Modelling Public Sector Wage-Employment Behaviour: Evidence from Transitioning Economies

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Motivation: Theoretical framework & stylised facts

- Public sector a dominant employer in pre-transition economies – dominance declining during transition
- Evidence of lower pay inequality in the public than in the private sector
- Evidence of growing inequality during transition
- The standard interpretation is a ‘solidaristic’ pay policy that is eroded by private sector

Public sector dominated employment pre-transition

Table 1: Public sector employment as a proportion of the labour force, 1988 (percent)

Country	Share
EE average	90.0
Czechoslovakia	98.8
U.S.S.R.	96.3
Romania	95.2
German Democratic Republic	94.7
Hungary	93.9
Bulgaria	91.5
Yugoslavia	78.9
Poland	70.4
OECD average	21.2

Wage inequality lower pre-transition; grew more rapidly in transition

Table 2: Wage inequality in the advanced OECD countries, 1979–1990 and in the EE countries, 1988-1995: Log 90/10 wage differential

OECD	1979	1984	1987	1990	(1990)-(1979) change	Five year change [a]
			Males			
United States	1.23	1.36	1.38	1.40	0.17	0.077
United Kingdom	0.88	1.04	1.10	1.16	0.28	0.121
France	1.19	1.18	1.22	1.23	0.04	0.018
Japan	0.95	1.02	1.01	1.04	0.09	0.041
			Females			
United States	0.96	1.16	1.23	1.27	0.31	0.141
United Kingdom	0.84	0.98	1.02	1.11	0.27	0.123
France	0.96	0.93	1.00	1.02	0.06	0.027
Japan	0.78	0.79	0.84	0.83	0.05	0.023
EE	1988	1989	1993	1994	1995	Five year change [a]
			All			
Czech Republic	...	0.88	1.16	...	1.31	0.358
Hungary	1.14	...	1.30	1.33	...	0.158
Poland	0.96	...	1.11	...	1.22	0.186
Romania	...	0.67	1.02	...	1.12	0.375

Returns to education lower pre-transition; grew faster in transition

Table 3: Changes in educational differentials in the advanced OECD countries and in the EE countries

OECD	Educational group ratio	Initial year	Ratio value	Second year	Ratio value	Five years change [a]
United States	College/ High school	1979	1.37	1987	1.52	0.11
United Kingdom	College/No qualification	1980	1.53	1988	1.65	0.08
France	Males: Nonmanual/Manual [b]	1976	1.58	1987	1.53	-0.03
	Females: Nonmanual/Manual [b]	1976	1.38	1987	1.35	-0.01
Japan	College/Upper high school	1979	1.26	1987	1.26	0.00
Canada	University/High school	1980	1.4	1985	1.43	0.03
West Germany	(14-18)/(11-13) years	1981	1.36	1983	1.42	0.10
Sweden	University/Post Secondary	1981	1.16	1986	1.19	0.03
Netherlands	University/Secondary	1983	1.43	1987	1.23	-0.25
EE						
Czech Republic	Higher education/Secondary	1988	1.29	1992	1.41	0.15
Hungary	Higher education/Secondary	1989	1.44	1994	1.47	0.03
	Higher education/Vocat.training sch.	1989	1.56	1994	1.86	0.30
Poland	Higher education/Vocational secondary	1988	1.23	1993	1.39	0.16

Table 4: Gini coefficients for income inequality by ownership type

Country		1987 Gini	1992 Gini	1995 Gini
Poland	All	0.23	0.25	0.29
	Public	0.23	0.24	0.27
	Private		0.29	0.33
Hungary	All	0.27	0.30	0.32
	Public Men		0.27	0.32
	Private Men		0.31	0.33
	Public Women		0.26	0.28
	Private Women		0.30	0.31

