Search Capital and Unemployment Duration

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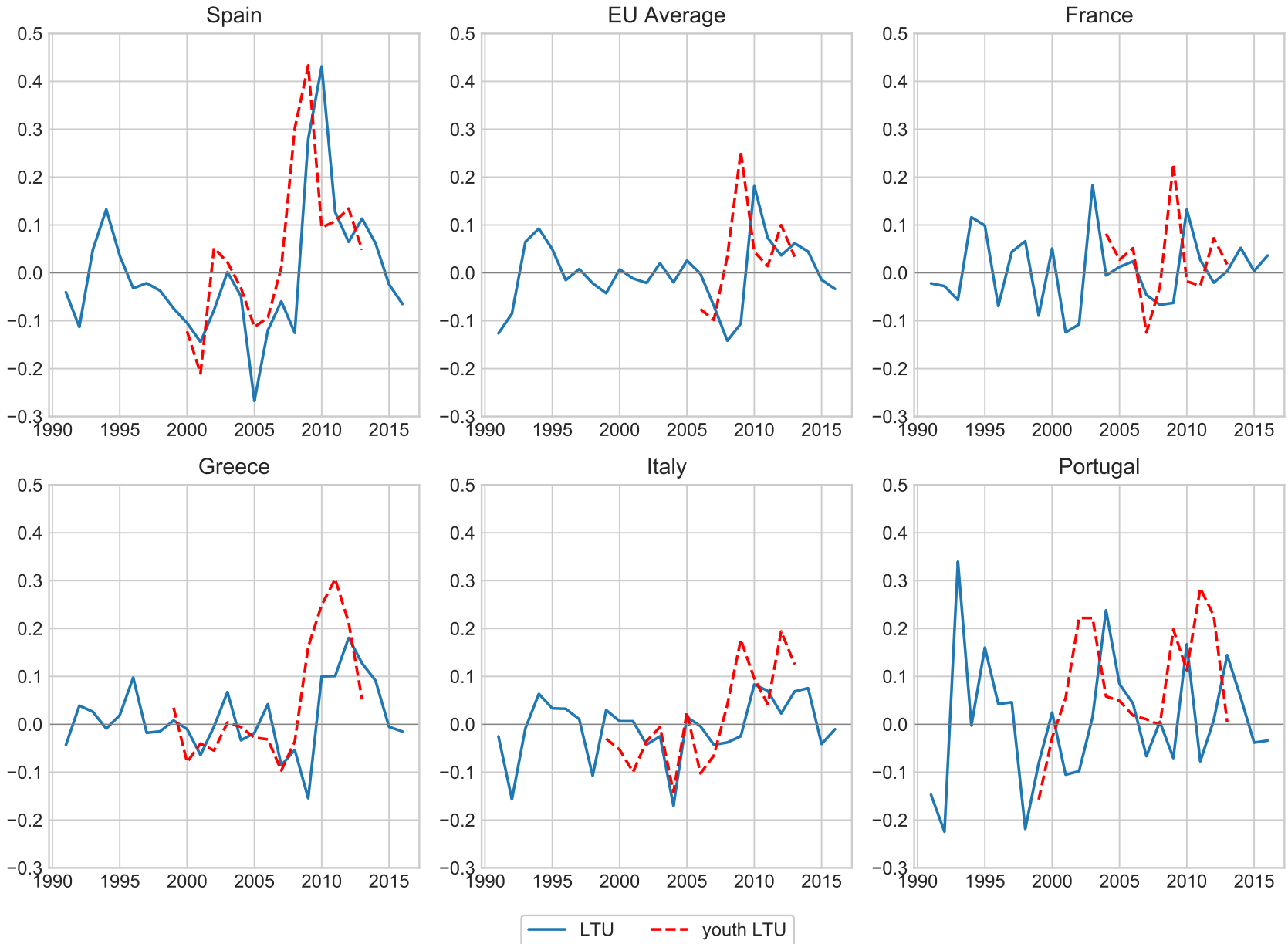
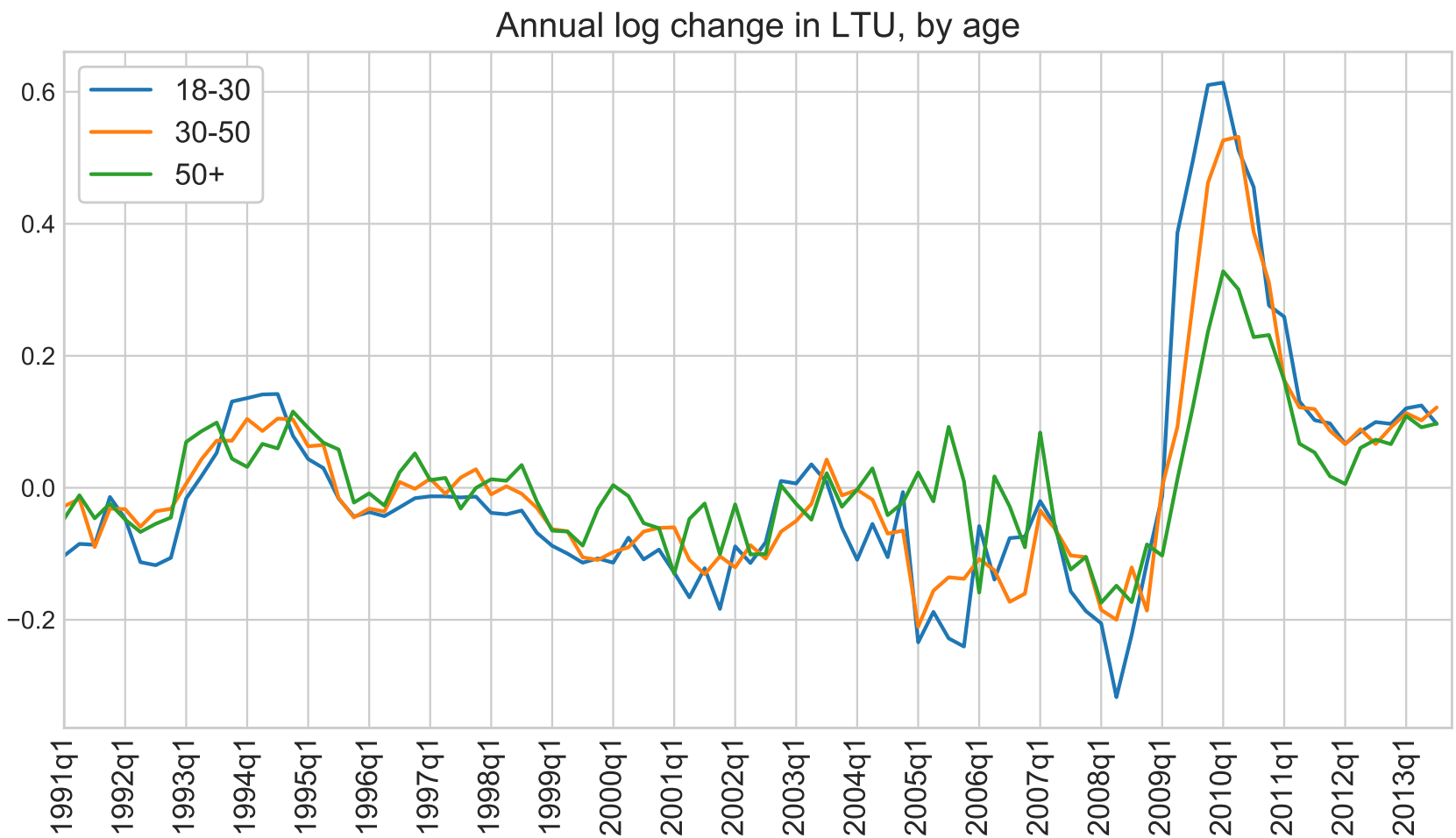
Motivation

Long term unemployment (LTU) rises in every recession, but in Europe the last recession has risen more among young workers.

Long Term Unemployment, annual log change % total



An example by age groups (Spain)



How do we explain this?

The literature on long-term unemployment has difficulties explaining why the young will be more affected now:

- Loss of human capital: recessions see long term jobs destroyed and with them human capital loses. Affected workers have to retrain to gain their skills back, which takes time. Kitao, Ljungqvist and Sargent (2016), Acemoglu (1995)
- Generous unemployment benefits, specially extensions triggered after the recession in the US, disincentivise job search. Krueger, Cramer and Cho (2014), Ljungqvist and Sargent (2008), Lalive (2007)

Roadmap

In this presentation:

1. Proposes a new mechanism (Search Capital) that can explain this increase among the youngest workers.
2. Presents a simple model.
3. Empirically testes the predictions of the model.
4. Shows that when embedded in a macro model, search capital helps to explain aggregate labor dynamics we see in the data.

Search Capital

By interacting with the labour market (searching for a job), workers gain experience and skills that improve their search outcomes in the future $\rightarrow$ they become better searchers.

- Some workers can be naturally better searchers than others, but all can improve their skills over time.
- Not related to productivity (unlike Human Capital) or search effort.
- Examples: networks (Wiczer'18, Witte'17), better information on potential vacancies (Belot, Kircher and Muller '16) and all things *Active Labor Market Policies* (Bentolila and Jansen'16).

Link to LTU

Over the last decades labor policies across Europe have pushed for more unregulated work to fight LTU and youth unemployment.

These short jobs force young workers to search often.

At the same time, tightly protected regular jobs that discourage search.

$\Rightarrow$ In a recession, both kind of workers compete for few jobs with the experience searchers. A stock of long term unemployment builds up as a result.

A simple model

Easiest way to see what search capital adds to a standard search and matching model. Assume:

- The job arrival rate $f(\theta, s)$ is increasing in s (search capital)
- Temporary jobs (high δ_T) increase search capital
- Long term jobs (low δ_P) decrease search capital

This is the simplest way to capture the dynamic component of search capital.

