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University Teachers and Moonlighting Payments in Northern Pakistan

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Abstract: *There are studies on moonlighting, but literature on moonlighting wages and its determinants is scarce. To know the factors that influence the secondary job payments in government higher education institutions, I took a sample from all the public sector universities in Khyber Pakhtunkhwa Pakistan in multi-stages with a total of 656 teachers. I have collected data from all 656 teachers and separated the sample who was undertaking second jobs or jobs. The activity of keeping a second job is mostly hidden which could only be revealed in an anonymous survey. The model was estimated in ordinary least square linear modelling. However, after solving many specification and BLUE requirements, certain linearity and normality issues could not be resolved, so generalized linear modelling was applied. Results reveal that location, age, hours of work at the second job, and job grades affect secondary job payment significantly. The study suggests cross-occupation studies in continuation of this research.*

Key Words: Generalized Linear Modeling, Moonlighting Wage, OLS, University Teachers

Introduction

The education sector in Pakistan is amongst the lowest in spending and teachers are paid low salaries. It has been termed as the core of educational issues by UNESCO[1]. There are also variations in the market based on the segmented labour market and Public-Private institutions have different wage offerings and a wage gap exists. The variance in wages is due to differences in education, regions, and occupation, and people having higher degrees prefer preferring public sector as the primary employment choice in Pakistan (Hakro et al., 2021).In higher education institutes, the trend was to grab full-time employment in a university and look for part-time employment in private sector universities (in some cases, in public sector universities as well). Seemingly, the main cause is the income earning abilities which restrict teachers to a specific salary.

Labour is supplied based on various factors like age, institutional framework laws and alternate sources of income for example the chance to work outside/abroad as well as inside (Ehrenberg & Smith, 2003). As (Hall & Krueger, 2008) mentioned, if someone is undertaking a new job, they can be offered prevailing wages or a negotiated one. The determination of wage may be based on the similarity of qualification or some other yardsticks (Gertler & Trigari, 2009). It's not necessary that a new job is a person's primary

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job, it could be his/her secondary job (Moonlighting) as well.(Foster et al., 2002) and (Bewley & Bewley, 2009) defined primary jobs as full-time and long term and secondary jobs were termed as part-time and short-term. So it can be assumed that wage determination in both jobs will differ from each other. Similarly, the type of job-keeping differs across various sectors. Some sectors (like teaching and manufacturing) have a higher concentration of primary jobs, while the majority of jobs in retail and hotels are secondary in nature (Foster et al., 2002). It is shown by (Hall & Krueger, 2008) that wage determination is influenced by sartorial and institutional factors. Moonlighting jobs and the salary of the first /primary job may have different influencing factors and hence the Moonlighting wages need to be studied differently. Factors like educational level and gender which also have effects on wages (Jolliffe, 2002; Paternostro & Sahn, 1999) may have different responses.

There can also be regional differences in determining wages (Jolliffe, 2002; Paternostro & Sahn, 1999) in general and secondary wages in special(Shishko & Rostker, 1976). Due to these factors, the wage in a secondary job i.e. the activity of secondary job holding is an occupation-specific phenomenon (Baba & Jamal, 1992; Betts, 2006) and hence the greater macro level study did not provide an in-depth idea of specific professional circumstances.

Moonlighting is a well-known idea in the teaching profession. Many authors have worked on various aspects of the phenomenon to know its causes and consequences while developing a main financial motive profile for moonlighters (Klinger & Weber, 2020; Parham & Gordon, 2011).(Van der Gaag et al., 1989)finds that the wages in public organizations are low compared to the private sector, due to which people moonlight. They claim that moonlighting is more prevalent in the public sector than private in Cote d'Ivoire and Peru. There is also evidence (Psacharopoulos, 1983) that experience and education are valued in the private sector in countries like Brazil, Colombia, Greece, Malaysia, and Portugal.

