

Job Polarization and the Flattening of the Price Phillips Curve

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The Dynamics of the Phillips Curve in the EMU

$$\Delta \log(p)_t = \alpha + \beta_1 u_{t-1} + X_{t-1}^0 \gamma + \epsilon_t$$

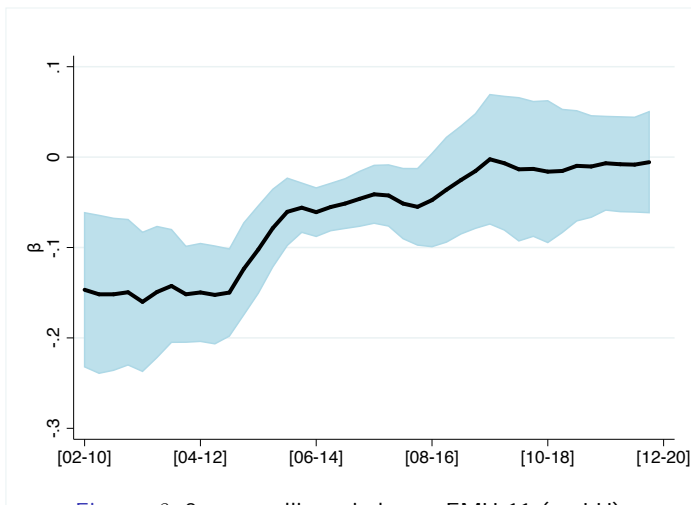
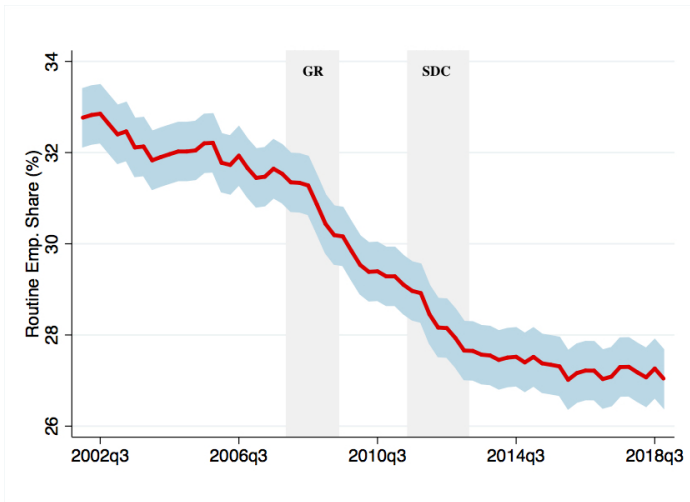


Figure: β , 8-years rolling windows - EMU-11 (no LU)

Job Polarization



Note: Share of routine employment (employment in clerical, plant and craft jobs) for the EMU-12 (LU excluded); Eurostat data.



This paper

Shows that: *Empirics*

1. **the composition** of the job ladder
2. **changes in the composition** of the job ladder

matters for the slope of the Phillips Curve in the Euro Area 2002-2018.

-) A fall in routine shares flattens the Phillips Curve
-) The occupational shifts of the last two recessions explain up to a forth of the flattening of the PC

Why *Theory*

- occupation-specific **characteristics**

matter for the (analytical) slope of the Phillips Curve.

-) Non-routine jobs are more **fluid**: higher separation rate and hiring rate

Literature Review

The literature (U.S and Europe) has mostly focused on two explanations:

1. Inflation Expectations & Anchoring:

- see Yellen et al. (2015), Kiley et al. (2015), Pfajfar and Roberts (2018), Ng, et al. (2018), for the U.S
- see Draghi (2015), Speck (2016), Natoli and Sigalotti (2017), Ciccarelli et al. (2017) Bobeica and Jarocinski (2017) for the EMU

2. Structural Changes due to

- **demographic dynamics:** see Daly et al. (2016), Yoon et al. (2018), Pfajfar and Santoro (2008), Bruine et al. (2010)
- **technological change:** Mincer and Danninger (2000), Ciccarelli and Osbat (2017), Jorgenson (2001), Akerlof et al. (1996)
- **Other:** Del Negro et al. (2020), Geerolf (2020)

