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Union wage effect: Evidence from Ghana

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Abstract: Consistent with Convention 87 of the International Labour Organization (ILO), Section 79 of the Labour Act, 2003 (Act 651) empowers every employee in an organization to either form or join a trade union of their choice for the promotion and protection of their economic and social interests. In spite of this legal provision, union coverage and density in Ghana have continually declined in recent years. The decline in union density and coverage is likely to decrease the collective bargaining strength of unions. It is against this background that our study seeks to examine the effect of unions' bargaining (proxied by union presence variable) on wages in Ghana. We employ the Heckman Selection Model and quantile regression technique to analyze data extracted from the sixth round of the Ghana Living Standards Survey (GLSS 6) and 2015 Ghana Labour Force Survey (GLFS 2015) respectively. The findings indicate that unions' bargaining effect on wages is positive. Furthermore, the study finds that the union wage premium is highest at the lowest point of the wage distribution (25^{th} quantile) but lowest at the highest point of the wage distribution (75^{th} quantile). Whilst the study acknowledges the importance of education in earnings determination, we recommend that low-wage employees in a non-union establishment should join a trade union in order to earn a living/decent wage.

Subjects: Economics and Development; Political Economy; Economics

Keywords: Unions; Collective Bargaining; Wages; Labour Act; and Ghana

JEL Classification: D02; J01; J08; J31; J51

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1. Introduction

The emergence of trade unionism in African labour markets has greatly influenced socio-political development in the continent. In the 1950s through to the 1990s, trade unions in Africa played an instrumental role in achieving political independence for the continent (Kalusopa et al., 2012). To cite few examples; the Trades Union Congress (TUC) of the then Gold Coast (now Ghana) aided the Conventions People's Party (CPP), a strong political group at the time, to gain political independence for the country in 1957 whereas in the mid-1990s, the South African Trade Unions partly contributed to the elimination of apartheid (Agyeman, 1980; Budeli, 2007; Nimoh, 2015). In Tunisia, the "Union Générale Tunisienne du Travail (UGTT)" played an instrumental role in the Arab Spring in 2011 that led to political liberation of the North African States from authoritarian rule (World Report, 2012).

In spite of the significant political achievements of trade unions in Africa, a recent report by International Labour Organization (ILO) reveals that only 12.6 percent of the world's estimated workforce (i.e. 1.3 billion persons) belonged to trade unions in 1995. The report further reveals that union membership rate exceeded 50 percent of the national labour force in only fourteen (14) out of the ninety-two (92) countries surveyed.[1] These statistics indicate that union coverage has not been pervasive at the global level. Similarly, union density has been low in the African region. For instance, whereas Southern Africa recorded an average union density of 10 percent between 2000 and 2016, the West African region recorded an average union density of 15 percent over the same period (Visser, 2019). In Eastern Africa, union density averaged about 10 percent between 2000 and 2009 but averaged only 4 percent in the Northern African region over the same period (ibid.). Thus, within the entire African region, union density averaged less than 20 percent. This is lower when compared to those of other regions of the world, particularly America and Europe. For instance, in 2016, Northern Europe recorded a union density of about 63.2 percent, whereas South America recorded a union density rate of about 20.1 percent (ibid.).

In Ghana, modern industrial developments indicate that trade union membership has declined steadily, although it increased during the early years of the ratification of ILO's Conventions 87 and 98 respectively (Lartey, 2013). Furthermore, Asafu-Adjaye et al. (2009) reveal that there was a decline in union membership of about one hundred thousand members (100, 000) of the affiliates of Trades Union Congress (TUC) in 2012. This indicates that union density has drastically declined in Ghana. The declining trend in union membership could be attributed to the growth of the digital economy and continuous automation of jobs coupled with growing informal employment (Visser, 2019).

Although union density has declined in formal settings, unionism has been employed as a tool to improve the working conditions of informal workers. For instance, the study by Segbenya (2019) finds that organizing leads to decent working conditions among informal stone quarry workers in Ghana. Also, the study by Segbenya et al. (2022) reveals that informal quarry workers in Ghana employed organizing to improve their working conditions through a collective agreement with management.