Government of Pakistan defines moonlighting as 'working beyond fifty hours per week' (*Labour Force Survey 2017-18 (Annual Report) | Pakistan Bureau of Statistics*, 2018). The same survey shows that there is comparatively highest prevalence of excess hours worked in Khyber Pakhtunkhwa in the education sector. The surprising element is the reality that females too have a higher tendency of excessive hours of work. Research also shows that moonlighting is practised higher in Khyber Pakhtunkhwa (Hyder & Ahmed, 2009). So it arouses curiosity that what can be the determinants of the payments for undertaking a second job in teaching in Khyber Pakhtunkhwa (*Unesco Report*, 2017).

Moonlighting in the context of higher education has not been researched to the knowledge of the researcher. Pakistan-related studies related to moonlighting are scarce. Similarly, studies have been made in a general context (Hyder & Ahmed, 2009) or addressing determinants of the moonlighting phenomenon (Jehan & Khan, 2016). Moonlighting is an occupation-specific phenomenon because every occupation and sector has its own unique set of variables acting upon each other. Hence the findings of one occupation cannot be generalized across other occupations (Baba & Jamal, 1992; Betts, 2006).

There is a dearth of research on the determinants of secondary jobs' wages and almost no study on primary data. Most of the studies on moonlighting and the wages of secondary jobs are done on secondary macro data. There is also less work on the supply of labour to a second job. Similarly, very few studies are occupation-specific where the primary and secondary tasks are similar, and the nature of work resembles.

Literature Review

Secondary work is mostly overlooked and is seldom measured traditionally (Glavin, 2020).

However, there are studies which show that the topic has literary importance besides practical standings. The literature review reveals that previous research on moonlighting (Shishko & Rostker, 1976) concentrates primarily on the determinants of moonlighting labour supply. Education is a significant determinant of supply-side wages (Becker, 1962). Nonetheless, location also proves to be a significant factor in this regard. In addition, the need satisfaction aspect of moonlighting is emphasized (Jamal & Crawford, 1981). Several studies (Williams, 1992) that focus on the public sector examine the phenomenon of moonlighting among instructors. Most of the moonlighting research has focused on the variables that explain moonlighting (Baah-Boateng et al., 2013; Biglaiser & Albert Ma, 2007; Conway & Kimmel, 1998; Heineck & Schwarze, 2004; Nadrei, 2003; Shishko & Rostker, 1976; Sicherman & Paxson, 1996). Despite the fact that the focus of the research is on the determinants of moonlighting, teachers of higher institutes have not been the subject of research in this regard in the past, as the majority of studies have been conducted on teachers of public schools(Burch, 1966; Stewart, 1981; Williams, 1992; Wisniewski & Kleine, 1983). The primary concern of the researchers in these studies is that moonlighting is a result of time constraints at the principal job. In some cases, it is believed that good salaries in the private sector attract the attention and job inputs of people engaged in dual job practices away from their public employment and into the private sector (Biglaiser & Albert Ma, 2007; Krishnan, 1990; O'Connell, 1979; Shishko & Rostker, 1976). In 1985, (Khan et al., 1985) computed the private rate of returns of education in Pakistan and found that, in absolute terms, the return to education was low compared to other developing nations, but that there was a positive correlation between these variables. However, they conclude that the incentives associated with obtaining a higher education are unsatisfactory (especially for those who are economically and socially disadvantaged) due to the fact that at that time (i.e. 1985) these returns were below-market interest rates.

A calibration exercise demonstrates that the key driver of moonlighting is hour limits because people are less likely to be interested in low-paying side occupations unless their primary income is too low. Since the majority of people only maintain secondary employment for a year or less, these hours restrictions are probably just temporary (Tazhitdinova, 2020). The wage of the primary employment and involvement in the side job have a positive link, according to (Bikoue, 2020). The author also confirms that gender and degree of education are inversely connected with the intention to moonlight, while age and age are positively correlated with this intention (female). In this regard, (Lachowska et al., 2021) believe that the number of hours worked at secondary employment should be inversely proportional to the pay rate at the primary job (due to income effects).

