The Short- and Long-Term Career Effects of Graduating in a Recession

Student names: Nursultan Baitlessov, Timur Aubakir

Nazarbayev University

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Dr. Iraj Rahmani

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1. Research topic

Research question

This paper studied the duration and size of adverse effects of temporary labor market conditions in a recession on graduating college students. It has the following research question: What are the short- and long-term career effects of a recession on people graduating in this period?

Motivation for study

This topic is highly important for devising policies for inexperienced young employees to prevent them from losing earnings in periods of recessions. From economic theory we know that recessions will ultimately end but they can have persistent and even permanent negative effects on people who were unlucky to start their careers in this period. Therefore, the government and individuals should know how to adjust to the changing economic situation after a recession to prevent long lasting negative economic effects for young workers. Understanding the mechanism of these effects is essential to effectively cope with them. This paper analyzes statistical data and describes the underlying impact of a recession on fresh graduates.

Literature review

There are several earlier works on this research topic that introduced career development models and found out direct correlation between job mobility and earnings, meaning that people change their jobs more frequently when their annual earnings decrease in a recession (Okun, 1973). Previous studies also showed that people tend to have lower quality jobs in recessions, as it is problematic to find jobs that provide notable opportunities for professional growth during economic downturn (Topel & Ward, 1992). Therefore, these authors claim that higher rates of job mobility will be one of the solutions to escape from the brunt of a recession on career. Still, there are other models showing that the recovery can take

place inside of firms, as people accumulate human capital over time, and thereby finding a permanent job can also be a solution to recover from the burden of a recession.

A statement of economic theories used

This paper used developed economic theories of career advancement in the analysis of long-lasting recession effects. The three categories of models were used: search theory model, job mobility model and human capital accumulation model. Search theory model states that people enter a long process of finding a high paying job in a recession and the cost of this search is increased with age because of family immobility constraints (Topel & Ward, 1992). According to this theory, high skilled inexperienced workers tend to change industries and provinces in response to decreasing wages, whereas low skilled workers search at a lower rate after obtaining their first job. Job mobility model explains that the career movement across firms is more frequent in a recession until employers learn the skill distribution of the graduating cohort (Gibbons et al., 2005). Low skilled workers have a prolonged adverse effects of initial labor market conditions, as they search for a job less intensely than high skilled workers. What about the last model, it explains the possibility to recover from a recession within the firm with accumulation of human capital (Gibbons & Waldman, 2006). However, the theory covered in these models fails to explain the permanent adverse effects of a recession. Therefore, the authors combined the theory from the above models and created a search model with high and low skilled workers that helped to explain the permanent effects of a downturn.

2. Data

Description of data

This research used a large longitudinal Canadian university-employer-employee dataset that spans a 20 years period. The data was collected by Statistics Canada by matching and compiling three administrative datasets. It contains information of approximately 70% of Canadian college students and graduates from 1976 to 1995 with the records of their earnings

and payroll of firms where they worked from 1982 to 1999. The dataset included information about students', degree level, program of study and graduation date and about their employers, yearlong earnings, acquisition of unemployment benefits and province of residence.

The use of data to answer the research question

As the research question spans only those young workers who graduate in a recession, the authors excluded college dropouts and women to reduce potential measurement errors. To exclude college dropouts, the difference between actual and forecasted graduation year was estimated and if the difference was negative then these students were eliminated from the data. In addition, those young workers who left the country and stopped filing taxes and those who entered the underground economy were excluded to make calculations more precise.

In statistical analysis, it was important to define the "quality" of the firm attribute to describe the employee's job mobility in a period after the recession. The quality of the firm was estimated by the firm's size and average earnings of employees. The quality was considered a permanent attribute, meaning that an employee can improve the firm "quality" characteristic only if the worker shifts to the firm with higher quality, but the firm's quality in the same firm could not be enhanced.

While calculating the statistical effects of a downturn in the regression model, the authors decided that a 5% increase in unemployment rate will be considered as the notion of a recession, as this percentage increase characterizes an ordinary recession in Canada.

3. Regression models

This paper was unique because it presented the categorized duration of recession effects on high and low skilled employees. It was possible to classify students as less or more advantaged in the labor market at the time of graduation by predicting their expected earnings relying on information about college type, length of study, year of graduation and program of study. The two models of estimation were developed: cell-level model and dynamic model.