On the other hand, the challenge with declining union membership is the real extent to which it weakens union's collective bargaining power, thereby creating an unbalanced industrial relations pivoted on employer discretion. Some studies have also found declining union membership to weaken union's collective bargaining strength and thus, hampers union's ability to organize for collective action against exploitation (Barling et al., 1992; Klandermans, 1986). Thus, in this era of eroding union membership at both global and national levels, this study primarily examines the extent to which trade unions in Ghana are potent at influencing wages of their members through collective bargaining. Secondly, if a union wage effect is evident, the study also seeks to examine whether this effect varies with wage distributions.

The rest of the paper proceeds in the following structure. Section 2 reviews the extant literature on unions' effect on wages whilst section 3 presents some stylized facts of trade unionism in

Ghana. Section 4 presents the methodology; describing the empirical models and data sources. Section 5 presents and discusses the results. Conclusion and policy recommendation are presented in Section 6.

2. Literature review

This study is theoretically based on the Dunlop model of union bargaining, which is attributed to John Dunlop (an eminent Labour Economist), who propounded it in the 1940s. As per the model, the union is viewed as a firm acting as a profit maximizer seeking to attain some objectives for its members. According to Dunlop (1944), some possible objectives that a union may seek to maximize include the size of the wage rate, the size of the union membership, the wage bill and economic rents of the membership. However, our study only focuses on examining union's objective of maximizing the size of the wage rate.

On the contrary, at the empirical level, there is a long-standing debate as to whether unions have any effect on wages. Adam Smith in 1776 and Fleeming Jenkin in 1868 opined that unions indeed did increase wages, whilst Milton Friedman in 1950 on the other hand thought they had negligible effect on wages, since they could not influence the supply of labour much (Bryson, 2014). However, a consensus emerged towards the end of the 20th century that unions did affect wages (Freeman & Medoff, 1984; Lewis, 1986).

The effect of trade unions on wages has been widely discussed in advanced countries, with most of the studies concluding that unions have a mark-up effect on wages of their members. For instance, Lee (1978) analysed the effect of trade unionism on wages in the United States using the 1967 Survey of Economic Opportunity. His findings basically indicate that unionism has a significantly positive effect on wages and that union membership is determined by wage gains as well as the selectiveness of employer's employment policy. Chamberlain (1994) also revealed that among blue-collar workers in Germany with industrial experience of 20 to 29 years, the union wage effect is much stronger at the lower end of the conditional wage distribution than at the upper end of the distribution. However, for workers with industrial experience of less than 9 years, he does not find such a pattern. This means that, industrial experience has a significant influence on union's effect on the conditional wage distribution. In South Africa, Butcher and Rouse (2001) found that the wage premium monotonically decreases along the wage distribution. Thus, Kerr and Wittenberg (2021) concluded that unions slightly increase wage inequality in South Africa. However, their conclusion is contrary to the evidence provided by Ntlhola et al. (2019); the union wage premium is constant across the conditional wage distribution. In Australia, Cai and Liu (2007) found that male union wage effect decreases when moving up the wage distribution whilst for females, it is relatively stable except at the extreme part of the distribution. Hence, overall, the study finds that unions have a larger effect on males than females. This finding generally suggests that trade unions benefit workers at the lower tail of the wage distribution more than workers at the upper tail of the distribution. On the other hand, Fitzenberger et al. (2008) provided an analytical anatomy of union wage effects in Germany by applying quantile regressions to employer-employee data. They found that, all things being equal, a large proportion of employees in a firm with industry-wide or firm-level contracts increased wages, whilst individual bargaining coverage in a covered firm showed negative impact both on the wage level and on wage dispersion. This suggests that, the type of contract has implications for the union wage effect. In South Korea, Kleiner and Lee (1997) found the wage gap to be 7 percent, whilst the study by Fields and Yoo (2000)found that despite the increase in union density, and hence bargaining ability, the union wage gap slightly rose from 3 percent to 6 percent. Furthermore, new evidence from Korea on the union wage premium in a segmented labour market indicates that voluntary non-union members experience a marginal wage penalty relative to their union counterparts, whilst for the involuntary non-union members, the wage penalty is higher (Choi & Ramos, 2023).

