

# Entrepreneurship, Unemployment and Insurance Effect

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45min

# Overview

- **Small firm returns are very risky**
  - ▶ entrepreneur's exit rate is high (22 - 26% per year)
  - ▶ entrepreneur's income distribution is right skewed and
  - ▶ std. dev of entrepreneurs' log income is 2 to 4 times larger than for wage-earners
- **Entrepreneurial risk is a barrier** that affect the **quantity** of entrepreneurs
  - ▶ Risk perception and business creation (Arenius and Minniti, 2005),
  - ▶ Bankruptcy regulation plays a crucial role (Mankart & Rodano, 2015)

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## Research questions:

- ① How **occupational mobility**, **entrepreneurial risk** and **wealth** interact?
- ② How better **insuring** entrepreneurial risk affect **occupational choice** and entrepreneur's **quality**?
- ③ How it compares to a **start-up subsidy**?

# Outline

- ① We build a general equilibrium occupational choice model that accounts for
  - ▶ heterogeneous agents (ability, wealth)
  - ▶ risky entrepreneurship (persistent business shock)
  - ▶ labor market frictions
- ② We use CPS and SCF to discipline our model to the US,
  - ▶ match key characteristics of occupational flows and entrepreneurship
  - ▶ infer (unobservable) entrepreneurial ability using occupational flows
- ③ What is the effect of providing a (partial) insurance / a start-up subsidy to unemployment individuals starting a business?

# Roadmap

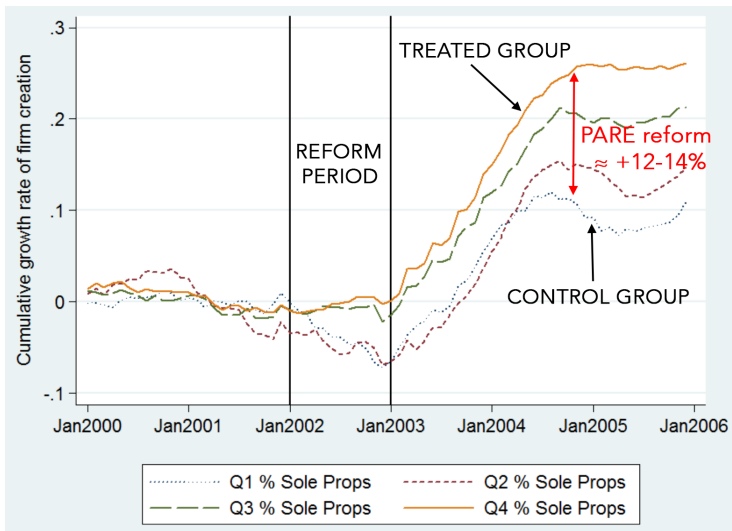
- ① Motivation
- ② Related literature
- ③ Model
- ④ Parameterization results
- ⑤ Policy experiments
- ⑥ Conclusion

# Motivation: Downside Risk Insurance (DRI)

Recent interest in (partially) insuring entrepreneur's downside risk (associated with business failure or bad performances).

- Trade-off of the existence of downside risk:
  - ▶ **selection mechanism** of the most able entrepreneurs
  - ▶ could **prevent potentially successful individuals** from engaging in an entrepreneurial activity
- Downside risk insurance
  - ▶ France: implemented a DRI mechanism in 2002 that guarantee UI provision to (new entrepreneurs) previously unemployed.
  - ▶ Germany: Bridging Allowance (BA) implemented in 1985, similar to the French reform.

# French program: quantitative effect (Hombert et al., 2017)



**Figure:** Effect of the PARE reform on cumulative growth rate of firm creation.  
**Note:** treatment intensity variable is the fraction of sole-proprietorship in sectors

# UI and entrepreneurship in US

Current Unemployment Insurance (UI) system:

- In almost every US states, **UI benefits are lost when starting a business.**

Ex: Pennsylvania Unemployment Compensation Law:

*"a claimant is ineligible for any week in which he/she is engaged in self-employment. When a claimant is starting a new business, the claimant becomes self-employed with the first positive step toward starting the business."*

- create a **bias** for paid-employment rather than self-employment.



