The Italian labour market amid the Covid-19 outbreak

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May 11, 2021

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Covid-19: What do we know so far?

- The Covid-19 shock has had **highly asymmetric** effects.
- **Younger** and **lower income quintiles** workers suffered more job losses (Byrne et al., 2020, Lemieux et al., 2020, Casarico and Lattanzio, 2020, Nunes et al., 2020), together with **minorities** (Bell and Blanchflower, 2020);
- **She-cession?** Women more likely to lose their jobs in UK, US but not in Germany (Adams-Prassl et al., 2020, Fabrizio et al., 2021), but gender is a non-significant predictor of job loss in the UK (Casarico and Lattanzio, 2020; Hupkau and Petrongolo, 2020) and in Portugal (Nunes et al., 2020);
- **Men**, younger and low paid workers in small businesses more likely to be furloughed, and **whites** in middle-income jobs (Witteveen, 2020; Pope et al., 2020). **Young women** are more likely to be furloughed (WBG, 2021)

Covid-19 impact on the Italian labour market

- Share of workers who (temporarily or permanently) stopped working around 34% [50% of blue collars] (Galasso, 2020)
- Low-income more heavily impacted than higher income families $\rightarrow$ increase in labour **income inequality** (Carta and De Philippis, 2021)
- **Severe employment consequences** due to specialization in sectors more likely to be forcefully closed (Fana et al., 2020)
- Division of household and care activities remains highly gendered (Meraviglia and Dudka, 2002, Del Boca et al., 2020)
- Italian **younger workers and women** have higher risk to be hit hard by the measures adopted to contrast Covid (Quaranta et al., 2020)

Covid-19 and labour market performance

- The changes due to Covid have brought to light many issues in how to **measure** the performance of an economy, even during normal times.
- Most of the economic literature considers **unemployment rate** indicators as the main proxies of labour market performance (Perugini et al., 2007).
- However, are measures of unemployment rate (involuntary, short-term, long-term, structural, frictional) **alone** really revealing the underlying nature of the state of the economy?

A road map of analysis

- We start from a search and matching model to justify the need for a dynamic perspective for the labour market.
- We estimate **transition probabilities/intensities** between different labour market states (employment, unemployment, etc.), drawing from the search and matching theory.
- We consider different types of workers defined by individual characteristics (age, gender, education etc)

Literature on labour market flows

- A number of papers propose methodologies to measure flows in and out of unemployment, using publicly available data (Elsby et al., 2009; Darby et al., 1986; Fujita et al., 2009, Shimer, 2012).
- These studies differ along two main dimensions:
  1. How many **labour market states** are included (employment and unemployment, with or without labour force participation)
  2. The "time aggregation" as flows in and out of each state are taking place in continuous time while **data are collected at discrete times**.

A toy search and matching model

- Continuous time infinite-horizon
- A measure L of homogeneous individuals supply **labour inelastically**, are risk neutral and discount the future at rate r
- Employees can be **employed, unemployed or inactive**
- When unemployed, they find a job at rate α (**job finding rate**) or transit to inactivity at rate γ
- When employed, they may lose their job at exogenous rate δ (**job destruction rate**) or transit to inactivity at rate μ
- When inactive, they may transit to unemployment or employment at exogenous rates ϕ_e and ϕ_u, respectively.

A toy search and matching model

Employment, unemployment and inactivity evolve according to the following dynamic equations:

$$\begin{cases} \dot{e} = -(\lambda + \mu)e + \alpha u + \varphi_e n; \\ \dot{u} = -(\alpha + \gamma)u + \lambda e + \varphi_u n; \text{ and} \\ \dot{n} = -(\varphi_u + \varphi_e)u + \mu e + \gamma u. \end{cases} \tag{1}$$

In matrix form:

$$\begin{bmatrix} \dot{e}_t \\ \dot{u}_t \\ \dot{n}_t \end{bmatrix} = \begin{bmatrix} -(\lambda + \mu) & \alpha & \phi_e \\ \lambda & -(\alpha + \gamma) & \phi_u \\ \mu & \gamma & -(\phi_e + \phi_u) \end{bmatrix} \begin{bmatrix} e_t \\ u_t \\ n_t \end{bmatrix} = \mathrm{Q}^T \begin{bmatrix} e_t \\ u_t \\ n_t \end{bmatrix} \tag{2}$$

where Q is the matrix of **transition intensities**.