In the developing countries' context, the few studies that have been conducted, as pointed out by Fang and Hartley (2022), indicate a "mixed" union effect on wages. For instance, Blunch and Verner (2004) reported an estimated union wage gap of about 6 percent for Ghana. Baah (2005)

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also reported that the Ghanaian union wage gap increase ranged between 7.8 and 12.6 percentage points in 1992 and 1999 respectively. Similar to the conclusion reached by Blunch and Verner (2001), Blunch and Verner (2004) and Baah (2005) also concluded that unions in Ghana decreases the dispersion of wages. Furthermore, using quantile regression, Blunch and Verner (2001) found that trade unions have an asymmetrical effect on wages in such a way that they benefit mainly those at the lower end of the wage distribution in the Ghanaian Manufacturing sector. In Mexico, Rufrancos (2017) estimated that there was a sizeable raw mean wage differential between union members and non-union members of about 18 to 22 percent. However, that gap reduced to about 6.7 to 13.8 percent, when worker characteristics were considered. Fang and Hartley (2022) also found through a literature survey that union wage premiums in the developing world exhibit more variation compared to those in the developed world.

In a related study, Barth et al. (2020) examined the effect of union density on productivity and wages and found that raising firm-level union density contributed to a significant increase in both productivity and wages, with the wage effect being larger in more productive firms.

In summary, whilst some of the studies found a union mark-up effect on wages (Baah, 2005; Blunch & Verner, 2004; Rufrancos, 2017 among others), others discovered a negative union effect on wages (Verner, 1998; Rama, 1998) among others. In Ghana, a recent and extensive study on the effect of unions on wages is conducted by Baah (2005), which employed data from waves 3 and 4 of the GLSS. Thus, as far as the literature survey of this study is concerned, not many extensive studies have been conducted on the effect of trade unions' bargaining on wages in Ghana using recent datasets such as GLSS 6 (2012/2013) and 2015 GLFS. In addition, since union coverage has continually declined over the years, which is an indication of decline in union strength, there is the need to re-examine the union-wage nexus using recent data. Thus, our study seeks to fill these gaps in the empirical literature.

3. Some stylized facts of trade unionism in Ghana

3.1. Trade union coverage and density

Evidence from the 2015 Ghana Labour Survey (GLFS) indicates that, union presence (our measure of collective bargaining strength) covers about only 12 percent of enterprises in Ghana (Figure 1). Specifically, in terms of distribution of union presence across enterprises, Figure 1 indicates that only 1 percent of enterprises have multiple trade unions, whilst 11 percent of enterprises have a single trade union representation (that is, only one trade union is present in those enterprises). On the other hand, Figure 1 indicates that a relatively larger number of enterprises, about

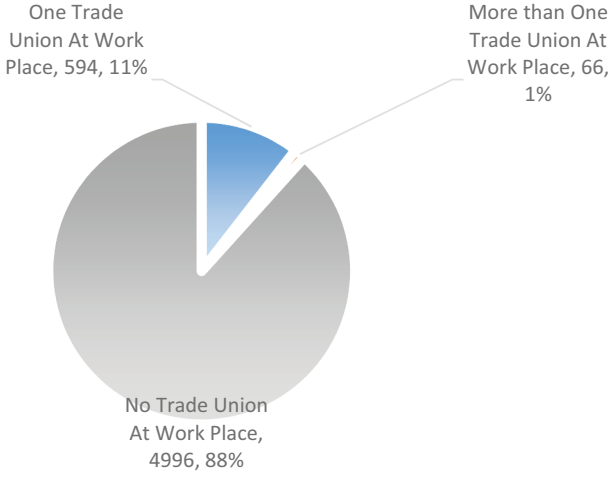

Figure 1. Trade union coverage (No. of unionized work/total no. of work %).

Source: Author`s construction based on GLFS 2015.

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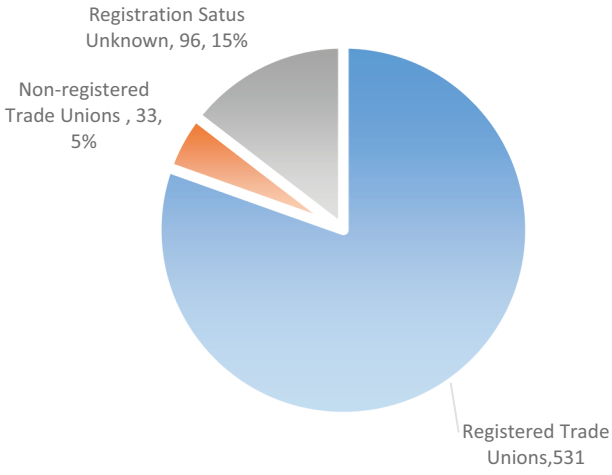

Figure 2. Registration status of trade unions present at workplace.

