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PUBLIC-PRIVATE SECTOR WAGE GAP: AN EVIDENCE FOR
POLAND

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INTRODUCTION

Since the 1970s, the issue of public-private pay differentials and discrimination have been of concern for economists and policy makers alike. Initially the debate focused on well-developed countries, mainly the United States. But the greater variety of countries that belong to emerging economies and their increasing role in the global economy – as well as significant political and economic changes that have taken place in those countries over the last decades – resulted in growing interest on pay differentials in developing economies. Finally, the outbreak of the last economic recession (accompanied by huge fiscal imbalances that were needed to be reduced) and adjustment to the public wage bill implemented as an effective consolidation tool (which had a relatively small negative impact on growth) revived interest in this topic in terms of public debate (Pérez et al., 2016).

An in-depth understanding of the relationship between the remunerations offered by the public and private sectors is necessary as it has far-reaching consequences for the whole economy. Public sector plays an important role as an employer – according to the OECD data public sector workers constitute 15% of total employment in Poland, while 25% of total spendings of the general government sector are expenditures related to compensation of employees.

Additionally, If one sector, which is usually the public sector, decides to discriminate against its workers by offering them higher or lower wages in comparison to the private sector, it is a sign of market inefficiency. This is because the economy might not be able to fully utilise its scarce human capital resources. But, it is worth noting that the main aim of the public sector, in contrast to private companies, is not necessarily to maximize profits – political considerations can also play an important role in wage setting. The public sector might justify itself in offering its employees earnings that do not fully reflect their productivity. But the permanent under or overpayment of workers in one sector affects the composition of employment in both sectors – high-skilled people are lured by the sector offering higher wages, while low-skilled people are crowded out from this sector and are forced to find a job in the other. The aforementioned division of workers influences the quality of goods and services provided by those sectors. Lastly, due to the linkages between both sectors and the spillover effect, changes in one segment of the labour market affect the other. Finally, it affects the entire economy – for example, an increase in public sector wages followed by a growth of wages in the private sector reduces the competitiveness of the country.

The main purpose of this thesis is to provide a comprehensive analysis of public-private pay differentials in Poland following its accession to the EU. This thesis is made up of three empirical studies that focus on the public-private sector wage gap. However, each of these empirical analyses addresses different research questions and verifies different set

of research hypotheses. The objective of the first empirical research is to test whether there are significant differences in earnings between public and private sector employees in Poland. These differences in wages are measured at the mean, as well as at various points of wage distribution. The purpose of the second analysis is to investigate the public-private sector wage gap in Poland by taking into account various sample selection schemes and to identify the impact of the problem of sample selection on pay difference estimates. The last empirical study verifies changes to the public-private pay differentials that occurred during the last economic crisis.

The remainder of this dissertation is set out as follows. Chapter 1 serves as an introduction to the subject of my analysis. At the beginning, the main features of the Polish labour market are described, including its recent developments. In the literature review, which is presented in the next section, I focus consecutively on advanced and emerging economies, illustrating the main differences in the public-private wage gap between these two types of countries. Following this, the findings of the previous studies focused on Poland are discussed. The last section of chapter 1 revolves around the formulation of hypotheses and their respective descriptions. Chapter 2 provides a detailed analysis of public-private wage differentials in Poland from 2005 to 2012. Using four econometric techniques, I verify my first two hypotheses – in other words, I investigate the existence and the size of the public-private pay gap for average workers and how it is in the entire income distribution. The objective of chapter 3 is to analyse the public-private sector wage gap in Poland taking into account various sample selection schemes, and to identify the impact of the problem of sample selection on pay difference estimates. In this chapter, I test if the analysed sample is a random draw from the population and if some unobserved worker's characteristics, which encourage him/her to work, are correlated with his/her willingness to be employed in a particular sector. Finally, after controlling for the sample selection, the discrepancy in earnings between public and private sector workers is tested. The impact that the economic recession and wage freeze has on changing the pay gap is investigated in chapter 4. The final chapter concludes the thesis.

