WPS7925

Policy Research Working Paper 7925

The Public/Private Wage Differential in the Land of Gross National Happiness

Achim D. Schmillen

WORLD BANK GROUP
Social Protection and Labor Global Practice Group
December 2016

Policy Research Working Paper 7925

Abstract

In Bhutan, the public sector is usually seen as the most desirable employer. This study asks if this can be attributed to public sector employees receiving higher wages than comparable private sector workers. To answer the question, the study combines an Oaxaca-type decomposition of wage differentials into characteristics and coefficients effects with a multinomial logit model for self-selection into labor force participation and the public or private sector. The study finds that the public/private wage differential is sizeable but can entirely be accounted for by observable characteristics. At the same time, there is strong evidence that preferences for public sector jobs are caused by pronounced intersectoral differences in overall compensation packages, in particular fringe benefits.

This paper is a product of the Social Protection and Labor Global Practice Group. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at http://econ.worldbank.org. The author may be contacted at aschmillen@worldbank.org.

The Public/Private Wage Differential in the Land of Gross National Happiness

Achim D. Schmillen

The World Bank; 1818 H St., NW; Washington, DC 20433; USA; phone: +1 (202) 473 1000;
email: aschmillen@worldbank.org

JEL-Classification: J31, J45, O15

Keywords: public/private wage differential, sector selection, decomposition methods, Bhutan

Acknowledgements: I thank Genevieve Boyreau and Pablo Gottret for guidance and Laurent Bossavie, Urmila Chatterjee, Afra Chowdhury, Ira Gang, Cem Mete, Jasmine Rajbhandary and Martin Rama for helpful comments and suggestions. Special thanks are due to the officials of Bhutan's Ministry of Labour and Human Resources for their productive cooperation throughout this project and for their comments on a previous version of this paper.

1. Introduction

All over the world, public sector labor markets and especially the determination of wages in the public sector have attracted a great deal of attention by both researchers and policy makers. As noted by Gregory and Borland (1999), this attention seems to be largely due to the significant size of many public sector labor markets and also to their fundamental differences from private sector labor markets. With regard to wage determination, competition imposes discipline on (many) private sector wages whereas (many) public sector wages are not governed by market forces but are instead influenced by political developments, government priorities and similar non-market processes. In an early contribution, Fogel and Lewin (1974) establish that *de jure* public sector workers in many jurisdictions are supposed to obtain wages equivalent to those received by private sector workers performing comparable work. While Fogel and Lewin (1974) argue that this "prevailing wage principle" is sensible in terms of both equity and efficiency they note that *de facto* it is often violated.

This study asks whether public sector wages in Bhutan follow the prevailing wage principle or if instead systematic differences between the wages of the country's public and private sector workers exist. To answer this question, a three-step procedure is used that makes it possible to (i) account for possible self-selection into labor force participation and into public or private sector work, (ii) estimate flexible models of wage determination for the public and the private sector and (iii) investigate the proportion of the differences in the average levels of hourly wages between public and private sector workers that is accounted for by differences in the level of individuals' characteristics (the "characteristics effect") and by differences in the impact on wages of these characteristics (the "coefficients effect"), as originally suggested by Oaxaca (1973).

The three-step procedure reveals that average public sector wages are significantly higher than average wages in the private sector. Quantile regressions show that the public/private wage differential is especially pronounced in the left tail of the wage distribution. However, in the mean and across most of the wage distribution, the public/private wage differential can entirely be accounted for by differences in observable characteristics between public and private sector workers (in particular by differences in the average educational attainment and industrial structure between public and private sector). Therefore, the study finds that in the narrow sense of the word, i.e., as far as wages and not overall compensation packages are concerned, Bhutan's public sector does in fact follow the prevailing wage principle. However, it has to be noted that Bhutan's public sector workers enjoy more extensive

fringe benefits, better access to pensions and other social insurances, more job security and higher prestige. Therefore, overall compensation packages received by Bhutan's public sector workers tend to be far more generous than those offered in the private sector. This also explains why for many in Bhutan the public sector is the most desirable employer.

This study aims to make three contributions. First, it is among the very first empirical studies on Bhutan's labor market and the very first one documenting patterns of sector selection, wage structure and wage determinants. The issue of public/private wage differentials is particularly relevant for Bhutan as the country's public sector is not only seen as the sector of choice by many job seekers but also large, comprising almost 50 percent of employment outside agriculture. Because three hydropower projects currently under construction that together have a cost of 150 percent of Bhutan's GDP will come on stream in the coming years, incentives to expand the size of the public sector even further are likely to rise as are incentives to increase the generosity of the compensation packages offered to public sector workers. Second, the study adds to the literature on public/private wage differentials in development countries. While quite a bit is known on this issue for developed and transition economies, knowledge is still limited or even non-existent for large parts of the developing world. Finally, by using a refined three-step procedure that combines the decomposition method introduced by Oaxaca (1973) with the multinomial logit model for sector self-selection suggested by Bourguignon, Fournier and Gurgand (2007) the study makes a methodological contribution.

This study is closely related to the microeconomic literature on public/private wage differentials. Ehrenberg and Schwartz (1986), Bender (1998) and Gregory and Borland (1999) review early contributions largely with respect to developed countries. The body of literature focusing on transition economies is surveyed in Lausev (2014). The literature for developing countries is more scattered. Pioneering analyses include those by Lindauer and Sabot (1983) for Tanzania, van der Gaag and Vijverberg (1988) for Côte d'Ivoire, Stelcner, van der Gaag and Vijverberg (1989) for Peru and Terrell (1993) for Haiti. More recently, empirical investigations of the public/private wage differential have been conducted for Vietnam (Bales and Rama, 2001), China (Chen, Démurger and Fournier, 2005, and Démurger, Li and Yang, 2012), Turkey (Tansel, 2005), India (Glinskaya and Lokshin, 2007, and Saha, Roy and Kar, 2014), Pakistan (Aslam and Kingdon, 2009), different Latin American economies (Mizala, Romaguera and Gallegos, 2011), again Peru (Coppola and Calvo-Gonzales, 2011) and a handful of other countries. As noted by Lausev (2014), the relevant literature typically finds that

average public sector wage premiums in developing countries are positive and larger than those in developed economies.

The rest of this paper is structured as follows: Section 2 provides background on the economic situation in Bhutan. Section 3 contains a description of the Bhutan Labour Force Survey (BLFS) 2014, the data set used henceforth. The same section also introduces the analytical strategy and describes the econometric model underlying the three-step procedure. The main empirical analysis follows in Section 4. The section consists of four parts: First, a compilation of descriptive statistics on wages, fringe benefits and other variables. Second, an analysis of self-selection into labor force participation and public or private sector as well as of the determinants of wages in either sector and a decomposition of the selection-adjusted difference in average wages between public and private sector into characteristics and coefficients effects. Third, an appraisal of whether results are robust to variations in the empirical setup. Fourth, similar decompositions for different quantiles of the wage distribution. Finally, Section 5 discusses possible implications for research and policy and concludes.

2. Background

Bhutan is a landlocked country in South Asia bordering China to the North and India to the West, South and East. According to NSB (2014), Bhutan's population in 2014 was around 745,000 and its land area covers 38,394 square kilometers. Thus, Bhutan has a population in the same order of magnitude as the Comoros or Guyana and covers a land area similar to that of the Netherlands or Switzerland. Bhutan's official currency is the *ngultrum* or *Nu*. The *Nu* is pegged to the Indian *rupee* at par; in late 2014 one US dollar was worth about *Nu* 63.5. Administratively, Bhutan's territory is divided into 20 *dzongkhags* (administrative districts). The 20 *dzongkhags* are further divided into 205 *gewogs* (groups of villages).

Bhutan is maybe most famous for introducing and popularizing the concept of Gross National Happiness (GNH), now enshrined as a principle of state policy in Article 9 of the country's constitution. Exact characterizations of GNH differ but one widely cited publication defines it as a "multi-dimensional development approach that seeks to achieve a harmonious balance between material well-being and the spiritual, emotional and cultural needs of our society" (GNHC, 2012, p. 3). Over the last decades, Bhutan has seen rapid and sustained economic growth. In 2014, its GDP per capita reached US dollar 2,379 according to the World Development Indicators. Over the last

decades, Bhutan has also achieved broad-based and inclusive poverty reduction. As noted by NSB and World Bank (2014), between 2007 and 2012 the proportion of the population with consumption below the official poverty line dropped by half and Bhutan was able to practically eradicate extreme poverty. Multidimensional poverty indices and indicators related to education and health outcomes have also seen significant improvements.

With regard to Bhutan's labor market, overall conditions are more favorable in the country than in most other South Asian economies. For instance, data from MoLHR (2015) show that in 2014 Bhutan's overall unemployment rate stood at 2.6 percent. Besides, the gaps between male and female labor force participation and employment rates have long been much narrower than in many other South Asian economies. While the overall education level of Bhutan's labor force continues to be comparatively low, it has been improving rapidly due to a trend toward almost universal enrollment in primary education, increasing enrollment rates in secondary education, and an ever greater emphasis on tertiary education.

At the same time, Bhutan faces a number of significant labor market challenges and bottlenecks. These include high levels of informality and underemployment (in particular in rural areas), a limited formal social protection system and relatively elevated rates of unemployment for certain parts of the labor force, especially for young, well-educated city dwellers. Specific labor market challenges relate to the interplay between the public and the private sector. A vibrant private sector has yet to emerge in Bhutan. As documented in MoLHR (2015), the country's public sector comprises almost 50 percent of employment outside agriculture. It also employs two-thirds of workers with tertiary education. In addition to that, the public sector is widely perceived as the preferred employer, including among educated youth who aspire to white-collar jobs. In a recent survey among unemployed youth in Bhutan, 50.3 percent of respondents said they would prefer to work for the government and another 32.4 percent aspired for a job in a state-owned enterprise (MoLHR and UNDP, 2014). Similar data from the 2014 edition of the Bhutan Labour Force Survey confirm that the majority of unemployed persons would like to work in the public sector. Highly educated persons are particularly keen to find a job in the public sector and the perceived superior salary, good benefit packages and high job security of public sector jobs are cited among the main reasons for why work in the public sector is so attractive.

With major hydropower projects coming on stream in the next few years, Bhutan's macroeconomic environment is expected to change radically in a short period of time. This will potentially exacerbate the already existing imbalances between public and private sector. The three hydropower projects currently under construction in Bhutan together have a cost of 150 percent of the country's GDP. Already today, hydropower contributes 30 percent of the Royal Government of Bhutan's domestic revenues and this figure is expected to reach 56 percent by 2024/25. While Bhutan's hydropower developments are a huge opportunity for the country's development, they also carry risks. In particular, they are expected to lead to an appreciation of real exchange rates through higher wages and land and real estate prices. This "Dutch disease" phenomenon will make it ever harder for the private sector to compete in the tradable sector. Furthermore, because the hydropower revenues will enter Bhutan through the government budget, the incentives to expand the size of the public sector and increase public sector pay and benefits are likely to rise. This might limit opportunities for the private sector even in the non-tradable part of the economy.

