

2.2 Wage spillovers between the public and corporate sectors

ÁLMOS TELEGDY

The aim of this section is to analyse the effect of public sector wages on corporate compensation. This indirect effect of the State's activity on labor markets has largely been neglected from research on wage spillovers over recent decades although the interaction of public and corporate wages is an important ingredient to wage setting policies.¹ If public and corporate workers compete on the same labor market, corporate employees may consider the public sector as an alternative to their current employment. If total compensation, including the net value of amenities and disamenities derived from various job attributes, is high in the public sector, private employers may face difficulties in the hiring process or have to cope with large quit rates among incumbent employees. To prevent such mechanisms taking place, they have to increase wages to keep a high-quality workforce and to prevent their current employees moving to the public sector.

May spillovers between public and corporate wages exist, their estimation is not straightforward, to say the least. Public and corporate labor markets are distinctly different in all countries. Public sector employees work fewer hours, enjoy longer paid vacations, have more secure jobs and the required effort, worker motivation and job satisfaction may also differ across the two sectors (*Delfgaauw and Dur, 2008; Heywood et al., 2002*). Workers therefore self-select themselves into one or the other sector based not only on observable, but also on unobservable characteristics such as their innate ability, risk aversion, willingness to work hard in exchange for higher wages and faster promotions and so on (*Roy, 1951*). Another problem contaminating the measurement of wage differentials of private and public sector employees is that public sector workers typically cluster in a few industries – predominantly in state administration, health care and education – where the share of corporations is small or non-existent. This makes it impossible to control for industry wage effects, which may be sizable (*Krueger and Summers, 1988*). Any of the factors discussed above may create co-movements of the wage levels in the two sectors; to identify a causal relationship, an exogenous variation of public sector wages is necessary.

The Hungarian institutional context is particularly useful in analysing public wage spillovers as it provides the exogenous variation of public wages which permits overcoming many of the identification problems discussed above and the interaction of public and corporate wages can be measured more accurately than is usually possible. The Hungarian government executed a large wage increase in 2001 and 2002 and thus created the conditions to establish

1 A thorough search of the literature resulted in only a few papers analysing public wage spillovers: for example, *Jacobsen (1992)* studies this question in the United States and *Lacroix and Dussault (1984)* in Canada.

the effect of public wages on corporate compensation. The large and rapid increase of public sector wages provides a unique opportunity to identify wage spillovers as the exogenous wage increase breaks co-movements between public and private sector wages. The sector-specific differences discussed above, which may bias the estimation, do not present a problem here as it is unlikely that the composition of workers, job attributes or industrial wage differentials changed considerably in such a short period of time.²

Data description

The dataset used in this study is the Hungarian Wage Tariff Survey Data, hosted by the National Employment Office. It provides yearly information on workers' year of birth, gender, highest level of education, occupation, earnings, tenure and type of contract (corporate and two types of public sector labor relation, as discussed below). These data are recorded for May of a given year. I use the years between 1998 and 2006 in this chapter as the public wage increase took place in the middle of this period.

I keep in the sample only full time employees between 18 and 60 years. The police, military, firemen and border guards are not included in the public sector data, and I excluded the legal professions as their employment relation is regulated by a special law and they were not subject to the wage increase. The final sample includes 379–487 thousand public sector employees and 106–153 thousand corporate workers. The comparison of the sample and the population data reveals that the sample of corporate and public sector employees is about 7–8 and 70 per cent, respectively.

Composition of employment and the evolution of wages in the public and corporate sectors

Composition of the public and corporate employment. Public and corporate employment differs in a wide variety of dimensions. The public sector is present in health care, education and public administration while the share of corporations in these economic sectors is minuscule. As presented in *Table 2.2.1*, the demographic attributes of employees are very different in the two sectors. Three-quarters of public sector workers are female which is almost twice as large a share as in corporations. Corporate employees' potential labor market experience is shorter by two years.³

Given the peculiar industrial structure of the public sector, it is not surprising that the occupational structure of employees is very divergent across the two sectors. Professionals and associate professionals are the most typical occupations in the public sector and 60 per cent of all employees belong to these categories. This is in sharp contrast with such occupations' share of 20 per cent in corporations. As expected, skilled workers are the most typical workers in the corporate sector as 46 per cent of all occupations are in

² Employers may raise wages even if actual mobility does not take place between the two sectors due to threat effects. See *Borjas et al. (1997)* on threat effects in the context of international trade and *Farber (2005)* on wage effects resulting from the threat of unionization.

