Higher Education Graduates' Flattening Returns to Experience in France

Pauline Corblet

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Abstract

This article evidences the flattening of higher education graduates' wage dynamics in France between 1998 and 2010. The cohort that enters the market in 1998 benefits from 4% yearly wage increases in their first seven years of work, while the cohort that enters in 2010 only obtains 2.4% increases. This flattening is partly compensated by higher starting wages. I show that occupation with the largest influx of young graduates experience the most pronounced flattening of returns to experience, which is evidence of a supply-side impact, or congestion. Two congestion mechanisms are shown to flatten returns: access to managerial position and shifts in study fields. Alternative explanations such as changes in unobserved ability or human capital acquisition are ruled out.

1 Introduction

Young workers' early career outcomes are the focus of a large and wide-spanning literature in economics. The evidence points to a worsening of outcomes, both in terms of unemployment and labor market earnings. This paper investigates the flattening returns to experience for young higher education graduates in France and its impact on life-cycle earnings.

The paper explores both the causes and the consequences of young higher education graduates' depression in returns to experience. It identifies a congestion phenomenon, as the large higher education expansion in the 1990s and 2000s grows the supply of young higher education graduates on the labor market. To determine whether the higher education expansion caused the flattening returns to experience, I document the sorting of young higher education graduates into occupations and compare it to their older peers. This analysis shows that occupations that have received the largest influx of young graduates are the ones where returns to experience have flattened the most, suggesting the supply side is dragging down wage returns to experience. To support this fining, I explore two mechanisms linked to congestion: access to managerial experience, and over-representation of degree majors. I find that the restricted access to managerial positions and the increase in the supply of some majors drive the overall returns to experience down. I also consider a demand-side mechanism, namely potential increases in unemployment, and find it to be a non-significant contributor to the flattening returns to experience.

The relationship between labor market experience and wage is widely understood to be concave. The longer an individual spends on the labor market, the higher their wage on average, until they reach a peak. The wage at entry, the steepness of the relationship between experience accumulation and wage growth, and the age at which the peak is reached together determine individuals' lifetime labor earnings. This paper illustrates that the three determinants of wage trajectory depend on individuals' education level, but also on when individuals enter the labor market. In France, later cohorts see their returns to experience flatten compared to older cohorts at the same age, while their starting wage increases slightly. The flattening happens only to higher education graduates, not to individuals who graduated or dropped out from secondary education. Because of the concavity of the relationship between wages and experience, a flattening of the returns to experience has direct and large implications for life-cycle earnings. To check these implications, I perform a welfare analysis and compute the present value of discounted earnings in early career. I find that the higher starting wage protects young graduates from large losses compared to their older peers, but that effect is likely to fade if the analysis was performed over a longer time-span.

The paper contributes to the literature in two ways. First, it augments the growing body of research that points to a structural decrease in young higher education graduates' labor income, as opposed to a decrease caused by an economic downturn or temporary lack of demand from firms. Second, it thoroughly lays out the congestion mechanism behind the structural decrease in labor earnings and describes how it plays out in young graduates' early careers, through occupational sorting, degree choice, and access to managing positions

The paper's empirical approach is in three steps. First, I measure the effect of potential experience on wage separately by cohort and education level. To do so, I use two datasets: first, a large cross-section *Enquêtes Emploi* (hereafter the EE cross-section), that offers a complete picture of the French labor market between 1995 and 2015, and second a smaller panel *Enquêtes Génération* (hereafter the EG panel) that follows individuals from three different graduating cohorts in 1998, 2004 and 2010. Highly educated individuals' flattening returns to experience are observed in both datasets.

Second, I explore the link between the shifts on the supply side and changes in returns to experience. The hypothesis is that if the flattening returns to experience are driven by the higher education expansion, then the occupations in which the influx of new graduates is largest should see the most salient flattening in the returns to education. To test this hypothesis, I perform an Oaxaca-Blinder decomposition over occupations, effectively breaking down the changes in returns to experience between two cohorts in a composition and a price effect, by occupation. The resulting decomposition supports the supply side, or congestion, hypothesis.

Third, the paper explores three potential congestion mechanisms: access to managerial positions and changes in study fields I find that both contribute to the flattening returns to experience for young higher education graduates. I also find that time spent in unemployment between cohort does not rise, further suggesting that supply rather than demand drives the flattening. I also check whether alternative explanations related to unobserved heterogeneity may be driving the flattening returns to experience, and find that they do not.

The OLS estimation of log wages on potential experience on the 1998, 2004, and 2010 cohorts from the EG panel, reveals that higher education graduates from 1998, 2004, and 2010 experience averages of 4.0%, 3.0% and 2.4% yearly wage increases, respectively. This translates to flattening returns to potential experience for higher education graduates. Yearly wage increases do not flatten among secondary education graduates and dropouts. I perform a welfare analysis overall and by gender by computing the present discounted value of seven years of labor market earnings after graduating. I find that male higher education graduates from the 2010 cohort suffer the most from the flattening returns to experience: they lose 1.5% of cumulated earnings compared to the 1998 cohort. Overall, the 2004 higher education graduates lose 1.9% of cumulated earnings compared to the 1998 cohort, and the 2010 higher education graduates gain 1.6%, due to their slightly higher average wage upon labor market entry.

Next, I evidence the negative link between an influx of higher education graduates and flatter returns to experience between two cohorts through the Oaxaca-Blinder decomposition described above. To understand the mechanisms behind this negative relationship, I explore three aspects of young higher education graduates' careers. The first is access to managerial positions. I find first that the wage bonus associated with becoming a manager is mitigated over time: the 1998 higher education graduates enjoy a 3.7% extra annual wage increase as managers, while the 2010 higher education graduates only enjoy a 1.2% bonus. Second, I compare the influx of higher education graduates in an occupation to the share of managers in that occupation and find a negative relationship, signaling that congestion affects access to managerial positions, which in turn lowers the returns to experience. The second aspect is higher education graduates' field of study. Another way that occupational congestion could be unfolding is through an increase in the share of graduates who studied a particular field, within a particular degree, which would push them to a specific occupation. Again, I find a negative relationship between an increase in the share of a degree and field between cohort and steep returns to experience. Finally, I examine whether congestion could have caused increased unemployment, which in turn would have lowered returns to potential experience. I find an insignificant decrease in time spent in unemployment across cohorts, which makes it an unlikely candidate to be driving the flattening returns to experience.

Finally, I consider alternative explanations for congestion. There are mostly two: potential shifts in unobserved ability and changes in human capital acquisition in education. Both are plausible phenomena in the context of an education expansion. I find no evidence that either a shift in unobserved ability or a change in the quality of human capital could be driving higher education graduates' flattening returns to experience.

This paper relates to the literature on life cycle earnings across cohorts and education levels. Much of this literature studies life cycle earnings through the prism of the 'scarring effect', examining the impact of labor market entry conditions on workers' employment and earnings over the course of their careers. It generally concludes that cohorts who enter the labor market during a recession sustain persistent losses both in employment rates and wage levels. This has been shown in Canada (Oreopoulos et al. (2012)), Japan (Genda et al. (2010)), France (Gaini et al. (2013)), and the United States (Kahn (2010), Schwandt and von Wachter (2019), von Wachter (2020)), among other countries. This strand of literature offers many useful mechanisms to explain this persistence. Kahn (2010) and Brunner and Kuhn (2014) highlight the sorting into low-paying occupations that occur for unlucky cohorts. Rinz (2022) shows that young workers were more affected by the Great Recession because they remained less likely to be employed by high-paying firms even after overall employment recovered, and Forsythe (2022) that firms are less likely to hire young workers during recessions. Arellano-Bover (2022) shows that higher unemployment in early careers leads to lower cognitive skills in the long term. In the Netherlands, van den Berge and Brouwers (2017) show that the scarring effect fades in the medium term, thanks to increased mobility. The effect of a recession has also been shown to have a differential impact on academic and vocational graduates (van den Berge (2018)), as well as different majors (Liu et al. (2016), Altonji et al. (2016)). The scarring effect carries beyond labor income, as it increases mortality and disability rates, and has a damaging impact on family formation (Schwandt and von Wachter (2020)). Another piece of literature focuses on life-cycle earning profiles across cohorts. It highlights a flattening of life-time earnings (Manovskii and Kambourov (2005), Guvenen et al. (2021), Guvenen et al. (2017)). In particular, Kong et al. (2018) show recent higher education graduates' earnings stagnate over their life-cycle compared to older cohorts, which they explain through a combination of increased supply of educated workers and higher starting wage in their early career. In this study, I evidence a similar supply effect and higher starting wage for recent cohorts. On the demand side Beaudry et al. (2014) show that a fall in demand for higher education graduates in cognitive occupations is driving their wage stagnation. This paper studies a structural shift in the returns to experience in France, that goes beyond the effects of recessions. I highlight that young higher education graduates who entered the labor market before the Great Recession already display depressed returns to experience (see Rothstein (2021) for a similar observation in the US). As such the paper is strongly related to the second strand of literature mentioned. I also borrow from the mechanisms highlighted in the literature on the scarring effect, in particular relating to unemployment

(Yagan (2018)), degree characteristics (Liu et al. (2016)), and promotion patterns (Kwon et al. (2010), DeVaro and Waldman (2012)) to explicit the impact of congestion on returns to experience. The same phenomenom is also explored in Dupray and Moullet (2010), Argan et al. (2022) and Argan and Gary-Bobo (2023).

2 Data and Empirical Fact

2.1 The Data

I use two datasets to evidence the flattening returns of experience and explore its mechanisms: the first is the EE cross-section, *Enquêtes Emplois*, produced by INSEE, the French Institute for Statistics and Economic Studies, and the second is the EG panel, *Enquêtes Générations*, a survey conducted by CEREQ, the Centre for Study and Research on Qualifications.

The EE cross-section is a yearly national labor force survey that has run since 1950. In this paper, I use the years 1990 to 2020[1]. It surveys a representative sample of French residents between the ages of 15 and 89. In the most recent version of the survey, respondents are surveyed for 6 consecutive trimesters. This means we may be able to follow individuals from one year to the next, but not for longer. I therefore treat the data as a cross-section in the analysis. The main variables I use from this survey are individual age, education level, employment status, wage, and occupation.