3. Data, Analytical Strategy and Econometric Model

3.1. Data

The analysis relies on data from the 2014 edition of the Bhutan Labour Force Survey (BLFS), described in detail in MoLHR (2015). The BLFS is a household survey that is conducted annually by the Department of Employment of Bhutan's Ministry of Labour and Human Resources (MoLHR). The BLFS covers a nationally representative sample of around 6,000 households in all 20 *dzongkhags* of Bhutan. As Bhutan's urban residents are more heterogeneous than its rural population and economic activities in urban centers are more diverse, urban households are oversampled. In 2014, the BLFS covered 1,479 rural and 4,440 urban households for a total sample of 5,919 households. On average, sampled households contained about four household members resulting in a total sample size of 23,587 individuals.

In each household covered in the BLFS, all questions are answered by one respondent, often the household head. Respondents are questioned about variables concerning the household as a whole and about socio-demographic and work-related characteristics of all household members. Together with items on labor force participation, the core of the BLFS questionnaire encompasses questions related to the household members' current work status and employment history. An additional module

covers housing and asset ownership, risks and coping mechanisms, and coverage of social protection programs on the household level. Interviews were done in December 2014 and January 2015. For the first time for a large-scale household survey in Bhutan, tablet-based computer-assisted personal interviews (CAPI) were conducted. The objective was to improve data quality and streamline data analysis. As another measure to assure high data quality, all respondents were asked for their cellphone numbers and during a meticulous data cleaning exercise these numbers were used to reach out to respondents in case any inconsistencies or missing values had been discovered in the raw BLFS data.[1]

The BLFS contains information on household members' monthly earnings and weekly hours. Both variables are available for dependent as well as own-account workers. Under the assumption that each month consists of 4.35 weeks this makes it possible to construct a measure for hourly wages.[2] The survey also ascertains whether a worker is employed in the civil service, other government agencies, the armed forces or state-owned enterprises (which following ILO, 2009, together constitute the public sector), in agriculture or private enterprises (defined henceforth as the private sector) or by a non-governmental organization, international non-governmental organization or community service organization (a very small group of workers that is henceforth disregarded).

Additionally, the 2014 edition of the BLFS questions respondents about a wide range of household members' individual characteristics useful for an analysis of wages. These include information on labor market characteristics such as whether an individual is a regular paid employee, casually paid employee, contract worker, own-account worker or unpaid family worker. Henceforth, unpaid family workers and/or workers for whom an hourly wage cannot be discerned will not be considered. Comprehensive sectoral information is also available in the BLFS. For the purpose of this study, this information is aggregated to the level of 16 broad sectors according to the ISIC Rev. 3 classification (agriculture, hunting and forestry; fishing; mining and quarrying; manufacturing; electricity, gas and water supply; construction; wholesale and retail trade; hotels and restaurants;

[1] To verify the reliability of the BLFS data, Appendix A compares size, structure and annual average pay of Bhutan's civil service according to the BLFS with administrative data from the country's Royal Civil Service Commission (RCSC, 2014, 2015). While some noteworthy discrepancies between the civil service employment structure according to the BLFS data and RCSC (2014) can be documented, the overall size, structure and annual average pay of the civil service is similar according to both sources.

[2] Implicitly, the construction of the measure for hourly wages assumes equal pay structures in the public and the private sectors. Alternative computations not reported here but available upon request document that the main results of Section 4 are robust to instead constructing the wage variable under the assumption that a month consists of four weeks for public sector workers and 4.5 weeks for private sector workers (or *vice versa*).

Table 1
Variable definitions

Variable	Definition
Hourly wage in *Nu*	Average monthly earnings from primary job in *Nu* divided by total hours worked for the primary job in the past week multiplied by 4.35
Regular paid employee	Individual performing any kind of work for wage or salary, in cash or in kind
Casual paid employee	Individual working as and when they find a job for which they get paid, in cash or in kind
Contract / piece paid worker	Individual who has a temporary contract to do a particular piece of work but is not an employee of the company he/she is working for
Own-account worker	Individual operating his own enterprise neither employing anybody to operate his/her enterprise nor being employed by anybody
Potential experience	Age minus six for individuals with no or no formal education, age minus years of schooling minus six for individuals with one to 12 years of schooling, age minus 20 for individuals with undergraduate degree below Bachelor's degree, age minus 21 for individuals with Bachelor's degree, age minus 23 for individuals with graduate degree, individuals aged 14 or under or 66 or over are not covered
Education	No formal education includes no or no formal education, primary education includes nursery and/or up to five years of schooling, lower secondary education includes six to eight years of schooling, middle secondary education includes nine or ten years of schooling, higher secondary education includes 11 or 12 years of schooling, lower tertiary education includes undergraduate degree including Bachelor's degree, higher tertiary education includes graduate degree (Master's degree or higher), religious education is not covered
Industry	Industry classified according to top level of ISIC Rev. 3, wholesale and retail trade includes wholesale and retail trade and repair of motor vehicles, motorcycles and personal and household goods, transport and communications includes transport, storage and communications, real estate and business activities includes real estate, renting and business activities, public administration and defense includes public administration and defense and compulsory social security, other service activities includes other community, social and personal service activities, extra-territorial organizations and bodies are not covered
Location	20 *dzongkhags* (Bumthang, Chukha, Dagana, Gasa, Haa, Lhuntse, Mongar, Paro, Pemagatshel, Punakha, Samdrup Jongkhar, Samtse, Sarpang, Thimphu, Trashigang, Trashiyangste, Trongsa, Tsirang, Wangdue Phodrang and Zhemgang)
Wealth index	Weighted first principal component factor of variables capturing household ownership of sofa set, furniture, heater, *bukhari*, fan, *choesham*, mobile phone, bicycle, rice cooker, curry cooker, water boiler, refrigerator, modern stove, microwave oven, camera / video camera, radio / cassette / CD player, television, VCR / VCD / DVD player, computer / laptop, rice grinding machine, jewelry, dish antenna / decoder, lamps / kerosene lamps, foreign bow, electric iron, sewing machine, washing machine, tractor, bike / scooter, family car as well as the number of pigs, cattle, yaks, buffaloes, horses, sheep goats and chicken and the acreage of wet land, dry land and other land owned and whether the household owns its dwelling and whether the dwelling has electricity
Prop. of individuals in household aged 14 or under	Number of household members aged 14 or under divided by total number of household members
Prop. of individuals in household aged 66 or over	Number of household members aged 66 or over divided by total number of household members
Prop. of individuals in household in public sector	Number of household members in public sector (not counting respective individual) divided by total number of household members minus one
Prop. of individuals in household in private sector	Number of household members in private sector (not counting respective individual) divided by total number of household members minus one

transport and communications; financial intermediation; real estate and business activities; public administration and defense; education; health and social work; other service activities; and private households).

Information on socio-demographic characteristics, such as individuals' age and education are included in the BLFS as well. This allows the construction of a variable for potential labor market experience. Information on an individual's location (*dzongkhag* and urban or rural area) and his or her gender and nationality (Bhutanese or not) can also be used. Lastly, the questionnaire contains a series of questions on households' wealth and exact demographic composition. For precise definitions of all variables used in the empirical analysis of Section 4, cf. Table 1.

3.2. Analytical Strategy and Econometric Model

The microeconomic literature has used a wide range of methods to investigate wage differentials between public and private sector workers (cf. Lausev, 2014, for an overview). Among the most commonly used methods are "single equation" models and "double equation" models. Single equation models are basically wage regressions in the tradition of Mincer (1974) for the whole economy that include a public sector dummy variable. For double equation models separate wage regressions are run for the public and private sector samples. The main advantage of single equation models is that they make corrections for self-selection into labor force participation and specific sectors straightforward. In the context of analyzing wage differentials between public and private sector, controlling for such self-selection is of paramount importance. On the other hand, double equation models are more flexible and allow intercepts and returns to productive characteristics to differ across sectors. They can also be an intermediate step for counterfactual decompositions, i.e., for an investigation of the proportion of the differences in the average levels of hourly wages between public and private sector workers that is accounted for by differences in the level of individuals' characteristics (the "characteristics effect") and by differences in the impact on earnings of these characteristics (the "coefficients effect") as originally suggested by Oaxaca (1973).[3]

[3] The Oaxaca type decomposition was originally introduced to study racial or gender wage differentials. It has since been applied to many other areas.

Here, a procedure is used that combines the decomposition method introduced by Oaxaca (1973) based on a double equation model with the multinomial logit model for sector self-selection suggested by Bourguignon, Fournier and Gurgand (2007):[4] The combined procedure makes it possible to account for possible self-selection into labor force participation and into public or private sector work in a straightforward way, to estimate a flexible double equation model and to conduct a counterfactual decomposition of the wage differential between public and private sector. It consists of three steps: In the first step, a multinomial logit model for simultaneous selection into labor force participation and into the public or private sector is estimated. Second, the correlates of log hourly wages are estimated separately for public and private sector workers. Finally, the difference in mean hourly wages of the two groups is decomposed into characteristics and coefficients effects.

The basic model for steps one and two is given by

(1) $Y_s = X_s\alpha_s + \varepsilon_s$ and

(2) $Y_s^* = Z_s\gamma_s + \eta_s$.

Here $s = \{public, private, inactive\}$ indicates the sector (in this case public sector, private sector or inactivity), Y_s refers to the wage associated with work in a specific sector of employment, Y_s^* is a discrete choice variable that indicates the choice of a sector of employment. X_z and Z_s are vectors of demographic, institutional, regional or labor-related explanatory variables. ε_s and η_s are error terms. Equation (1) is a wage equation in the tradition of Mincer (1974) and equation (2) an equation for simultaneous choice of labor force participation and sector.

