LATVIJAS BANKA
EIROSISTĒMA

Wage formation, unemployment and business cycle in Latvia

Ginters Buss
(Latvijas Banka)

Full paper at Ginters Buss @ IDEAS

1. Taylor or Calvo-type wage frictions **unsuitable** for Latvia

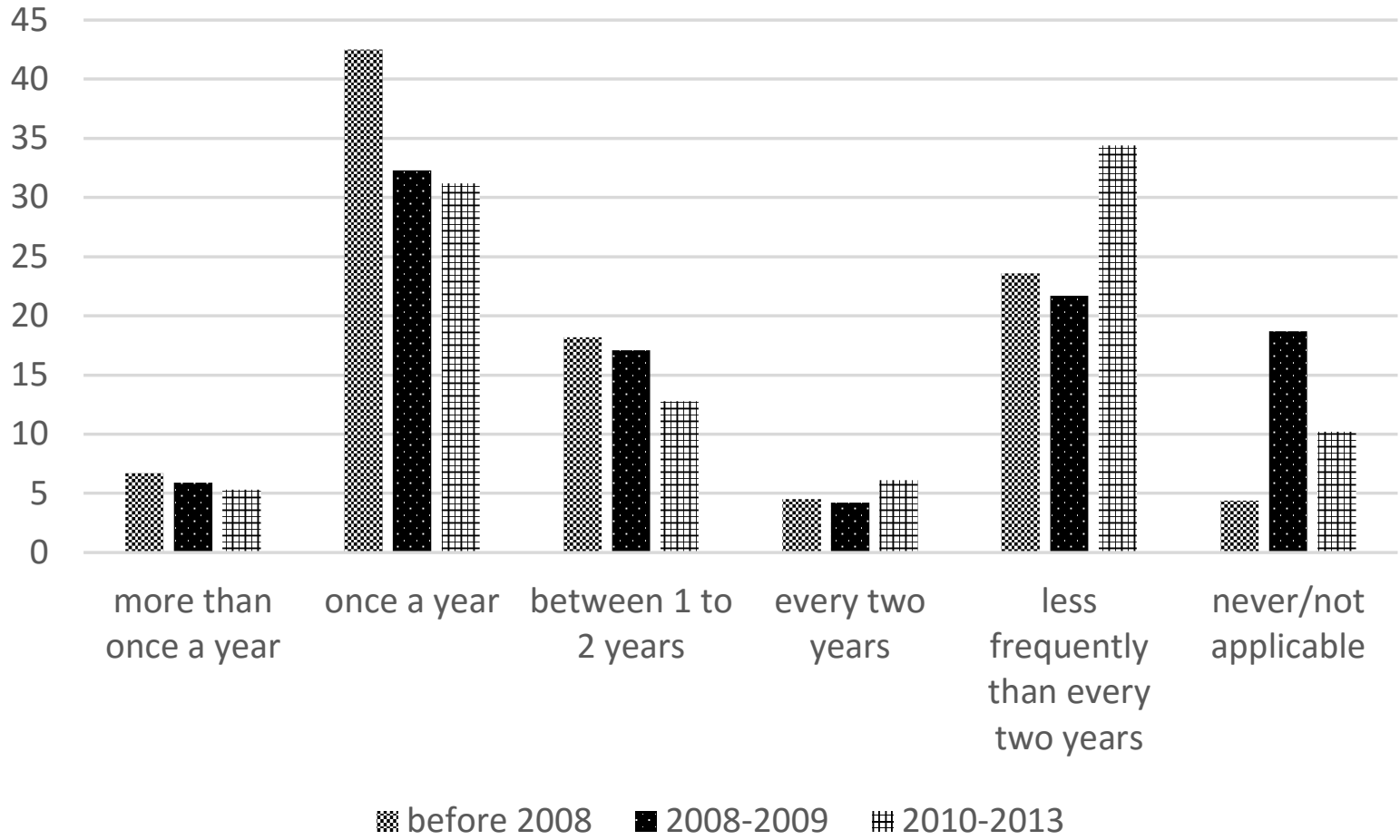


Figure: Frequency of base wage change in Latvia (%)

Source: Fadejeva and Krasnopjorovs (2015).