Steady state

In steady state:

$$\begin{cases} \pi_e^{EQ} = \dfrac{e^{EQ}}{L} = \dfrac{\varphi_e(\varphi_u + \alpha) + \alpha\varphi_u}{(\gamma + \varphi_u)(\lambda + \mu) + \alpha(\varphi_u + \mu) + \varphi_e(\lambda + \varphi_u + \alpha)}; \\ \pi_u^{EQ} = \dfrac{u^{EQ}}{L} = \dfrac{\varphi_u(\lambda + \mu) + \varphi_e\lambda}{(\gamma + \varphi_u)(\lambda + \mu) + \alpha(\varphi_u + \mu) + \varphi_e(\lambda + \varphi_u + \alpha)}; \text{ and} \\ \pi_n^{EQ} = \dfrac{n^{EQ}}{L} = \dfrac{\alpha\mu + \gamma(\lambda + \mu)}{(\gamma + \varphi_u)(\lambda + \mu) + \alpha(\varphi_u + \mu) + \varphi_e(\lambda + \varphi_u + \alpha)}, \end{cases}$$

Remark: the same u^{EQ} and n^{EQ} are compatible with several combinations of parameters, but **social preferences** on these parameters can be different!

A toy search and matching model

Eq. (2) can be expressed as:

$$\dot{x}_t = Q^T x_t, \tag{3}$$

where $x_t = [e_t \ u_t \ n_t]^T$. The **general solution** to Eq. (3) is:

$$x_t = \exp\left(tQ^T\right) x_0, \tag{4}$$

and $1^T x_t = L$, 1 is a $K \times 1$ vector of ones and L is the measure of working age population.
From Eq. (4) we find the **equilibrium values**:

$$x^{EQ} = \left(11^T - Q^T\right)^{-1} L, \tag{5}$$

and the **mass of probability** of different variables π^{EQ} as:

$$\pi^{EQ} \equiv \left(\frac{x^{EQ}}{L}\right) = \left(11^T - Q^T\right)^{-1}. \tag{6}$$

From model to estimates

- If the labour market dynamics are driven by Eq. (4) then **all information** on such dynamics is in Q.
- From the estimate of Q we can estimate each parameter of model (i.e., the **identification** of deep parameters is guaranteed).
- We can expand on the **possible states of individuals** in the labour force maintaining the same framework.
- **Observations are available at discrete time** $\rightarrow$ a direct estimate of Q is not feasible.

From model to estimates

- Consider an **approximate** Markov model in discrete time:

$$\pi_{t+1} = \mathrm{P}^{T} \pi_t, \tag{7}$$

where P is a Markov matrix collecting transition probabilities. Then (Israel et al. 2001):

$$\mathrm{P} \approx \exp(\mathrm{Q}). \tag{8}$$

Empirical analysis

- We apply the methodology just described to the Italian labour market.
- We consider 6 labour market states: **inactivity**(IN), **unemployment** (U), **fixed term employment** (FT), **permanent employment** (PE), **self-employment** (SE) and **furlough scheme** (FS).
- We evaluate the impact of the Covid-19 outbreak for different age classes, education, gender, geographical area, place of birth.

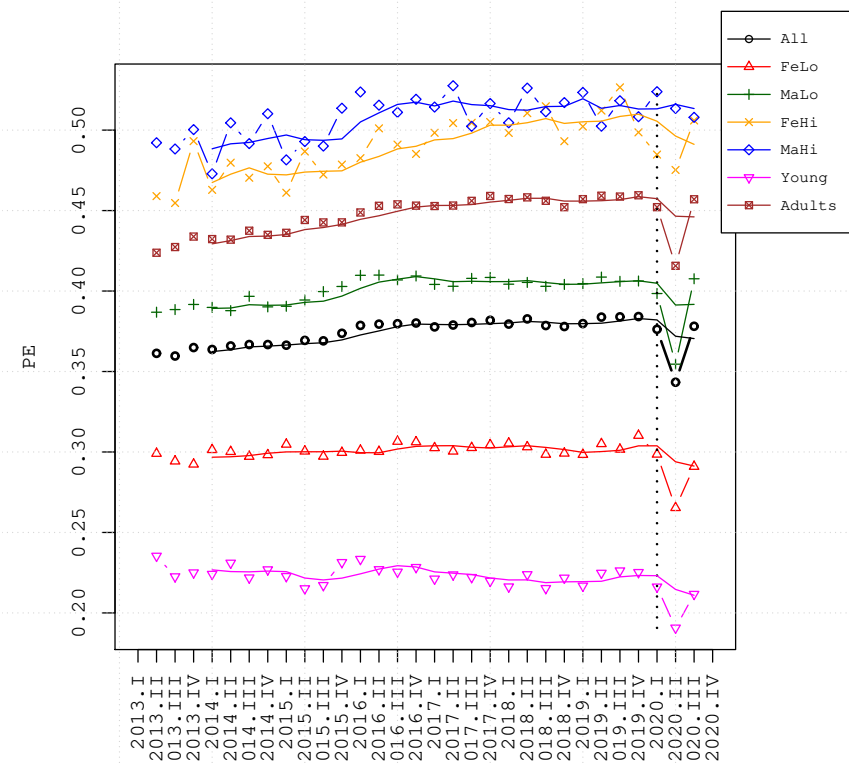
Institutional background

- On **March 10**, the whole country went into a full **lockdown**; from **March 11** nearly all commercial activity except for supermarkets and pharmacies were prohibited;
- On **March 21** it restricted movement of people and closed all non-essential businesses and industries.
- On **March 17** the Italian government implemented two new labor market policies to protect workers:
  1. a COVID furlough scheme (wage subsidy granted by the government, it applied retroactively starting from February 23)
  2. a ban on layoffs (this ban could be applied retroactively to pending, but already validated layoffs from February 23)