In the most basic double equation model, wage equations for the public and the private sector are estimated separately and without consideration for sector self-selection. However, if individuals have unobserved characteristics that affect both their choice of employment and their wages, then the error terms ε_s and η_s will be correlated and estimates of α_s that do not account for self-selection biased and inconsistent. To correct for this potential inconsistency, applied research has traditionally employed the bias correction method embedded in Lee's (1983) extension of the Heckman (1979)

[4] A combination of the selection correction strategy by Bourguignon, Fournier and Gurgand (2007) and decomposition by Oaxaca (1973) has previously been used in similar form by a small number of studies, including by Chen, Démurger and Fournier (2007). The exposition of this section draws on Bhaumik, Gang and Yun (2006), Bourguignon, Fournier and Gurgand (2007), Dimova and Gang (2007) and Gang and Schmillen (2014).

two-stage selection model to the multinomial logit case. The advantage of Lee's (1983) approach is that it is fairly simple. It requires the estimation of only one correction term. However, Bourguignon, Fournier and Gurgand (2007) note that this simplicity is achieved at the cost of relatively restrictive assumptions. They use Monte Carlo methods to show that a variation of the selection-correction approach suggested by Dubin and McFadden (1984) performs better in practice.

The approach proposed by Bourguignon, Fournier and Gurgand (2007) is again based on a multinomial logit model. Its central feature is that it takes the correlation between the disturbance terms from each wage equation and the disturbance terms from each multinomial logit equation (namely the terms ε_s and η_s) explicitly into account. This link is incorporated by assuming a linear association between ε_s and η_s. After further assuming that the Independence of Irrelevant Alternatives (IIA) hypothesis holds and performing a number of algebraic manipulations, Bourguignon, Fournier and Gurgand (2007) propose the following selection-corrected variant of equation (1):

$$(3)\quad Y_s = X_s\alpha_s + \sigma_s\left[\rho_s m(P_s) + \sum_{j=1\ldots M|j\neq s}\rho_j\frac{P_j}{(P_j-1)}m(P_j)\right] + \varepsilon_s,$$

where P_s is the probability of self-selection into sector s and the $m(P_s)$e are bias correction terms. While the $m(P_s)$ have no closed form they can be computed numerically after the multinomial logit estimation. Moreover, Dimova and Gang (2007) point out that as the number of bias correction terms in this equation is equal to the number of multinomial logit choices one can identify not only the direction of the bias related to the allocation of individuals in a specific sector but also which choice among any two alternative sectors this bias stems from. For instance, a positive bias correction coefficient related to the private sector selection equation in the public sector wage equation highlights higher wages of individuals in the public sector compared to individuals taken at random due to the allocation of people with less favorable unobserved skills out of the public sector into the private sector.

The empirical estimation of equation (3), i.e., of separate selection-corrected wage regressions for the private and the public sector, forms the basis for the third and final step. In this step, a selection-adjusted Oaxaca type decomposition is used to investigate the proportion of the differences in the average levels of hourly wages between public and private sector workers that can be accounted

for by characteristics and coefficients effects, respectively. Formally, the stylized Oaxaca type decomposition equation can be written as

$$(4)\quad \bar{Y}_{public} - \bar{Y}_{private} = \left(X_{public} - \bar{X}_{private}\right)\beta_{public} + \bar{X}_{private}\left(\beta_{public} - \beta_{private}\right) + \bar{e}_{public} - \bar{e}_{private},$$

or alternatively as

$$(5)\quad \bar{Y}_{public} - \bar{Y}_{private} = \left(X_{public} - \bar{X}_{private}\right)\beta_{private} + \bar{X}_{public}\left(\beta_{public} - \beta_{private}\right) + \bar{e}_{public} - \bar{e}_{private}.$$

Here, $\bar{Y}_s$ denotes average log hourly wages and $\bar{X}_s$ is a $1 \times K$ vector of average individual characteristics of sector $s = \{public, private\}$ including the relevant correction terms. β_s is a $K \times 1$ vector of parameters and $\bar{e}_s$ the average error terms which are zero by construction. The first, second, and third components of the right-hand side of equations (4) and (5) are called the characteristics, the coefficients and the residuals effects, respectively. The key difference between equations (4) and (5) is that equation (4) uses public sector coefficients as the baseline while equation (5) relies on private sector coefficients for this purpose. As there is rarely a particular reason to estimate either equation (4) or equation (5), Reimers (1983) proposes to use the average coefficients over both groups instead. This is the approach followed here. Moreover, Bhaumik, Gang and Yun (2006) note that the coefficients effect generally incorporates the effect of differences in the constant term between sectors. The coefficients of the constant terms explain the wage differential between public and private sector workers that is not attributed to explanatory variables. Hence, the difference in the constant terms may be interpreted as baseline differences between the two sectors. It can be separated from the effects of the other coefficients.

The characteristics and coefficients effects can be further decomposed into subgroups of variables or even individual variables. In this context, a critical issue is that the decomposition results for categorical variables depend on which category is chosen to be the omitted base category. To avoid this issue and to arrive at decomposition results that are independent of such a choice, this study makes use of a method introduced by Yun (2005). The method relies on first estimating the group models with the standard dummy coding. Next, the coefficient vectors are transformed so that they represent deviations from the grand mean and the coefficient for the base category is added.

Also note that while the estimates from the second stage wage regressions and the third stage are consistent, their standard errors are inefficient. However, efficient standard errors can however be obtained with the help of the bootstrap. This is the approach followed here.

In terms of characteristics to be included in the vectors of explanatory variables, X_z and Z_s, this study uses potential experience, potential experience squared, nationality and gender of the worker and indicators for his or her educational attainment and type of employment in the wage equations and ensuing Oaxaca type decomposition. The inclusion of these variables is based on standard human capital theory. For similar reasons, variables for the sector and *dzongkhag* of employment and a rural/urban dummy variable are also included in the wage equations and Oaxaca type decomposition. In contrast, occupation dummies are not included. This is due to their potential endogeneity related to the interaction of self-selection into sectors and into occupations.[5]

When estimating the equations for selection into labor force participation and into private or public sector work, all controls for an individuals' socio-demographic characteristics, education and location are again included. To avoid identification to rely entirely on the parametric form of the multinomial logit model, a number of additional variables appear in the selection equation but not in the earnings equation. I.e., these explanatory variables are used as excluded instruments. Here, excluded instruments are mainly family characteristics – the proportion in the household of children aged 14 or under, seniors aged 66 or over, private sector workers and public sector workers. The selection of family characteristics as excluded instruments borrows significantly from the literature on labor supply and earnings. For instance, Christofides and Michael (2013) and Gang and Schmillen (2014) postulate that the presence of children and/or old individuals in the household should influence self-selection into labor force participation and Christofides and Pashardes (2002) argue that the employment of other members of an individual's family in a specific sector should reduce the costs of job search in this sector. At the same time, family characteristics should have no direct effects on wages.

Additionally, a wealth index is used as an excluded instrument. Following standard practice, this wealth index is defined as the first principal component factor of a large number of variables

[5] Similar concerns about potential endogeneity might also be voiced about the use of labor market characteristics and industry dummies as regressors. As such concerns can be seen as less pressing as compared to those for occupations, labor market and industry characteristics are nevertheless included as regressors.

capturing household living conditions, wealth and assets (cf. World Bank, 2003). Here, these variables are the ownership of a dwelling, of different types of livestock and land as well as of 29 different consumer goods like mobile phones, rice cookers, composite bows or cars, and the presence of an electricity connection. Schultz (1995) and Tansel (2005) argue that higher household wealth – or rather the higher unearned income derived from it – should increase the shadow value of time spent working and therefore decrease labor force participation but should not influence wages through any other channels.[6]

4. Results

4.1. Descriptive Statistics

Basic summary statistics for various variables related to individuals' earnings, labor market characteristics, socio-demographic characteristics, education and industry are summarized in Table 2. The table displays the means and standard deviations of all relevant variables separately for public and private sector workers. Additionally, results of t-tests for differences in characteristics between the two groups are presented. Appropriate sample weights are used for the descriptive statistics summarized in Table 2 and all other statistics presented in this section.[7]

Table 2 makes it clear that there are many differences in the average characteristics of public and private sector workers that are statistically and economically significant. Maybe most strikingly, public sector employees have significantly higher average hourly wages than those in the private sector. On average, public sector workers earn *Nu* 77.31 (that is approximately US dollar 1.22) per hour. Average hourly wages of private sector workers are *Nu* 66.23 (or US dollar 1.04). The public/private wage differential is statistically significant at the 1 percent level.

---

[6] The practical implementation of the three-step procedure is greatly facilitated by a number of STATA ado-files programmed by different researchers: Below, *oaxaca* by Jann (2008) is used for the Oaxaca type decompositions and code based on the one in *selmlog* by Bourguignon, Fournier and Gurgand (2007) for the numerical computation of correction terms. Besides, the quantile regressions of Section 4.3 rely on *rifreg* by Firpo, Fortin and Lemieux (2007, 2009).

[7] As mentioned above, the BLFS contains data on 23,587 individuals. 14,137 of these fulfill the restrictions underlying the baseline decomposition (as detailed in Table 1, this implies in particular that they are between 15 and 65 years old and are neither unpaid family workers nor graduates of institutions of religious education). Of these, 7,178 individuals work either in the public or the private sector. Finally, for 6,562 individuals valid information on all control variables is available in the BLFS. Accordingly, they form the basis of the analysis of this section. Table 2 shows that the unweighted sample of 6,562 individuals can be broken down into 3,180 observations for public sector workers and 3,382 observations for private sector workers. Using appropriate sample weights, this translates into 58,068 public sector workers and 118,853 private sector workers.