Worker Surplus

The value of unemployment and a temporary job are:

$$rU(s) = z + f(\theta, s)\Big[\alpha_T \int_{R_T(s)} [W_T(\epsilon, s^+) - U(s)] dF_T(\epsilon) + (1 - \alpha_T) \int_{R_P(s)} [W_P(\epsilon, s^-) - U(s)] dF_P(\epsilon)\Big]$$

$$rW_T(\epsilon, s) = w_T(\epsilon, s) + \delta_T[U(s) - W_T(\epsilon, s)]$$

Worker surplus of a temporary contract is:

$$(r+\delta)[W_T(\epsilon, s^+) - U(s)] = w(\epsilon, s^+) - rU(s) + \delta_T[U(s^+) - U(s)]$$

This extra term in the worker surplus from a match is a positive 'search externality'.

- Lower SC $\rightarrow$ lower reservation wage for temporary jobs
- The magnitude of the effect depends on the destruction rate$(+)$ and the increase in value of unemployment from gaining search capital.
- The opposite is true for long-term jobs.

Predictions

- Unemployed with more (recent) temporary jobs should find jobs faster.
- Unemployed with more (recent) temporary jobs should receive higher wages.
- If search capital deteriorates during a long-term match, unemployed with long tenures in their last job should find jobs slower.
- Unemployed with more (recent) temporary jobs should have higher chances to find a long-term job.

Testing the predictions on microdata

I use data for Spain, a country that has some nice features:

- Clear distinction between temporary land long-term jobs.
- High incidence of temporary jobs (20%–30% of employment)
- Step increase of firing costs for regular (permanent) jobs mean that firms do not promote most workers (93%) after the end of the contract.
- Big cyclical movements in unemployment and long-term unemployment over the last 20 years.

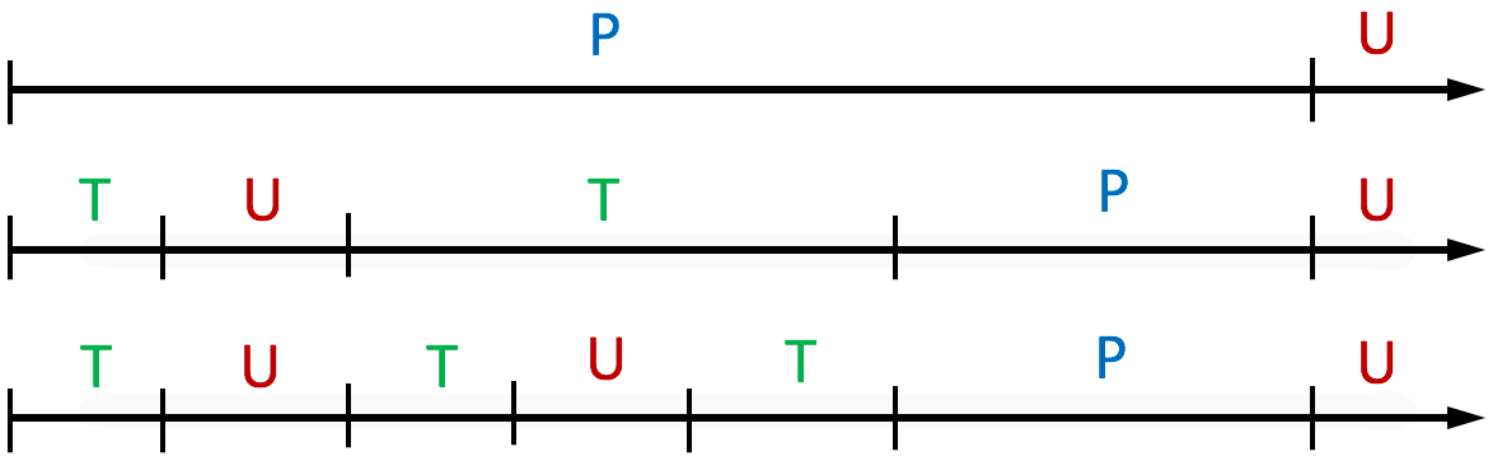
Data

- Matched employer-employee dataset, from 2005 to 2014, containing over 1 million individual observations.
- Unemployment is measured in a way that is consistent with the LFS (Lafuente (2017)).
- Linked with income tax records: information on firm-worker pairs for annual wages, unemployment subsidies, severance payments and profits for some of the self employed.
- Allows to control for work histories - tenure, experience, occupation.

Identification

Proxy search capital with the number of jobs held in the past.

Most of the variation in number of jobs comes from Temporary contracts (No.TC):



Workers with more temporary contracts in different firms have more observable search experience.

Resgressions

$$log(weeks)_{i,t} = \beta_0 + \beta_1 TCs_{i,t} + \gamma CLAIM_{i,t} + \beta_2 Ten_{i,t} +$$
$$\beta_3 Exp_{i,t} + \beta_4 log(wage_{i,t-1}) + \beta_5 log(UB)_{i,t} + \delta X_{i,t} + \epsilon_{i,t}$$

- CLAIM dummies control for spikes at expiration of benefits.
- Years of Tenure and experience control for human capital accumulation.
- Also control for wage in the previous job as a proxy for match quality/productivity.
- Include (for those who have data on it) the quantity of unemployment benefits.
- Other controls: occupation, industry, region, time dummies, etc.
- Allow for different effects of recent contracts and include a quadratic term on the number of contracts.

Resgressions

$$log(wage_{i,t+1}) = \beta_0 + \beta_1 TCs_{i,t} + \gamma CLAIM_{i,t} + \beta_2 Ten_{i,t} + \beta_3 Exp_{i,t} + \beta_4 log(wage_{i,t-1})_{i,t} + \beta_5 log(weeks)_{i,t} + \delta X_{i,t} + \epsilon_{i,t}$$

- CLAIM dummies control for spikes at expiration of benefits.
- Years of Tenure and experience control for human capital accumulation.
- Also control for wage in the previous job as a proxy for match quality/productivity.
- Include (for those who have data on it) the quantity of unemployment benefits.
- Other controls: occupation, industry, region, time dummies, etc.
- Allow for different effects of recent contracts and include a quadratic term on the number of contracts.

Resgressions

$$P(PC_{t+1}|U_t)_{i,t} = \beta_0 + \beta_1 TCs_{i,t} + \gamma CLAIM_{i,t} + \beta_2 Ten_{i,t} + \beta_3 Exp_{i,t} + \beta_4 log(wage_{i,t-1})_{i,t} + \beta_5 log(weeks)_{i,t} + \delta X_{i,t} + \epsilon_{i,t}$$

- CLAIM dummies control for spikes at expiration of benefits.
- Years of Tenure and experience control for human capital accumulation.
- Also control for wage in the previous job as a proxy for match quality/productivity.
- Include (for those who have data on it) the quantity of unemployment benefits.
- Other controls: occupation, industry, region, time dummies, etc.
- Allow for different effects of recent contracts and include a quadratic term on the number of contracts.

Results - recent contracts

Dependent variable	Coefficient on No.TCs	
	Pooled OLS	Fixed Effects
Duration of unemployment spell - log(weeks)	**-0.032*** **	**-0.005*** **
	(0.0010)	(0.0013)
N	461,369	461,369
Adjusted R^2	0.561	0.458
Wage in the next job - log(wage)	**0.0008*** **	**0.0088*** **
	(0.0009)	(0.0014)
N	363,473	370,945
Adjusted R^2	0.223	0.067
	Probit	Probit+FE
Probability of next job being permanent	**-0.068*** **	**0.243*** **
	(0.0020)	(0.0081)
N	472,006	77,992
Controls: length UI, last job PC, No.PC, age		
Years	✓	✓
Industry	✓	✓
Occupation	✓	✓
Region	✓	✓

▸ By industry ▸ Regression details

Results - all contracts

Dependent variable	Coefficient on No.TCs	
	Pooled OLS	Fixed Effects
Duration of unemployment spell - log(weeks)	**-0.011*** **	**-0.004*** **
	(0.0005)	(0.0008)
N	530,073	530,073
Adjusted R^2	0.552	0.457
Wage in the next job - log(wage)	**0.0007*** **	**0.0052*** **
	(0.0002)	(0.0010)
N	209,215	209,215
Adjusted R^2	0.248	0.067
	Probit	Probit+FE
Probability of next job being permanent	**-.048*** **	**.417 *** **
	(0.00003)	(0.0071)
N	543,529	126,432
Controls: length UI, last job PC, No.PC, age		
Years	✓	✓
Industry	✓	✓
Occupation	✓	✓
Region	✓	✓

Recap of results

- More temporary jobs in the past $\Rightarrow$ shorter unemployment spells
- More temporary jobs in the past $\Rightarrow$ higher wages.
- The effects on wages are **higher** under fixed effects and the effects on unemployment duration are **lower**. This is consistent with setting higher reservation wages over time.
- More temporary jobs in the past $\Rightarrow$ more likely to find a permanent job (with fixed effects)
- **Recent** temporary contracts have a larger effect than older contracts.

Model - motivation

- Can Search Capital add something new to the LTU macro literature?
- Can Search Capital generate systematic differences in the unemployment level, unemployment duration, job finding rates?

Key Ingredients

Same as in the basic model but now:

- Workers are risk averse and they save to insure against unemployment (no borrowing allowed, unemployment benefits expire)
- When workers receive an offer they draw a wage from a fixed wage distribution.
- No on-the-job search but temporary workers can be offered an upgrade to permanent.
- In a long-term contract (specific) human capital increases over time, increasing wages.
- Workers can quit (no slavery).

