THE WAGE–EMPLOYMENT NEXUS: A TALE OF PERSISTENCE

ANTONIO M. CONTI, ELISA GUGLIELMINETTI, MARIANNA RIGGI[1]

[1]Economic Outlook and Monetary Policy Department, Banca d'Italia

An elusive wage Phillips curve (I)

- **Missing wage growth puzzle** in the euro area: fading correlation employment/wage growth after the Global Financial Crisis
- At the same time also the correlation employment/labour productivity (output per worker) turned negative

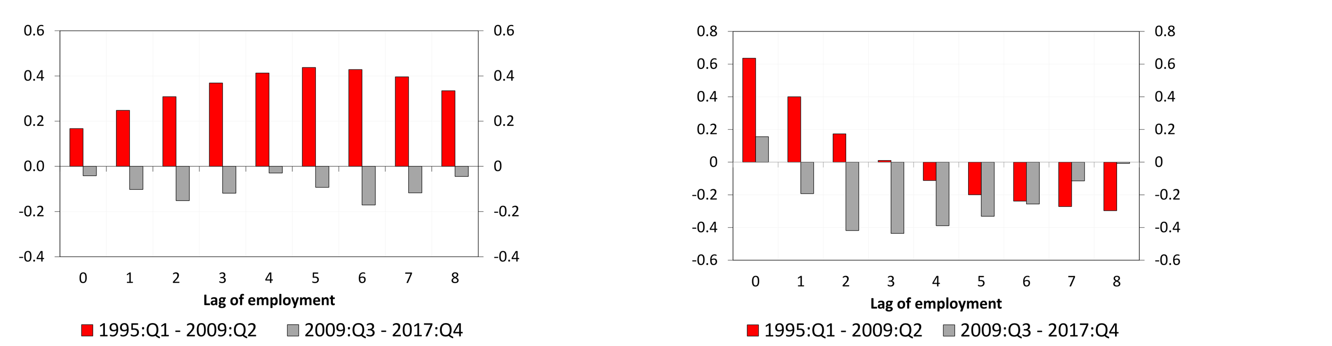


Fig. 1: Unconditional correlation:wages and employment (left) - productivity and employment (right)

An elusive wage Phillips curve (II)

- Estimate a Bayesian VAR over the period 1995:Q1–2008:Q2

$$\mathbf{Y}_t = [mpn_t, n_t, w_t]$$

- Forecast wages w_t *conditional* on actual employment n_t
- **Overestimation of w_t *and* break in labour productivity** mpn_t
- Evidence is robust to (i) estimating BVAR over other samples; (ii) accounting for underemployment (i.e. higher slack)

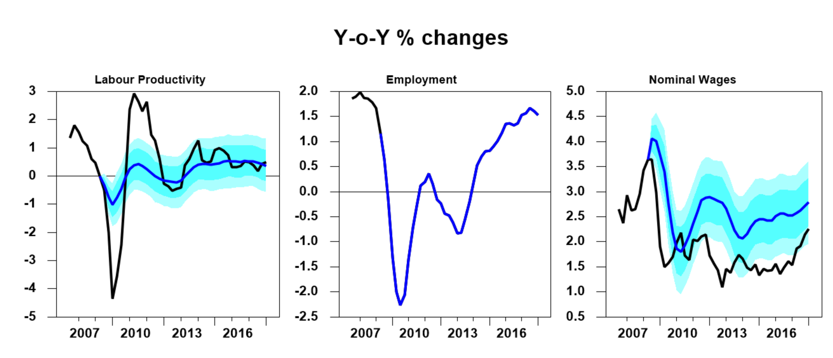


Fig. 2: Conditional forecasts

A more persistent cyclical phase

- The GFC and the sovereign debt crisis left persistent scars on the EA economy and were followed by a long-lasting recovery
- The persistence of the shocks hitting the economy can be assessed by computing the variance ratio (Cochrane, JPE 1988)

