

Public Sector Employment and Wages in Hungary. Evidence from Micro Data

Research Proposal

1. Overview of the Research

Public sector employment patterns and wages have attracted a considerable amount of research during the past decades.¹ Much less research has been oriented, however, towards understanding the peculiarities of public sector labor markets in Central and Eastern Europe, despite that fact that in these countries employment in the public sector is usually of a larger percentage of total employment than in the OECD countries (OECD).² It is even more important that the public sector has not been reformed in most of these countries, and such reform cannot wait any longer.

The purpose of the research proposed here is to develop a comprehensive empirical analysis of the Hungarian public sector labor markets, based on micro datasets.³ About 20 percent of all employed, and 30 percent of all employees work in the public sector, therefore it represents a large part of total employment (author's own calculations). These labor markets have not undergone serious reforms so far, but during the last years there have been attempts made to reform segments of the public sector, with effects on public sector employees. Two major changes took place in the last decade: the general wage increase of about 50 percent of all public employees in 2002, and the downsizing of the public sector, in which public administration was hit the most. The political discourse and the events of the last year are evidence that the reform is going to take place, and a prerequisite for a successful reform is understanding the state of this labor market and the effects induced by changes in wage setting or employment regulation.

Our research has three broad goals. First, we analyze the differences between the public and private sectors along multiple dimensions: are public sector wages much lower than the salary received by similar workers in the private sector, as the public perception suggests, or is there a public sector wage premium, as in most Western countries (e.g., Postel-Vinay and Turon, 2007)? Are returns to human capital similar in the two labor markets? How different are the distributions of wages in the two sectors – how unequal is the public sector compared to the private sector? Are public sector employers discriminating against women or not? How do members of households decide about the working in public or private sectors of the economy, and do they take into account their partner's decision? These issues have been studied in developed economies, but much less in a transitional context, where wage and employment dynamics are much faster, and the private sector has undergone a major structural change, while the public sector has not.

¹ Gregory and Borland (1999) and Cahuc and Zylberberg (2002) describe the functioning of public sector labor markets in the OECD, while Elliott, Lucifora and Meurs (1999) discuss wage determination in the public sector in a number of European countries.

² Most studies that focus on this region have been aiming at the understanding of wage differentials between public and private sector employees (see, e.g., Adamchik and Bedi, 2000; Gorodnichenko and Sabirianova Peter, 2007).

³ In this research we make a distinction between those employees that work for the government in state-owned enterprises (SOEs), and those who work in public sector organizations, such as schools, hospitals or the public administration. We focus solely on the latter group, as the regulation of wages and employment decisions of these organizations is very different from the SOEs and financially they depend directly on the central or local governments' budget.

Second, taking advantage of the large and abrupt wage increase that took place in 2002, we discuss issues that can be identified much better in this quasi-experimental context than in a case when there is no large, exogenous change in wages. How did this policy affect the public wage premium? Did any compositional changes take place? Did the public sector wage increase have an effect on private sector wages? Were there any demographic groups that benefited more from the wage increase than others? Did the wage increase have any supply side effect? We discuss all these issues below in more detail.

Finally, we are also going to study the effects of the downsizing that took place in the last period: what is the size of this downsizing and which groups were affected the most? Did it have a regional dimension? What are the strategies of the people who were laid off?

2. Data

Hungarian public sector labor markets are not only interesting because there has been little research directed towards it, but the data available are particularly useful.⁴ Several databases provide information on public sector employees, each of them having their own value. We briefly present the data we plan to use in these research.

The **Labour Force Survey (LFS)**, conducted by the Hungarian Central Statistical Office in each quarter since 1992, is a representative survey (a rotating panel) that contains more than 70,000 observations in each wave. The survey has detailed information on the individuals' employment status (employed unemployed or out of labor force), occupation, industry, marital status, education, information on the labor market status of the spouse and other demographic and human capital variables. The survey records the individual's reason for quitting the job (lay-off, voluntary quit, etc.), thus it is possible to distinguish whether the individual quit his job or was laid-off. Two main drawbacks of the survey are the relatively short time span of the panel (six quarters) and that the wage data are only available for about one sixth of the sample. The LFS therefore makes possible the analysis of the reasons for leaving the public sector, and to study the transitions between labour market states in the short run.

The **Hungarian Wage Survey Data** is of particular quality, which is quite rare in developed countries, and practically non-existent in Central and Eastern Europe, at least not of this quality. This dataset is a linked employer-employee data that runs from 1986 through 2007, and it is updated every year. It is a large sample survey that includes most large corporations and a representative sample of the smaller ones. Individual level wages and other information are provided for about 10 percent of the workforce of each company. There are roughly 30,000 firms and 120,000 workers included in each year of the sample. The public sector contains 400 to 500 thousand employees from all the public sector organizations in Hungary. Some organizations provided data from all the employees, some a random sample of 10 percent.⁵ In its current status, both the corporations and the public sector organizations can be followed across years, but the employees cannot. (One purpose of this project is to try to link the workers across years.) These data are ideal for studying differences in public and private sector wages and employment, as well as the public sector itself.

⁴ For research on the topic, see, e.g., Kézdi (2000), Kőrösi, Telegdy and Vincze (2007), and Telegdy (2006).

⁵ The data from corporations has been extensively cleaned by the Data Group of the Institute of Economics – HAS. The public sector data has undergone some cleaning and checking but more efforts are needed, which is one purpose of this research. For details about sampling and cleaning, see the descriptions made by the Data Group of the Institute of Economics of the Hungarian Academy of Sciences (Institute of Economics Data Group, 2005 and 2006).