The EG panel is a survey that follows a graduation cohort over the first seven years of their professional lives. Every six years, the CEREQ surveys a representative sample of school leavers at different education levels, from high school dropouts to Ph.D. graduates. The surveys used in this paper cover three cohorts, who leave school in 1998, 2004, and 2010. I refer to the cohort who left school and entered the labor market in year X as the X cohort. Each cohort is surveyed for up to eight years after they leave school. As such, the Generation Surveys provide a comprehensive outlook of early career outcomes in the French labor market between the end of the 1990s and the 2010s. Appendix A details the data cleaning procedure and shows descriptive statistics on the variables of interest. The surveys are presented as an unbalanced panel: each observation corresponds to the activity of an individual (employment or unemployment) over a given period, referred to

[1] Starting in 2003, the survey is run every trimester, but I do not exploit this dimension here.

as a spell.

The EE cross-section and EG panel complement each other in the analysis. The former offers an overview of a large sample of French workers: each year between 1990 and 2020 between 39,551 and 60,378 full-time workers between the ages of 25 and 64 are observed, with a median of 54,496. However, it is a cross-section, which means that potential experience needs to be inferred: we do not know when individuals finished school and entered the labor market. The EE cross-section is used in the next section of the paper to illustrate the decreasing returns to experience. The latter dataset is smaller: there are 13,729 individuals in the 1998 cohort, 9,700 in the 2004 cohort, and 7,702 in the 2010 cohort. However, as a panel, it keeps track precisely of individuals' labor market trajectories. In particular, potential experience can be computed easily as the number of years since they left school. This makes it a better candidate to test the empirical hypothesis that congestion is causing the returns to experience flattening than the first dataset. It also contains detailed information on individuals' job content, which will be exploited in the mechanism section of the paper.

In the next two subsections, I use the EE cross-section to highlight two facts: first the French education expansion, whereby the share of higher education graduates increased rapidly since the 1990s, and second the flattening returns to experience for higher education graduates.

2.2 The French Education Expansion

The most notable evolution in the French labor market between 1990 and 2020 is the rise in the share of higher education graduates among workers either employed or looking for a job. Figure 1 plots this share among all workers, workers at most 40 years old, and workers at most 30 years old. The share of higher education graduates goes from 17.9% of the working population in 1990 to 46.0% in 2020. The increase is even steeper among workers at most 30 and 40, which is consistent with successive cohorts acquiring more education.

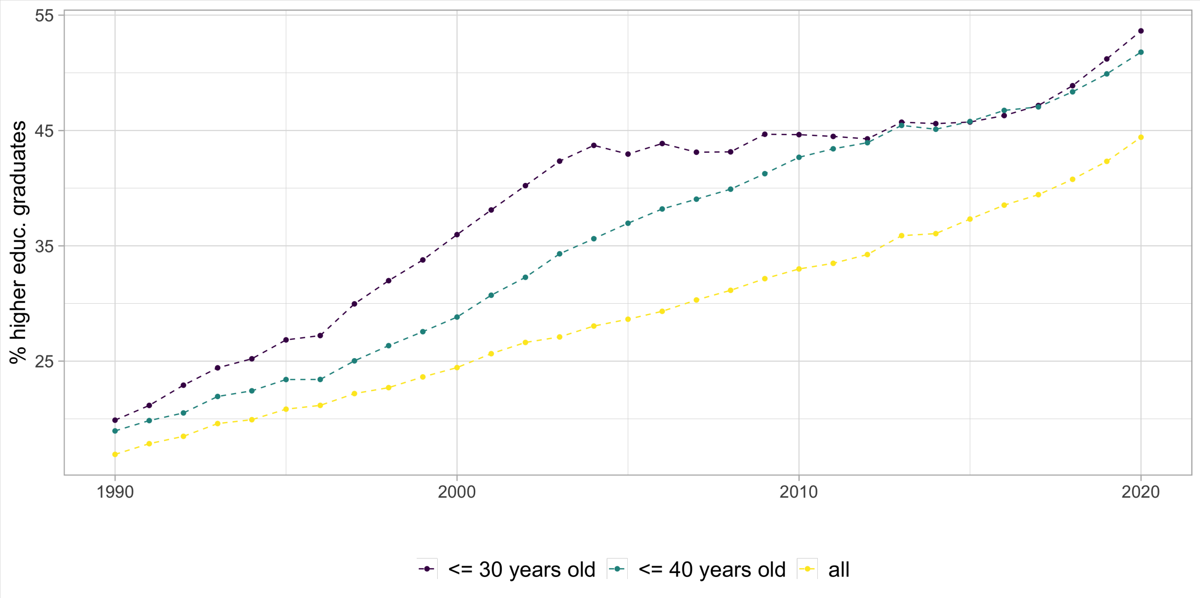

Figure 1: Share of higher education graduates over time

Notes: Author's own calculations from *Enquetes Emploi* from 1990 to 2020.

2.3 The Flattening Returns To Experience

This subsection evidences the flattening returns to experience in France over the 1990-2020 period, in particular for young higher education graduates. To do so, I compute experience profiles by birth cohort and education level over time, in the *Enquêtes Emploi*, controlling for gender. Because the *Enquêtes Emploi* are a cross-section, actual experience is unknown and is approximated with age. Age profiles are built by computing average wages $\bar{w}^{eat}$ at every age $a \in \{25, \ldots, 65\}$ in every year $t \in \{1995, \ldots, 2015\}$ for both education levels $e \in \{\text{Secondary educ. or less, Higher educ.}\}$.

Figure 2 plots the average wages $\{\bar{w}^{eat}\}_{e,a,t}$, as well as the linear trend in wage variation across cohorts at the same age. There are three things to notice from this Figure 2: first, individuals with secondary education or less have a much flatter experience profile than higher education graduates. Second, linear trends in wages show a rise in average wage at the same age across cohorts for low-educated individuals and a decrease in average wage at the same age across cohorts for high-educated individuals. Third, the decrease in average wage across highly educated cohorts is increasingly steep from 25 to 40 years old. At 40, the 1955 birth cohort earns on average 2978.1 euros, while at the same age 30 years later, the 1985 cohorts earn only 2629.9 euros, which is 11.7% less.

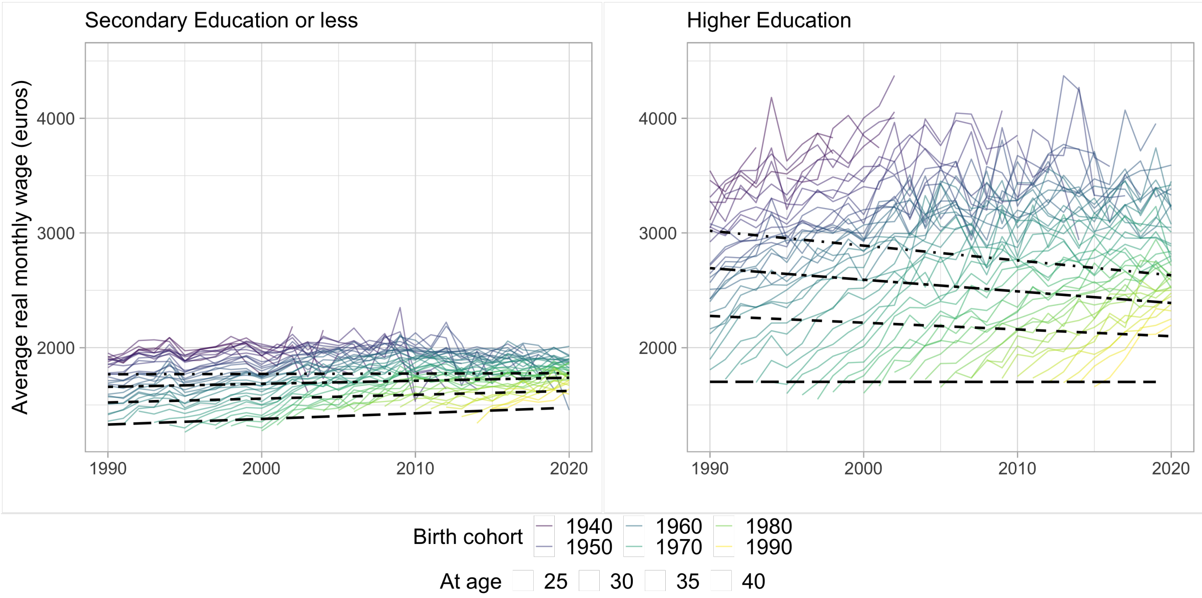

Figure 2: Experience profiles by birth cohort and education level

Notes: Author's own calculations from *Enquetes Emploi* from 1990 to 2020. Each colored line plots the average wage of a given cohort over time. The left pane plots the average wage for individuals with secondary education or less, and the right pane plots higher education graduates' average wage. Smoothed average wages across cohorts at the same age are shown in dashed black lines. Sample restriction: only cohorts born before 1990.

Put differently, Figure 2 shows that younger highly educated individuals earn less on average than their older peers at the same age, and this difference increases with age. Because Figure 2 uses the EE cross-section, we cannot directly conclude from this observation that returns to experience have flattened. The observation could be driven by a difference in the sampling of individuals from the same cohort at different points in time. It could also be due to a change in the labor market entry age among the high-skilled. The next section describes the empirical strategy to ascertain and quantify the claim that returns to experience have flattened, using the EG *Enquêtes Générations* panel data.

3 Empirical Strategy

The empirical strategy outlined in this section has three aims. First, it quantifies the flattening described in graph 1. Second, it establishes the link between the occupational congestion flattening the returns to experience. Third, it measures the variation in cumulative earnings that stems from the flattening returns to experience.

To quantify the flattening in returns to experience observed in Figure 2, I turn to the EG *Enquêtes Générations* panel data. Besides their panel aspect, they have the benefit of recording each individual i's entry dates on the labor market, which lets us measure individual potential experience at time t. To measure returns to experience, I estimate the following equation[2] for each cohort $c \in \{1998, 2004, 2010\}$ separately:

$$\log w_{it} = \sum_{e} \mathbb{1}_{[e_i=e]} \left(\alpha^{ce} + \beta^{ce}\text{exp}_{it}\right) + \gamma^{c} X_{it} + \epsilon_{it} \tag{1}$$

where exp_{it} measures potential experience i.e. time elapsed since labor market entry, or potential experience, in years. Returns are measured at the cohort level $c \in \{1998, 2004, 2010\}$, and the education level $e \in \{\text{Secondary Educ. or less, Higher Educ.}\}$. α^{ce} captures cohort c and education level e's initial average wage. β^{ce} measures the returns to experience. X_{it} is a set of time-varying individual fixed effects that include gender, sector, and a dummy for urban locations.