# Results sneak peek

- Introducing a DRI policy in our baseline model
  - ▶ Helps resorbing the bias towards paid-employment,
  - ▶ Increases the fraction of unemployed starting a business,
  - ▶ Has small effect on unemployment rate.
- compare to a start-up subsidy (SUS):
  - ▶ DRI favours entry of richer and more able entrepreneurs who grow faster and survive longer.
  - ▶ DRI and SUS are implementable welfare wise in our specification.

## Related literature

- Modelling entrepreneurship
  - ▶ **Entrepreneurs are heterogenous:** ability (Lucas, 1978), wealth (Quadrini, 2002), risk aversion (Herranz et al., 2014)
  - ▶ **Financial frictions:** Cagetti & De Nardi (2006), Buera & Shin (2013), Mankart & Rodano (2015)
  - ▶ **Labor market transitions:** Poschke (2009) and Visschers et al. (2014)
- Entrepreneurship and insurance policy
  - ▶ **Entrepreneurial insurance:** Fairlie et al. (2011), Caliendo and Künn (2011), Hombert et al. (2014), Ejrnæs and Hochguertel (2014)
  - ▶ **Bankruptcy law:** Mankart & Rodano (2015).

# Model: structure

- **Two production sectors:** representative competitive corporate sector and entrepreneurial sector.
- **Households**
  - ▶ common heterogeneity: innate ability  $\theta$ , wealth  $a$ .
  - ▶ can be employed ( $W$ ), unemployed ( $U$ ) or self-employed ( $E$ )
  - ▶ can be insured ( $j = i$ ) or not ( $j = n$ )
  - ▶ can access the credit market ( $e = A$ ) or be excluded ( $e = C$ ), depending on previous bankruptcy decision
- **Government:**
  - ▶ Baseline model: runs an UI program.
  - ▶ Policy experiment: also implement DRI and SUS policies

## Model: Workers

- can search a business idea *on-the-job* with intensity  $s_e$ .
- given the probability to find the idea  $\pi(s_e)$  and the probability to be laid-off  $\eta$ , choose his occupation.
- subject to transitory shock  $y$
- pay tax  $\tau_w$  on his labor income  $wh(\theta)y$  to finance UI benefits.

$$W(a, \theta, y, e) = \max_{c, a', s_e} u(c, 0, s_e) + \beta \mathbb{E}_{e', y', \theta'} \left\{ (1 - \eta) [(1 - \pi_e)W' + \pi_e \max\{E', W'\}] \right. \\ \left. + \eta [(1 - \pi_e)U'_i + \pi_e \max\{E', U'\}] \mid e, y, \theta \right\}$$

$$\text{s.t.} \quad c = (1 - \tau_w)h(\theta)wy + (1 + r^d)a - a'$$

## Model: Unemployed individuals

- Can search for a job and a business idea with effort  $s_w$  and  $s_e$
- Find job with probability  $\pi_w(s_w)$  and business idea with  $\pi_e(s_e)$ .
- Receive home production endowment  $m$ .
- If insured ( $\epsilon = i$ ): receive  $b(\theta)$ . Lose UI rights with probability  $\rho$ .

$$U(a, \theta, e, j) = \max_{c, a', s_w, s_e} u(c, s_w, s_e) + \beta \mathbb{E}_{\theta', y', j', e'} \left\{ \pi_w [(1 - \pi_e)W' + \pi_e \max\{E', W'\}] \right. \\ \left. + (1 - \pi_w) [(1 - \pi_e)U' + \pi_e \max\{E', U'\}] | e, j, \theta \right\}$$

$$\text{s.t. } c = m + \mathbb{1}_{\{j=i\}}(1 - \tau_w)h(\theta)w\mu + (1 + r^d)a - a'$$

## Model: Entrepreneur (self-employed)

- Can search a job *on-the-business* with intensity  $s_w$
- Face business shock  $z$  (has some persistency) and choose capital invested  $k$  before  $z$  is realized.
- Can use own wealth or borrow from financial intermediary to invest
- Can repay or bankrupt and be excluded temporarily from the credit market

Entrepreneurial production function:

$$f(k, \theta, z) = zg(\theta)(k)^\nu$$

where  $g(\theta)$  maps innate ability into entrepreneurial ability.

