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Graduating into a recession

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Abstract

We investigate labour market outcomes among persons who graduated from college during a recession in Spain. We use administrative data that allow for longitudinal analysis for a large sample of workers. The main result is that men and women who enter the labour market in a period of rising unemployment experience a significant loss of earnings in comparison with cohorts entering just before or after the downturn. However, we find that earnings differentials become insignificant by the third year after graduation for men, and by the fifth year for women. Almost all earnings losses among unlucky college graduates appear to be caused by joblessness: the brunt of adjustment takes place through employment rather than wages.

JEL: J23, J24

Keywords: college graduates; youth unemployment; recession; earnings

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1 Introduction

Graduating from college in periods of high and rising unemployment poses many challenges for young workers because the increased difficulty to find a first job may have negative and long-lasting consequences for their careers. We investigate the short and long-term effects of entering the labour market in the midst of a recession in Spain. We estimate its negative effects on earnings and other working conditions and assess the extent to which graduates recover from this negative shock. This analysis helps us understand the dynamics of the Spanish labour market in connection with college graduates and the business cycle. Our research focuses on the early nineties, a time when the overall unemployment rate reached 24% due to a short but deep economic crisis. This negative environment put more pressure on a rising and strained labour supply of college graduates, whose expectations were formed in the midst of secular high unemployment.

Looking for a job in a sluggish labour market makes work finding harder and a good job match more difficult. This is particularly damaging for college graduates because they are just setting foot on the market and early missteps can have scarring effects. Although the short-term effects on employment and wages of graduating into a recession seem obvious, the long-term effects are less clear, though more worrisome and difficult to assess. It may depend on the intensity and length of the recession and its impact on the labour market conditions. Institutional factors can also play a role, i.e., labour market flexibility may condition the nature of economic adjustments and outcomes. We are interested in gauging the extent to which cohorts graduating into a recession become trapped in lower-paid jobs or suffer drawbacks when labour market conditions improve. In this vane we address the following general question: How are college graduates' employment, earnings, and job quality affected if they enter the labour market during a period of economic recession? We ascertain the relationship between the initial unemployment rate faced by graduates and labour market outcomes over a period of ten years. We do so by comparing cohort-specific effects based on the date of graduation. The aim is to shed light on the mechanism connecting employment performance of college graduates with the labour market conditions they faced at time of graduation.

Researchers have found that graduating from college during a recession have negative, sizable, and persistent effects on earnings. For males in Canada Oreopoulos, von Wachter, and Heisz (2012) find a negative effect that lasts for ten years. For white-males in the United States, Kahn (2010) finds that wage losses are significant for the first 15

years of workers' careers. More recently, Altonji, Kahn, and Speer (2014) find that graduating during a recession reduces earnings on average by about 10% in the first year, and differences last about seven years. They also find that the effect is less important for higher-skilled majors.

For European countries results differ in terms of the persistence of the effects. For male workers in Austria, Brunner and Kuhn (2014) estimate that for a one percentage point increase in the initial local unemployment rate, initial wages drop by about 0.9% and the lifetime loss in wages is about 1.3%. The effects for white collar workers are smaller, and disappear after five to ten years. The estimated effects look similar to those found for the US or Canada. For Norway, Liu, Salvanes, and Sorensen (2016) find that a one percentage point increase in unemployment implies an earnings reduction of about 6% in the first two years, and those losses disappear by the fourth year. Less persistent effects that those for the US or Canada. They also find a strong counter-cyclical pattern of skill mismatch, suggested as an important mechanism to explain the negative effects.

Spain is a case in point for studying the consequences of graduating from college into a recession for several reasons. First, we are able to use panel data from social security records containing the complete work history of a large sample of individuals who entered the labour market in late eighties and during the nineties. Second, in the early nineties Spain experienced a deep recession followed by more than a decade of strong economic growth and employment creation. This feature of the recession provides us plenty of lead time to test the catch up process of the unlucky cohorts. Third, by OECD standards the Spanish youth labour market is characterized by massive unemployment, even among higher educated workers. Fourth, we are able to focus on college graduates because we have to our disposal a large sample of persons who graduated from college around the time of interest (late eighties and during the nineties) that conform a relatively homogeneous group of individuals. Finally, we can generate a clear measure for a job match because in the social security records jobs are classified in ten categories which can be linked to skills or education level required by the job. We consider that a good match in the case of college graduates is attained when the worker gets a job that requires a college degree.

As the youth labour market in Spain is characterized by skyrocketing unemployment, there is much research on its causes and consequences. For example, Dolado, Felgueroso, and Jimeno (2000) and Blazquez (2005) focus on the problem of over-educated young

workers. A closer paper to ours, Rodriguez-Planas and Fernandez-Kranz (2016), analyzes the effect of initial labour market conditions on workers' careers in Spain. For college graduates, the authors find that earnings losses are driven by non-employment fixed-term contracts. Contrary to our results, they find no earnings recovery. Our approach is different in two main aspects: one is that we use the actual date of graduation from college, another one is that we focus on the recession of the early nineties in Spain. By knowing the exact date of graduation for a sub-sample of college graduates we are able to disentangle cohort effects, age effects, and time of graduation effects. Otherwise assumptions need to be made about age at graduation.

Our first contribution is to estimate the effects of economic conditions at graduation time on the following labour market outcomes: the probability of finding a job, unemployment duration, annual earnings, wage rate, mobility, and measures of job quality (full-time versus part-time employment, permanent versus temporary contract, and whether or not the job requires college education). Following cohorts of college graduates for their first ten years after graduating we estimate the effects for both men and women. It should be stressed that in Spain since the nineties the labour force participation rate of young women with a college education is fairly comparable to that of their male counterpart. Indeed, we find strikingly similar results for both genders.

One additional contribution of the paper is to explore the mechanisms through which graduating during a recession may have an impact on a college graduate's career in Spain. We assess whether the impact is through employment, wages, or the quality of the job.