2. Thus try & compare alternative wage formations

- **alternating-offer bargaining (AOB) without exogenous wage rigidity** (CET, 2016 Econometrica; Hall & Milgrom 2008 AER)
- Nash bargaining with Taylor-type frictions (Buss, 2015; CTW)
- Nash bargaining without exogenous wage rigidity
- reduced-form bargaining rule
- simple, reduced-form wage rule

in a full-sized, estimated open economy New-Keynesian model with financial accelerator as in Buss (2015,2016) & CTW.

Nash bargaining threat: discontinue firm-worker relationship
AOB bargaining threat: prolong bargaining process
$\Rightarrow$ **weaker relation b/w wages & outside option**

3. AOB vs Nash bargaining sharing rules

Sharing rule:

$$J_t = \begin{cases} \beta_1(V_t - U_t) - \beta_2\gamma_{b,t} + \beta_3(\vartheta_t - b_t^u), \text{ for } \textbf{AOB} \\ \frac{1-\eta}{\eta}(V_t - U_t), \text{ for } \textbf{Nash} \end{cases}$$

J_t - firm surplus from having a worker
V_t - worker surplus from having a job
U_t - worker value of unemployment
ϑ_t - real price of intermediate good
b_t^u - unemployment benefit
$\beta_1, \beta_2, \beta_3$ - restricted functions of δ_b, M
M - # bargaining subperiods (even)
δ_b - prob of break-up
γ_b - cost of counter-offer for a firm
η - worker bargaining power (Nash)

4. Reduced-form specifications

Reduced-form sharing rule

$$J_t = \epsilon_1(V_t - U_t) - \epsilon_2 + \epsilon_3(\vartheta_t - b_t^u),$$

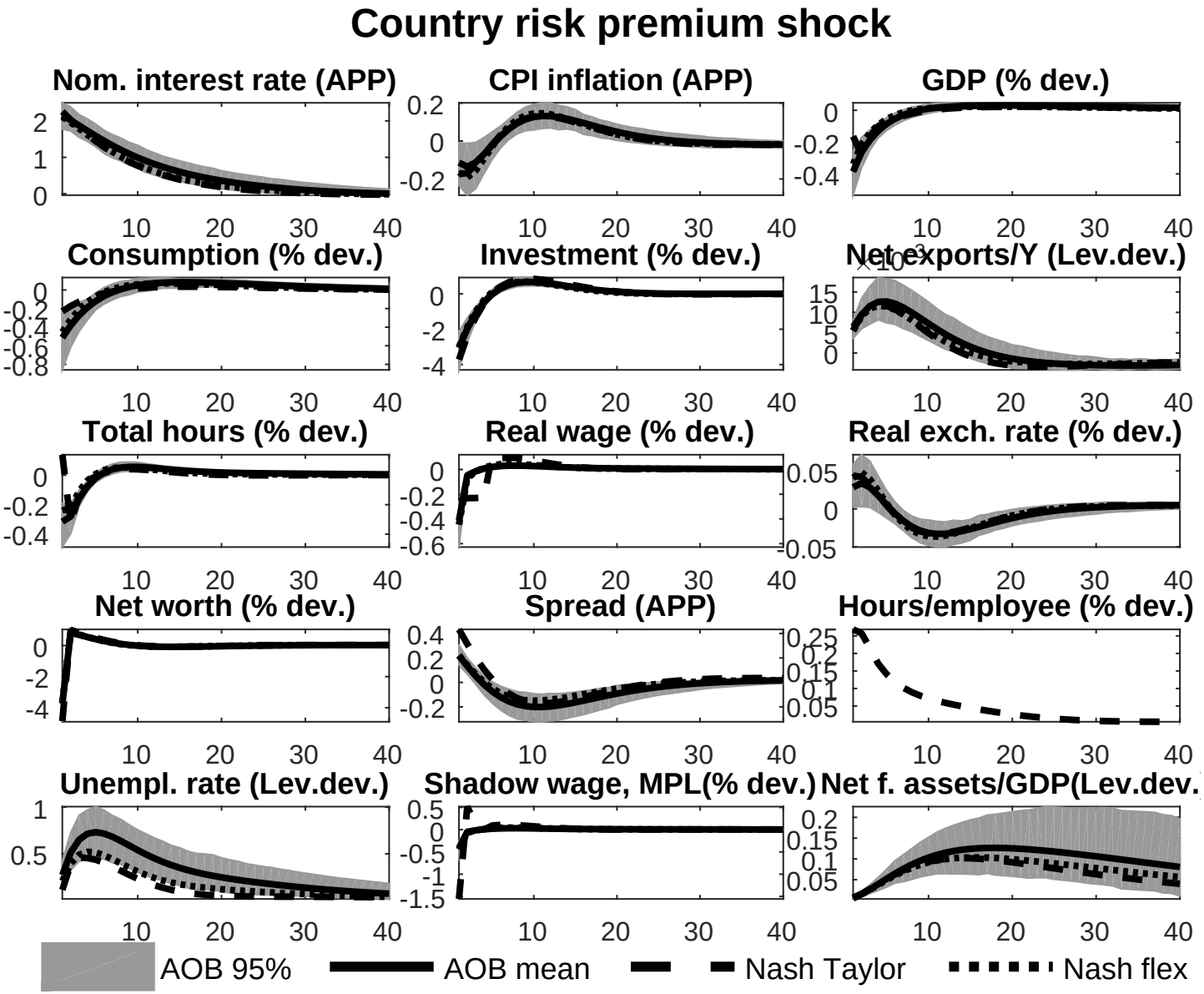
ϵ-s unrestricted.
Nests AOB and Nash sharing rules as special cases.
AOB: $\epsilon_1 = \beta_1$, $\epsilon_2 = \beta_2\gamma_b$, $\epsilon_3 = \beta_3$.
Nash: $\epsilon_1 = (1-\eta)/\eta$, $\epsilon_2 = \epsilon_3 = 0$.