Source: Author`s construction based on GLFS 2015 Data.

88 percent, do not have trade union representation or coverage. Hence, union coverage is not pervasive or widespread in the Ghanaian labour market.

In terms of registration/legal status of trade unions, Figure 2 indicates that 80 percent (531 trade unions) of the total number of trade unions existing in all enterprises (both formal and informal) are registered, whilst only 5 percent (33 trade unions) are not registered. This suggests that majority of the trade unions present in various enterprises in Ghana have a legal status and can therefore act lawfully to protect the interests of their members. However, the registration status of the remaining 15 percent (96 trade unions) is reported as unknown.

At the regional level, the trend analysis of union coverage from 1991/1992 to 2015 reveals that, union coverage in most of the administrative regions have declined (Table 1), which is consistent with the discovery of Gockel and Vormawor (2004). It is however striking that the analysis in Table 1 indicates that Greater-Accra region has had the lowest average union coverage (28.2%) for

Table 1. Regional trend of union coverage from 1991/1992 to 2015

Administrative Regions						
	1991/1992	***1998/1999***	***2005/2006***	***2012/2013***	***2015****	***Average***
Western	74.8	63.2	45.0	26.0	16.4	***45.1***
Central	49.4	21.2	43.9	31.4	9.7	***31.1***
Greater-Accra	42.3	30.7	30.5	27.4	10.1	***28.2***
Volta	53.2	57.9	40.2	40.5	9.4	***40.2***
Eastern	47.7	60.0	34.2	28.2	8.6	***35.7***
Ashanti	61.5	41.4	31.4	23.4	15.7	***34.7***
Brong-Ahafo	70.0	49.7	43.2	38.3	8.0	***41.8***
Northern	33.3	77.8	37.0	32.8	8.4	***37.9***
Upper-East	40.0	84.6	45.8	36.0	26.6	***46.6***
Upper-West	70.0	77.8	55.9	44.6	10.2	***51.7***
Overall	***53.9***	***46.4***	***36.2***	***30.6***	***12.3***	***35.9***

*Ghana Labour Force Survey Data.

Source: Author`s Construction based on GLSS 3, 4, 5 and 6 as well as GLFS 2015.

the period 1991/1992 to 2015, whilst the Upper-West region has had the highest average union coverage (51.7%) over the same period. This is because a large proportion of formal sector employees in the Greater-Accra region are by law, not permitted to join nor form trade unions (Baah, 2005). Examples include employees of the Customs, Excise and Preventive Service, the Immigration Service, the Police Service, the Armed Forces, Fire Service and the Prison Service (ibid.).

4. Methodology

4.1. Empirical models and estimation techniques

First, in order to examine the effect of trade unions on wages, we specify based on the Dunlop Model the empirical equation (Equation 1) as:

$$Inw = \eta_0 + \eta_1 U + \alpha_1 basic + \alpha_2 \sec + \alpha_3 ter + \beta x + \Omega_1 age + \Omega_2 age^2 + \Omega_3 male + \Omega_4 manu + \Omega_5 serv + \Omega_6 urban + \Omega_7 formal + \varepsilon \quad (1)$$

Where: *Inw* is the dependent variable measured as logarithm of wages (in monthly terms) of the individual worker. We use monthly earnings to minimize biases caused by misreporting of wages (Baah, 2005). The explanatory variables are *U, basic, sec, ter, x, age, age squared, male,manu, serv, urban* and *formal. U* is a dummy variable which is one (1) when a union is present at the workplace/ enterprise and zero (0) if otherwise (our justification of union presence over union membership variable is that union agreements also spill over to nonunion members in same enterprise); *basic* is one (1) if the individual has basic education and zero (0) if otherwise; *sec* (secondary) is one (1) if the individual has secondary/vocational/technical education and zero (0) if otherwise; *ter* (tertiary) is one (1) if the individual has tertiary education and zero (0) if otherwise; *age* is the age of the individual in years; *male* is a male dummy which is one (1) if the individual is a male and zero (0) if otherwise; *manu* is an employment dummy which is one (1) if the individual is engaged in industrial activities such as manufacturing, construction, refining, mining, quarrying, processing, water and electricity generation and zero (0) if otherwise; *serv* is an employment dummy which is one (1) if the individual is engaged in services and zero (0) if otherwise; *urban* is a locational dummy which is one (1) if the individual is in the urban area and zero (0) if otherwise; *formal* is a dummy which is one (1) if the individual is employed in the formal sector and zero (0) if otherwise, and $\mathcal{E}$ is known as the stochastic error term, which captures the effect of unobservable characteristics that may influence wages of the individual worker; $\eta_0, \eta_1, \alpha_1, \alpha_2, \alpha_3, \beta, \Omega_1, \Omega_2, \Omega_3, \Omega_4, \Omega_5, \Omega_6$ and Ω_7 are the parameters of the model.

