Leveraging on human capital:
Labor rigidities and sorting over the business cycle

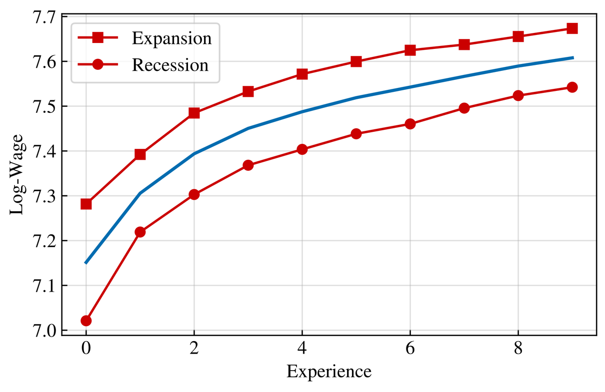
Edoardo Acabbi[1], **Andrea Alati**[2], **Luca Mazzone**[3]

[1]: UCIIIM, [2]: Bank of England, [3]: IMF

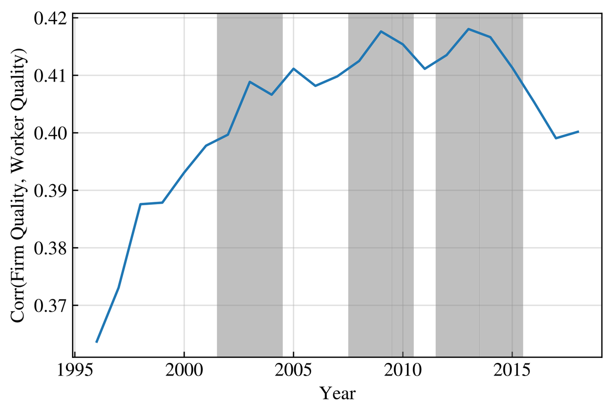
ABSTRACT: Labor market sorting matters for the costs of aggregate fluctuations and is a key factor for human capital accumulation. We build a labor search model to study output, employment and welfare jointly, and to assess the importance of labor market sorting dynamics as a driver of reallocation and productivity growth.
The model is estimated on Italian administrative data.