Regression (1) is laid out with the age-time-cohort identification problem in mind. This issue arises when one seeks to identify the effect of all three of age, time, and cohort on an outcome variable. The reason is that the third element is always a linear combination of the other two. There exist various ways to solve this problem (see Schulhofer-Wohl (2018) for an extensive review). The most common one is to assume trends appear only in cohort or in time effects. In our case, a cohort effect refers to specific cohort characteristics such as the quality of human capital, while a time effect refers to characteristics of the labor market, such as relative worker supply. The framework outlined here uses equation (1) to evidence the flattening returns to experience, but remains agnostic on whether it relates to a time or a cohort effect. Then it brings forth occupational congestion as an explanation for the decreasing returns to experience, effectively dismissing the cohort effect in favor of a time effect. Additionally, I check with the available information in the EG panel data that the distribution of unobserved heterogeneity does not change across cohorts. It means that determinants of wage that are not included in equation (1), such as the quality of human capital acquired in school, or interpersonal skills, are drawn from the same distribution for all cohorts. I check in section 6 that this assumption is not contradicted by the available information the data provides on cohorts. Note that this

[2] This is equivalent to a Mincerian framework in which the additivity assumption between experience and schooling is relaxed.

assumption does not preclude sorting: within each education level, the distribution of unobserved heterogeneity may well have changed. I also check in section 6 that sorting is not driving the flattening returns to experience. Under the assumption that unobserved heterogeneity is from the same distribution across cohorts, returns to experience's slope β^{ce} captures a time effect and not a cohort effect, which is driven by variations in supply and demand.

To separate the time and cohort effects on the decreasing returns to experience, I develop a strategy to evidence occupational congestion. Occupational congestion is defined as an increase in the supply of workers of some education level to a given occupation, while demand remains constant in that occupation. The framework's backbone is a firm's production function with decreasing returns to scale, where workers' wages are tied to their marginal productivity, as in Katz and Murphy (1992) and Card and Lemieux (2001). The framework is flexible enough to allow substituability between education and experience levels in firm production, for instance with a Constant Elasticity of Substitution production function. In this framework, an increase in the supply of young higher education graduates induces firms to pay them less than they used to pay their older peers at the same experience level. The empirical strategy developed in the remainder of this section allows us to verify if the firms' decreasing returns to scale and increase in worker supply are indeed behind the higher education graduates' decreasing returns to experience. It relies on computing returns to experience at the occupational level, and showing that a decrease in occupational returns to experience is correlated with an influx of new workers in that occupation. The regression framework and the possible biases are discussed below.

The framework is the following: at time t, individual i from birth cohort c and with education level e is employed in occupation j, and earns wage w_{ijt}. There are 28 different occupations, summarized in Table 12. Occupational returns to experience by education level and cohort are estimated with a similar equation to (1), but at the cohort-education-occupation level, through:

$$\log w_{ijt} = \sum_{e} \mathbb{1}_{[e_i=e]} \sum_{e} \mathbb{1}_{[j_i=j]} \left(\alpha^{cej} + \beta^{cej} \exp_{it}\right) + \gamma^c X_{it} + \epsilon_{it}. \tag{2}$$

As before, α^{cej} measures the expected initial log wage, while β^{cej} measures the slope of yearly wage growth, at the cohort, education, and now occupation level. ρ^c are the same gender, location, and sector fixed effects as in (1). Regression (2) is run by cohort.

In this framework, overall returns to experience β^{ce} for cohort c and education level e from equation (1) are a weighted average of occupational returns for that same cohort and occupation level from equation (2):

$$\beta^{ce} = \sum_j n_{cej} \beta^{cej}$$

where n_{cej} is the share of individual spells in cohort c and education level e employed in occupation j. Let N_{ce} be the total number of spells entered by cohort c in education level e counted from labor market entry to seven years later, and let N_{cej} be the number of spells in a specific occupation j. Then

$$n_{cej} = \frac{N_{cej}}{N_{ce}} \tag{3}$$

Now, consider two birth cohorts c and c', with c' being the youngest of the two. The difference in the returns to experience between c and c' is

$$\beta^{ce} - \beta^{c'e} = \sum_j n_{cej} \beta^{cej} - \sum_j n_{c'ej} \beta^{c'ej}$$

In the spirit of an Oaxaca-Blinder decomposition, we can introduce the cross-term $\sum_j n_{c'ej} \delta^{cej}$ to the above and obtain:

$$\beta^{ce} - \beta^{c'e} = \underbrace{\sum_j (n_{cej} - n_{c'ej}) \beta^{cej}}_{\text{Extensive margin}} + \underbrace{\sum_j n_{c'ej} (\beta^{cej} - \beta^{c'ej})}_{\text{Intensive margin}} \tag{4}$$

The first term $(n_{cej} - n_{c'ej})\beta^{cej}$ is an extensive margin or a composition effect: it measures the change in the overall returns to experience between the two cohorts that are due to a change in occupational shares. The second term $n_{c'ej}(\beta^{cej} - \beta^{c'ej})$ is an intensive margin or price effect: it measures the change in the overall returns to experience between the two cohorts that are driven by the change in return to experience in occupation j.

The point of decomposition (4) is to separate changes in employment in a given occupation (the extensive margin) from occupational returns to experience (the intensive margin). The next step is to determine if the intensive margin is negatively correlated with the extensive margin. If this is the case, it brings credit to the hypothesis that occupational congestion is causing the flattening returns to experience.

This strategy must be applied keeping in mind it may suffer from an important bias. Indeed, the extensive margin does not exactly measure the supply of workers to the occupation. Rather, it is an equilibrium object which results from both the supply of workers and the demand from firms. Because we do not measure demand from firms in each occupation, and it is positively correlated both with equilibrium employment and wage in a given occupation, this strategy suffers from an upward bias. What this means is that if the correlation between the extensive and intensive margin is positive, it may be due to the upward bias, and the results are inconclusive. If however the correlation is found to be negative despite the upward bias then we can conclude that occupational congestion is indeed driving the flattening returns to experience.

Finally, to assess the impact of the change in returns to experience across cohorts on earnings, I follow Schwandt and von Wachter (2019) and von Wachter (2020) and compute cumulative earnings over the first seven years after labor market entry, by cohort and education level. To that end, I use the estimated coefficients from equation (2). The present discounted value of annual earnings is computed as follows:

$$\mathrm{PDV}^{ce} = \sum_{t=1}^{7} 12 \times \delta^{t-1} \exp\left(\hat{\alpha}^{ce} + \hat{\beta}^{ce} t + \hat{\rho}^{c} \bar{X}^{c}\right) \tag{5}$$

where $\left(\hat{\alpha}^{ce}, \hat{\beta}^{ce}, \hat{\rho}^{c}\right)$ are estimated from equation (1), and $\bar{X}^{c}$ is the weighted average of gender, industry and location over each cohort. Equation (5) obtains the present discounted value (PDV) of earnings for each cohort $c \in \{1998, 2004, 2010\}$ and education level $e \in \{\text{Secondary Educ. or less}, \text{Higher Educ.}\}$. These PDVs are only computed for the first seven years spent by each cohort on the labor market, so any difference observed between cohorts is likely to widen beyond that scope.

To check for any gender differences, I also compute the present discounted value of earnings for men and female separately, simply by using the gender fixed effect estimated in equation (1).

4 Results

4.1 Returns to Experience

Table 1 shows the results from equation (1)'s estimation. Across all cohorts, holding a higher education degree yields a significant bonus to wage, both in starting wage (the estimated intercept) and returns to experience (the estimated slope). Secondary education graduates or less from the 2010 cohort see their returns to experience steepen compared to previous cohorts: their wage increases by 2.8% a year, which is higher than their peers in the 1998 (2.4%) or the 2004 cohort (2.0%). On the contrary, higher education graduates' returns to experience clearly flatten: the return to an extra year of potential experience falls by 16 percentage points between the 1998 and the 2010 cohort. Counterbalancing this loss on returns to experience, higher education graduates' starting wage has increased between cohorts[3]. The welfare analysis that follows shows that the higher starting wage protects higher education graduates from large losses in earnings over the first seven years of their careers.

[3]Because fixed effects are allowed to vary across cohorts, this trend must be checked using average starting log wages, which are 7.19, 7.21 and 7.26 respectively, confirming the previous observation.

	log entry wage		
Cohort	1998	2004	2010
Secondary Educ. or less	6.77***	6.86***	6.82***
	(.006)	(.007)	(.009)
Higher Educ.	7.03***	7.07***	7.15***
	(.007)	(.008)	(.009)
Secondary Educ. or less × Pot. Exp.	.025***	.020***	.029***
	(.001)	(.001)	(.001)
Higher Educ. × Pot. Exp.	.040***	.031***	.024***
	(.001)	(.001)	(.002)
FE gender, urban, sector	✓	✓	✓
Observations	44,021	33,475	22,317
R^2	0.219	0.158	0.222

Table 1: Average starting wage and returns to experience by cohort and education level

Notes: Source: EG panel. Author's own calculations from OLS estimation of equation (1): $\log w_{it} = \sum_e \mathbb{1}_{[e_i=e]} (\alpha^{ce} + \beta^{ce} \text{exp}_{it}) + \gamma^c X_{it} + \epsilon_{it}$ by cohort. *p<0.1; **p<0.05; ***p<0.01.

Table 1 provides compelling proof of the flattening returns to experience for young labor market entrants in the years 1998 to 2010 in France. The reasons for the flattening returns of experience remain to be attributed to time or cohort effects. This paper argues that the flattening returns are driven by a time effect, as they are the result of the changing equilibrium between supply and demand. To support this argument, I present evidence of congestion at the occupation level, i.e. an excess of supply given demand, which drives the flattening returns to experience. In the next section, I lay out the empirical strategy to evidence congestion. I lay counter-arguments to a potential cohort effect in section 6.