LITERATURE REVIEW

Empirical studies provide evidence of considerable differences in the sign and the size of inter-sectoral pay gaps that exist between developed and developing countries. The results of studies dedicated to advanced economies are fairly unanimous in indicating that there is a positive wage premium paid to public sector workers, see e.g. [Smith \(1976\)](#); [Gunderson \(1979\)](#); [Pederson et al. \(1990\)](#); [Giordano et al. \(2011\)](#) and [Christofides and Michael \(2013\)](#). However, the size of the wage gap differs significantly between countries and depends on a dataset that is used in the analysis and an implemented empirical approach.

Some early studies by [Smith \(1976\)](#) for the United States indicate that up to 65 percent of wage differentials between public and private sector employees can be attributed to discrimination of the latter group of workers, whereas it equals less than 10% in the case of Canada over a similar period of time ([Gunderson, 1979](#)). In one of the most recent papers, [de Castro et al. \(2013\)](#) measure the size of the wage gap between the public and private sectors within a group of 26 EU countries by using the European Structure of Earnings Survey (SES). The results obtained from a linear regression for a pooled sample of EU countries indicate that, on average, public sector workers earned 3.6% more in comparison to private sector employees in 2010. The outcome of the Oaxaca-Blinder decomposition confirms these results – the total wage gap equals 10.5%, but 65% of the difference in earnings is due to the superior characteristics of public sector workers.

The literature devoted to developing countries is relatively scarce. It provides more ambiguous results when compared to those of advanced economies. This may be because of a greater variety of countries classified within the former group. The great diversity between countries that belong to this group makes cross-country comparisons more difficult than in the case of developed economies – they are located in very different regions (Asia, Central and Eastern Europe and South America), have different model of economic development, and vary in labour market structures. On the one hand, according to [Lau-sev \(2014\)](#), most studies for post-communist European countries show that there is a negative public-private wage gap for both genders. On the other hand, [Mizala et al. \(2011\)](#), who investigates 11 Latin American countries using a matching approach, finds a positive public-private wage differential in most of the economies studied, which increased over the 1992-2007 period.

The public-private wage gap in Poland has received little attention despite the size of the government sector, but the situation has changed in recent years. The main purpose of the studies completed at the beginning of the 2000s was to assess the impact that the transition from a central-planned economy to a free-market economy had on wages, and their distribution through the whole population instead of estimating inter-sectoral wage premia. [Adamchik and Bedi \(2000\)](#) used the data from the Labour Force Survey (LFS) for 1996 and concluded that, on average, private sector workers earn more than their public sector counterparts, and the premium is higher for females than for males. This result was confirmed in the study of [Adamchik et al. \(2003\)](#), who investigate the evolution of wages over time. Additionally, the authors conclude that the private-sector wage premium declined between 1994 and 2001 – for both men and for women.

The public-private pay differential has gained more attention in recent years. However, the results of several studies do not provide a clear picture of the superior position of any group of workers on the labour market. They differ depending on the dataset and applied econometric approaches. The studies of [Grotkowska and Wincenciak \(2014\)](#) and [Grotkowska et al. \(2016a\)](#) provide evidence of a positive private-public sector wage

premium, while [Grotkowska et al. \(2016b\)](#) conclude that public employees are better rewarded in comparison to their private sector counterparts. Despite growing interest in this topic in Poland, the ambiguity of the completed results suggests that there is still room for further enquiries.

AIMS AND RESEARCH HYPOTHESES

On the basis of the literature review and the primary research objective – to conduct a comprehensive analysis of wage differentials between public and private employees in Poland – the following hypotheses have been formulated and verified for this thesis:

1. There are wage differentials between public and private sector employees.
2. Public-private wage differentials are heterogenous at different points of earnings distribution.
3. Employment decisions are non-random.
4. Employment decisions are interrelated.
5. When controlling for the sample selection, there are wage differentials between public and private sector employees.
6. Wage freezes reduce wage gaps.

The verification of the first hypotheses allows us to state if the average wage of a public sector employee differs significantly from an average wage in the private sector. All implemented methods enable us to control for the impact of personal characteristics on the difference in earnings. Hence, a discrepancy in wages arising just from a sector of employment, that can be interpreted as a discrimination, can be estimated.

Hypothesis 2 is a natural extension of the first hypothesis, as it widens the scope of the analysis by 'going beyond the mean' and focuses on differences in wages across the entire earnings distribution. The literature review indicates that a public-private wage gap is heterogenous – the least skilled workers face the highest premium for working in the public sector, but the gap declines along the earnings distribution. It is usually insignificant, or even negative at the top of the distribution – see for example [Melly \(2005\)](#); [Giordano et al. \(2011\)](#).