Simple, reduced-form wage rule

$$\ln(\bar{w}_t/\bar{w}) = \iota_1 \ln(\bar{w}_{t-1}/\bar{w}) + \iota_2 \ln(L_{t-1}/L) + \iota_3 \ln(\mu_{z,t}/\mu_z) + \iota_4 \ln \epsilon_t.$$

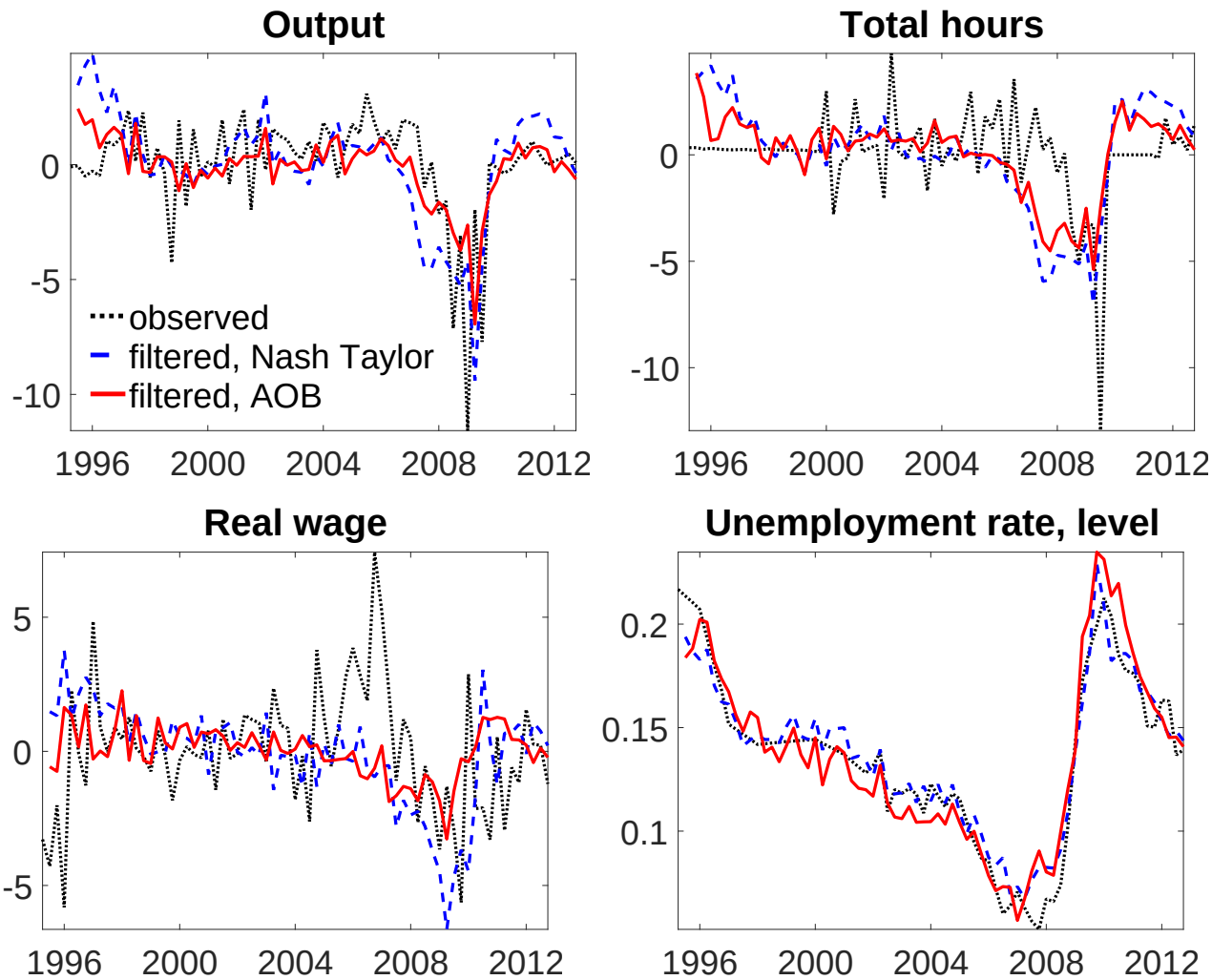
$\bar{w}_t$ - real wage scaled by unit-root technology trend
L_{t-1} - employment in t-1
$\mu_{z,t}$ - unit-root neutral technology growth
ϵ_t - stationary neutral technology growth
$\iota_1, \iota_2, \iota_3, \iota_4$ - free parameters to be estimated.

