

**Labor Market Institutions and Inflation
Volatility in the Euro Area**

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Questions

- Despite the EMU cyclical inflation differentials still persist
- Country data show pronounced differences in labor market institutions
- Is there a link between the two?

Table 1: **Masures of benefit replacement rates (benefit as a ratio to average earnings before taxes taken from Nickell and Nunziata). Average over 1985 to 1995.**

Countries	Benefit Duration
Austria	0.75
Belgium	0.77
Finland	0.53
France	0.49
Germany	0.61
Ireland	0.54
Italy	0.09
Netherlands	0.47
Portugal	0.60
Spain	0.26

Table 2: **Business cycle properties of the euro area economy and of the model economy.**

Standard deviation	Euro area		Model economy	
		Home country	Foreign country	
Output	1.14	1.59	1.61	
Consumption	0.78	0.93	0.94	
Inflation (GDP deflator)	0.5	0.5	0.49	
Employment	0.85	0.87	0.85	
Vacancies	...	5.17	5.04	
Tightness	...	11.38	11.13	

Statistics for the euro area are taken from Agresti and Mojon (2003) except for the standard deviation of employment which is taken from Backus, Kehoe and Kydland (1985).

All standard deviations are relative to output. Statistics from the model are Hodrick-Prescott filtered. and are computed under two correlated productivity shocks and one common monetary policy shock.

Stylized facts

- Data: negative relation between ratio of standard deviations (across countries) for real wages, marginal costs and inflation versus ratio of replacement rates
- What type of supply side mechanism explain the link?
- DSGE model for currency with labor market frictions to account for the facts