4.2 Oaxaca-Blinder Decomposition

Although it could simply be argued that the 2010 graduates are suffering from a scarring effect due to the Great Recession, two observations contradict this view. First, it is clear from Table 1 that the 2004 graduates also suffer from flatter returns to experience than the 1998 graduates, even though they entered the labor market at a time of economic growth. Second, low-educated workers from the 2010 cohort do not suffer from the same loss of returns to experience as their high-educated peers. These two observations suggest the reason for high-educated workers' flattening returns to experience may lie in changes in supply, rather than changes in demand. This section evidences the link between the increase in the supply of highly educated and their flattening returns to experience.

I run regression (2) on the EG panel's 1998, 2004, and 2010 cohorts. Using the estimates from the regression, I apply the Oaxaca-Blinder decomposition described in section 3. 1998 is taken as the reference cohort as I decompose the two following differences:

$$\beta^{e,1998} - \beta^{e,2004} \quad \text{and} \quad \beta^{e,1998} - \beta^{e,2010}$$

for each education level $e \in \{\text{Secondary Educ. or less}, \text{Higher Educ.}\}$. The decomposition obtains an extensive and intensive margin for each education level-occupation tuple (e, j).

Figure 3 shows the scatter plot of the intensive over the extensive margins by education level and cohort pair (1998-2004 and 1998-2010). An OLS fit is provided at the same level. The fit is downward sloping for all education levels and cohort pairs, except secondary education graduates or less between the 1998 and 2010 cohorts, where it is slightly upward sloping. Because demand is omitted from this analysis, the relationship is likely to be upward biased, which would explain the last observation. The 'true' relationship between extensive and intensive margins is likely to be even more negative than is observed in Figure 3.

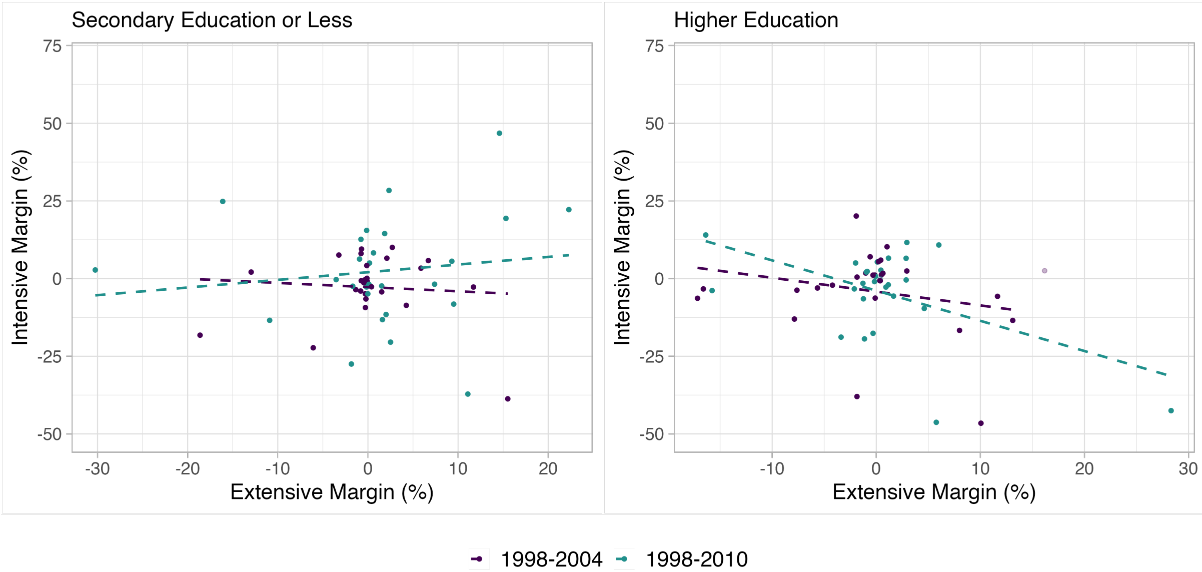

Figure 3: Change in intensive over extensive margin by education level

Notes: Source: EG panel. Author's own calculations. Each data point represents an occupation from the list of disaggregated occupations in table 12. The extensive margin is the difference between two cohorts in the share of employment spells started in the occupation. The intensive margin is the difference in returns to experience estimated at the occupation level (see Eq (2)). Occupations with nonsignificant intensive or extensive margins are greyed out. the fit is computed only on significant margins.

The negative relationship means that a large influx of new labor market entrants in the occupation is correlated with a flattening in wage growth in this occupation. It is consistent with the hypothesis that congestion causes a slow-down in wage progression.

Figure 3 does not rule out all alternative explanations for congestion for explaining the flattening returns to experience. In particular, there is another explanation for the flattening returns to experience also consistent with Figure 3: a shift to the left in the distribution of unobserved heterogeneity between cohorts. The higher education expansion that occurred in France over the period could have caused a decrease in unobserved ability among higher education graduates between the 1998 cohort and the subsequent 2004 and 2010 cohorts. This could be either because admission requirements to higher education have become stringent, or because the quality of teaching has fallen with the rise in the number of students. In this case, the negative correlation observed between extensive and intensive margin among higher education graduates would be downward biased. In a paper that uses the same data, Argan et al. (2022) estimate the distribution of unobserved heterogeneity across cohorts and disprove that hypothesis. In this paper, I perform a series of robustness checks using proxies for ability in Section 6.

4.3 Welfare Analysis

Finally, Table 2 presents the results of the welfare analysis described in section 3. The Present Discounted Value (PDV) of annual earnings over the first seven years on the labor market is measured in euros, and computed at the cohort, education, and gender level. Table 2 also reports variation in the PDV of earnings for the 2004 and 2010 cohorts compared to the 1998 cohort.

Across both genders, the PDV of higher education graduates' earnings stagnates between the 1998 and the 2010 cohort. Individuals without a higher education degree also see their PDV of earnings mostly stagnate, although the 2004 cohort enjoys a 5.7% compared to the 1998 cohort. The pattern is different by gender: women from the 2004 and 2010 cohorts enjoy a sizable increase in PDV of earnings compared to women from the 1998 cohort, except for higher education graduates in 2004. However, cumulative earnings of male higher education graduates decrease between the 1998 and 2004/2010 cohorts.

The welfare analysis of the three cohorts over their first seven years on the labor market shows the higher baseline average earnings of the 2004 and 2010 cohorts mostly compensate for their flatter returns to experience compared to the 1998 cohort. However, the loss in PDV of annual earnings is visible among men. If the same welfare analysis was run over the long run, it is likely the same loss would be observed for women too, as the flat returns to experience compound over time.

Cohort	1998	2004		2010	
	PDV (€)	PDV (€)	% Change to 1998	PDV (€)	% Change to 1998
All					
Secondary Educ. or Less	83,361	88,028	5.6	85,055	2.0
Higher Educ.	112,719	110,589	-1.9	114,468	1.6
Women					
Secondary Educ. or Less	75,303	80,887	7.4	79,706	5.8
Higher Educ.	103,838	103,401	-.4	108,424	4.4
Men					
Secondary Educ. or Less	89,516	93,093	4.0	89,404	-.1
Higher Educ.	123,438	119,003	-3.6	121,613	-1.5

Table 2: Present Discounted Value of annual earnings 7 years after labor market entry

Notes: Source: EG panel. Author's own calculations based on OLS estimation of equation (1): $\log w_{it} = \sum_e \mathbb{1}_{[e_i=e]} (\alpha^{ce} + \beta^{ce}\text{exp}_{it}) + \gamma^c X_{it} + \epsilon_{it}$ by cohort. The PDV (Present Discounted Value) of earnings is computed using a 5% discount rate from equation (5).

5 Mechanisms

5.1 Access To Managerial Positions

The first mechanism of congestion is the increasingly difficult access of recent cohorts to managerial positions. The EG panel offers useful insights on the job content of its interviewees, and in particular on whether they oversee other people's work. If an individual oversees at least one other person's work, I denote their position as a 'managerial' position. I show that managerial positions play a role in the returns to experience flattening in two steps. First I show the positive relationship between accessing managerial positions and wage growth. Second, I show that the 2004 and 2010 cohorts' access to managerial positions is more restricted than the 1998 cohort. This restriction is especially stark in occupations where the influx of new workers has been highest, which makes it a product of congestion. This phenomenon is also evidenced in the literature: Kwon et al. (2010) show that in Sweden and the US, cohorts who enter the labor market in a boom get promoted faster, which accounts for a substantial part of their wage growth.

To establish the link between accessing a manager's job and wage growth, I estimate the following regression separately by cohort:

$$\log w_{it} = \lambda^c m_{it} + \sum_e \mathbb{1}_{[e_i=e]} \left(\alpha^{ce} + \beta^{ce}\text{exp}_{it} + \mu^{ec}\left(m_{it} \times \text{exp}_{it}\right)\right) + \gamma^c X_{it} + \epsilon_{it} \tag{6}$$

where all elements are the same as in the baseline regression (1), except for the introduction of m_it, a dummy equal to 1 if individual i is a manager at time t. λ^c is a fixed effect for being a manager and μ^{ec} measures the returns to experience for managing positions at the cohort and education levels.

Regression (6) aims at measuring the impact of being a manager on wage dynamically, accounting for the bonus it might provide as potential experience accumulates. It provides insights as to how the overall returns to experience are driven by individuals becoming managers.

Table 3 presents the results from equation (6)'s estimation. Individuals who are managers enjoy a higher initial average wage:+ 8.1, +10.7, and +14.0 percentage points for the 1998, 2004, and 2010 cohorts, respectively. This initial bonus is increasing across cohorts. Manager positions do not offer a significant boost to secondary education or less workers' returns to experience, but it does for higher education graduates. The boost is decreasing across cohorts: +3.7, +3.1, and +1.2 percentage points to the baseline returns to experience for the 1998, 2004, and 2010 cohorts, respectively.

	log entry wage		
Cohort	1998	2004	2010
Secondary Educ. or less	6.76***	6.84***	6.81***
	(.006)	(.007)	(.009)
Higher Educ.	7.01***	7.03***	7.12***
	(.007)	(.008)	(.010)
Manager	.081***	.107***	.140***
	(.008)	(.010)	(.012)
Secondary Educ. or less × Pot. Exp.	.025***	.019***	.029***
	(.001)	(.001)	(.001)
Higher Educ. × Pot. Exp.	.031***	.023***	.022***
	(.001)	(.002)	(.002)
Secondary Educ. or less × Manager	.002	.002	.002
× Pot. Exp.	(.002)	(.003)	(.003)
Higher Educ. × Manager	.037***	.031***	.012***
× Pot. Exp.	(.002)	(.003)	(.004)
FE gender, urban, sector	✓	✓	✓
Observations	43,601	32,347	22,273
R^2	.241	.183	.245

Table 3: Average starting wage and returns to experience by cohort, education level, and managerial status.