We find a significant loss in earnings for workers entering the labour market around the period 1992-1993, just when a short but deep recession hit the Spanish economy. A percentage point increase in the unemployment rate at year of graduation reduces total earnings during the subsequent year by about 13%. This effect decreases and becomes insignificant quite rapidly: for men by the third year since graduation, and for women lasts until the fifth year. We find that the difference in earnings is smaller and less significant when we condition on having positive earnings. We interpret this result as indicating that the main part of the loss in earnings is accounted for by joblessness and to a much lesser extent is caused by a lower wage rate received by those workers who managed to find work. Job quality does not seem to be significantly affected by high unemployment rates and, therefore, does not contribute to explain earnings losses among

recession-stricken graduates.

2 Data and Empirical Strategy

Data and Sample Selection

From the Continuous Sample of Work Histories (CSWH) – a 4% sample of workers registered with Social Security in a given year – we have selected specific cohorts of workers using ten waves of the CSWH (2005-2013). The CSWH contains information on the entire labour market history of workers in the sample, and only those who had not contact at all with the Social Security Administration in a given year are not excluded in that year, but will reenter the sample as soon as a relationship with the social security system is resumed.

Bonhomme and Hospido (2016) compare the CSWH with other data sources to show that retrospective information is good enough to construct cross-sectional distributions of male earnings from the late 1980s. Earnings information in these data can be affected by attrition, migration, long periods of inactivity, and topping by maximum and minimum levels as recorded for Social Security purposes. However, we argue that for our use of the dataset these problems are not relevant. There is not much attrition because emigration was insignificant during the period of study and both men and women show high attachment to the labour market. Censoring of earnings is not a problem in our sample of college graduates, because we focus on the beginning of their careers and starting wages are in general below the censoring threshold.

We constructed work histories from 1987 to 2013 for the cohorts of interest in the CSWH between 2005 and 2013. Importantly, we matched individual records in CSWH with other administrative sources that allowed adding crucial information. In particular, we were able to greatly improve and expand information on the educational level, and to include graduation date. The graduation date was obtained from the registry of the Public Employment Service. Without graduation date we can still use the CSWH, but it would be necessary to make assumptions about age at graduation, as for instance assigning all graduates born in a given period the same graduation date. However, by imputing graduation age this way it is impossible to distinguish between cohort effects,

age effects, and time of graduation effects. Therefore we decide to use a smaller sample of individuals for whom the exact graduation date is available.

In Table 1 we compare individuals in our final sample with the rest of individuals in the database. We find no striking differences when comparing characteristics of the whole sample of college-graduated cohorts with those of the reduced sample for which the graduation date is available. It is important to emphasize that only for this reduced sample we are certain that they completed their college education and their exact age at graduation.

Table 1: Characteristics of individuals in the final sample and the whole sample

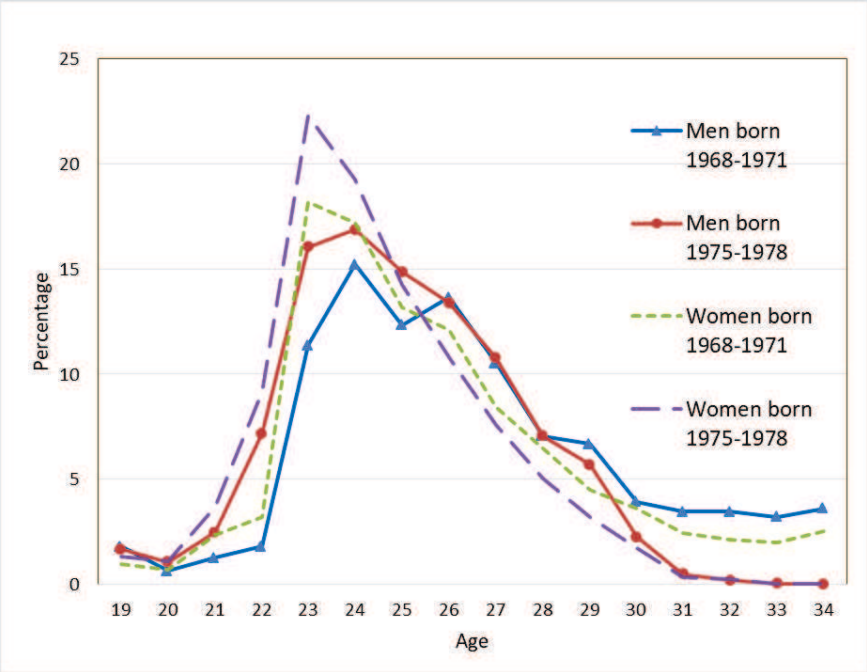
	Men		Women	
	Our Sample	Whole Sample	Our Sample	Whole Sample
Age	29.92	29.28	29.38	29.05
	(3.81)	(7.47)	(3.69)	(7.44)
Unemployed	0.47	0.49	0.56	0.52
	(0.50)	(0.50)	(0.50)	(0.50)
Annual Earnings (logs)	9.65	9.64	9.43	9.51
	(0.85)	(0.92)	(0.89)	(0.97)
Num. of obs.	36,030	651,456	68,486	755,711

We compare some characteristics of men and women in the final sample with the rest of men and women with college education for whom we do not know the exact date of graduation. We compare age, the fraction in unemployment, and total annual earnings.

To emphasize the importance of using date of graduation, we show in Figure 1 the distribution of age of graduation for several cohorts in our sample. First, we see that the concentration of individuals who graduate around 23-27 years old has increased from 63% for men (69% for women) born in 1968-1971 to 72% for men (74% for women) born in 1975-1978. The proportion of persons graduating at age 30 and older has declined for younger cohorts. Second, we see that variation in age of graduation is important, therefore if one imputes age of graduation the imputed age will not reflect actual age at graduation for the majority of the sample.

There are several advantages of focusing on college graduates instead of a more general sample of high-school and college graduates. First, most college graduates start looking

Figure 1: Frequency distribution of age at graduation for selected cohorts



for a full time job right after graduation. Second, separate samples of men and women are more homogeneous groups in terms of educational level, year of birth, and participation in the labour market. Third, it is straightforward with our data to assess if a person holds a job that matches her level of education. Fourth, attrition due to long intervals of inactivity is very low throughout the ten-year period in which we follow cohorts of graduates.