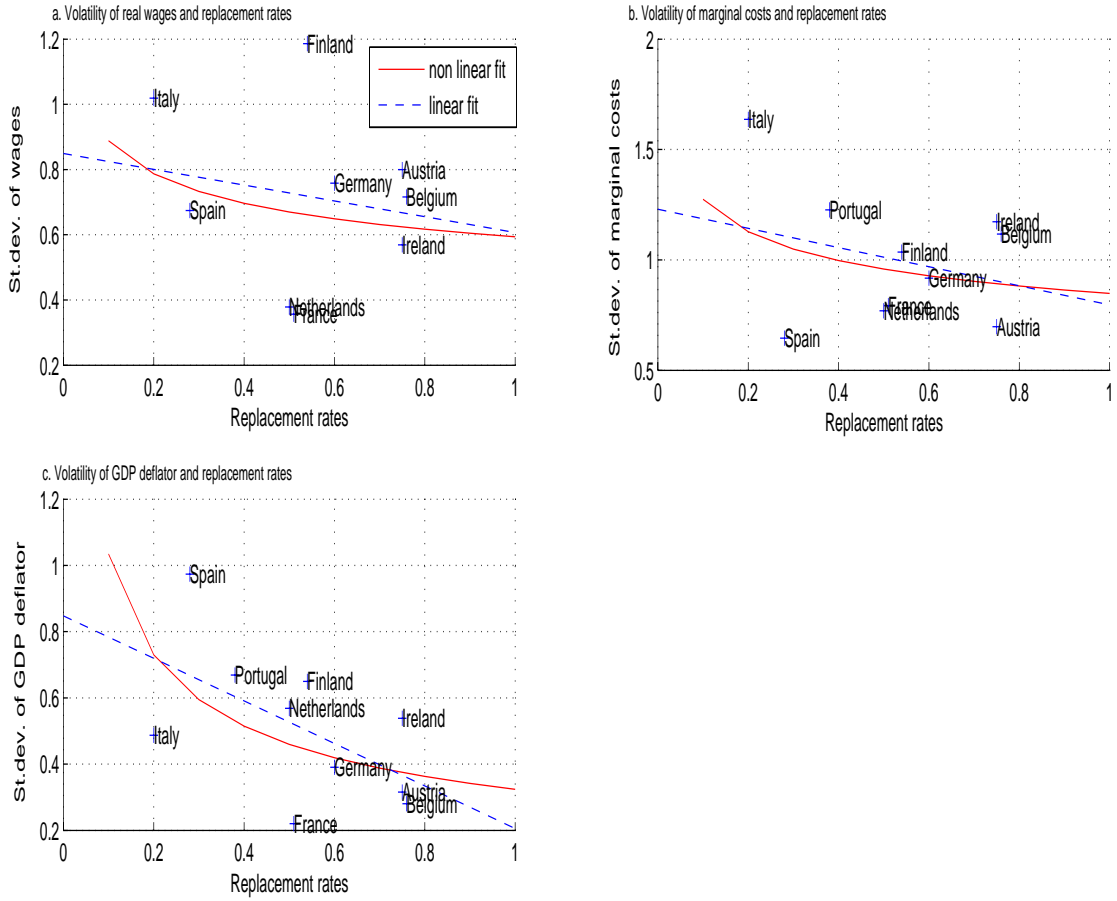


Figure 1: **Relation between standard deviation of wages, marginal costs and inflation (relative to that of output) and replacement rates for the EMU countries.**

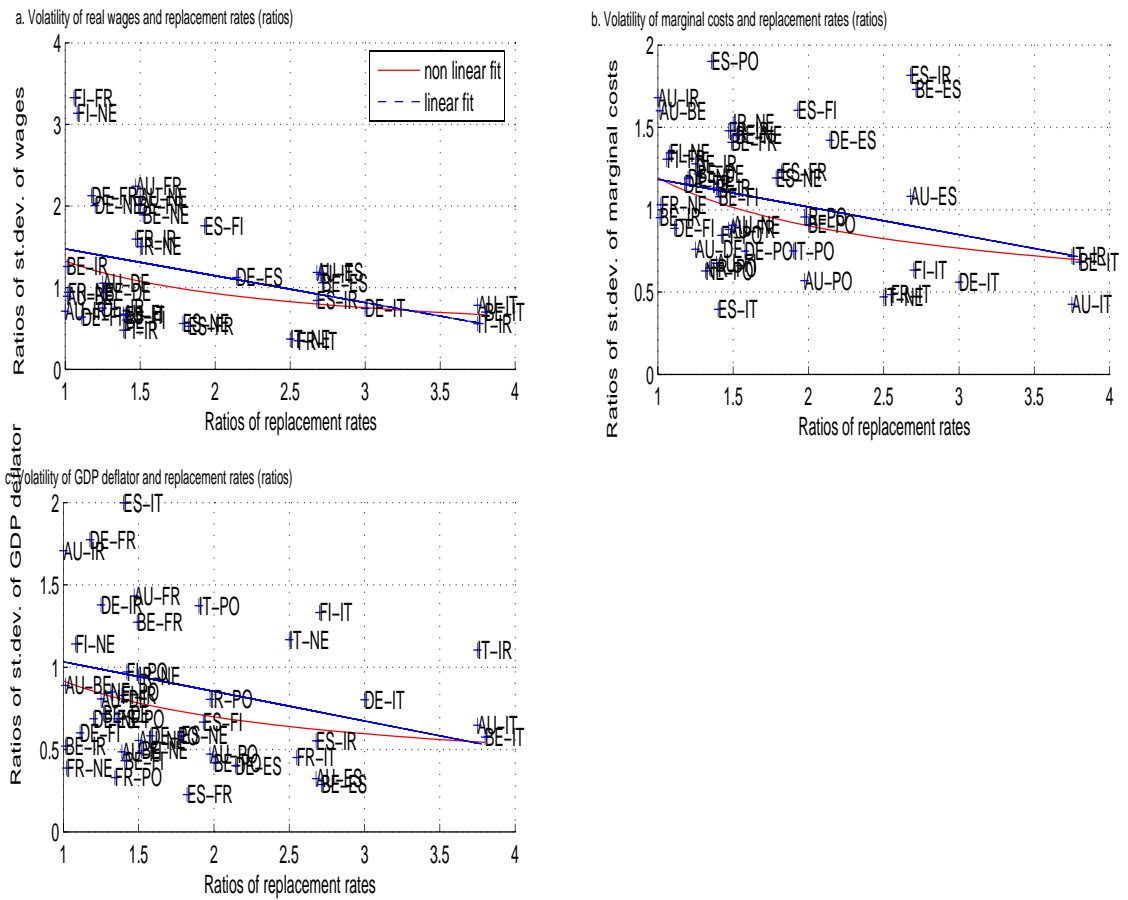


Figure 2: Relation between ratios of standard deviation of wages, marginal costs and inflation (relative to that of output) and ratios of replacement rates for the EMU countries.