5. Impulse responses AOB vs Nash



6. 1-quarter ahead forecasts AOB vs Nash-Taylor

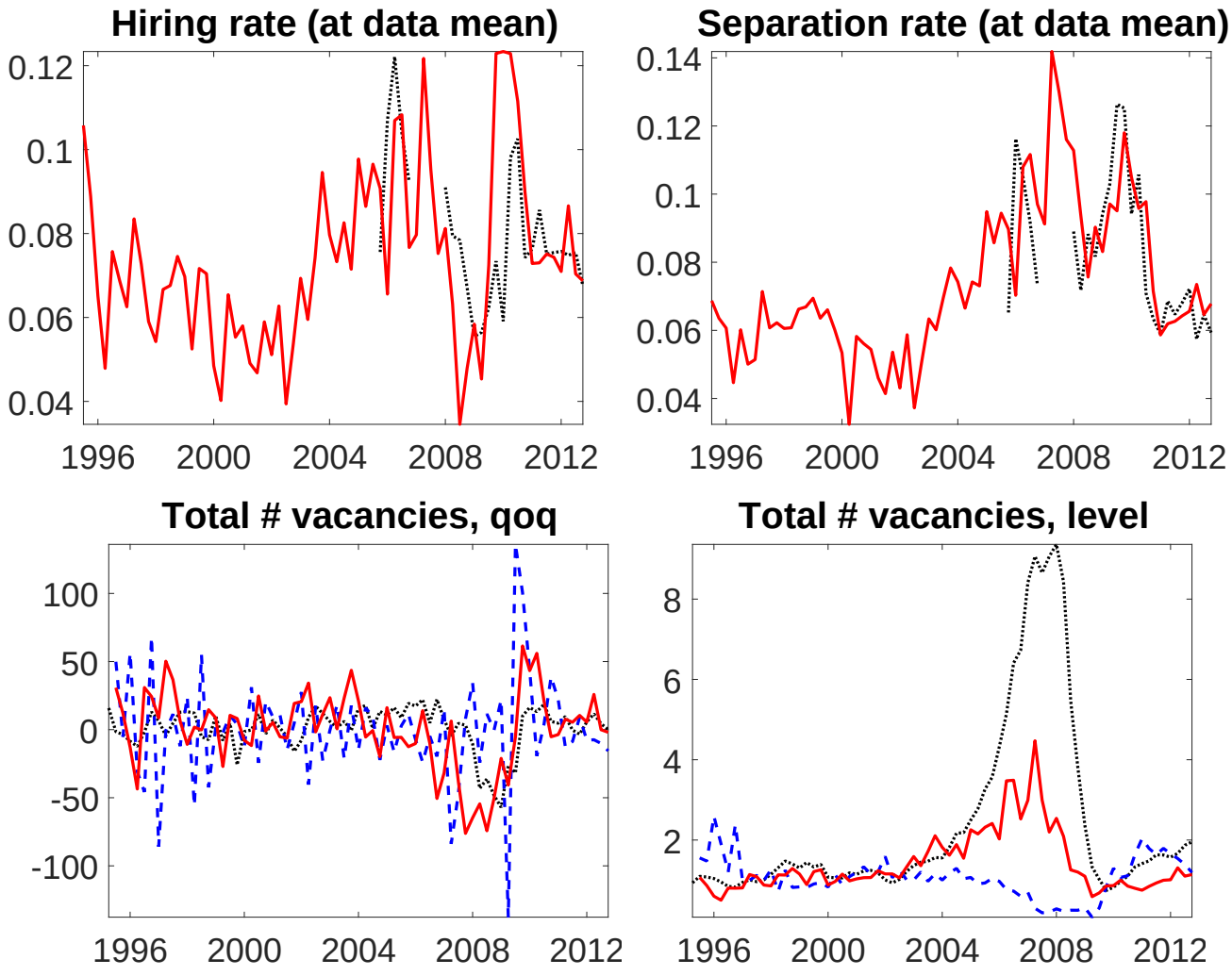
AOB: **no excess volatility in wage** forecasts
despite the absence of exogenous wage rigidity