Because we want to observe each individual for at least ten consecutive years after graduation, we focus on workers born in the period 1960-1980 who graduated during the years 1991-2003. We study the effects of the recession that took place in the early nineties, in which Spain experienced a sharp increase in the unemployment rate which peaked in 1994, at 24%. A long period of expansion gradually brought the unemployment rate down to 8% in 2007. Thus, our sample includes graduates who entered the labour market in the midst of a deep recession and graduates who entered the labour market in a period of growth and record-low unemployment rates. We estimate the effects of initial labour market conditions on several outcomes: probability of finding a job, duration of unemployment, annual earnings, the wage rate, labour mobility, and several measures of job quality: full-time employment, permanent employment status, and holding a job that requires college education.

We estimate the effects on earnings for the entire sample (regardless of the person's employment status) and for a subsample of workers with positive earnings. Moreover, we use two different measures of earnings: one includes wages only and the other includes wages and unemployment insurance benefits.[1] In the estimation of the effect of initial conditions on employment we consider the full sample of workers. Because information on the type of contract is most reliable since early nineties, we restrict our analysis to workers' labour market histories starting as far back as 1991. The final sample for the main specifications contains 10,367 graduates in the period 1991-2003.

Empirical Strategy

The first specification we use to estimate the impact of initial unemployment rate is:

$$Y_{ict} = \beta_0 U_{ic} + \beta_1 U_{ic} \times E_{it} + \beta_2 U_{ic} \times E_{it}^2 + \phi_c + \delta_t + \theta X_{it} + u_{it} \tag{1}$$

where Y_{ict} represents a labour market outcome of interest for individual i, from graduate cohort c, in year t. The effect of initial unemployment (measured by U_{ic}) on the outcome of interest the first year after graduation is captured by β_0, and the persistence of the effect is jointly captured by β_1 and β_2, because E_{it} is potential experience in period t and E_{it}^2 potential experience squared. This specification is similar to the ones estimated in Light and McGarry (1998), Kahn (2010), and Altonji, Kahn, and Speer (2014). Then ϕ_c represents cohort dummies, δ_t time dummies, and X_{it} a set of controls that always includes region fixed effects. In estimations restricted to employed workers we also include the following job characteristics: the type of contract (permanent or temporary), working time (full-time or part-time job), and whether or not the job requires college education. In all estimations we use cluster-robust standard errors (by date of graduation), although results do not change with different computations of the standard errors.[2]

Given that unemployment rates for subsequent years are correlated with its initial level, U_{ic}, and that we do not include unemployment rates at different levels of potential

[1] These two measures are similar, unemployment benefits are not very important for recent graduates because most of them start looking for a formal job after graduation.

[2] We include results with different standard errors in the appendix.

experience, β_1 also captures the impact of experiencing similar unemployment rates in subsequent periods.

A potential concern is that those who graduate during periods of high unemployment may be a selected group of individuals. One way in which we address this potential problem is performing a within estimation that eliminates time-invariant individual heterogeneity. For instance, if ability is correlated with graduating in bad or good times, and we consider ability as time-invariant, with the within estimation we obtain consistency despite potential correlation between regressors and ability. Because it is not possible to run a fixed effects estimation for our baseline equation, we use individual fixed effects in an alternative specification, interacting initial unemployment rate with potential experience.

Our main results come then from the estimation of the following equation controlling for individual unobserved time-invariant heterogeneity:

$$Y_{ict} = \sum_{k=1}^{K} \beta_k U_{ic} \times E_{it}^k + \sum_{k=1}^{K} \gamma_k \times E_{it}^k + \alpha_i + \delta_t + \theta X_{it} + \varepsilon_{it}, \tag{2}$$

where α_i represents time-invariant individual heterogeneity, and β_k are the coefficients of interest. They measure the effect of the initial unemployment rate for each year after graduation. In our main analysis using the first ten years of labour market history, $K = 10$, thus we are interested on ten parameters.

This specification is also more flexible than the one in equation (1) because it does not impose a quadratic in potential experience allowing the effect of the initial unemployment rate to be different each year.

3 Descriptive Analysis

In this section we include some descriptive statistics for outcomes that are relevant for our analysis: employment, earnings, and job characteristics.

Employment of college graduates

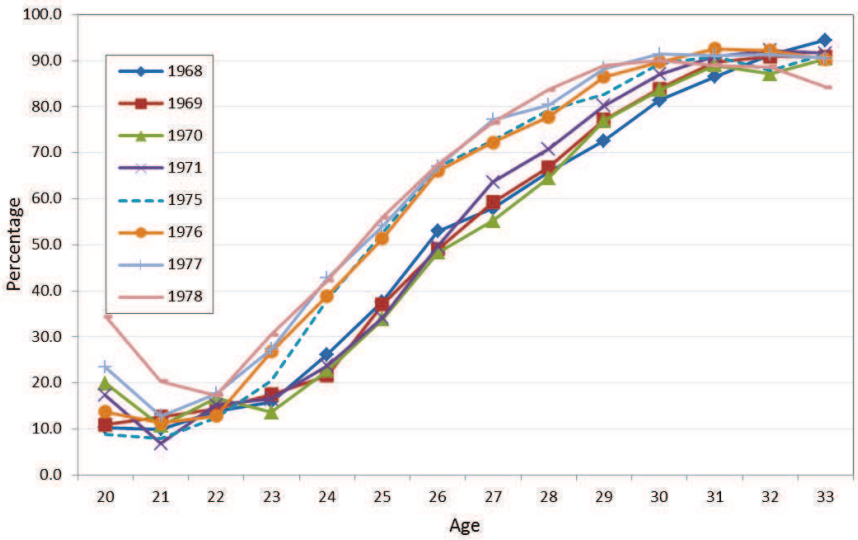
Using data from the Spanish Labour Force Survey, in Figures 2a and 2b we depict the employment to population ratio for higher educated men and women respectively. Age cohorts have been chosen to show the gap in employment performance which can be attributed to time of graduation and the kind of labour market situation faced by newly-graduated workers. Most of those individuals born in 1968-1970 graduated during the peak of the recession, and most of those born in 1975-1978 graduated when the economy was booming. For men at age 25, the employment ratio is about 20 percentage points lower if they were born in 1970 than if they were born in 1975. The differential in the employment ratio gradually disappears and is very low for men in their early thirties. Among college educated women, results are strikingly similar to men's in terms of levels and differentials of the age employment profile.