Cell-level model:

To estimate the continuous effect of initial labor market conditions after graduation, the unemployment rate at the time of graduation was used. As the rate of unemployment is the central independent variable, its variation was accounted on particular levels: graduation cohort (c), first region of residence (r), year (t) and log of year earnings was used as the cell means $\bar{y}_{crt}$ with other variables in the regression that were weighted by the particular sizes of the cell. The cell-model (1) is:

$$\bar{y}_{crt} = \alpha + \beta_e UR_{cr0} + \phi_t + \theta_r + \gamma_e + \chi_c + u_{crt},$$

In this model θ_r, Υ_e, φ_t , χ_c are added for unrestricted fixed effect of year (t), year of graduation (c), initial region of residence (r), year of potential experience (e). β_e is the main coefficient of interest and varies with experience (e).

Dynamic model:

The actual condition of the labor market in the region also affects the earnings of workers with experience. Therefore, in the primary estimate, experienced workers encountered the persistent effect of initial unemployment rate and sum of weights of unemployment rates throughout the career. The primary estimate captured the expected effect of graduating in a recession on earnings given the ordinary unemployment rate faced at the time of graduation. The restricted model was used that grouped the unemployment rate effects in consecutive two-year periods. Therefore, for the experience years 0-1, 2-3, 4-5, 6-7, etc. the coefficients were given as $\beta_{e,01}$ ($\beta_{e,2\text{-}3}$, $\beta_{e,4\text{-}5}$, $\beta_{e,6\text{-}7}$, etc.) and the regional subscripts were excluded for convenience. The dynamic model (2) is:

$$\log \bar{w}_{crt} = \phi_t + \theta_r + \chi_c + \gamma_e + \beta_{e,01}\overline{UR}_{01} + \beta_{e,23}\overline{UR}_{23} + \cdot + \beta_{e,45}\overline{UR}_{45} + \cdots + u_{crt},$$

In this model $\overline{UR}_{01}$ is the average unemployment rate for two consecutive years ($\overline{UR}_{01}$= $(UR_{cr0}+UR_{cr1})/2$, $\overline{UR}_{23}$= $(UR_{cr2}+UR_{cr3})/2$, ...) and the restriction for the estimator is $\beta_{e,d} = 0$ for all d<e.