The **Central Administration of National Pension Insurance** (Pension Fund Data in short), contains information of 200,000 representatively selected individuals for the years 2000 to 2007. For every person in the sample it includes the starting and termination date of the spell of entitlement to insurance, and also the corresponding wage and insurance payment data. The data allow identification of categories of employment (employee, member of cooperative society, sole proprietor etc.), and also of legal entitlements to insurance (e.g. receiving unemployment benefit). The database also contains the spells of the suspension of insurance payment for certain reasons (e.g. sick pay, child benefits) and pension claim data (this is available only up to 2004). Some individual characteristics (age, gender, region, occupation) are also provided. Hence, the database has the advantage that precise monthly wage data can be derived from it and that individual labour market behaviour can be traced for several years. Compared to the LFS, however, its drawback is that it contains fewer personal variables and more important, it does not contain the reason for leaving the public sector. The data have already been used for simple descriptive analyses (e.g. Scharle, 2008) but further cleaning and transformation of the data are needed to make it suitable for our analysis.

The 2004-2006 panel data of the **Hungarian EU-SILC** surveys contain information on household income, personal activity, demand for redistribution, and subjective measures of well-being. The surveys are undertaken by the Hungarian Central Statistical Office (HCSO). It is a household-based, 4-year long rotation panel that started in 2004. One-fourth of households in the survey sample rotate annually, thus in principle one fourth of households spend 4 years in the survey. In this research we plan to use the first three waves of the EU-SILC panel (2004-2006), which will contain about 2000 households with about 5000 persons. Previously we were able to attach two subjective questions to the 2005, and a supplementary survey with nine subjective questions to the 2006 standard yearly interviews of the EU-SILC. The main advantages of this household panel compared to the Hungarian Household Surveys applied in our previous studies are that it contains monthly activity reports, information about the parents' highest education; and subjective well-being and demand for redistribution questions for two years (not only for the end-year).

3. Participants

The project will be undertaken by 13 researchers. Besides producing papers of high scientific quality, the purpose of the project is to stimulate joint work between senior and junior researchers: about half of the team (6 persons) are junior, and out of these 3 are in the phase of writing PhD dissertation. A large number of the researchers are affiliated with the Labor Market Group of the Host Institute (the Institute of Economics of the Hungarian Academy of Sciences), but employees of four other institutions are also involved. One researcher is professor at the Corvinus University, one at the Faculty of Law in Eötvös Loránd University, two work for the Ministry of Finance, and another is a PhD student at the Central European University.

As the character of the research is microeconomic analysis, we need a large number of research assistants who clean the data and help carry out the analysis. We estimate that we need 4 full-time research assistants at the beginning of the project to help cleaning the data, and 2 in the later years. We plan to complete about 10 scientific papers in this research, and publish them in Hungarian and international journals.

In the following we discuss each topic in detail, providing the research question, a summary of previous research, our contribution, and the proposed methodology.

4. Differences in Public and Private Sector Labor Market Regulation

This research aims to compare the public and private labor market regulation in the following areas. How different are individual rights in private employment, public employment, and civil service? Do these have an effect on job security and employment flexibility, and if there are differences in this respect between the sectors, are these justified by the characteristics of the specific employment relationship (private employment, public employment, civil service), and by other entitlements deriving from the relationships? Finally, how has the balance of entitlements and obligations been changed in the specific relationships?

The labor legislation of 1992 established three sub-categories of the employment relationship: (1) the employment relationship of private sector (Act No. XXII of 1992 on Labor Code), (2) the employment relationship between civil servants and the State (Act No. XXIII of 1992 on Civil Servants), and (3) the employment relationship between public employees and publicly-financed institutions – hospitals, schools, universities, and so on (Act No. XXXIII of 1992 on Public Employees). Contrary to the socialist practice, the new legislation created an intensively fragmented labor legislation for different types of workers.⁶

Despite the fact that no agreement has been reached on the future of the public employment, the legal regulations of public employment are modified frequently (mostly on ad hoc political grounds) and they are becoming increasingly similar to the employment legislation of the private sector. The job security of public employees has been seriously undermined, partly by privatization of big public employers (such as hospitals) by which workers are shifted from the coverage of Act on Public Employees to the coverage of Labor Code. The job security of those who remain employed in the public sphere has been also reduced in 2007 by the modification of the Act No XXXIII of 1992. This widely criticized modification reduced the level of job security of public employees to the level of job security of private employees overall, and lessened the sanctions for unjust dismissal of public employees even below that of private employees. Regarding civil service, the most characteristic modification has been the introduction of certain human resource techniques like performance evaluation and performance-related differentiation in wages. The overall impact of the ongoing relaxation and transformation of public employment legislation has not been studied on the performance of the civil service and public institutions yet.

In the last few years, major research efforts have been utilized to study the industrial relations of public service, pointing out that legal regulations considerably limit the collective rights of civil servants and public employees (Berki, Fodor T., Nacsa and Neumann, 2007). The right to collective bargaining of unions representing public employees is seriously limited, and that of unions of public servants are prohibited, which is contrary to the ILO Convention No. 154. which Hungary has joined (Nacsa, 2007). Similarly, the right to strike in civil service is limited in as much as it is contrary to the Constitution and European Social Charter (Nacsa, 2000; Fodor, 2007). There is a serious discrepancy in recent labor regulation of the public sphere in the regard that the collective rights of workers are extremely limited in international comparison, while the regulation of individual relationships is very much of the private /market type, including the increasing application of different HR techniques (Berki, Fodor T., Nacsa and

⁶ The differentiation between public employees and civil servants was a political decision and lacked any theoretical basis (Horváth, 2006). There is an ongoing debate on the reform of public sector labor law and the elimination of the category of public employees, though neither political nor theoretical understanding has been reached on the direction and details of legal reforms.