The Italian labor market

Scarring

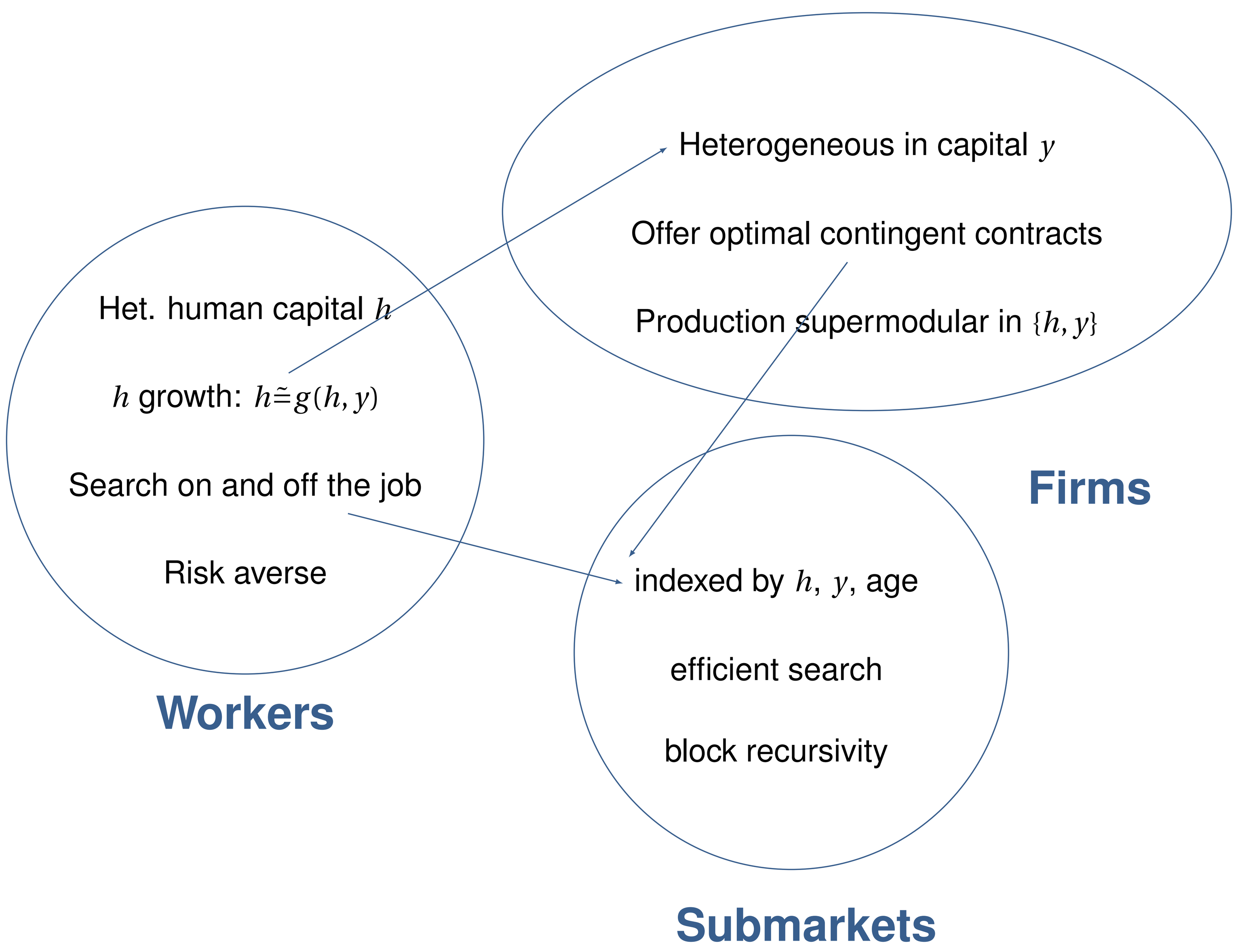


Sorting



- Workers and firms are, on average, positively assorted in the Italian labor market
- Business cycle fluctuations alter their sorting: after recessions, workers end up in firms that are less productive, and experience lower wage growth
- This is at the root of recessionary scarring effects, and has aggregate implications

The Model



Properties of the model

Proposition 1. *The optimal search strategy, $v^*(h, \tau, V; \Omega)$, is (i) unique, (ii) weakly increasing in V and (iii) increasing in aggregate productivity, a.*

- Intuition (ii): being in a good contract - high V - increases the **outside options**.
- Intuition (iii): in good times - high a - firms open more vacancies, job-finding probability increases, optimal to try for **better submarkets**.

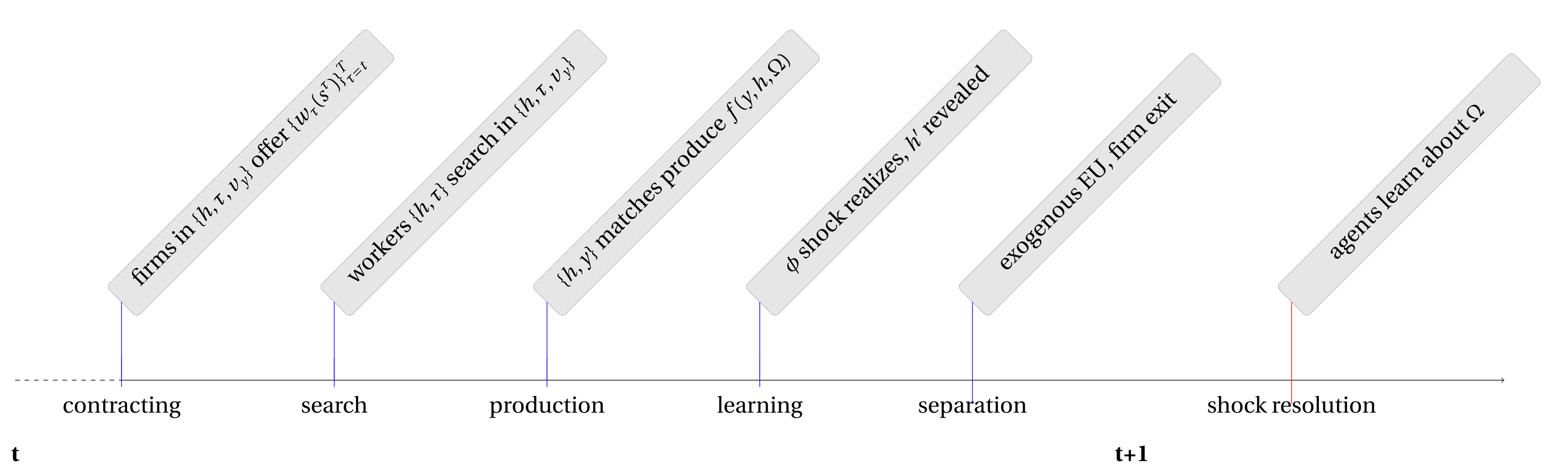
Proposition 2. *The optimal contract with bilateral lack of commitment delivers the following wage path:*

$$\frac{\partial \log\left(\tilde{p}(\Theta)\right)}{\partial W_{\Omega'}} J_{t+1}(\Theta) = \frac{1}{u'(w_{\Omega'})} - \frac{1}{u'(w)}$$

with $\Theta \equiv (g(\phi, y, h), \tau+1, W_{y,\Omega'}; \Omega')$ being the definition of the relevant state and $w_{\Omega'}$ is the wage paid in the future state, $\tilde{p}()$ is the retention probability and $J_{t+1}(\Theta)$ is the value of the match in the future state.