Unemployed problem

$$V^U(a,s) = u(c(b,a)) + \beta\Big(\alpha_T(s)\int_0^{\bar{w}} \max\{V^U(a',s), V^T(w,a',s')\}dF(w) + \alpha_P(s)\int_0^{\bar{w}} \max\{V^U(a',s), V^P(w,a',s')\}dF(w) + (1-\alpha_T-\alpha_P)[(1-\delta_0 V^U(a',s) + \delta_0 V^0(a',s)]\Big)$$

st.

$$c + a' = (1+r)a + b$$

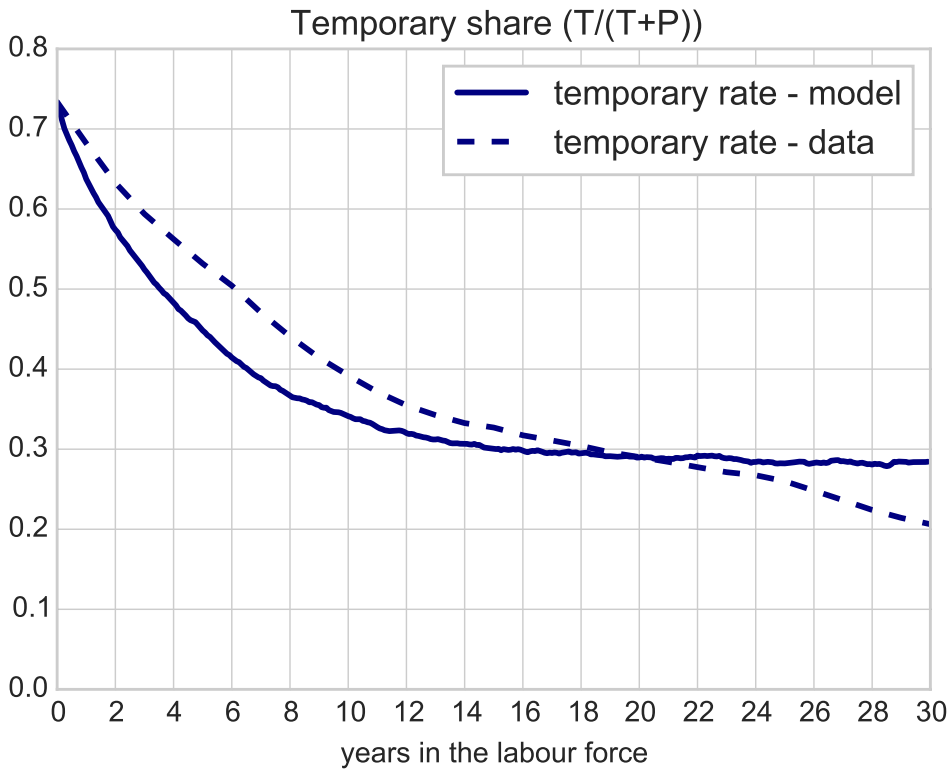
$$s' = \begin{cases} P(s' = s^+|s) = \pi_{s^+|s} \\ P(s' = s|s) = 1 - \pi_{s^+|s} \end{cases}$$

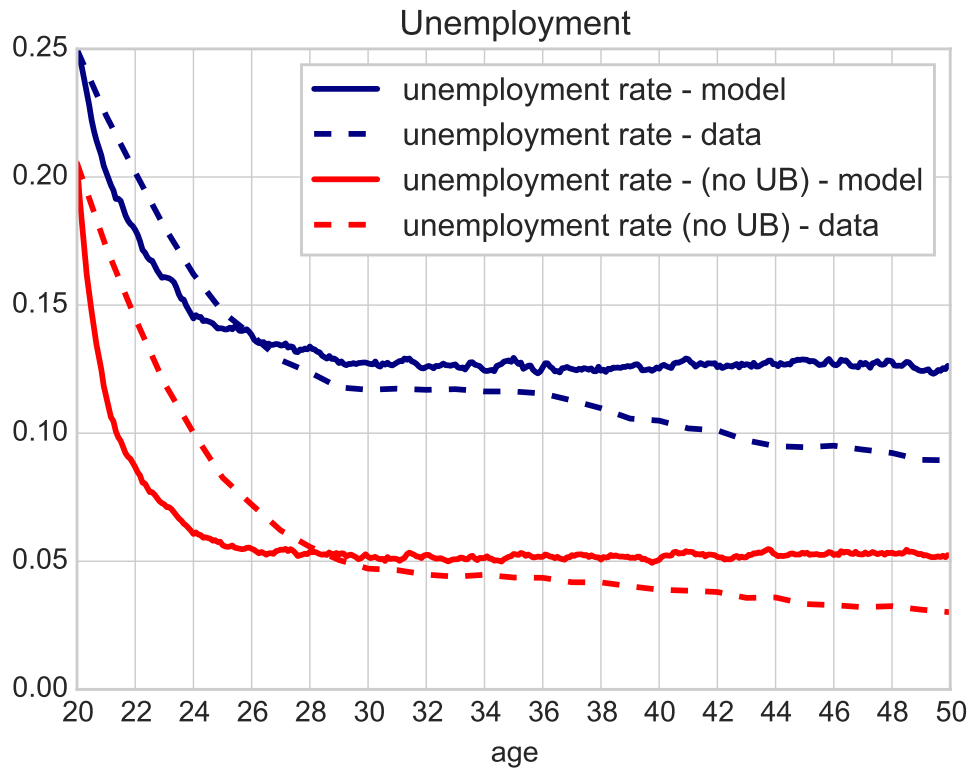
▸ Timing ▸ Temporary problem ▸ Long-term problem

Calibration

Parameter	Value	Target
$F_T(w)$	-	entry wage distribution for TCs
$F_P(w)$	-	entry wage distribution for PCs
b	695.52	average UB
$\alpha_T(1)$	0.116	UT transition rates at age 20
$\alpha_P(1)$	0.019	UP transition rates at age 20
α_{TP}	0.023	average TP flow
α_{PT}	0.226	average PT rates, modified*
δ_P	0.007	average PU flow
δ_T	0.030	average TU flow
δ_{T0}	0.15	average T0 flow
δ_0	0.079	average U0 flow
$p(h)$	-	tenure wage distribution
s_0, s_1, s_2	$\{0.666, 1, 1.666\}$	duration of unemployment for different NoTs
$\pi^+_{s'\|s}$	$\{1, 1, 0\}$	duration of unemployment for different NoTs
$\pi^-_{s'\|s}$	$\{0, 0.0507, 0.0507\}$	5 year average
r	0.0016	2% annual (ECB)
β	0.98	
σ	2.0	