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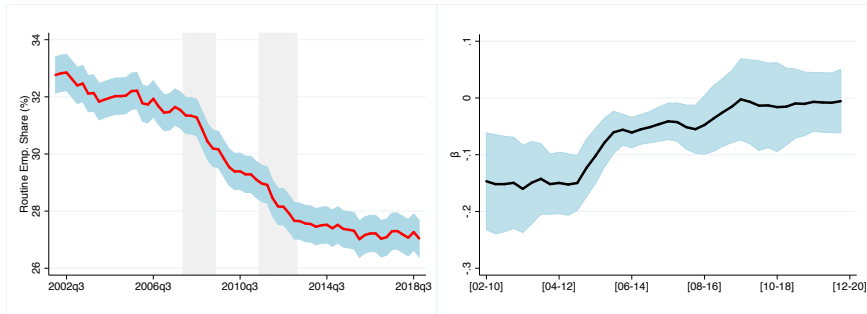
3. Labor Market Dynamics and Characteristics, e.g. bargaining power, wage rigidities, on-the-job search, etc.

- see Daly and Hobijn (2014), Benigno and Ricci (2011), Shmitt-Grohe and Uribe (2013), Faccini and Melosi (2019), Alves (2020), Petrosky et al. (2020)

Empirical Analysis

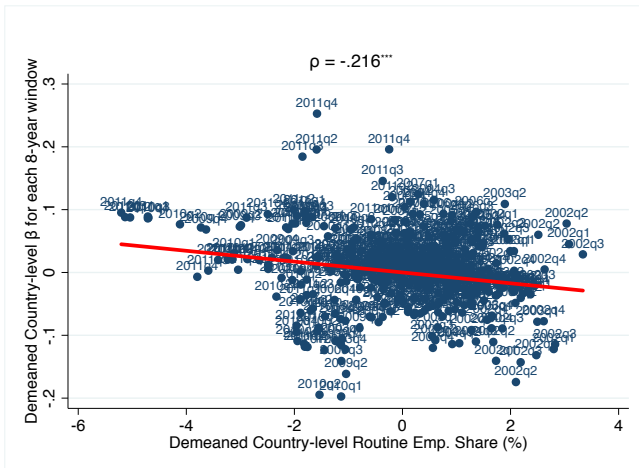
Job Ladder Composition and the PC

Can the share of routine jobs explain the slope of the PC?



Job Ladder Composition and the PC

Can employment composition explain the slope of the PC?

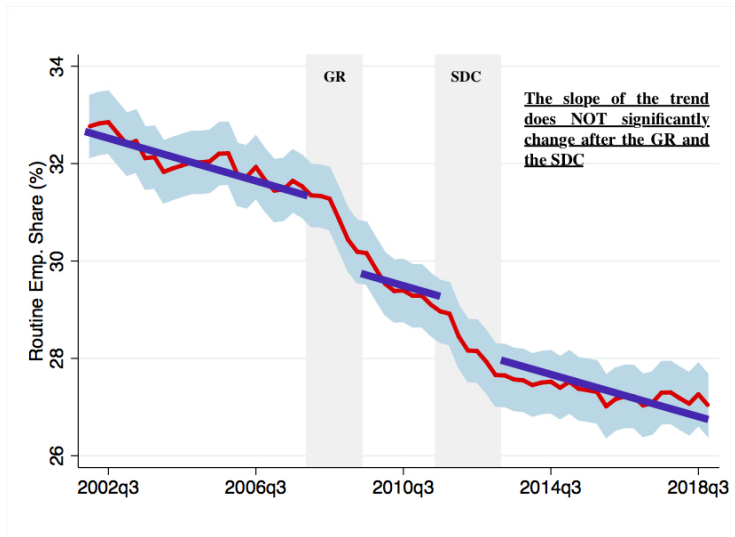


Note: the y-axis is the slope of the PC in country i estimated between year t and $t+8$; the x-axis is the country-level routine employment share as observed at the beginning of each 8-year window. Eurostat and ECB data.

but...does composition really matter?