# Model: Entrepreneur - timing

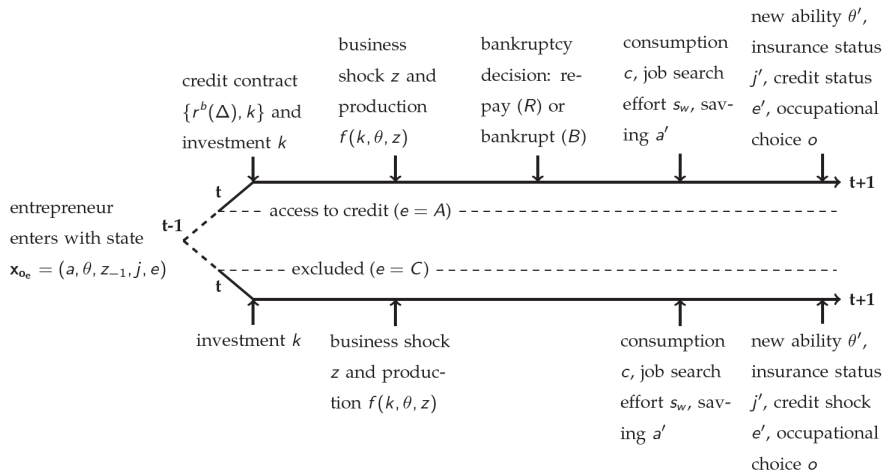


Figure: Timing of an entrepreneur

- $r^b(\Delta)$  is determined endogenously
  - ▶ by financial intermediary using a zero-profit condition,
  - ▶ observable characteristics  $\Delta = (a, \theta, z_{-1}, j)$  and
  - ▶ endogenous default probability.
- **Repayment:** repay  $(1 + r^b(\Delta))loan$  and can pursue his activity
- **Bankruptcy** in the spirit of D'Erasmus and Boedo (2012): firm is liquidated and entrepreneur renegotiates what is due in court
  - ▶ has to pay court fees  $\chi k$
  - ▶ recover  $(1 - \xi)k$  through liquidation and/or reorganisation.



## Baseline model: Parameterisation

Heterogeneity (wealth/skill/shocks) matter for occupational choice, so target moments on mobility and entrepreneurship.

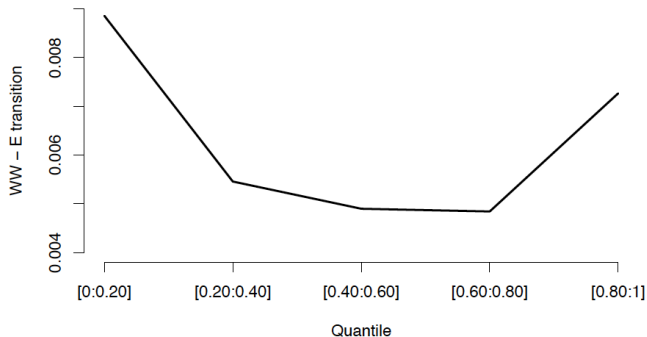
**Table:** Targeted moments (time is a quarter)

<b>Moment (time is a quarter)</b>	<b>Data</b>	<b>Model</b>
Unemployment rate	5.1	5.06
Entrepreneurship rate	8.5	8.5
Entrepreneur's exit rate	6	5.8
Ratio of net worth E/W	8.0	8.04
Capital used by entrepreneurs (%)	30	29.7
% of entrepreneurs with neg. income	3	3.3
Flows W to E by quantiles	[1.07, 0.87, 1.07]	[1.069, 0.85, 1.082]

The U-shaped curve in the transition  $W - E \rightarrow$  provides a mapping between working and entrepreneurial abilities.

# W to E transition by earning quantile

Figure: W to E transition by earning quantile



**Fig. 4.** Transition from worker to entrepreneur by earning quantiles. *Data source:* basic monthly CPS from 2001 to 2008.