These findings illustrate two important aspects. First, the negative impact of the early nineties crisis on employment of university graduates was very strong and it shows clearly in the data from labour force survey for both men and women. Second, such strong effect vanishes in a relatively short period of time. By analyzing the issue at hand for both genders we provide additional ground for more conclusive results.

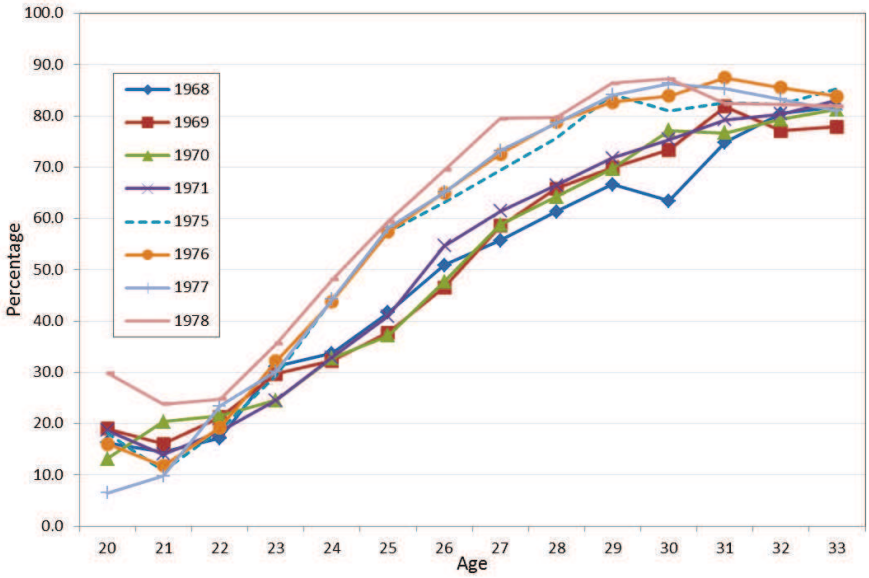
Initial earnings by time of graduation

Using the CSWH sample, in Figure 3 we plot annual real earnings obtained during the first year after graduation for cohorts graduating in the period 1990-2005. We plot in the secondary axis the unemployment rate; we distinguish between all graduates and graduates who were employed in their first year after graduation (those with positive earnings). The chart shows that earnings of persons with continuous employment during the first year after graduation do not seem to be significantly affected by the economic cycle. On the other hand, it is apparent the fall in annual earnings when calculated with the entire sample of college graduates. We can infer from these descriptive results that fall in average earnings is the consequence of workers being unemployed rather than a lower wage rate because of increasing unemployment. This interpretation seems to be reinforced by the fact that the annual earnings gap between the two measures gradually diminishes as the unemployment rate declines.

Figure 2: Employment to population ratios by age, for selected cohorts



(a) Men

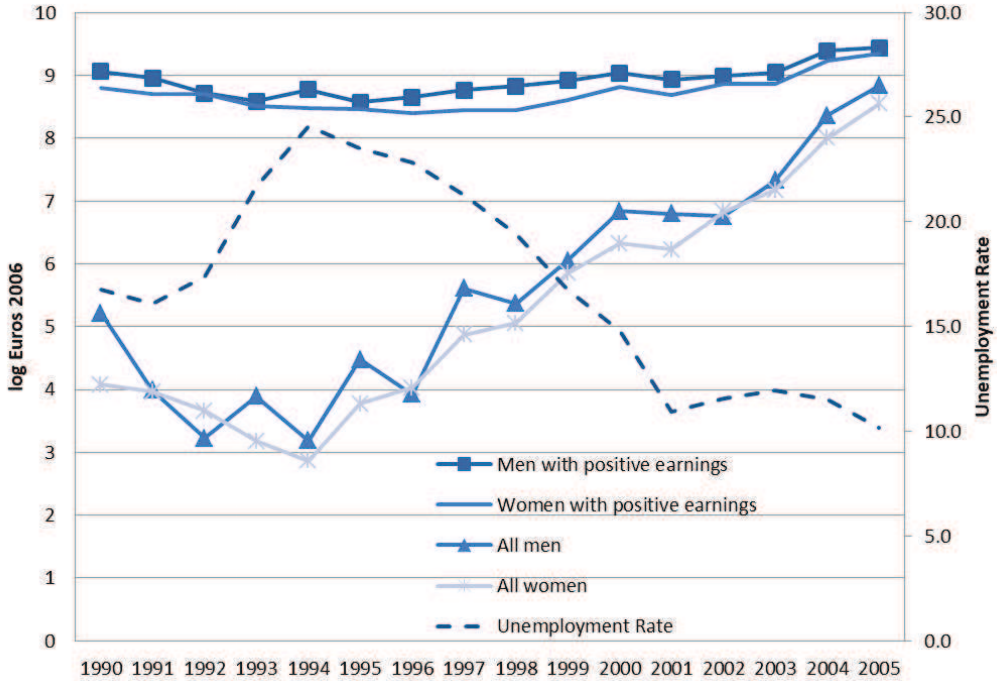


(b) Women

Note: We plot employment to population ratios of individuals with higher education in each birth cohort at each age. We plot birth cohorts 1968-1971, graduating on average during the peak of the recession, and birth cohorts 1975-1978, graduating on average when the recession is over. Source: Labor Force Survey, INE.

Based on these descriptive patterns we posit that the main mechanism behind the differences in earnings by time of graduation is associated with experiencing unemployment rather than getting lower-paying jobs. That is, the adjustment in the labour market for workers graduating from college in bad times takes place through quantity rather than price and this result may also be relevant to understand the persistence of the effects.

Figure 3: Initial earnings by graduation date for men and women



Note: We plot average log earnings during the first year after graduation, for the whole sample and for those with positive earnings during that first year. Earnings are expressed in Euros of 2006. The overall unemployment rate is from the labour force survey and is plotted in the secondary axis.

Job characteristics over time

To describe further our data set we run several regressions where the dependent variables are total annual earnings (regression 1) and a binary variable equal to one when the worker holds a job with the following characteristics and zero otherwise: (2) permanent, (3) mismatched (college education not required), and (4) full-time. Coefficients in Tables 2 and 3 reflect changes in those labour market outcomes with respect to the year of graduation (Year 1). Results indicate that graduates move towards better jobs

along their first ten years of career because of increasing earnings and rising probability of being in permanent, matched, and full-time jobs.