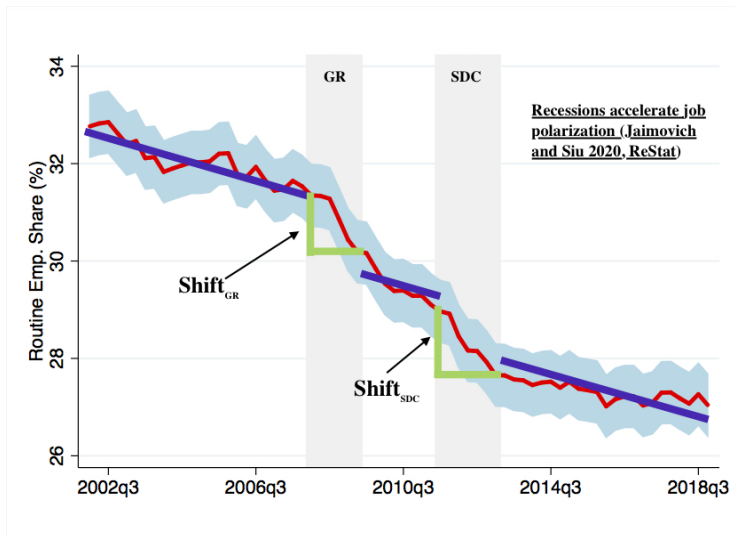
- In the correlation we find that the PC is steeper in periods in which the routine share is high **but**
 - | both series are trending: spurious correlation
 - | both evolution could be driven by other factors: sectorial change
 - | the evolution of job polarization is capturing country-specific characteristics
- To assess this question, we need variation in the composition
 - | unrelated to the trend
 - | unrelated to country-characteristics
-) We exploit the cyclical properties of job polarization

Structural Changes in the Job Ladder



Note: The figure plots the share of routine employment (employment in clerical, plant and craft jobs) for countries that joined the EMU in 2002 (LU excluded). Eurostat data.

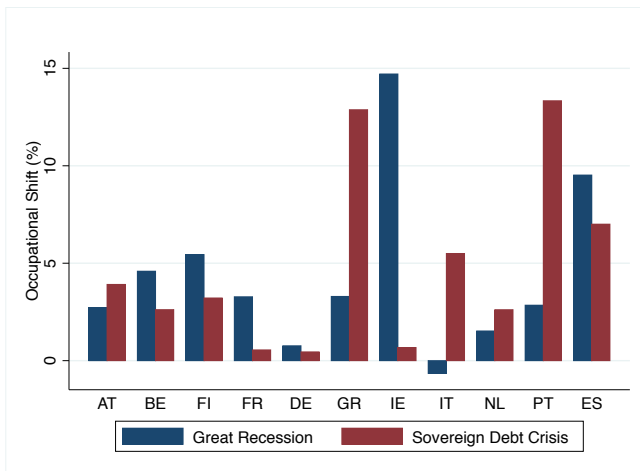
The Cycle and Job Polarization



Note: The figure plots the share of routine employment (employment in clerical, plant and craft jobs) for countries that joined the EMU in 2002 (LU excluded). Eurostat data.


Occupational Shifts


$$\text{Shift}_{i,c} = \frac{\text{Share}_{\text{peak}_{i,c}}^R \text{Share}_{\text{trough}_{i,c}}^R}{\text{Share}_{\text{peak}_{i,c}}^R}, \quad c = fGR, SDCg$$



Occupational Shifts - characteristics

Our measure of Occupational Shift is

- Uncorrelated to 
 - | labor market pre-recession characteristics
 - | pre-recession sectorial composition
 - | pre-recession price dynamics

- Correlated to 
 - | size of the recession
 - | length of the recession

The Phillips Curve Revisited

Can the shift in the occupational structure experienced during the GR explain the flattening of the PC afterward?

$$\begin{aligned}\Delta \log(p)_{i,t} = & \alpha_i + \beta_1 u_{i,t-1} + X_{i,t-1}^0 \gamma \\ & + \beta_2 \text{After}_{i,GR} u_{i,t-1} + \delta_1 \text{After}_{i,GR} \\ & + \beta_{GR} \text{After}_{i,GR} \text{Shift}_{i,GR} u_{i,t-1} + \delta_2 \text{After}_{i,GR} \text{Shift}_{i,GR} \\ & + \epsilon_{i,t}\end{aligned}$$

where the vector $X_{i,t-1}^0$ controls for lagged inflation, past expectations on current inflation and the change in the import price index

	(1)	(2)	(3)	(4)
	$\Delta \log(p)$	$\Delta \log(p)$	$\Delta \log(p)$	$\Delta \log(p)$
u_{t-1}	-0.033 (0.007)	-0.087 (0.013)	-0.086 (0.012)	
<i>After</i> _{GR} u_{t-1}		0.069 (0.019)	0.052 (0.018)	
After _{GR} Shift _{GR} u_{t-1}			0.002 (0.001)	
Observations	748	748	748	
R^2	0.893	0.896	0.897	
Country FE	Yes	Yes	Yes	
Controls	Yes	Yes	Yes	

What about other recessions?



