unemployment spells. Yet, at the beginning of the career, entrants' skills are mainly general skills provided by education, which are less likely to deteriorate during a spell of non-employment. Moreover, it could be the duration of the non-employment spell and not being unemployed that really matters. It is well-documented that entrants into the labour market have a higher number of unemployment spells but that they are generally shorter than for other workers. If non-employment spells are quite short, the difference in actual experience would not be too large between entrants facing favourable and unfavourable economic conditions. That could explain the fact of a no wage penalty for cohorts having more non-employment spells. Finally, at the beginning of the career, the main determinants of wage could be on one hand education and on the other hand age or potential experience, and not the experience accumulated while working.

Furthermore, unemployment rates are high in France even during economic booms. This reinforces the statement of unemployment as a noisy signal for ability during economic downturns. The event of unemployment could hit quite randomly young entrants conditional to an educational attainment. In France the catch-up in terms of employment is as quick as in other countries, while it is much quicker in terms of wages: entrants would be more penalized in terms of employment but when they get a job they would not be penalized in terms of wage. The high level of young people paid at the minimum wage in France (35% of the 15-24, see Demailly, 2009) may also explain this difference compared to other countries. Lowering wages of a large part of new entrants is thus not legally possible and this may partly explain why we found no effect on wages. It is worth noting that wage inequalities are lower in France than in the US. Differences between cohorts entering the labour market in contrasted economic conditions would be therefore structurally less pronounced in France. Finally and consistently with our findings, Royer (2012) shows that

earning losses for displaced workers between 1995 and 1999 are smaller in France than in the US and that negative effects are stronger on employment than on wages.

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A Appendix

A.1 Correction of the school leaving cohorts (Men example)

Figure 15: Size of school leaving cohorts according to year of observation (before correction)

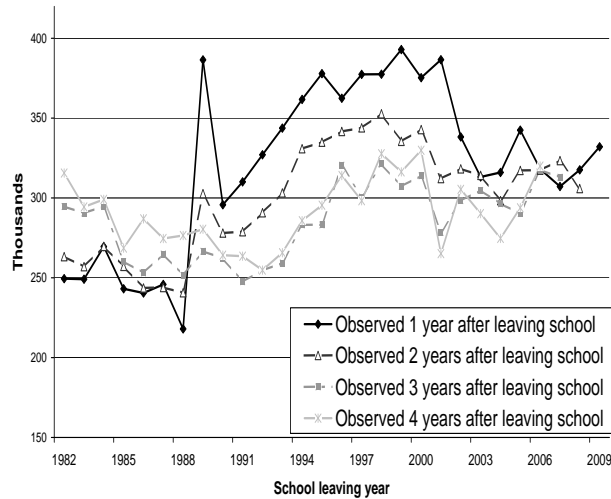
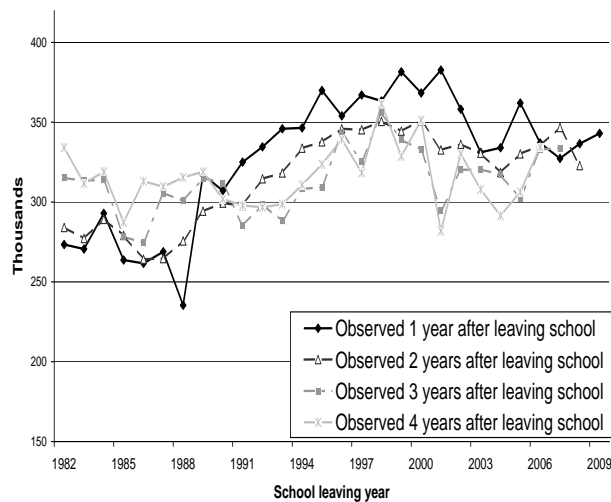
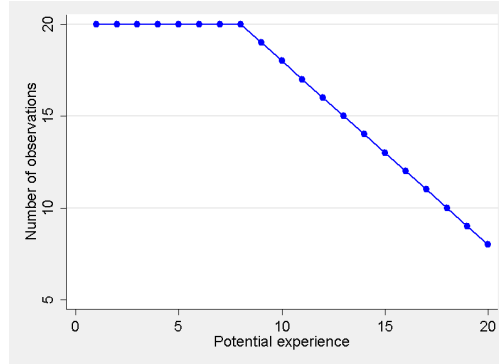