Our main parameter of interest is η_1, which measures the effect of unions' bargaining on wages. The study estimates this effect using the Heckman Selection Model (HSM). This is because the HSM addresses the sample selection bias associated with regressing wages on characteristics of those in employment (Heckman, 1979; Lee, 1983). The sample selection bias is however attributed to the reason that, employed persons tend to have higher wages than unemployed persons (Heckman, 1979; Lee, 1983). Thus, when the Ordinary Least Squares (OLS) technique is applied to estimate the union wage effect (η_1), it biases it since the OLS regression uses the sample of employed persons only and ignores unemployed persons (Heckman, 1979; Lee, 1983). In addition, the Heckman Selection Model (HSM) is relatively better than the OLS regression in the sense that it addresses the endogeneity problem associated with the union status variable. Robinson (1989) argued that union status is not randomly determined. However, in reality, union membership in Ghana is a condition for employment in the public sector, which makes the union status variable exogenous in that sector. In the private sector, union membership is not a condition for employment and thus, the union status variable is endogenously determined within that sector. Thus, with more than half of private sector employees in our samples (69% for GLSS 6 sample and 92.40% for 2015 GLFS sample), the union status variable (i.e. union present variable) is considered to be more endogenous than exogenous. Thus, rather than the OLS regression, we apply the Heckman Selection Model (HSM) to estimate the union wage effect.

The Heckman Selection Model (HSM) is therefore specified as follows: First, the model is developed within the context of an observed wage equation specified as equation1. However, the underlying participation equation (also known as the selection equation) relating to employment status (whether employed or unemployed) is specified as: $E^*_i = Z_i'\Omega + u_i$

Where: E_i*= Wi—E'i is the excess of actual wages over reservation wage, E_i". The reservation wage is the minimum wage at which the ith individual will be willing to work. If the wage is less than the reservation wage (E_i"), the ith individual will not be willing to work. Thus, we observe only an indicator variable for employment defined as E = 1, if > 0 and E = 0 if < 0. Z_i is a vector of characteristics of the ith individual that may influence his/her employment status. These characteristics include age, marital status, status in household, educational level of the individual, mother's and father's educational status, regional dummy (Accra) and non-labour income of household. These variables (also known as instruments) are included in the selection/participation equation but excluded in the observed wage equation (i.e. Equation 1). Thus, our specification of the Heckman Selection Model is therefore consistent with the exclusivity condition (Heckman, 1979).

We further employ the quantile regression technique by Koenker and Basset(1978) to estimate the union wage premium/effect beyond the first moment (mean). Specifically, the quantile regression technique estimates the union wage effect or premium at different points of the conditional wage distribution (the different quantiles of wages). In order words, it is employed by the study to examine whether the union wage premium varies among low-wage, average-wage and high-wage earners or not. Consistent with Koenker & Bassett (1978), the quantile regression model of the earnings (wage) function to examine whether the union wage premium varies with the wage distributions is specified as:

$$Quant_\theta(Inw_i/x_i) = x'\beta_\theta + \frac{\varphi(X'\beta_{probit})}{\Phi(X'\beta_{probit})} + \left[\frac{\varphi(X'\beta_{probit})}{\Phi(X'\beta_{probit})}\right]^2; Quant_\theta(u_{\theta i}/x_i) = 0 \quad (2)$$