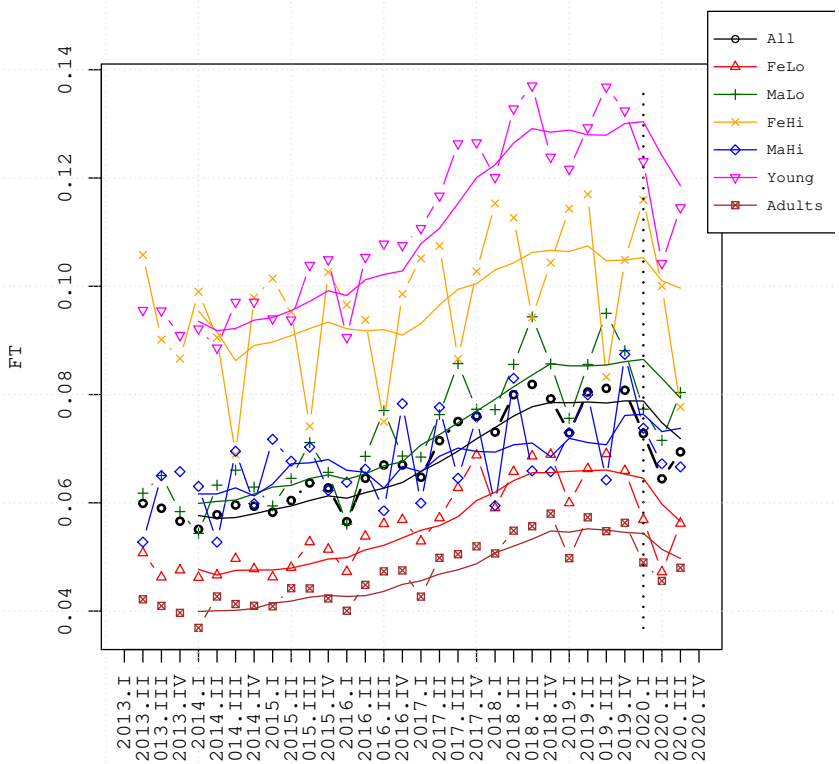
Data

- We use **Labour Force longitudinal data at 3 months** provided by ISTAT for the period 2013 (quarter I) -2020 (quarter III).
- We observe the labour market state of each individual at time t and 3 months before.
- We compute per each quarter the **shares** of workers in each state.
- We compute per each quarter the **transition probabilities** and the **transition intensities** across states.

Summary of Results: Shares

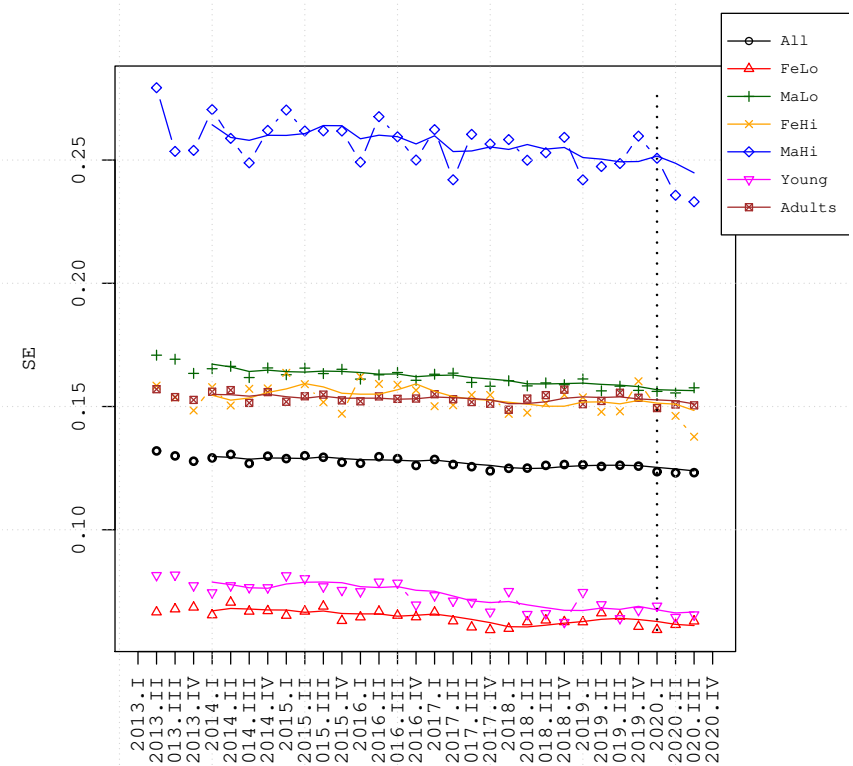


(a) Permanent employees.