Figure 16: Size of school leaving cohorts by potential experience (after correction)



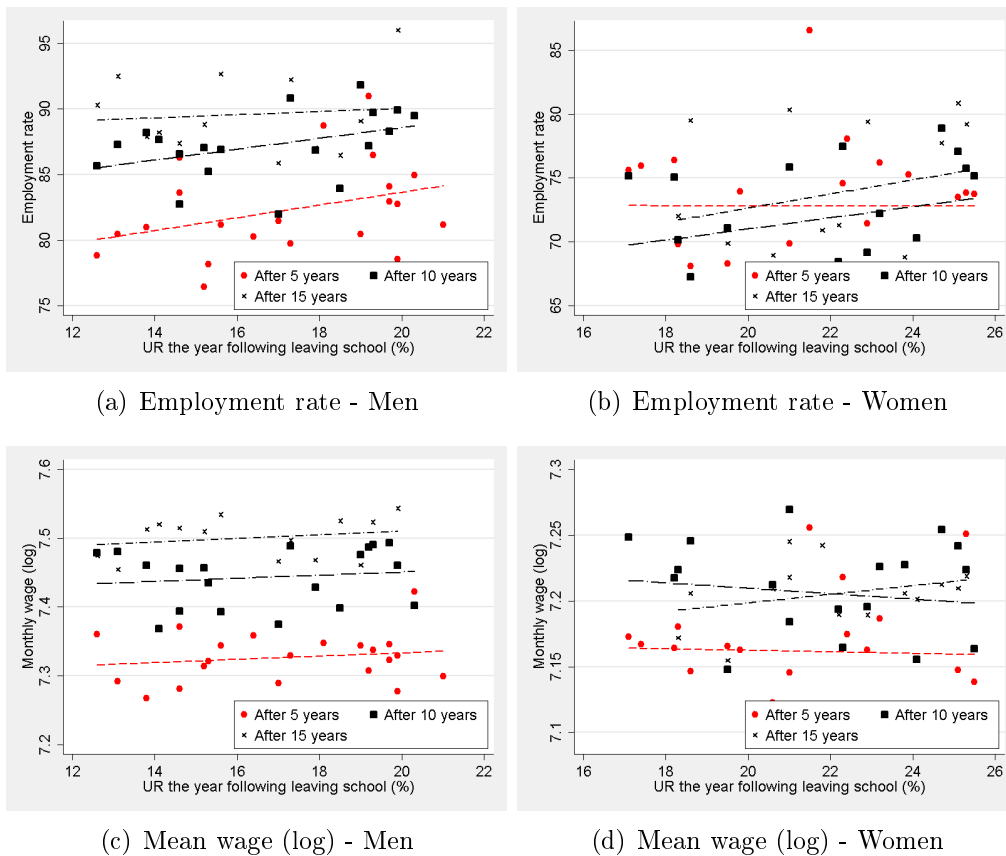
A.2 Number of observations by cohort and potential experience

Figure 17: Number of cohorts observed for each potential experience (men and women)



A.3 Mean employment rate and wage by entry conditions, 5, 10 and 15 years after labour market entry

Figure 18: Mean employment rate and wage by entry conditions, 5, 10 and 15 years after labour market entry