The majority of moonlighters work in the service industry (Klinger & Weber, 2020).

Multiple jobholding is associated with increased work-life conflict and employee stress(Katz & Krueger, 2019; Mas & Pallais, 2020). With the expansion of the electronically-mediated freelance economy, there has been a resurgence of interest in the topic (Bird et al., 1994; Chase, 1998; Flanagan, 1998; Jones & Simon, 2005).

Education is the basic supply-side determining factor of wages (Becker, 1962). The measurements represent the year of schooling or the educational level of an employee. Research suggests that Central and European research employed both approaches. The results of these countries show that the return to education of one year in the earlier career ranges from 3.9percent to 5.7 per cent (Bird et al., 1994; Chase, 1998; Flanagan, 1998; Jones & Simon, 2005) and in exceptional cases to 11.2percent (Campos & Jolliffe, 2002). However, a university degree exhibits higher returns as high as 50 per cent (Chase, 1998; Flanagan, 1998; Noorkôiv et al., 1998;

Stanovnik, 1997) and in some cases even exceeding 80 per cent (Campos & Jolliffe, 2002).

Referring to Becker's (1962) idea of human capital as general and human capital as specific, labour market-specific work experience which is on-the-job training in a sense, is given attention in payments decisions. Labour market experience (not job specific) receives a cumulative return of 14.7percent to 44.2percent, and for the same years of tenure, i.e. job specific experience reaches from 6.6percenttp 28percent (Abowd & Kang, 2002; Altonji & Shakotko, 1987; Altonji & Williams, 2005).

Education plays a significant role in differentiating the return to market experience and tenure (Buchinsky et al., 2010) and somewhat similar effects of the socioeconomic status related to a specific job (Abraham & Farber, 1987). There could be cases where labour market experience data may not be available, in such cases; age could be used as a potential alternative (see Mincer, 1974). The wage returns to education and labour market experience are scarce and in case of a second job, they are almost absent. The measurement problems related to soft and/or social skills are another related impediment.

So it can be asserted that the majority of the literature has an understanding of the determinants of wages (Balcar, 2012) though there is less evidence of wage determination in the case of a second job. Research mainly directs (from a supply-side perspective) on defining new variables emphasizing the description of the main elements of an individual.

According to Murnane et al. (2000), there is a lack of data on interpersonal skills. There is also a selective application of job performance tools (Gerhart, 1990) due to which the explanatory power of the wage model decreases and can lead to biased estimates as a result of omitted variables. The comprehensiveness of the wage equations as pointed out by (Joy, 2003) is a good mechanism to avoid any possible bias of regression estimates (mostly omitted variables) as a result the explanatory power of the model is enhanced. It needs a good data set and the inclusion of new variables hence capturing the effect of new traits.

It was revealed in a study related to employment choice that people having higher degrees prefer the public sector for work, and already employed people (in the private sector) opt public sector for future employment. In case more people in the family hold jobs, other members of the family favour the public sector (Hakro et al., 2021). Although people prefer government jobs, dissatisfaction with government salaries can lead to other options like taking a second work. As noted by (Šťastný et al., 2021)about teachers in Czech schools who take on private tutoring because of financial burden and discontent with government salaries. However, there are employees who work in older organizations and have spent time there who are able to network outside the organization and intend to leave (Cohen, 2020).

Research Methodology

Sample Selection

The research selected a sample frame of all public sector universities/Institutes from the Higher Education Commission of Pakistan website. From these, nine universities were selected in stratified random sampling dividing universities into rural, semi-urban and urban universities. In the next stage, stratification was applied to the faculty sampling frame based on their grades. Finally, 246 lecturers, 98 professors, 60 associate professors, 195 assistant professors and 67 teaching assistants were selected randomly by equal proportion allocation (656 in total).