Neumann, 2007). It seems to us that there is a serious and increasing tension among different aspects of labor legislation, the impact of which is still waiting for further analysis.

5. Public Sector Employment: Composition, Flows, Downsizing

5.1 Employment dynamics and generational change in branches of the public sector in Hungary

The employment composition of the Hungarian labor force has changed considerably after the transition. Employees laid off from state-owned firms entered inactivity through pension en masse, while the newly formed and successfully privatized firms hired more educated and young individuals, and paid them higher wages (Kézdi, 2005; Kertesi and Varga, 2005; Campos and Joliffe, 2005; Redor and Paihlé, 2004; Fleisher et al, 2005). Surprisingly, we know very little about the changes that took place within public sector employment, or the mechanism of these changes. This research aims to lay out detailed stylized facts of employment trends within the public sector, looking for signs of a generational change, such as apparent upskilling, changes in age composition of employment, and a shift in cohort age-earnings profiles. Besides creating descriptive models of employment dynamics, we seek to explain the speed of change in different establishments through characteristics of the workplaces and the individuals, paying attention to age-specific shocks such as the reform of the pension system.

Empirical research on employment and wage setting in the public sector during the transition is relatively scarce. Research on industry-level data from Hungary, Poland, Romania and the former Czechoslovakia suggested that public sector wages fell substantially in both absolute and relative terms in early years of the transition (Kertesi and Köllő, 2003). Using individual data, Kézdi (1998) shows that the wage disadvantage of public sector workers varied with the transferability of skills. The depressed wages of those with less transferable, sector-specific skills hindered the inflows of better educated youth; moreover the seniority-based wage grid system resulted in particularly low wage offers for young workers. Kertesi and Köllő (2006) found that while in the private sector the relative wages of young university graduates increased substantially, the age-earnings profile remained virtually unchanged in the public sector. In most public sector high-skill occupations, the share of young workers fell or remained unchanged between 1986 and 2003, but whether the substantial increases in public sector wages in 2002 gave impetus to the inflows of better endowed young employees has not yet been analysed. Similarly, we know very little about the specific employment effects of the pension reform both on the directly affected cohorts and other workers. Although Layard, Nickell and Jackman (1991) show that elderly workers do not crowd out the young on the long run, some others, such as Boeri (2005) suggest that there might be significant losses in the short and medium run. Empirical evidence on this matter is mixed: Herbertsson (2001) and Jousten et al (2008) find no evidence of crowding-out, while Skans (2005) and Cseres-Gergely (2008) do.

The proposed research is aimed at showing both a finer picture of employment and related cohort-specific changes by percentiles of the wage distribution, and also explaining the observed differences between different types of public sector organizations. The research will mostly be based on the Wage Survey Data, but will also use the Labor Force Survey and will be supplemented by qualitative evidence coming from interviews conducted with human resource managers of private and public employees. The almost complete data enable us to use only this industry and still provide precise and detailed statistics.

The outcome of this research is as follows. It will provide a detailed picture of changes of public employee stocks and flows and their relation to wages by analyzing Markov transition matrices as well as nonparametric age-earnings profiles and earnings distributions before and after large-scale changes. This analysis will be broken down by age, education and sex, paying attention to different wage components separately. The information produced here is completely missing for Hungary, but is a valuable contribution in general.

Second, we relate the ability to change to characteristics of the workplace, composition of the workforce and also to external factors determining the supply of labor. An index of generational mix and change will be created on the basis of the interaction of age, schooling and employment type of workers of a particular workplace. Using this as a left-hand side variable, we run regressions to relate the index to attributes of the workplace. To our knowledge, this is a novel approach to the problem, relevant in relation to managing demographic changes, many of which is forthcoming in Europe.

Third, we will closely scrutinize the potential crowding-out between older and younger workers. We shall use panel regression techniques to estimate a relative labor demand function for heterogeneous labor, using the employment evolution of comparable private sector workplaces as a counterfactual. This analysis is similar to the one put forward in Cseres-Gergely (2008), but because of the availability of linked employer-employee data, it could pay attention to wages and look at employer-level changes.

5.2 Public-Private Employment Strategies in Households: Matched Employee-Workplace Pairs

The main question of this research is how family structure and other family characteristics affect the decisions of people in choosing workplaces and sorting into public employment. Analyzing employment models of the Hungarian households, we focus on different family strategies in choosing workplaces and sorting into the public sector by gender, generation, and region.

One approach to labor supply decisions in a household is that these are not solved individually, but they are the result of the combined utility maximization of the household where the labor market and consumption preferences of all the family members are taken into consideration. This approach has implications for the choice of working in the public sector. For a family with small children, for example, employment in the public sector can be attached to more job security and less stress, and thus can positively affect the overall level of satisfaction of the family. To give another example, more risk averse individuals sort into public sector employment, and risk taking is rewarded with higher wages in the private sector. Family patterns (families with or without working couple, families with or without children, etc.) can significantly influence people's attitudes toward choosing workplaces and being sorted into sectors. Public and private sector can represent very different labor market options for the different families and their members.

The combined decisions of the household – for choosing a given combination of workplaces for the household members – and the perceived characteristics of the workplaces in public and private sectors can significantly differ across genders, generations. They may also vary by region though the demand for the individual's skills in the private and public sectors.

The attitude of working in the public sector can also be inheritable. Working in the public sector may be contingent upon parents' workplaces.

It is rather obvious that living in a household containing a couple with permanent source of income is much more secure than living in a mutilated and temporary employed or unemployed family. Our next question is whether the satisfaction of households can be increased by combining the security of the public sector of one member and enjoying the higher income in the private sector of the other. This risk-sharing may be a voluntary option of families which can lead to the maximization of satisfaction on the family level.