Our hypothesis

- Labor market institutions are an important determinant of real wages
- Real wages determine marginal costs
- Marginal costs impact inflation dynamics (via Phillips curve)

Our hypothesis II

- An decrease in the replacement rate (unemployment benefit over wages) decreases the value of outside option compared to value of a job
- Workers are willing to accept bigger variations in wages to keep their jobs
- Volatility of real wages, marginal cost and inflation increases
- Decreasing the replacement rate increase rigidity of labor market for insider workers

Related literature

- Empirical Studies:

- a) Alberola (2000), Rogers (2002), Ortega (2003). Product markets and wage differences on inflation differentials

- b) Honohan and Lane (2003). Different exposure of European countries to the original weakness of the EURO

- c) Angeloni and Ehrmann (2003). Inflation persistence and indeterminacy

- Theoretical literature:

- a) Benigno (2003), Benigno and Lopez-Salido (2003). Welfare implications of inflation differentials

- b) Andrés, Ortega and Vallés (2003). Impact of different product market regulations on inflation differentials

The Model

- Two-Country model for a currency area with:
 - monopolistic competition and sticky prices
 - matching frictions and wage rigidity in the labor market
- Differences across the two countries in replacement rate (unemployment benefit over wages)
- This institutions accounts for worker trade-off between the outside option and the value of an existing job

Model results

- Even in response to common (monetary policy and technology) shocks the model exhibits significant inflation differentials
- The model replicates the negative relations found in the data

The Transmission mechanism

- In countries with lower replacement rates workers attach a high value to existing jobs
- Hence they are willing to accept bigger swings in real wages in response to shocks
- This implies bigger swings in marginal costs and inflation

Model I: workers-consumers

- Currency area with two tradable goods:

$$c_t \equiv \left[(1 - \gamma)^{\frac{1}{\eta}} c_{h,t}^{\frac{\eta-1}{\eta}} + \gamma^{\frac{1}{\eta}} c_{f,t}^{\frac{\eta-1}{\eta}} \right]^{\frac{\eta-1}{\eta}}$$

- Workers expected lifetime utility

$$E_t \left\{ \sum_{t=0}^{\infty} \beta^t \left(\frac{c_t^{1-\sigma}}{1-\sigma} \right) \right\}$$

- Workers budget constraints:

$$c_t + \frac{b_t}{p_t} + e_t^r \frac{b_t^*}{p_t^*} \leq w_t(1 - u_t) +$$

$$u_t b + \frac{\Theta_t}{p_t} - \frac{\tau_t}{p_t} + (1 + r_{t-1}^n) \frac{b_{t-1}}{p_t} + (1 + r_{t-1}^{n,f}) e_t^r \frac{b_{t-1}^*}{p_t^*}$$

Workers' FOC

•

$$c_t^{-\sigma} = \beta(1 + r_t^n) E_t \left\{ c_{t+1}^{-\sigma} \frac{p_t}{p_{t+1}} \right\}$$

$$c_t^{-\sigma} = \beta(1 + r_t^{n,f}) E_t \left\{ c_{t+1}^{-\sigma} \frac{p_t^*}{p_{t+1}^*} \frac{e_{t+1}^r}{e_t^r} \right\}$$

Model II: Search and Matching

- Matching technology:

$$m(u_t, v_t) = m u_t^\xi v_t^{1-\xi}$$

- Production function:

$$y_{i,t} = z_t n_{i,t} \int_{\tilde{a}_{i,t}}^{\infty} a \frac{f(a)}{1 - F(\tilde{a}_{i,t})} da$$

- Destruction rate:

$$\rho(\tilde{a}_{i,t}) = \rho^x + \rho^n(\tilde{a}_{i,t})(1 - \rho^x)$$

- Evolution of employment:

$$n_{i,t} = (1 - \rho(\tilde{a}_{i,t}))(n_{i,t-1} + v_{i,t-1}q(\theta_{i,t-1}))$$