Notes: Source: EG panel. Observations for which managerial status is known. Author's own calculations from OLS estimation of equation (6): $\log w_{it} = \lambda^c m_{it} + \sum_e \mathbb{1}_{[e_i=e]} \left(\alpha^{ce} + \beta^{ce}\text{exp}_{it} + \mu^{ec}\left(m_{it} \times \text{exp}_{it}\right)\right) + \gamma^c X_{it} + \epsilon_{it}$ by cohort. *p<0.1; **p<0.05; ***p<0.01.

Table 3 shows being a manager is positively associated with a higher wage. The nature of this association has evolved over time: the baseline average wage of managers is higher among younger cohorts, but the returns to experience for managers have flattened across cohorts for higher education graduates. This last observation could be because of a 'manager congestion': because previous cohorts have already become managers, the spots are scarce for the 2004 and 2010 cohorts, and do not bring as steep returns to experience as for the 1998 cohort. I check this hypothesis with the same occupational decomposition techniques presented in the main results. If the hypothesis is true, then we should observe especially stark difficulties in accessing managing positions in occupations where the influx of higher education graduates is largest.

Compute the difference in occupation j's share between the cohorts c and c' at education level e as

$$n^{cej} - n^{c'ej}$$

where n^{cej} is defined as in equation (3). Also, define the difference in managers' share as

$$m^{cej} - m^{c'ej}$$

where m^{cej} is the share of spells in starting occupation j that are managing positions in cohort c and education level e.

Figure 4 plots the difference in managers share $m^{1998,ej} - m^{2004,ej}$ and $m^{1998,ej} - m^{2010,ej}$ against the difference in occupation share $n^{1998,ej} - n^{2004,ej}$ and $n^{1998,ej} - n^{2010,ej}$ for all education levels e and occupations j. The relationship is clearly decreasing among higher education graduates, meaning a larger share of workers in occupation j is correlated with a lower share of managers in j. It is flatter among secondary education or less graduates.

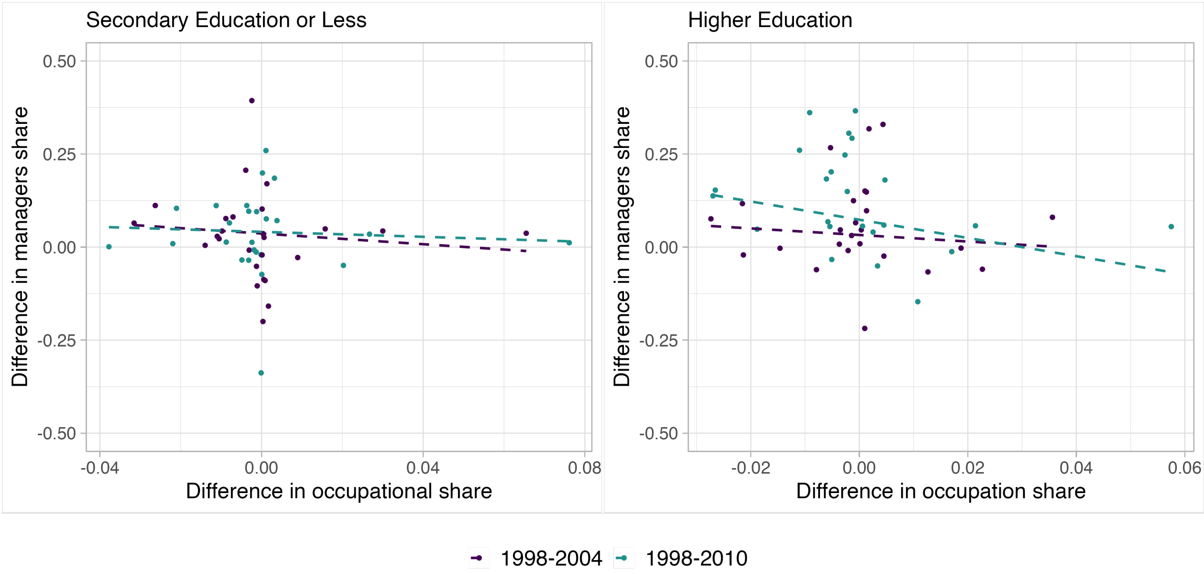

Figure 4: Cohort difference in manager's share against difference occupation share

Notes: Source: EG panel. Author's own calculations. Each data point represents an occupation. The difference in occupational share is the difference between two cohorts in the share of employment spells started in the occupation. The difference in manager share is the difference in the share of employment spells started as managers in the occupation.

Figure 4 confirms access to managing positions has decreased especially in occupations where the share of Higher education graduates has increased between the 1998 and 2004/2010 cohorts. This observation indicates congestion occurs at the managerial level, which slows down wage progression over time and flattens returns to experience.

5.2 Types of Degree and Fields of Study

Next, a potential driver of congestion and the resulting flattening returns to higher education graduates' experience is the degree content itself. The scarring effect literature has evidenced heterogeneity in the effect of recessions on young workers depending on degree type (van den Berge (2018)) and major (Liu et al. (2016), Altonji et al. (2016)), although the latter paper finds the Great Recession has had a relatively homogeneous effect on different majors. Both the degree type and major may play into congestion: if a degree has become more popular among the 2004 and 2010 cohorts than it was among the 1998 cohort, it creates an oversupply of young graduates with a specific skill set (provided demand for this skill set has not increased). To check this hypothesis I measure the correlation between the change in share of young graduates from the degree type and major, and the change in returns to experience for these young graduates.

I start by splitting each of the secondary education or less and higher education groups into two. I obtain four categories of degrees: no degree, secondary education, short higher education, and long higher education. Short higher education graduates hold a degree that takes three years to complete or less. Long higher education graduates study for at least four years to obtain their degree. Figure 5 plots the distribution of the four categories of degrees across cohorts, with a further decomposition by major within each education level. Its first takeaway is that the share of long higher education graduates increases across cohorts: from 10.7% to 11.5% to 16.9%. The share of individuals with no degree also increases, while the other two categories, secondary education and short-term higher education decrease slightly. It appears higher education degrees are increasingly lengthy, while the multiplication of short degree options did not generate wider take-up. Second, among short higher education graduates, the share of Economics and Business majors rises across cohorts while the share of Humanities decreases. No such variation is observed among long higher education graduates, whose major share stays roughly constant across cohorts.

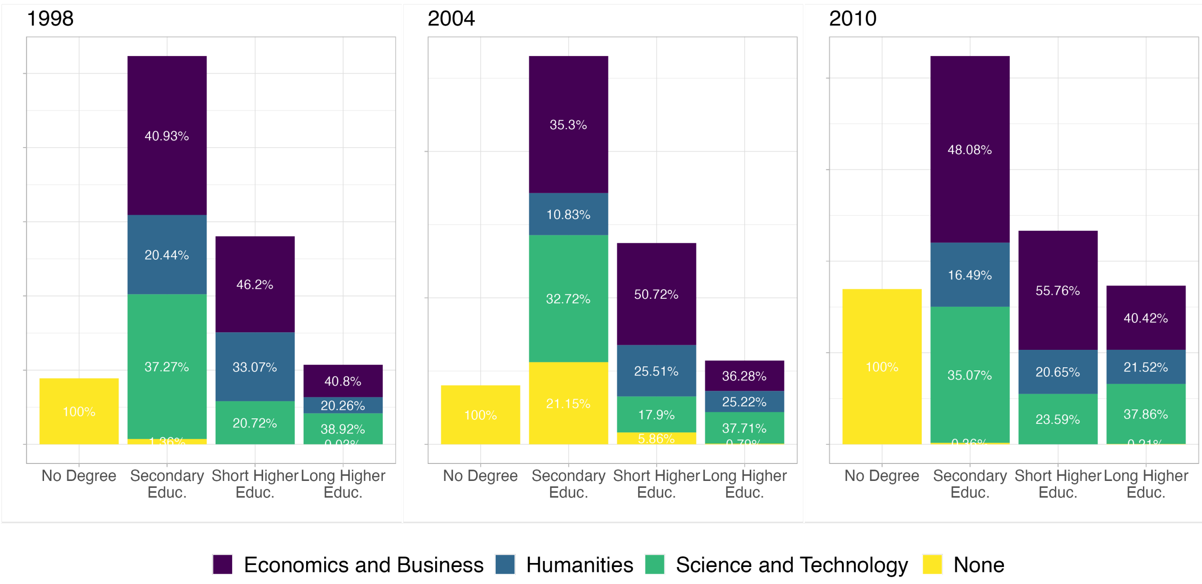

Figure 5: Major and degree type distribution across cohorts

Notes: Source: EG panel. Author's own calculations. The 'None' refers either to no major or unknown major.

Given that the overall share of long higher education graduates as well as some majors among short higher education graduates have increased between the 1998 and 2010 cohorts, it could be that an increase in these degrees is causing congestion on the labor market for young graduates. To check this hypothesis, I run the following regression separately by cohort, adapted from equation (1):

$$\log w_{it} = \sum_{\tilde{e}} \mathbb{1}_{[\tilde{e}_i = \tilde{e}]} \left(\alpha^{c\tilde{e}f} + \beta^{c\tilde{e}f} \exp_{it} \right) + \rho^c X_{it} + \epsilon_{it} \tag{7}$$

where $\tilde{e}$ is the disaggregated level of education that is either 'No degree', 'Secondary education degree', 'Short higher education degree' and 'Long higher education degree', and f is the degree field, either 'Economics and Business', 'Humanities', 'Science and Technology' or 'None'[4]. Regression (7) measures the intercept and slope of wage progression both by degree type and field of study. The difference between estimated coefficients $\hat{\beta}^{c'\tilde{e}f}$ and $\hat{\beta}^{c\tilde{e}f}$ measures the change in returns occurring between two cohorts.