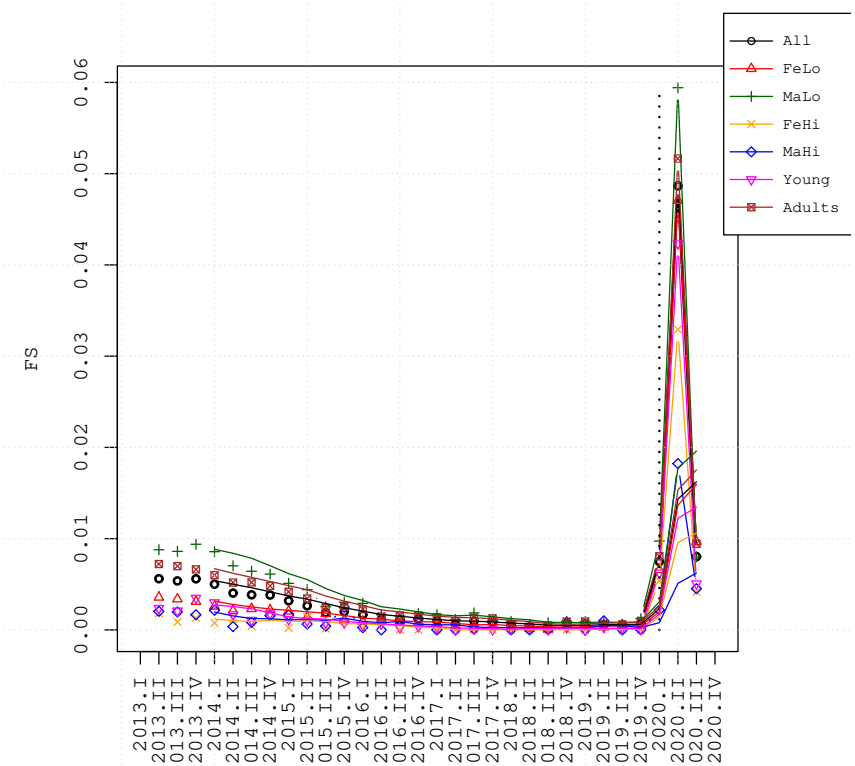


(b) Temporary employees.

Summary of Results: Shares

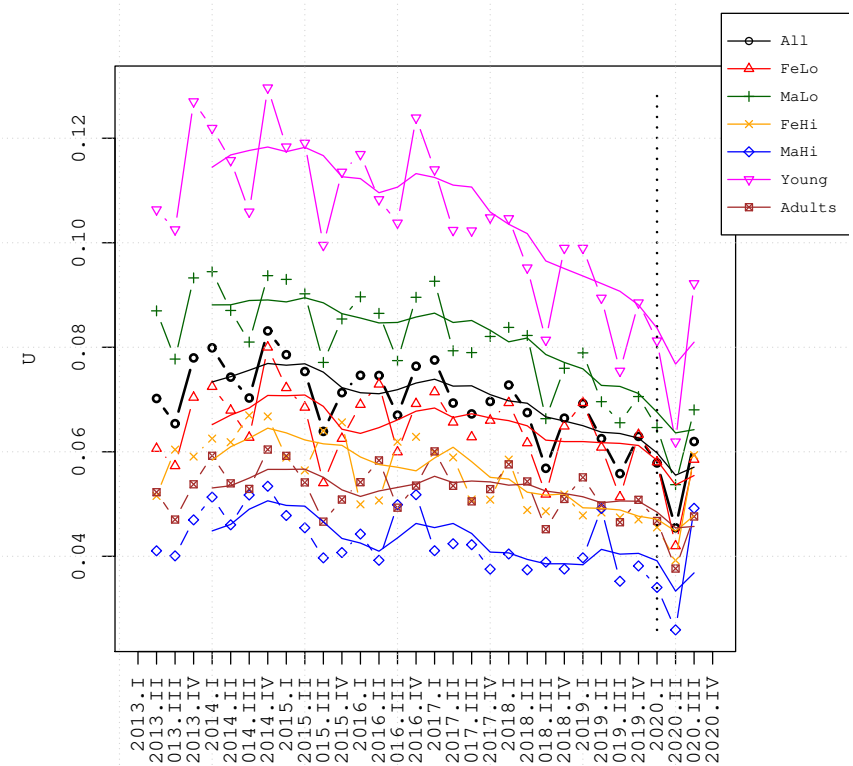


(a) Self-employed.

