Understanding the Gains from Wage Flexibility: The Exchange Rate Connection

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National Bank of Serbia, 19 June 2015

[..]*However, in order to increase investment activity, boost job creation and raise productivity growth, other policy areas need to contribute decisively. In particular, the determined implementation of* **product and labour market reforms** *as well as actions to improve the business environment for firms needs to gain momentum in several countries.*

[Ecb Introductory statement 22 Jan. 2015]

The alleged benefits of higher wage flexibility

- Wide belief in the benefits of **wage flexibility**
- Typical example of "structural reform"
- View features prominently, e.g., in the **Euro crisis** debate
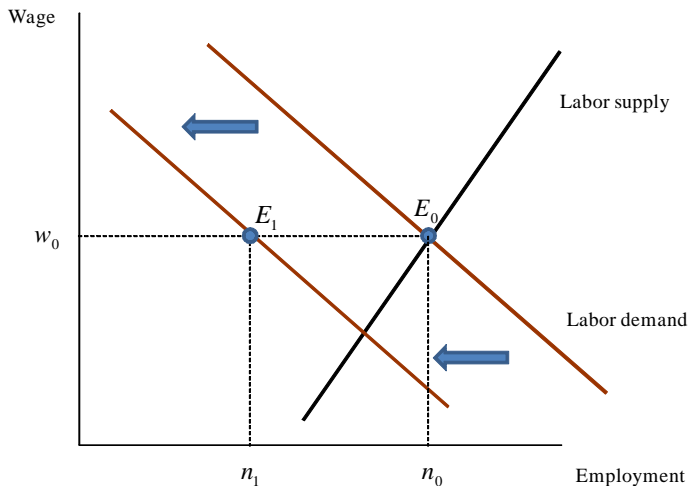
Wages and Employment: Classical View

Wage flexibility and employment: flexible wages

Wage Flexibility and Employment Stability: The Classical View
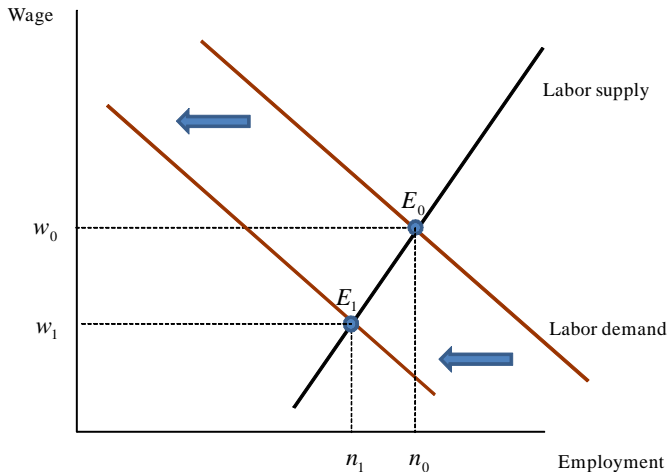
Wage flexibility and employment: rigid wages

Wage Flexibility and Employment Stability: The Classical View

Wage flexibility and monetary policy

- Conventional (classical) wisdom ignores that - with nominal rigidities - impact of **wage** adjustment on employment works through monetary policy

What happens in an economy if wages become more flexible?

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  1. ↑ wage inflation volatility ("bad")
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- Endogenous response of monetary policy **counterbalances** impact on employment

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- Possibly **welfare reducing**

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- Evaluate realistic case of "constrained" monetary policy: concern for **exchange rate**
- Limit relevant case: participation to a **currency area**
- **Policy question**: *does higher wage flexibility in the South help if not accompanied by expansion in aggregate demand (via monetary policy)?*

Main results

1. Impact of **wage adjustments** on employment **smaller** the more the CB seeks to stabilize exchange rate

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2. Increase in wage flexibility often **reduces welfare** (more likely so in economies under exchange rate-focused monetary policy).