A.4 Results of controlling by education levels and cohort size

Table 3: Cohort control variable (education and cohort size): men employment

	(1) Main specif.	(2) W/o education	(3) With cohort size
15-24 Unemployment rate - UR(δ_0)	-1.439*** (0.349)	-1.438*** (0.342)	-1.440*** (0.350)
UR * Exp. 1 to 15 (δ_1)	0.475*** (0.147)	0.495*** (0.139)	0.475*** (0.147)
UR * Exp. 3 to 15 (δ_2)	-0.474** (0.215)	-0.476** (0.208)	-0.474** (0.215)
UR * Exp. 6 to 15 (δ_3)	0.0534 (0.150)	0.00745 (0.154)	0.0536 (0.151)
UR * Exp. 9 to 15 (δ_4)	-0.0960 (0.173)	-0.0628 (0.174)	-0.0964 (0.174)
UR * Exp. 12 to 15 (δ_5)	0.0677 (0.102)	0.0825 (0.106)	0.0675 (0.102)
University	70.99*** (23.98)		71.74*** (27.17)
Some college	47.41** (23.27)		48.58** (23.88)
High school / Advanced vocational	30.64* (18.49)		32.41 (28.65)
Basic vocational	64.11** (27.90)		65.70** (31.94)
Junior high school	82.31** (37.59)		83.89* (47.39)
Cohort size			-0.00000152 (0.0000197)
Experience controls	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
R^2	0.8823	0.8792	0.8823
Observations	286	286	286

Standard errors in parentheses (clustered at the cohort level, with a bias-reduced linearization to account for the small number of clusters)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Cohort control variable (education and cohort size): women employment

	(1) Main specif.	(2) W/o education	(3) With cohort size
15-24 Unemployment rate - UR(δ_0)	-2.081*** (0.387)	-2.065*** (0.361)	-2.104*** (0.386)
UR * Exp. 1 to 15 (δ_1)	0.728*** (0.185)	0.716*** (0.186)	0.725*** (0.185)
UR * Exp. 3 to 15 (δ_2)	-0.678** (0.264)	-0.665** (0.269)	-0.675** (0.264)
UR * Exp. 6 to 15 (δ_3)	-0.246 (0.185)	-0.236 (0.183)	-0.241 (0.185)
UR * Exp. 9 to 15 (δ_4)	0.432*** (0.123)	0.394*** (0.132)	0.437*** (0.124)
UR * Exp. 12 to 15 (δ_5)	-0.0897 (0.179)	-0.0717 (0.186)	-0.101 (0.178)
University	-25.05 (30.49)		-4.896 (36.94)
Some college	-28.71 (29.42)		-26.60 (33.84)
High school / Advanced vocational	-47.54* (26.37)		-35.54 (30.20)
Basic vocational	-42.05 (36.05)		-38.01 (42.56)
Junior high school	-31.12 (42.77)		-21.18 (46.59)
Cohort size			-0.0000245 (0.0000224)
Experience controls	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
R^2	0.7760	0.7725	0.7773
Observations	286	286	286

Standard errors in parentheses (clustered at the cohort level, with a bias-reduced linearization to account for the small number of clusters)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Cohort control variable (education and cohort size): men wage

	(1) Main specif.	(2) W/o education	(3) With cohort size
15-24 Unemployment rate - UR(δ_0)	-0.00892* (0.00517)	-0.00439 (0.00577)	-0.00890* (0.00522)
UR * Exp. 1 to 15 (δ_1)	0.00320 (0.00231)	0.00221 (0.00263)	0.00318 (0.00234)
UR * Exp. 3 to 15 (δ_2)	-0.00346 (0.00306)	-0.00296 (0.00334)	-0.00344 (0.00309)
UR * Exp. 6 to 15 (δ_3)	-0.000841 (0.00192)	-0.000612 (0.00184)	-0.000855 (0.00193)
UR * Exp. 9 to 15 (δ_4)	0.00520** (0.00243)	0.00501** (0.00244)	0.00522** (0.00243)
UR * Exp. 12 to 15 (δ_5)	-0.00339** (0.00145)	-0.00304** (0.00147)	-0.00338** (0.00145)
University	0.738 (0.448)		0.691 (0.489)
Some college	-0.647** (0.325)		-0.720* (0.381)
High school / Advanced vocational	0.0261 (0.392)		-0.0848 (0.539)
Basic vocational	0.0681 (0.478)		-0.0311 (0.579)
Junior high school	-0.850* (0.492)		-0.949 (0.582)
Cohort size			9.48e-08 (0.000000195)
Experience controls	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
R^2	0.9142	0.9092	0.9142
Observations	286	286	286