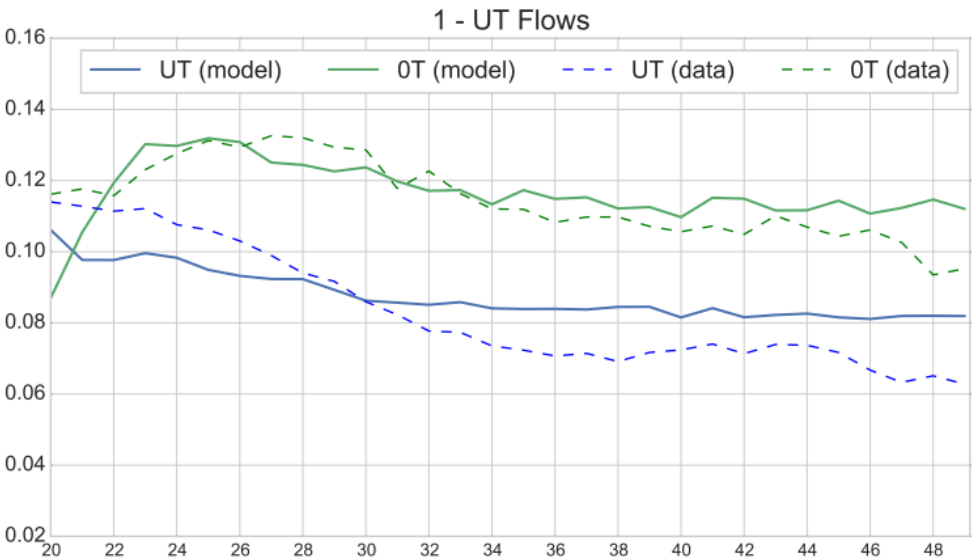
Results Unemployment

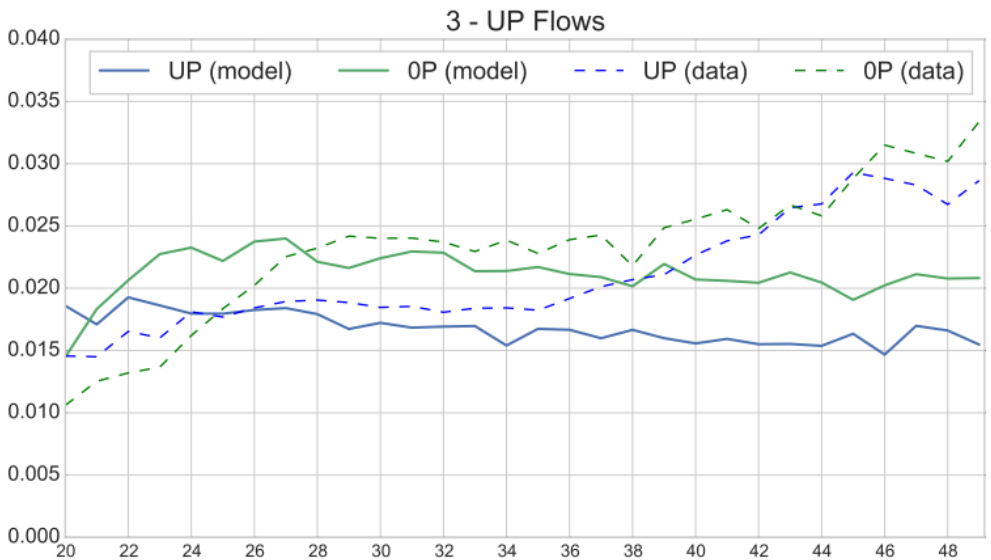




▸ Stocks

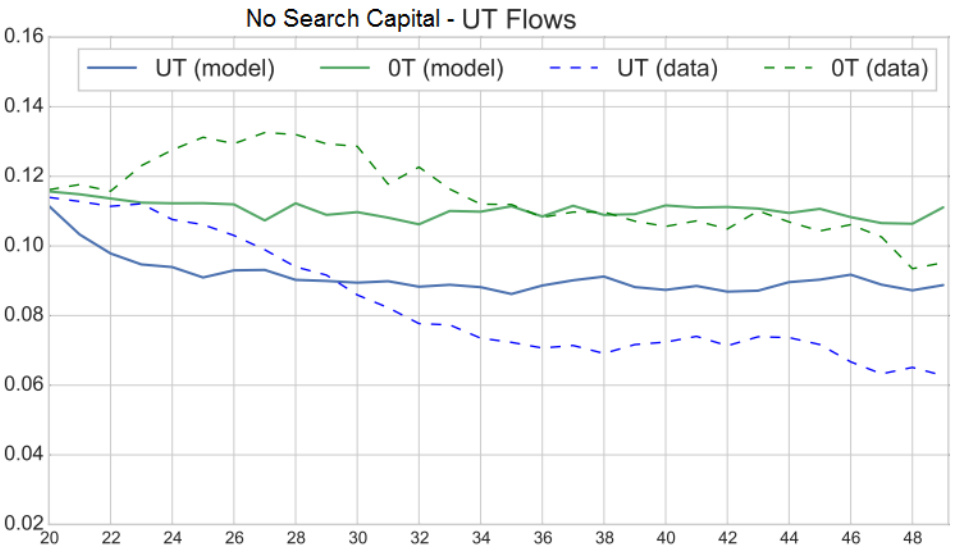
Results Flows

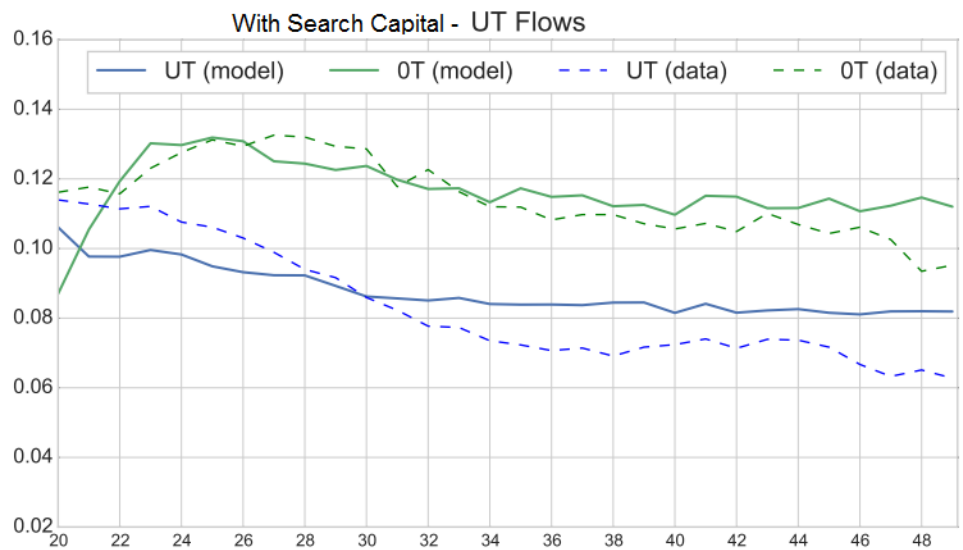


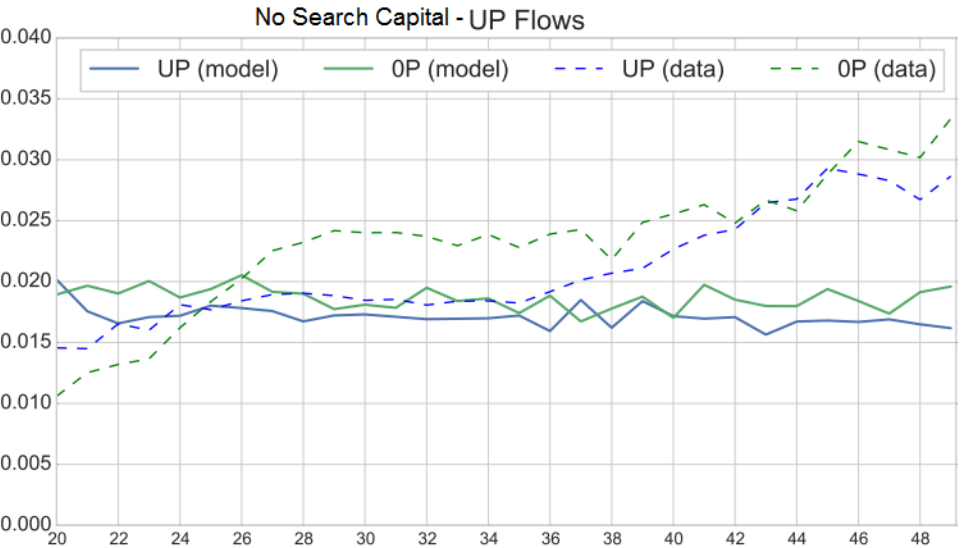


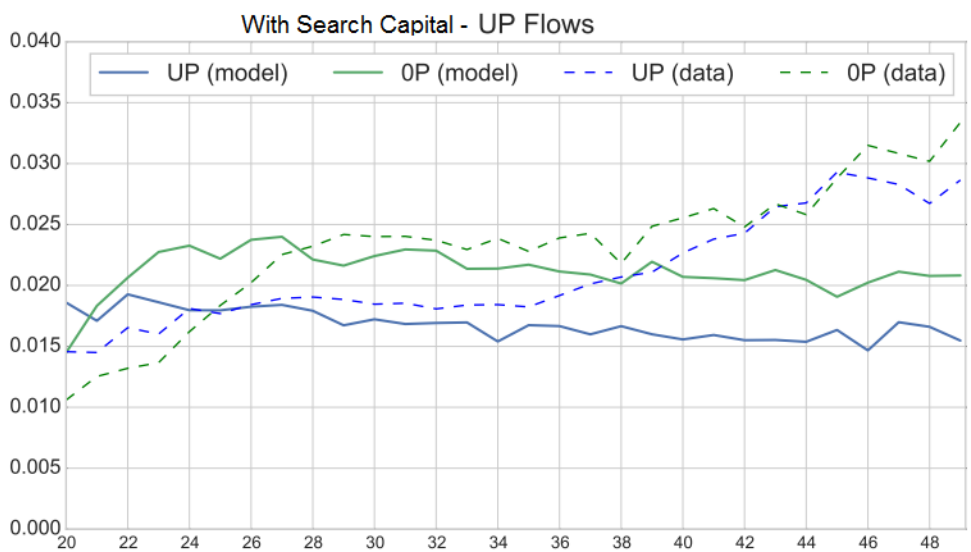
▸ More flows

Removing SC: flows

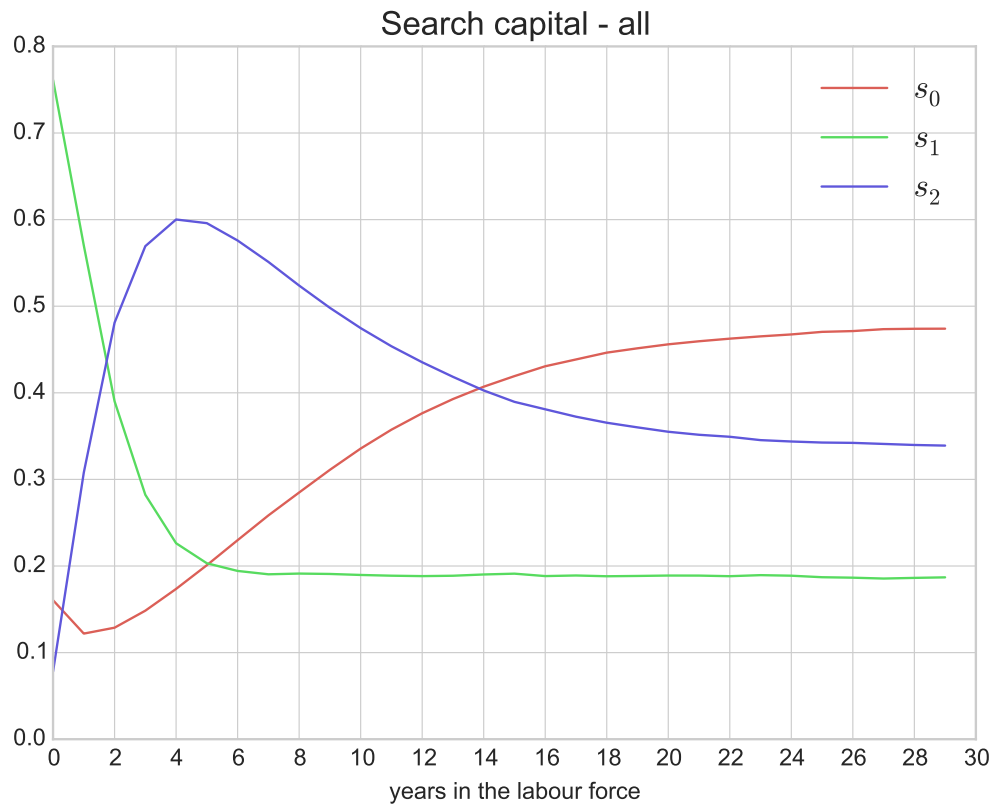


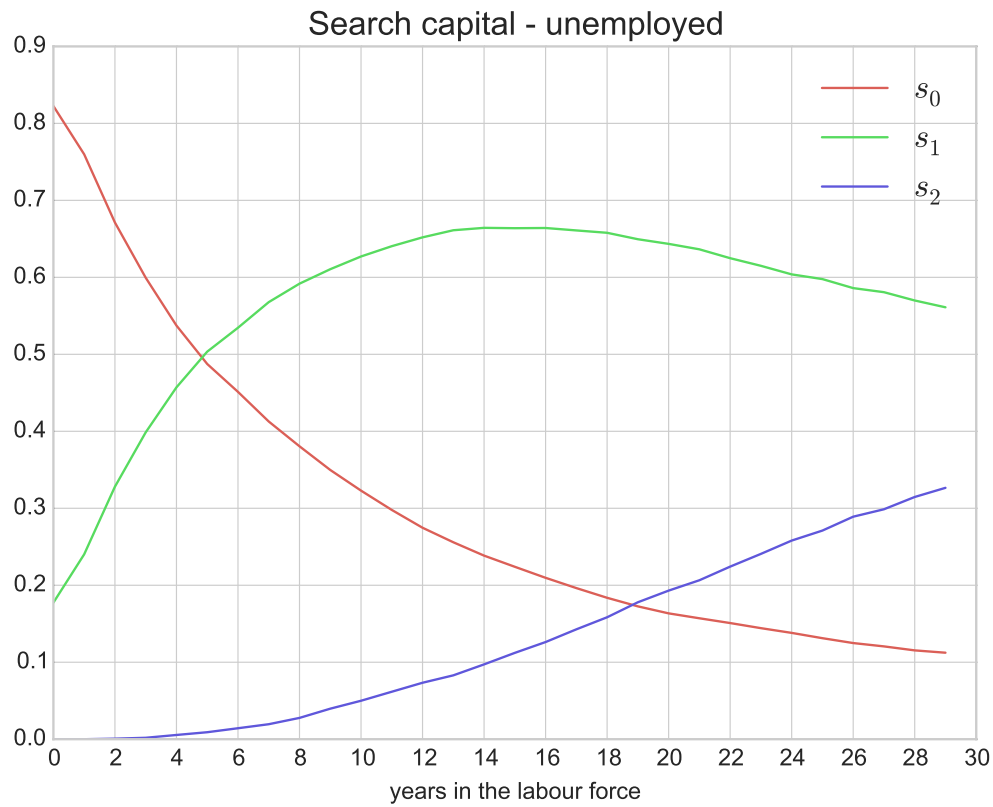




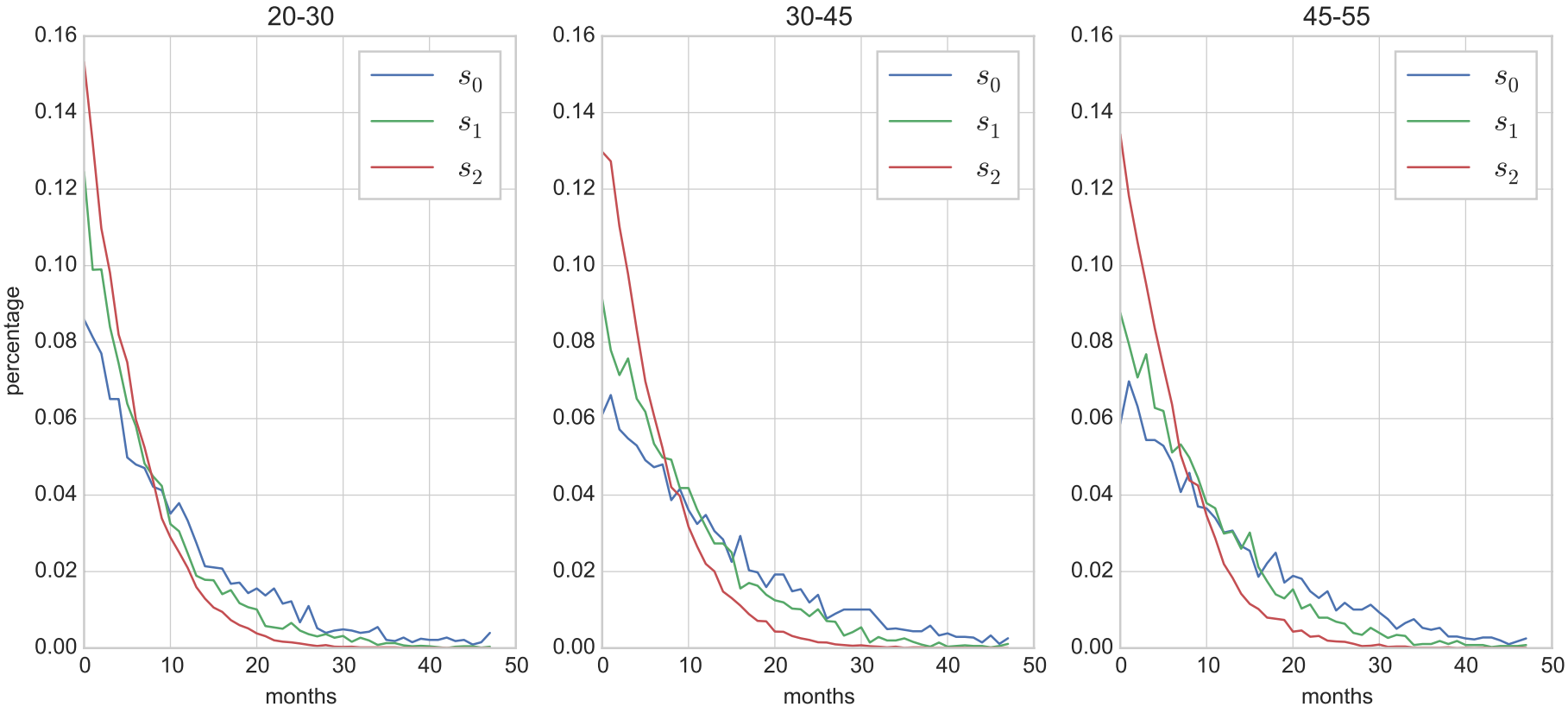


Results Search Capital





Results Duration



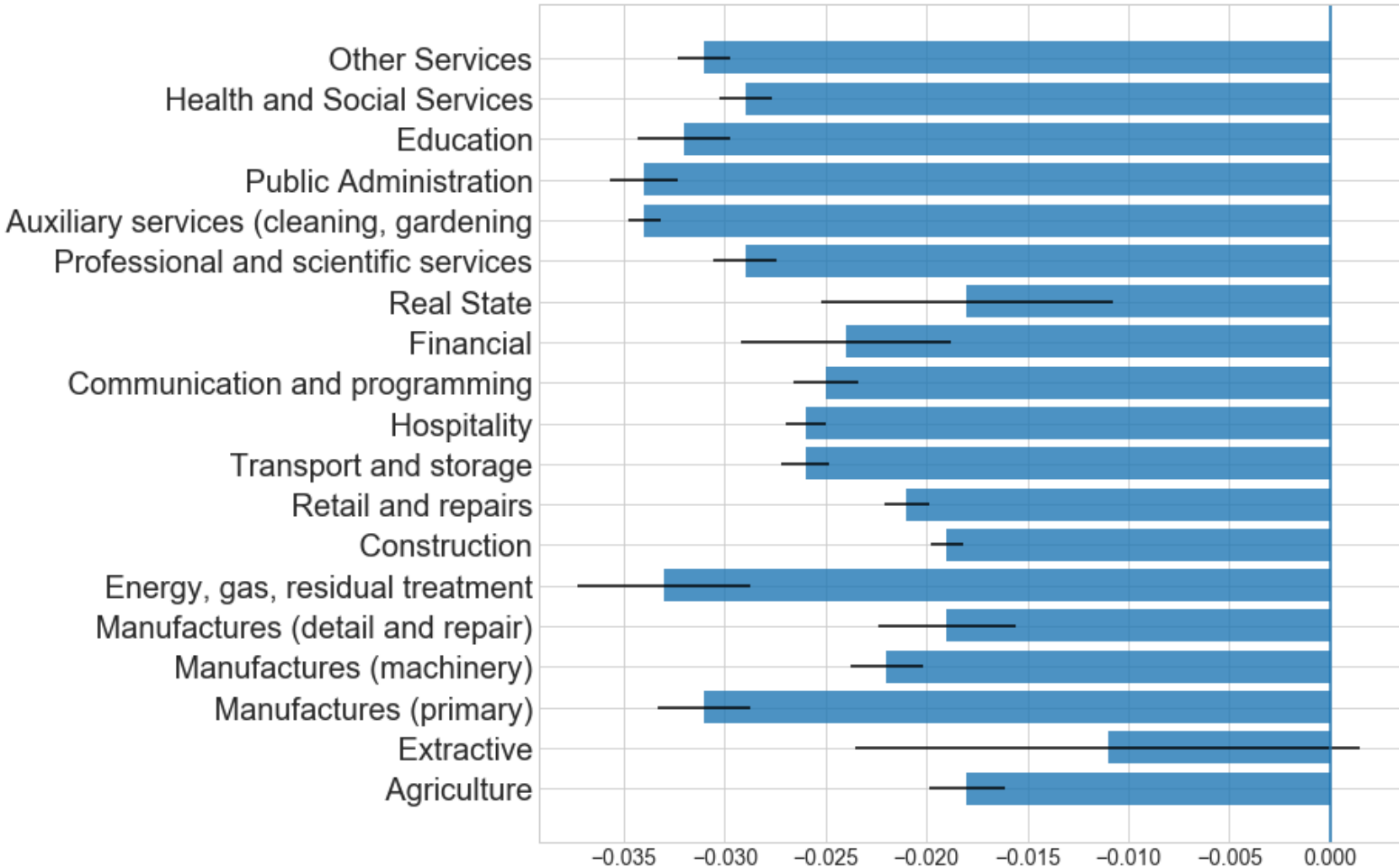
Soon

- Allow for job-to-job transitions in the model
- Shock the job finding rates and/or the wage distributions to simulate the effects of a recession
- Repeat the regressions using simulation data

Conclusion

- I proposed a new mechanism, Search Capital, that treats search as a skill that evolves over time as the worker interacts with the labour market.
- This can help explain why LTU rose among the youngest workers in the last recession: they were crowded out by better searchers.
- I provided some evidence that at the individual level that higher SC (proxied by temporary jobs in the past) $\rightarrow$ shorter unemployment and higher wages.
- I included search capital in a dynamic search model to show that it has a significant impact on labour flows and unemployment duration.