³ Potential experience is computed as age – years of education – 6.

this category while such occupations' share is only 6 per cent in the public sphere. Managers are more prevalent in the corporate sector: their share is 9.5 per cent, 1.5 percentage points higher than this occupation in the public sector. Elementary occupations have a share of 14 per cent in the public sector, almost twice as high as in corporations.

Table 2.2.1: Composition of the workforce in the public and private sectors

	Public	Corporate
Gender (Female)	73.5	39.8
Labor market experience	23.8 (10.6)	22.0 (10.1)
Occupation		
Manager	8.0	9.5
Professional	30.6	4.9
Technician, associate professional	28.4	14.9
Clerk	6.4	6.7
Service	6.7	10.3
Skilled agricultural, craft industrial	6.0	45.7
Elementary	13.9	8.1
N	3,969,046	1,185,909

Notes: Pooled data. All variables are dummy variables, except average experience (in years, standard deviation in parentheses).

Public sector wage policies. The period between 1997 and 2006 is characterized by a steady growth of the Hungarian economy. Gross domestic product (GDP) grew each year between 3 and 5 per cent (Hungarian Statistical Office), and private wages followed this pattern, as we document below. Public sector wages, however, presented a more volatile behaviour which was probably rooted partly in the need to increase these relative to corporate wages and partly through political considerations.

Wages in the public sector are determined by a wage grid, which consists of a base wage and multipliers. Compensation may change either by raising the base wage (in this case the relative wages in the public sector are not affected) or the multipliers can be changed (which implies that relative wages within the public sector will vary).

During the period studied the multipliers concerning public servants' wages did not change so their relative wages were also stable, but the base wage was raised considerably. Most importantly, a large and universal wage increase raised each public servant's base wage (but it did not affect civil servants). While the base was increased steadily between 1998 and 2002 such that relative wages between the public and corporate sectors were stable, in 2002 it was suddenly increased by 50 per cent. The following year it did not change but in 2005 it was raised again by 14 per cent. This was, however, accompanied by a decrease in multipliers which further reduced the wage differentials

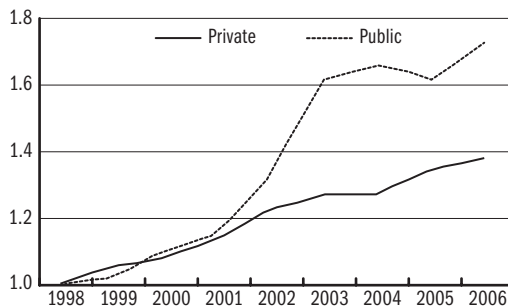
within the public sector. The last year in these data was election year and the base wage was raised again by 10 per cent.

Civil servants' wages were increased in 2001 (15 per cent of the sample are made up of these employees, who are typically highly skilled and work in public administration). Wage policy in their case was used to motivate civil servants to work in the public sector for their whole career. The base wage was almost constant, but the multipliers were changed such that it increased the relative wages of university graduates and those with long experience.

It is important to note that the wage grid serves only to set the minimum compensation for various categories of workers (defined by the level of education and experience). Total compensation may be larger due to allowances (such as a managerial allowance) and public sector organizations also have the right to pay higher wages if they have the funds for it. Public sector employees also received a 13th month's salary during the period studied.

During the first several years of the analysis public sector employees had indeed very low wages.⁴ Despite the fact that the share of university graduates is much larger in the public sector than in corporations, average wages are about 11 per cent lower in this sector before 2002. *Figure 2.2.1* shows that public and corporate wages had experienced widely different growth patterns.

Figure 2.2.1: Wage growth in the public and corporate sectors
(1998 = 100, N = 1,184,604)



While corporate real wages steadily increased by 3–6 per cent each year (except in 2004 when they did not change), wages in the public sector follow a distinctly different pattern. In the first three years of the analysis the overall growth rate is quite similar in the two sectors, but between 2001 and 2002 – the year when civil servants experienced a wage growth – public sector wages grew by 15 per cent. This is followed by an increase of 22 per cent in 2002, which is more than a 5 times larger wage growth than in corporations.⁵ Our data therefore show that over a two-year time period, real wages in the public sector increased by 40 per cent while those in corporations by only 12 per cent. In the last years of the analysis the overall growth rates are quite similar (but the timing varies). During the whole period studied, therefore, cor-

⁴ The wage measure used in this chapter is the monthly wage paid in May, and it includes the base wage, overtime pay, regular payments other than the base wage (such as language and managerial allowances), and 1/12th of the previous year's irregular payments (e.g., end-of-year bonuses and the 13th salary in the public sector).