Where: *Inw* is log of wages; *x* is a vector of explanatory variables; β_θ is a vector of the effects of the explanatory variable on the wage quantiles, $U_\theta$is a random error term; $Quant_\theta$ (In $w_i|\ x_i$) is the θ^{th} conditional quantile of *Inw* given x_i, $\frac{\varphi(X'\beta_{probit})}{\Phi(X'\beta_{probit})}$

The underlying econometric problem inherent in the quantile regression model is that the sample, n, contains only the number of employed workers, thus resulting in the problem of selectivity bias (see Heckman, 1979). Thus, to correct for selectivity bias in the quantile regression (i.e. Equation 9), the study employs an approach consistent with Buchinsky (1998). The approach involves two stages. In the first stage, we estimate a participation or selection equation (probit model) from which we derive the Inverse Mills Ratio (IMR). The participation equation is specified as:

$$E(Y_i/X_i) = P(Y_i = 1|X_i) = F(Xi, \beta) \quad (3)$$

\Where: F(Xi, β) = Φ (X_i`β) is the cumulative distribution of the standard normal density, E and P denote expectation and probability respectively, Y is a binary dependent variable defined as one (1) if the individual is employed and zero (0) if otherwise, Xi is a vector of the characteristics of the ith individual, which are likely to influence his/her employment participation. Specifically, the X vector includes variables such as age, educational attainment (measured by qualification), marital status, status in household (member or head), non-labour income of the household, mother and father`s educational attainment. B is a vector of coefficients of X (estimates are reported in Table 1A in the Appendix).

The Inverse Mills Ratio (IMR) is estimated based on the participation equation (Equation 10) as:

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Table 2. Sources of data extracted for the study

	GLSS 6 (2012/2013)	GLFS (2015)
Sampled Households	18 000	5 838
Sampled Household Members	72 372 (31 664)	19 367 (9 604)
Enumeration Areas	1 200	—-

Notes: Number of sampled household members employed for the study are in parenthesis.

$$\text{Inverse Mills Ratio}(\text{IMR}) = \frac{\varphi(X'\beta_{probit})}{\Phi(X'\beta_{probit})} \tag{4}$$

Where: φ and Φ are the univariate probability density and cumulative distribution function respectively of the standard normal distribution, $\frac{\varphi}{\Phi}$ is the Inverse Mills Ratio (IMR) and β_{probit} is the probit estimates of the participation coefficients. In the second stage of estimation, the Inverse Mills Ratio (i.e. Equation4) and its squared are included in the observed wage quantile equation (i.e. Equation 2) as explanatory variable to address the selectivity bias problem (see Buchinsky, 1998).

4.2. Data sources for the study

The data for this extensive study are extracted from the sixth round of the Ghana Living Standards Survey (GLSS 6) and 2015 Ghana Labour Force Survey (2015 GLFS). We employ these two datasets concurrently for this study for robustness purposes. However, we do not extract data from the GLSS 7 because it does not contain data on union status of enterprises. Thus, our choice of GLFS. Also, it is ethically worth revealing that our datasets are collected by the Ghana Statistical Service with the support of the World Bank. The study employs these datasets because they are nationally representative, adequate and of high quality. Table 2 further provides elaboration on these datasets.

5. Results and discussion

5.1. Summary statistics of dependent and explanatory variables

Table 3 indicates the summary statistics of all variables (both continuous and categorical). The summary statistics of the dependent variable (real monthly earnings) in Table 3 indicates a mean of GH¢ 0.51 with a maximum value of GH¢ 304.12 (2012/2013 sample), whilst for 2015 sample, the mean value of the real monthly earnings is GH¢ 0.66 with a maximum value of GH¢ 131.46 (Table 3). In terms of years of labour market experience, the summary statistics in Table 3 indicate mean values of not less than 10 years for all the two samples (GLSS6–2012/2013 and 2015 GLFS). This implies that, on average, the sampled individual workers in the two datasets have considerable number of years of experience in same industry. In terms of age, the summary statistics reveal that the average age in the 2012/2013 sample is 32.97 years with minimum and maximum values of 15 and 99 years respectively, whereas in the 2015 sample, the average age is 33.45 years with minimum and maximum values of 15 and 60 years respectively (Table 3).

