Early-Career Job Instability and Life-Cycle Income Dynamics

Antonio Cabrales
UCL & FEDEA

Maia Güell
Edinburgh, CEPR & FEDEA

Rocio Madera
SMU

July 2022

Conference on the Spanish Economy,
Banco de España
Motivation

- Labor markets: more unstable for young workers in the last decades
  - Era of “job for life” era replaced by era of the gig economy

- **What are the life-cycle consequences of early-career job instability?**
  - We know: instability in early years → lower *levels* of future earnings (von Wachter ’20).
  - Open question: Whether and how it affects the life-cycle of earnings *uncertainty*

- Important as earnings uncertainty can affect other *macro outcomes*
  - *consumption patterns* (Meghir and Pistaferri, 2011; De Nardi et al., 2019), *timing of fertility* (Sommer, 2016; Guner et al., 2021), *housing* (Paz-Pardo, 2022)

- **This paper:** how early instability in the labor market shape the size and nature of earnings uncertainty & life-cycle profile
Bridge two literatures

- Lit. on earnings uncertainty & macro outcomes → ignore initial career
  - Meghir and Pistaferri, 2011, Karahan and Ozkan, 2013

- Lit. on early career *scarring* → focus on long-run averages of income levels
  - BEYOND LEVELS, variance and income risk: Cappellari and Leonardi, 2016 & Arellano et al., 2021

- This paper: early career & earnings uncertainty (size+nature) & life-cycle
  - Important: While the literature finds that earning levels stabilize after 10-15 years, it’s not the case for income uncertainty
Outline of Talk

Measuring Early-Career Job Instability

Data
Job-Unstable vs. Job-Stable

Estimating Life-Cycle Earnings Dynamics

Sources of Earnings Variance over the Life-Cycle

Conclusion
Measuring Early-Career Job Instability

Goal: Identify workers disproportionately exposed to job instability

- Exploit rigid dual structure of Spanish labor market
  - measure instability over longer periods of times
  - above and beyond macro shocks and trends
    - c.f. graduating in a recession, cohort
Measuring Early-Career Job Instability

Goal: Identify workers disproportionately exposed to job instability

- Exploit rigid *dual* structure of Spanish labor market
  - measure instability over longer periods of times
  - above and beyond macro shocks and trends
    - c.f. graduating in a recession, cohort

- Focus on male college graduates
  - Minimize other forms of heterogeneity.
  - Moreover, our methods allows for ex-ante heterogeneity.
Data: Spanish Continuous Sample of Working Histories

4% rep. random sample of all workers affiliated to the SSA / year

- Panel: selected workers are kept for subsequent years
Data: Spanish Continuous Sample of Working Histories

4% rep. random sample of all workers affiliated to the SSA / year
- Panel: selected workers are kept for subsequent years

Social Security records
- 2004-2015, working histories back to the 60s (repres. since 1988)
- Daily info on all contracts, full-time/part-time indicator
- Top-coded
Data: Spanish Continuous Sample of Working Histories

4% rep. random sample of all workers affiliated to the SSA / year

- Panel: selected workers are kept for subsequent years

Social Security records

- 2004-2015, working histories back to the 60s (repres. since 1988)
- Daily info on all contracts, full-time/part-time indicator
- Top-coded

Tax records

- Yearly info on all taxable labor income sources
- Non top-coded
Characterizing Early-Career Job Instability

Three job states:
- Employed on an open-ended contract (Permanent)
- Employed on a fixed-term contract (Temporary)
- Unemployed

For all workers with labor market attachment during Early Career:
- If days worked as temp during Early Career > days worked as perm → Job-Unstable
- Otherwise → Job-Stable
Characterizing Early-Career Job Instability

Early Career

LM Entry (22)  30  Retirement (60)

- Three job states:
  - Employed on an open-ended contract (Permanent)
  - Employed on an fixed-term contract (Temporary)
  - Unemployed

- For all workers with labor market attachment during Early Career
  - If days worked as temp during Early Career > days worked as perm → Job-Unstable
  - Otherwise → Job-Stable
Characterizing Early-Career Job Instability

Three job states:
- Employed on an open-ended contract (Permanent)
- Employed on a fixed-term contract (Temporary)
- Unemployed