The analysis presented in chapter 2 is completed assuming that people are randomly assigned to their working sector. In other words, it is expected that an individual's unobservable characteristics (e.g. ability), which influence his/her earning potential, have no impact on his/her employment decisions such as sector choice. However, the issue of

sample selection has been intensively empirically explored in studies focused on earning, see e.g. Gronau (1974); Heckman (1979); Mroz (1987); Lewis (1963).

There are at least two reasons mentioned in the literature as to why the analysed sample can be a non-random draw from the population. Firstly, participation in the labour force might be a non-random process and depends on some unobservable characteristics that people possess. As a result, the wage is observed only for those individuals that decide to work – in other words, for those whose reservation wage is below the market wage. In addition, workers can be non-randomly assigned to their employment sector, as it seems rational to assume that people decide to work in a sector in which they expect to be better rewarded. The empirical results confirm that the estimates of a wage gap depend on whether the sample selection problem is taken into account or not, see e.g. Heitmueller (2006); Christofides and Michael (2013).

Verification of hypothesis 3 allows for the conclusion that the analysed sample is a random draw from the population. In other words, the confirmation of the third hypothesis, as it is formulated above, indicates that estimates provided with the methods that ignore the sample selection problem are biased and inconsistent. Thus, the sample selection problem should be considered in wage modelling. Contrary to previous studies that usually incorporated just only type of a sample selection, in the empirical research present in chapter 3 the public-private sector wage gap in Poland is investigated assuming various sample selection schemes, namely: i) participation in the labour force; ii) selection to the employment sector; iii) double selection to the workforce and employment sector assuming there is no correlation between those decisions; and iv) double selection to the workforce and employment assuming a correlation between those decisions. Additionally, the impact of including sample selection terms on the pay gap is compared.

Hypothesis 4 is an extension of the former hypothesis when more than one source of selection is considered. I test whether taking into account more than one source of sample selection, namely due to participation in labour force and sector choice, helps to improve an estimation of the coefficients and if those selection mechanisms relate to each other. The last hypothesis that is verified in chapter 3 (hypothesis 5) is formulated by analogy to the first hypothesis.

As previously indicated, the issue surrounding a public-private sector wage gap has experienced a revived interest since the onset of the last economic crisis. The growing popularity of this topic arises not only from the fact that the slowdown in economic activity directly affected employment and wages in the private sectors – as most companies were forced to cut costs in order to improve their competitiveness – but also because of the worsening of fiscal positions in most of the EU countries that resulted from the introduction of consolidation measures, such as a public sector wage freezes or reductions. To the best of my knowledge, the impact of fiscal adjustments on wages and the pay gap has not been widely investigated so far – just two studies have been identified that

are concerned with this issue, see [Christopoulou and Monastiriotis \(2016\)](#); [Pérez et al. \(2016\)](#). The last chapter discusses changes in the pay gap that occurred over recent years. My main interest is to assess how the implemented wage freeze for employees in the government sector contributed to changes in the wage gap.

DATA AND EMPIRICAL APPROACH

In my empirical analyses presented in the next three chapters I use individual-level data for the years 2005-2012 from the European Union Statistics on Income and Living Conditions (EU-SILC) for Poland. The chosen dataset not only provides up-to-date data, but is now the most commonly used data source for this kind of research. The potential advantage of using this particular dataset arises from the possibility of comparing the results of my studies with the findings from other European countries. Additionally, it includes a wide range of personal and job's characteristics that can be used as control variables.

One of the major limitations of the data used in this thesis, is the fact that it is impossible to precisely allocate respondents to the public and private sector. This is because there is no direct question in the EU-SILC questionnaire about the sector in which one is employed. In this thesis, the public sector is defined in a broad sense – in other words, it is an aggregate of public administration, education and health sectors, see e.g. [Giordano et al. \(2014\)](#).

All empirical methods applied in the thesis are based on the Mincerian equation ([Mincer, 1974](#)). In the most popular specification of human capital, log earnings are expressed as a linear function of years of schooling and a quadratic function of years of potential experience.

$$\ln(w) = \ln(w_0) + \rho s + \beta_0 x + \beta_1 x^2 + \varepsilon, \quad \varepsilon \sim N(0, \sigma^2), \quad (1)$$

where w is earnings, w_0 is the level of earnings of an individual with no education and no experience, s denotes years of schooling, x is years of potential working experience and parameters ρ , β_0 and β_1 are interpreted as returns to education and labour market experience, respectively. Additionally, it is assumed that ε is independent and identically distributed with mean zero and variance equalled to σ^2 .