7. 1-quarter ahead forecasts AOB vs Nash-Taylor

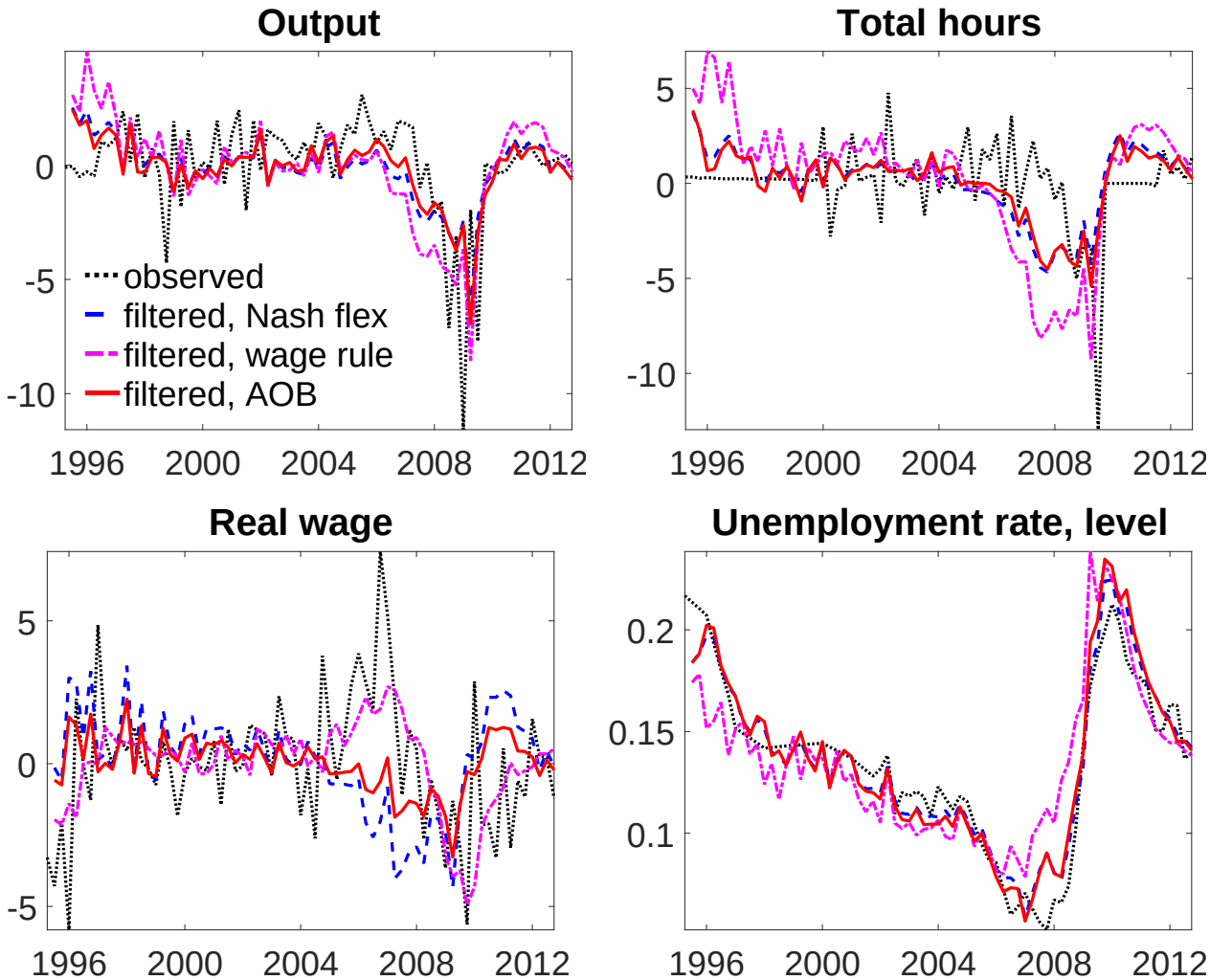
Nash-Taylor w/o labor supply shock struggles to forecast vacancies