This research fits well in the literature. It is a stylized fact that there are significant differences in the behavior of male and female participants and that risk aversion and uncertainty are strongly attached to the labor market status, and unemployment is a major element of dissatisfaction.⁷ After controlling for income level, the unemployed and quasi-unemployed are significantly less satisfied than full-time workers and other inactive, and this dissatisfaction is transferred to their family members. Among variables concerning marital status of adults and family structure of the households Molnár and Kapitány (2006, 2007) found two variables which have considerable effect on satisfaction: people living in households with couples (married or living in common-law marriage) are more satisfied both with their material situation and with their life in general than others, and families with younger children are less satisfied with their material situation those without infants.

This research opens up new dimensions, as according to our knowledge, the connection between household type (family structure and other family characteristics) and choice for public sector employment has never been analyzed. Moreover, investigation of household type, sorting into public sector employment, and satisfaction with life and material situation together is quite unique in the literature.

In the analysis – controlling for education, age, and other variables – we use logit models for estimating the main relationships. We investigate the conditional probability of the incidence that both of the couple or two members of the family work in the same – public or private – sector. With the aid of this method we try to identify the different family employment strategies by genders, generations, regions, and by characteristics of the labor market supply.

5.3 Analysis of the labor outflow from the public sector

The number of public sector employees fluctuated substantially between 2000 and 2007, and decreased by a net 70,000 from the peak in 2003 – this is in sharp contrast with the stable employment figures from the previous decade. Measured by gross flows, even more employees left the sector during this period. The analysis of the personal characteristics, motivations, and subsequent work history of the employees leaving the sector voluntarily or otherwise may answer several important questions: what patterns characterized the laid off? How many could get a job in the private sector and what career path did they follow? How did the change in the regulatory framework (the conditions of the subsidies and special retirement schemes) affect the probabilities of transition into alternative employment, unemployment, or inactivity? The final aim from a policy perspective is to calculate the net budgetary effects of public sector layoffs, taking into account the opportunities for early retirement and other transfers.

Although the topic is important both from an academic and a policy perspective, it has been largely ignored in academic research in Hungary. A notable exception is Varga (2007), who examines the composition and wage dynamics in public education. However, the studies analyzing labor market mobility in transition economies dealt with some aspects of labor market

⁷ See Bertola et al (2002), Lackó, (2005, 2006), Blanchflower and Oswald (2000), Di Tella et al (2001), Molnár and Kapitány (2006, 2007, 2008).

flows from the public sector as well. Boeri and Flinn (1997) concluded that the public sector is less mobile compared to the private sector in Poland, Hungary, and Slovakia. The empirical micro-based research of some other labor market and transfer states has already been carried out in Hungary, and these analyses are relevant in the public sector context as well. For instance, retirement has been one of the main paths of leaving the public sector (Cseres-Gergely, 2008).

We concentrate on three questions in the research project. First, based on Labor Force Survey (LFS) data, we estimate probit models on the probability of transitions into various states and examine how the regulatory framework and incentives (e.g. the premium years program) affected the composition of the layoffs (age, gender, education) between 2000 and 2007.

Second, we examine the time-evolution of labor market and transfer states of the employees laid off. The analysis of the next labor market state as well as the labor market state one year later will be carried out with multinomial logit models based on LFS-data. We take advantage of the Pension Fund Database, which monitors the history of pension contributions of persons for several years, and it is therefore suitable for a more detailed analysis than the LFS. Based on these data, we estimate duration models of the time spent in each labor market state following exit from the public sector.

Finally, we compare the wage evolution of employees leaving the public sector for the private sector to the wage evolution of similar employees staying in the private sector for the whole period. We plan to use the discounted wage difference as the dependent variable and the propensity score matching method as a suitable econometric technique.

As a result of the research, the net budgetary effects (corrected for the additional pension expenditure, severance pay, etc.) of the layoffs can be quantified.

6. Wages: Private-Public Relative Wages, Wage Inequality in the Public Sector, Spillovers

6.1 Public-Private Sector Relative Wages

In agreement with research done on public-private wage differentials, we start by comparing the returns to demographic characteristics and human capital in the two sectors. For Hungary there is descriptive evidence on the evolution of the private-public sector earnings gap for the period of the public sector wage reforms in the early 2000s, as well as research focusing on the evolution of the private-public sector earnings gap for the transition period. For instance, Telegdy (2006) and Hámori (2007) provide evidence on the private-public sector earnings gap for the years prior to and after the public sector wage reforms (2000 – 2004) in Hungary, for groups of full-time employees differentiated by education and occupation. Kertesi and Köllő (2002) provide evidence of a widening wage gap between the private and public sectors of employment during the transition period in Hungary.

This research employs data that describe the reforms of the public sector in 2002 and after 2006. Using longer time series are also useful as long run effects of the policies can also be taken into account. In addition, the research will provide a decomposition of the mean private-public sector earnings gap, which, to the best of our knowledge, has not been carried out for Hungary to this date. This method accounts for not only the measurable characteristics of workers, but it also shows to what extent unmeasurable characteristics are responsible for the wage gap.

In the first part of the empirical analysis, the private-public earnings differential will be estimated using Mincer earnings equations pooling data for both sectors of employment and including (in addition to education, potential labor market experience, occupation, and region) a dummy variable for the private sector of employment – the key variable of interest. The Mincer equations will be estimated on a yearly basis (a) for the entire economy and (b) for four groups distinguished by education. The second part will concentrate on the decomposition of the mean private-public sector earnings gap following Oaxaca (1973). That is, Mincer earnings equations will be estimated for the private and public sectors, and the estimates from these regressions will be used to decompose the earnings gap into a component explained by differences in individual characteristics and an unexplained component.

