1. Summary
   A. Uses NLSY79 to study white males who graduated from college in 1979-89; studies how graduating from college is related to the unemployment rate (takes account of both national and state-level unemployment; state-level unemployment refers to state of one’s college/university).

   B. Key finding: persistent and significant negative effect on wages of unemployment at the time of college graduation in some analyses (e.g., using national unemployment rates):
      - initial wage loss: 6-7% wage loss for each 1% increase in unemployment rate
      - subsequent loss: initial loss shrinks by about 0.25 percentage point per year for each year of college graduation
      - persistence: even 15 years after graduation, wage loss is 2.5% and significant.

   C. Other outcomes:
      - not much effect of unemployment on labor supply
      - negative effect of unemployment on occupational attainment (supposedly a measure of prestige of the job, but highly correlated with income)
      - slight positive effect of unemployment on probability of graduate degree
2. Theory: Effect of graduating into a poor labor market
   A. Human capital theory: Poor labor market reduces opportunities for training, causing big persistent effect on wages that’s hard to overcome
   B. Job search: Poor labor market affects wages temporarily, but easy to overcome in the longer run by job-shopping after economy improves
   C. Problem: changes over time /differences in outcomes could be due to factors other than the national unemployment rate as such:
      e.g., changes in cohort size (supply shift), deregulation, rising wage inequality
   D. So, also use local unemployment rate – rate in state of one’s college/university at graduation: the “college unemployment rate” (or just “college,” for short)

3. Basic model
   A. Estimating equation is
      \[
      \text{Dep}_{it} = \alpha_0 + \lambda_1 \text{college}_i + \lambda_2 [\text{college}_i \times \text{Exp}_{it}] \\
      + \alpha_1 \text{AFQT}_i + \gamma Y_t + \beta \text{State}_{it}^{ue} + \delta \text{Exp}_{it} + \delta_2 \text{Exp}_{it}^2 + u_{it}
      \]

      Dep = dependent variable (earnings, occupation, etc.) for i at time t
      college = unemployment rate in state where i graduated from college, as of i’s graduation date (NB: sometimes, national unemp rate is used instead)
      AFQT$_i$ = i’s score on the Armed Forces Qualifying Test
      Y$_t$ = dummy variables for year (1979, 1980, …)
      State$_{it}^{ue}$ = unemployment rate in i’s state of residence at time t
      Exp$_{it}$ = i’s years of potential work experience (after college graduation) at time t

   B. So effect of unemp at time of graduation is given by \( \lambda_1 \text{college}_i + \lambda_2 [\text{college}_i \times \text{Exp}_{it}] \)
4. Avoiding possible missing variables bias with *instruments* (essentially, this is 2SLS)
   
   A. college\_i (state unemployment rate *at i’s graduation*) might be correlated with the *current* error term, u\_it (e.g., go to college and then stay in low-unemp. state) -- so, use instruments for college\_i
   
   B. Exp\_it (potential experience at t) might be correlated with the *current* error term, u\_it i.e., delay graduation or speed it up depending on state of labor market in the state if i remains in his state and unemployment rate stays at roughly the same level, Exp\_it and u\_it could be correlated -- again, use instruments for Exp\_it

5. Results: large negative effects of unemployment on wages (pp. 308-309, esp. Table 4)
   
   A. results hold up regardless of whether national or state-level unemp rate is used
   
   B. results similar regardless of whether 2SLS is used
   
   C. results persist over time
6. Summary for results for national unemployment rate using IV (column 2, Table 4)
   A. Panel A: rise of one percentage point in unemployment rate will...
      reduce wage in first year by 7.0%, with 0.4% rises per year thereafter

   B. Panel B: 1 year after grad, 1% higher unemployment rate at grad ➔ 6.6% lower wage
      5 years after, 1% higher unemployment rate at grad ➔ 5.0% lower wage (1% recovery)
      10 years after, 1% higher unemployment rate at grad ➔ 3.0% lower wage (3.6% recovery)
      15 years after, 1% higher unemployment rate at grad ➔ 1.0% lower wage (5.6% recovery)

7. Summary for results for state unemployment rate using IV (column 6, Table 4)
   A. Panel A: rise of one percentage point in unemployment rate will...
      reduce wage in first year by 9.1%, with 0.0% rises per year thereafter

   B. Panel B: 1 year after grad, 1% higher unemployment rate at grad ➔ 9.2% lower wage
      5 years after, 1% higher unemployment rate at grad ➔ 9.4% lower wage (0.2% worse)
      10 years after, 1% higher unemployment rate at grad ➔ 9.6% lower wage (0.4% worse)
      15 years after, 1% higher unemployment rate at grad ➔ 9.8% lower wage (0.6% worse)
Table 4
Log wage regression results.

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<td></td>
<td>1</td>
<td>2</td>
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<tr>
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<td>OLS(^b)</td>
<td>IV(^c)</td>
<td>OLS(^b)</td>
<td>IV(^c)</td>
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<td>A: Regression coefficients</td>
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<td>College UE rate</td>
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<td>−0.070**</td>
<td>−0.02</td>
<td>−0.091*</td>
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<td>B: Fitted effects for selected years of experience</td>
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<td>Years after college</td>
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<td>[0.020]*</td>
<td>[0.014]**</td>
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<td>[0.020]**</td>
<td>[0.016]</td>
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<td>0.2</td>
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</table>

NLSY79 white males with at least a BA/BS.
Standard errors in brackets clustered as specified below.
* significant at 10%; ** significant at 5%; *** significant at 1%.
Notes: Sample is restricted to the cross-section, white-male sample who graduated from college between 1979 and 1989 and have valid AFQT score and state unemployment rate. Unless otherwise specified observations are restricted to valid wage observations within the first 17 years of college graduation who are not enrolled in school.
\(^a\) Regressions also include state and year of college graduation fixed effects in the OLS specification or state at age 14 and year of birth fixed effects in the IV specification.
\(^b\) OLS results also include controls for a quadratic in potential experience, age-adjusted AFQT score, contemporaneous year effects and the contemporaneous state unemployment rate. Standard errors are clustered by graduation cohort.
\(^c\) The IV specification instruments for the college unemployment rate, its interaction with potential experience and the quadratic in potential experience with the unemployment rate at age 22 (national or in state of residence at age 14), its interaction with age and a quadratic in age. Standard errors are clustered by birth cohort.