Conceptual Framework

Several studies, including those by (Angrist, 1991; Bhattarai, 2017; Dougherty & Jimenez, 1991; Heckman, 1979; Mroz, 1987), pertain to

theoretical arguments on how wages are determined and the supply of labour. Wide-ranging literature is also available that focuses on empirical features. For both the UK and the USA, there is a sizable body of literature that examines empirical elements (Blundell et al., 1992; Dex et al., 1995; Kimmel & Kniesner, 1998; Miles, 1997; Nakamura & Nakamura, 1981).

Based on theoretical and empirical research, the secondary hourly earnings are taken in logarithmic form with economic and noneconomic characteristics as explanatory variables for second job income determinants. The logarithmic form is the most effective functional specification for the dependent variable (wage), as it maximizes the explanatory power of the regression and satisfies the assumption of heteroscedasticity (Dougherty & Jimenez, 1991). For workers whose market pay is smaller than their reservation pay (which means they offer no labour), the wage level is unobserved; in such a circumstance, regression is based on a censored sample. We consider the following equation to be the individual's offered logarithmic wage.

$$\log wi = \beta_0 + \beta_1 w_{2i} + \beta_2 Age_i + \beta_3 Lec_i + \beta_4 TA + \beta_5 P_i + \beta_6\ Region_{i1} + \beta_7 Region_{i2} + \beta_8 AP_i + \beta_9 Deg_i + \beta_{10} h2_i + \varepsilon_i = X_i\, w\beta + \varepsilon_i\, w \quad (1)$$

Lets assume about the observed wages as:

$$\log(wi) = Xi\ ^{w}\beta + \varepsilon i^{w} \quad (2)$$

Here Xi^{w} shows labour market characteristics while β shows coefficients' column vector characteristics. So, if we want the estimation of the probabilistic model and data is missing for log(w) in case of certain observations, also assume an indicator I_i^{empl}, where $I_i^{empl}>0$ in case of paid employment for individual i and $I_i^{empl}=0$ in case of non-paid or no employment. Hence general wage equation can be:

$$E(\ln(wi) \mid Xi^{w}, Ii^{empl}>0) = Xi\, w\beta + E(\varepsilon i\, w \mid Xi^{w}, Ii^{empl}>0) = Xi\ ^{w}\beta + E(\varepsilon i\, w \mid \varepsilon i^{empl} > -Xi^{empl}\alpha) \quad (3)$$

On the labour-supply side, the functional form could be:

$$\log h_i = \delta_1 + \delta_2 \log(w_i) + \delta_3 \log(HH_i) + \delta_4 NLI_i + \delta_5 MS_i + \delta_6 Sex_i + \delta_7 Party_i + \delta_7 OTQ_i + \varepsilon i^{h} = Zi_h\, \delta \quad (4)$$

Here, $\log h_i$ refers to the logarithmic hours of work supplied by the ith individual which also includes overtime. Wage is shown by $w_{i,}$ the weekly housework hours denoted by HHi, non-labour income per month as NLI_i, for marital status $MS_i$is used. For gender, $sex_i$is used as a dummy (male=1), and $party_i$is a vector of binomial variables which is used for political preferences, while $OTQ_i$is a vector of continuous variables which represents responses on a scale of 1-10. Lastly, the stochastic disturbance term is denoted by εi^{h} (Mas & Pallais, 2020).

The Research Model

The moonlighting wage and primary wage were both transformed into wage rates to align them with each other. The research model was primarily estimated in the following manner.

$$wm = \beta_0 + \beta_1 w_{2i} + \beta_2 Age_i + \beta_3 Lec_i + \beta_4 TA + \beta_5 P_i + \beta_6\ Region_{i1} + \beta_7 Region_{i2} + \beta_8 AP_i + \beta_9 Deg_i + \beta_{10} h2_i + \varepsilon_i \quad (5)$$

However, the research used a generalized linear model for analysis after finding some linearity issues in the data which were not resolved.

