MISMATCH CYCLES

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1. What we do

- Key role of labor market is to assign the right worker to the right job
- Information/search frictions ⇒ Skill **mismatch** between workers and occupations
- Do **business cycles** affect **mismatch**? For whom?

1. **New facts**:

   Recessions: **Destroy** highly mismatched jobs (mostly under-qualified)
   Create highly mismatched jobs (both over- and under-qualified)

2. **New model** w/ unobserved mismatch & countercyclical uncertainty

   Recessions: Low productivy → Destroy *perceived* high mismatches
   High uncertainty → Create *undetected* high mismatches

2. Measuring mismatch: Guvenen et al. (2018)

- Jobs and workers characterized by 4 skills: math, verbal, technical and social
  - $a_{i,k}$ = percentile rank of worker i's ability in skill k
  - $r_{c,k}$ = percentile rank of occupation c requirement of skill k

Mismatch between individual i and his occupation c_t

$$m_{i,c_t} \equiv \sum_{j=1}^{K} \frac{1}{K} \left| a_i^k - r_{c_t}^k \right| \qquad \in [0, 100]$$

- **Over-qualification**: $m_{i,t}^{+} \equiv \sum_{k=1}^{K} \frac{1}{K} \max[a_i^k - r_{c_t}^k, 0]$
- **Under-qualification**: $m_{i,t}^{-} \equiv \sum_{k=1}^{K} \frac{1}{K} |\min[a_i^k - r_{c_t}^k, 0]|$

3. Data and Estimation

- **NLSY79**, monthly panel, 1979-2012: ASVAB scores (a_i^k) + Employment history
- **O*NET**: Occupation Skill Requirements (r_c^k)
- **Identification**: Exploit within individual variation across months when employed

Mismatch and unemployment: by type of transition

$$m_{i,c_t} = \beta_0 + \beta_1 U_t + \beta_2 EE'_{i,t} + \beta_3 UE_{i,t} + \beta_4 (U_t \cdot EE'_{i,t}) + \beta_5 (U_t \cdot UE_{i,t}) + \gamma' x_{i,t} + \delta_i + \delta_y + \delta_m + \varepsilon_{i,t}$$

- U_t = aggregate unemployment rate in month m and year y
- $EE'_{i,t} = 1$ for job-to-job transitions; $UE_{i,t} = 1$ for new hires from unemployment
- Controls = age, age^2, industry, occupation, residence region, month, year, and individual fe

4. Mismatch cylicality varies by flow type

Dependent Variable:	m_{i,c_t}		m^{+}_{i,c_t}	m^{-}_{i,c_t}	
	(1)	(2)	(3)	(4)	
Unemployment$_t$	**-0.141*****	**-0.159*****	-0.050	**-0.109*****	⇒ **Cleansing**
	(0.050)	(0.050)	(0.038)	(0.035)	
UE$_{i,t}$ × Unemployment$_t$		**0.378*****	**0.167*****	**0.212*****	⇒ **Sullying**
		(0.085)	(0.062)	(0.056)	
Observations	510788	510788	510788	510788	
Adjusted R^2	0.500	0.500	0.771	0.763	

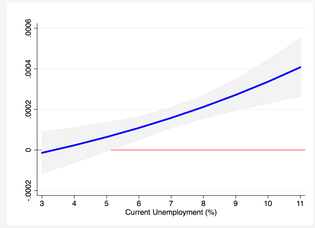
- ΔU from 50–90$^{\text{th}}$ pctl: mismatch ↓ 1.86% for job stayers + ↑ 2.56% for UE
  - Job Stayers: less under-qualified
  - New Hires from Unemployment: more over- and under-qualified
  - Job-to-Job transitions: mismatch is acyclical
- Quantile Reg.: mismatch **2.4x** more cyclical than average for highest mismatched
- Results robust across many different specifications

5. Job tenure varies with the cycle

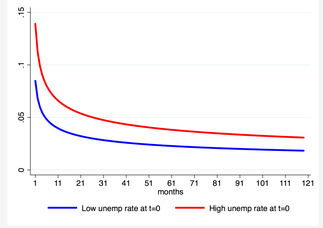
Hazard Rate Specification

$$h_i(\tau) = \alpha_0 + \alpha_1 m_{i,c_0} + \alpha_2 U_0 + \alpha_3 U_\tau + \alpha_4 (U_\tau \cdot m_{i,c_0}) + \gamma' x_{i,\tau} + h_{0,\tau} + \varepsilon_{i,\tau}$$

Effect of m_{i,c_0}



Effect of U_0



- Mismatch increases separation rate; effect increases with U_τ
- Conditional on mismatch: U_0 increases separation; U_τ decreases separation

6. Facts difficult to explain *simultaneously* by current theories

- **Cleansing:** Mortensen & Pissarides (1994) w/ endogenous separations

  ⇒ High mismatch jobs are destroyed + only low mismatch jobs are created!

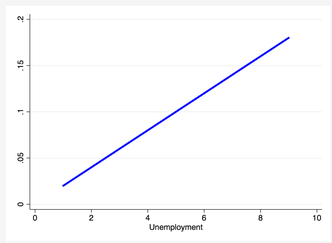
- **Sullying:** Moscarini (2001) + Lise & Robin (2017)

  ⇒ Under-qualification increases ***or*** Over-qualification increases

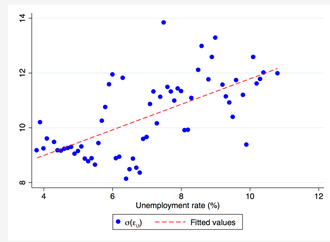
- **New channel: Unobserved mismatch + Cyclical information frictions**
- Our proposed mechanism: Occupational switching
  1. Upon switching occupation, learning about skills not previsously used
  2. High uncertainty about mismatch
  3. Recessions: More UE switching occupations → Higher uncertainty

7. Evidence supports our mechanism

Occupational Switching



Mismatch Dispersion*



- Occupational switching increases in recessions.
- Correlation between requirements and abilities falls in recessions.
- Separation hazard 9% larger for new hires from unemployment that switch occupation.
- Mismatch dispersion is countercyclical

*Dispersion = std deviation of estimated residuals from mismatch regression w/o unemployment.

8. A model of learning and occupational switching

- **Workers** Characterized by a vector of unobserved abilities $a_i \sim \mathcal{N}(\bar{a}, S_a)$
- **Production** Firm j in occupation k: only uses skill k with intensity $r_j^k \sim G^k$

  $dy_t = (z_t - \psi m^2)\, dt$; $m = r^k - a^k$; $z_t = \{z_L, z_H\}$ w/ Poisson rates (λ_L, λ_H)

  Information Set: $\mathcal{I}_t = \{z, s\}$; s = noisy signals about m
- **Labor Market** Random search across K occupations; No search on the job
  - Matching: $M_t = M(u_t, v_t)$; Upon matching, firms have all bargaining power
- **Filtering**: Mismatch estimate $\mu_t \equiv \mathbb{E}[m|\mathcal{I}_t]$ w/ uncertainty $\Sigma_t \equiv \mathbb{E}[(m_t - \mu_t)^2|\mathcal{I}_t]$
- **Occupational Switching** for the unemployed w/ prob π_t: Upon switiching, start learning about a new skill
- **Stopping time problem** → time- and state-dependent, symmetric inaction region

9. Effects of a recession on mismatch

1. Lower productivity z ⇒ **Cleansing**
2. Higher switching prob π ⇒ **Sullying**