Let $o^c\tilde{e}f$ be the share of each major f within the cohort-education cell $c\tilde{e}$, as computed in Figure 5. The within-education difference in major shares between cohorts c and c' is

$$o^{c'\tilde{e}f} - o^{c\tilde{e}f}$$

This difference captures the change in supply in majors between the two cohorts. Figure 6 plots the relationship between the difference in returns to experience $\hat{\beta}^{c'\tilde{e}f} - \hat{\beta}^{c\tilde{e}f}$and the difference in supply $o^{c\tilde{e}f} - o^{c'\tilde{e}f}$. It shows the relationship is downward sloping both for the 2004 and 2010 cohorts, meaning the larger the increase in the share degree type and field of study, the larger the loss in returns to experience between the 1998 and the 2004/2010 cohorts.

[4]Because the share of short and long higher education graduates with 'None' major is so small, they are not included in the regression

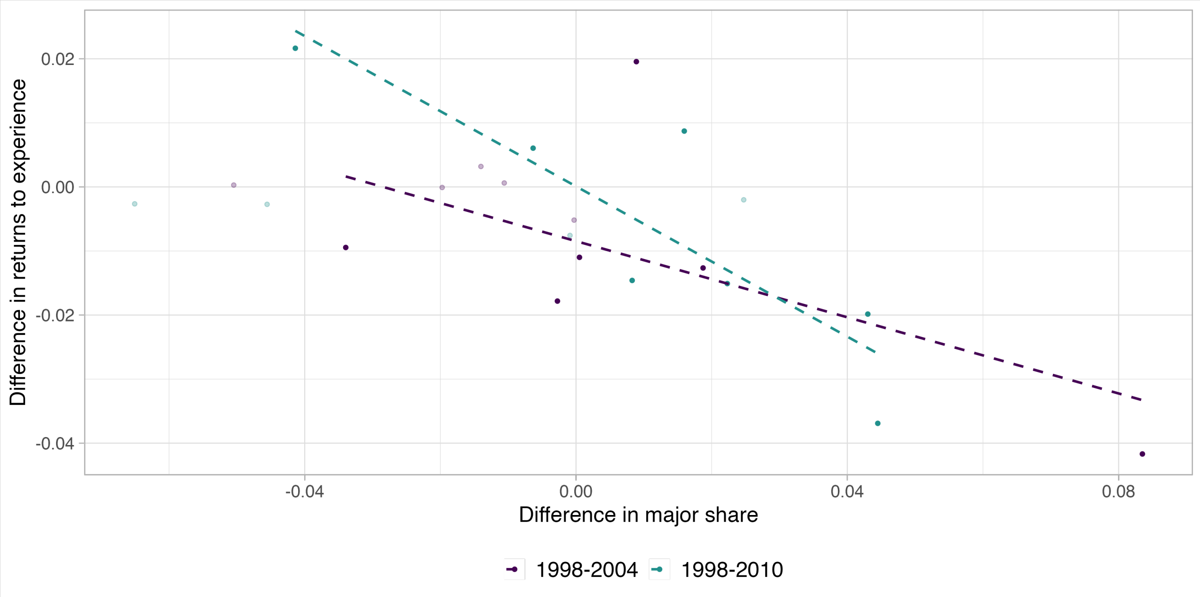

Figure 6: Change in major $\times$ degree returns to experience against change in share
Notes: Source: EG panel. Author's own calculations. Each data point represents a major and degree type. The extensive margin is the change in the share of individuals graduating from that major between two cohorts. The intensive margin is the change in returns to experience in the degree type and major between two cohorts (see equation (7)). Differences in returns that are not significant are greyed out. The fit is computed only on significant differences.

Individuals holding a degree in a field of study that has become more common between 1998 and 2004 or between 1998 and 2010 suffer from the worst flattening in the returns to experience on average. As such, changes in the type of degree and fields of study shares among cohorts contribute to congestion.

5.3 Unemployment

Lastly, a commonly cited mechanism of flattening returns to potential experience is unemployment. The scarring literature focuses on the unemployment rate increases that follow a recession, and the harmful effect of unemployment on wages, as it reduces effective labor market experience (Fernández-Kranz and Rodríguez-Planas (2018), Forsythe (2022)), and even skill acquisition (Arellano-Bover (2022)). Unemployment is also linked to congestion, via a simple supply and demand effect: if too many young higher education graduates enter the labor market for it to absorb, it may lead to higher unemployment among these graduates.

I test this hypothesis in the following way: first, I check whether unemployment hurts wage progression, and I find that it does: one extra month of unemployment reduced wage progression by a little less than one percentage point among higher education graduates and about .5 percentage point among secondary education or less graduates. Both numbers are constant across cohorts. Next, I check whether the younger 2004 and 2010 cohorts experience significantly higher unemployment rates over their first seven years on the labor market than the 1998 cohort, but find that higher education graduates do not. I conclude unemployment is unlikely to cause the flattening returns to experience for higher education graduates.

To measure the effect of unemployment on wages, I augment regression (1) in the following way:

$$\log w_{it} = \sum_{e} \mathbb{1}_{[e_i=e]} \left(\alpha^{ce} + \beta^{ce}\text{exp}_{it} + \lambda^{ce}\text{unemp}_{it}\right) + \rho^{c} X_{it} + \epsilon_{it} \tag{8}$$

where unemp_{it} is the number of months individual i has spent unemployed at time t since entering the labor market, divided by 12 to make it directly comparable to exp_{it}. λ^{ce} measures the impact of one extra month of unemployment on returns to experience, all other things equal. Equation (8) is broadly equivalent to equation (1) if the potential experience was replaced by effective experience on the job.

Table 4 shows the estimates from regression (8). Unemployment has a negative and significant impact on wage progression for all cohorts and education levels. It is about twice as high for higher education graduates as for secondary education or less graduates, consistent with larger human capital accumulation on the job for more educated workers. The effect is not changing across cohorts.

	log entry wage		
Cohort	1998	2004	2010
Secondary Educ. or less	6.76***	6.86***	6.81***
	(.007)	(.007)	(.009)
Higher Educ.	7.04***	7.06***	7.13***
	(.007)	(.008)	(.009)
Secondary Educ. or less × Pot. Exp.	.046***	.040***	.053***
	(.001)	(.002)	(.002)
Higher Educ. × Pot. Exp.	.065***	.054***	.050***
	(001)	(.001)	(.002)
Secondary Educ. or less × Unemp.	−.063***	−.055***	−.053***
	(.002)	(.002)	(.003)
Higher Educ. × Unemp.	−.125***	−.107***	-0.110***
	(.004)	(.004)	(.005)
FE gender, location, sector	✓	✓	✓
Observations	44,021	33,475	22,317
R^2	.255	.189	.253

Table 4: Average starting wage and returns to experience by cohort, education level, and unemployment history

Notes: Source: EG panel. Author's own calculations from OLS estimation of equation (8): $\log w_{it} = \sum_e \mathbb{1}_{[e_i=e]} (\alpha^{ce} + \beta^{ce}\text{exp}_{it} + \lambda^{ce}\text{unemp}_{it}) + \rho^c X_{it} + \epsilon_{it}$ by cohort. *p<0.1; **p<0.05; ***p<0.01.

Given the negative correlation between individuals' months spent in unemployment and wage progression, unemployment is a suitable candidate for driving the returns to experience down. If the younger higher education graduates from the 2004 and 2010 cohorts have been more unemployed than the graduates from 1998 as a result of congestion, it would be driving wage progression down. To check whether this is the case, I compute the average number of years spent in unemployment by cohort and education level after seven years in the labor market, controlling for gender, location, and sector:

$$\text{unemp}_i = \sum_e \mathbb{1}_{[e_i=e]}\zeta^{ce} + \rho^c X_i + \epsilon_i \tag{9}$$

The previous equation is estimated by OLS on the total number of years spent in unemployment of each individual of every cohort and education level at the end of the observation period, seven years after labor market entry. Table 5 presents the estimated $\hat{\zeta}^{ce}$. Both secondary education or less and higher education graduates from the 2010 cohort spent significantly more time in unemployment than graduates from the 1998 cohort. The same does not apply to the 2004 cohort: secondary education graduates or less spent a similar time unemployed as the 1998 cohort, and higher education graduates spent significantly less time unemployed than the 1998 cohort.

	months unemployed		
Cohort	1998	2004	2010
Secondary Educ. or less	6.85***	8.55***	8.81***
	(.219)	(.221)	(.222)
Higher Educ.	3.32***	3.28***	2.44***
	(.247)	(.248)	(.249)
FE gender, urban	✓	✓	✓
Observations		34,829	
R^2		.031	

Table 5: Mean number of years in unemployment by cohort and education level

Notes: Source: EG panel. Sample: last observed sequence. Author's own calculations from OLS estimation of equation (9): $\text{unemp}_i = \sum_e \mathbb{1}_{[e_i=e]}\zeta^{ce} + \rho^c X_i + \epsilon_i$. *p<0.1; **p<0.05; ***p<0.01.

The number of years sent in unemployment is lower for higher education graduates from the 2010 cohort than for the 2004 and 1998 cohorts, but not significantly. The opposite is true of secondary education graduates or less. This is in line with the scarring effect of recessions: because the last cohort entered the labor market in 2010, it suffers from the aftermath of the Great Recession and knows higher unemployment rates. The 2004 cohort fares better because it enters the labor market before the recession. Because the 2010 higher education graduates spent on average less time unemployed than their 1998 peers, it makes it unlikely that unemployment is driving the decreasing returns to experience.

6 Robustness Tests and Alternative Explanations

There are two types of threats to the conclusions drawn in this paper. The first is the representativeness of the unbalanced sample provided by the *Enquêtes Générations.* Because wages and job characteristics are reported at the start of the employment spell, rather than every year, individuals who change jobs more often are over-represented. I check for this concern by using the last wage recorded in the EG panel, which is recorded in the last year of the survey for all individuals. Changes in unobserved heterogeneity between cohorts are a second threat to congestion as an explanation for the decreasing returns to experience of higher education graduates, as it might be driving part of the difference in returns. To rule it out, I perform the analysis using some proxies for unobserved heterogeneity.

6.1 Sample Representativeness

The EG survey ends seven years after its respondents left school or university. In their last interview, respondents who were employed were all asked about their wages at that time. This provides us with simultaneous wage information on all employed respondents, regardless of whether they are starting a new employment spell. I use the difference between the starting wage of individuals who started working in their first employment spell and the seventh-year wages to compare average increases in wages between cohorts.