Standard errors in parentheses (clustered at the cohort level, with a bias-reduced linearization to account for the small number of clusters)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 6: Cohort control variable (education and cohort size): women wage

	(1) Main specif.	(2) W/o education	(3) With cohort size
15-24 Unemployment rate - UR(δ_0)	-0.0110 (0.00723)	-0.00988 (0.00687)	-0.0109 (0.00738)
UR * Exp. 1 to 15 (δ_1)	0.00191 (0.00273)	0.00198 (0.00277)	0.00191 (0.00273)
UR * Exp. 3 to 15 (δ_2)	-0.0000437 (0.00413)	-0.000173 (0.00411)	-0.0000457 (0.00413)
UR * Exp. 6 to 15 (δ_3)	-0.00316 (0.00298)	-0.00316 (0.00295)	-0.00317 (0.00300)
UR * Exp. 9 to 15 (δ_4)	0.000467 (0.00233)	0.000636 (0.00234)	0.000464 (0.00231)
UR * Exp. 12 to 15 (δ_5)	0.00469* (0.00255)	0.00460* (0.00253)	0.00469* (0.00255)
University	0.0526 (0.361)		0.0404 (0.525)
Some college	-0.356 (0.361)		-0.358 (0.373)
High school / Advanced vocational	-0.131 (0.336)		-0.138 (0.405)
Basic vocational	-0.380 (0.468)		-0.382 (0.497)
Junior high school	0.0405 (0.507)		0.0345 (0.568)
Cohort size			1.48e-08 (0.000000308)
Experience controls	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
R^2	0.7966	0.7942	0.7966
Observations	286	286	286

Standard errors in parentheses (clustered at the cohort level, with a bias-reduced linearization to account for the small number of clusters)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Cohort control variable (education and cohort size): men earned income

	(1) Main specif.	(2) W/o education	(3) With cohort size
15-24 Unemployment rate - UR(δ_0)	-0.116** (0.0462)	-0.0865 (0.0558)	-0.116** (0.0463)
UR * Exp. 1 to 15 (δ_1)	0.0369* (0.0191)	0.0327 (0.0200)	0.0369* (0.0192)
UR * Exp. 3 to 15 (δ_2)	-0.0427* (0.0237)	-0.0427* (0.0232)	-0.0426* (0.0238)
UR * Exp. 6 to 15 (δ_3)	0.0177 (0.0129)	0.0158 (0.0144)	0.0177 (0.0130)
UR * Exp. 9 to 15 (δ_4)	-0.00390 (0.0165)	-0.00247 (0.0176)	-0.00386 (0.0166)
UR * Exp. 12 to 15 (δ_5)	-0.00255 (0.0112)	0.00382 (0.00961)	-0.00253 (0.0112)
University	7.356*** (2.506)		7.289*** (2.320)
Some college	-0.380 (2.045)		-0.483 (2.287)
High school / Advanced vocational	1.441 (2.269)		1.284 (2.305)
Basic vocational	5.229* (3.027)		5.090* (2.862)
Junior high school	7.867* (4.252)		7.728* (4.277)
Cohort size			0.000000134 (0.00000168)
Experience controls	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
R^2	0.9135	0.9009	0.9135
Observations	286	286	286

Standard errors in parentheses (clustered at the cohort level, with a bias-reduced linearization to account for the small number of clusters)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Cohort control variable (education and cohort size): women earned income