6.2 Wage Inequality within the Public Sector

Wage inequality has been one of the most studied topics in all of economic research during the last decade.⁸ The extent of wage inequality and the shape of wage distribution, however, has been carefully studied in rather few countries, and even fewer studies looked at differences in the public sector only. Among Central and East European economies, the only case of a thorough study, albeit one that uses data only through 1996 and has little information on employers, is for Poland (Keane and Prasad, 2006). Concerning Hungary, there has been little measurement of inequality indices, although some aspects of wage differentials have received attention. For example, Campos and Joliffe (2003) and Kertesi and Köllő (2002, 2006) study skill differentials, Neuman (1997, 2002) explores the effect of collective wage bargaining, Rutkowski (2001) documents earnings mobility, and Köllő and Nagy (1996) study the effects of unemployment on earnings. The Labor Market Yearbook (2000) contains an overview of the evolution of wages during transition. These studies focus either only on wage inequality of employees working in corporations, or the whole economy.

The aim of this research is first to document carefully the evolution of wage inequality in the Hungarian public sector. Looking only at the public sector is important, as the forces shaping the relative wages in the two sectors are obviously different: the demand and supply on the product and labor markets on the first, and political factors on the second. In addition, both in the private and public sector, unions may influence the wage setting behavior. By looking only at wage differentials in the public sector, we can identify those groups that had more bargaining power than others, or were considered by the government to be important, either because of their voting power, their ability to shape public opinion, or because they are considered to be important for society.

The second aim is to use regression and decomposition techniques to shed light on possible causes of the changes in inequality. The results of this analysis will show which categories of workers gained, and which lost during the transition and accession processes. The research will also employ the decomposition approach of Juhn, Murphy, and Pierce (1993) and Lemieux (2006) analyses.

The data enable us to test whether the workplace has an effect on wage inequality. In the public sector there is still a wage grid, which sets the base wage of each worker, depending on education, experience and industry (at least to some extent). Nevertheless, if a public sector

⁸ Bound and Johnson (1992), Katz and Murphy (1992), and Juhn, Murphy, and Pierce (1993) are among the seminal contributions documenting the rise and some of the patterns of inequality in the United States. Katz and Autor (1999) summarize the early literature on the US and a few other economies, and Atkinson (2007) provides a recent overview.

institution is able to attract funds, it can provide higher wages than the base wage set in the grid. One peculiarity of our data is that we can identify the workplace, and thus we can carry out such an analysis.

Having documented wage changes by individual and workplace characteristics, we turn to the decomposition of the wage change into four categories: observable individual characteristics, observable workplace characteristics, unobservable individual characteristics, and unobservable firm characteristics. The decomposition method developed by Juhn, Murphy, and Pierce, and the quality of the dataset allow us to do this. Since our data is a panel at the firm level, we can construct the residual wage distribution at the worker and the workplace separately.

6.3 Gender Discrimination in the Public Sector

This section seeks to assess the prevalence of two types of discrimination against women working in the public sector. Labor market discrimination may take the form of wage discrimination, when a female worker who is equally productive as a male worker is paid a lower wage. Another form of discrimination may occur in hiring and promotion practices of employers. In this case, women are selected into worse (lower-paying) occupations, and move up in position less frequently than men. Contrary to the private sector, where wages are generally based on employers' decisions and market forces (Koltay, 2002), public sector wages are centrally determined, with paycales based on observable productive characteristics of workers. Theoretically, we would not expect to observe evidence of wage discrimination against women in public sector data, while an unexplained wage gap of about 0.15 remains in the private sector (Campos and Jolliffe, 2004; Lovász, 2008).⁹ On the other hand, hiring and promotional decisions of employers are much less transparent, so discrimination of this type may exist in the public sector as well.

To assess whether wage discrimination is present in the public sector, and whether it is lower than what is seen in the private sector, as expected, we plan to estimate the wage gap between men and women separately for the two sectors. Basic worker-level wage equations will be estimated with controls for observable worker and employer characteristics, where the coefficient of the female variable will be evaluated as the gender wage gap. An important issue that arises when comparing public and private sector wages is the endogeneity of sector choice. If variables that affect sectoral choice and wages are correlated, estimates of wage differentials between groups by sector will be biased (Greene & Hoffnar, 1996). To address this problem, we will estimate a probit equation predicting whether the individual is employed in the public or private sector, and include the inverse of the Mills' ratio as an explanatory variable in the wage equations.

The second goal of this section will be to assess the extent of occupational segregation in the public sector, and the changes that have occurred over time in this respect. Csillag (2007) found that occupational segregation explained a large part of the gender wage gap in the private sector towards the end of communism, but following the transition, this type of segregation declined significantly. We plan to assess the role of occupational segregation in the public sector in a similar manner up to the year 2007. It is possible that even though the strict wage grids of public sector employees make wage discrimination impossible, the desired equality of workers is still not achieved if women are selected into and remain in lower-paying occupations.

⁹ This refers to the wage gap that remains between men and women after observable characteristics of workers (education, potential experience, region of employment) and firms (industry, ownership type, size) are taken into account.

6.4 An Industry Study: Recent Trends in Wages in the Education Sector

Having discussed the overall differences between the public and private sectors' wages and the distribution of public wages, we turn our attention to a case study: this part of the project will investigate recent trends in wages in the education sector in Hungary. The questions to be answered are the following. How the relative earnings position of those employed in the education sector has changed as a result of 50% gross salary increase of the public servants in 2002, and how it has changed in the succeeding years? What was the effect of these changes on the employment of teachers and other workers, and on the measurable skill composition of teachers?