TCs, coefficient on unemployment duration by industry



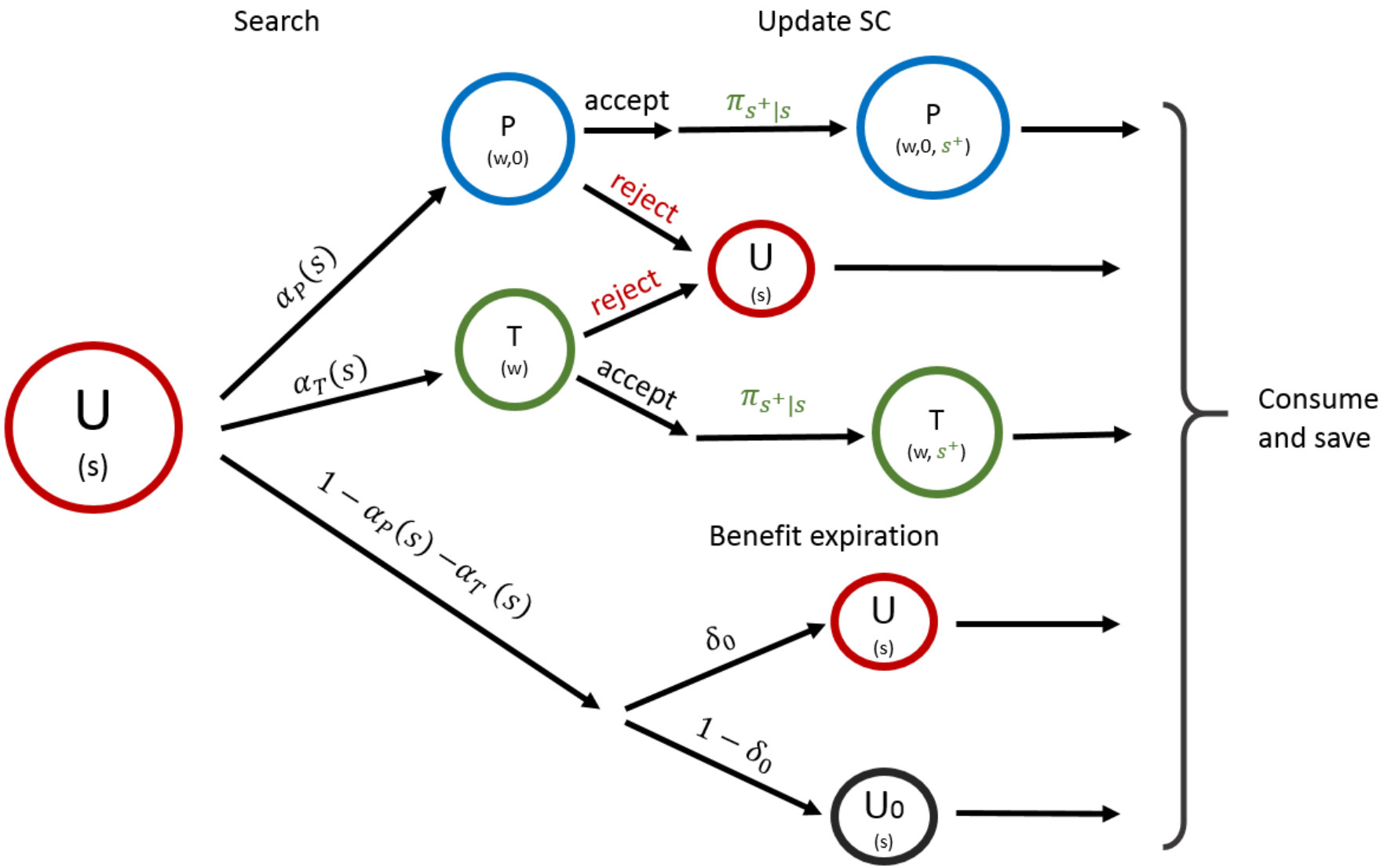
Back

Full table

	Pooled OLS log(weeks)	Fixed Effects log(weeks)
No. T	-0.032*** (0.0010)	-0.005*** (0.0013)
YEmp	0.003*** (0.0007)	0.001 (0.0013)
Last P	0.041*** (0.0046)	0.040*** (0.0061)
Tenure	0.016*** (0.0012)	0.027*** (0.0023)
Experience	-0.007*** (0.0005)	0.042*** (0.0034)
No. P	-0.035*** (0.0022)	-0.008* (0.0032)
age	-0.001 (0.0017)	-0.035*** (0.0054)
log(past wage)	-0.081*** (0.0014)	-0.044*** (0.0018)
Constant	1.169*** (0.2387)	0.971* (0.4024)
Controls		
Years	✓	✓
Industry	✓	✓
Occupation	✓	✓
Region	✓	✓
Observations	461,369	461,369
Adjusted R^2	0.561	0.458

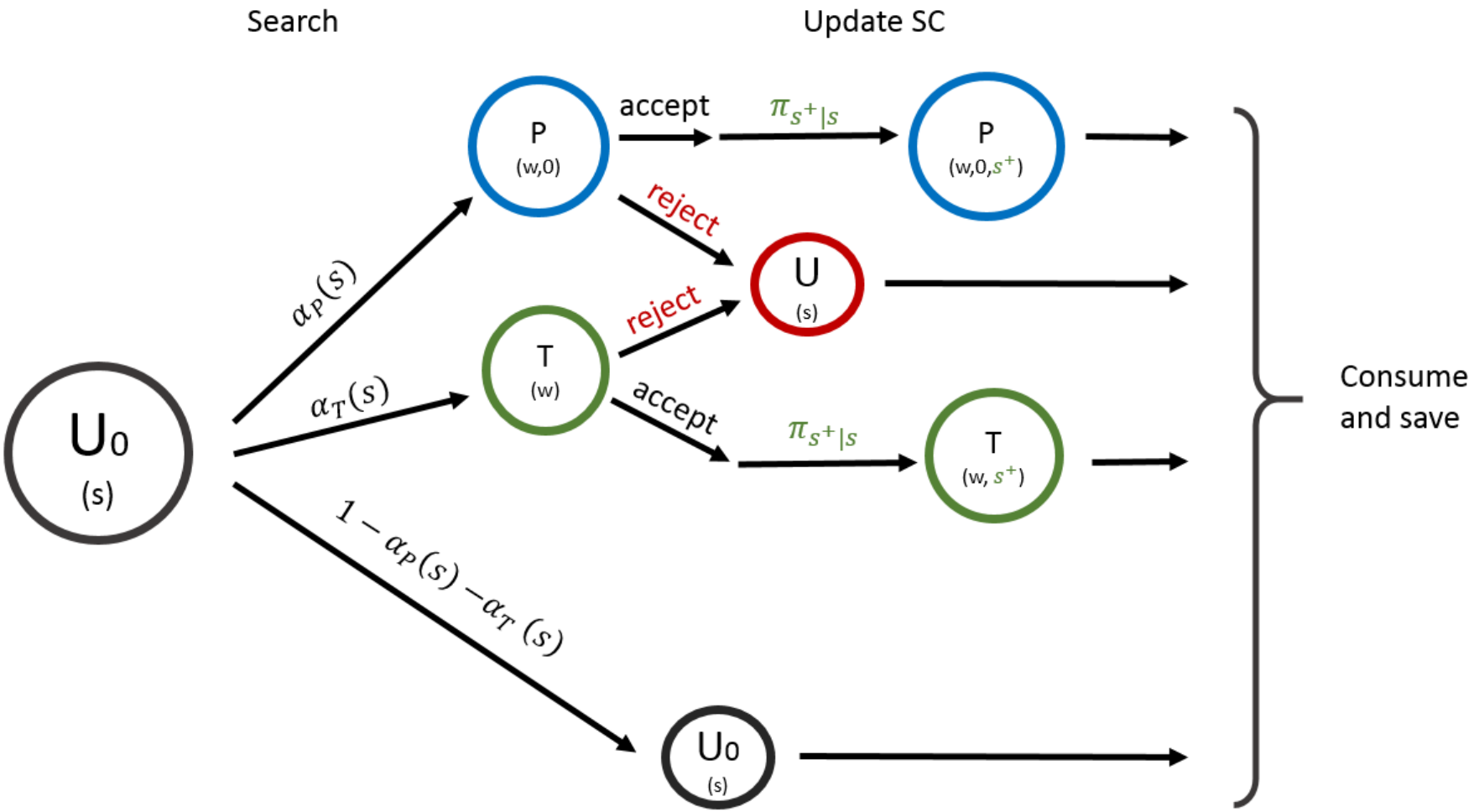
Robust standard errors in parentheses. Sample is all finished unemployment spells ending in employment, for workers aged 20-55. Excludes recalls (workers returning to the same firm), self-employed and spells shorter than 15 days.