- **Wage Backloading**: Risk-neutrality + retention incentives → optimal to front-load profits.
- **Worker Insurance**: Contract links wage growth to profit realizations.
  The contract provides insurance, firms profit off implicit premia. → **wage rigidity**.

Timeline



Search behaviour of employed workers

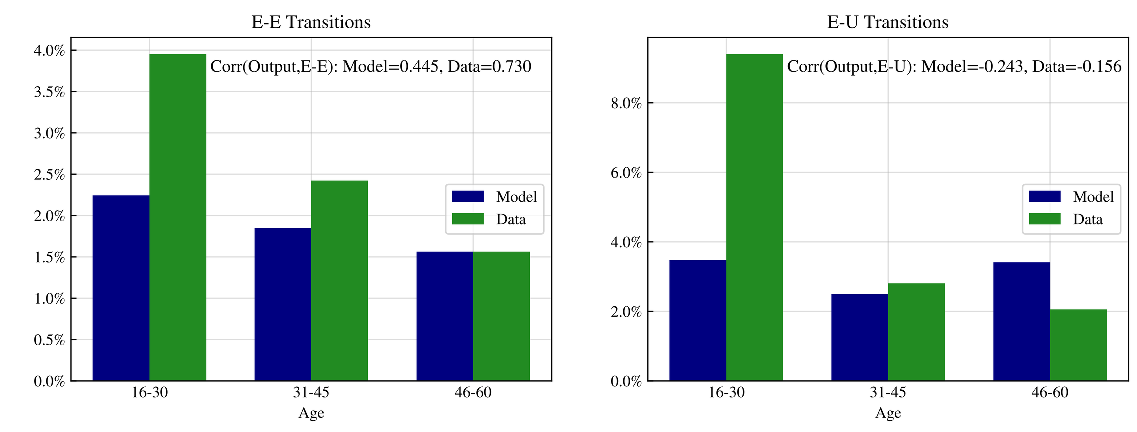
- Workers direct their search towards "better" firms in good times

	Human capital quartiles			
Aggregate State	1	2	3	4
Severe Recession	4.61	7.38	11.75	16.22
Recession	4.70	7.54	11.95	16.97
Normal	4.79	7.67	12.14	16.94
Expansion	4.85	7.77	12.34	20.41
Boom	4.92	7.97	12.37	17.81

Model vs Data

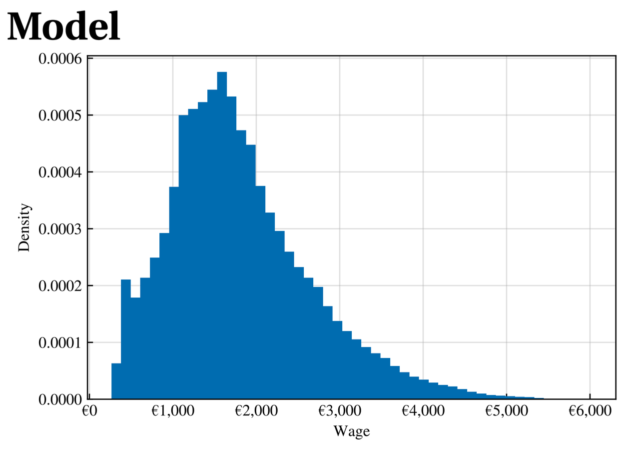
- Calibration to assess the behaviour of the model based on Italian admin data
  (via the *VisitINPS* program)