Trends in wages in public education might be interesting for different reasons. First, public education has a large share in employment and in public sector employment. During the 2000's 8 percent of the employed and 14 per cent of the female employed worked in the public education sector and more than a third of the public sector employees work in public education. The effect of the overall salary increase on the composition of the teaching force might also be interesting. Teachers' quality is one of the main determinants of students' performance (Rivkin-Hanusek-Kain, 2000; Darling-Hammod, 1999). Earlier studies have shown that hiring and keeping highly skilled school teachers has become very difficult in Hungary in the past twenty years as their relative earnings steadily declined (Varga, 2007). The relative wage of school teachers declined steadily until 2002, especially compared to young college graduates employed in the private sector (Kézdi 2000, Varga 2007b). As a result, during this period, self-selection led to a declining average quality of the pool of teachers' college entrants and the pool of entrants to the profession itself (Varga, 2007).

6.5 Wage Spillovers: the Effect of the Public Sector Wage Increase on Private Sector Wages

The aim of this analysis is to establish an important but somewhat neglected topic of wage formation: the effect of public sector wages on wage formation in the private sector. Wage spillovers have been studied, but their focus was mostly the effect of wages in foreign owned firms on domestic ones, or between unionized and non-unionized workers.¹⁰ These research used either industry or firm level data, and did not take into account individual worker characteristics. Preliminary evidence of wage spillovers between the public and private sector were given in the eighties by Lacroix and Dussault (1983). To our knowledge, only Jacobsen (1992) uses individual level data in determining public-private wage spillovers.

Hungary is particularly apt for drawing conclusions about the effects of wage spillovers. The main problem with such studies is that wage changes are usually small, and it is hard to find an exogenous variation in public sector wages which does not have an effect on private sector wages. If such a variation does not exist, the researcher cannot be sure that the identified effect is indeed a result of spillovers. In Hungary, such a variation exists, and the resulting public wage change is large. The large wage increase in 2002 affected most public sector employees and increased their wages by about 50 percent from one month to the other. This wage increase,

¹⁰ On foreign wage spillovers see, e.g., Aitken, Harrison and Lipsey (1996) and Driffield and Girma (2003). For early studies on union wage spillovers see Mehra (1974) and Vroman (1982). For more recent evidence see Budd (1997).

unprecedented in its magnitude and speed, provides a quasi-experimental setting in which wage spillovers can be tested more precisely than in any other study.¹¹

The composition of the public sector differs by worker education, experience and gender, and the spillovers should be different in different segments of the labor market, depending on the proportion of public sector employees. The variation in the proportion of public sector employees by types of workers is the basis of identification of the spillover effect. We employ the method used by Borjas (2003) in his study of the effect of immigration on native workers' wages. He segmented the labor market by several worker characteristics, and used as the explanatory variable the proportion of immigrants in these segments. This approach can easily be used in the study of public sector wage spillovers; here the explanatory variable is the proportion of public sector workers by several characteristics: education, experience, region and several broad categories of occupations.

¹¹ See preliminary results in Kőrösi, Telegdy and Vincze (2007). This study will be an update of theirs in several respects. First, their data stops quite early after the wage increase, and the methodology is also developed further.

References

- Adamchik, Vera and Arjun Bedi (2000), "Wage Differentials between the Public and the Private Sectors: Evidence from an Economy in Transition." *Labour Economics*, Vol. 7, 203-234.
- Aitken, Brian, Ann Harrison, and Robert E. Lipsey (1996), "Wages and Foreign Ownership. A Comparative Study of Mexico, Venezuela and the United States." *Journal of International Economics*, 40(3-4), 345-71.
- Berki, Erzsébet, Gábor Fodor, Beáta Nacsa, and László Neumann (2007): "Kollektív jogok és érvényesülésük a közszolgálatban (Collective rights in the Public Sector)." Mimeo.
- Bertola, G., F. D. Blau and L. Kahn (2002), "Labour Market Institutions and Demographic Employment Patterns." CEPR Discussion Papers 3448.
- Blanchflower, David (2006), "Happiness and Well-being Across Nations. New Perspectives on Job Satisfaction and Well-being." *DTI's 4th labor Market Research Conference*, 1-18.
- Blanchflower, David, and A. Oswald (2000), "Well-being Over Time in Britain and the USA." NBER Working Paper 7487.
- Boeri, Tito (2005), "The Lisbon Process and European Women at Work." Mimeo.
- Boeri, T., and C. Flinn (1997), "Returns to mobility in the transition to a market economy." The William Davidson Institute Working Paper No. 1018.
- Borjas, George (2003), "The Labor Demand Curve Is Downward Sloping: Reexamining the Impact of Immigration on the Labor Market." *Quarterly Journal of Economics*, 1336-1374.
- Budd, John (1997), "Institutional and Market Determinants of Wage Spillovers: Evidence from UAW Pattern Bargaining." *Industrial Relations* 36(1), 97-116.
- Cahuc, Pierre and Andre Zylberberg (2002), "Public Employment: Does it Increase Unemployment?" *Economic Policy*.
- Campos, Nauro, and Dean Jolliffe (2005), "Does Market Liberalisation Reduce Gender Discrimination? Lessons from Hungary, 1986 to 1998." *Labour Economics*, 12 (1), 1-22.
- Clark, A., and A. J. Oswald (1994), "Unhappiness and Unemployment." *The Economic Journal* 104, 648-659.
- Csillag, Márton (2007), "Female Work and the Gender Wage Gap from Late Socialism to Today," In: *The Hungarian Labour Market: Review and Analysis*, (Galasi and Kézdi eds.), Budapest: Institute of Economics.
- Cseres-Gergely, Zsombor (2007), "Ösztönzési hatások a magyarországi nyugdíjrendszerben. (Incentive components of the Hungarian Pension System)." In: *Munkaerőpiaci Tükör 2007*, (Fazekas, Cseres-Gergely, Scharle eds.), Budapest: Institute of Economics – HAS.
- Cseres-Gergely, Zsombor (2008), "Are the old edging out the young in the new millennium? What can we learn about cross-age crowding out from EU aggregate data. Mimeo.
- Darling-Hammod, L. (1999), *Teacher Quality and Student Achievement. A Review of State Policy Evidence*. Research Report, Center for the Study of Teaching Policy, University of Washington.
- Delteil Valerie, Ariane Pailhé and Dominique Redor, (2004), "Comparing Individual Wage Determinants in Western and Central Europe: On the Way to Convergence? The Cases of France and Hungary." *Journal of Comparative Economics*, 482-499.