4. Results

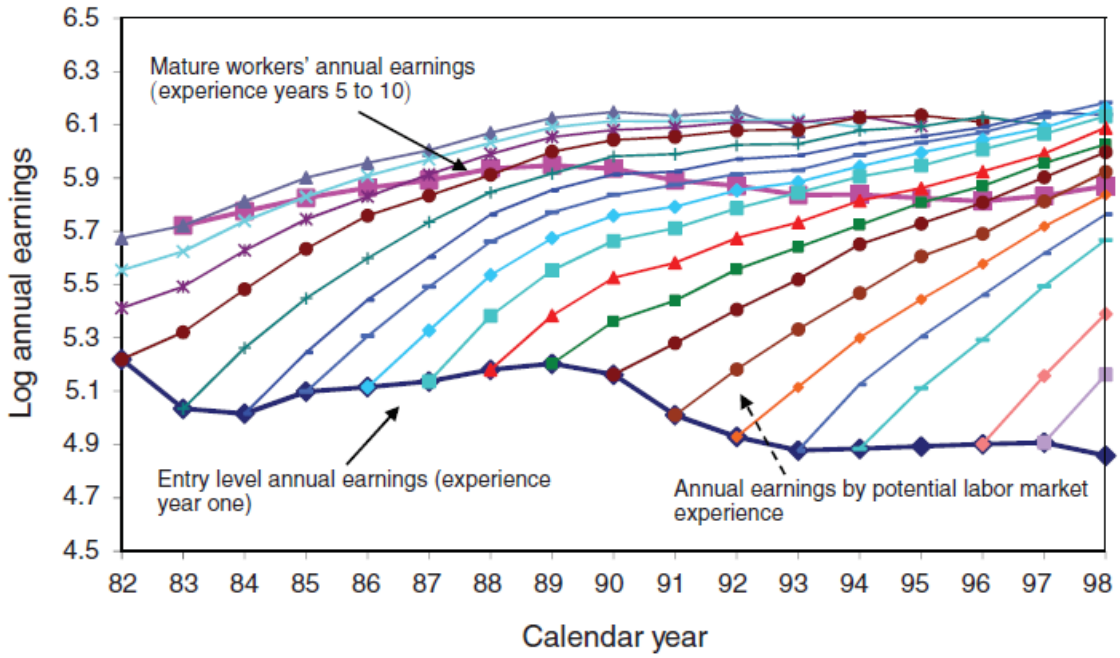

FIGURE 1A. MATURE AND ENTRY LEVEL EARNINGS AND EXPERIENCE PROFILES BY GRADUATION YEAR

Notes: The figure plots average log annual earnings profiles by year of degree completion for our baseline sample (all males in our administrative data that began a full-time undergraduate program at a post-secondary school institution in Canada between the ages of 17 and 20 from 1976–1995). See text and Data Appendix for more details.

The change of yearly earnings in the sample showed the distinction in entry level earnings and consequent rise of earnings by year of graduation from college. In Figure 1A it is apparent that initial wages differed throughout cohorts that led to differences in average earnings of cohorts. Moreover, the graph illustrated the convergence in average earnings across cohorts. Therefore, the effect of initial labor market condition was expected to disappear over time.

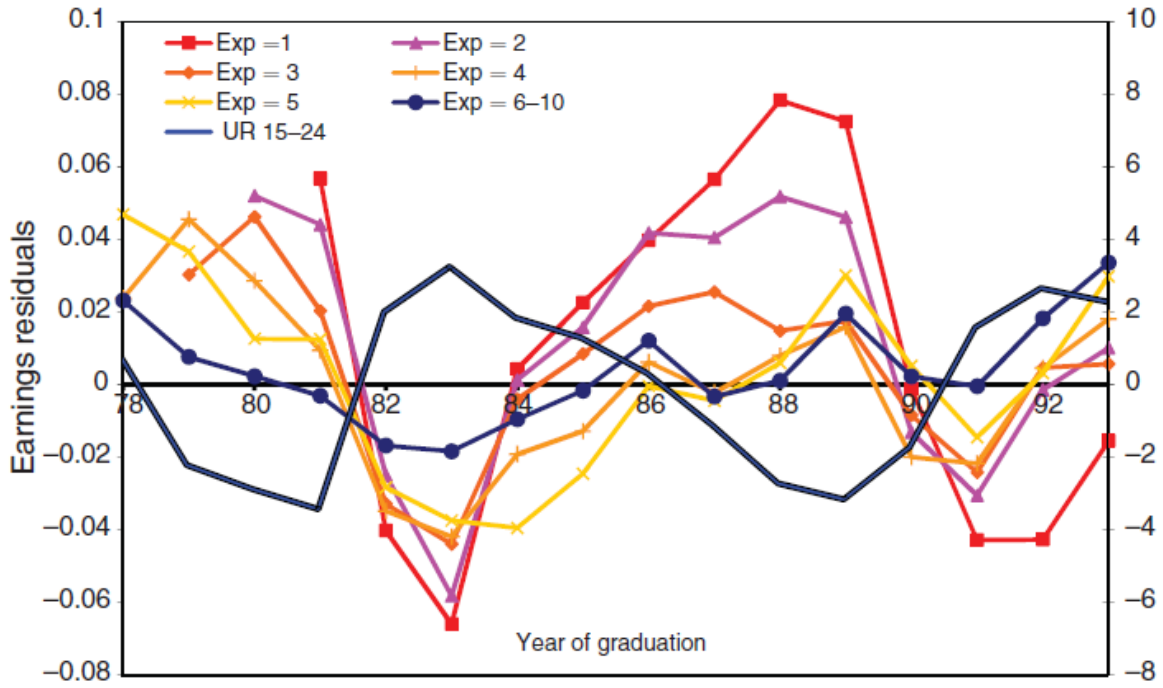

FIGURE 1B. EARNINGS BY EXPERIENCE YEAR FOR COHORTS ENTERING LABOR MARKET 1978–1993

Notes: The figure is constructed by first regressing log earnings from the baseline sample on fixed effects for year of college completion. The figure plots the average residuals from this regression for different years of experience. The figure also shows the national 15 to 24 year-old unemployment rate matched to the year of college completion (these values are from Statistics Canada). See text for more details.