## Results: Non targeted statistics

<b>Statistic</b>	<b>Data</b>	<b>Model</b>
Necessity share* (%)	12-13	10
New entrepreneurs previously unemployed (%)	20	21
Median ratio ent. net worth to whole pop.	6.57	6.42
Median ratio workers over ent. income	1.65	1.61
Median debt to income ratio	0.5	0.75
Fraction total ent. wealth (%)	30	32.6
Fraction zero or negative net worth (%)	10	4
std deviation log E's income / log W's income	2 - 4	2.5

\*Necessity share: when  $W(a, \theta, y, e) > E(a, \theta, z_{-1}, e, j) > U(a, \theta, e, j)$

# Results: search behavior

Figure: Job search effort ( $s_w$ )

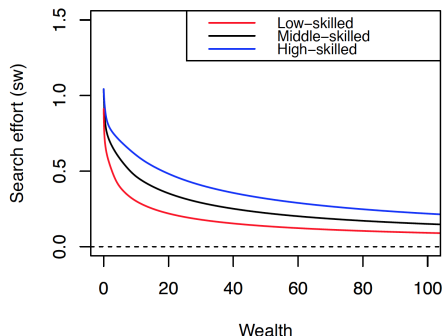
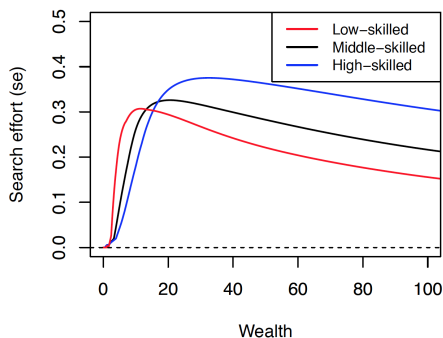


Figure: Business search effort ( $s_e$ )



- Financial frictions plays a crucial role in the business search effort intensity.
- Disincentive to search increases in wealth.

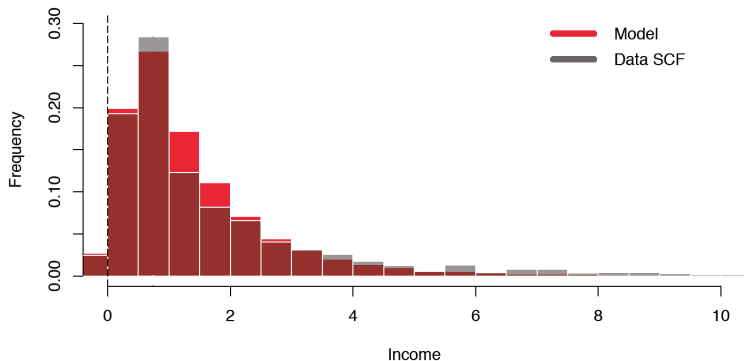
## Results: transition between occupations

	Mass (%)		Flows: Model (Data) (%)		
	Data	Model	<i>W</i>	<i>E</i>	<i>U</i>
<i>W</i>	86.4	86.44	97.45 (97.56)	0.48 (0.52)	2.07 (1.92)
<i>E</i>	8.5	8.5	5.23 (5.18)	94.22 (93.98)	0.49 (0.84)
<i>U</i>	5.1	5.06	43.23 (43.05)	2.25 (2.39)	54.32 (54.56)

**Table:** Flows between occupations during a quarter (data counterpart between braces). *Data sources:* authors' computations using the monthly basic CPS from 2001 to 2008.

- Only *W* to *U* and entrepreneur's exit rate (6%) are targetted.
- Within transitions by ability level are also close to their data counterparts.

## Results: entrepreneur's income



**Figure:** Distribution of normalized entrepreneurs total income (including wage, business income and capital gains) with respect to the median.

- Right skewed distribution consistent with actual entrepreneurial risk.

## Policy: DRI

**In the spirit of French program:** insure new entrepreneurs previously insured unemployed (with UI rights).

- Downside Risk Insurance (DRI)
  - ▶ **In case of failure:** preserve their UI rights when returning to the unemployment pool.
  - ▶ **A compensation that guarantees at least UI benefits** in case of low but positive entrepreneurial income, only the UI if income is negative.
- Start-Up Subsidy (SUS)
  - ▶ **additional amount of wealth**  $S$  provided to the new entrepreneur
  - ▶ US SBA program: free entrepreneurial training, loan guarantees and grants.