The introduction of generalized linear models is related to (Nelder & Wedderburn, 1972). A collection of modelling frameworks for multiple data types, including discrete, continuous, and categorical outcome data, was the main objective of GLM. These models can be viewed as an extension of the linear regression model in situations where it is challenging to satisfy the assumptions of constant variance and normality. These models

were popularized by (McCullagh & Nelder, 1989). GLM assumptions include the independence of instances and Yi (the independent variable) to follow a given distribution, such as a multinomial, poison, etc. Instead of assuming that the dependent and independent variables are normally distributed, the response is transformed. No variance homogeneity requirement exists (Agresti, 2007; Lenz, 2016; McCullagh & Nelder, 1989). In our case, a unique instance of (Tweedie, 1984) exists, as explained below.

Let X_i be a vector of predictor variables for the ith observation and let Y_i stand for the ith observation's response variable. The assumption is that the response variable Y_i will have a Tweedie distribution with mean μ_i, variance _ $\phi\mu_i^p$, and power parameter p. ϕ as the dispersion parameter.

The link function $g(\mu_i) = \eta_i$, where g() is a predetermined link function, connects the mean μ_i and the linear predictor η_i. The logarithmic, power, and identity linkages are popular options for g().

η_i which is represented as:

$$\eta\_i = \beta_0 + \beta_1 X_{\{i1\}} + \ldots + \beta_p X_{\{ip\}} + b_i,$$

here, βs represent coefficients of fixed effect related to predictor variables, bi represents random effect accounting for correlation structure in the data and it is assumed to be following multivariate normal distribution having zero mean and covariance matrix of D.

We can express to probability density function of Tweedie as

$$f(yi;\mu i,\emptyset,\rho) = \frac{\left(yi^{\{(p-1)\}} \exp\left(\left(\frac{yi}{\mu i}\right)^{\{1-p\}/(\emptyset(1-p))}\right)\right)}{(\mu i \emptyset^{(yi(1-p))}} (C(p,\emptyset)$$

Here $C(p,\emptyset)$ refers to the normalization constant which is dependent on the power and dispersion parameter. Maximum likelihood estimation is used for estimating the parameters.

$$|(\beta,D|Y,X) = \sum[\log(f(yi;\mu i,\phi,p))] + \log(f(bi;0,D),$$

where the first term is the log-likelihood of the observed data given the coefficients of the fixed effects and the second term is the log-likelihood of the random effects given the covariance matrix D.

Results and Discussion

The moonlighting compensation estimation model employs ordinary least squares. The design is based on the work of (Shishko & Rostker, 1976). Initial variables included wage at the second job as the response variable and primary wage, master Education taken as one and above as 0, age taken as a continuous variable, and location as explanatory variables in line with the model proposed by (Kimmel & Powell, 1999). As there were BLUE issues that, despite repeated efforts, could not be resolved, the Generalized Linear Model (GLM) was utilized for the final analysis.

Estimation of Moonlighting Wage Through Generalized Linear Model

The salary of the second job was calculated using generalized linear modelling (GLM). GLM is an alternative to conventional least square estimation when normality and linearity issues exist. Comparing the Deviance value to the chi-square value determined the GLM model's fit quality. The deviance value (280) was statistically significant (having 240 degrees of freedom), so it can be concluded that the model accurately represented the data. Additionally, the test for the intercept-only model demonstrates the significance of the data.

Likewise, the test results for individual coefficients are shown in Table 1. It indicates that teaching assistants, urban location, age, and hours worked at the second job significantly affect earnings at the second work. The intercept is also statistically significant, and there is no evidence that the models' grand mean is equal to zero. Consequently, these variables exert a non-zero effect.