From Figure 1B it could be understood that entry level wages and entry unemployment rates were highly correlated. Moreover, it can be deduced that this correlation remained with several years of experience and disappeared with time. The pattern of correlation in Figure 1B indicated that distinctions in entry level earnings in Figure 1A were induced by the entry condition of the labor market, the effect of which disappeared through time.

TABLE 1—THE PERSISTENT EFFECT OF THE UNEMPLOYMENT RATE (UR) IN THE YEAR OF COLLEGE GRADUATION ON ANNUAL EARNINGS OF MALE COLLEGE GRADUATES BY YEARS SINCE GRADUATION, ALTERNATIVE SPECIFICATIONS

Effect of UR at graduation on annual earnings by year since graduation	National unemployment rate: Linear cohort trend (1)	National unemployment rate: Quadratic cohort trend (2)	Main model based on regional unemployment rate (3)	Working every year in first ten years after graduation (regional UR) (4)	Instrument actual with predicted year of graduation (regional UR) (5)	Effect by different graduation years (regional UR): 1980–1984 (6)	1985–1989 (7)	1990–1994 (8)
Panel A. Sensitivity of main findings with respect to alternative specifications and samples								
Effect Year 0–1	−0.0196	−0.0197	−0.0183	−0.0168	−0.0182	−0.0163	−0.0130	−0.0188
	(0.0037)	(0.0023)	(0.0020)	(0.0022)	(0.0027)	(0.0052)	(0.0059)	(0.0060)
Effect Year 4–5	−0.0038	−0.0038	−0.0089	−0.0067	−0.0079	−0.0088	−0.0118	−0.0087
	(0.0025)	(0.0017)	(0.0016)	(0.0016)	(0.0017)	(0.0025)	(0.0054)	(0.0053)
Effect Year 9–10	0.0035	0.0044	−0.0042	−0.0042	−0.0050	−0.0020	−0.0128	−0.0235
	(0.0031)	(0.0018)	(0.0017)	(0.0018)	(0.0020)	(0.0030)	(0.0051)	(0.0074)

Effect of UR at graduation on annual earnings by year since graduation	Main model but only including cohorts graduating after 1982 (1)	Including initial-firm fixed effects (2)	Including initial-firm-experience fixed effects (3)	By type of initial employer: Median log earnings <75th percentile (4)	Difference for median log earnings >75th percentile (5)	Mean log payroll <75th percentile (6)	Difference for mean log payroll >75th percentile (7)
Panel B. Including controls for initial firm and by initial firm characteristics (Regional UR)							
Effect Year 0–1	−0.0180	−0.0168	−0.0099	−0.0236	0.0157	−0.0198	0.0038
	(0.0025)	(0.0019)	(0.0027)	(0.0021)	(0.0010)	(0.0020)	(0.0010)
Effect Year 4–5	−0.0111	0.0026	−0.0046	−0.0131	0.0094	−0.0094	0.0008
	(0.0018)	(0.0015)	(0.0024)	(0.0016)	(0.0008)	(0.0016)	(0.0006)
Effect Year 9–10	−0.0068	−0.0189	0.0001	−0.0084	0.0093	−0.0050	0.0017
	(0.0019)	(0.0020)	(0.0027)	(0.0018)	(0.0012)	(0.0018)	(0.0009)

Notes: The sample includes males in Canada leaving university between 1976 and 1995 (see the data Appendix). Regressions are based on cell data at the level of graduation cohort, province of residence in each year of graduation, and experience year (year since graduation). The national model regresses log annual earnings on the youth unemployment rate in the country at the year of college exit, interacted with dummies for five experience groups, plus experience fixed effects, and a linear or quadratic graduation cohort trend. The regional model regresses log annual earnings on the youth unemployment rate in the province of first residence, interacted with for five experience groups, plus province of first residence fixed effects, experience fixed effects, and year of graduation fixed effects. The coefficients shown are on the interaction of the unemployment rate at college exit and selected experience groups. Standard errors clustered at the first-province-cohort level are in brackets. See text for more details.