Study	Country	Data	Period	Method	Pay Gap %
Depalo et al (2011)	Italy	SHIW	1998-2008	QR	men: 10 at lower end, 6 at median, 0 at the higher end.
Disney et al (2003)	UK	BHPS	1991-1999	OLS FE	5 men; 17.2 women 0 men; 9.2 women
Lucifora et al (2006)	France Italy UK	LFS SHIW LFS	1998	Decompos	men (women):10th;50th;90th F: 9(11);2.4(8.4);-5.5(3.4) I: 8(8); 2(5); -2(1.3) UK:13.7(16.3);7.3(8.3);0(0)
Machado et al (2001)	Portugal	QP	1982, 1994	QR	17.4 at 10th; -6.8 at 90th 11.8 at 10th; -1.6 at 90th
Melly (2005)	Germany	SOEP	1984-2001	Decompos	men (women): 5 (29.6) at 10th and -17.4 (-7) at 90th
Monaster. et al (2011)	Greece	SES	2005	OLS QR	14.2 12.9 at 10th; 3.5 at 90th
Albrecht et al (2003)	Sweden	LINDA	1998	OLS QR	-9.5 men; -2.9 women men (women):10th;50th;90th -0.9(3.7); -8(-2); -15.5(-10)

Adamchik et al (2000)	Poland	LFS	1996	IV	-7(-10) men (women)
Newell (2001)	Poland	LFS	1994; 1998	OLS	-12.9; -8.5 all workers
Brainerd (2002)	Russia	CPOR	1993; 1998	OLS	-27; -16.5 all workers
Jovanovic et al (2003)	Yugoslavia	LFS	2000	IV	-9.4(-4) men (women)
Jovanovic et al (2004)	Moscow		1997	IV	-14.3(-18.3) men (women)
Leping (2006)	Estonia	LFS	1989 2004	QR	-23;-31.2;-76.8 0;-2.8;-11.4 all 10^{th}; 50^{th}; 90^{th}
Peter et al (2007)	Ukraine	LMS	1997-2003	OLS FE	-20.5(-30.9) -22.6(-20.4) men (women)
Hamori (2007)	Hungary	WS	1994; 2003	QR	LS 1, -4; 11, -20 HS -30, -42,12, -48 men 10^{th}, 90^{th}
Lausev (2010)	Serbia	LFS	1995-2003 2004-2008	Decomp	-7.8(-4.3); -15(-19) 17(12.2);0(-5.9) men (women)

The model in the paper predicts:

- A public sector pay ‘penalty’ relative to competitive market at the start of transition
- More compressed pay in the public monopsony case than in the competitive market
- Increase in the wage inequality as a result of decline in the public sector monopsony power
- Increase in returns to education

Theoretical background

- Static models of monopsony, especially in public sector (but typically consider only one kind of labour).

- Mortensen (1990) and Burdett and Mortensen (1998), Mortensen (2003) and Manning (2003):
  - imperfect competition is a necessary explanation for the dispersion of pay

- Burdett (2012): cost minimising government offers a single wage after it has chosen to employ a given number of workers in a steady-state.

A Model of Public Sector Monopsony

- Non-profit:
  - Employs two kinds of labour: E_s E_u
  - Hires subject to Budget constraint:

$$\max_{E_s E_u} f(E_s, E_u)$$

s.t. $\overline{wE} = w_s E_s + w_u E_u$

- Upward sloping labour supply curve:

$$\varepsilon_{Ew} = wE'(w)/E(w) \geq 0 \qquad \frac{Y' - w}{w} = \frac{1}{\varepsilon_{Ew}} > 0$$

Model: Public Sector Monopsony continued

Cobb Douglas production function: $Y = f(E_s, E_u)$

$$Y = E_s^{\alpha} E_u^{1-\alpha} \qquad 0 < \alpha < 1$$

$$\alpha = \frac{\partial Y}{\partial E_s}\frac{E_s}{Y} \qquad \alpha = \frac{w_s E_s}{w_s E_s + w_u E_u} = \frac{w_s E_s}{\overline{wE}}$$