- Di Tella, R., R. J. MacCulloch, and A. J. Oswald (2001), "Preferences over Inflation and Unemployment: Evidence from Surveys of Happiness." *American Economic Review* 91(1), 335-341.
- Driffield, Nigel, and Sourafel Girma (2003), "Regional Foreign Direct Investment and Wage Spillovers: Plant Level Evidence from the UK Electronics Industry." *Oxford Bulletin of Economics and Statistics*, 65(4), 453-74.
- Drewes, Torben (1987), "Regional Wage Spillover in Canada," *Review of Economics and Statistics*, 69(2), 224-31.
- Earle, John, and Álmos Telegdy (2008), "Ownership and Wages: New Evidence from Linked Employer-Employee Data in Hungary, 1986-2003." In: *Analysis of Firms and Employees - Qualitative and Quantitative Approaches* (F. Andersson, S. Bender, J. Lane, K. Shaw, and T. Von Wachter, eds.), Cambridge: NBER.
- Elliott, Robert, Claudio Lucifora, and Dominique Meurs (1999), *Public Sector Pay Determination in the European Union*. Great Britain: Macmillan Press.
- Fleisher, B., K. Sabirianova, and X. Wang (2005), "Returns to skills and the speed of reforms: Evidence from Central and Eastern Europe, China, and Russia." *Journal of Comparative Economics*, (33): 351-370.
- Gorodinchenki, Yuriy and Klara Sabirianova Peter (2007), "Public Sector Pay and Corruption: Measuring Bribery from Micro Data." *Journal of Public Economics*, Vol. 91, 963-991.
- Gregory, Robert and Jeff Borland (1999), "Recent Developments in Public Sector Labor Markets." In: *Handbook of Labor Economics*, Vol. 3 (Ashenfelter and Card eds.), Elsevier.
- Hámori, Szilvia (2008), "An Analysis of the Earnings Structures in the Public and Private Sectors in Hungary." Center for Doctoral Studies in Economics (CDSE), University of Mannheim, Discussion Paper No. 33.
- Herbertsson, T. (2001), "Why do icelanders not retire early?" Technical report, Pensionsforum, Stockholm.
- Horváth, István (2006), „Diagnózis és terápia. Javaslat a közszolgálati munkajogi szabályozásának reformjára – figyelemmel az EU tagállamok jogalkotására és hazai helyzetünkre. (Suggestion to the public sector labor law reform).” Unpublished PhD dissertation, Pécs.
- Hungarian Statistical Office (2005), *Employment and Earnings 1998 – 2003*. Budapest: Hungarian Statistical Office.
- Hungarian Statistical Office (2004), *Labour Report: January – December 2003*. Budapest: Hungarian Statistical Office.
- Greene, Michael, and Emily Hoffnar (1996), "Gender Discrimination in the Public and Private Sectors: A Sample Selectivity Approach." *Journal of Socio-Economics*, 25(1).
- Institute of Economics Data Group (2005), "Bértarifa Felvételek: a Vállalati Dolgozókra Vonatkozó Adatok (Wage Survey Data: Information on Workers in Corporations)." Mimeo.
- Institute of Economics Data Group (2006), "Bértarifa Felvételek: a Költségvetési Dolgozókra Vonatkozó Adatok (Wage Survey Data: Information on Public Sector Workers)." Mimeo.
- Jacobsen, Joyce (1992), "Spillover Effects from Government Employment," *Economics Letters*, 39(1), 101-104.