The output in table 1 illustrated similar results as the figures mentioned above. Comparable to Figure 1B, the part of the table with panel A (column 1 and 2) showed the coefficients of the effect of unemployment rate (in graduating year) for three categories of workers' experience years in the labor market with the use of variation in national unemployment rate. Earnings in corresponding years, mean effect of experience across cohorts, and linear/quadratic trend functional forms of cohorts were also included. Referring to the regional model (column 3), keeping other factors constant on average, a 5 percentage point increase in unemployment rate decreased yearly earnings by approximately 9 percent in the

year after college graduation. This effect decreased in the following years, so the paper showed the convergence of the initial unemployment rate to zero in ten years after entering the labor market.

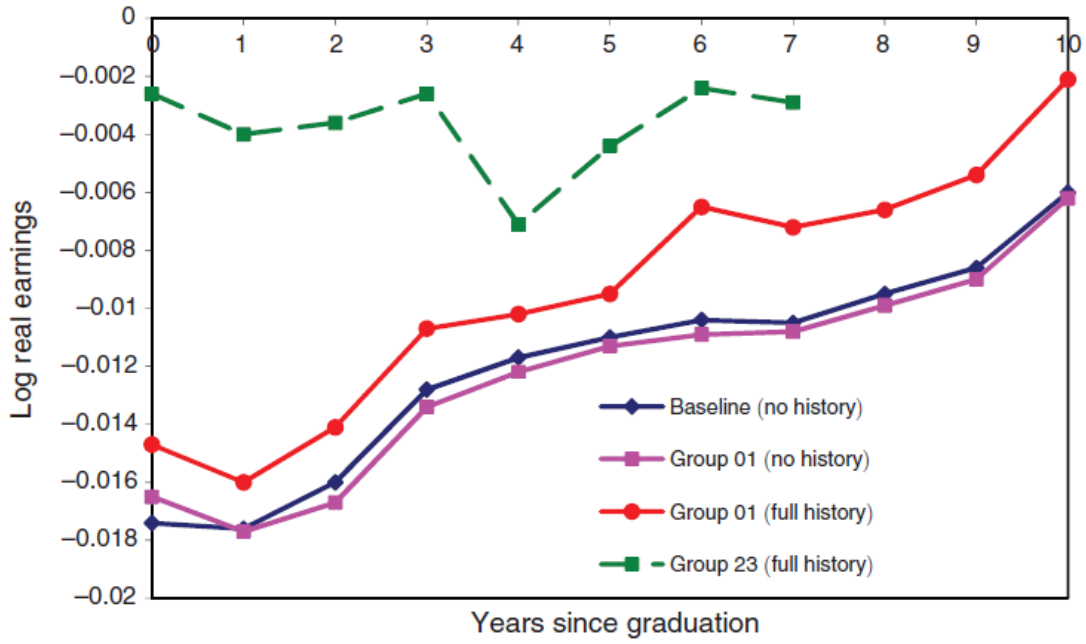

FIGURE 3. EFFECT OF UNEMPLOYMENT RATE AT TIME OF GRADUATION ON EARNINGS CONTROLLING FOR DYNAMIC EFFECTS OF FURTHER UNEMPLOYMENT SHOCKS
(*by experience groups*)

Notes: This figure shows estimates from regressing log annual earnings on the average of regional unemployment rates (UR) in experience years 0 and 1 at the end of college completion interacted with experience dummies, controlling for effects for cohort of graduation, experience (years since graduation), and region of first residence ("Group 01 (No History)"). The remaining lines show estimates from equation (2) in the text that control for the dynamic effect of unemployment rates encountered at higher experience years. Since we only observe full labor market histories for cohorts graduating in 1982 onwards, this figure is restricted to this set of cohorts. In addition, the figure shows our main estimates comparable to those in Figure 2 ("Baseline") for this sample.

Figure 3 presents the dynamic effect of recession for workers with different experience years. The loss in earnings due to recession is significantly higher for workers entering the labor market (0-1) in comparison with experienced workers (2-3). Therefore, the authors found that economic conditions have stronger negative effects for entry level workers.