⁵ The policy was labeled as a 50 per cent increase, but it was not applied to civil servants and referred to the base nominal wages. We computed the growth of nominal base wages for public employees between 2002 and 2003 which is indeed very close to 50 per cent.

porate wages increased by 38 per cent while public sector wages increased by 72 per cent – the large difference between the two growth rates was built up in only two years.

Identification strategy, results

The starting point in the measurement of the degree of interrelatedness of public and corporate wages is the classification of corporate workers by their “closeness” to the public sector: how similar they are to public employees. This is important to identify those workers who are likely to be affected by the wage increase. If, for example, a corporate worker has an occupation which does not exist in the public sector and his or her abilities are also very different from what is demanded, a switch to the public sector is almost impossible due to a lack of demand or is very costly for the worker as most of his human capital will be lost. Therefore, the employer of such workers does not need to take into account their earnings potential in the public sector, which can be seen as an outside option in wage bargaining.

The variable measuring public sector proximity of a corporate employee is the proportion of public sector workers in labor market segments defined by gender, occupation and work experience. More precisely, I segment the labor market by gender, potential labor market experience (5-year intervals making up 8 groups) and 7 occupational dummies (manager, professional, associate professional, clerk, service worker, skilled worker and elementary occupation). I call this variable PSHARE.⁶

I regress the log of corporate sector wages on PSHARE, which is interacted with two periods of time which represent the periods before and after the public wage increase (1998–2001 and 2002–2006, respectively). To control for average wages by worker type, I include fixed effects of the variables used in the construction of PSHARE (Z_{ijt}) as well as year effects, 21 regional (county) effects and a full set of 2-digit industries to partial out any differences between local labor markets, consumer prices, and industrial wage differentials. As the level of public sector wages may also affect the strength of the spillover, I also control for the average public sector wage within labor market cells (WP_{ijt}). The unemployment rate (UE_{ijt}) at the cell level is included as well, as it can also affect spillovers: if there are many unemployed, the bargaining power of workers declines and they cannot ask for higher wages, regardless of the proximity of the public sector (*Blanchflower and Oswald, 1990*).⁷ The estimation equation is the following (i indexes workers, j the labor market segment and t indexes time):

$$\begin{aligned} \log(w_{ijt}) = & \alpha_0 + \gamma_{before} PSHARE_{jt} BEFORE_t + \gamma_{after} PSHARE_{jt} AFTER_t + \\ & + \alpha_{wp} \log(WP_{jt}) + \alpha_{ue} \log(UE_{jt}) + \alpha x Z_{ijt} + \sum \alpha_{ind} INDUSTRY_k + \\ & + \sum \alpha_{reg} REGION_r + \sum \alpha_t YEAR_t + \varepsilon_{ijt} \end{aligned}$$

6 The average value of PSHARE is between 22 and 27 per cent during the period studied, its median is 13–14 per cent. The standard deviation of the variable is large relative to the mean showing that the variable covers most of the interval on which it is defined.

7 The unemployment rate is computed for each labor market segment defined by gender, experience and education, using the Hungarian Labor Force Survey.

The estimated spillover effect is the difference between γ_{after} and γ_{before} : this measures the change in the effect of the presence of the public sector on corporate wages.

The results suggest that private wages do not vary by the exposure of workers to the public sector before the public sector wage increase as the coefficient on the interaction of PSHARE and the period before the wage increase is only 0.001. In the period subsequent to the public sector wage increase, however, the level of corporate compensation increases in the sectors exposed to the public sector: the estimated coefficient of PSHARE after 2001 is equal to 0.143 (and is highly significant in statistical terms). Taking the difference between the coefficients associated with PSHARE before and after the wage increase as a measure of the wage spillover, this analysis finds that during a period of a 40-per cent increase in the public wage, a 10-per cent difference in public sector exposure induced a larger wage growth of 1.4 percentage points. Compared to the wage increase of about 12 per cent during this period, this result translates to a faster wage growth of over 10 per cent, which is quite sizable.