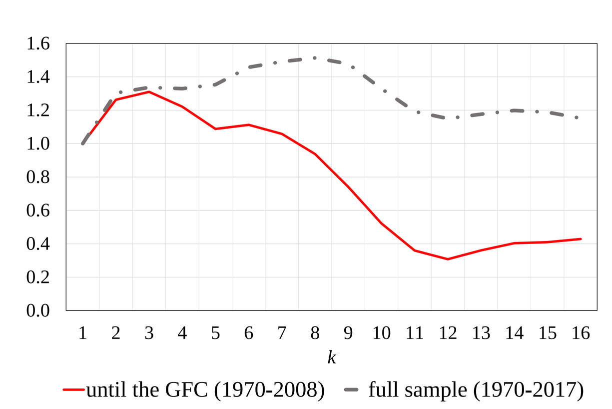


Fig. 3: Variance ratio of GDP: $\frac{1}{k}var(y_t - y_{t-k})$

Theory: DSGE with employment adjustment costs

- We interpret this evidence through the lens of a small-scale DSGE model with employment adjustment costs based on Galì (1999) with convex costs of adjusting employment as in Nucci and Riggi (2018)
- **Labour** is distinguished in:

1. ***extensive margin*** (employment), denoted by N
2. ***intensive margin*** (effort), denoted by E

Labour productivity and wages

- Define compensation per employee as: $\Psi_t = W_t^r + \frac{E_t}{N_t}V_t^r$
- Log-linearizing the model around the steady state, we obtain:

$$\widetilde{\psi}_t = A * \widetilde{mpn}_t + B * n_t$$

where A and B are positive convolutions of deep parameters.

- Hence the reaction of wages to a change in employment is:

$$\frac{\partial \widetilde{\psi}_t}{\partial n_t} = A * \frac{\partial \widetilde{mpn}_t}{\partial n_t} + B$$

- positive if labour productivity is **procyclical** ($\frac{\partial \widetilde{mpn}_t}{\partial n_t} > 0$) $\rightarrow$ labour hoarding: more variation in the **intensive** margin
- negative if labour productivity is **countercyclical** ($\frac{\partial \widetilde{mpn}_t}{\partial n_t} < 0$) $\rightarrow$ more variation in the **extensive** margin

Demand shocks and the cyclical phase

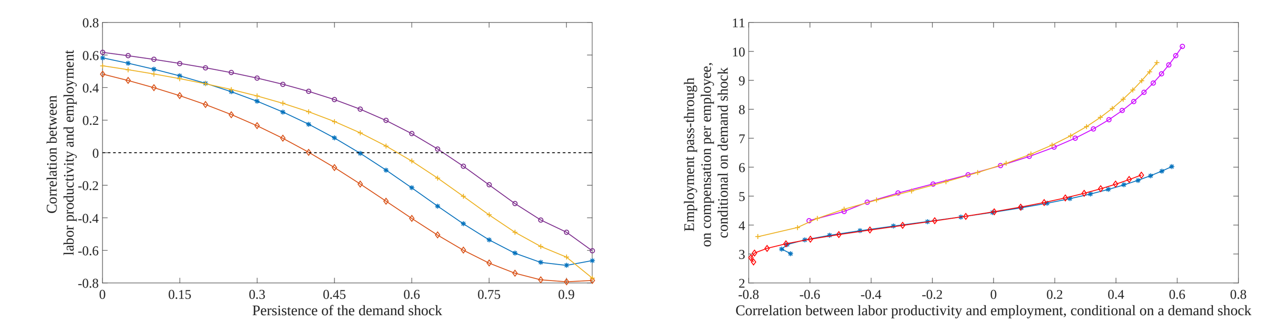
- Focus on **the impact of a demand shock** (shock to the discount factor):

$$\log \xi_t = \rho_\xi \log \xi_{t-1} + \varepsilon_t$$

A positive demand shock increases output, labour and inflation.