note: AOB has no labor supply shock either



8. 1-quarter ahead forecasts, alternatives

alternative specifications; **AOB the best**
(reduced-form sharing rule in b/w AOB & Nash-flex)



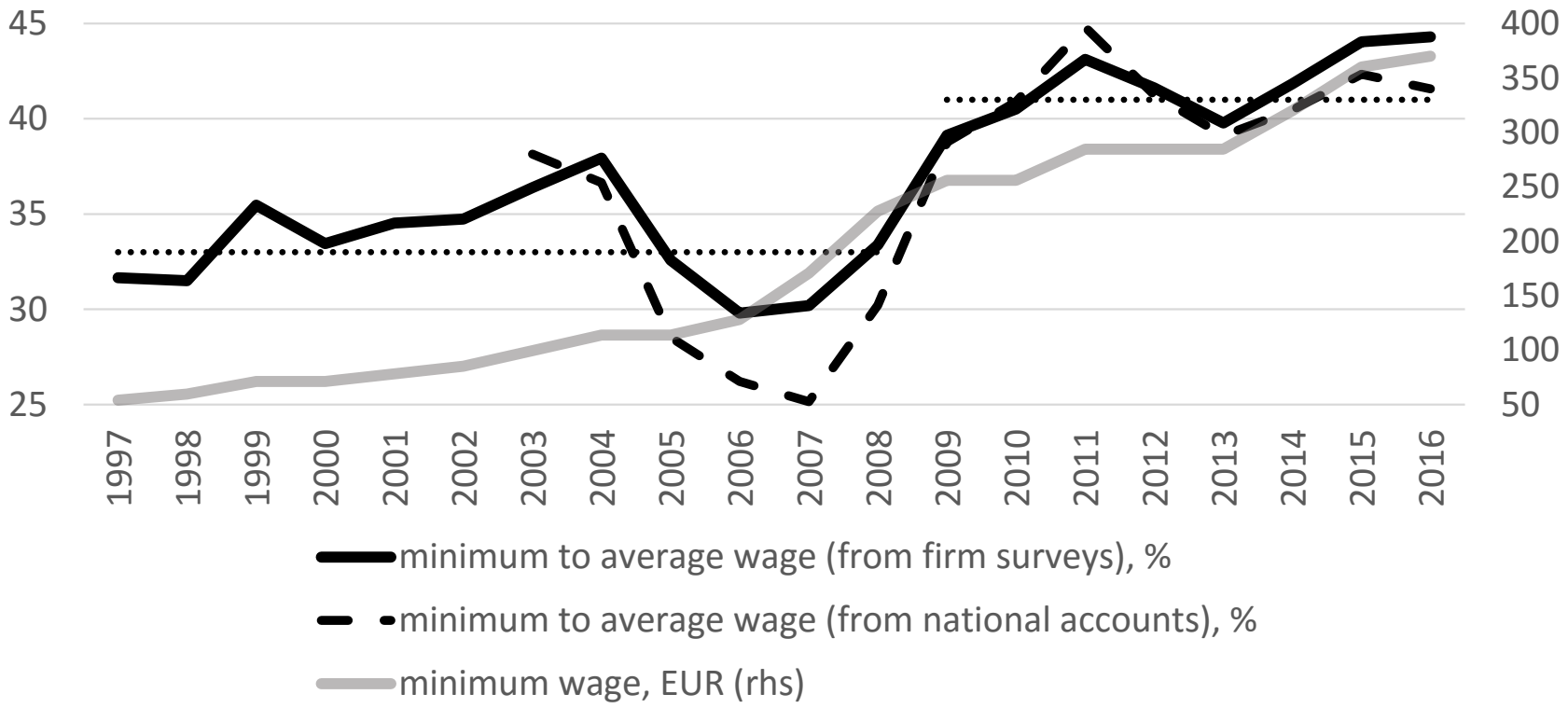
9. 1-12q forecasting performance w.r.t. RW