For all workers with labor market attachment during Early Career:
- If days worked as temp during Early Career > days worked as perm → Job-Unstable
- Otherwise → Job-Stable
Characterizing Early-Career Job Instability

Three job states:
- Employed on an open-ended contract (Permanent)
- Employed on an fixed-term contract (Temporary)
- Unemployed

For all workers with labor market attachment during Early Career
- If days worked as temp during Early Career > days worked as perm → Job-Unstable
- Otherwise → Job-Stable
Characterizing Early-Career Job Instability

Early Career

- Employed on an open-ended contract (Permanent)
- Employed on a fixed-term contract (Temporary)
- Unemployed

For all workers with labor market attachment during Early Career:

- If days worked as temp during Early Career > days worked as perm → Job-Unstable
- Otherwise → Job-Stable
Characterizing Early-Career Job Instability

Three job states:
- Employed on an open-ended contract (Permanent)
- Employed on an fixed-term contract (Temporary)
- Unemployed

For all workers with labor market attachment during Early Career
- If days worked as temp during Early Career > days worked as perm → Job-Unstable
- Otherwise → Job-Stable
50% Threshold not binding

Figure: Share of Days Worked in a Temporary Contract by 30
Outline of Talk

Measuring Early-Career Job Instability

**Estimating Life-Cycle Earnings Dynamics**
- A Statistical Model to Capture Life-Cycle Dynamics
  - Estimation

Sources of Earnings Variance over the Life-Cycle

Conclusion
Let the log earnings of a worker $i$ of age $a$ be:

$$\log Y_{ia} = \text{observed} \cdot g(a, X_{ia}) + \text{unobserved} \cdot \alpha_i + \gamma_i a$$

ex-ante heterogeneity + transitory $u_{ia}$ + persistent $z_{ia}$

ex-post uncertainty, (one.pnum)
Let the log earnings of a worker $i$ of age $a$ be:

$$\log Y_{ia} = g(a, X_{ia}) + \alpha_i + \gamma_i a + \alpha_{ia} + \gamma_{ia} + u_{ia} + z_{ia},$$

where $g(a, X_{ia})$ represents observed ex-ante heterogeneity, $\alpha_i$ and $\gamma_i a$ represent transitory and persistent ex-post uncertainty, $u_{ia}$ is unobserved transitory, and $z_{ia}$ is unobserved persistent.
**Ex-Ante Unobserved Heterogeneity**

### $\alpha$ : Unobserved Heterogeneity

$\alpha_i \sim N(0, \sigma^2_\alpha)$

- Age-independent, captures initial conditions as of graduation
- E.g. wage differences b/c major choice, diligence,...

### $\gamma$ : Heterogeneity in income profiles

$\gamma_i \sim N(0, \sigma^2_\gamma)$

- Proportional to age, captures different expected income growth due to initial conditions
- E.g. job-ladder differences b/c major choice
Ex-Post Uncertainty (Luck)

$\mathbf{z}$: Persistent: $z_{ia} = \rho a z_{i,a-1} + \eta_{ia}$, with shock $\eta_{ia} \sim N(0, \sigma_{\eta,a}^2)$

- Age-specific, captures shocks that have long-run consequences
- E.g. big layoff

$\mathbf{u}$: Transitory: $u_{ia} = \epsilon_{ia} + \theta \epsilon_{i,a-1}$, with shock $\epsilon_{ia} \sim N(0, \sigma_{\epsilon,a}^2)$

- Age-specific, captures shocks that are perceived as short lived
- E.g. temporary wage cut or freeze
Estimation

- $\rho$, $\sigma_\varepsilon$, and $\sigma_\eta$ are functions of age:
  - $\sigma_\varepsilon^2$, $\sigma_\eta^2$, and $\rho$ are cubic functions of age
  - $\theta$, $\sigma_\alpha$, and $\sigma_\gamma$ are time-invariant

- Method: GMM
  - Autocovariance matrix up to 6 lags
  - Efficient weighting matrix
Estimates: Life-Cycle

Figure: Persistence

Early-Career Job Instability and Life-Cycle Dynamics
Features of shock persistence, Job-unstable vs Job-stable:

- Hump-shaped for all
- Higher at the beginning and end of life
- Peaks later in life

→ age of 46 vs 37
Estimates: Life-Cycle

Figure: Variance of Persistent Shocks
Features of persistent uncertainty, Job-unstable vs Job-stable:

- Higher
- U-shaped vs. decreasing over the life cycle
- Big difference at the end of the life-cycle
  → From age 50 on
Estimates: Life-Cycle

Figure: Variance of Transitory Shocks
Estimates: Life-Cycle

Features of transitory uncertainty, Job-unstable vs Job-stable:

- Higher
- Flat vs decreasing over life
  → Big difference at the end of the life-cycle

Figure: Variance of Transitory Shocks
Outline of Talk

Measuring Early-Career Job Instability

Estimating Life-Cycle Earnings Dynamics

Sources of Earnings Variance over the Life-Cycle

Conclusion
Decomposing Sources of Earnings Variance

How much of total earnings variance of the life cycle is accounted for by

- Ex-ante heterogeneity
  - Cumulative effect of initial heterogeneity

- Ex-post uncertainty (luck)
  - transitory
  - persistent: Combination of behavior of persistence ($\rho$) and variance of persistent shocks ($\sigma^2_{\eta}$)
Decomposing Sources of Earnings Heterogeneity

Job-Stable

Ex-Ante Heterogeneity
Persistent Uncertainty
Transitory Uncertainty

Variance Decomposition (Stable)

Age

Early-Career Job Instability and Life-Cycle Dynamics
Decomposing Sources of Earnings Heterogeneity

Job-Unstable

Variance Decomposition (Unstable)

Age

Early-Career Job Instability and Life-Cycle Dynamics
Decomposing Sources of Earnings Heterogeneity

Job-Unstable

Features, Job-unstable vs Job-stable:
- Overall uncertainty higher (luck matters more)
- Smaller role of ex-ante heterogeneity
- Job-ladder and education not as important

Early-Career Job Instability and Life-Cycle Dynamics
Outline of Talk

Measuring Early-Career Job Instability

Estimating Life-Cycle Earnings Dynamics

Sources of Earnings Variance over the Life-Cycle

Conclusion
Conclusions

▶ Workers exposed to job instability during early-career years face higher uncertainty throughout the life-cycle
  ▶ They experience higher volatility in their income shocks
  ▶ Shocks are increasingly persistent until later in life, compared to job-stable

▶ Decomposing the sources of increasing uncertainty shows that
  ▶ Variance of earnings shocks does not fade out with age, as opposed to job-stable
  ▶ Risk play less of a role for the job-stable than job-unstable. Persistent component of uncertainty plays a bigger role for the job-unstable, especially later on in the life-cycle.
APPENDIX
Simulation Fit
*Estimated earnings within a model of job transitions, from CGMV 2018.

**Figure**: Quantiles of Log earnings: Data (solid) vs. Simulation (dashed)
Sample Selection

**Table:** Number of observations kept at each step

<table>
<thead>
<tr>
<th>Sel. Criteria</th>
<th>Remaining Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Begin with</td>
<td>10.88M</td>
</tr>
<tr>
<td>Age missing</td>
<td>10.87M</td>
</tr>
<tr>
<td>Contract missing</td>
<td>10.87M</td>
</tr>
<tr>
<td>Education missing</td>
<td>10.14M</td>
</tr>
<tr>
<td>Age 22-60</td>
<td>6.42M</td>
</tr>
<tr>
<td>Drop duplicate spells</td>
<td>5.41M</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5.41M</strong></td>
</tr>
</tbody>
</table>

- Men: 2.95M
- Women: 2.46M
Sample Selection

Table: Number of observations kept at each step

<table>
<thead>
<tr>
<th>Sel. Criteria</th>
<th>Remaining Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Begin with</td>
<td>10.88M</td>
</tr>
<tr>
<td>Age missing</td>
<td>10.87M</td>
</tr>
<tr>
<td>Contract missing</td>
<td>10.87M</td>
</tr>
<tr>
<td>Education missing</td>
<td>10.14M</td>
</tr>
<tr>
<td>Age 22-60</td>
<td>6.42M</td>
</tr>
<tr>
<td>Drop duplicate spells</td>
<td>5.41M</td>
</tr>
<tr>
<td>Total</td>
<td>5.41M</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>College</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>2.95M</td>
</tr>
<tr>
<td>Women</td>
<td>2.46M</td>
</tr>
</tbody>
</table>