Model

Households

- Small open economy (GM 2005)
- Continuum of households, each specialized in the provision of **labor type** i
- **Wages** reoptimized at random intervals (Erceg et al. 2006)
- All goods are traded + LOP holds at the level of each individual variety
- Continuum of domestic firms. Each hires a continuum of differentiated labor types
- Staggered prices

Monetary Policy

- Interest rate rule:

$$i_t = \rho + \phi_\pi \pi_{H,t} + \underbrace{\frac{\phi_e}{1 - \phi_e}}_{\substack{\text{ex. rate} \\ \text{feedback}}} e_t$$

$\phi_e \to 1$: ex. rate peg

Optimal wage setting

- Each household i can reset nominal wage with probablity $1 - \theta_w$:

$$\max \mathbb{E}_t \sum_{k=0}^{\infty} (\beta \theta_w)^k U(C_{t+k|t}(i), \underbrace{N_{t+k|t}(i)}_{\substack{\text{t+k labor supply} \\ \text{by type i} \\ \text{who last reset her wage in t.}}})$$

- At the chosen wage $\overline{W}_t(i)$, household type i assumed to supply enough labor to satisfy demand:

$$\underbrace{N_{t+k|t}(i)}_{\substack{\text{total supply} \\ \text{of labor type i}}} = \underbrace{N^d_{t+k|t}(i)}_{\substack{\text{total demand for} \\ \text{for labor type j}}}$$

$$= \left(\frac{\overline{W}_t(i)}{W_{t+k}} \right)^{-\varepsilon_w} \underbrace{N^d_{t+k}}_{\substack{\text{aggregate (avg.)} \\ \text{labor demand}}}$$

Household's wage setting problem

- ▶ (Relevant portion of the) Lagrangian of household problem

$$\mathcal{L}^w = \mathbb{E}_t \sum_{k=0}^{\infty} (\beta\theta_w)^k \left\{ \begin{array}{c} U\left(C_{t+k|t}, \ N_{t+k|t}\right) \\ -\lambda_{t+k|t} \left[P_{t+k} C_{t+k|t} - \overline{W}_t \ N_{t+k|t}\right] \end{array} \right\}.$$

- ▶ Leads to FOC

$$\sum_{k=0}^{\infty} (\beta\theta_w)^k \mathbb{E}_t \left\{ U_{c,t+k} N_{t+k|t} \underbrace{\left[\frac{\overline{W}_t}{P_{t+k}} - \frac{(-U_{n,t+k|t})}{U_{c,t+k}} \mathcal{M}_w \right]}_{\substack{\text{wedge btw} \\ \text{real w. and MRS}}} \right\} = 0$$

$$\underbrace{\mathcal{M}_w}_{\substack{\text{optimal ss} \\ \text{wage markup}}} \equiv \varepsilon_w / (\varepsilon_w - 1)$$

Optimal domestic price setting: Calvo staggering

- Individual vs *average* nominal **marginal cost**:

$$MC_{t+k|t} = \left(\frac{W_{t+k} g(S_{t+k})}{(1-\alpha) A_{t+k} N_{t+k}^{-\alpha}} \right) \left(\frac{N_{t+k}}{N_{t+k|t}} \right)^{-\alpha}$$

$$= MC_{t+k} \left(\frac{P_{H,t+k}}{\overline{P}_{H,t}} \right)^{\frac{\varepsilon_p \alpha}{1-\alpha}}$$

→ Optimality condition

$$\sum_{k=0}^{\infty} \theta_p^k E_t \left\{ Q_{t,t+k} Y_{t+k|t} \left(\overline{P}_{H,t} - \overbrace{\mathcal{M}_p}^{\substack{\text{optimal ss} \\ \text{price markup}}} MC_{t+k|t} \right) \right\} = 0$$

$$\underbrace{\phantom{\overline{P}_{H,t} - \mathcal{M}_p MC_{t+k|t}}}_{\substack{\text{time varying} \\ \text{wedge btw price} \\ \text{and marg cost}}}$$

Table 1. Baseline Calibration

	Description	Value	Target
φ	Curvature of labor disutility	5	Frisch elasticity 0.2
α	Index of decrasing returns to labor	$1/4$	
ϵ_w	Elasticity of substitution (labor)	4.52	$u = 0.05$
ϵ_p	Elasticity of substitution (goods)	9	labor income share $= 2/3$
θ_p	Calvo index of price rigidities	$3/4$	average duration $= 4$
θ_w	Calvo index of wage rigidities	$3/4$	average duration $= 4$
ϕ_p	Inflation coefficient in policy rule	1.5	Taylor (1993)
ν	Openness	0.4	import share $= 0.4$
η	Elasticity of substitution domestic vs foreign goods	1	Cole-Obstfeld
β	Discount factor	0.99	
ρ_i	Persistence of exogenous processes	0.9	