Model III: Monopolistic Firms

- They maximize the sum of expected profits:

$$\left\{ \frac{p_{h,t}^i}{p_{h,t}} y_t^i - \phi_t W_{i,t} - \kappa v_{i,t} - \frac{\psi}{2} \left(\frac{p_{h,t}^i}{p_{h,t-1}^i} - 1 \right)^2 y_t^i \right\}$$

$$\text{s.to: } \left(\frac{p_{h,t}^i}{p_{h,t}} \right)^{-\epsilon} (c_{h,t} + c_{h,t}^*) = z_t n_{i,t} H(\tilde{a}_{i,t})$$

$$\text{and: } n_{i,t} = (1 - \rho(\tilde{a}_{i,t})) (n_{i,t-1} + v_{i,t-1} q(\theta_{i,t-1}))$$

Firms' FOC

- FOCs:

$$\begin{aligned} & \psi(\pi_{h,t} - 1)\pi_{h,t} - \beta E_t\left(\frac{\lambda_{t+1}}{\lambda_t}\right) [\psi(\pi_{h,t+1} - 1)\pi_{h,t+1} \frac{y_{t+1}}{y_t}] \\ = & -(1 - mc_t)\varepsilon + 1 \end{aligned}$$

$$\tilde{a}_t = \frac{b\phi_t}{mc_t z_t} + \frac{1}{mc_t z_t} \frac{\kappa}{1 - \varsigma} \left(\varsigma \theta_t - \frac{1}{q(\theta_t)} \right)$$

Model IV: Nash bargaining

- Maximization problem:

$$\max_w (\phi_t(V_t^E(a_t) - V_t^U))^{\varsigma} (V_t^J(a_t))^{1-\varsigma}$$

- Wage schedule:

$$w_t(a_t) = \varsigma(mc_t z_t a_t + \theta_t \kappa) \frac{1}{\phi_t} + (1 - \varsigma)b$$

Model V: The Monetary Policy Rule in the Currency Area

- Monetary policy rule:

$$r_t^n = \exp\left(\frac{1 - \chi}{\beta}\right) (r_{t-1}^n)^\chi \left(\frac{\pi_t + \pi_t^*}{2}\right)^{b_\pi} m_t^{1-\chi}$$