Table 6 reports average wages for individuals who were working at the start and end of their survey, as well as the percentage increase between the start and the end. It confirms that average returns to experience have flattened for higher education graduates: the increase in wage over seven years goes from 38.1% for the 1998 cohort to 27.8% for the 2010 cohort. It also points to a higher average starting wage among 2010 than 1998 graduates.

	1998			2004			2010		
Average Wage	Start	End	%	Start	End	%	Start	End	%
Secondary Educ. or less	1152.9	1483.2	28.6	1216.4	1453.8	19.5	1203.6	1484.6	23.3
Higher Educ.	1569.0	2166.7	38.1	1555.6	1971.0	26.7	1658.9	2119.5	27.8

Table 6: EG panel - Average start and end of survey wages

Notes: Source: EG panel. Author's own calculations. *p<0.1; **p<0.05; ***p<0.01. % change = $\frac{\text{End wage - Start wage}}{\text{Start Wage}}$

6.2 Unobserved Heterogeneity

A common confounder when attributing the returns to experience to education is the workers' unobserved heterogeneity. There are many dimensions of what makes a worker productive that researchers do not observe, such as soft skills, career ambitions, or family environment. If the distribution of one of these dimensions changes between cohorts, it also shifts the distribution of worker productivity and ultimately affects the wage distribution, through a cohort rather than a time effect.

Education expansions are particularly likely to cause shifts in unobserved heterogeneity, for two reasons. First, if more people can study, it might be because selection in universities and schools is less stringent than it used to be, which would mean the average unobserved ability of new graduates is lower than their older peers. Second, the quality of education may suffer during expansions, if more resources are not allocated to universities and schools. A lower quality of education means a lower quality of human capital acquired through a degree, which can lower productivity.

In what follows, I deal with both concerns. I proxy unobserved ability by grade retention. Next, I use wage variance to shed light on higher education sorting. Finally, I decompose returns by type of schools and universities, which differ by the intensity of the expansion they experienced. In all three analyses, I find no evidence of changes in unobserved heterogeneity driving the flattening returns to experience for higher education graduates.

6.2.1 Grade Retention

The identifying assumption in the main empirical specification (1) is that the distribution of unobserved heterogeneity is the same across the 1998, 2004, and 2010 cohorts. This assumption is supported by Argan et al. (2022), who show on the same *Enquêtes Générations* dataset that the distribution of unobserved ability remains constant across cohorts. To further test this assumption we can introduce a proxy for unobserved heterogeneity to the main specification. The CEREQ data contains information on the age at which each individual started secondary school, which I use as a proxy for unobserved heterogeneity (a strategy also used in Dupray and Moullet (2010)). The normal starting age of secondary school in France is 11 years old, so anyone starting later must have repeated at least one grade in primary school. Grade retention is frequent in France, and is used as a means to strengthen struggling students' learning abilities. The literature on grade retention in France finds small and positive effects on scores (d'Haultfoeuille (2010), Gary-Bobo et al. (2016)) and a negative correlation with wages (Brodaty et al. (2013)). Retained students are therefore expected to be at the lower end of the unobserved ability distribution.

Grade retention was more common in the 1980s than it is today, as reflected in the share of retained students across cohorts: 23% among the 1998 cohort, 12% among the 2004 cohort, and 13% among the 2010 cohort. The shares of retained students are therefore not per se informative of the distribution of unobserved heterogeneity in a cohort. However, grade retention can still be used to check the identifying assumption, in the following way: if it was wrong, and indeed the distribution of unobserved heterogeneity had shifted to the left between the 1998 and 2010 cohorts, then the average unobserved ability of retained individuals would be lower for 2010 labor market entrants than it would be for 1998 entrants, especially since the threshold for grade retention is lower for the latter. Then grade retention would impose a larger penalty on both initial wage and wage progressions for younger cohorts. We can check this last statement with the following equation:

$$\log w_{it} = \sum_{e} \mathbb{1}_{[e_i=e]} \left(\eta^{ce} r_i + \alpha^{ce} + \beta^{ce} \text{exp}_{it} + \tau^{ec} \left(r_i \times \text{exp}_{it}\right)\right) + \gamma^{c} X_{it} + \epsilon_{it} \tag{10}$$

Equation (10) is an extension of the main specification (1): it features dummy r_i, which is equal to 1 if individual i repeated a grade in primary school, and 0 otherwise. Coefficients η^{ce} andτ^{ce} respectively capture the initial wage and returns to experience penalty from having been retained in a grade, by cohort c and education level e. The rest of the equation is the same as in (1).

The results from estimating equation (10) by OLS as presented in table 13 in the appendix. They show that having retained a grade imposes a small and significant penalty on the initial wage, and a small and insignificant penalty on returns to experience, for all cohorts and education levels. Importantly, the penalty imposed does not vary across cohorts, which gives support to the identifying assumption that the distribution of unobserved heterogeneity has not changed across cohorts.

6.3 Sorting into Higher Education

Even under the identifying assumption that the unobserved heterogeneity distribution has remained unchanged between cohorts, changes in sorting into education levels may have occurred. If more individuals graduate from higher education, the average unobserved ability among higher education graduates is likely to decrease, and its variance is likely to increase. A concurrent explanation for congestion for the flattening returns to experience could be that employers gradually learn about the lower abilities of the more recent higher education graduates. If it were true, however, we should see an increase in higher education graduates' wage standard deviation, as the individuals with the highest unobserved ability still sort into higher education and enjoy a steep wage progression.

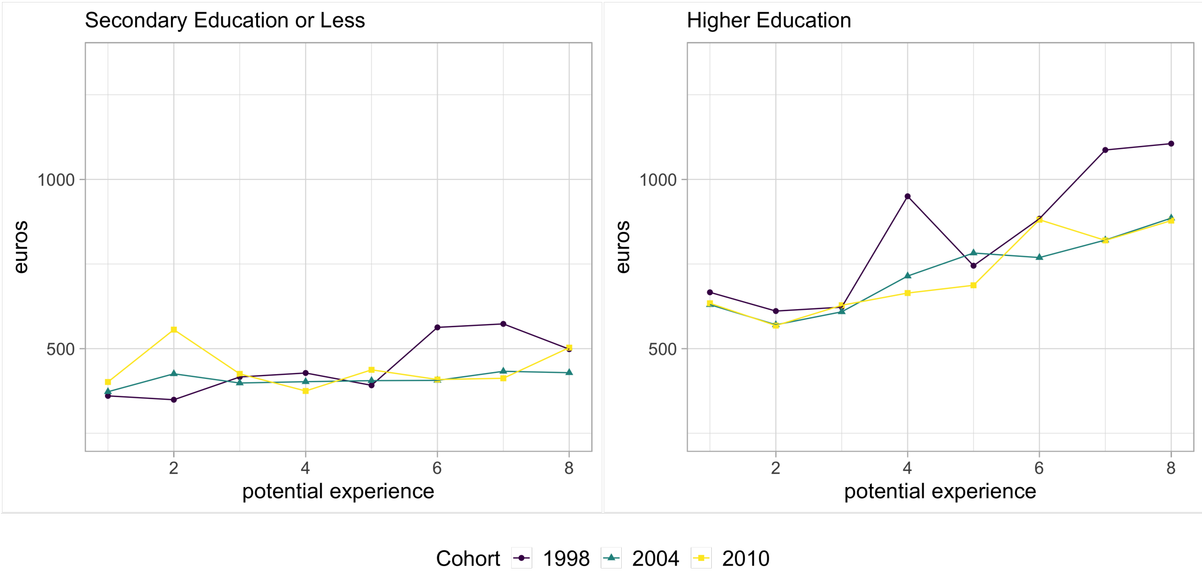

Figure 7: Entry wage standard deviation by cohort and education level over time

Notes: Source: EG panel. Author's own calculations.

Figure 7 plots entry wages standard deviation over time, by cohort and education level. Wage standard deviation does increase with potential experience, in particular for higher education graduates, which is indicative of some learning on the employers' side. However, the 1998 cohort's entry wage standard deviation increases more than the 2004 and the 2010 cohorts, which suggests sorting is not driving the higher education graduates' flattening returns to experience.

6.3.1 Human Capital

Another way the distribution of unobserved heterogeneity could differ across cohorts is through the accumulation of human capital. Because the French higher education system changed in the 1990s and 2000s, the type and quality of human capital accumulated in higher education curricula may have varied too. In turn, this variation could be captured by different returns to experience across cohorts. To proxy the type of human capital acquired by higher education graduates from different cohorts, one can use the type of school they attended. The French system counts three main types of higher education institutions: public universities, business schools, and engineering schools. Public universities are the institutions that have changed the most since the 1990s: they had to align their curricula on the Bologna process, have introduced vocational degrees, and have absorbed a large part of the higher education expansion. To check if these changes hurt returns to experience, I use the information on the type of higher institution each graduate attended to compare the returns of university graduates to business and engineering school graduates. I further decompose the type of degrees obtained at university into Vocational degrees (two years of study), Bachelor+ (three or four years of study), and Master's (five years of study and PhDs). Business schools and Engineering schools only deliver Master's. If all types of higher education graduates experience a flattening wage progression, it would mean the changes in universities are not driving the flattening returns to experience.

To compare returns to experience across the type of institution attended, I run the following regression:

$$\log w_{it} = \sum_e \mathbb{1}_{[e_i=e]} \sum_d \mathbb{1}_{[d_i=d]} \left(\alpha^{ced} + \beta^{ced}\text{exp}_{it}\right) \tag{11}$$

where d is the type of institution $\times$ degree of each individual i. If i is a higher education graduate, it can be a vocational degree, a bachelor's or master's from a public university, or a master's from a business school or engineering school. If i is a secondary education graduate, d can only be in high school.

Table 14 in appendix B shows the average initial wages and returns to experience by type of degree and institution. Two points are apparent from this table: first, graduates from all three types of institutions experience a flattening wage progression across cohorts, and second five-year degrees are particularly affected by the wage progression slowdown. We can conclude that if the quality of human capital acquired at university varied across cohorts, it is not to blame for the flattening returns to experience, since business and engineering school graduates experience the same phenomenon.

7 Conclusion

This paper demonstrates that wage returns to experience have fallen in France for higher education graduates since the end of the 1990s. Average yearly wage increases in early career have gone from 4% for 1998 graduates to 3.1% for the 2004 graduates and 2.4 for the 2010 graduates. The welfare consequences of the flattening returns to experience are especially stark for men: the present discounted value of earnings drops by 1.4% between the 1998 and 2010 cohorts, while women's actually increases by 4.4%.