Table 2
Characteristics of individuals and t-tests for differences in these characteristics

	Public sector		Private sector		t-Tests
Earnings					
Hourly wage in *Nu*	77.31	(3.01)	66.23	(4.46)	***
Labor market characteristics					
Regular paid employee	0.941	(0.010)	0.165	(0.021)	***
Casual paid employee	0.015	(0.004)	0.051	(0.009)	***
Contract / piece paid worker	0.040	(0.011)	0.036	(0.005)	
Own-account worker	0.005	(0.002)	0.748	(0.024)	***
Socio-demographic characteristics					
Urban	0.679	(0.048)	0.270	(0.045)	***
Female	0.228	(0.012)	0.383	(0.015)	***
Bhutanese	0.998	(0.001)	0.995	(0.002)	
Potential experience	22.60	(0.55)	31.88	(0.71)	***
Education					
No formal education	0.227	(0.024)	0.648	(0.020)	***
Primary education	0.089	(0.008)	0.082	(0.006)	
Lower secondary education	0.137	(0.009)	0.082	(0.005)	***
Middle secondary education	0.170	(0.010)	0.087	(0.010)	***
Higher secondary education	0.173	(0.009)	0.056	(0.009)	***
Lower tertiary education	0.169	(0.014)	0.040	(0.007)	***
Higher tertiary education	0.035	(0.006)	0.005	(0.001)	***
Industry					
Agriculture, hunting and forestry	0.000	-	0.467	(0.031)	***
Fishing	0.000	-	0.001	(0.001)	
Mining and quarrying	0.003	(0.002)	0.022	(0.008)	**
Manufacturing	0.047	(0.009)	0.133	(0.010)	***
Electricity, gas and water supply	0.037	(0.011)	0.005	(0.001)	***
Construction	0.024	(0.011)	0.036	(0.007)	
Wholesale and retail trade	0.009	(0.003)	0.157	(0.011)	***
Hotels and restaurants	0.003	(0.002)	0.064	(0.010)	***
Transport and communications	0.018	(0.003)	0.066	(0.010)	***
Financial intermediation	0.039	(0.006)	0.001	(0.001)	***
Real estate and business activities	0.094	(0.015)	0.023	(0.003)	***
Public administration and defense	0.525	(0.027)	0.000	(0.000)	***
Education	0.111	(0.010)	0.005	(0.001)	***
Health and social work	0.057	(0.007)	0.001	(0.000)	***
Other service activities	0.031	(0.006)	0.013	(0.002)	***
Private households	0.000	-	0.006	(0.002)	***
Fringe benefits					
Gratuity	0.945	(0.013)	0.289	(0.035)	***
Provident fund payments	0.949	(0.014)	0.321	(0.034)	***
Overtime payments	0.957	(0.013)	0.270	(0.021)	***
Paid annual leave	0.943	(0.015)	0.443	(0.032)	***
Paid sick leave	0.962	(0.013)	0.645	(0.024)	***
Paid casual leave	0.961	(0.013)	0.628	(0.025)	***
Paid maternity/paternity leave	0.960	(0.014)	0.481	(0.040)	***
Compensation for work accidents or occupational diseases	0.965	(0.011)	0.326	(0.030)	***
Number of observations (unweighted)	3,180		3,382		
Number of observations (weighted)	58,068		118,853		

Notes: (1) The figures within the parentheses are linearized standard errors. (2) The symbols *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. (3) Unless otherwise noted, weights have been used. (4) For fringe benefits, comparisons are for regular paid employees, casual paid employees and contract / piece paid workers in state-owned or private enterprises or only. (5) Location variables are not depicted.

Concerning labor market characteristics, public sector workers are relatively more likely to be employed as regular wage workers. This status applies to 94.1 percent of public sector workers but to only 16.5 percent of private sector workers. Conversely, public sector employees are substantially less likely to be contract or piece paid workers or, unsurprisingly, own-account workers. Socio-demographic variables also show notable differences between the two sectors. In particular, statistically significant differences exist with respect to workers' average location, gender and experience. For instance, 67.9 percent of public sector workers live in urban parts of Bhutan but only 27.0 percent of private sector workers are city dwellers. Moreover, public sector workers are less likely to be female and on average have less potential experience. At the same time, while according to the BLFS 2014 the proportion of Bhutanese nationals is very high in both sectors it does not significantly differ between them.[8]

The average educational attainment of workers differs markedly between the two sectors. Whereas less than a quarter (22.7 percent) of public sector employees have no or no formal education this is the case for almost two-thirds of private sector workers (64.8 percent). On the other hand, 3.5 percent of public sector workers but only 0.5 percent of private sector workers have higher tertiary education, defined here as the completion of at least a Master's degree. Finally, industrial structures also differ between the two sectors. For instance, public sector workers are dramatically less likely to work in agriculture, hunting and forestry (*nil* vs. 46.7 percent) but much more likely to work in public administration and defense (52.5 vs. *nil* percent). Again, these differences are statistically significant at the 1 percent level. In general, the picture that emerges from Table 2 is that in Bhutan wages, jobs and workers all differ considerably between the public and the private sector.

Fringe benefits that are paid in addition to the base salary are an important aspect of overall worker compensation for which the BLFS 2014 contains relatively detailed information. According to Bhutan's Labor and Employment Act, the majority of workers should *de jure* be entitled to the following eight distinct fringe benefits: gratuity (not in the sense of tips but as an additional retirement benefit after a certain length of service), provident fund payments (another retirement benefit), overtime payments, paid annual leave, paid sick leave, paid casual leave, paid maternity/paternity leave

[8] Administrative data from the MoLHR and the World Bank's Bhutan Enterprise Survey 2015 document much higher proportions of non-Bhutanese workers than the BLFS 2014. This hints at a general under-reporting of non-Bhutanese individuals in the BLFS 2014.

and compensation for work accidents or occupational diseases. However, in many countries and also in Bhutan the enforcement of labor laws is relatively lax and some employers are able to avoid compliance (cf. Fandl, Kugler, Vodopivec and Weber, 2011, for details on compliance with Bhutan's Labor and Employment Act). Against this backdrop, the BLFS 2014 collects data for regular paid employees, casual paid employees and contract / piece paid workers in state-owned or private enterprises, and data on their *de facto* coverage by fringe benefits.

As monetary values of fringe benefits are hard to quantify, they will not be considered in the subsequent analysis of the public/private wage differential. However, Table 2 still lists the prevalence of these benefits separately for public and private sector workers. The table shows that coverage is incomplete both in the public and the private sector. At the same time, public sector workers are more likely to be eligible for each of the eight types of benefits and all differentials are both statistically significant and economically meaningful. In fact, for each of the eight benefits, coverage among public sector workers easily exceeds 90 percent. The benefit with the lowest prevalence among public sector workers is paid annual leave. 94.3 of public sector workers are covered by this benefit. On the other end of the spectrum, 96.5 percent of public sector workers receive compensation for work accidents or occupational diseases. In contrast, only between around 25 percent and 65 percent of private sector workers are covered by each particular benefit. Only 27.0 percent of private sector employees are paid for overtime. Paid sick leave is the most common benefit in the private sector. 64.5 percent of private sector workers receive this benefit. It seems safe to assume that differences between public and private sector would be even more pronounced if data on benefit coverage were also collected for workers other than regular paid employees, casual paid employees and contract / piece paid workers in state-owned or private enterprises.

4.2. Selection Equation, Wage Regressions and Baseline Decomposition

Turning to the initial step of the three-step procedure outlined above, Table 3 reports outputs from an empirical estimation of the sector selection equation (2). These outputs provide insights into the determinants of self-selection into labor force participation and into public and private sector. Not directly reported in Table 3 but available upon request are the coefficients of the multinomial logit model used to estimate equation (2). What is displayed in Table 3 are marginal effects on the likelihood of self-selection into the public sector, the private sector or inactivity. This is because marginal effects

are much more straightforward to interpret. Since the marginal effects of a multinomial logit model depend on the values of the explanatory variables, one must decide at which values to report them. As is common in the literature, the table shows the average marginal effects. In other words, Table 3 provides insights into the determinants of the sectoral choice of individuals with average characteristics. The delta method is used to compute standard errors.

Table 3
Marginal effects from selection regressions

	Inactive			Public sector			Private sector		
	Estimate		S.E.	Estimate		S.E.	Estimate		S.E.
Socio-demographic characteristics									
Urban	0.030	*	(0.017)	0.055	***	(0.008)	-0.085	***	(0.018)
Female	0.385	***	(0.029)	-0.149	***	(0.014)	-0.236	***	(0.023)
Bhutanese	-0.156	**	(0.070)	0.233	***	(0.048)	-0.078		(0.048)
Potential experience	-0.090	***	(0.003)	0.026	***	(0.002)	0.064	***	(0.003)
Potential experience squared	0.001	***	(0.000)	-0.000	***	(0.000)	-0.001	***	(0.000)
Education									
Primary education	-0.180	***	(0.038)	0.100	***	(0.014)	0.079	**	(0.034)
Lower secondary education	-0.212	***	(0.039)	0.127	***	(0.014)	0.084	**	(0.036)
Middle secondary education	-0.410	***	(0.039)	0.187	***	(0.018)	0.219	***	(0.037)
Higher secondary education	-0.566	***	(0.036)	0.281	***	(0.020)	0.286	***	(0.037)
Lower tertiary education	-0.692	***	(0.042)	0.323	***	(0.019)	0.369	***	(0.039)
Higher tertiary education	-0.829	***	(0.258)	0.368	***	(0.077)	0.461	**	(0.191)
Selection variables									
Wealth index	0.024	***	(0.009)	0.003		(0.007)	-0.026	***	(0.007)
Prop. of individuals in household aged 14 or under	-0.101	*	(0.057)	0.100	***	(0.018)	0.002		(0.054)
Prop. of individuals in household aged 66 or over	0.165		(0.104)	-0.128	***	(0.048)	-0.036		(0.096)
Prop. of individuals in household in public sector	0.231	***	(0.038)	-0.010		(0.017)	-0.221	***	(0.032)
Prop. of individuals in household in private sector	0.079	***	(0.019)	-0.103	***	(0.014)	0.024	*	(0.014)

Notes. (1) The symbols *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. (2) Weights have been used for the estimation. (3) The reported standard errors have been calculated using the delta method. (4) Location variables are not depicted.

In many ways, the multinomial logit estimates of Table 3 confirm the descriptive evidence of Table 2. For instance, they confirm that urban workers are more likely to work in the public rather than in the private sector, *ceteris paribus*. Additionally, they provide some evidence that city dwellers are more likely to be inactive. Moreover, the multinomial logit estimates confirm that relatively well-educated individuals are more likely to self-select into public sector jobs. Well-educated individuals are also much less likely to be inactive. Other results of the multinomial logit estimates could not have

been deducted from descriptive evidence or nuance the descriptive picture of Table 2. For instance, Table 3 shows that women are less likely to participate in the labor market but also indicates that women tend to self-select out of the private sector. In addition to that, Bhutanese nationals are shown to be more prone to seek public sector employment and less likely to be either inactive or employed in the private sector. Finally, the table demonstrate that an inverse u-shaped pattern exists between potential experience and labor force participation (irrespective of the sector of employment). Similar inverse u-shaped patterns have been documented for many other countries.

Concerning possible self-selection into labor force participation and public or private sector work, it was mentioned above that the empirical representation of equation (2) uses household and family characteristics (the proportion of children, seniors, private sector workers and public sector workers in the household) and a wealth index as excluded instruments. As is evident from Table 3, all of these instruments have at least some statistically and economically significant influence on self-selection. For instance, individuals in households with a higher proportion of members aged 14 or under are relatively more likely to work in the public sector. The opposite is the case for individuals in households with a higher proportion of members aged 66 or above. Besides, the sector of activity of other household members apparently acts as an important push factor: in case a higher proportion of other household members is employed in the public sectors that makes employment in the private sector less likely. Similarly, when relatively more household members are private sector workers, this reduces the probability that a specific worker self-selects into the public sector. Finally, higher household wealth reduces the likelihood of self-selection into the public sector and increases the likelihood of labor force non-participation. The last result is consistent with the argument of Schultz (1995) and Tansel (2005) that higher household wealth – or rather the higher unearned income derived from it – should increase the shadow value of time spent working and therefore decrease labor force participation.