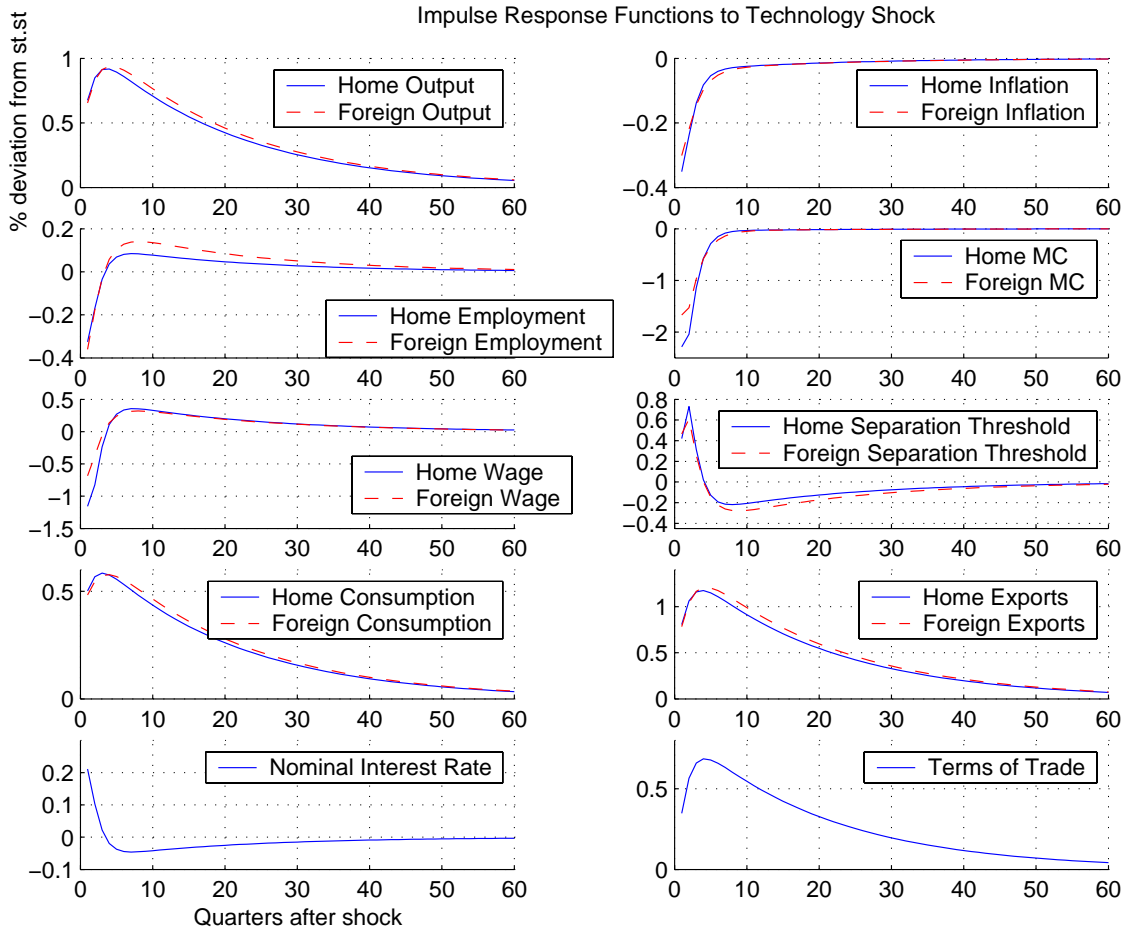


Figure 3: Impulse responses of selected domestic and foreign variables to domestic (solid line) and foreign technology (dashed line) shocks.