- Jousten, A, M. Lefebvre, S. Perelman, and P. Pestieau (2008), "The effects of early retirement on youth unemployment: The case of Belgium." Working paper series.
- Kertesi, Gábor, and János Köllő (2006), "Felsőoktatási expanzió, "diplomás munkanélküliség" és a diplomák piaci értéke. (Expansion of tertiary education, unemployment of its graduates and the market value of diplomas)." *Közgazdasági szemle* 53(3).
- Kertesi, Gábor and János Köllő (2003), "Ágazati bérkülönbségek Magyarországon, I. rész. Az ágazati járadékképződés alternatív modelljei (Interindustrial wage differentials in Hungary)." *Közgazdasági Szemle*, 50, 923–938.
- Kertesi, Gábor, and János Köllő (2002), "Economic Transformation and the revaluation of human capital Hungary, 1986 – 1999." In: *Research in Labor Economics, volume 21* (de Grip, van Loo and K. Mayhew eds.), Amsterdam: Elsevier.
- Kertesi, Gábor, and Júlia Varga (2005), "Foglalkoztatás és iskolázottság Magyarországon. (Employment and education in Hungary)." *Közgazdasági szemle*, 52(7-8), 633-662.
- Kézdi, Gábor (2000), "Versenyszféra és költségvetés." In: *Munkaerőpiaci Tükör 2000* (Fazekas ed.), Budapest: Institute of Economics – HAS.
- Kézdi, Gábor (1998), "Wages, Employment and Incentives in the Public Sector in Hungary." In: *Public sector reform in Hungary* (Bokros and Dethier eds.), The World Bank.
- Közalkalmazotti Bértábla: Béremelés (2002), www.tudosz.hu/bertabla02szept.html.
- Köllő, János (2005), "Education and Earnings." In: *The Hungarian Labour Market 2005. In Focus: Education and the Labour Market* (Fazekas and Varga eds.), Budapest: Institute of Economics – HAS.
- Koltay, Jenő (2002), "Wage Setting: Institutions and Practices," In: *The Hungarian Labour Market: Review and Analysis* (Fazekas and Koltay eds.), Budapest: Institute of Economics.
- Kőrösi, Gábor, Álmos Telegdy, and János Vincze (2007), „A közalkalmazottak béremelésének egyes mikro- és makrohatásai.” *Munkaügyi Szemle*, 51(7-8), 48-53.
- Lackó, Mária (2005), "Hidden economy and its relationship with different segments of the labour market – calculations based on a new indicator." In: Christie, E., M. Holzner and M. Lacko.
- Lackó, Mária (2006), "Tax Rates with Corruption: Labour-market Effects. Empirical Cross-country Comparisons on OECD Countries." IEHAS Discussion Papers from Institute of Economics, No. 604.
- Lacroix, Robert, and Francios Dussault (1983), "The Spillover Effect of Public-Sector Wage Contracts in Canada." *The Review of Economics and Statistics* 66(3), 509-512.
- Layard, R., S. Nickell, and R. Jackman (1991), *Unemployment: Macroeconomic Performance and the Labour Market*. Oxford: Oxford University Press.
- Lelkes, O. (2006), "Knowing What is Good for You. Empirical Analysis of Personal Preferences and the "Objective Good"." *The Journal of Socio-Economics* 35, 285-307.
- Lemieux, Thomas (2006), "Increasing Residual Wage Inequality: Composition Effects, Noisy Data, or Rising Demand for Skill?" *American Economic Review* 96(3), 461-498.
- Mehra, Y. (1975), "Spillovers in Wage Determination in U.S. Manufacturing Industries." *The Review of Economics and Statistics* 58(3), 300-312.

- Molnár, György and Zsuzsa Kapitány (2006), “Mobility, Uncertainty and Subjective Well-being in Hungary.” Institute of Economics Discussion Paper Series, 2006/5.
- Molnár, György and Zsuzsa Kapitány (2007), “Mobility, Uncertainty and Subjective Well-being in Hungary.” International Conference on Policies for Happiness, Siena 2007, <http://www.unisi.it/eventi/happiness/curriculum/molnar.pdf>
- Molnár, György and Zsuzsa Kapitány (2008), “Welfare Recipients’ Satisfaction with Their Lives and Income Position.” In: *The Hungarian Labour Market. Review and Analysis 2008* (Fazekas ed.) Budapest: Institute of Economics and Hungarian Employment Foundation.
- Nacsa, Beáta (2007), “A közzféra munkaügyi kapcsolatait szabályozó ILO egyezmények és jogalkalmazási gyakorlatuk (The ILO documents that regulate the public sector labor market).” In: *Kollektív jogok és érvényesülésük közszolgálati, szolgálati és hivatásos katonai jogviszonyban* (Berki, Fodor, Nacsa, Neumann eds.) Budapest: Raabe.
- Oaxaca, R. (1973), “Male-female wage differentials in urban labour market.” *International Economic Review* 9, 693 – 709.
- OECD: Share of the Public Employment in Total Employment: www.oecd.org/dataoecd/37/43/1849079.xls
- Postel-Vinay, Fabien, and Helene Turon (2007), “The Public Pay Gap in Britain: Small Differences the (don’t) Matter.” *The Economic Journal*, 117, 1460-1503.
- Ravallion, M. and M. Lokshin (2001), “Identifying Welfare Effects from Subjective Questions.” *Economica* 68, 335-357.
- Ravallion, M. and M. Lokshin (2002), “Self-rated Economic Welfare in Russia.” *European Economic Review* 46(8), 1453-1473.
- Rivkin, G.R., E. Hanusek, and J. Kain, (2000), “Teachers, Schools and Academic Achievement.” NBER WorkingPaper 6691.
- Scharle Ágota (2008), “Korai nyugdíjba vonulás. (Early retirement).” In: *Jóléti ellátások, szakképzés és munkakínálat* (Nagy ed.), Budapest: Institute of Economics – HAS.
- Skans, O. (2005), “Age effects in swedish local labor markets.” *Economics Letters* (86), 419–426.
- Telegdy, Álmos (2006), “The effect of the Public Sector Wage Increase on Private Sector Wages.” In: *The Hungarian Labour Market, 2007* (Fazekas and Kézdi eds), Budapest: Institute of Economics – HAS.
- Varga Júlia (2007), “Change of relative wages and the composition of those employed in the public education.” In: *The Hungarian Labour Market – Review and Analysis 2007* (Fazekas and Kézdi eds.), Budapest: Institute of Economics – HAS.
- Varga, Júlia (2007), “Kiből lesz ma tanár? A tanári pálya választásának empirikus elemzése. (Who becomes a teacher? An empirical analysis).” *Közgazdasági Szemle* 54(7-8), 609-637.
- Varga, Júlia (2006), “A közoktatásban foglalkoztatottak keresetének és összetételének változása. In: *Munkaerőpiaci Tükör 2006* (Fazekas and Kézdi eds.), Budapest: Institute of Economics – HAS.
- Vroman, Wayne (1982), “Union Contracts and Money Wage Changes in U.S. Manufacturing Industries.” *The Quarterly Journal of Economics* 94(4), 571-594.