Table 4 shifts the attention to the second step of the three-step procedure and an empirical estimation of equation (3). I.e., Table 4 is concerned with estimating the correlates of log hourly wages in the public and the private sector. As mentioned in Section 3, following the methodology proposed by Bourguignon, Fournier and Gurgand (2007) this is done in a way that takes self-selection into account and even allows an explicit consideration of biases related to the allocation of individuals in a specific sector and which choice among any two alternative sectors this bias stems from.

Table 4
Selection-corrected wage regressions

	Public sector			Private sector		
	Estimate		S.E.	Estimate		S.E.
Labor market characteristics						
Regular paid employee	-0.150		(0.254)	-0.442	***	(0.042)
Casual paid employee	-0.478	*	(0.269)	-0.357	***	(0.085)
Contract / piece paid worker	-0.240		(0.262)	-0.196	*	(0.116)
Socio-demographic characteristics						
Urban	-0.031		(0.040)	0.271	***	(0.049)
Female	0.036		(0.054)	-0.108		(0.101)
Bhutanese	-0.398	***	(0.144)	-0.137		(0.130)
Potential experience	0.043	***	(0.008)	0.016		(0.018)
Potential experience squared	-0.000	***	(0.000)	-0.000		(0.000)
Education						
Primary education	0.130	**	(0.058)	-0.023		(0.083)
Lower secondary education	0.267	***	(0.058)	0.159	**	(0.072)
Middle secondary education	0.556	***	(0.063)	0.422	***	(0.091)
Higher secondary education	0.874	***	(0.083)	0.624	***	(0.121)
Lower tertiary education	1.295	***	(0.083)	0.920	***	(0.128)
Higher tertiary education	1.443	***	(0.100)	1.373	***	(0.176)
Industry						
Fishing	-		-	2.371	***	(0.146)
Mining and quarrying	1.141	**	(0.545)	1.006	***	(0.122)
Manufacturing	0.849	*	(0.514)	0.771	***	(0.068)
Electricity, gas and water supply	1.008	*	(0.523)	0.651	***	(0.215)
Construction	1.271	**	(0.553)	0.732	***	(0.120)
Wholesale and retail trade	0.939	*	(0.520)	0.608	***	(0.072)
Hotels and restaurants	-		-	0.552	***	(0.088)
Transport and communications	0.946	*	(0.524)	0.648	***	(0.069)
Financial intermediation	0.895	*	(0.516)	0.542	***	(0.170)
Real estate and business activities	0.901	*	(0.514)	0.947	***	(0.147)
Public administration and defense	0.831		(0.514)	1.019	***	(0.361)
Education	0.874	*	(0.517)	0.787	***	(0.101)
Health and social work	0.996	*	(0.515)	1.200	***	(0.175)
Other service activities	1.026	**	(0.521)	0.841	***	(0.154)
Private households	-		-	0.470	***	(0.175)
Correction terms and constant						
Correction term (inactive)	-0.077		(0.156)	0.101		(0.190)
Correction term (public sector)	-0.065		(0.052)	-0.195		(0.246)
Correction term (private sector)	0.289	*	(0.153)	-0.208	**	(0.106)
Constant	2.890	***	(0.571)	2.849	***	(0.354)
R-square	0.536			0.335		

Notes. (1) The symbols *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. (2) Weights have been used for the estimation. (3) The reported standard errors are bootstrap standard errors from 200 replications. (4) Location variables are not depicted. (5) The wage regressions are based on the selection regressions of Table 3. (6) The correction terms are the Bourguignon, Fournier and Gurgand (2007) equivalents for the Mill's ratio.

In spite of some important differences between correlates of log hourly wages in the public and the private sector, Table 4 shows that altogether the patterns associated with individual wages look rather similar for the two sectors. Moreover, the overall picture that emerge from the table is that

even in Bhutan – a country with many unique features – most basic regularities derived from standard human capital theory hold. Direction and size of the individual coefficients are generally those that one would expect from the estimation of such a wage equation in the tradition of Mincer (1974). For instance, Table 4 demonstrates that both in the public and the private sector average hourly wages are higher for better educated individuals, *ceteris paribus*. It should be noted that Table 4 does not correct for the possible endogeneity of educational choice and therefore does not make causal statements about the returns to education in Bhutan.

For both public and private sector workers, wages tend to increase with potential experience but with a declining rate. Thus, over the life cycle wages exhibit an inverse u-shaped path. However, this pattern is only statistically significant for public sector workers. With regard to gender, a statistically significant gender wage gap exists neither in the public nor the private sector. Given that gender wage gaps continue to be a defining feature of many countries' labor markets this appears noteworthy. Concerning the different industry variables, wages tend to be lowest in agriculture, hunting and forestry (the reference category in Table 4). In both the public and the private sector, workers in mining and quarrying and in health and social work earn among the highest wages. Other industries with relatively high wages include construction and other service activities in the public sector and fishing and public administration and defense in the private sector. Note that the wage differences across industries are generally much more precisely estimated for the private sector.

According to Table 4, an urban wage premium is only present for the private sector while wages between urban and rural areas do not differ in a statistically significant way for the public sector. Together with the often only marginally significant coefficients associated with industry variables, this result gives the impression that Bhutan's *de facto* public sector wages are in fact strongly correlated with variables that *de jure* determine public sector wages, especially in the civil service (like an individual's education), but much less so with variables that have less of a *de jure* role like gender, location or industry. Contrary to this overall pattern, Table 4 shows that hourly wages and Bhutanese citizenship are negatively correlated in the public sector whereas there is no statistically significant relationship between the two variables in the private sector. This might reflect a specific (unobservable) assignment to high-level positions demanding specialized technical expertise of the small number of non-Bhutanese employees in Bhutan's public sector.

Finally, it is worth having a look at the coefficients associated with the various correction terms. As pointed out in Dimova and Gang (2006, p. 625), "(f)or each sector-based wage estimation, a negative (…) selectivity coefficient related to any of the alternative sectors indicates lower wages than those of randomly chosen individuals on account of the allocation of individuals with better (…) unobserved characteristics out of the given sector and into the respective alternative sector. For instance, if we observe a negative private sector selectivity correction coefficient in the public sector equation, this indicates lower than randomly chosen rewards to the skills of individuals working for the public sector due to the allocation of individuals with better unobserved characteristics out of the public and into the private sector." The reverse is the case for positive correction terms. As is clear from Table 4, the correction term related to the private sector is negative and marginally statistically significant in the public sector wage equation. In other words, wages in the public sector appear downward biased due to the allocation of individuals with better unobserved characteristics out of this sector into inactivity. The correction term related to the private sector is also negative and statistically significant in the private sector wage equation. No other correction terms are individually statistically significant in either wage equation.

Results from the third and final step of the procedure outlined in Section 3, i.e., an Oaxaca type decomposition of log hourly wages based on the selection-corrected wage regressions from Table 4, are reported in Table 5. The objective of the decomposition is to explain how much of the overall difference in the logarithm of hourly wages between public and private sector workers adjusted for self-selection of individuals can be attributed to differences in the level of individuals' characteristics and by differences in the impact on wages of these characteristics. As the table shows, when sector self-selection is taken into account the overall difference in hourly wages amounts to 0.587 log points or roughly 58.7 percent.

The two most important estimates are those for the aggregate characteristics and coefficients effects. According to Table 5, these amount to 0.583 and 0.004 log points, respectively. The positive value of the characteristics effect means that if public and private sector employees were to have the same regression coefficients, i.e., the impact of the characteristics on their hourly wages were identical, the logarithm of hourly wages of public sector workers would have been higher than that of private sector workers by 0.583 log points due solely to differences in characteristics. Conversely, the coefficients effect of 0.004 implies that, if both public and private sector workers were to have the exact same characteristics so that any difference in wages between the two sectors were due only to

Table 5
Decomposition of the difference in hourly wages between public and private sector (benchmark)

	Overall difference					
	Estimate			S.E.		
	0.587	***		(0.125)		
	Characteristics effect				Coefficients effect	
	Estimate		S.E.		Estimate		S.E.
Aggregate Effect	0.583	***	(0.216)		0.004		(0.260)
Aggregate effect without constants					0.186		(0.330)
Labor market characteristics	-0.215	*	(0.111)		0.124	**	(0.055)
Regular paid employee	-0.049		(0.040)		0.144	***	(0.049)
Casual paid employee	0.007	***	(0.002)		-0.005		(0.004)
Contract / piece paid worker	0.000		(0.001)		-0.003		(0.005)
Own-account worker	-0.173	**	(0.088)		-0.012		(0.094)
Socio-demographic characteristics	-0.061	***	(0.021)		0.037		(0.324)
Urban	0.049	***	(0.013)		-0.143	***	(0.033)
Female	0.006		(0.009)		0.044		(0.035)
Bhutanese	-0.001		(0.000)		-0.260		(0.184)
Potential experience	-0.273	***	(0.095)		0.714		(0.527)
Potential experience squared	0.158	*	(0.085)		-0.318		(0.274)
Education	0.326	***	(0.030)		-0.044		(0.039)
No formal education	0.242	***	(0.022)		-0.068		(0.045)
Primary education	-0.004		(0.005)		-0.000		(0.008)
Lower secondary education	-0.020	***	(0.004)		-0.005		(0.008)
Middle secondary education	-0.007	***	(0.002)		-0.003		(0.007)
Higher secondary education	0.020	***	(0.004)		0.011		(0.008)
Lower tertiary education	0.069	***	(0.007)		0.023	***	(0.008)
Higher tertiary education	0.025	***	(0.004)		-0.002		(0.003)
Industry	0.499	***	(0.186)		0.102		(0.126)
Agriculture, hunting and forestry	0.362	***	(0.104)		0.021		(0.102)
Fishing	-0.000		(0.000)		-0.001		(0.000)
Mining and quarrying	-0.006	***	(0.002)		0.003		(0.003)
Manufacturing	-0.003		(0.006)		0.015		(0.012)
Electricity, gas and water supply	0.002		(0.004)		0.009	**	(0.005)
Construction	-0.003		(0.002)		0.019	**	(0.008)
Wholesale and retail trade	0.000		(0.011)		0.035	***	(0.012)
Hotels and restaurants	0.030	**	(0.016)		-0.015		(0.018)
Transport and communications	-0.001		(0.004)		0.016	***	(0.006)
Financial intermediation	-0.002		(0.004)		0.009	**	(0.004)
Real estate and business activities	0.011	*	(0.006)		0.003		(0.011)
Public administration and defense	0.078		(0.122)		-0.025		(0.117)
Education	0.006		(0.008)		0.010		(0.009)
Health and social work	0.018	***	(0.006)		-0.003		(0.006)
Other service activities	0.003		(0.002)		0.006		(0.004)
Private households	0.003	**	(0.002)		-0.001		(0.001)
Location	0.035	***	(0.013)		-0.032		(0.023)
Constant					-0.183		(0.398)

Notes. (1) The symbols *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. (2) Weights have been used for the decomposition. (3) The reported standard errors are bootstrap standard errors from 200 replications. (4) Detailed location variables and correction terms are not depicted. (5) The decomposition is based on the selection regressions of Table 3 and the selection-corrected wage regressions of Table 4.

differences in the regression coefficients, i.e., the rates of return on the characteristics, the logarithm of hourly wages of public sector workers would have been higher than that of private sector workers by 0.004 log points. In short, public sector workers would be worse off if the differences between their characteristics and those of the private sector workers were to disappear. In addition to that, they would also be worse off in the absence of any differences between the two groups in the effectiveness of, or returns to, those characteristics.