Table 1

Individual coefficient effects for the model

Source	Type III		
	Wald Chi-Square	Df	Significance
(Intercept)	205.01	1	.00 ***
Master degree	1.5	1	.22
TA	6.0	1	.012**
Lecturer	.04	1	.83
Urban university	3.5	1	.06**
Rural	1.47	1	0.223
Assistant P	.01	1	.94
Professor	.1	1	.71
Age (Years)	21.6	1	.00***
wage rate primary job	1.5	1	.23
Secondary job work (h0urs)	3	1	.09*

Source: author's own calculation in SPSS

Table 1 represents the outcomes for individual coefficients known as the partial sum of squares. The values of the partial sums of squares indicate that faculty working in urban locations, faculty 'age, teaching assistants, and hours worked at the second job have a significant effect. The model's grand mean is not equal to zero. Therefore, these variables exert an effect that is not zero. In some institutions, a teaching assistant is not considered faculty, and the demand for their services is inconsistent. However, their work is esteemed more monetarily when they are classified as regular teachers. A person may have a higher degree, but if they are employed as a teaching assistant, their secondary employment offer is not particularly satisfactory. We recommend eliminating such posts if they are not recognized across international borders. Insignificantly, the moonlighting wage rate for non-professor cadre decreases by 0.047 units. We can assert that moonlighting pay increases as we ascend the teaching hierarchy to the professor. If a faculty member moves from an urban area, the moonlighting wage rate decreases by 0.232 units. Urban jobs had higher compensation rates than non-urban jobs, there is a greater supply of labour for the second job, and therefore there is a greater demand. Urban areas offer more opportunities for moonlighting than non-urban ones. (Shishko & Rostker, 1976) and (Baah-Boateng et al., 2013) subsequently discovered identical results. Age has a positive and statistically significant influence on the moonlighting wage rate. A one-year increase in age can result in a 0.038-unit increase in the second wage rate. This result was statistically significant at the 5% level of significance. Consequently, as the average age of the population rises, networking develops, and we can increase wage rate demand. Because the second job's pay is not fixed, and the position is offered on a semester-by-semester basis, an experienced worker (who may have a higher position at their primary job) may be offered competitive pay. (Shishko & Rostker, 1976) and obtained comparable outcomes. The hours worked at a second job were found to be statistically significant at a 10% level of significance, with an increase of one hour in second job hours decreasing the wage rate by 0.013 units. One subject moonlighting work may be taught at one wage rate, while additional subjects may be taught at a lower rate. The additive effect could be substantial. The primary wage rate has a significant but minimal effect. This can also be

ascribed to non-economic factors. Thus, there is bargaining involved in offering the opportunity for moonlighting. It can be asserted that secondary employment offerings in the education sector of northern Pakistan are not formal but rather informal activities that can be formalized.

Table 2

Send Job Wage's Estimated Parameters

Parameter	B	Std. Error	Hypothesis Test		
			Wald Chi-Square	df	Sig.
(Intercept)	4.01	.14	776.40	1	.00***
Higher degree	-.16	.04	12.97	1	.23
Higher posts than TA	.65	.09	53.44	1	.01**
Other than lecturer	.03	.04	.42	1	.83
Non-Urban	-.23	.042	30.7	1	.06*
Non-Rural	.17	.049	12.99	1	.22
Other than AP	-.01	.04	.05	1	.81
Other than Professor	-.05	.042	1.24	1	.94
Years of age	.04	.01	188.5	1	.00***
wage rate (Primary job)	0.00	0.00	12.7	1	.223
Work at a second job (hours)	-.01	.003	25.9	1	.00***
(Scale)	1				

Source: Survey (AP refers to Assistant Professor), TA to teaching assistant)

Conclusion

This study concluded that there is a positive correlation between age and moonlighting remuneration, and as age increases, so does secondary job compensation. Therefore, an experienced person receives a higher rate for moonlighting. Or, we can say that the older a person is, the better they know people and the greater the number of second job opportunities. According to research, moonlighters are not compensated differently based on their principal job's salary. Moonlighting wage rates can be ascribed to other variables and should not be compared to those of the primary job. If a person advances from teaching assistant grades to regular job cadre, their second job's pay increases. All universities have a secondary wage rate tied to their formal grades, and the services of teaching assistants are poorly compensated. There is a possibility that advanced degrees will not increase secondary job pay. Additional hours at a second employment reduce the wage rate of moonlighting. The study determined that GLM is an appropriate alternative for data with extreme data and normality issues. The GLM and OLS yield nearly identical results.

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