## Policy: DRI

- Evaluated to the US economy
- Complementary income  $b_e(\theta, \pi_r)$  depending on their income  $\pi_r$
- Policy characterized by: a **duration**  $q$  and an insurance **replacement rate**  $f$

$$b_e(\theta, \pi_r) = \begin{cases} b(\theta) & \text{if } \pi_r < 0 \\ b(\theta) - (1 - f)\pi_r & \text{if } 0 \leq \pi_r \leq \frac{b(\theta)}{1-f} \\ 0 & \text{if } \pi_r > \frac{b(\theta)}{1-f} \end{cases}$$

$b(\theta) = (1 - \tau_w)h(\theta)w\mu$ : full UI benefit while unemployed.

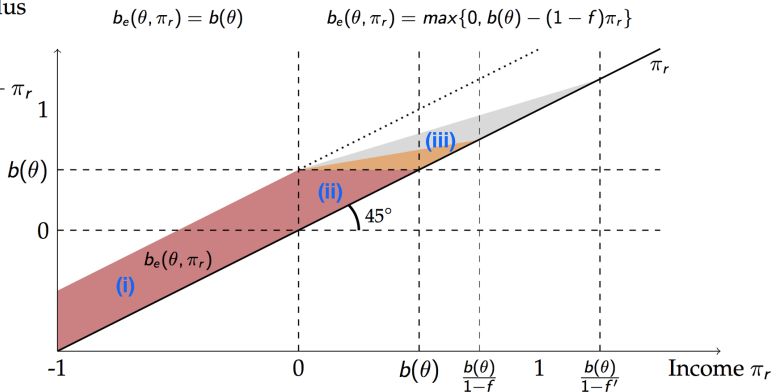
- Full entrepreneurial income with DRI is  $\pi_r + b_e(\theta, \pi_r)$



# Policy: DRI

Income plus insurance

$$b_e(\theta, \pi_r) + \pi_r$$



**Figure:** DRI policy. Red:  $f = 0$ , Orange  $f = 0.3$ , Grey:  $f = 0.45$ , White:  $f \rightarrow 1$ .

3 regions: (i) full benefits if negative income, (ii) complementary amount to at least full benefits if low income (iii) insurance subsidy if income larger than UI benefits

## Results: policy experiments

- Standard implementation for DRI is  $(f, q) = (0.3, 0.5)$ 
  - ▶  $q$  is set to match US UI duration
  - ▶  $f$  is set to the value adopted in France. We conduct robustness on this,
- To make DRI and SUS comparable, the subsidy amount  $S$  is adjusted to generate the same share of entrepreneurs between the two policies.

## Results: policy experiments

	DRI (% deviation) ( $\mu = 0.5, f = 0.3$ )	SUS (% deviation) ( $S = 0.0693$ )
prob. U $\rightarrow$ E	<b>10</b>	<b>18</b>
Ent. exit rate	<b>1.64</b>	<b>3.76</b>
unemp. rate	-0.07	<b>-0.43</b>
New ent. per year	<b>2.5</b>	<b>4.4</b>
Necessity share	<b>-21.5</b>	<b>20</b>
Avg firm size	-0.18	<b>-0.42</b>
Ent. sector production	<b>0.9</b>	0.6
Tax rate $\tau_w$	2.5	1.8
Ratio cost/GDP	0.0032	0.0026

**Table:** Effects on mobility and aggregates of the two policies, expressed as % deviation from the baseline economy.

- DRI policy is slightly more expensive tax wise (but similar over production),
- DRI overall smaller quantitative footprint than the SUS policy.

## Results: policy experiments - quality

% of entrepreneurs	$\theta_1$	$\theta_2$	$\theta_3$
Baseline	11.60	7.55	7.24
DRI	+0.66	+1.11	<b>+1.38</b>
SUS	<b>+1.30</b>	+0.98	+0.66

**Table:** Percent increase (relative to the baseline economy) in the share of entrepreneurs by ability groups under different reforms.

- Resorbing the bias due to the UI system favours high-skilled group.
  - ▶ **High opportunity cost of abandoning their UI rights.**
  - ▶ Even under DRI, **low-skilled group are**, on average, the most **financially constrained** group.