A cut in labor taxes

A cut in payroll taxes

- "Classical view": direct effect on employment via labor demand

  ↓ payroll taxes → ↑ labor demand →↑ equilibrium employment

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- Dynamic NK view: role of expansion in **aggregate demand** via monetary policy

- Study how the response of employment to the payroll tax cut depends on the strength of the **central bank's** response to the **exchange rate**, as measured by ϕ_e

Dynamic response of employment to a cut in payroll tax

Dynamic Response of Employment to a Payroll Tax Cut
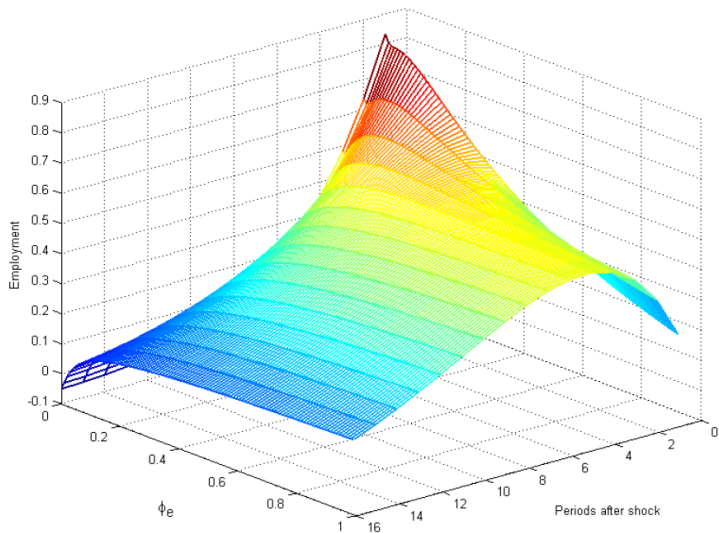
Dynamic Responses to a Payroll Tax Cut: Interest Rates
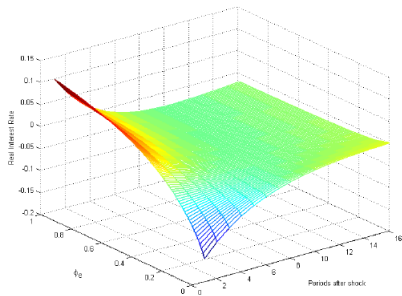
Real interest rate
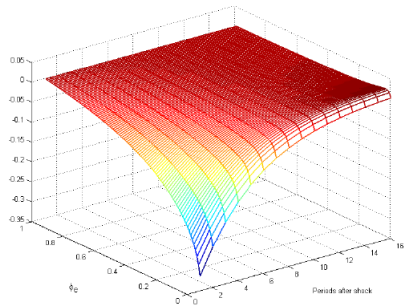
Nominal interest rate

Intuition

- Consumption Euler

$$c_t = x_t - (1 - \nu) \underbrace{\sum_{k=0}^{\infty} E_t\{r_{t+k}\}}_{\substack{\text{LT real} \\ \text{int rate}}}$$

- "Real" UIP condition

$$s_t = -r_t + E_t\{s_{t+1}\}$$
$$s_t = -\sum_{k=0}^{\infty} E_t\{r_{t+k}\}$$

- $\phi_e > 0 \rightarrow$ domestic price level stationary $(\lim_{T \to \infty} p_{H,T} = 0)$

$$\sum_{k=0}^{\infty} E_t\{r_{t+k}\} = p_{H,t} + \underbrace{\sum_{k=0}^{\infty} E_t\{i_{t+k}\}}_{\substack{\text{endogenous} \\ \text{mp channel}}}$$

Summary so far

1. Effects on employment of exogenous changes in labor costs **strongly mediated** by response of monetary policy.
2. When the exchange rate is **fixed**, as in a currency union, supply side interventions aimed at stimulating employment through a reduction in labor costs are **less effective**
3. Net effect unblanced towards an increase in **wage inflation instability** rather than an increase in **employment**