To gauge how the spillover effect evolves in time, we present the same regressions as before, but with a full set of interactions between years and PSHARE. These results are shown in *Table 2.2.2*. In the first three years of the analysis the coefficients of PSHARE are between -0.027 and -0.017 with no conceivable trend. In 2001, in the year of the civil servant wage increase, the effect of public sector exposure on corporate wages is 3.3 per cent and one year later it grows to 7.1 per cent (both coefficients are statistically significant). In 2003, after the large public employee wage increase affecting almost all public sector workers, the coefficient becomes 0.176 further increasing to 0.2 the following year. The difference between the coefficient in 2001 and 2004 is 0.167 which we take as the estimate of the wage spillover. As the public wage premium starts to stagnate, the coefficients decrease somewhat.⁸

Table 2.2.2: The yearly effect of public sector size on corporate wages

PSHARE × 1998	-0.027	(0.018)	PSHARE × 2003	0.176***	(0.014)
PSHARE × 1999	0.017	(0.017)	PSHARE × 2004	0.200***	(0.014)
PSHARE × 2000	-0.019	(0.017)	PSHARE × 2005	0.158***	(0.015)
PSHARE × 2001	0.033**	(0.015)	PSHARE × 2006	0.112***	(0.017)
PSHARE × 2002	0.071***	(0.013)			
R^2		0.445			
N		1,184,604			

Notes: Each regression includes controls for gender, experience, education, year, industry, and region. Robust standard errors in parentheses.

*** Significant at the 1-per cent level; ** significant at the 5-per cent level.

Wage spillovers may also vary along the occupational structure of the corporate sector. Workers with occupations which are abundant in the public sector are likely to have a higher wage increase, as they can find a job more easily

⁸ The last year of the analysis was election year which resulted in an increase of public sector wages. As the budget deficit was 10 per cent of the GDP, it was expected that the new government would cut back spending. As such interventions make the public sector less attractive to employees, this may be the reason for a declining spillover effect.

and will not lose their occupation-specific human capital if they move (e.g., *Kambourov and Manovskii*, 2009). To test this, I construct a dummy variable which categorizes each 3-digit occupation by its public sector share: the dummy equals 1 if this is larger than 40 per cent.⁹ This variable enters the estimation equation in a three-way interaction between the time periods before-after the wage increase and PSHARE (and I also control for its level). The estimated coefficients, presented in *Table 2.2.3*, indeed demonstrate that the spillover effect is larger for such workers. The interactions term just described is associated with a coefficient of -0.18 before the wage increase which shrinks to -0.115 in the period subsequent to it. Therefore the wages of such workers increase faster if the worker is exposed to the public sector.

Table 2.2.3: The effect of occupation on wage spillovers

PSHARE - BEFORE	0.057***	(0.013)	PSHARE - OCCPREV - BEFORE	-0.179***	(0.016)
PSHARE - AFTER	0.173***	(0.012)	PSHARE - OCCPREV - AFTER	-0.115**	(0.017)
R ²	0.446				
N	1,184,604				

Notes: Before = 1998–2001, After = 2002–2006. Occprev = 1 if occupation prevalent in public sector. Each regression includes controls for gender, experience, occupation, year, industry, region, and the Occprev interacted with “Before” and “After.” Robust standard errors in parentheses.

*** Significant at the 1-per cent level; ** significant at the 5-per cent level.

Another feature of the labor market which may alter wage spillovers is the proportion of new hires in the public sector. If there are no employment opportunities, corporate workers cannot switch sector. We compute the rate of new hires in the public sector relative to the number of workers in corporations within each labor market segment, and we add this variable to the regression.¹⁰ The results (presented in *Table 2.2.4*) show that public sector hiring does not have an effect on corporate wages before the wage increase (the estimated coefficient is essentially zero), but after the public sector wage increase this coefficient becomes 0.12. Although the coefficient is not significant, its large magnitude provides partial evidence that more public vacancies induce a significantly faster wage increase in the corporate sector.

Table 2.2.4: The effect of public sector vacancies on wage spillovers

PSHARE - BEFORE	0.017	(0.017)	PROPORTION HIRED - BEFORE	-0.007	(0.125)
PSHARE - AFTER	0.152**	(0.014)	PROPORTION HIRED - AFTER	0.120	(0.078)
R ²	0.444				
N	951,303				

Notes: Before = 1998 to 2001; After = 2002 to 2006. Each regression includes controls for gender, experience, occupation, year, industry, region, and proportion hired. Proportion hired is measured relative to the size of the corporate sector. Robust standard errors in parentheses.