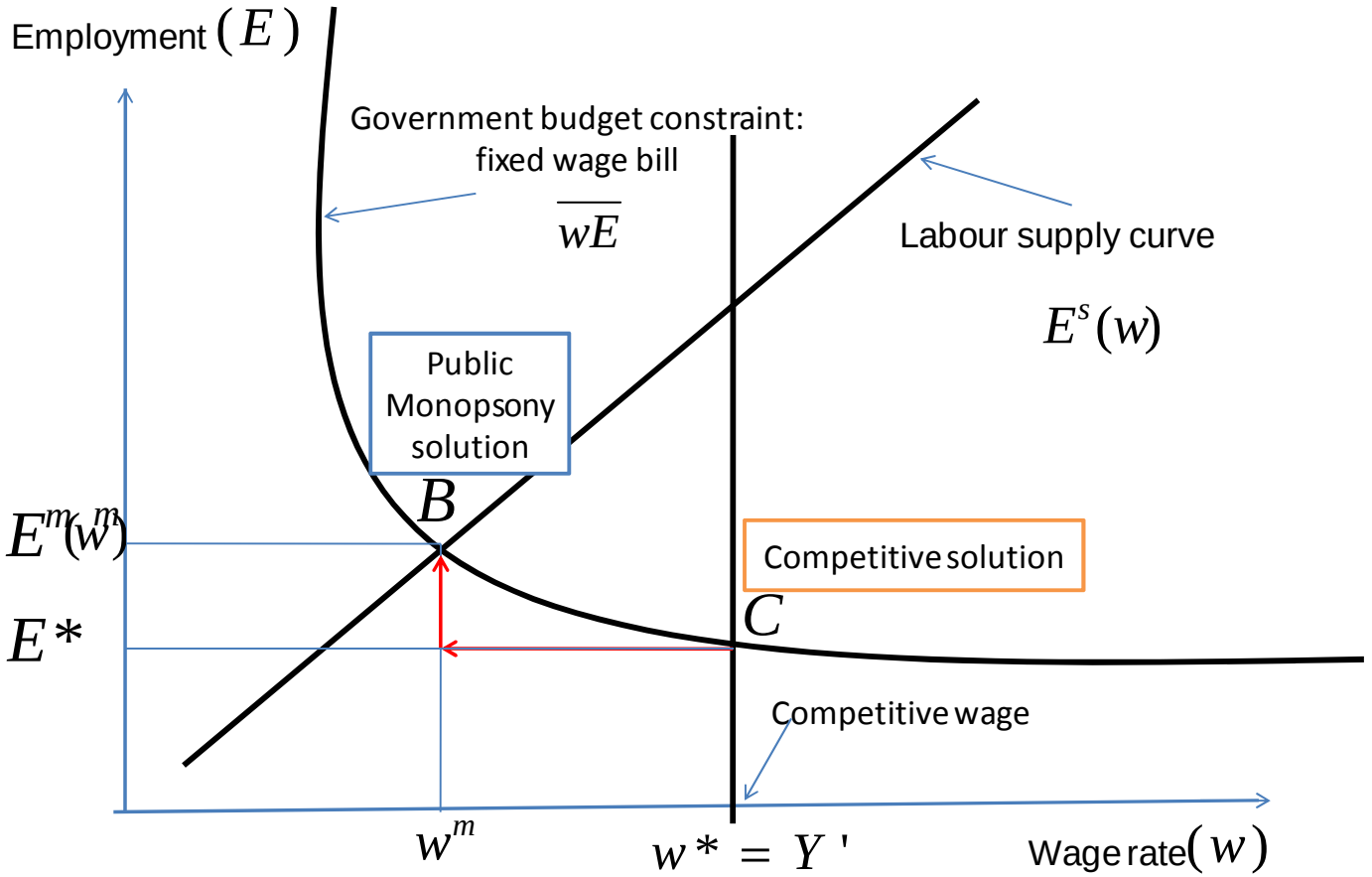
The elasticity of substitution between E_s and E_u

$$\sigma = \frac{d\ln(\frac{E_s}{E_u})}{d\ln(\frac{w_u}{w_s})} = \frac{d\ln e}{d\ln\frac{1}{\omega}} = 1 \qquad \frac{w_s}{w_u} = \omega \qquad \frac{E_s}{E_u} = e$$

the slope of demand function with unit elasticity:

$$\frac{de}{e} = -\frac{d\omega}{\omega}$$

Diagrammatic illustration for one type of labour



Solutions

- Two solutions
  - Competitive Solution: $\varepsilon_{Ew} \to \infty$
    - Hence:

$$\frac{Y' - w}{w} = \frac{1}{\varepsilon_{Ew}} = 0 \qquad \gamma = \frac{w_s}{w_u} = \frac{\alpha}{1-\alpha}\frac{E_u}{E_s} = \frac{Y'_s}{Y'_u}$$