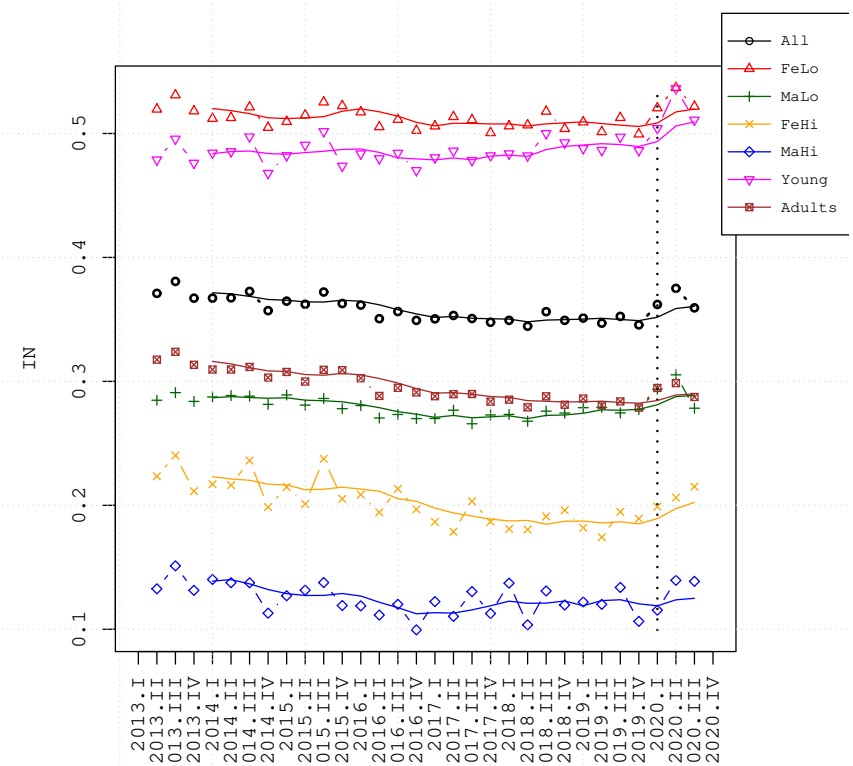


(b) Furlough scheme.

Summary of Results: Shares (cont.)



(a) Unemployed.



(b) Inactive.

Transition Probabilities

	SE 2019.IV	FT 2019.IV	PE 2019.IV	U 2019.IV	IN 2019.IV	FS 2019.IV
SE 2019.III	0.96	0.01	0.01	0.01	0.02	0
FT 2019.III	0.01	0.73	0.08	0.07	0.11	0
PE 2019.III	0	0.01	0.96	0	0.02	**0**
U 2019.III	0.01	**0.12**	0.02	0.46	**0.39**	0
IN 2019.III	0.01	0.03	0.01	0.08	0.88	0
FS 2019.III	0	0.02	0.33	0.15	0.19	0.31
	SE 2020.I	FT 2020.I	PE 2020.I	U 2020.I	IN 2020.I	FS 2020.I
SE 2019.IV	0.94	0.01	0.02	0.01	0.03	0
FT 2019.IV	0.01	0.72	0.08	0.06	0.12	**0.01**
PE 2019.IV	0.01	0.01	0.94	0.01	0.02	**0.02**
U 2019.IV	0.02	**0.08**	0.02	0.43	**0.46**	0
IN 2019.IV	0.01	0.02	0.01	0.06	0.91	0
FS 2019.IV	0	0.05	0.49	0.11	0.09	0.27
	SE 2020.II	FT 2020.II	PE 2020.II	U 2020.II	IN 2020.II	FS 2020.II
SE 2020.I	0.94	0	0.02	0.01	0.03	0
FT 2020.I	0.02	0.69	0.06	0.07	0.12	**0.04**
PE 2020.I	0	0.01	0.85	0	0.02	**0.11**
U 2020.I	0.02	**0.07**	0.02	0.30	**0.58**	**0.01**
IN 2020.I	0.01	0.02	0.01	0.06	0.91	0
FS 2020.I	0	0.01	0.77	0.01	0.05	0.16
	SE 2020.III	FT 2020.III	PE 2020.III	U 2020.III	IN 2020.III	FS 2020.III
SE 2020.II	0.95	0.01	0.01	0.01	0.02	0
FT 2020.II	0.01	0.72	0.07	0.07	0.13	0
PE 2020.II	0.01	0.01	0.96	0	0.01	**0.01**
U 2020.II	0.02	**0.11**	0.02	0.40	**0.45**	0
IN 2020.II	0.01	0.03	0.01	0.09	0.86	0
FS 2020.II	0	0.03	0.80	0.02	0.03	0.11