Table 2: Evolution of job characteristics for men

VARIABLES	(1) Total earnings	(2) Fraction Permanent	(3) Fraction Mismatch	(4) Fraction Full Time
Year 2	0.060	0.062***	-0.032***	0.035***
	(0.072)	(0.008)	(0.008)	(0.008)
Year 3	0.069	0.120***	-0.055***	0.065***
	(0.081)	(0.011)	(0.010)	(0.010)
Year 4	0.147*	0.175***	-0.071***	0.091***
	(0.085)	(0.013)	(0.012)	(0.012)
Year 5	0.264***	0.218***	-0.077***	0.113***
	(0.093)	(0.015)	(0.014)	(0.014)
Year 6	0.323***	0.254***	-0.088***	0.112***
	(0.105)	(0.017)	(0.015)	(0.016)
Year 7	0.353***	0.279***	-0.093***	0.118***
	(0.108)	(0.018)	(0.017)	(0.018)
Year 8	0.377***	0.306***	-0.101***	0.140***
	(0.112)	(0.020)	(0.019)	(0.020)
Year 9	0.400***	0.330***	-0.115***	0.155***
	(0.116)	(0.022)	(0.020)	(0.022)
Year 10	0.436***	0.346***	-0.128***	0.157***
	(0.120)	(0.023)	(0.022)	(0.025)
Observations	26,050	26,050	26,050	26,050
R-squared	0.355	0.180	0.039	0.027
Number of individuals	3,580	3,580	3,580	3,580

*Dependent variables are: (1) Total annual earnings; and a dichotomous variable equal to one if the job has the following characteristics and zero otherwise: (2) permanent, (3) mismatched, and (4) full-time. Cluster-robust standard errors in parentheses. *** indicates significance at the 1%, ** at the 5% level, and * at the 10% level.*

4 Results

In this section, we present the results of estimations aimed at gauging the impact of unemployment rate at time of graduation on different labour market outcomes among college graduates.

Table 3: Evolution of job characteristics for women

VARIABLES	(1) Total earnings	(2) Fraction Permanent	(3) Fraction Mismatch	(4) Fraction Full Time
Year 2	0.203***	0.047***	-0.033***	0.041***
	(0.058)	(0.006)	(0.006)	(0.007)
Year 3	0.305***	0.093***	-0.064***	0.067***
	(0.064)	(0.008)	(0.008)	(0.008)
Year 4	0.426***	0.139***	-0.072***	0.093***
	(0.067)	(0.010)	(0.009)	(0.010)
Year 5	0.439***	0.184***	-0.086***	0.109***
	(0.073)	(0.011)	(0.010)	(0.011)
Year 6	0.524***	0.211***	-0.096***	0.120***
	(0.082)	(0.012)	(0.011)	(0.012)
Year 7	0.579***	0.230***	-0.107***	0.127***
	(0.084)	(0.013)	(0.012)	(0.013)
Year 8	0.622***	0.245***	-0.113***	0.134***
	(0.086)	(0.014)	(0.013)	(0.015)
Year 9	0.653***	0.265***	-0.123***	0.144***
	(0.088)	(0.014)	(0.014)	(0.016)
Year 10	0.685***	0.285***	-0.128***	0.154***
	(0.091)	(0.015)	(0.015)	(0.017)
Observations	48,886	48,886	48,886	48,886
R-squared	0.346	0.127	0.049	0.025
Number of individuals	6,787	6,787	6,787	6,787

*Dependent variables are: (1) Total annual earnings; and a binary variable equal to one if the job has the following characteristics and zero otherwise: (2) permanent, (3) mismatched, and (4) full-time. Cluster-robust standard errors in parentheses. *** indicates significance at the 1%, ** at the 5% level, and * at the 10% level.*

Effect on Earnings

In the first estimation of the effect of initial conditions on earnings we consider all workers who held at least one job in the first five years after graduation. The measure for earnings includes both wages earned and unemployment benefits received during the year.[3] Thus, joblessness and working time are factored in by estimating a Tobit model. In other estimations the dependent variable will be daily earnings because we consider only workers with positive earnings during the year and we observe days worked but not hours worked. In the estimation of the effect of initial conditions on other job-related variables we consider all workers for whom we have information on the type of contract, which could affect sample size for early years of graduates' work history.

Overall unemployment rate in Spain in the period of study (1990-2005) reached 24% in 1993-1994, and declined sharply until 2000, remaining around 10% during the following five years. Thus, workers in our sample face very different labour market environments depending on their time of graduation. For the estimations in this paper we use the nation's unemployment rates provided by the Spanish Statistical Office (INE).[4]

Table 4 contains results for men and women obtained from estimating a Tobit model for the baseline equation (equation (1)) with logarithm of annual earnings as the dependent variable. The three estimated coefficients shown are for the initial unemployment rate and for its interaction with potential experience and its quadratic term. Columns (1) and (2) refer to the whole sample of college graduates. The estimated effect of the initial unemployment rate is similar for men and women; there is a negative and sizable impact for both genders. A one percentage point rise in unemployment rate at time of graduation reduces first-year earnings by around 14 percent. Therefore, graduating in the midst of rising unemployment causes an important loss of earnings in the first year after graduation. However, the effect decreases rapidly, becoming not significant by the third year.

Columns (3) and (4) of Table 4 refer to graduated workers with positive annual earnings. The dependent variable is now daily earnings. This is intended to net out the effect of joblessness on annual earnings. The results are now very different. Although we still find a negative effect of unemployment rate at time of graduation on earnings, such

[3]Excluding unemployment insurance benefits from earnings does not change our results.

[4]Results do not change when we use regional unemployment rates or unemployment rates for workers aged 25-29 years instead of the overall unemployment rate as shown in the appendix.

effect is much lower: one percentage point increase in the initial unemployment rate reduces earnings by around one percent for men and less than one percentage point for women. This finding is consistent with previously shown descriptive evidence and reveals that the channels by which initial unemployment rate affects annual earnings of college graduates is not receiving lower wages at the beginning of their careers but lack of earnings because of joblessness. Notice that the condition of "positive earnings" to select the sample does not exclude workers with sporadic employment during the year because we include all workers with some earnings during each year after graduation.