	(1) Main specif.	(2) W/o education	(3) With cohort size
15-24 Unemployment rate - UR(δ_0)	-0.154*** (0.0272)	-0.150*** (0.0245)	-0.156*** (0.0273)
UR * Exp. 1 to 15 (δ_1)	0.0526*** (0.0130)	0.0520*** (0.0129)	0.0524*** (0.0130)
UR * Exp. 3 to 15 (δ_2)	-0.0471** (0.0193)	-0.0471** (0.0196)	-0.0469** (0.0194)
UR * Exp. 6 to 15 (δ_3)	-0.0210 (0.0147)	-0.0204 (0.0147)	-0.0207 (0.0147)
UR * Exp. 9 to 15 (δ_4)	0.0314*** (0.00941)	0.0308*** (0.00970)	0.0318*** (0.00946)
UR * Exp. 12 to 15 (δ_5)	-0.00210 (0.0128)	-0.00166 (0.0133)	-0.00281 (0.0129)
University	-1.752 (2.292)		-0.499 (2.633)
Some college	-1.898 (2.104)		-1.766 (2.387)
High school / Advanced vocational	-3.184* (1.823)		-2.437 (2.082)
Basic vocational	-3.370 (2.551)		-3.118 (2.960)
Junior high school	-2.104 (3.007)		-1.486 (3.248)
Cohort size			-0.00000152 (0.00000153)
Experience controls	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
R^2	0.7840	0.7822	0.7849
Observations	286	286	286

Standard errors in parentheses (clustered at the cohort level, with a bias-reduced linearization to account for the small number of clusters)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

A.5 Main regression for 20 years

Table 9: OLS results on men employment, wage and earned income with 3-years grouped trends

	(1) Employment	(2) Wage	(3) Earned income
15-24 Unemployment rate - UR	-1.449*** (0.337)	-0.00834 (0.00530)	-0.113** (0.0465)
UR * Exp. 1 to 15	0.482*** (0.141)	0.00293 (0.00233)	0.0359* (0.0186)
UR * Exp. 3 to 15	-0.481** (0.207)	-0.00346 (0.00312)	-0.0419* (0.0223)
UR * Exp. 6 to 15	0.0534 (0.147)	-0.000138 (0.00209)	0.0184 (0.0127)
UR * Exp. 9 to 15	-0.102 (0.171)	0.00365 (0.00249)	-0.00944 (0.0174)
UR * Exp. 12 to 15	0.0797 (0.118)	-0.00191 (0.00200)	0.00373 (0.0128)
UR * Exp. 16 to 20	-0.0969 (0.178)	-0.00286 (0.00270)	-0.0222 (0.0175)
Experience controls	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
R^2	0.8812	0.9164	0.9080
Observations	341	341	341

Standard errors in parentheses (clustered at the cohort level, with a bias-reduced linearization to account for the small number of clusters)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