- How much firms adjust the extensive vs the intensive margin of labour?
- Crucial is the **persistence** of the shock (ρ_ξ)
- Intuition: the more persistent is the cyclical phase the more firms are willing to pay the cost of adjusting the extensive margin. Hence:
  - **Low persistence**: firms hoard labour $\rightarrow$ labour prod. is ***procyclical*** $\rightarrow$ positive impact on wages
  - **High persistence**: firms adjust more the extensive margin $\rightarrow$ labour prod. is ***countercyclical*** $\rightarrow$ null/negative impact on wages

Countercyclical productivity & employment–wages multiplier: DSGE



- **Calibration**: $\beta = 0.99$, $\alpha = 2/3$, $\theta = 0.6$, $\sigma_h = 0.5$, $\sigma_e = 1$, $\lambda_v = 0.5$, $\epsilon = 6$, $\phi_\pi = 1.2$. **Each line corresponds to a different calibration for the sticky price parameter** ς **and employment adjustment cost** ϕ_h: −○− $\varsigma = 0.8$ $\phi_h = 4$; −∗− $\varsigma = 0.8$ $\phi_h = 2$; −+− $\varsigma = 0.5$ $\phi_h = 4$; −◇− $\varsigma = 0.5$ $\phi_h = 2$.

Empirical Validation with SVAR

- Data would support the theoretical mechanism if:
  1. conditional on a demand shock **labour productivity became countercyclical** after the GFC;
  2. **response of wages to employment** conditional on a demand shock is **smaller** after the GFC
- Estimation over subsamples (pre and post GFC) $\mathbf{Y}_t = [mpn_t, n_t, w_t, s_t]$
- Zero-sign restrictions consistent with theory: demand, technology, labour supply and monetary policy shocks

Countercyclical productivity & employment–wages multiplier: SVAR

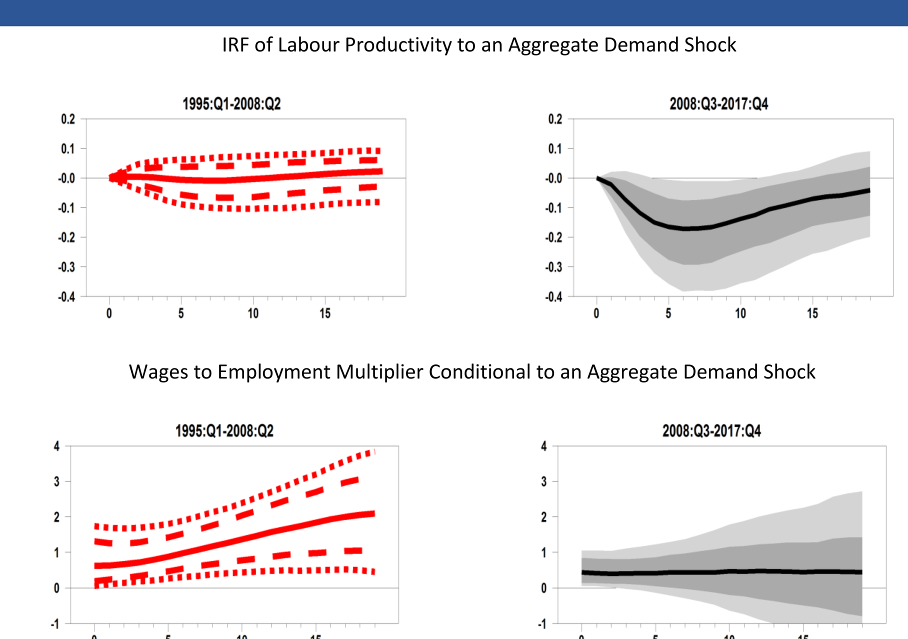


Fig. 5: IRFs to demand shock, SVAR model.

Concluding Remarks

- **Novel explanation** of the **wageless recovery in the EA**
- **Persistent** demand shocks $\Rightarrow$ change in the conditional correlation between **labour productivity** and **employment** after the GFC $\Rightarrow$ smaller reaction of **wages**