Table 4: Effect of unemployment rate at time of graduation on earnings

	(1)	(2)	(3)	(4)
	Whole Sample		Positive Earnings	
	Men	Women	Men	Women
Initial UR	-0.134***	-0.144***	-0.014**	-0.010**
	(0.017)	(0.014)	(0.006)	(0.005)
Initial UR × Pot. Exp.	0.062***	0.059***	0.007***	0.003**
	(0.005)	(0.004)	(0.002)	(0.002)
Initial UR × Pot. Exp. sq.	-0.006***	-0.004***	-0.001***	-0.000*
	(0.001)	(0.000)	(0.000)	(0.000)
Observations	36,030	68,486	26,050	48,886
Number of individuals	3,663	6,976	3,580	6,787

*Regression of log annual earnings on initial unemployment rate interacted with a quadratic of potential experience, and controls described in Section 2. Coefficients represent marginal effects. Standard errors (in parentheses) are clustered by date of graduation. *** indicates significance at the 1%, ** at the 5% level, and * at the 10% level.*

To investigate more deeply the persistence of the effect of the unemployment rate at time of graduation on earnings of graduates, we use now a different specification (equation (2)) which allows us to capture year-specific effect following graduation by interacting initial unemployment rate with year dummies for subsequent years after graduation. As indicated, we can estimate this equation using a within-group estimator to remove individual time-invariant unobserved heterogeneity.[5] This way we obtain consistent estimators even in the presence of correlation between time-invariant unobserved heterogeneity and the error term. In this respect one possible cause of concern could be that in the face of

[5]We estimated this equation using a random effects estimator, and results are similar in both cases.

high unemployment individuals postpone entry to the labour market and pursue further studies instead. We argue that this is not a serious concern for two reasons. First, we find that age at graduation does not change during bad times, implying that individuals do not seem to stay in college longer when unemployment rates are high. Second, in Spain only about 4% of college graduates enroll in post-graduate programs during the period of study.

Table 5 shows the estimated effect of the initial unemployment rate for the first five years after graduation for men and women. When we consider all graduates, the negative effect on earnings appears to last for the first two years of men's careers: the first year earnings fall by 12.5 percentage points per additional point in the unemployment rate; that impact diminishes to 7 percentage points in the second year, and becomes insignificant in the third year after graduation. For women, the effect of initial unemployment rates seems to be more persistent: after five years of graduating a point increase in the unemployment rate at time of graduation implies a fall by 2 percentage points in earnings.[6]

We consider also graduates with positive annual earnings. To be in this sample we require that the person earned some income in at lest one month of the year. Among the explanatory variables we add observed job characteristics (permanent versus temporary, and full-time versus part-time). We also consider the occupational category of the job to assess educational match. A mismatch occurs if the job held by the person is not classified as one of the two top Social Security categories: "Ingenieros, Licenciados o Alta Dirección" or "Ingenieros Técnicos, Ayudantes Titulados". This assessment is simple but meaningful for our research because the classification is related to work tasks and responsibility attached to the job, in addition to its level of compensation.

When we consider employed workers the effect is smaller and less persistent. For men, we find that an increase in unemployment of 1 percentage point leads to a reduction in annual wages of about 1.8 percent in the first year after graduation, one percent in the second year (but not significant), and vanishes by the third year. For women, differences are even smaller, and actually not significant in any year. As expected, having a permanent job, a full time job, or a job that requires a college degree have significant and positive effects on earnings.

[6]We also estimate a censored regression model based on Honore (1992) and find similar results: coefficients are slightly bigger and the effect also becomes not significant by the third year. We use the Stata ado file pantob version 0.6 that implements the estimators in the article.

Thus, once we compare workers in similar jobs and facing the same current economic conditions, we find that graduating in bad times decreases earnings for both men and women. The negative effect is much smaller when we consider only graduates with positive earnings. Therefore, a lower wage rate is not the cause of loss earnings of workers who graduated from college when the unemployment rate was high. This is particularly true for women, who experience overall losses similar to those of men although more persistent, in spite of the weaker effect of the initial unemployment rate on women's daily wages.[7]

Results in context

The negative economic consequences of graduating into a recession found for the US by Altonji, Kahn, and Speer (2014) and Kahn (2010); and for Canada by Oreopoulos, von Wachter, and Heisz (2012), are larger and more persistent than what we find for Spain. One important difference between the cited papers and ours is their focus on male graduates with jobs, restricting the sample to workers with earnings above a given threshold, similarly to our sample for column (3) in Table 4 and column (3) in Table 5. For instance, Altonji, Kahn, and Speer (2014) find that graduating during a recession reduces earnings on average by about 10% in the first year, and this negative effect on earnings lasts up to seven years. For Canada, Oreopoulos, von Wachter, and Heisz (2012) find that annual wages are about 9% lower in the first year after college graduation, 4% lower five years later and 2% lower nine years after graduation.

There are two aspects we need to consider when comparing our results with those for other countries or periods. First, we are considering the impact of a short recession in the early-nineties followed by a long period of declining unemployment rate. This fact may have contributed to the quick recovery of earnings for the cohort graduating during or immediately after the recession. Second, variations in unemployment rates are a lot more pronounced in Spain than in the US or Canada. Unemployment rates in Canada and the US in the different periods analyzed vary around 5 percentage points between peak and through. In Spain, in the period analyzed, annual unemployment rate varied around 12 percentage points (ranging from 10.9% to 23.6%).

[7]This finding is consistent with weak real wage cyclicality in Spain during the period analyzed in this paper.