Importantly, the aggregate characteristics effect is statistically significant at the 1 percent level and of the same magnitude as the overall public/private wage differential. In contrast, the aggregate coefficients effect is not statistically significant at any conventional level of statistical significance. Therefore, the main result from Table 5 – and the whole three-step procedure – is that the sizeable differences in average wages between public and private sector workers in Bhutan can entirely be explained by differences in the observable characteristics of public and private sector workers.

Table 5 also allows a more detailed consideration of how different variables or groups of variables influence the aggregate characteristics and coefficients effects. Disaggregating the characteristics effect shows that public sector workers benefit considerably from being on average better educated than private sector workers. The education variables explain 0.326 log points of the difference between public and private sector wages. Most importantly in this regard, public sector workers are relatively less likely to have no or no formal education and relatively more likely to have lower tertiary education. The very high wage premiums associated with higher tertiary education documented in Table 4 play a comparatively smaller role in explaining the aggregate characteristics effect.

The other group of observable characteristics that explains a sizeable portion of the wage gap between public and private sector relates to the distinct industrial structures of the two sectors. Public sector workers are much more likely to work in industries that are more favorable for the labor market and this explains 0.499 log points of the difference between public and private sector wages. Most importantly, public sector workers are much less likely to work in agriculture, hunting and forestry – the industry with the lowest hourly wages. Additionally, the sectoral distribution of work in hotels and restaurants, health and social work and private households favors public sector workers. (That of mining and quarrying has the opposite effect.)

Observable characteristics of public sector workers are also more favorable when it comes to their location in terms of *dzongkhag*. At the same time, the characteristics effect associated with labor market and socio-demographic variables actually works against them. In particular, public sector workers are much less likely to be engaged as own-account workers, a type of activity very favorable for the labor market. On average, the potential experience profile across sectors also puts public sector workers at a disadvantage. In contrast, their higher degree of urbanization is associated with a favorable characteristics effect. Overall, the public sector workers' favorable characteristics effects associated with the education, sector and location variables outweigh the unfavorable characteristics effects stemming from labor market and socio-economic variables. This leads the overall characteristics effect for public sector workers to be positive and statistically and economically significant.

Concerning a detailed decomposition of the coefficients effect, Table 5 shows that much fewer variables can be identified as statistically significant drivers of such an effect. Of those that are statistically significant, the returns to labor market characteristics and in particular to being a regular paid employee favor the public sector. Among the few individual variables with statistically significant coefficients effects, it is noteworthy that the returns to being a city dweller are higher in the private sector whereas the wage premium associated with having a lower tertiary education is more elevated in the public sector. The coefficients effects of some sectoral variables (including those for construction, wholesale and retail trade and transport and communications) also work in the private sector workers' favor. It should be noted, however, that neither the overall coefficients effect nor the coefficients effect net of baseline differences between public and private sector nor the baseline differences as measured by the coefficient associated with the constant are statistically significant.

4.3. Sensitivity Checks

Table 6 summarizes three alternative specifications of the benchmark selection-corrected Oaxaca type decomposition of log hourly wages. The objective is to assess whether this study's main results are robust to variations in the empirical setup. For conciseness, outputs are displayed only for the aggregate characteristics and coefficient effects as well as for semi-detailed decompositions that group the effects of labor market characteristics, socio-demographic characteristics, education, industry and location. Outputs for the corresponding detailed decompositions are available upon request.

Table 6
Decomposition of the difference in hourly wages between public and private sector (robustness)

PANEL A – GROUP DIFFERENCES IN THE PREDICTORS WEIGHTED BY GROUP SIZES

Overall difference		
Estimate		S.E.
0.587	***	(0.125)

	Characteristics effect			Coefficients effect		
	Estimate		S.E.	Estimate		S.E.
Aggregate Effect	0.612	***	(0.217)	-0.025		(0.261)
Aggregate effect without constants				0.158		(0.373)
Labor market characteristics	-0.287	***	(0.050)	0.204	***	(0.051)
Socio-demographic characteristics	0.001		(0.025)	-0.025		(0.325)
Education	0.296	***	(0.038)	-0.014		(0.025)
Industry	0.535	***	(0.204)	0.066		(0.203)
Location	0.068	***	(0.018)	-0.065	**	(0.027)
Constant				-0.183		(0.398)

PANEL B – SELECTION CORRECTION FOLLOWING DUBIN AND MCFADDEN (1984)

Overall difference		
Estimate		S.E.
0.505	***	(0.097)

	Characteristics effect			Coefficients effect		
	Estimate		S.E.	Estimate		S.E.
Aggregate Effect	0.580	***	(0.208)	-0.075		(0.234)
Aggregate effect without constants				0.349		(0.348)
Labor market characteristics	-0.213	**	(0.108)	0.125	**	(0.054)
Socio-demographic characteristics	-0.061	***	(0.021)	0.220		(0.351)
Education	0.327	***	(0.032)	-0.065		(0.042)
Industry	0.493	***	(0.179)	0.104		(0.124)
Location	0.034	***	(0.013)	-0.035		(0.023)
Constant				-0.424		(0.410)

PANEL C – TRIMMED SAMPLE

Overall difference		
Estimate		S.E.
0.677	***	(0.128)

	Characteristics effect			Coefficients effect		
	Estimate		S.E.	Estimate		S.E.
Aggregate Effect	0.474	**	(0.217)	0.203		(0.265)
Aggregate effect without constants				0.187		(0.283)
Labor market characteristics	-0.224	**	(0.113)	0.117	**	(0.052)
Socio-demographic characteristics	-0.069	***	(0.020)	0.079		(0.275)
Education	0.304	***	(0.028)	-0.059	*	(0.033)
Industry	0.455	**	(0.197)	0.070		(0.117)
Location	0.008		(0.012)	-0.019		(0.022)
Constant				0.016		(0.367)

Notes. (1) The symbols *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. (2) Weights have been used for the decomposition. (3) The reported standard errors are bootstrap standard errors from 200 replications. (4) Detailed variables and correction terms are not depicted.

As mentioned in Section 3, the benchmark selection-corrected Oaxaca type decomposition uses the average coefficients of public and private sector workers. This follows a suggestion by

Reimers (1983). As an alternative, Cotton (1988) proposes to weigh the coefficients by the group sizes. This alternative suggestion is implemented in Panel A of Table 6. Panel B of Table 6 does not rely on the variation of the selection-correction procedure of Dubin and McFadden (1984) recommended by Bourguignon, Fournier and Gurgand (2007). Instead, the original procedure introduced by Dubin and McFadden (1984) is used. This procedure relies on a slightly different linearity assumption and imposes the additional restriction that all correlation coefficients between error terms sum to zero. Finally, in Panel C of Table 6 the sample is restricted in a way that excludes the 1 percent of observation with the lowest hourly wage as well the as the 1 percent of observations with the highest wage per hour. The rationale behind this robustness exercise is to assess whether results are robust to the exclusion of outliers.

Panels A, B and C of Table 6 show that for all three alternative specifications selection-corrected predicted average hourly wages are statistically significantly higher for public sector workers than for private sector workers. The magnitude of the difference in these hourly wages is quite robust as well. Moreover, the differences can be completely attributed to characteristics effects in all three alternative specifications. Overall coefficients effects are never statistically significant. Finally, in all three alternative specifications observable labor market characteristics continue to favor private sector workers whereas education and industry characteristics work to the benefit of public sector workers. In the case of the characteristics effects of socio-demographic and location characteristics, two of three alternative specifications support the findings from the baseline decomposition. In the third alternative specification these variables are not associated with a statistically significant characteristics effect. Concerning coefficients effects, results of the robustness exercise once again confirm those from the baseline decomposition. In particular, all three alternative specifications support the notion that returns to favorable labor market characteristics are higher in the public sector. Apart from these labor market characteristics, hardly any of the semi-aggregate variables depicted in Table 6 are associated with statistically significant coefficients effects. Overall, Table 6 makes it clear that the main results from the baseline decomposition are very robust to variations in the empirical setup.[9]

[9] The main results from the baseline decomposition are also robust to a number of additional sensitivity checks not depicted here but available upon request. These include the use of the standard Oaxaca decomposition based on OLS regressions instead of the three-step decomposition method and of a three-step decomposition without sample weights. Qualitatively, the main results are also robust to a specification that avoids possible concerns about the measurement of

4.4. Quantile Decompositions

So far, the analysis has focused on decomposing the differences in average hourly wages between the public and the private sector. In recent years procedures have gained prominence that make it possible to complement an analysis of differences in mean wages by quantile decompositions that assess different quantiles of the wage distribution (cf. Fortin, Lemieux and Firpo, 2011). Here, the Oaxaca type decompositions of differences in mean wages between public and private sector of the last subsections are complemented by similar decompositions based on differences in various quantiles of the wage distributions in the public and private sectors. In terms of methodology, a two-step procedure first suggested by Firpo, Fortin and Lemieux (2007, 2009) is implemented: First, separate regressions of the recentered influence function (a widely used tool in robust estimation) of the unconditional quantile on the explanatory variables are run for the private and the public sectors. Second, generalized Oaxaca type decompositions are performed for various quantiles of the wage distribution. An important caveat is that the procedure suggested by Firpo, Fortin and Lemieux (2007, 2009) does not control for self-selection into labor force participation and public or private sector jobs.

Results of the quantile decompositions are summarized in Table 7. The table focuses on the second step of the two-step procedure suggested by Firpo, Fortin and Lemieux (2007, 2009) and on the overall wage differences between public and private sectors at various quantiles of the wage distribution. Additionally, the table indicates whether the overall differences are attributable to workers' characteristics or the returns to these characteristics. The quantiles considered range from the tenth percentile to the 90th percentile, in steps of ten percentiles.