better if < 1; **AOB among the best**

Model	Distance measure	1Q CPI	1Q GDP	4Q CPI	4Q GDP	8Q CPI	8Q GDP	12Q CPI	12Q GDP
AOB	RMSE	1.28	0.77	0.75	0.79	0.56	0.67	0.60	0.64
	DM p-val	0.946	0.020	0.120	0.115	0.081	0.080	0.071	0.093
	MAE	1.45	0.85	0.84	0.77	0.61	0.61	0.61	0.61
	DM p-val	0.997	0.074	0.209	0.078	0.090	0.072	0.067	0.111
Nash Taylor	RMSE	1.13	0.90	0.69	0.76	0.54	0.66	0.58	0.64
	MAE	1.24	1.07	0.72	0.75	0.55	0.60	0.58	0.59
Wage rule	RMSE	1.31	0.93	0.78	0.82	0.60	0.71	0.63	0.66
	MAE	1.49	1.14	0.89	0.83	0.67	0.67	0.66	0.63
SVAR	RMSE	0.95	0.72	0.68	0.80	0.59	0.68	0.55	0.66
	MAE	1.03	0.72	0.67	0.76	0.59	0.62	0.47	0.61
		real wage forecasts							
AOB vs Nash flex wage	RMSE	0.82		0.99		1.00		1.00	
	MAE	0.82		0.99		1.00		1.00	

10. Simulation: min wage ↑ in Latvia

$\frac{Minimum}{average}$ wage in LV ↑ from ∼33%(1997-2008) to $>$ 40%
looks like a permanent **level shift** (1997-2008) vs (2009-2016)



Source: Central statistical bureau of Latvia, likumi.lv and author's calculations

11. Simulation: min wage ↑ in Latvia (2)

(Affected) firm share that considers a particular cost-correction action (due to min wage ↑) was important (2010-2015):

action	BG	EE	HU	LT	LV	RO	SI	total
fire	20.8	5.8	15.7	3.9	15.7	25.2	2.7	15.0
↓ **hiring**	-	6.6	42.6	13.5	20.4	39.4	8.5	28.5
↑ **product prices**	37.5	22.3	50.2	20.6	36.9	52.3	5.1	37.2
↓ **other costs**	7.2	19.1	47.1	28.6	39.7	59.8	24.2	40.1
↑ **wages for others**	37.5	18.1	-	23.7	38.4	23.9	7.8	22.1
↑ **productivity**	26.7	18.3	52.6	39.1	36.1	-	-	41.2