If the composition of the job ladder matters, we should observe a further flattening due to the occupational shift occurred during the SDC.

$$\begin{aligned}\Delta \log(p)_{i,t} = & \alpha_i + \beta_1 u_{i,t-1} + X_{i,t-1}^0 \gamma \\ & + \beta_2 \text{After}_{i,GR} u_{i,t-1} + \delta_1 \text{After}_{i,GR} \\ & + \beta_{GR} \text{After}_{i,GR} \text{Shift}_{i,GR} u_{i,t-1} + \delta_2 \text{After}_{i,GR} \text{Shift}_{i,GR} \\ & + \beta_{SDC} \text{After}_{i,SDC} \text{Shift}_{i,SDC} u_{i,t-1} + \delta_2 \text{After}_{i,SDC} \text{Shift}_{i,SDC} \\ & + \epsilon_{i,t}\end{aligned}$$

where the vector $X_{i,t-1}^0$ controls for lagged inflation, past expectations on current inflation and the change in the import price index

	(1)	(2)	(3)	(4)
	$\Delta \log(p)$	$\Delta \log(p)$	$\Delta \log(p)$	$\Delta \log(p)$
u_{t-1}	-0.033 (0.007)	-0.087 (0.013)	-0.086 (0.012)	-0.079 (0.014)
$After_{GR} u_{t-1}$		0.069 (0.019)	0.052 (0.018)	0.057 (0.027)
After_{GR} Shift_{GR} u_{t-1}			0.002 (0.001)	0.005 (0.001)
$After_{SDC} u_{t-1}$				0.010 (0.010)
After_{SDC} Shift_{SDC} u_{t-1}				0.010 (0.003)
Observations	748	748	748	748
R^2	0.893	0.896	0.897	0.900
Country FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes

Robustness Checks

1. Taking into account changes in sectorial composition (e.g. due to de-industrialization) does not change results 
2. Sectorial composition is important for the slope of **Wage Phillips Curve**, but job composition is not 
3. Results are robust to several definitions of unemployment gap and inflation
4. Results are not driven by subset of countries



Occupational composition matters for the flattening of the price PC

Why?

Theory

Theoretical Analysis

Constructing a **NK-DSGE model** with:

- sticky prices, search and matching frictions and real rigidities
- unemployment

! **Labor market characteristics** matters for the slope of the PC

- labor market tightness and separation rate influence the transmission of unemployment fluctuations to prices
- higher labor market *fluidity* (i.e. higher market tightness and higher separation rate) ! flatter PC

The model - based on Blanchard and Gal (2010)

- Household $E_0 \beta^t \left(\log C_t - \chi \frac{N_t^{1+\phi}}{1+\phi} \right)$
 - Income and substitution effect cancel out
- Intermediate good firm (perfect competition) $X_t(j) = A_t N_t$
 - | $N_t(j) = (1 - \delta) N_{t-1}(j) + H_t(j)$
 - | Hiring costs a positive function of labor market tightness $x_t = \frac{H_t}{U_t}$
- Final good firm (monopolistically competitive) $Y_t(i) = X_t(i)$
 - | Price stickiness a la Calvo 1983

Analytical Phillips curve

$$\hat{\pi}_t = \frac{\alpha g \mu \lambda}{\delta(1-u)} \hat{u}_t + \kappa(1-\delta)(1-x) \hat{u}_{t-1} - \psi \gamma \hat{a}_t$$