Table 7 shows that overall differences between wages in the public and the private sectors are statistically and economically significant across the wage distribution. Additionally, it demonstrates that these differences are most pronounced in the left tail of the distribution. The tenth percentile of the public sector wage distribution is 98.8 percent higher than the tenth percentile of the private sector wage distribution. With regard to the median the difference is 52.2 percent and with regard to the 90th percentile it amounts to 16.6 percent. The quantile decompositions demonstrate that over the entire

own-account workers' wages by restricting the second-stage regressions and third-stage decompositions to dependent workers in the public and private sector (though in this case the overall characteristics effect is significant only at the 10 percent level).

wage distribution, none of the overall differences between public and private sector wages can be attributed to coefficients effects; these are all statistically insignificant. In contrast, differences in observable characteristics between the public and private sectors can fully explain overall wage differences from the tenth percentile of the wage distribution up to the median. For the right-hand side of the wage distribution precision in the estimation of characteristics effects is insufficient to clearly attribute overall wage differences to these as opposed to coefficients effects.

Table 7
Decomposition of the difference in hourly wages between public and private sector (quantile decompositions)

Quantile	Overall difference			Characteristics effect			Coefficients effect	
	Estimate		S.E.	Estimate		S.E.	Estimate	S.E.
10th percentile	0.988	***	(0.057)	1.072	***	(0.220)	-0.084	(0.224)
20th percentile	0.744	***	(0.035)	0.615	***	(0.103)	0.129	(0.106)
30th percentile	0.659	***	(0.032)	0.523	***	(0.075)	0.135	(0.078)
40th percentile	0.574	***	(0.030)	0.541	***	(0.080)	0.032	(0.082)
50th percentile / median	0.522	***	(0.029)	0.505	***	(0.084)	0.017	(0.086)
60th percentile	0.496	***	(0.029)	0.282		(0.223)	0.215	(0.224)
70th percentile	0.448	***	(0.029)	0.208		(0.243)	0.240	(0.244)
80th percentile	0.324	***	(0.031)	0.313		(0.309)	0.011	(0.310)
90th percentile	0.161	***	(0.039)	0.556		(0.516)	-0.395	(0.517)

Notes. (1) The symbols *, ** and *** indicate significance at the 10%, 5% and 1% levels, respectively. (2) Weights have been used for the estimation. (3) The reported standard errors are robust standard errors. (4) Quantile decompositions use the procedure suggested by Firpo, Fortin and Lemieux (2007, 2009). They do not correct for selection.

Overall, the quantile decompositions complement the decomposition at the mean by demonstrating that public sector wages are significantly higher than private sector wages across the whole wage distribution but especially in its left tail. Whenever power is sufficient to disentangle characteristics and coefficients effects, the overall difference between public and private sector wages can be attributed to differences in observable characteristics between public and private sector workers. No evidence is found that would support the contention that differing returns to observable characteristics explain the overall differences in wages across any of a number of different quantiles of the wage distribution.

5. Conclusions

This study investigated why many in Bhutan see the public sector as the most desirable employer. It asked if this was because public sector employees received higher wages than comparable private

sector workers. To answer this question, it used a refined three-step procedure that made it possible to account for possible self-selection into labor force participation and into public or private sector work in a straightforward way, to estimate a flexible model of wage determination in either sector and to conduct a counterfactual decomposition of the wage differential between the public and private sectors into characteristics and coefficients effects, as originally suggested by Oaxaca (1973). The empirical investigation revealed that average wages in Bhutan's public sector are significantly higher than average wages in the country's private sector. Quantile regressions showed that public/private wage differentials are in fact positive over the whole wage distribution and especially pronounced in its left tail. However, the investigation also demonstrated that in the mean and over much of the wage distribution the positive public/private wage differentials can entirely be accounted for by differences in observable characteristics between public and private sector workers.

This study's results for Bhutan are generally comparable to those of the broader literature on the public/private wage differential in developed and developing countries. For instance, Mizala, Romaguera and Gallegos (2011) document positive raw public/private wage gaps for all 11 Latin American countries in their sample. All of these gaps decrease when controlling for characteristics effects. Qualitatively similar patterns have also been documented by Christofides and Michael (2013) for 23 of 27 European countries in their sample, by Aslam and Kingdon (2009) for Pakistan and by others.[10] What is striking about Bhutan is the sheer difference between the very sizeable raw public/private wage gap and the practically inexistent wage gap once characteristics effects are controlled for. Observable characteristics of workers or jobs explain a larger proportion of Bhutan's public/private wage differential than in almost all other countries for which comparable data exist.

What are the policy implications of these findings? At least in a narrow sense of the word, the overall conclusion seems to be that Bhutan's public sector follows what has been called the prevailing wage principle. In other words, the country's public sector workers tend to receive wages equivalent to those earned by private sector workers performing comparable work (cf. Fogel and Lewin, 1974). At the same time, the public sector clearly remains the sector of choice for many Bhutanese job seekers and queuing for public sector jobs is widespread. At first glance it might appear puzzling why the

[10] In contrast, in their study of the Peruvian labor market Coppola and Calvo-Gonzales (2011) document no overall public/wage gap. Instead, they find significantly positive characteristics effects and significantly negative coefficients effects that cancel each other out.

public sector should be seen as so attractive when public sector workers receive wages equivalent to those earned by private sector workers performing comparable work. However, this apparent puzzle can be explained by the fact that the overall compensation packages received by Bhutan's public sector workers tend to be far more generous than those offered in the private sector. As documented in Section 4, Bhutan's public sector employees enjoy more extensive fringe benefits than private sector workers. In addition to that, they also have better access to pensions and other social insurances, more job security and higher prestige.

A number of major hydropower projects will come on stream in the next few years. As a result, the pressure is likely to rise to further expand Bhutan's public sector and to further increase the generosity of the compensation packages offered to public sector workers. In light of the results of this study it might appear more prudent for the Royal Government of Bhutan to instead consider a three-pronged strategy for sectoral rebalancing – not to weaken the public sector but to allow private sector jobs to emerge and prosper. First, reign in wage increases in the public sector and make sure that in the future adjustments to public sector wages are modest and in line or below private sector wage growth. Second, gradually align the overall compensation packages offered to public sector and private sector workers, e.g. by strengthening the enforcement of labor regulations to improve private sector workers' access to fringe benefits they are legally entitled to, extending pension insurance to the private sector and considering the introduction of unemployment benefits or other forms of income support for jobless private sector workers. Third, foster broad private sector development and continue the current policy of limiting growth in the public sector workforce, especially with regard to the civil service.

References

Aslam, Monazza and Geeta Kingdon. 2009. "Public-Private Sector Segmentation in the Pakistani Labour Market." Journal of Asian Economics 20: 34–49.

Bales, Sarah and Martin Rama. 2001. "Are Public Sector Workers Underpaid? – Appropriate Comparators in a Developing Country." World Bank Policy Research Working Paper 2747.

Bender, Keith. 1998. "The Central Government-Private Sector Wage Differential." Journal of Economic Surveys 12: 177–220.

Bhaumik, Sumon K., Ira N. Gang and Myeung-Su Yun. 2006. "Ethnic Conflict and Economic Disparity: Serbians and Albanians in Kosovo." Journal of Comparative Economics 34: 754–773.

Bourguignon, Francois, Martin Fournier and Marc Gurgand. 2007. "Selection Bias Corrections Based on the Multinomial Logit Model: Monte Carlo Comparisons." Journal of Economic Surveys 21: 174–205.

Chen, Yi, Sylvie Démurger and Martin Fournier, 2005. "Earnings Differentials and Ownership Structure in Chinese Enterprises." Economic Development and Cultural Change 53: 933–958.

Chen, Yi, Sylvie Démurger and Martin Fournier. 2007. "Différentiels Salariaux, Segmentation et Discrimination à l'Egard des Femmes sur le Marché du Travail Chinois." GATE Working Paper 07–13.

Christofides, Louis N. and Maria Michael. 2013. "Exploring the Public-Private Sector Wage Gap in European Countries." IZA Journal of European Labor Studies 2: 1–53.

Christofides, Louis N. and Panos Pashardes. 2002. "Self/Paid-Employment, Public/Private Sector Selection, and Wage Differentials." Labour Economics 9: 737–762.

Coppola, Andrea and Oscar Calvo-Gonzalez. 2011. "Higher Wages, Lower Pay: Public vs. Private Sector Compensation in Peru." World Bank Policy Research Working Paper 5858.

Cotton, Jeremiah. 1988. "On the Decomposition of Wage Differentials." Review of Economics and Statistics 70: 236–243.

Démurger, Sylvie, Shi Li and Juan Yang. 2012. "Earnings Differentials between the Public and Private Sectors in China: Exploring Changes for Urban Local Residents in the 2000s." China Economic Review 23: 138–153.

Dimova, Ralitza and Ira N. Gang. 2007. "Self-Selection and Earnings during Volatile Transition." Journal of Comparative Economics 35: 612–629.

Dubin, Jeffrey A. and Daniel L. McFadden. 1984. "An Econometric Analysis of Residential Electric Appliance Holdings and Consumption." Econometrica 52: 345–362.

Ehrenberg, Ronald G. and Joshua L. Schwarz. 1987. "Public-Sector Labor Markets." In Ashenfelter, Orley and Richard Layard (eds.). Handbook of Labor Economics 2: 1219–1260.

Fandl, Kevon, Adriana Kugler, Milan Vodopivec and Michael Weber. 2011. "Is Enforcement of Labor Market Regulations Beneficial for Workers? Evidence from Surprise Inspections in Bhutan." Unpublished manuscript. Washington, DC: World Bank.

Firpo, Sergio, Nicole M. Fortin and Thomas Lemieux. 2007. "Decomposing Wage Distributions Using Recentered Influence Function Regressions." *Mimeo*, University of British Columbia.

Firpo, Sergio, Nicole M. Fortin and Thomas Lemieux. 2009. "Unconditional Quantile Regressions." Econometrica 77: 953–973.

Fogel, Walter and David Lewin. 1974. "Wage Determination in the Public Sector." Industrial and Labor Relations Review 27: 410–431.

Fortin, Nicole M., Thomas Lemieux and Sergio Firpo. 2011. "Decomposition Methods in Economics." In: Ashenfelter, Orley and David Card (eds.). Handbook of Labor Economics 4A: 1–102.

van der Gaag, Jacques and Wim Vijverberg. 1988. "A Switching Regression Model for Wage Determinants in the Public and Private Sectors of a Developing Country." Review of Economics and Statistics 70: 244–252.