Transitions Female Low Skilled

	SE 2019.IV	FT 2019.IV	PE 2019.IV	U 2019.IV	IN 2019.IV	FS 2019.IV
SE 2019.III	0.93	0.01	0.03	0.01	**0.03**	0
FT 2019.III	0	0.68	0.09	0.08	0.15	0
PE 2019.III	0	0.01	**0.96**	0	0.02	0
U 2019.III	0	**0.09**	0.02	0.42	**0.47**	0
IN 2019.III	0	0.02	0.01	0.06	0.91	0
FS 2019.III	0	0	0.53	0.22	0.13	**0.12**
	SE 2020.I	FT 2020.I	PE 2020.I	U 2020.I	IN 2020.I	FS 2020.I
SE 2019.IV	0.89	0.01	0.02	0	**0.08**	0
FT 2019.IV	0.01	0.69	0.08	0.06	0.15	**0.01**
PE 2019.IV	0	0.01	**0.94**	0.01	0.03	**0.02**
U 2019.IV	0.01	**0.06**	0.02	0.40	**0.51**	0
IN 2019.IV	0	0.01	0.01	0.05	0.93	0
FS 2019.IV	0	0	0.57	0.07	**0.18**	**0.18**
	SE 2020.II	FT 2020.II	PE 2020.II	U 2020.II	IN 2020.II	FS 2020.II
SE 2020.I	0.88	0.01	0.03	0.02	0.06	0
FT 2020.I	0.02	0.64	0.06	0.07	0.16	**0.05**
PE 2020.I	0	0.01	**0.81**	0	0.03	**0.14**
U 2020.I	0.01	**0.05**	0.03	0.25	**0.66**	0
IN 2020.I	0	0.01	0.01	0.04	0.94	0
FS 2020.I	0.01	0	0.78	0.02	0.05	0.15
	SE 2020.III	FT 2020.III	PE 2020.III	U 2020.III	IN 2020.III	FS 2020.III
SE 2020.II	0.92	0	0.02	0.01	0.05	0
FT 2020.II	0.01	0.70	0.08	0.07	0.14	0.01
PE 2020.II	0.01	0.01	0.94	0	0.02	0.01
U 2020.II	0.01	**0.13**	0.03	0.32	**0.51**	0
IN 2020.II	0	0.02	0.01	0.07	0.90	0
FS 2020.II	0	0.02	0.75	0.02	0.07	0.14

Transitions Female High Skilled

	SE 2019.IV	FT 2019.IV	PE 2019.IV	U 2019.IV	IN 2019.IV	FS 2019.IV
SE 2019.III	0.97	0.01	0	0.01	0.02	0
FT 2019.III	0.01	0.81	0.09	0.04	0.05	0
PE 2019.III	0.01	0.01	0.97	0	0.02	0
U 2019.III	0.03	**0.18**	0.04	0.33	**0.42**	0
IN 2019.III	0.03	0.09	0.03	0.11	0.74	0
FS 2019.III	0.17	0.17	0.17	0.17	0.17	**0.17**
	SE 2020.I	FT 2020.I	PE 2020.I	U 2020.I	IN 2020.I	FS 2020.I
SE 2019.IV	0.93	0.02	0.01	0.01	0.04	0
FT 2019.IV	0.02	0.83	0.07	0.03	0.05	0
PE 2019.IV	0	0.01	0.95	0.01	0.02	0.01
U 2019.IV	0.03	**0.11**	0.02	0.39	**0.46**	0
IN 2019.IV	0.02	0.04	0.02	0.09	**0.83**	0
FS 2019.IV	0.17	0.17	0.17	0.17	0.17	**0.17**
	SE 2020.II	FT 2020.II	PE 2020.II	U 2020.II	IN 2020.II	FS 2020.II
SE 2020.I	0.93	0.01	0.02	0.01	0.03	**0.01**
FT 2020.I	0.01	0.79	0.04	0.05	0.08	**0.03**
PE 2020.I	0	0.01	0.92	0	0.01	**0.05**
U 2020.I	0.03	**0.11**	0.04	0.30	**0.52**	0
IN 2020.I	0.03	0.03	0.01	0.08	**0.85**	0
FS 2020.I	0	0	0.72	0	0	**0.28**
	SE 2020.III	FT 2020.III	PE 2020.III	U 2020.III	IN 2020.III	FS 2020.III
SE 2020.II	0.93	0.01	0.01	0.02	0.02	0
FT 2020.II	0.02	0.57	0.05	0.11	0.25	0
PE 2020.II	0	0.01	0.97	0	0.02	0
U 2020.II	0	**0.10**	0.01	0.38	**0.51**	0
IN 2020.II	0.01	0.05	0.01	0.14	0.78	0
FS 2020.II	0.01	0	**0.84**	0	0.06	0.08