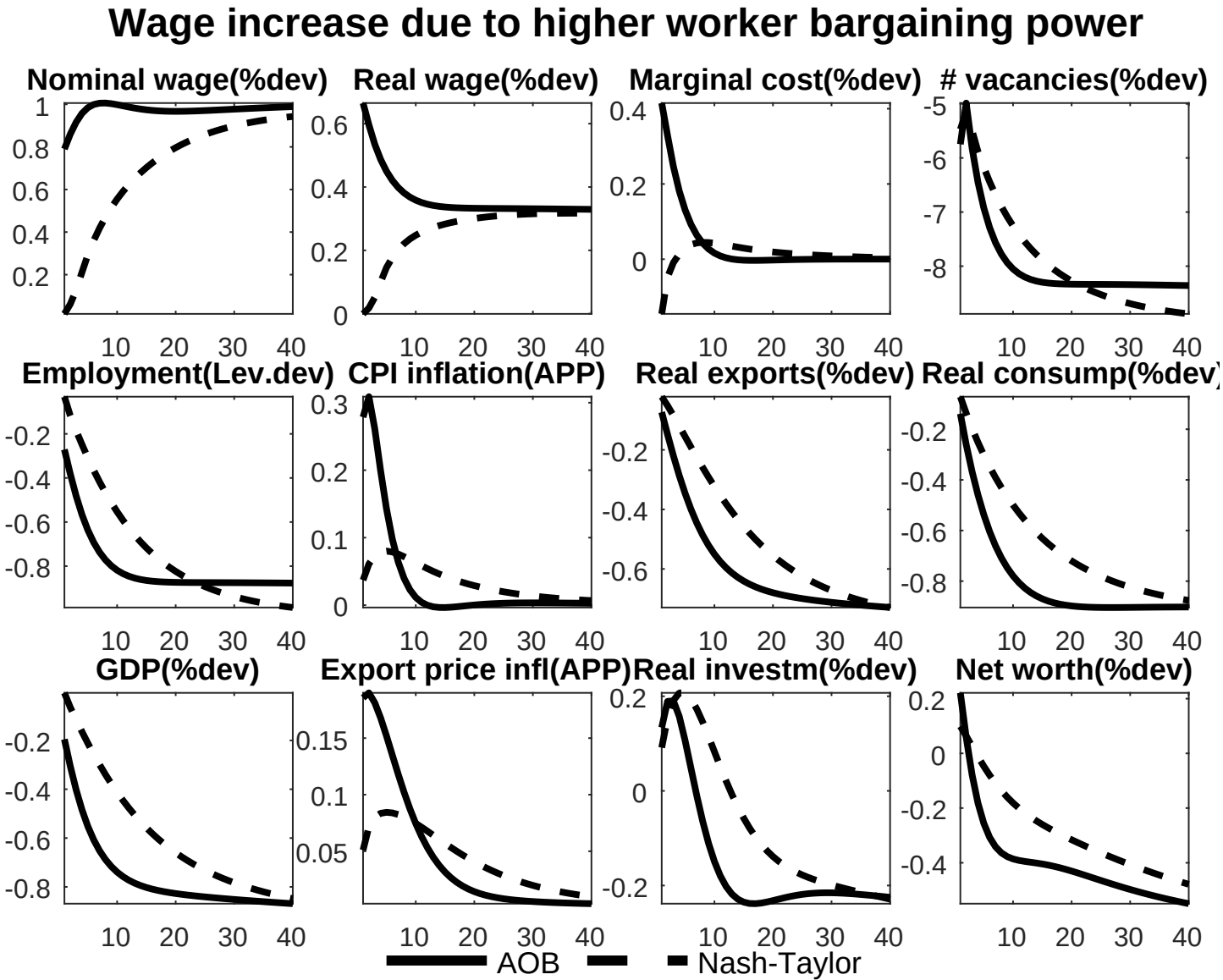
Source: ESCB Wage Dynamic Network

Simulation strategy:

There is no min wage nor wage distribution in the model but **permanently ↑ worker bargaining power** s.t. firms ↑ wages

12. Simulation: min wage ↑ in Latvia (3)

3 endog re-actions: ↑ price, ↓ hiring, factor substitution
potentially **high long-term losses** in employment & output



13. Conclusion

AOB is a **decent alternative** to Nash bargaining:

- can live **w/o exogenous wage rigidity**
- otherwise similar behavior

Simulation of **permanent min wage** $\uparrow$ (relative to average):

- approximate by **permanently** $\uparrow$ **worker barg.power**
  - that induces firms $\uparrow$ wages
- identifies **3 endogenous re-actions** ($\uparrow$ price, $\downarrow$ hiring, factor substitution) supported by surveys
- potentially **high long-term losses** in employment & output (about -3% for Latvia (1997-2008) vs (2009-2016))