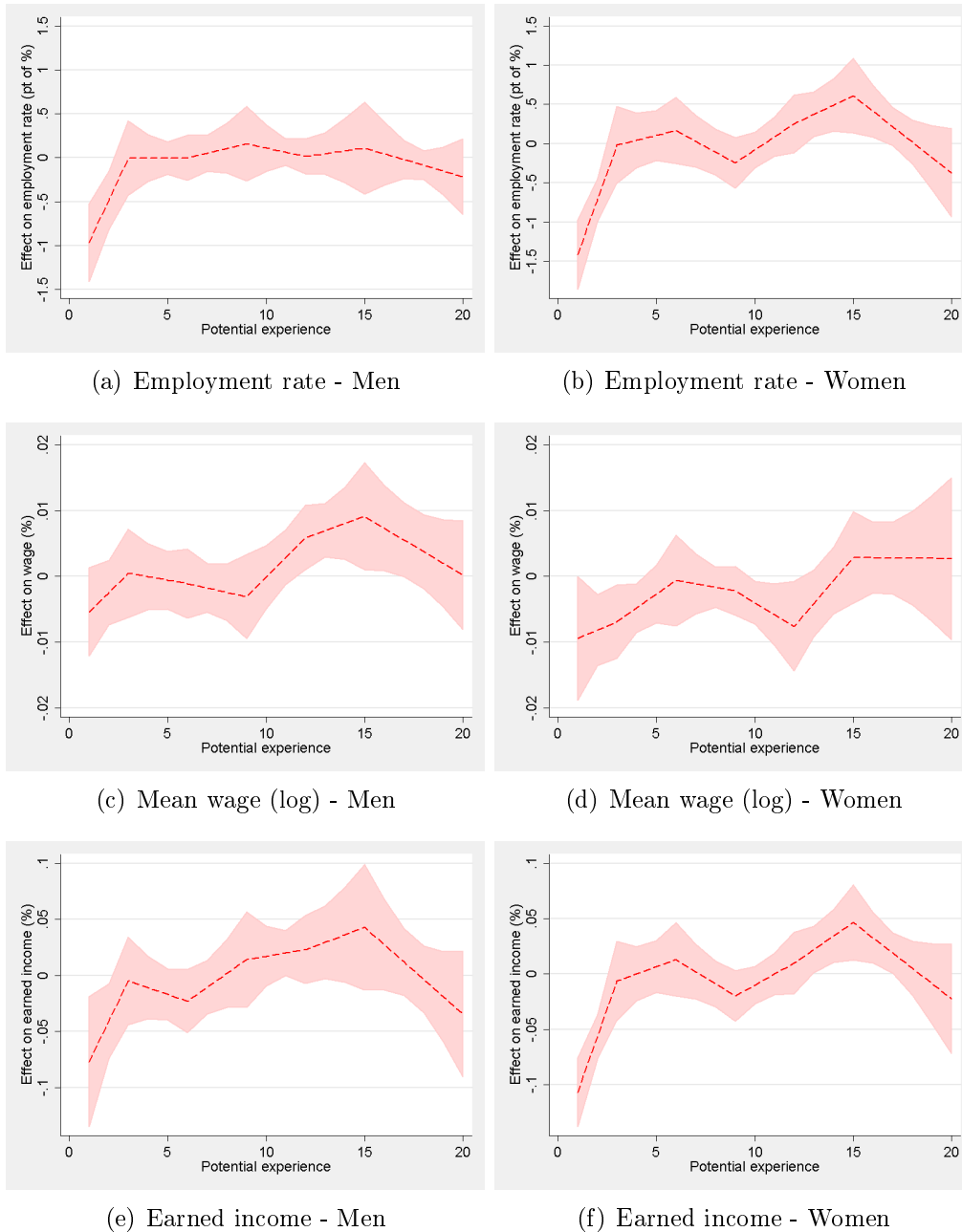
Table 10: OLS results on women employment, wage and earned income with 3-years grouped trends

	(1) Employment	(2) Wage	(3) Earned income
15-24 Unemployment rate - UR	-2.117*** (0.398)	-0.0107 (0.00733)	-0.157*** (0.0278)
UR * Exp. 1 to 20	0.700*** (0.194)	0.00127 (0.00281)	0.0503*** (0.0136)
UR * Exp. 3 to 20	-0.639** (0.273)	0.000818 (0.00426)	-0.0438** (0.0201)
UR * Exp. 6 to 20	-0.198 (0.166)	-0.00262 (0.00299)	-0.0174 (0.0134)
UR * Exp. 9 to 20	0.304** (0.128)	-0.00127 (0.00225)	0.0209** (0.00933)
UR * Exp. 12 to 20	-0.0480 (0.170)	0.00528** (0.00264)	0.00230 (0.0123)
UR * Exp. 16 to 20	-0.316* (0.175)	-0.00351 (0.00284)	-0.0261* (0.0132)
Experience controls	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
R^2	0.7621	0.7686	0.7685
Observations	341	341	341

Standard errors in parentheses (clustered at the cohort level, with a bias-reduced linearization to account for the small number of clusters)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Figure 19: Effect of a 1 percentage point difference in unemployment - spline specification (generations: 1982-2009; years: 1990-2010; experience: until 20 years)



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