Transitions Young

	SE 2019.IV	FT 2019.IV	PE 2019.IV	U 2019.IV	IN 2019.IV	FS 2019.IV
SE 2019.III	0.91	0.02	0.02	0.01	0.04	0
FT 2019.III	0.01	0.72	0.08	0.07	0.11	0
PE 2019.III	0.01	0.03	0.94	0.01	0.02	**0**
U 2019.III	0.01	**0.15**	0.02	0.45	**0.38**	0
IN 2019.III	0.01	0.03	0.01	0.08	0.88	0
FS 2019.III	0	0	1	0	0	0
	SE 2020.I	FT 2020.I	PE 2020.I	U 2020.I	IN 2020.I	FS 2020.I
SE 2019.IV	0.89	0.02	0.03	0.01	0.05	0
FT 2019.IV	0.01	0.75	0.09	0.06	0.09	**0.01**
PE 2019.IV	0.01	0.03	0.91	0.01	0.03	**0.02**
U 2019.IV	0.02	**0.10**	0.01	0.44	**0.43**	0
IN 2019.IV	0.01	0.02	0.01	0.06	0.91	0
FS 2019.IV	0	0	1	0	0	0
	SE 2020.II	FT 2020.II	PE 2020.II	U 2020.II	IN 2020.II	FS 2020.II
SE 2020.I	0.87	0.01	0.04	0.02	0.06	0.01
FT 2020.I	0.01	0.68	0.06	0.07	0.13	**0.05**
PE 2020.I	0.01	0.03	0.77	0.01	0.03	**0.16**
U 2020.I	0.01	**0.08**	0.02	0.29	**0.59**	0.01
IN 2020.I	0.01	0.02	0.01	0.05	0.91	0
FS 2020.I	0.01	0.01	0.86	0.02	0.08	**0.03**
	SE 2020.III	FT 2020.III	PE 2020.III	U 2020.III	IN 2020.III	FS 2020.III
SE 2020.II	0.89	0.03	0.02	0.02	0.04	0
FT 2020.II	0.01	0.76	0.07	0.06	0.10	0
PE 2020.II	0.01	0.02	0.94	0.01	0.01	0.01
U 2020.II	0.03	**0.11**	0.02	0.41	**0.43**	0
IN 2020.II	0	0.04	0.01	0.10	0.85	0
FS 2020.II	0	0.07	0.77	0.03	0.05	**0.08**

Summary of Results

- 11% of permanent workers were furloughed between q1 and q2 of 2020
- Transition probabilities between unemployment and temporary employment strongly decreased between q4 of 2019 and q2 of 2020 (from 12% to 7%)
- Transition probabilities between unemployment and inactivity increased from 39% to 58% between q4 of 2019 and q2 of 2020

Summary of Results: Females low-skilled

- 14% of female low-skilled permanent workers were furloughed between q1 and q2 of 2020
- Transition probabilities between unemployment and temporary employment decreased from 9% to 5% between q4 of 2019 and q2 of 2020
- Transition probabilities between unemployment and inactivity increased from 47% to 66% between q4 of 2019 and q2 of 2020
- Transition probabilities between self-employment and inactivity increased from 3% to 8% between q1 and q2 of 2020

Summary of Results: Young

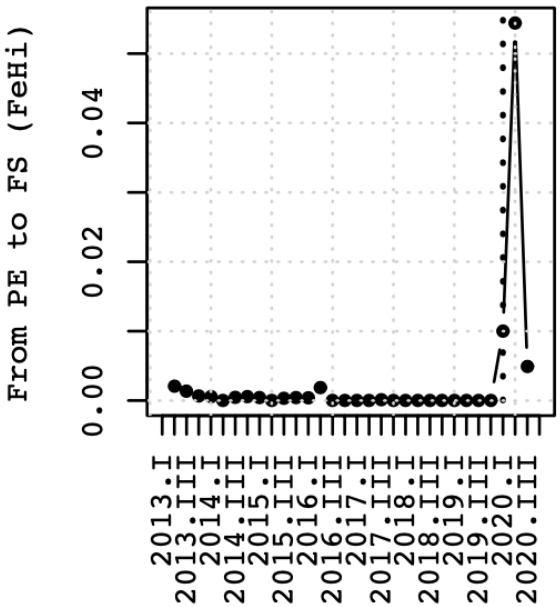
- 16% of young permanent workers were furloughed between q1 and q2 of 2020
- Transition probabilities between unemployment and temporary employment decreased from 15% to 8% between q4 of 2019 and q2 of 2020
- Transition probabilities between unemployment and inactivity increased from 38% to 59% between q4 of 2019 and q2 of 2020
- More persistence into the furlough scheme