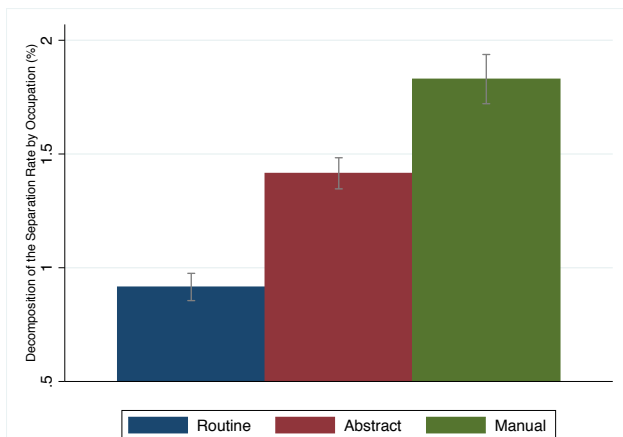
SLOPE OF THE PC:

$$\frac{\alpha g \mu \lambda}{\delta(1-u)} = \frac{\alpha B \left(\frac{\overbrace{\delta N}^{X=\text{Hirings}}}{1 - (1-\delta)N} \right)^\alpha}{\delta N} \mu \lambda$$

-) if δ increases, x increases (but less than proportionally) / higher *fluidity*
-) if δ increases, the slope of the PC is smaller

Slope of the Phillips curve - micro evidence

- Higher separation rate (δ) implies a flatter PC. Micro-evidence:
 - ▮ Non-routine intensive jobs are characterized by higher separation rate and mkt tightness (🔵) [*Flattening*]
 - ▮ Employment relocation from routine to non-routine jobs increases the overall labor mkt fluidity [*Flattening*]



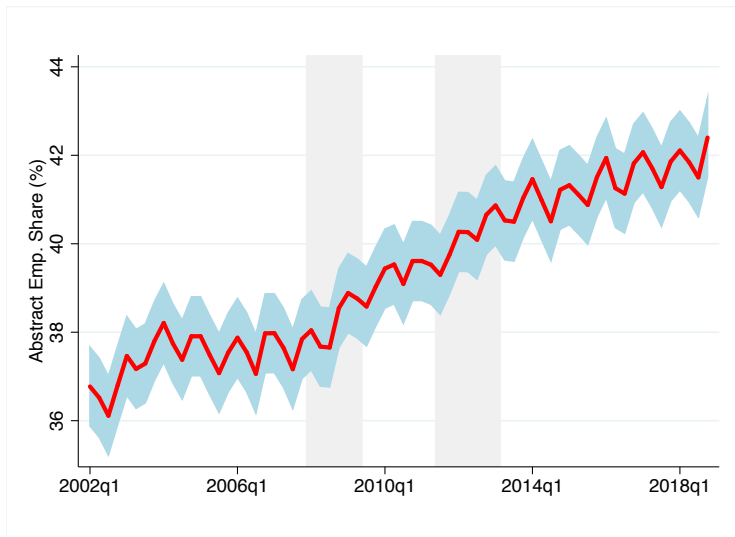
Conclusions

- This paper shows that:
 1. **the composition** and
 2. **structural changes in the composition** of the job laddermatters for the flattening of the Phillips Curve in the Euro Area.
- The occupational shifts matured during the GR and the SDC are responsible of 25% of the flattening between 2008-2018
- A standard NK model with search and matching frictions is consistent with our evidence

Thank you!

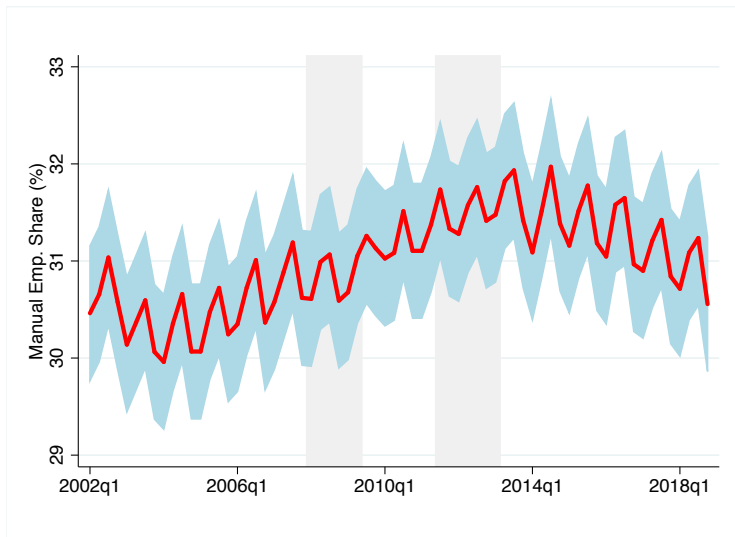
Appendix

Abstract Employment Share



Note: The figure plots the share of abstract employment (employment in professional, technical and managerial jobs) for the EMU-12 (LU excluded).