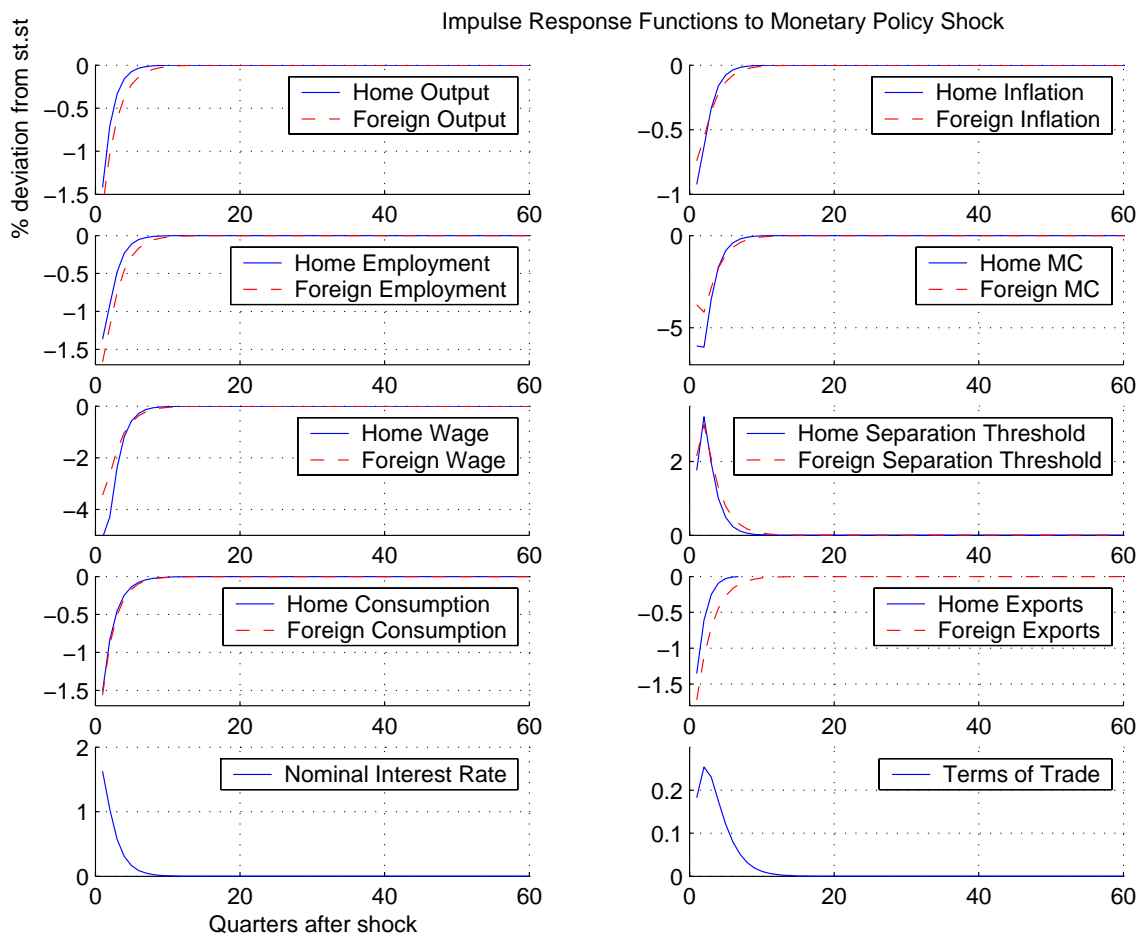


Figure 4: Impulse responses of selected domestic and foreign variables to common monetary policy shocks.

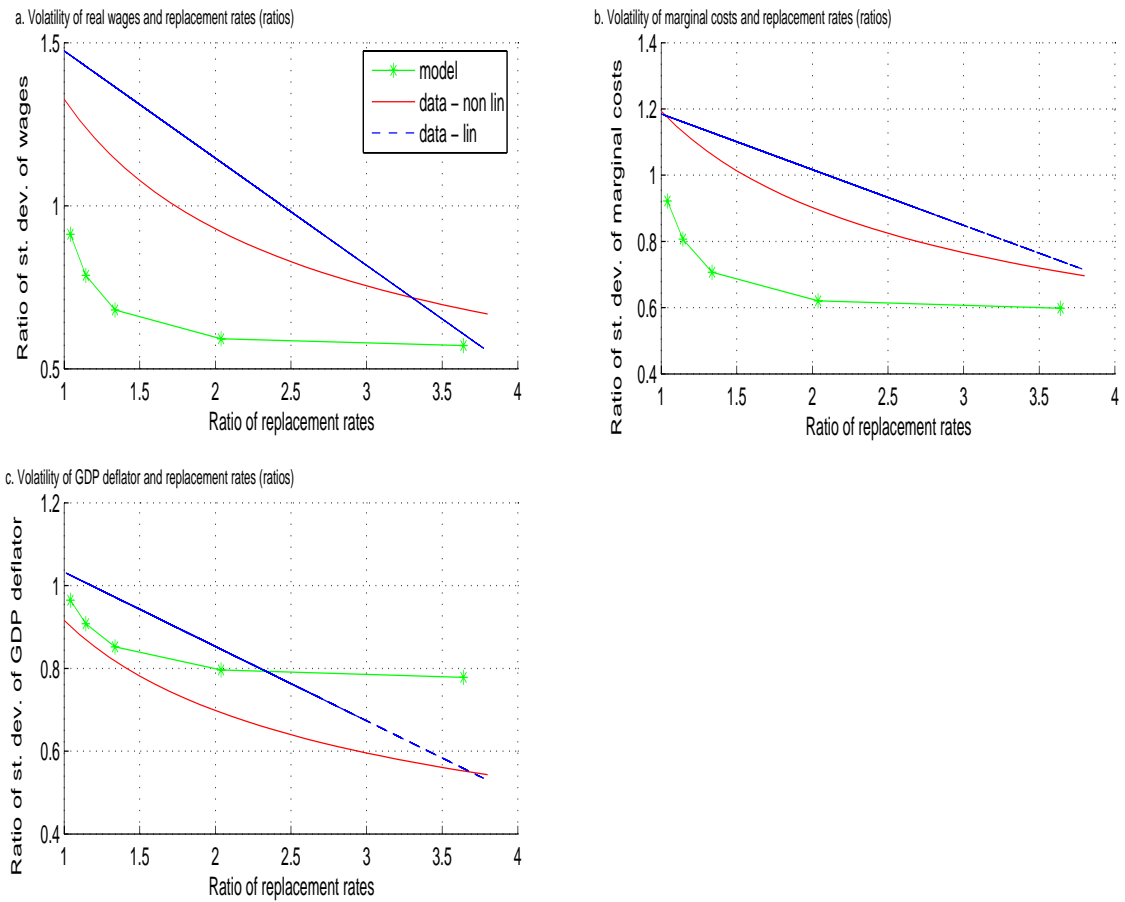


Figure 5: **Relation between ratios of standard deviation of wages, marginal costs and inflation (relative to that of output) and ratios of replacement rates both in the data and in the model.**