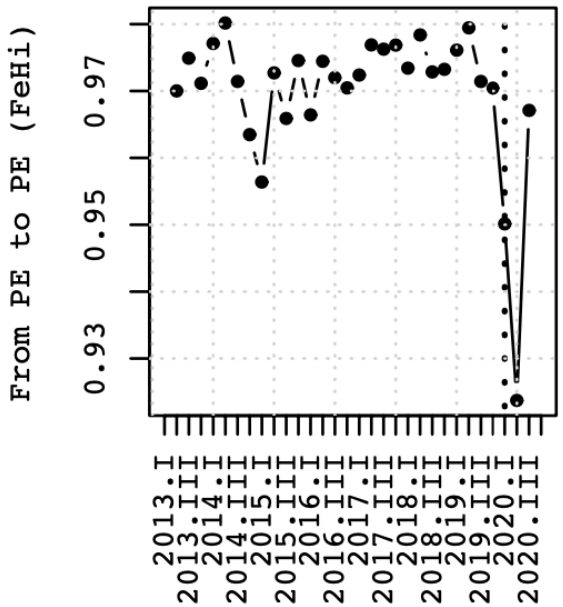
Future Research

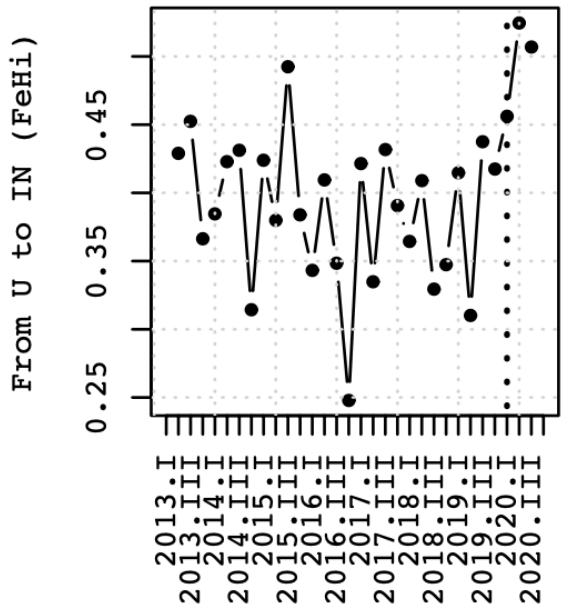
- More heterogeneity by
  - geographic area of residence (regions)
  - country of birth (natives vs immigrants)

Thank you for your attention!

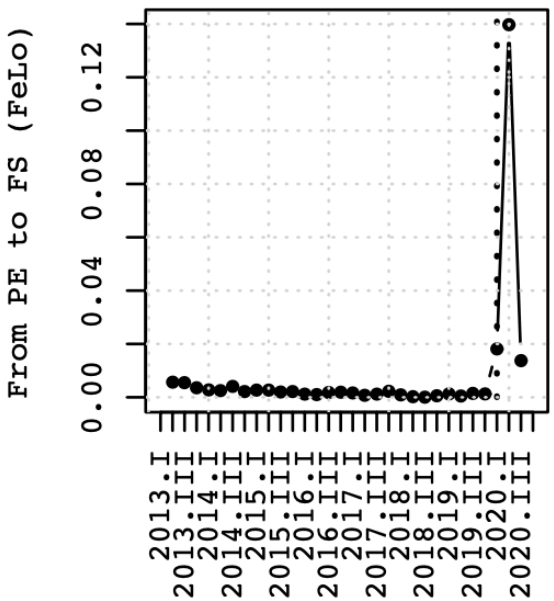
Transition probabilities: Female High-Skilled

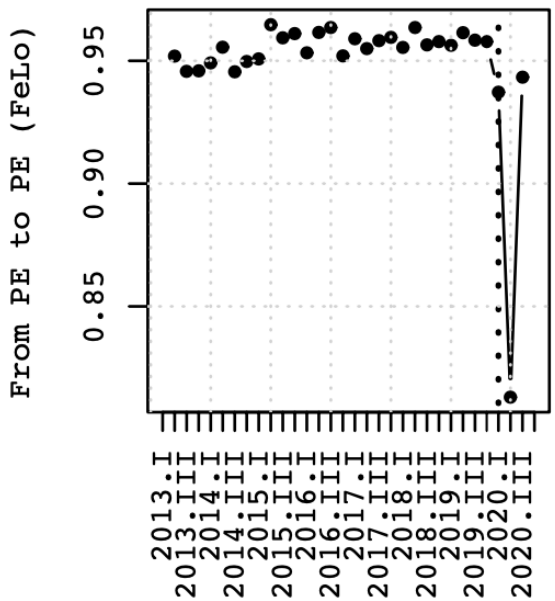


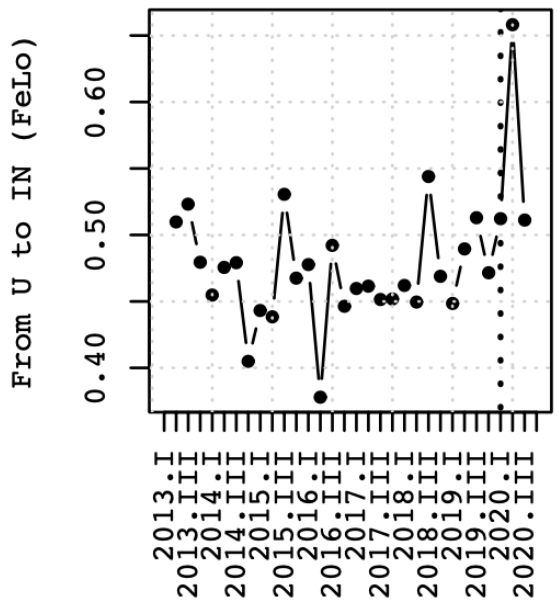




Transition probabilities: Female Low-Skilled







Transition probabilities: Young