## Results: policy experiments - performance

We measure performance over 5 years:

5 years average	Baseline	Counterfactual	Selected	
		DRI	DRI	SUS
$g(\theta)$	0.079	0.0791	0.0835	0.0754
Wealth	12.64	12.71	9.94	8.11
Production	0.952	0.954	0.944	0.691
Production growth (in %)	2.83	3.02	2.41	2.1
Survival rate at 5 years (in %)	32.09	32.21	15.20	20.81

**Table:** Performance and quality of entrepreneurs.

- **Counterfactual:** people entering entrepreneurship even without DRI in baseline.
- **Selected:** only people entering entrepreneurship because of the policies

## Results: policy experiments - insurance components

Disentangling components of DRI by using partial insurance:

	Baseline	DRI	No compensation	$f = 0$
% of entrepreneurs	8.488	1.013	<b>0.424</b>	0.966
prob. $U \rightarrow E$ (in %)	2.26	9.734	<b>7.080</b>	9.292
Tax rate $\tau_w$ (in %)	0.911	2.525	<b>0.110</b>	2.525
Ratio cost/GDP	-	0.01697	-	0.0172

**Table:** DRI effects under three different assumptions in % deviation from baseline.

- **No compensation:** only offered the possibility to return to unemployment and claim UI,
  - ▶ impact is still important, resorb part of the bias towards employment.
- **$f = 0$ :** no subsidy part in DRI, no compensation above initial UI benefit

## Results: What else ?

- We compute transitional dynamics,
- We compute welfare gains both at steady state and with transitions:  
**both policies are implementable welfare wise,**
- We conduct robustness and consider alternative policy specifications.

# Conclusion

- GE theoretical framework with occupational choice, which accounts for entrepreneur's heterogeneity.
- Occupational flows are very close to their data counterparts in CPS.
- Downside Risk Insurance for unemployed workers
  - ▶ Helps resorb the bias of the current UI system,
  - ▶ Increases the fraction of unemployed starting a business by 10%,
  - ▶ Benefits to high-skilled and richer individuals as compared to SUS.



# Program of the entrepreneur non-excluded return

$$R(a, k, \theta, z, j) = \max_{c, a', s_w} u(c, s_w, 0) + \beta \mathbb{E}_{\theta', y', j'} \left\{ \pi_w \max\{W', E'_{j'}\} \right. \\ \left. + (1 - \pi_w) \max\{U'_{j'}, E'_{j'}\} \mid \theta, j \right\} \quad (1)$$

$$\text{s.t. } \pi_r^A = z g(\theta) (k)^\nu - \delta k - r^b(\Delta) (k - a) \mathbb{1}_{\{k \geq a\}} \quad (2)$$

$$c + a' = \pi_r^A + \mathbb{1}_{\{j=i\}} b_e(\theta, \pi_r^A) + a + r^d(a - k) \mathbb{1}_{\{k \leq a\}} \quad (3)$$

$$B(a, k, \theta, z, j) = \max_{c, a', s_w} u(c, s_w, 0) + \beta \mathbb{E}_{\theta', y', j'} \left\{ \pi_w W' + (1 - \pi_w) U'_{j'} \mid \theta, j \right\} \quad (4)$$

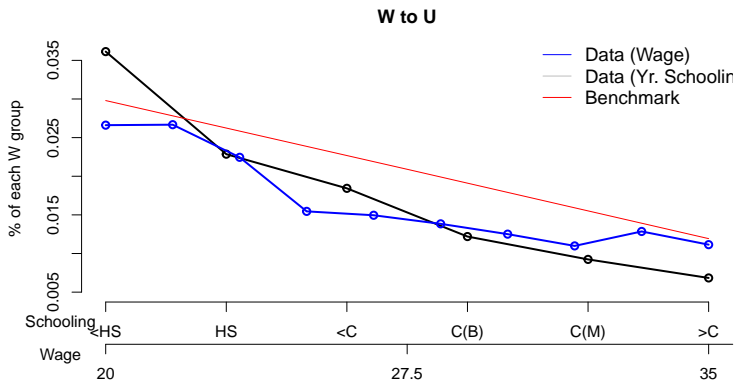
$$\text{s.t. } \pi_r = z g(\theta) (k)^\nu - \delta k \quad (5)$$

$$c + a' = \max\{(1 - \chi)k + \pi_r - \xi(k - a), 0\} + \mathbb{1}_{\{j=i\}} b_e(\theta, \pi_r) \quad (6)$$

$$E(a, \theta, z_{-1}, e = A, j) = \max_k \left\{ \sum_{z \in \mathcal{Z}} \pi_z(z \mid z_{-1}) \max\{B(a, k, \theta, z, j), R(a, k, \theta, z, j)\} \right\} \quad (7)$$