Since its publication, the model has been extensively modified by extending the list of variables, which can potentially determine earnings or using estimation methods that allow to assess the wage gap across earning distribution. To estimate the public-private sector wage gap, four econometric methods were applied (linear regression, quantile regression, Oaxaca-Blinder decomposition, quantile decomposition) – the first two help with understanding the difference in earnings for the average values, whereas the others allow

us to examine the gap within the entire income distribution. Additionally, decomposition methods (Oaxaca-Blinder decomposition and quantile decomposition) relaxes the assumption of equal returns to characteristics. Lastly, the literature of this field does not indicate the superiority of one econometric technique over the other. Therefore the results obtained with the use of different methods can be compared with each other and used as a robustness check.

The impact of a sample selection on the wage gap estimates is assessed with the use of the two-step approach proposed by Heckman (1979) and the modified version of Oaxaca-Blinder decomposition. In the first step, the selection equation has to be defined – depending on the number of selection processes that are considered as well as a possible interrelation between them, the selection regression can take the form of a probit model (single selection and/or double selection with independent error terms in selection equations) or a probit model with a sample selection (double selection with correlated error terms in selection equations). Then, on the basis of the results of the selection equation(s), the inverse Mills ratios are computed and included in earning regressions as an additional control variable(s).

To investigate the evolution of a public-private pay gap during the last economic downturn, and to analyse the impact of freezing the wage bill had on the difference in earnings between public and private workers, the modified version of Oaxaca-Blinder is applied. The proposed approach allows to analyse both differences between two groups of workers and changes of wages in time. It is assumed that the unexplained component of the public sector equation can reflect the impact of a wage bill freeze on pay gap. One can presume that changes to the government's wages policy is the only reason why the characteristics can be differently evaluated by the government as earnings in the public sector do not adjust automatically with improving or worsening economic conditions in the labour market. Consequently, the unexplained component of the private sector part indicates changes due to economic conditions, as wages in the private sector should adapt to the situation in the labour market.

RESULTS

The results of the first empirical study support the hypothesis of a positive wage premium for public sector workers. Both the results of linear regression and the Oaxaca-Blinder decomposition show that the observed pay differential cannot be fully attributable to the superior characteristics of public sector employees – it is partly a result of positive discrimination against people employed in the public sector. The size of public sector employee overpayments depends on the applied econometric techniques and the year of analysis; it ranges from 5% to 15%. In one of the latest studies for Poland, Grotkowska et al. (2016a) assesses that public sector workers earn 5-7% more in comparison to their

private counterparts. It is worth mentioning that both analyses present coherent results even though they are based on different datasets.

With regard wage differences in the entire earnings distribution, the findings suggest that the premium is highest for low-paid workers, but it diminishes as we move up the wage distribution, and the gap is even negative at the upper tail of earnings distribution.

The obtained outcomes are in line with trends observed in the majority of countries in Western Europe and North America, see for example [Mueller \(1998\)](#); [Melly \(2005\)](#); [Giordano et al. \(2011\)](#); [Christofides and Michael \(2013\)](#) and the latest findings for Poland, see e.g. [Grotkowska et al. \(2016a,b\)](#). The similarity of my findings to the tendencies observed in well-developed countries (the positive public sector pay differential and its reduction in earnings) suggests that, with regard the structure of wages, the Polish labour market coincides with Western European and North American countries. There is also evidence that public sector wage premium is countercyclical. Indeed, it can be observed that the wage premium shrinks during a time of prosperity and rises as the economy slumps. The countercyclical nature of the wage premium results from the relatively higher growth (deeper reduction) of salaries in the private sector compared to the public sector in a boom (in recession). This is because earnings in the public sector usually adjust with some lag to those in the private sector.