TABLE 2—HETEROGENEITY IN THE EFFECT OF THE REGIONAL UNEMPLOYMENT RATE (UR) IN THE YEAR OF COLLEGE GRADUATION ON ANNUAL EARNINGS, JOB MOBILITY, EMPLOYMENT, AND FIRM QUALITY

Outcome variable	Effect of UR at graduation by year since graduation	All graduates (1)	Position in distribution of predicted annual earnings at time of graduation		
			Bottom quintile (2)	Middle quintile (3)	Top quintile (4)
Annual earnings	Effect year 0–1	−0.0183	−0.0277	−0.0232	−0.0147
		(0.0020)	(0.0058)	(0.0033)	(0.0028)
	Effect year 4–5	−0.0089	−0.0167	−0.0124	−0.0042
		(0.0016)	(0.0046)	(0.0025)	(0.0019)
	Effect year 9–10	−0.0042	−0.0161	−0.0039	−0.0024
		(0.0016)	(0.0056)	(0.0028)	(0.0021)
Average firm median log earnings	Effect year 0–1	−0.0096	−0.0111	−0.0128	−0.0082
		(0.0012)	(0.0043)	(0.0022)	(0.0015)
	Effect year 4–5	−0.0042	−0.0087	−0.0050	−0.0004
		(0.0011)	(0.0040)	(0.0017)	(0.0015)
	Effect year 9–10	−0.0028	−0.0126	−0.0043	0.0010
		(0.0012)	(0.0044)	(0.0019)	(0.0015)
Average firm employment	Effect year 0–1	−0.0098	−0.0173	−0.0157	−0.0062
		(0.0048)	(0.0188)	(0.0092)	(0.0070)
	Effect year 4–5	−0.00001	0.0009	−0.0121	0.0069
		(0.0049)	(0.0168)	(0.0089)	(0.0070)
	Effect year 9–10	0.0044	−0.0252	−0.0104	0.0236
		(0.0060)	(0.0191)	(0.0100)	(0.0073)
Fraction changed employer	Effect year 0–1	0.0020	−0.0023	−0.0019	0.0078
		(0.0011)	(0.0024)	(0.0016)	(0.0013)
	Effect year 4–5	0.0021	0.0019	0.0032	−0.0002
		(0.0005)	(0.0020)	(0.0008)	(0.0007)
	Effect year 9–10	0.0016	0.0020	0.0033	−0.0012
		(0.0005)	(0.0020)	(0.0008)	(0.0007)
Fraction changed industry	Effect year 0–1	0.0009	−0.0032	−0.0036	0.0069
		(0.0010)	(0.0021)	(0.0016)	(0.0012)
	Effect year 4–5	0.0016	0.0018	0.0022	−0.0002
		(0.0004)	(0.0018)	(0.0008)	(0.0006)
	Effect year 9–10	0.0015	0.0030	0.0023	−0.0009
		(0.0005)	(0.0018)	(0.0008)	(0.0007)
Fraction zero earnings	Effect year 0–1	0.0014	−0.00001	0.0009	0.0017
		(0.0002)	(0.0009)	(0.0003)	(0.0004)
	Effect year 4–5	−0.0001	−0.0018	0.0003	−0.0005
		(0.0002)	(0.0007)	(0.0004)	(0.0003)
	Effect year 9–10	−0.0002	−0.0015	0.0006	−0.0006
		(0.0002)	(0.0007)	(0.0004)	(0.0003)

Notes: Coefficients from separate regression models of outcomes listed in the first column on unemployment rate at graduation by selected years since graduation, controlling for effects for year of graduation, experience, and province of first residence. Column 1 shows the results for the full sample of college graduates, whereas columns 2–4 show the results separately for college graduates in the first, third, and fifth quintile of predicted earnings at the time of graduation. Standard errors clustered at the first province cohort level are in parentheses. See text for more details.

In the columns 2-4 of Table 2, it was found that students with low predicted wage (bottom quantile) are affected more significantly by entry level unemployment rate and by persistent trend in unemployment rate in consequent experience periods. Keeping other factors constant on average, 5 percentage point increase in unemployment rate in the first year after

graduation, resulted in 7.5 percent decrease for the top quintile in comparison with bottom quintile but difference is only 2 percent in 4 years.