*** Significant at the 1-per cent level; ** significant at the 5-per cent level.

⁹ Out of 136 occupations, there are 42 which satisfy this condition, and they cover 10 per cent of corporate workers.

¹⁰ This variable is not interacted with PSHARE because it is proportional to it by construction. The average public sector hiring rate (standard deviation) relative to private sector employment is 0.024 (0.065).

Conclusions

This chapter analysed public wage spillovers, using for identification a fast and large wage rise which increased public sector wages by 40 per cent over a two year time period while corporate wages increased by only 12 per cent. Measuring public sector proximity by the share of public workers in labor market cells defined by gender, labor market experience and occupation, it finds that a 10 per cent higher share of public sector employment in the labor market cell caused a faster corporate wage increase by about 10 per cent.

The above analysis therefore suggests that public wages do have an effect on the wage policies of corporations: not only may average wages increase inducing therefore larger personnel costs, but wage differentials may also change as those workers, who are typical in the public sector, will be affected by spillovers to a larger extent than those who are not. It is also likely that such spillovers not only existed in Hungary in the early 2000s, but they occurred everywhere. This study used the periods before and after the public sector wage increase only to have a credible identification strategy – in the lack of an exogenous movement of public wages it is difficult to obtain an unbiased estimate of wage spillovers.

Using the results of the chapter, we can drive insights about the public sector wage spillovers in contemporary Hungary. Looking at the evolution of wages over the last decade or so, it is likely that their effect on corporate wages declined. As the information of the Hungarian Statistical Office suggests, between 2006 and 2013 public sector wages declined both in real and nominal terms and also relative to corporate wages. While the unconditional relative wage between the two sectors was 14–16 per cent in 2007 and 2008 (showing that public sector workers obtained a premium on average), during the following four years this was continuously falling resulting in a public wage penalty of 15 per cent in 2012 (despite the fact that the proportion of highly skilled workers is much larger in the public sector than in corporations). The current policy which increased the wages of several occupations in the public sector is not shown yet in the data, but it is likely that in the absence of a large wage increase, public sector wages will lag behind the compensation in corporations which decreases wage spillovers. This tendency, however, can be attenuated by longer job search in the corporate sector and less job security, which can make public sector jobs look more attractive to employees.

References

- BLANCHFLOWER, D. G., AND ANDREW J. O. (1990): The Wage Curve. *Scandinavian Journal of Economics*, Vol. 92, No. 2, pp. 215–235.
- BORJAS, G. J., FREEMAN, R. B. AND KATZ, L. F. (1997): How much do Immigration and Trade Affect Labor Market Outcomes? *Brookings Papers on Economic Activity*, 1, pp. 1–90.
- DELFGAAUW, J. AND DUR, R. (2008): Incentives and Workers' Motivation in the Public Sector. *Economic Journal*, Vol. 118, No. 525, pp. 171–191.
- FARBER, H. S. (2005): Non-union Wage Rates and the Threat of Unionization. *Industrial and Labor Relations Review* Vol. 58, No. 3, pp. 335–352.
- HEYWOOD, J. S., SIEBERT, W. S. AND WEI X. (2002): Worker Sorting and Job Satisfaction: The Case of Union and Government Jobs. *Industrial and Labor Relations Review*, Vol. 55, No. 4, pp. 595–609.
- JACOBSEN, J. (1992): Spillover Effects from Government Employment. *Economics Letters*, 39, pp. 101–104.
- KAMBOUROV, G. AND MANOVSKII, I. (2009): Occupational Mobility and Wage Inequality. *Review of Economic Studies*, Vol. 76, No. 2, pp. 731–759.
- KRUEGER, A. B. AND SUMMERS, L. H. (1988): Efficiency Wages and the Inter-Industry Wage Structure. *Econometrica*, Vol. 56, No. 2, pp. 259–293.
- LACROIX, R. AND DUSSAULT, F. (1984): The Spillover Effect of Public-Sector Wage Contracts in Canada. *Review of Economics and Statistics*, Vol. 66, No. 3, pp. 509–512.
- ROY, A. (1951): Some Thoughts on the Distribution of Earnings. *Oxford Economic Papers*, 3, pp. 135–146.