Unemployed



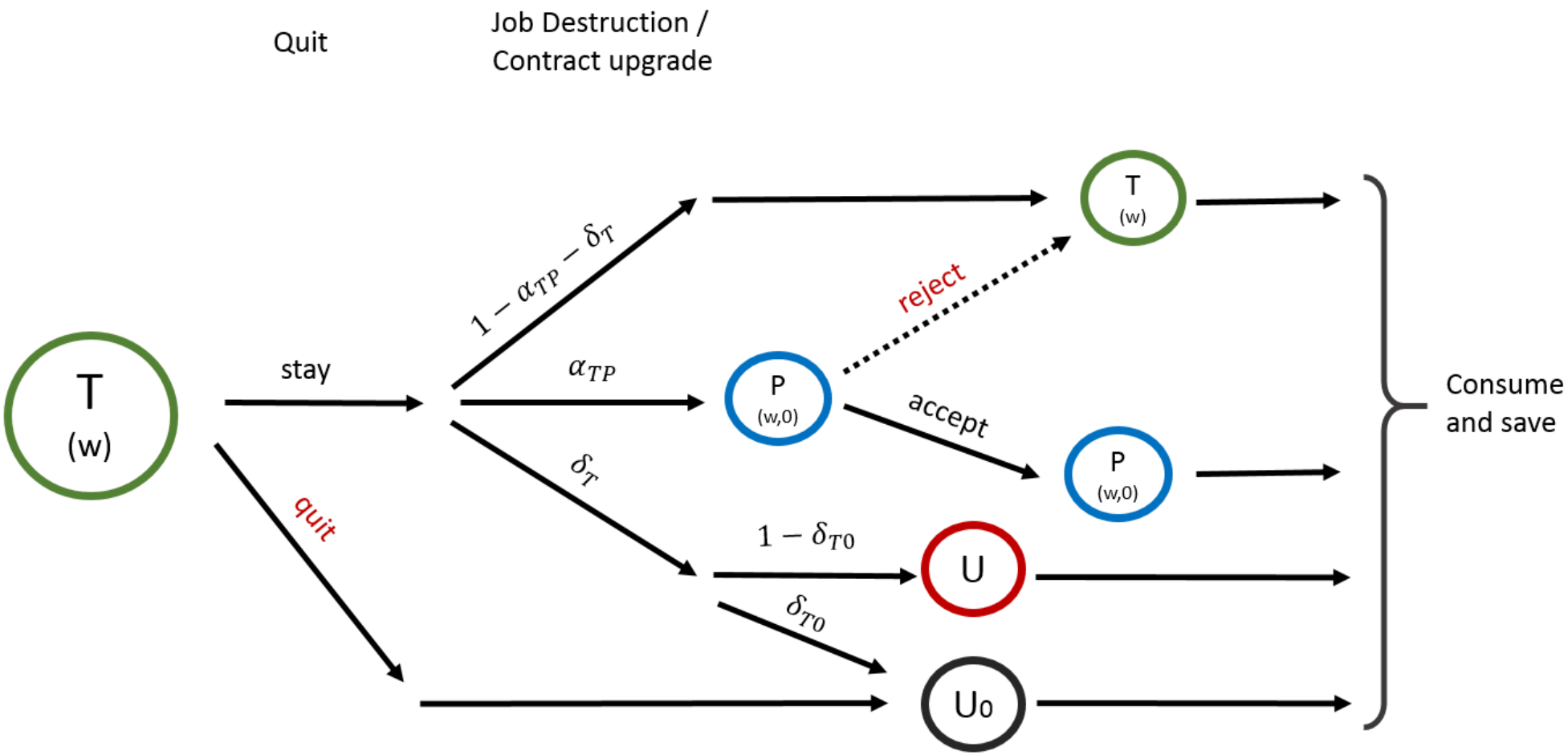
▸ Equations

Unemployed (no benefits)