$$\text{s.t. } (k - a) \leq \lambda a \quad (8)$$

# Results: occupational flows

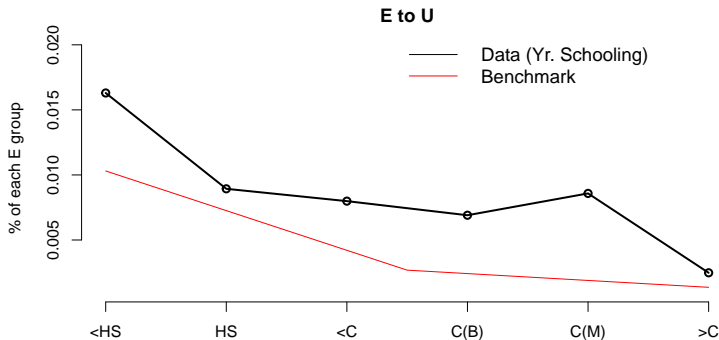


**Figure:** Occupational flows from paid-employment to unemployment by educational attainment and wage level.

*Source:* authors' calculation from CPS 2001 - 2008.

\*Job destruction rate per ability is targeted

## Results: occupational flows

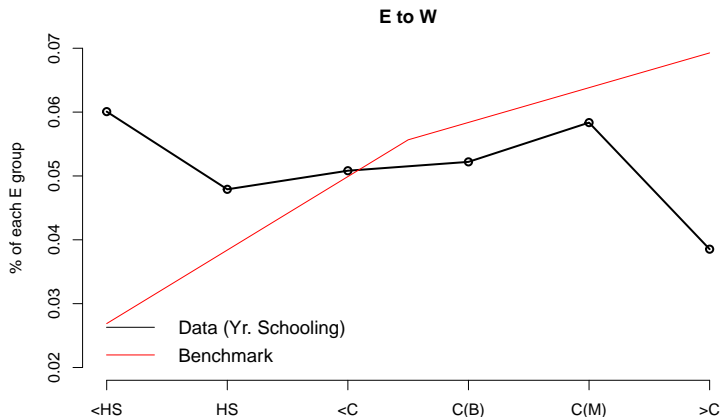


**Figure:** Occupational flows from entrepreneurship to unemployment by productivity level (data: educational attainment, model:  $\theta$ ).

*Source:* authors' calculation from CPS 2001 - 2008.

\*Only the average overall exit rate from entrepreneurship to any other occupation is targeted, not this specific shape

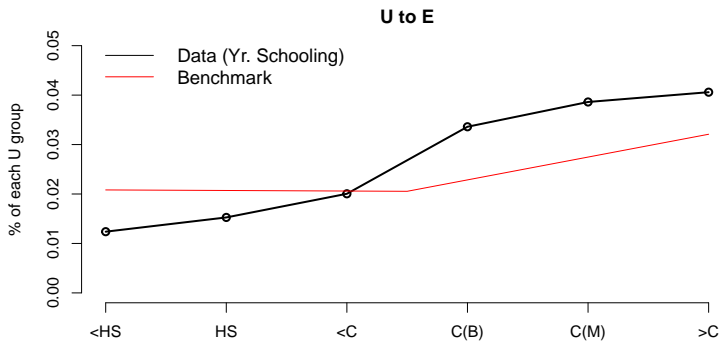
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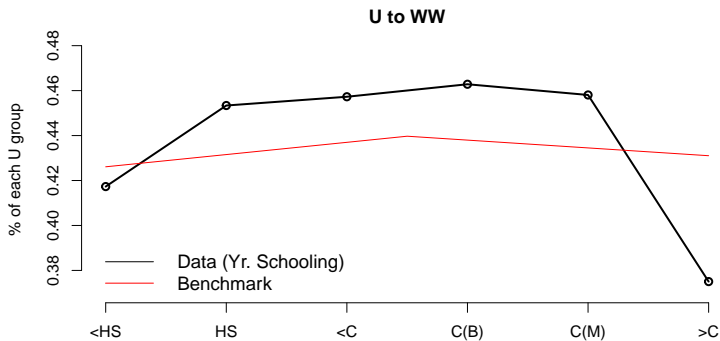
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