  - Monopsony Solution: $\varepsilon_{Ew} < \infty$
    - Hence:

$$\frac{Y' - w}{w} = \frac{1}{\varepsilon_{Ew}} > 0 \qquad \omega = \frac{w_s}{w_u} = \frac{\alpha}{1-\alpha}\frac{E_u}{E_s}\frac{\frac{1+\varepsilon_u}{\varepsilon_u}}{\frac{1+\varepsilon_s}{\varepsilon_s}} = \frac{\alpha}{1-\alpha}\frac{E_u^m}{E_s^m}$$

Competitive versus Monopsony Solutions

- Because the monopsony implies that

$$0<\theta_s=\frac{\varepsilon_s}{1+\varepsilon_s}<1 \quad \text{and} \quad 0<\theta_u=\frac{\varepsilon_u}{1+\varepsilon_u}<1$$

and because $\varepsilon_s<\varepsilon_u \Rightarrow \theta_s<\theta_u$:

  - The wage ratio is lower (more compressed) in the public monopsony case than in the competitive market i.e. $\omega<\gamma$
  - The employment ratio is greater in the public monopsony case than in the competitive market i.e. $e^m>e$

Economic Transition

- From: $\frac{\omega}{\gamma} = \frac{e}{e^m} = \frac{\theta_s}{\theta_u}$ and $\gamma e = \omega e^m = \frac{\alpha}{1-\alpha}$

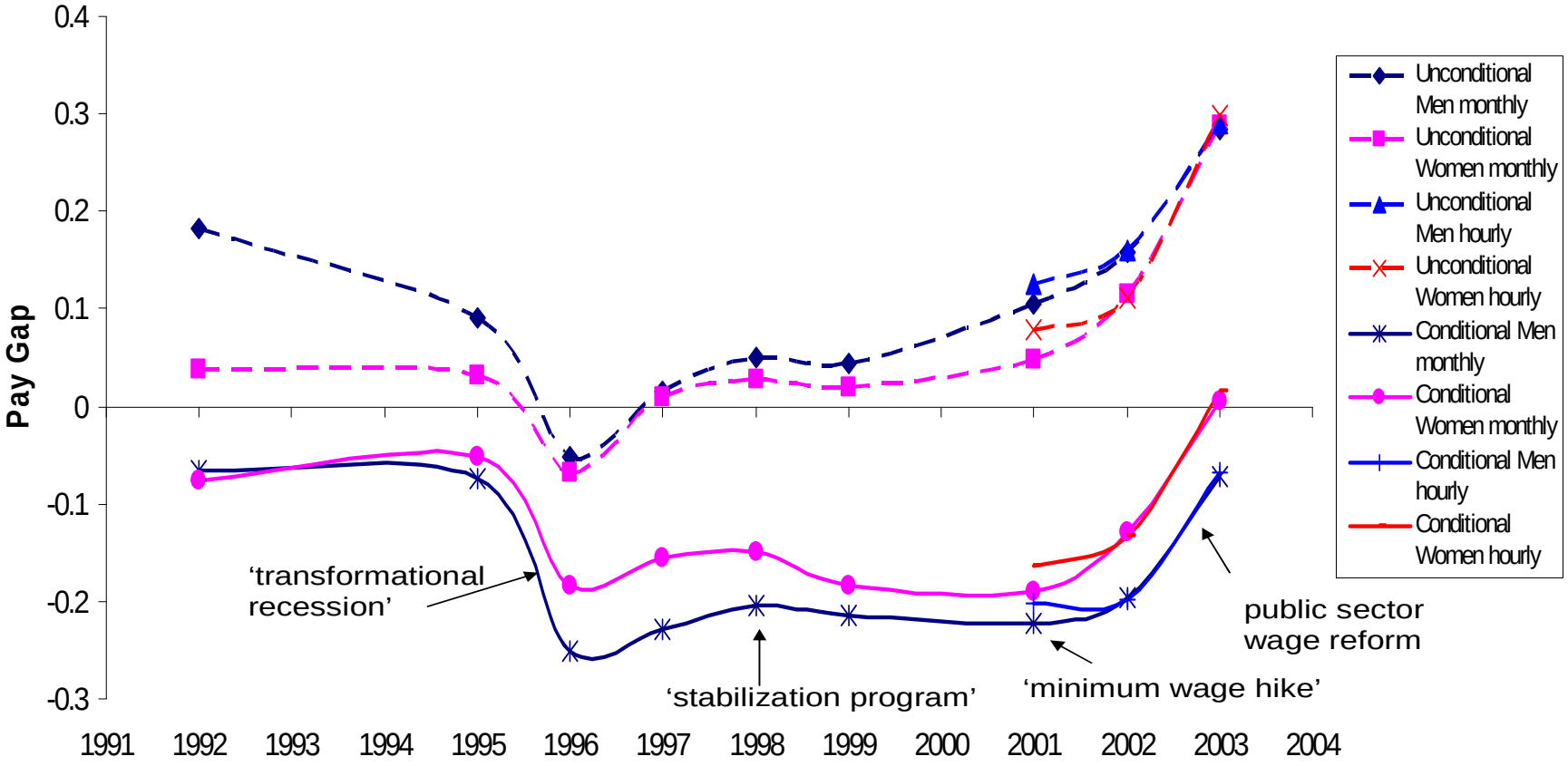
Transition means a decline in the relative public sector monopsony power: $\frac{\theta_s}{\theta_u} \rightarrow 1$