Manual Employment Share



Note: The figure plots the share of abstract employment (employment in elementary, sales and services, agricultural jobs) for the EMU-12 (LU excluded).

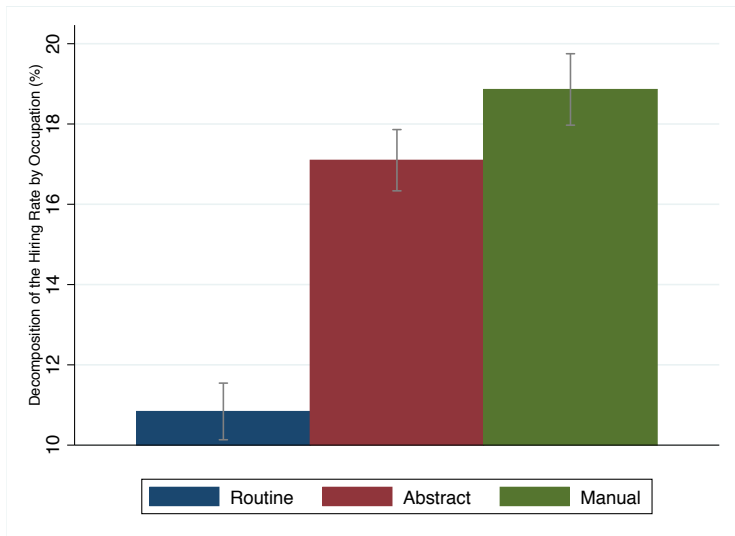
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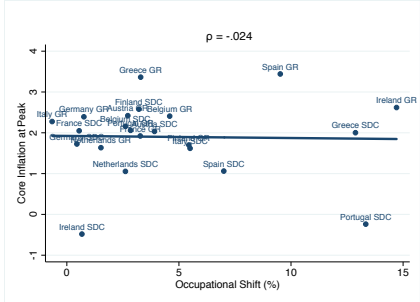
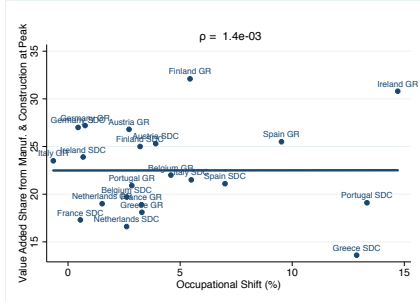
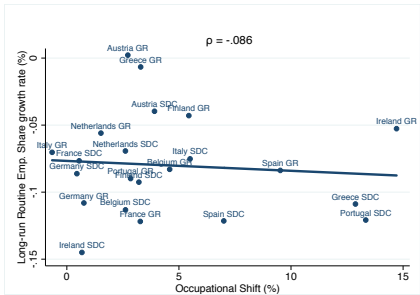
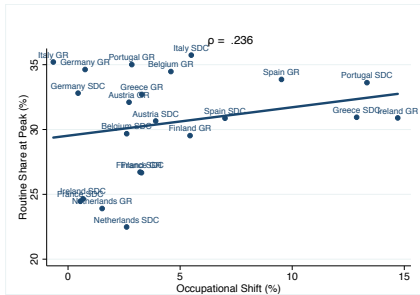
Robustness Checks + Wage PC

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	(1) $\Delta \log(p)$	(2) $\Delta \log(w)$
u_{t-1}	-0.079 (0.014)	-0.024 (0.066)
<i>After_{GR}</i> u_{t-1}	0.057 (0.027)	0.143 (0.082)
<i>After_{GR}</i> <i>Shift_{GR}</i> u_{t-1}	0.004 (0.001)	0.030 (0.015)
<i>After_{SDC}</i> u_{t-1}	0.010 (0.015)	-0.093 (0.064)
<i>After_{SDC}</i> <i>Shift_{SDC}</i> u_{t-1}	0.010 (0.003)	-0.003 (0.028)
After_{GR} Shift_{GR}^{manuf} u_{t-1}	-0.002 (0.001)	-0.025 (0.007)
After_{SDC} Shift_{SDC}^{manuf} u_{t-1}	-0.030 (0.009)	0.029 (0.031)
Observations	748	680
R^2	0.900	0.541
Country FE + Controls	Yes	Yes

Hiring Rate across Jobs





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