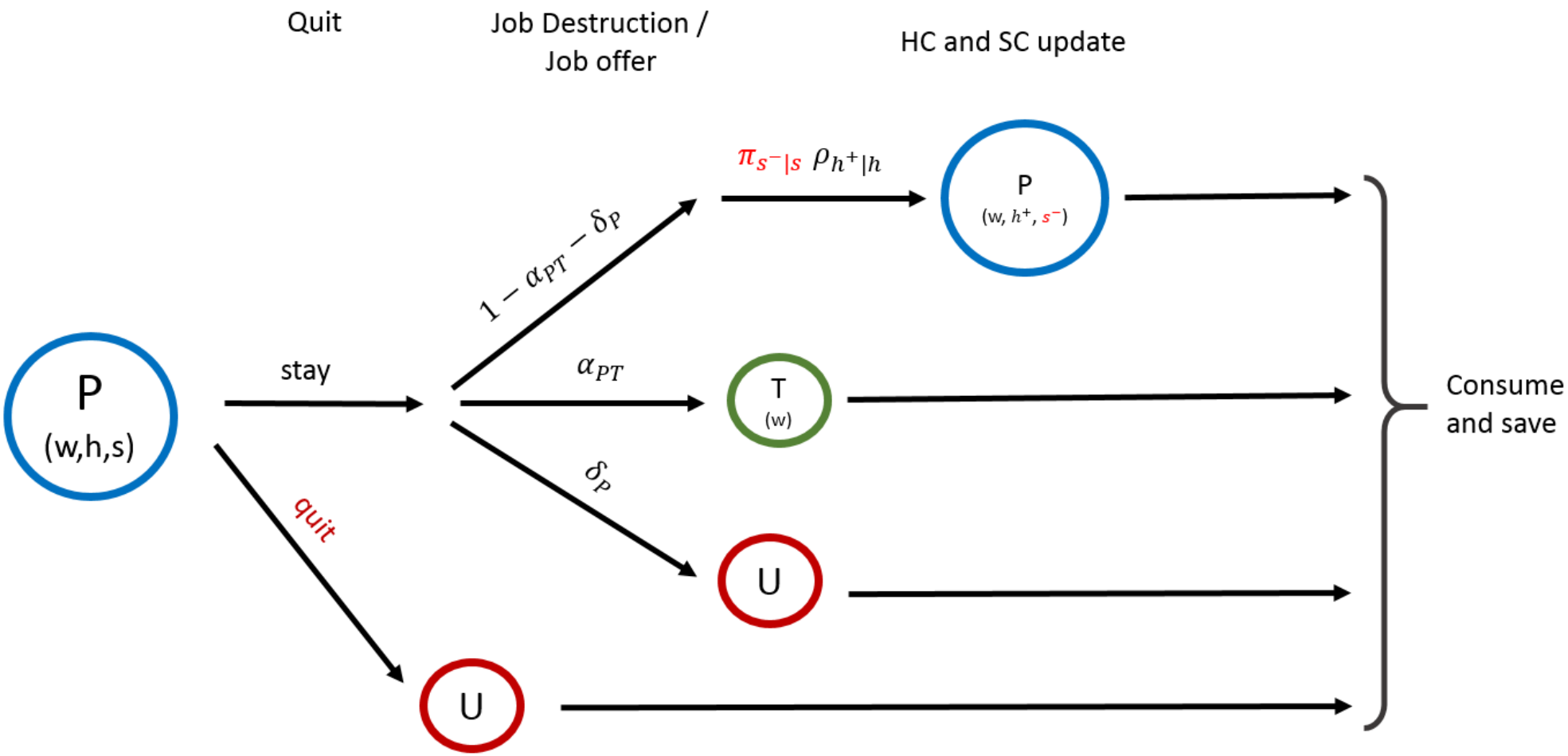
▸ Equations

Temporary workers



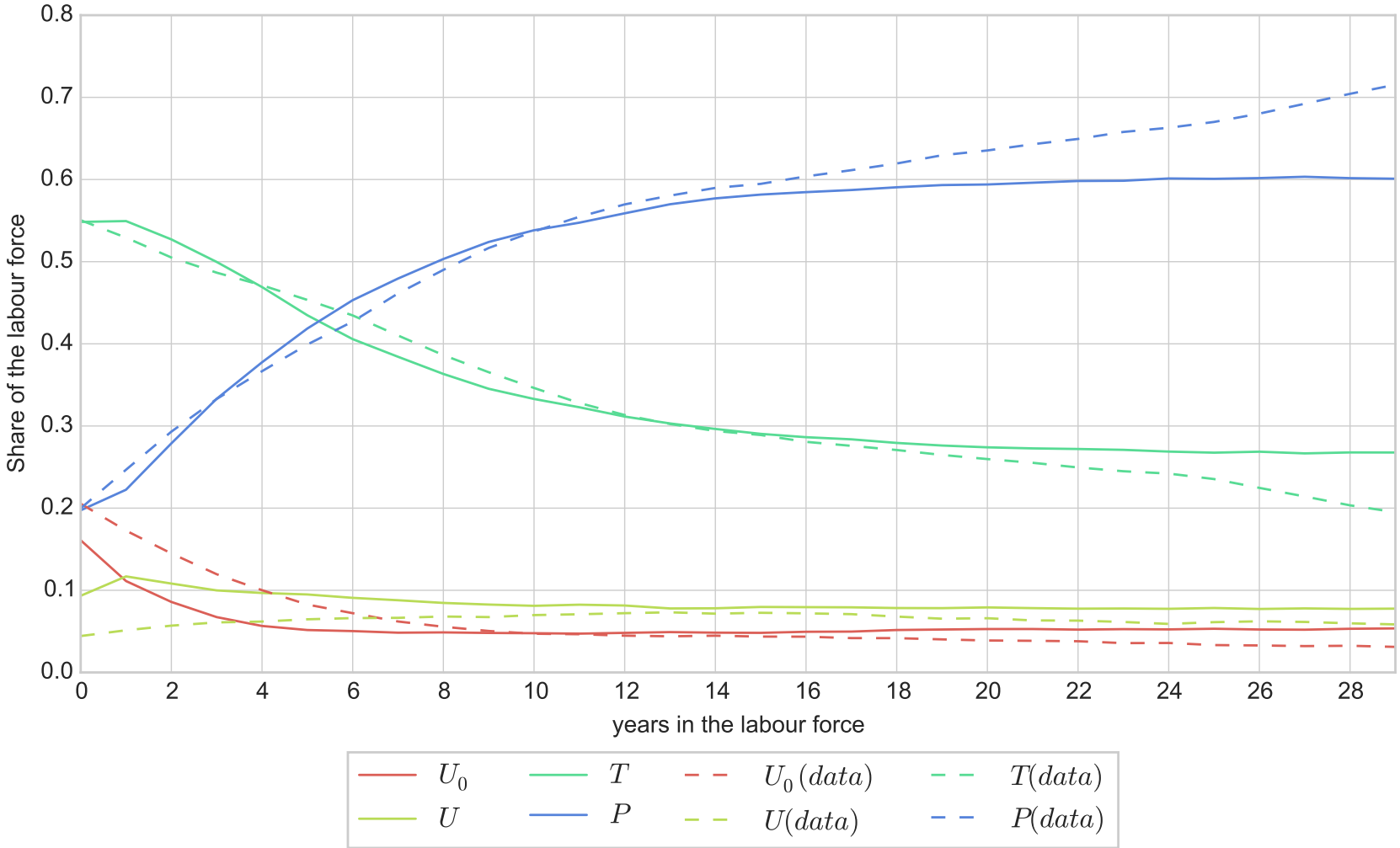
▸ Equations

Permanent workers

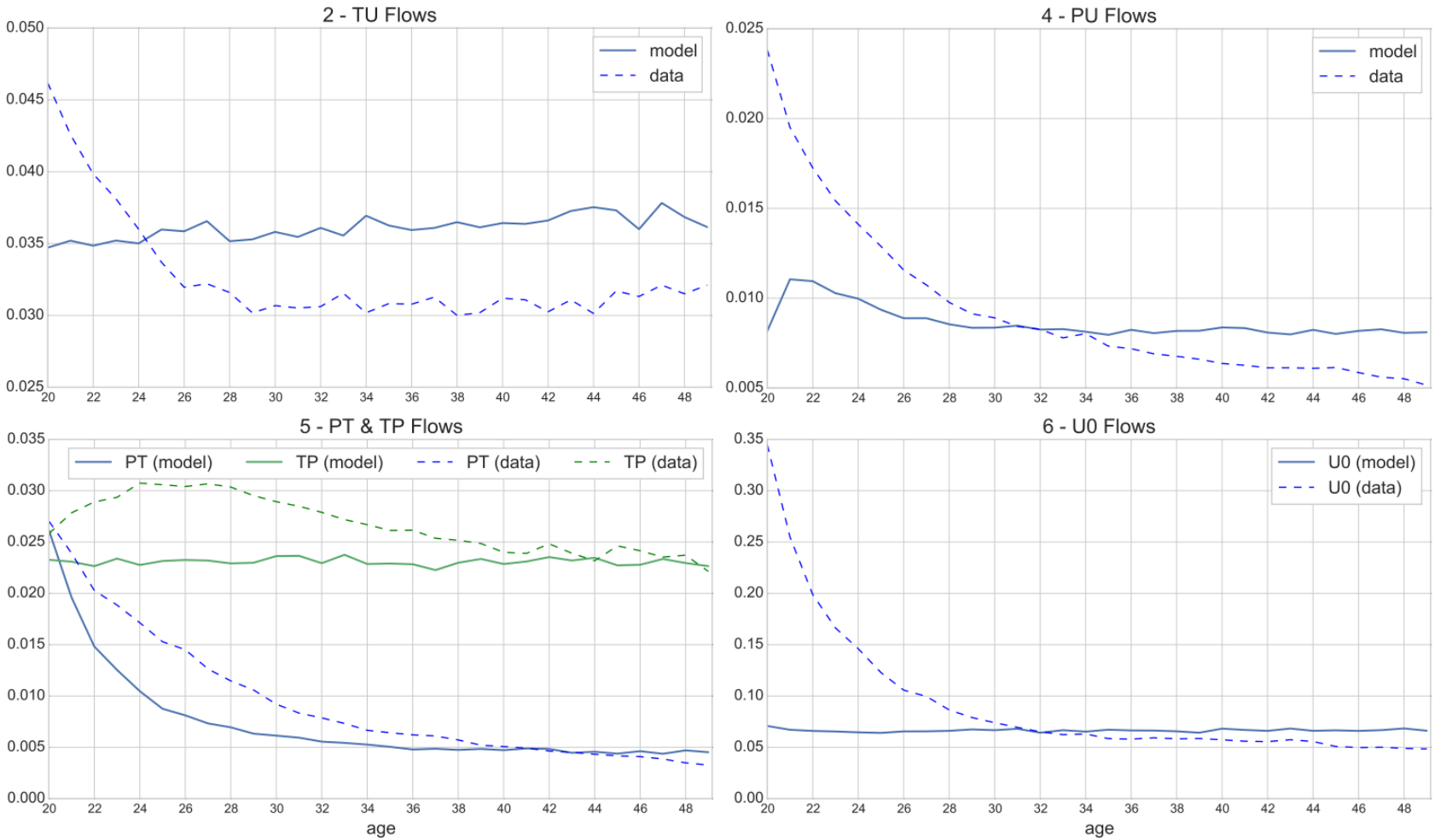


▸ Equations

Results Stocks



Results Flows



Back

Results: Duration and SC

	Duration of unemployment spell - log(weeks)	
	Pooled OLS	Fixed Effects
No. TC	**-0.032*** **	**-0.005*** **
	(0.0010)	(0.0013)
Tenure	0.016***	0.027***
	(0.0012)	(0.0023)
Experience	-0.007***	0.042***
	(0.0005)	(0.0034)
log(past wage)	-0.081***	-0.044***
	(0.0014)	(0.0018)
Controls: length UI, last job PC, No.PC, age		
Years	✓	✓
Industry	✓	✓
Occupation	✓	✓
Region	✓	✓
Observations	461,369	461,369
Adjusted R^2	0.561	0.458

Robust standard errors in parentheses. Sample is all finished unemployment spells ending in employment, for workers aged 20-55. Excludes recalls (workers returning to the same firm), self-employed and spells shorter than 15 days.

▸ By industry ▸ Back

Results: wages and SC

	Wage in the next job - log(wage)	
	Pooled OLS	Fixed Effects
log(weeks unemp)	**-0.0353*** **	**-0.0226*** **
	(0.0009)	(0.0014)
No. T	**0.0008*** **	**0.0088*** **
	(0.0009)	(0.0014)
Tenure	-0.0001	-0.0028**
	(0.0004)	(0.0009)
Experience	0.0041***	-0.0319***
	(0.0002)	(0.0025)
log(past wage)	0.0995***	0.0177***
	(0.0014)	(0.0024)
Controls		
Years	✓	✓
Industry	✓	✓
Occupation	✓	✓
Region	✓	✓
Observations	363,473	370,945
Adjusted R^2	0.223	0.067

Robust standard errors in parentheses. Sample is all employment spells 3 months or longer with wage information, for workers aged 20-55. Excludes recalls (workers returning to the same firm) and self-employed.

Back

Results: next job duration

	Duration of next employment spell - log(weeks)	
	Pooled OLS	Fixed Effects
log(weeks unemp)	**0.001**	**0.003**
	(0.0017)	(0.0018)
No. T	**-0.011*** **	**0.021*** **
	(0.0002)	(0.0034)
Tenure	0.030***	0.019***
	(0.0031)	(0.0038)
Experience (T)	-0.000	-0.502***
	(0.0009)	(0.0067)
Experience (P)	-0.001*	-0.775***
	(0.0005)	(0.0094)
log(past wage)	0.080***	0.030***
	(0.0018)	(0.0018)
Controls		
Years	✓	✓
Industry	✓	✓
Occupation	✓	✓
Region	✓	✓
Observations	438,787	438,787
Adjusted R^2	0.140	0.269

Robust standard errors in parentheses. Sample is all employment spells after an unemployment period of 15 days or more, for workers aged 20-55. Excludes recalls (workers returning to the same firm) and self-employment.

▸ Back

Temporary worker's problem

$$V^T(w,a,s) = u(c(w,a)) + \beta \max\{V^0(a',s), \tilde{V}^T(w,a',s)\}$$

$$\tilde{V}^T(w,a',s) = \delta_T V_0^U(a',s) + \alpha_{TP} \max\{V^0(a',s), V^P(w,0,a',s)\} + (1-\delta_T-\alpha_{TP})V^T(w,a',s)$$

st.

$$c + a' = (1+r)a + w$$

▸ Timing ▸ Back

Permanent worker's problem

$$V^P(w,h,a,s) = u(c(w,a)) + \beta \max\{V^U(a',s), \tilde{V}^P(w,h',a',s')\}$$

$$\tilde{V}^P(w,h',a',s') = \delta_P V^U(a',s) +$$
$$\alpha_{PT} \int max\{V^P(w,h,a,s), V^T(w',a,s)\} dF(w') +$$
$$(1-\delta_P-\alpha_{PT}) \Big[p(h) V^P(w,h',a',s) + (1-p(h)) V^P(w,h,a',s') \Big]$$

st.

$$c + a' = (1+r)a + w(h)$$

$$s' = \begin{cases} P(s' = s^-|s) = \pi_{s^-|s} \\ P(s' = s|s) = 1 - \pi_{s^-|s} \end{cases}$$

▸ Timing ▸ Back