Table 5: Persistence of the effect of entry conditions on earnings

	(1)	(2)	(3)	(4)
	Whole Sample		Positive Earnings	
	Men	Women	Men	Women
Year 1	-0.125***	-0.137***	-0.018***	-0.008
	(0.025)	(0.019)	(0.007)	(0.005)
Year 2	-0.069***	-0.116***	-0.007	-0.005
	(0.023)	(0.017)	(0.005)	(0.004)
Year 3	-0.027	-0.083***	0.002	-0.000
	(0.020)	(0.015)	(0.004)	(0.004)
Year 4	-0.008	-0.039***	0.004	-0.001
	(0.016)	(0.012)	(0.004)	(0.003)
Year 5	0.008	-0.020**	0.001	0.003
	(0.012)	(0.009)	(0.003)	(0.002)
Permanent			0.277***	0.222***
			(0.014)	(0.011)
Full Time			0.543***	0.549***
			(0.029)	(0.014)
Mismatch			-0.242***	-0.297***
			(0.016)	(0.013)
Observations	36,030	68,486	26,050	48,886
Number of individuals	3,663	6,976	3,580	6,787

*Within-group estimation of log annual earnings on initial unemployment rate interacted with dummies for different years of potential experience, and controls described in Section 2. We include all graduates in the sample in columns (1) and (2), and only those with positive annual earnings in columns (3) and (4). Coefficients represent marginal effects. Cluster-robust standard errors are in parentheses. *** indicates significance at the 1%, ** at the 5% level, and * at the 10% level.*

Therefore, the overall estimated impact of the recession in Spain is larger than what just looking at the point estimates suggests. In particular, comparing workers graduating in 2001 (facing the lowest level of unemployment in the period) with workers graduating in 1993 or 1994 (with the highest unemployment rates), our point estimates for college graduates with positive earnings, presented in Table 5, imply an average difference in first-year earnings between those two (extreme) cohorts of around 23% for men, and 10% for women. This loss is however a lot less persistent than losses found for the US or Canada: it falls below 10% both for men and women in the second year, and practically disappears afterwards.

As indicated earlier, the brunt of the recession on newly-graduated workers in Spain is joblessness. That is why we use the whole sample to show the magnitude of the loss which is longer lasting because of long-term unemployment, particularly high among younger job seekers. We provide further analysis of the mechanism by which graduating in the midst of a recession affects earnings in Spain.

Mechanisms: Prices vs. Quantities

In this section we ask ourselves two questions: 1) Why do workers graduating in a period of high unemployment earn less than those graduating before or after? 2) How do their earnings recover from the negative impact of the recession? To address these questions we estimate the effects of the unemployment rate the year after graduation on employment related variables. In columns 1 (males) and 3 (females) of Table 6 we present the results of estimating a linear probability model where the dependent variable is equal to 1 if the person was employed at least one month during the year after graduation. In columns 2 (males) and 4 (females) of the same table, we show the results of estimating an ordinary least square regression where the dependent variable is fraction of time spent in unemployment during the year after graduation.

Results indicate that both men and women graduating when the unemployment rate is higher are less likely to be employed, and they spend more time jobless during the first year after graduation. Moreover, the effect of the initial unemployment rate persists for the first three years in the labour market with a college degree. Both men and women graduating during a recession face a lower probability of being employed during the first three or four years after graduation. In terms of time in unemployment, we find that

Table 6: Effect of entry conditions on employment-related outcomes

	(1)	(2)	(3)	(4)
	Men		Women	
		Fraction		Fraction
VARIABLES	Employed	Unemployed	Employed	Unemployed
Year 1	-0.015***	0.011***	-0.014***	0.008***
	(0.003)	(0.003)	(0.002)	(0.002)
Year 2	-0.008***	0.005**	-0.012***	0.007***
	(0.002)	(0.002)	(0.002)	(0.002)
Year 3	-0.003*	0.001	-0.007***	0.004**
	(0.002)	(0.002)	(0.002)	(0.002)
Year 4	-0.002	0.000	-0.003*	0.001
	(0.002)	(0.002)	(0.001)	(0.001)
Year 5	0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Observations	36,030	36,030	68,486	68,486
R-squared	0.085	0.154	0.077	0.128
Number of individuals	3,663	3,663	6,976	6,976

*Within-group estimation of different outcomes on initial unemployment rate interacted with dummies for different years of potential experience, and controls described in Section 2. We present cluster-robust standard errors in parentheses. *** indicates significance at the 1%, ** at the 5% level, and * at the 10% level.*

for each additional point in the initial unemployment rate, men spend about 1.1 percent more time unemployed in the first year after graduation, and women almost 1 percent more.

In order to see if the recession affected the quality of the jobs graduates find, we estimate equation (2) for three different dependent variables: the fraction of the first year after graduation in a permanent job, in a mismatched job, and in a full time job. Results for men are shown in Table 7 and for women in Table 8. We include the baseline specification for earnings in the first columns for the sake of comparison. Overall, we find no significant effects of the unemployment rate at time of graduation on any of these job characteristics. In terms of observed quality, the first jobs obtained by college graduates when unemployment is high are not significantly different from jobs obtained when unemployment is low. Therefore, we interpret this result as indicating that differences

in job quality, which are correlated with earnings as shown in Table 5, do not explain the drop in earnings experienced by recent graduates who find work during a recession.

These findings suggest that college graduates do not seem to be affected in their long term careers in the sense that they do not seem to be relegated to worse jobs because of having finished their studies in a time period of high unemployment.

Table 7: Effect of entry conditions on other outcomes for men

VARIABLES	(1) Total earnings	(2) Fraction Permanent	(3) Fraction Mismatch	(4) Fraction Full Time
Year 1	-0.018***	-0.000	0.005	0.004
	(0.007)	(0.004)	(0.004)	(0.003)
Year 2	-0.007	-0.000	0.004	0.004
	(0.005)	(0.004)	(0.003)	(0.003)
Year 3	0.002	-0.001	0.002	0.004**
	(0.004)	(0.003)	(0.003)	(0.002)
Year 4	0.004	-0.002	0.002	0.003
	(0.004)	(0.003)	(0.002)	(0.002)
Year 5	0.001	-0.001	0.003*	0.001
	(0.003)	(0.002)	(0.002)	(0.001)
Observations	26,050	26,050	26,050	26,050
R-squared	0.355	0.180	0.039	0.028
Number of individuals	3,580	3,580	3,580	3,580

*We consider as outcomes dummies for having a permanent job, a full time job, and a mismatched job (when college education is not required). Within-group estimation with cluster-robust standard errors in parentheses. *** indicates significance at the 1%, ** at the 5% level, and * at the 10% level.*