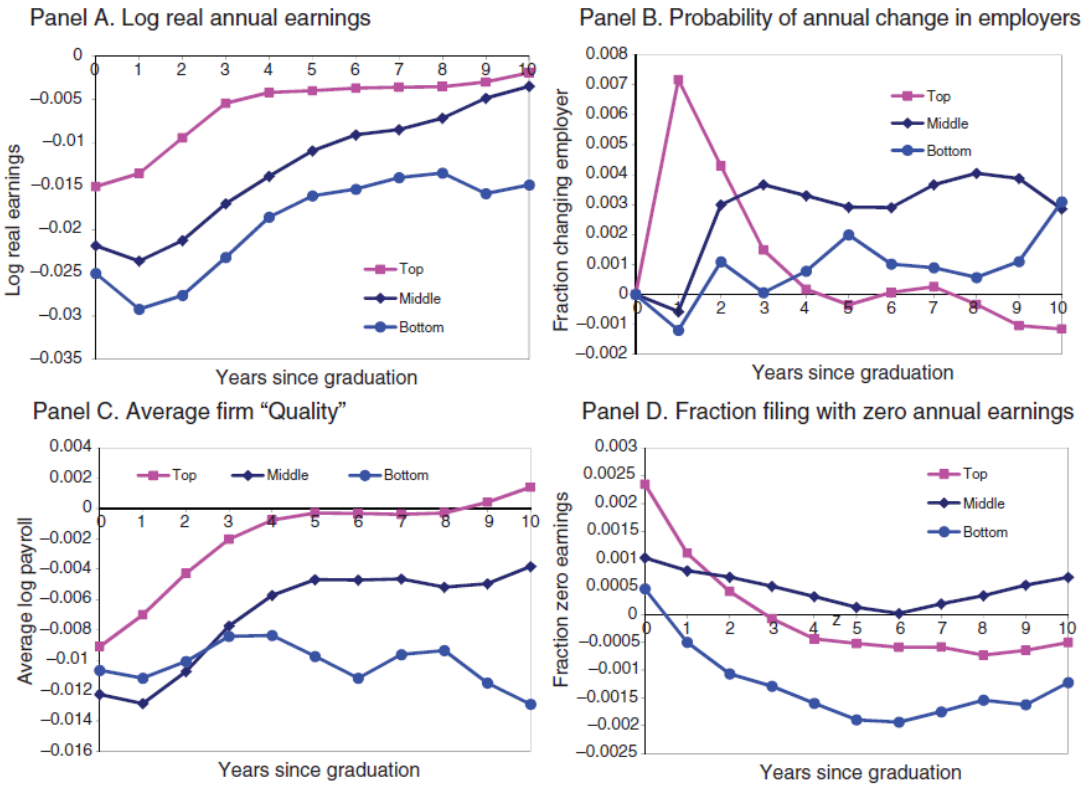

FIGURE 4. PERSISTENT EFFECTS OF THE REGIONAL UNEMPLOYMENT RATE IN THE YEAR OF GRADUATION ON ANNUAL EARNINGS, JOB MOBILITY, EMPLOYMENT, AND FIRM QUALITY FOR WORKERS WITH DIFFERENT PREDICTED EARNINGS BASED ON COLLEGE AND MAJOR

Notes: The figures show coefficients from regressing specified outcome variables on regional unemployment rates at the end of college completion, controlling for effects for year of graduation, experience (years since graduation), and province of first residence (equation (1) in the paper). The samples are divided into predicted skill groups, based on major program of study and college (see text for more details). Panel A shows coefficient estimates with log annual earnings as the outcome variable. Panel B shows coefficient estimates using a dummy variable for whether an individual was classified working in a different firm as the one indicated in the previous year as the outcome variable. Panel C shows coefficient estimates using the employer's average log total payroll (averaged across all years in the dataset) as a measure for firm quality. Panel D shows coefficient estimates for whether recorded as having zero earnings in a given year.

From Figure 4 it was found that bottom quantile students (lowest predicted earnings) are severely affected by effect of initial unemployment rate (based on earnings, changing employer, firm quality, fraction of group with zero earnings) which coincides with the output in Table 2.