Welfare

Deriving welfare objective

- Assumptions

1. Unitary elasticity of substitution between domestic and foreign goods ($\eta = 1$)
2. Optimal employment subsidy

$$\mathbb{L} \sim (1 + \varphi)\, var(\widetilde{n}_t) + \left(\frac{\epsilon_p}{\lambda_p(1-\alpha)} \right) var(\pi_t^p) + \left(\frac{\epsilon_w}{\lambda_w} \right) var(\pi_t^w)$$

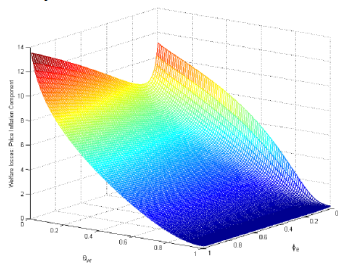# Wage Flexibility, Exchange Rate Policy and Welfare: Demand Shocks
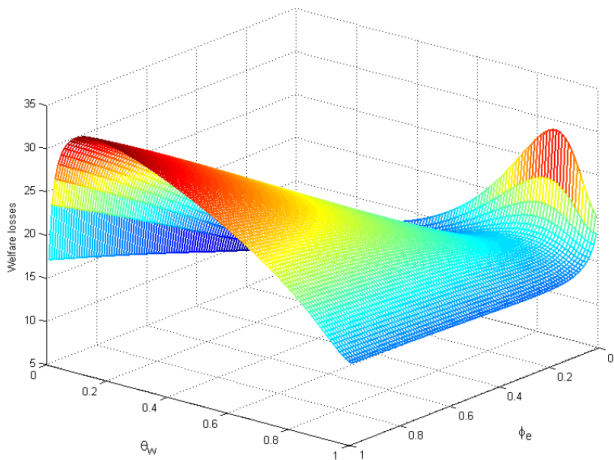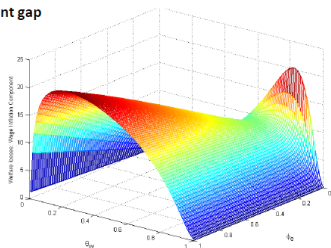
Wage Flexibility, Exchange Rate Policy and Welfare: Demand Shocks
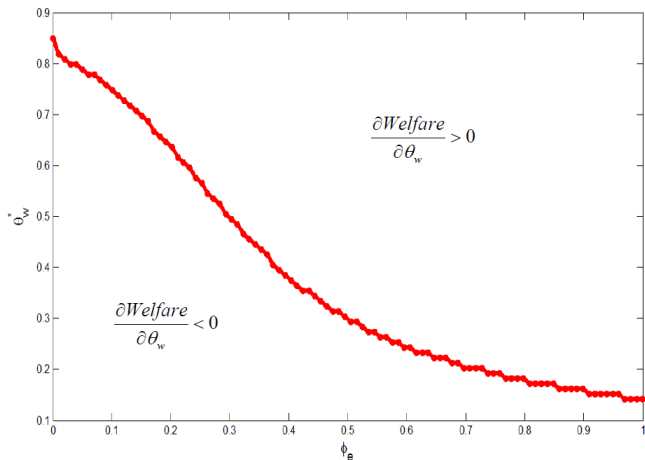## *Welfare Loss Components*
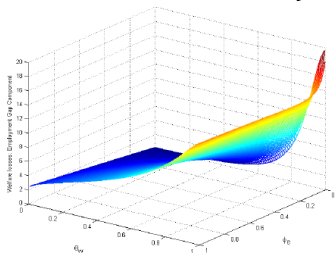
employment gap

price inflation

wage inflation

Welfare impact regions

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- ▶ Under a peg, it takes a **much larger** increase in wage inflation to achieve any given increase in employment.