We remark once again that our results contrast with those obtained for the US and Canada. Specifically, Altonji, Kahn, and Speer (2014) find that the average 10% reduction in earnings at time of graduation is driven partially by more unemployment and less full-time jobs, and partially by an average 4% reduction in hourly wage rates. For Canada, Oreopoulos, von Wachter, and Heisz (2012) find that the effect of graduating in periods of high unemployment is mainly due to lower weekly earnings while the loss of experience is not very large. We find that the loss in earnings is driven mainly by higher probability of unemployment, and that a small part of the negative effect is explained

Table 8: Effect of entry conditions on other outcomes for women

VARIABLES	(1) Total earnings	(2) Fraction Permanent	(3) Fraction Mismatch	(4) Fraction Full Time
Year 1	-0.008	-0.002	-0.003	0.001
	(0.005)	(0.003)	(0.003)	(0.003)
Year 2	-0.005	-0.001	-0.001	0.003
	(0.004)	(0.003)	(0.002)	(0.002)
Year 3	-0.000	-0.000	-0.001	0.000
	(0.004)	(0.002)	(0.002)	(0.002)
Year 4	-0.001	0.001	-0.001	0.001
	(0.003)	(0.002)	(0.002)	(0.002)
Year 5	0.003	0.001	-0.001	0.000
	(0.002)	(0.001)	(0.001)	(0.001)
Observations	48,886	48,886	48,886	48,886
R-squared	0.346	0.127	0.049	0.025
Number of individuals	6,787	6,787	6,787	6,787

*We consider as outcomes dummies for having a permanent job, a full time job, and a mismatched job (when college education is not required). Within-group estimation with cluster-robust standard errors in parentheses. *** indicates significance at the 1%, ** at the 5% level, and * at the 10% level.*

by lower wage rates. Moreover, we do not find significant differences in the quality of the jobs obtained by graduates when the unemployment rate is high as compared with those obtained when the unemployment rate is low.

5 Summary and Conclusion

Graduating in the midst of a recession, like the one in the early nineties in Spain, is associated with a significant reduction in earnings among college graduates. The negative effect on earnings becomes insignificant as of the third or fourth years after graduation. This result is indication of a sizable loss of earning that is never recovered, even though workers of the unlucky cohort catch-up pretty soon. Although the point estimate of the loss is relatively low in comparison with those of similar studies for other countries, in accumulated terms the loss is still important because of the huge unemployment rate gradient in Spain.

Comparing two cohorts of workers with positive earnings but facing very different labour markets situations at time of graduation we can provide a sense of the losses. Our point estimate for workers who find a job just out of college implies an average difference in first year earnings of 23% between men graduating in 1993-1994 (just in the middle of the recession) and men graduating in 2001 (way into a strong period of expansion). The analogous differential is 10% for women. Even if those differences disappear soon after graduation, the accumulated income loss is still quite significant.

We find differences between genders in the impact of unemployment rate at time of graduation. Women seems to be less negatively affected on the hourly wage, and more affected in terms of the persistence of the effect. This finding may be related with the potential different effects of recessions on the labour markets of men and women, an issue that we do not address in this paper. However, we should remark that few papers have analyzed the impact of recessions on the labour market outcomes of both, men and women, as we have done.

According to our results a key channel by which graduating during a recession in Spain has a negative effect on earnings of college graduates is the strong decline in the probability of getting a first job and the long duration of unemployment. Finding insignificant effects of the recession on job characteristics rules out job quality as an important driver

of lower earnings. A short recession followed by a long period of declining unemployment rate is probably a relevant factor behind the short-lived effect on the labour market of college graduates found in this paper. With new data available, we expect to do further research on the effect of the recent recession in Spain.

Appendix

Standard Errors

Our main variable of interest, U_{ic}, varies only at the graduate cohort level, where a graduate cohort is composed of individuals graduating in the same quarter. Because of this feature we need to take into account possible correlation within cohorts when computing standard errors. We have 72 groups based on graduation dates, with sizes varying from 610 to 11,438, and an average of 4,407 workers. In our main analysis we present clustered standard errors by individual. As shown in Table 9 for the sample of men, results are the same when using clustered standard errors by graduating cohort or blocked bootstrap, and very similar when using group averages instead of individual-level data.

Alternative Unemployment Rates

We use alternative definitions of the initial unemployment rate in our estimation of equation 1, as a robustness check; we use regional unemployment rates and young unemployment rates. We show the results for the sample of workers with positive earnings in a given year. As shown in Table 10, results are similar to those in columns (3) for men and (4) for women in Table 1.

Table 9: Robustness check for standard errors - Men

VARIABLES	(1) Clustering individuals	(2) Clustering graduating cohort	(3) Blocked Bootstrap	(4) Cohort level
Year 1	-0.125***	-0.125***	-0.125***	-0.118***
	(0.025)	(0.025)	(0.026)	(0.026)
Year 2	-0.069***	-0.069***	-0.069***	-0.062***
	(0.023)	(0.021)	(0.024)	(0.022)
Year 3	-0.027	-0.027	-0.027	-0.019
	(0.020)	(0.020)	(0.019)	(0.019)
Year 4	-0.007	-0.007	-0.007	-0.004
	(0.016)	(0.016)	(0.016)	(0.015)
Year 5	0.009	0.009	0.009	0.010
	(0.012)	(0.013)	(0.012)	(0.011)
Observations	36,030	36,030	36,030	692
Number of individuals	3,663	3,663	3,663	
Number of groups				72

*Within-group estimation of log annual earnings on initial unemployment rate interacted with dummies for different years of potential experience, and controls described in Section 2. We include all graduates. *** indicates significance at the 1%, ** at the 5% level, and * at the 10% level.*

Table 10: Effect of regional and youth unemployment rates at time of graduation on earnings

	(1)	(2)	(3)	(4)
	Men		Women	
VARIABLES	Regional	Youth	Regional	Youth
Initial UR	-0.010**	-0.009*	-0.010**	-0.007*
	(0.005)	(0.005)	(0.004)	(0.004)
Initial UR × Pot. Exp.	0.005***	0.006***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
Initial UR × Pot. Exp. sq.	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	26,050	26,050	48,886	48,886
Number of individuals	3,580	3,580	6,787	6,787

*Regression of log annual earnings on initial unemployment rate interacted with a quadratic of potential experience, and controls described in Section 2. Standard errors (in parentheses) are clustered by date of graduation. *** indicates significance at the 1%, ** at the 5% level, and * at the 10% level.*

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