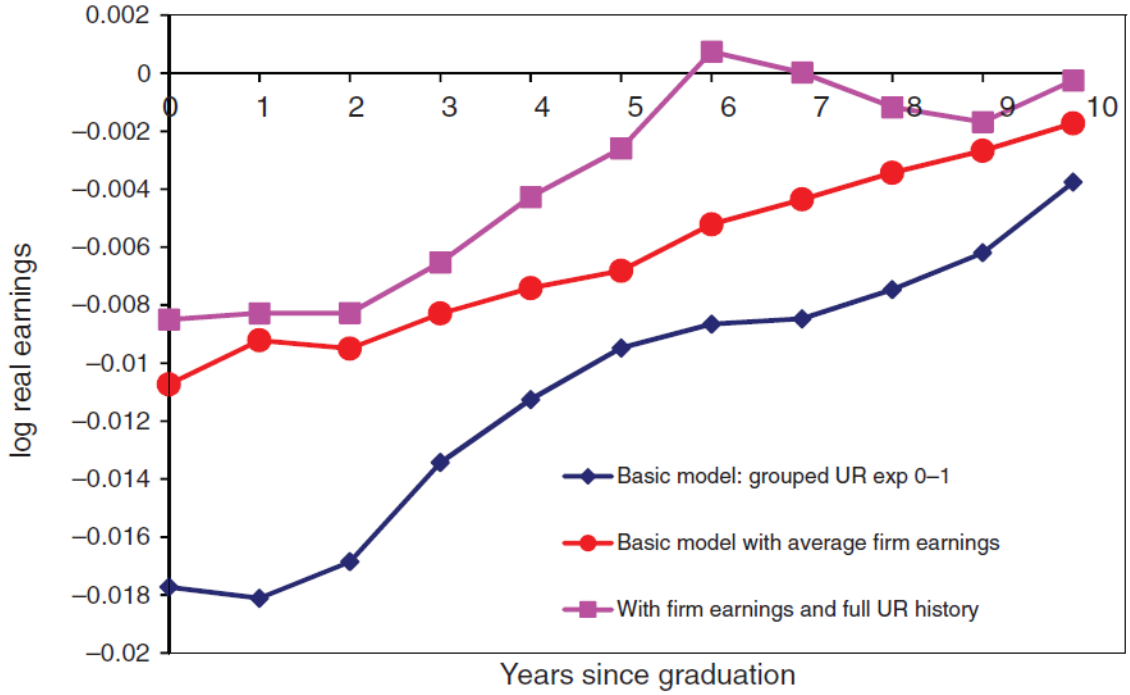

FIGURE 6. THE ROLE OF LABOR MARKET CONDITIONS AND FIRM CHARACTERISTICS IN EXPLAINING PERSISTENCE IN THE EFFECT OF UNEMPLOYMENT RATES IN THE YEAR OF COLLEGE GRADUATION ON ANNUAL EARNINGS

Notes: The figures show coefficients from regressing annual earnings on the average of regional unemployment rates (UR) in experience years 0 and 1 at the end of college completion interacted with experience dummies, controlling for effects for cohort of graduation, experience (years since graduation), and region of first residence ("Basic Model"). The circled line adds as a regressor average firm earnings at the cell-level to this model (where as discussed in the text cells are defined by graduation year, region of first residence, and year of experience). In addition, the squared line adds controls for the dynamic effects of the continuing history of unemployment rates as shown in equation (2) in the text. Since we only observe full labor market histories for cohorts graduating in 1982 onward, this figure is restricted to this set of cohorts.

The main conclusion from Figure 6 is drawn based on the middle (red) line that showed the effects of entry level shock and firm quality on persistence of annual earnings losses for years after graduation. So, this paper concludes that 40-50 percent of the initial effect of a downturn can be explained by a decline in firm quality.

In conclusion, the paper showed that variation in initial unemployment rate strongly influences wage loss in the years after graduation. Moreover, the higher the experience the lower is the effect of the shock, but the graduates with weak abilities are expected to have larger and more persistent effects. Furthermore, the important part of lowering the effect of the initial unemployment rate is a shift to higher quality firms (higher wages), particularly in the first year

after the recession. This strategy is definite for top graduates (high wage and ability distribution group), but the graduates at the bottom of the distribution recover from the negative effects of a recession at a lower pace, probably having long-lasting effects or unlikely to recover fully after starting the career in low quality firms.

The implications of results for policymakers

According to the results of this paper, policymakers should make recovery policies focused more towards young workers, as they are significantly affected by a recession compared to the workers with several years of work experience. Another result states that low skilled workers are more affected by adverse labor market conditions than high skilled workers and implies that the government and firms should provide more job training for those who have low predicted earnings after graduation. The results of this research will help labor market policymakers to determine a target group (employees mostly affected by a recession) and regulate the timing of the policies, as the paper provides the average number of years the adverse effects of a recession hold for workers with different experience and ability distributions.

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