# Welfare impact regions: The Role of Price Stickiness
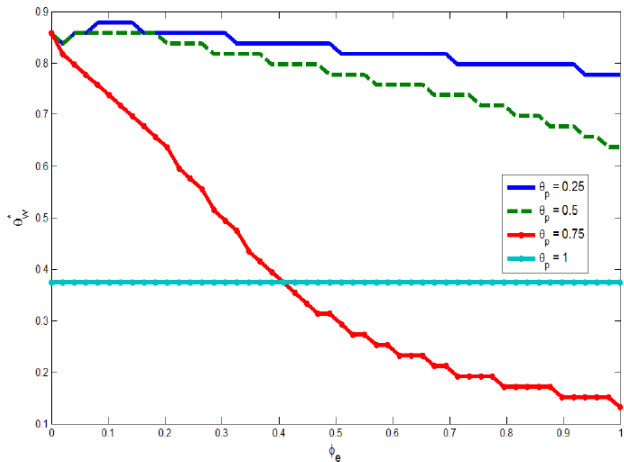

(a) Demand shocks

Medium-scale DSGE Model

Empirically realistic model

- Endogenous capital accumulation + adjustment costs
- Habit persistence in consumption
- Price and wage indexation
- Imperfect exchange rate pass-through (sticky import prices + distribution costs)
- Several shocks: demand, technology, export demand, world interest rate (volatility and persistence calibrated from data).
- Calibration mostly based on NAWM '08

Currency area. DSGE Model. Calibrated Shocks
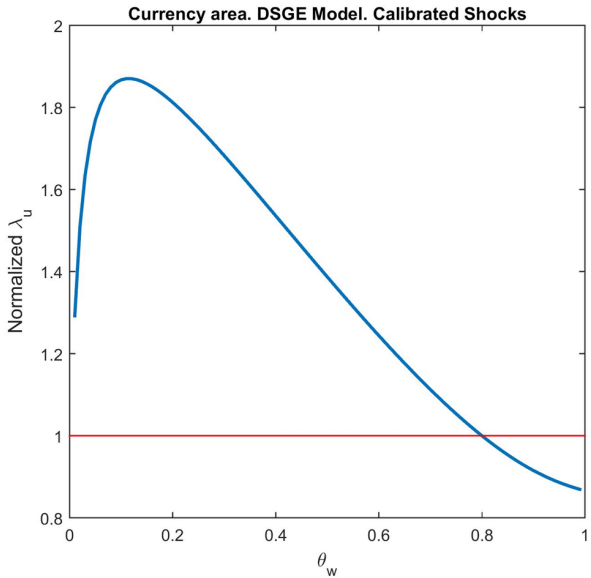
Currency area. DSGE model. All shocks
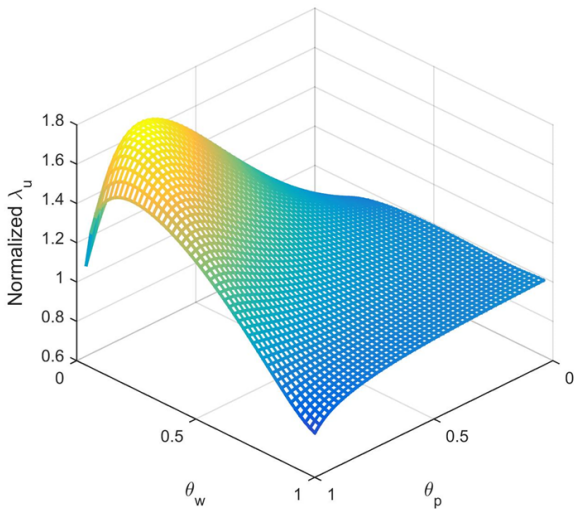
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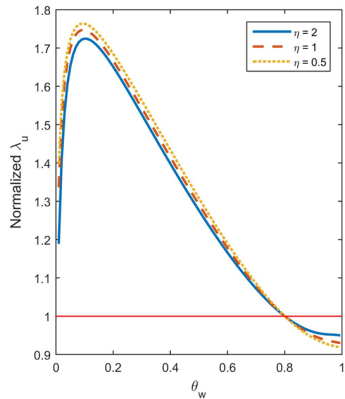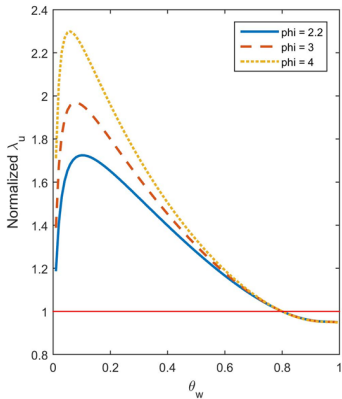
Conclusions

- Benefits of higher **wage flexibility** depend on the **monetary policy** regime in place
- **Supply** side reforms might be welfare **detrimental** if not accompanied by expansions in AD
- Relevance in the EA response to persistent crisis in Europe