The second empirical study focuses on the impact of the sample selection of workers on the wage gap estimates. The results confirm a non-random assignment to labour force and sector of employment. However, only in the case of private sector workers, the selection correction terms included in the wage equations are significantly different from zero – they indicate positive selection into labour force participation and sector of employment. Thus, private sector employees behave rationally and effectively allocate their resources – they possess some personal features which encourage them to find employment in the private sector. Because of these characteristics they can expect higher wages in this sector than a random person from the population at large. This finding is partly in line with results of some other studies – the analysis prepared by [Heitmueller \(2006\)](#) for Scotland indicates a positive selection into working sector, but only in case of men.

The answer to a question about the relationship between participation in the labour force and work in the public sector is rather ambiguous, as the correlation coefficient is negative and significant at the beginning of the analysed period – but then the decisions seem to be unrelated. Therefore, the data just partly supports the fourth of my research hypotheses. The correlation between employment decisions and its diminishment over time reflects the impact of the recession on people's preferences – as the likelihood of finding a job decreases during an economic downturn, people are more willing to accept a position in a less preferred sector. [Heitmueller \(2006\)](#) who considers the double selection problem also prefers the univariate probits approach.

The comparison of wage gaps estimated, assuming various selection schemes, cor-

roborates the hypothesis with regard the existence of wage differentials between public and private sector employees even after controlling for the sample selection. In fact, the election-corrected wage differential is greater than the unadjusted one, regardless of the selection scheme – a similar result was also found by [Christofides and Michael \(2013\)](#) in their analysis for a group of EU countries. Hence, the potential gap in the population would be wider than the one observed in the data. It suggests that private sector employees have higher productivity than an average person taken from the population. But inclusion of correction terms does not change the qualitative results of the decomposition, as in most years the difference in earnings is due to the superior characteristics of public sector workers.

The aim of the last chapter is to investigate the evolution of a public-private pay gap during the last economic downturn, and to analyse the impact of that freezing the wage bill had on the difference in earnings between public and private sector workers. In contrast to what was expected, the findings indicate that the public-private wage premium increased in the slowdown. But neither the economic conditions nor the fiscal adjustment contributed to this growth in pay differentials. The insignificant price effect, in the case of the public sector, can be interpreted as a sign of the effectiveness of the implemented fiscal measure. The widening of the wage gap results from an improvement in the quality of workforce that occurred at this time in both sectors, but it was stronger in the public sector. The findings are partly in line with a study by [Christopoulou and Monastiriotis \(2016\)](#), who also illustrate public-private pay differentials grew during the crisis, and the positive influence of rising skills in both sectors.

CONTRIBUTION

The obtained results help to fulfil gaps that were identified in the literature of this field. First empirical study provides some knowledge about the differences in earnings between public and private sector employees in Poland and to some extent confirms the latest findings of [Grotkowska et al. \(2016a\)](#) and [Grotkowska et al. \(2016b\)](#). The results of the second empirical research suggest that the problem of a sample selection should be taken into account in wage modelling. However, it does not give a clear answer if adoption of a more complex selection schemes allows to receive more reliable and more precise results. Finally, to the best of my knowledge, the last analysis is a first study that investigates changes in a wage gap in a formal manner.

The empirical analyses conducted lead to several policy implications. First, and most importantly, the wage and salaries policy of the public sector makes employment in this sector especially attractive for low-skilled workers, as they gain the highest premium. However, the constant overpayment of the least productive people, combined with the underpayment of the most productive, can result in problems with employing people to

managerial positions. This issue might be especially acute in big cities (e.g. in Warsaw), in which the remunerations offered by private firms exceed the wages of the public sector. Lower worker productivity affects the quality of goods and services provided by the public sector.

Additionally, positive selection into the private sector indicates that the potential difference in earnings in favour of the public sector would be even larger than the observed one – in other words, the average wage of a public sector employee is probably far above his productivity. Steps undertaken by authorities in recent years – for example, a gradual increase of a minimum wage at a pace exceeding the growth of an average wage in the economy, or the introduction of a minimum hourly wage – should contribute to a closure of the pay gap, at least for the low-paid workers. But if the public sector is interested in improving the quality of its executive staff, it should adopt some measures that make the employment conditions more competitive.

The last empirical study confirms that low-skilled people are the most affected by the economic downturn – in the case of redundancies they may be the first to receive a termination notice or can have problems with finding a job. This might suggest that disadvantaged workers, e.g. poorly educated, should be protected in a specific way, especially during less favourable economic conditions.

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