Gang, Ira N. and Achim Schmillen. 2014. "Sometimes, Winners Lose: Economic Disparity and Indigenization in Kazakhstan." IZA Discussion Papers 8464.

Glinskaya, Elena and Michael Lokshin. 2007. "Wage Differentials between the Public and Private Sectors in India." Journal of International Development 19: 333–355.

Gregory, Robert G. and Jeff Borland. 1999. "Recent Developments in Public Sector Labor Markets." In: Ashenfelter, Orley and David Card (eds.). Handbook of Labor Economics 1: 3573–3630.

Gross National Happiness Commission (GNHC). 2012. FAQs on GNH. Thimphu.

Heckman, James. 1979. "Sample Selection Bias as a Specification Error." Econometrica 47: 153–161.

International Labour Office (ILO). 1999. Statistics on Public Sector Employment: Methodology, Structures and Trends. Geneva.

Jann, Ben. 2008. "The Blinder-Oaxaca Decomposition for Linear Regression Models." Stata Journal 8: 453–479.

Lausev Jelena. 2014. "What has 20 Years of Public-Private Pay Gap Literature Told Us? Eastern European Transitioning vs. Developed Economies." Journal of Economic Surveys 28: 516–550.

Lee, Lung Fei. 1983. "Generalized Econometric Models with Selectivity." Econometrica 51: 507–512.

Lindauer, David L. and Richard H. Sabot. 1983. "The Public/Private Wage Differential in a Poor Urban Economy." Journal of Development Economics 12: 137–152.

Mincer, Jacob. 1974. Schooling, Experience and Earnings. National Bureau of Economic Research, New York.

Ministry of Labour and Human Resources (MoLHR). 2015. Labour Force Survey Report 2014. Thimphu.

Ministry of Labour and Human Resources (MoLHR) and United Nations Development Programme (UNDP). 2014. Unemployed Youth Perception Survey 2014 Report. Thimphu.

Mizala, Alejandra, Pilar Romaguera and Sebastián Gallegos. 2011. "Public-Private Wage Gap in Latin America (1992–2007): A Matching Approach." Labour Economics 18: S115–S131.

National Statistics Bureau (NSB). 2014. Bhutan at a Glance 2014. Thimphu.

National Statistics Bureau (NSB) and World Bank. 2014. Bhutan Poverty Assessment. Thimphu.

Oaxaca, Ronald L. 1973. "Male-Female Differentials in Urban Labor Markets." International Economic Review 14: 693–709.

Reimers, Cordelia W. 1983. "Labor Market Discrimination against Hispanic and Black Men." Review of Economics and Statistics 65: 570–579.

Royal Civil Service Commission (RCSC). 2014. Civil Service Statistics 2014. Thimphu.

Royal Civil Service Commission (RCSC). 2015. Annual Report 2014–2015. Thimphu.

Saha, Sarani, Poulomi Roy and Saibal Kar. 2014. "Public and Private Sector Jobs, Unreported Income and Consumption Gap in India: Evidence from Micro-Data." North American Journal of Economics and Finance 29: 285–300.

Schultz, T. Paul. 1990. "Testing the Neoclassical Model of Family Labor Supply and Fertility." Journal of Human Resources 25: 599–634.

Stelcner, Morton, Jacques van der Gaag and Wim Vijverberg, 1989. "A Switching Regression Model of Public-Private Sector Wage Differentials in Peru: 1985-86." Journal of Human Resources 24: 545–559.

Tansel, Avsit, 2005. "Public-Private Employment Choice, Wage Differentials, and Gender in Turkey." Economic Development and Cultural Change 53: 453–477.

World Bank. 2003. Measuring Living Standards: Household Consumption and Wealth Indices. Washington, DC.

Yun, Myeung-Su. 2005. "A Simple Solution to the Identification Problem in Detailed Wage Decompositions." Economic Inquiry 43: 766–772.

Appendix A. Civil Service Employment and Pay

To check the reliability of the BLFS data especially with regard to the absolute and relative size of Bhutan's public sector and the average pay in this sector, Table A1 compares size and structure of civil service employment and the average annual civil service pay according to the BLFS with administrative data from Bhutan's Royal Civil Service Commission (RCSC, 2014, 2015). RCSC (2014) contains reliable and up-to-date administrative information on the strength and structure of Bhutan's civil service as of December 31, 2014 and RCSC (2015) does the same for the average annual civil service pay as of July 2014. The civil service in turn forms the largest component of public sector employment in Bhutan. As outlined in Section 3, the other components of the public sector are other government agencies, the armed forces and state-owned enterprises. This definition follows ILO (2009).

Table A1 documents that using appropriate weights the BLFS counts 24,530 civil service employees in Bhutan whereas RCSC (2014) identifies 26,320 civil servants. In other words, RCSC (2014) gives a civil service headcount that is 7.3 percent larger than the one implied by the BLFS. While this discrepancy is not non-negligible, the overall size of Bhutan's civil service is similar according to both sources.

Concerning the structure of civil service employment, Table A1 breaks total employment in the civil service down by employees' labor market characteristics, socio-demographic characteristics and level of education. The age and education breakdowns are performed on a more aggregate level than what is possible with the BLFS alone. This is because RCSC (2014) does not provide the exact numbers of civil service employees for as many age or education groups as the BLFS. The specific categorization also differs between the two sources.

Table A1 documents that with regard to labor market characteristics, both the BLFS and RCSC (2014) categorize the overwhelming majority of civil servants as regular paid employees. At the same time, the number of contract workers in Bhutan's civil service is about six times higher according to RCSC (2014) than according to the BLFS. The reason might be because some contract workers in the civil service do not identify themselves as civil servants in the BLFS and instead refer of themselves as being employed in other government agencies. This would then also explain a large portion of the discrepancy in overall civil service employment between the BLFS and RCSC (2014). Besides, it is noteworthy that while the RCSC plausibly classifies no civil servants as casual paid employees or own-

account workers, the BLFS counts a very small number of civil servants as belonging to the two employment types. These are most probably miscategorizations.

Table A1
Civil service employment and pay according to the BLFS 2014, RCSC (2014) and RCSC (2015)

PANEL A – CIVIL SERVICE EMPLOYMENT ACCORDING TO THE BLFS 2014 AND RCSC (2014)

	BLFS 2014		RCSC (2014)		Difference	
	Absolute	Relative	Absolute	Relative	Absolute	Relative
Total	24,530	100.0%	26,320	100.0%	1,790	7.3%
By labor market characteristics						
Regular paid employee	24,301	99.1%	25,358	96.3%	1,057	4.3%
Casual paid employee	92	0.4%	0	0.0%	-92	-100.0%
Contract / piece paid worker	131	0.5%	962	3.7%	831	634.4%
Own-account worker	6	0.0%	0	0.0%	-6	-100.0%
By socio-demographic characteristics						
Male	16,247	66.2%	13,328	65.8%	1,081	6.7%
Female	8,283	33.8%	8,992	34.2%	709	8.6%
Non-Bhutanese	43	0.2%	469	1.8%	426	990.7%
Bhutanese	24,487	99.8%	25,851	98.2%	1,364	5.6%
Age 24 and under	1,263	5.1%	1,502	5.7%	239	18.9%
Age 25–34	11,940	48.7%	13,371	50.8%	1,431	12.0%
Age 35–44	6,511	26.5%	7,354	27.9%	843	12.9%
Age 45–54	4,063	16.6%	3,397	12.9%	-666	-16.4%
Age 55 and over	754	3.1%	696	2.6%	-58	-7.7%
By education						
Middle secondary education or less	8,849	36.1%	5,125	19.5%	-3,724	-42.1%
Higher secondary education	7,334	29.9%	6,320	24.0%	-1,014	-13.8%
Lower tertiary education	6,600	26.9%	12,141	46.1%	5,541	84.0%
Higher tertiary education	1,422	5.8%	1,772	6.7%	350	24.6%
Religious education	96	0.4%	0	0.0%	-96	-100.0%

PANEL B – CIVIL SERVICE PAY ACCORDING TO THE BLFS 2014 AND RCSC (2015)

	BLFS 2014		RCSC (2015)		Difference	
	Absolute	Relative	Absolute	Relative	Absolute	Relative
Annual average	Nu 209,948	100.0%	Nu 236,757	100.0%	Nu 26,809	12.8%

Notes. (1) Weights have been used for the BLFS 2014 numbers. (2) BLFS 2014 records civil service employment and pay around December 2014 and January 2015, RCSC (2014) records employment as on December 31, 2014 and RCSC (2015) pay as of July 2014. (3) Due to data availability, civil service employment by education and civil servant annual average pay are for regular paid employees only. (4) For the RCSC (2014) numbers, middle secondary education or less includes functional qualification and basic education class 10 and below, higher secondary education includes certificate, lower tertiary education includes diploma, bachelor, postgraduate diploma and postgraduate certificate, higher secondary education includes master und Ph.D.

Concerning socio-economic characteristics, the gender and age structure of Bhutan's civil service look very similar in the BLFS and according to RCSC (2014). At the same time, notable discrepancies are found with respect to civil servants' citizenship. Both sources count very few non-Bhutanese citizens among the group of civil servants. However, their number according to RCSC

(2014) is ten times as large as the one implied by the BLFS. This might partly be because following RCSC (2014) almost all non-Bhutanese citizens in the civil service are contract workers. According to the source, this is the case for 444 out of 469 non-Bhutanese citizens listed as civil service employees. However, the discrepancy between the BLFS and RCSC (2014) might also point towards a more general under-reporting of non-Bhutanese individuals in the BLFS (cf. footnote 8). Finally, relatively large differences are also recorded between both sources with regard to civil servants' education. Generally speaking, the average education level of civil servants as detailed in the BLFS is significantly higher than that of all employed individuals in Bhutan (cf. Table 1). Nevertheless, RCSC (2014) lists even higher average education levels for civil servants. No ready explanation is apparent for this discrepancy.

Finally, Table A1 shows that the average annual pay of a civil servant according to the BLFS 2014 is Nu 209,948 while RCSC (2015) lists it as Nu 236,757. Put differently, average civil service pay according to official sources is Nu 26,809 or 12.8 percent higher than according to the BLFS 2014. This is again a discrepancy that is not non-negligible but that still puts the BLFS 2014 relatively close to information garnered form administrative sources.

Summa summarum, a number of noteworthy discrepancies between the civil service employment headcount and structure and average pay according to the BLFS data and administrative data from the Royal Civil Service Commission can be documented, especially with regard to the typical nationality and educational attainment of civil servants. Still, the overall size, employment structure and level of pay of the civil service documented in the BLFS is quite similar to the one recorded by RCSC (2014, 2015).