- This implies:
  - a decline in e^m towards e
  - an increase in ω towards γ

Empirical studies of labour supply elasticity:

- Based on recruitment and separation rates:
  - Card and Krueger (1995); Manning (2003); Van Der Berg and Ridder (1993): $\varepsilon \approx 5 - 7$ (all workers)
- Individual case studies:
  - Sullivan (1989): (skilled workers)
    - Short-run: $\varepsilon_s = 1.26$
    - Long-run: $\varepsilon_s = 3.86$
  - JOLE (2010) (skilled workers)
    - Staiger, Spetz and Phibbs: $\varepsilon_s = 0.1$
    - Ransom and Sims: $\varepsilon_s = 3.7$
    - Falch: $\varepsilon_s = 1.4$
  - Boal (1995): (unskilled workers)
    - Short-run: $\varepsilon_u = 11$
    - Long-run: $\varepsilon_u = 30$
  - Other: Disney (2011); Elliott et al (2007)

Public sector pay relative to private sector pay in Hungary: unconditional and conditional differences in real gross earnings by gender in period 1992-2003



OLS and quantile regression estimates of public sector gross monthly pay premia and penalties, by highest educational qualification for male employees in Hungary

	Unskilled			Skilled			High-skilled		
	1992-1999 (1)	2001-2003 (2)	Change (1)-(2)	1992-1999 (1)	2001-2003 (2)	Change (1)-(2)	1992-1999 (1)	2001-2003 (2)	Change (1)-(2)
Mean	-0.146***	-0.059***	*-0.087*	-0.167***	-0.100***	*-0.067*	-0.338***	-0.293***	*-0.045*
	(0.001)	(0.001)		(0.001)	(0.001)		(0.001)	(0.002)	
10th	0.025***	0.064***	*-0.039*	0.025***	0.073***	*-0.048*	-0.014***	0.152***	*-0.166*
	(0.001)	(0.001)		(0.001)	(0.001)		(0.001)	(0.002)	
25th	-0.089***	0.028***	*-0.061*	-0.123***	-0.012***	*-0.111*	-0.209***	-0.149***	*-0.060*
	(0.001)	(0.002)		(0.001)	(0.001)		(0.001)	(0.001)	
50th	-0.169***	-0.061***	*-0.108*	-0.228***	-0.107***	*-0.121*	-0.372***	-0.362***	*-0.010*
	(0.001)	(0.001)		(0.001)	(0.001)		(0.001)	(0.002)	
75th	-0.235***	-0.132***	*-0.103*	-0.254***	-0.215***	*-0.039*	-0.533***	-0.500***	*-0.033*
	(0.001)	(0.002)		(0.001)	(0.002)		(0.001)	(0.001)	
90th	-0.277***	-0.165***	*-0.112*	-0.265***	-0.269***	*0.004*	-0.614***	-0.605***	*-0.009*
	(0.001)	(0.003)		(0.001)	(0.002)		(0.001)	(0.001)	

Could other models explain the same phenomena?

- Solidarity model
  - wages of skilled and unskilled workers are compressed because of egalitarian concerns
- Bureaucratic model
  - but incremental pay structure does not have the same predictions
- SBTC

Thank You

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