Transition rates

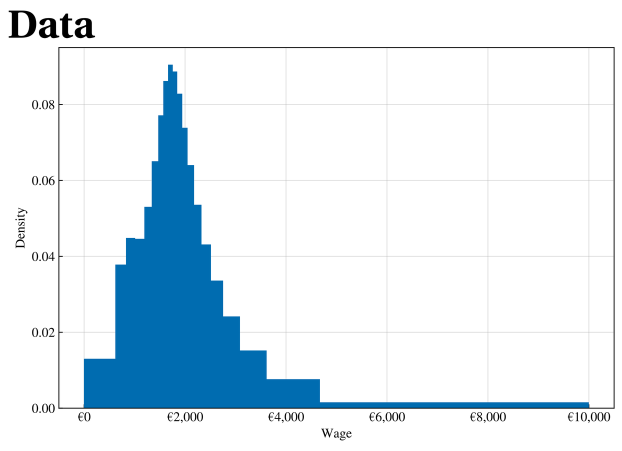


Wage distributions

Model

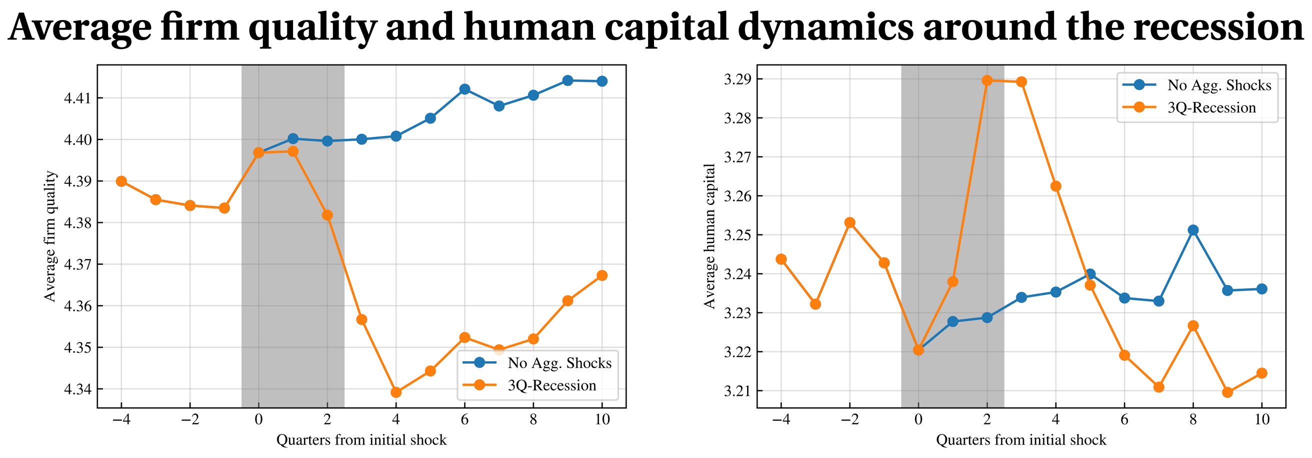


Data



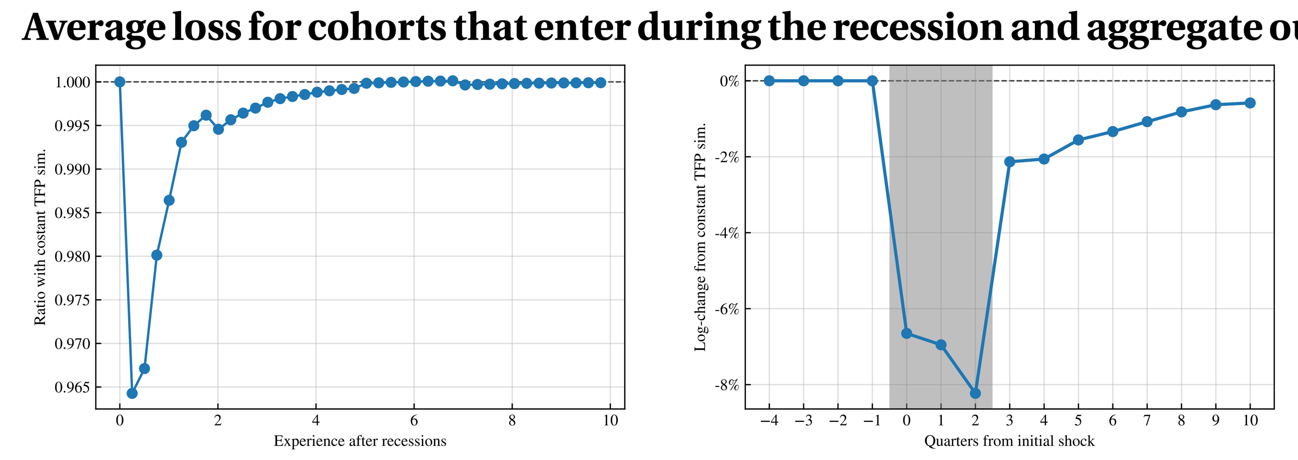
Transition dynamics after a three-quarters recession

Average firm quality and human capital dynamics around the recession



- As in the data, sorting is strongly counter-cyclical
- The recession is sullying, reducing the average firm quality in the economy
- This reduction impacts the average human capital that, after an initial increase due to separation of less viable matches, sets at a lower level even two years after the initial shock

Average loss for cohorts that enter during the recession and aggregate output dynamics



- Cohorts that enter the economy during the recession, compared to the normal scenario experience a loss in wages that persists for approximately five years in their careers
- Output falls during the recession and remains significantly below the level attained in the normal scenario up to two years after the initial shock

Conclusions

- Human capital and contractual rigidities are key drivers of worker heterogeneity in the labor market
- These elements are key ingredients for workers' life-cycles as well as aggregate dynamics
- Next steps: full quantification of business cycle costs as function of labor market sorting and policy counterfactuals (e.g. aggregate effects of furlough schemes)