The scarring effect literature often blames young graduates' flattening returns to the Great Recession. But the fall in wage returns between the 1998 and 2004 cohorts, who entered the labor market at a time of economic growth, suggests a lack of demand for educated workers cannot be the sole driver of the loss in returns to experience. To investigate whether the higher education expansion in the 1990-2000s is a driver, I perform an Oaxaca-Blinder style decomposition of returns to experience and workers employed by education. I find a positive correlation between an influx in employed workers and flattening returns to experience, thus confirming the expanding supply of educated workers is driving the flattening returns to experience, a phenomenon referred to as congestion.

Lastly, this paper shows that congestion works mostly through two mechanisms: promotion to managerial positions (or lack thereof) and over-representation of some degrees and majors. Unemployment varies little across cohorts and is therefore unlikely to be driving congestion. Alternative explanations, such as changes in unobserved heterogeneity across cohorts are shown not to hold.

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A Data

A.1 The EE cross-section

The *Enquêtes Emploi* (EE cross-section) is provided by the French Statistical Institute every year since 1990. In 2003, the data from annual to trimestrial. Individuals started being interviewed two trimesters in a row, although I do not use this dimension and use only the last trimester in which each individual was interviewed to retain yearly observations.

The analysis focuses on individuals between the ages of 25 and 64. To compute monthly average wages, only full-time employed observations reporting a wage above the .1 percentile and below the 99.9% percentile are used. I use the weight provided in the dataset in the computation of monthly average wages.

A.2 The EG panel

The *Enquêtes Générations* (EG panel) is conducted by the CEREQ on a new graduating cohort every six years. The survey starts in the year individuals leave school and enter the labor market. For a single cohort, the CEREQ conducts its surveys every two or three years. For instance, the 2010 cohort was surveyed in 2013, 2015, and 2017. Only individuals who responded to all three surveys are included in the analysis. The EG panel is unbalanced: each observation corresponds to an individual's activity spell. The spell lasts as long as the activity (employment, training, unemployment, etc.) lasts. The analysis focuses on employment and unemployment spells in France. Spells abroad or of unknown locations are excluded from the analysis. I also exclude spells started when the individual is less than 16 years old (the legal working age in France), employment spells that report starting wages below 200€or above 20,000€, or employment spells whose starting occupation or industry is unknown. Employment spells that report 'farmers' as starting occupations are also excluded.

Table 7 shows descriptive statistics on the EG panel. The number of individuals surveyed has decreased over time, but the average number of spells by individual remains roughly the same.

Cohort	1998	2004	2010
Number of individuals	13,729	9,700	7,702
Number of spells	73,953	55,218	39,241
Number of employment spells	44,330	34,078	23,798
Average number of spells by ind.	4.8	5.2	5.0
Average number of employment spells by ind.	2.7	2.9	2.7

Table 7: EG panel - spells and observations

Notes: Source: EG panel. Author's own calculations.

Variables used as controls in the main analysis include gender and whether the individual lives in an urban area. The measure for urbanity is computed from the county, or in French, 'departement' information. The 10 counties that correspond to the ten most populous cities in France in 2020 are classified as urban. These ten cities are: Paris, Marseille, Lyon, Toulouse, Nice, Nantes, Montpellier, Strasbourg, Bordeaux, Lille. The other counties are classified as non-urban. Table 8 gives descriptive statistics for gender and urbanity by cohort, as well as the average age at labor market entry (the start of the survey). There are no major differences between cohorts.

Cohort	1998	2004	2010
% Men	51.0	52.9	50.9
% Urban spells	25.3	25.2	28.1
Average age at labor market entry	21.5	21.1	21.3

Table 8: EG panel - demographics

Notes: Source: EG panel. Author's own calculations.

Education levels are classified into two broad categories. The first is 'Secondary education or less'. It regroups individuals who at most finished high school and obtained the French end-of-high school qualification, the baccalauréat. It contains two subcategories: individuals under 'No degree' left the school system without any qualification, while individuals under 'Secondary education' obtained a vocational or academic secondary degree. The second broad category is 'Higher Education'. It regroups graduates from the higher education systems. Graduates can hold short degrees ('Short higher education', two years at most) or long degrees (‘Long higher education’, at least three years or more)

% Individuals/ Cohort	1998	2004	2010
No degree	8.3	8.0	17.0
Secondary Educ.	52.3	53.0	42.4
Short Higher Educ.	28.0	27.5	23.3
Long Higher Educ.	10.7	11.4	17.3
Secondary Educ. or less	61.2	61.1	59.4
Higher Educ.	38.8	38.9	40.6

Table 9: EG panel - Education

Notes: Source: EG panel. Author’s own calculations.

The other variable used as a control in the analysis is industry. Its distribution across cohorts is shown in Table 10, as a percentage of the number of spells in each cohort. Over time, young workers have moved away from Manufacturing and Transport, Communications towards Trade, Hospitality, and Administration.

% spells/ Cohort	1998	2004	2010
Agriculture, Energy, Construction	9.7	11.6	9.6
Trade, Hospitality	17.3	17.2	24.8
Teaching, Health	17.8	17.3	18.8
Manufacturing	19.6	17.5	11.8
Administration	14.2	15.5	19.1
Specialized Services, Finance	10.6	9.2	8.9
Transports, Communications	10.9	11.7	7.0

Table 10: EG panel - Industries

Notes: Source: EG panel. Author’s own calculations.

Finally, Table 11 shows the distribution of aggregate occupations, as a percentage of the number of spells in each cohort. The share of Mid-level and Highly qualified professionals increased across cohorts, while the share of factory workers decreased.

% spells/ Cohort	1998	2004	2010
Craftsmen, Retailers, Business owners	1.3	1.3	1.7
Factory Workers	32.1	32.6	26.2
Employees	31.2	30.6	32.5
Mid-level Professionals	24.6	27.0	27.4
Highly Qualified Professionals	10.3	8.4	12.2
Unknown	.5	.0	.0

Table 11: EG panel - Aggregate Occupations

Notes: Source: EG panel. Author's own calculations.

Occupation 1	Occupation 2
Craftmen, Retailers, Business owners	Craftmen
	Retailers
	Business owners
Factory Workers	Agriculture workers
	Drivers
	Skilled workers - Handicraft
	Skilled workers - Manufacturing
	Skilled workers - Transport
	Unskilled workers - Handicraft
	Unskilled workers - Manufacturing
Employees	Admin. employees - private sector
	Commercial staff
	Direct service staff
	Employees - public sector
	Police and military staff
Mid-level Professionals	Admin. staff - private sector
	Admin. staff - public sector
	Clergy
	Foremen, Supervisors
	Health and social workers
	Teachers
	Technicians
Highly Qualified Professionals	Artists
	Engineers
	Liberal occupations
	Private sector executives
	Public sector executives
	Researchers, Professors

Table 12: Occupational Decomposition

Notes: Source: EG panel.

B Robustness Tests

	log entry wage		
Cohort	1998	2004	2010
Secondary Educ. or less	6.77***	6.86***	6.80***
	(.007)	(.007)	(.009)
Higher Educ.	7.03***	7.07***	7.15***
	(.007)	(.008)	(.009)
Secondary Educ. or less × Retained	−.024***	.017	.047***
	(.009)	(.011)	(.015)
Higher Educ. × Retained	−.034***	−.052	−.110***
	(.021)	(.032)	(.037)
Secondary Educ. or less × Pot. Exp.	.026***	.023***	.035***
	(.001)	(.001)	(.002)
Higher Educ. × Pot. Exp.	.041***	.031***	.024***
	(.001)	(.002)	(.002)
Secondary Educ. or less × Retained	−.003	−.012***	−.019***
× Pot. Exp.	(.002)	(.003)	(.003)
Higher Educ. × Retained	−.012**	−.007	.002
× Pot. Exp.	(.005)	(.009)	(.009)
FE gender, urban, sector	✓	✓	✓
Observations	44,021	33,410	22,176
R^2	.220	.159	.223

Table 13: Average starting wage and returns to experience by cohort, education level, and retention history

Notes: Source: EG panel. Observations for which retention status is known. Author's own calculations from OLS estimation of equation (10): $\log w_{it} = \sum_e \mathbb{1}_{[e_i=e]} \left(\eta^{ce} r_i + \alpha^{ce} + \beta^{ce}\text{exp}_{it} + \tau^{ec}\left(r_i \times \text{exp}_{it}\right)\right) + \gamma^c X_{it} + \epsilon_{it}$ by cohort. *p<0.1; **p<0.05; ***p<0.01.

Cohort	log entry wage 1998	2004	2010
Secondary Educ. or less	6.78***	6.87***	6.82***
	(.006)	(.007)	(.008)
Vocational	6.96***	7.03***	7.06***
	(.009)	(.009)	(.013)
Bachelor+	6.99***	6.97***	7.03***
	(.011)	(.012)	(.016)
Master	7.24***	7.20***	7.27***
	(.014)	(.014)	(.014)
Business School	7.22***	7.34***	7.36***
	(.026)	(.31)	(.037)
Engineering School	7.32***	7.36***	7.39***
	(.021)	(.025)	(.026)
Secondary Educ. or less × Pot. Exp.	.024***	.019***	.029***
	(.001)	(.001)	(.001)
Vocational × Pot. Exp.	.031***	.023***	.020***
	(.002)	(.002)	(.003)
Bachelor+ × Pot. Exp.	.040***	.037***	.033***
	(.003)	(.003)	(.004)
Master × Pot. Exp.	.038***	.045***	.025***
	(.003)	(.003)	(.003)
Business School × Pot. Exp.	.078***	.058***	.031***
	(.006)	(.008)	(.009)
Engineering School × Pot. Exp.	.056***	.036***	.023***
	(.005)	(.006)	(.006)
FE gender, urban, sector	✓	✓	✓
Observations	43,627	33,475	22,317
R^2	.248	.193	.276

Table 14: Average starting wage and returns to experience by cohort, education level, and higher education institution

Notes: Source: EG panel. Author's own calculations from OLS estimation of equation (11): $\log w_{it} = \sum_e \mathbb{1}_{[e_i=e]} \sum_d \mathbb{1}_{[d_i=d]} \left(\alpha^{ced} + \beta^{ced}\exp_{it}\right)$ by cohort. *p<0.1; **p<0.05; ***p<0.01.