In terms of average hours of work per week, the summary statistics (in Table 3) indicates that it is not more than 40 hours per week. This means that, on average, employees adhere to the maximum number of hours of work per week specified in the Labour Act, 2003 (Act 651). Furthermore, Table 3 indicates that approximately 32% of workplaces/enterprises had a union present in 2012/2013, whilst only 12% of workplaces/enterprises had a union present in 2015 (Table 3). In terms of educational attainment, the 2012/2013 sample reveals that majority of the individual employees (75%) have basic qualification whilst the minority (2%) have no qualification at all (Table 3). Similarly, the summary statistics of the 2015 sample indicate that majority of the individual employees (36%) have basic qualification. However, the minority of individual employees (11%) are holding tertiary qualifications.

Table 3. Summary statistics of all variables

	GLSS 6 (2005/2006)			GLFS (2015)		
Variable	**Mean**	**Minimum**	**Maximum**	**Mean**	**Minimum**	**Maximum**
Wages (Real Monthly Earnings)-Dependent Variable	0.51	0	304.12	0.66	0	131.46
Labour Market Experience (years)	10.95	0	91	10.97	0	99
Age	32.97	15	99	33.45	15	60
Hours of Work	39.67	0	120	32.89		99
Unionism status:						
Union Present	0.32	0	1	0.12	0	1
Union Absent	0.68	0	1	0.88	0	1
Educational Attainment: None	0.02	0	1	0.34	0	1
Basic	0.75	0	1	0.36	0	1
Secondary	0.16	0	1	0.19	0	1
Tertiary	0.07	0	1	0.11	0	1
Gender: Male	0.50	0	1	0.44	0	1
Female	0.50	0	1	0.56	0	1
Sector of Employment:						
Agriculture	0.45	0	1	0.40	0	1
Industry	0.14	0	1	0.17	0	1
Services	0.41	0	1	0.43	0	1
Locality: Urban	0.48	0	1	0.49	0	1
Rural	0.52	0	1	0.51	0	1
Formality status: Formal sector	0.41	0	1	0.57	0	1
Informal Sector	0.59	0	1	0.43	0	1
Firm Size	1002.79	0	9999	——-	——-	———

Source: Author`s construction based on GLSS 6 and GLFS (2015) datasets.

In terms of sector of employment, the statistics indicates that for the 2005/2006 and 2012/2013 samples, the agricultural sector has the highest proportion of employed persons followed by industrial and service sectors (Table 3). However, for the 2015 sample, the service sector has the highest proportion of employed persons. This indicates a change in the structure of employment in Ghana over the two periods.

5.2. Result 1; Unions' effect on wages (union wage premium)

Heckman Selection Model (HSM) is employed to estimate the effect of trade unions on wages, also known as the union wage effect.

HSM involves two stages. The first stage involves the estimation of the Inverse Mills` Ratio (IMR). This is done by employing a Probit Model to estimate the Selection Equation (Equation 3). In the second stage, the estimated Inverse Mills Ratio (IMR) is employed as an explanatory variable in the observed wage equation (Equation 2) to address the selectivity bias problem. The union wage premium is then estimated by using "union present" variable (it is defined as 1, if there is a trade union presence at the workplace and 0, if otherwise) as key explanatory variables whilst controlling for relevant firm and worker characteristics (i.e. hours of work, labour market experience, age, educational attainment, gender, firm size, formality status of employment, sector of employment and locality of employment) that may influence wages of the individual worker. Table 4 therefore presents the estimates of the union wage premium (also known as the union wage effect) based on the Heckman Selection Model (HSM).

From Table 4, it is evident that the estimated union wage premium is positive and significant (based on GLSS 6 and 2015 GLFS datasets), which satisfies our a priori expectation. Specifically, the results indicate that wages are higher in enterprises with trade union presence relative to enterprises without trade union presence by 12.3% and 13.1% in 2012/2013 and 2015 respectively (Table 4). This indicates that wage premium from trade unionism is evident in Ghana, although union density and coverage have declined significantly over the years. This finding also implies that, unlike individual bargaining, collective bargaining and negotiation by trade unions produce a better wage outcome. It is worth stating that, the positive and significant union wage premium revealed by the estimates in Table 4 is not novel in the literature. For instance, Cuesta (2005), Attanasio et al. (2004) and Bhorat et al. (2011) found that unions have a mark-up effect on wages or generate a wage premium. Our findings indicate that trade unions in Ghana are generally able to increase wages through collective bargaining, although their density and coverage have decreased over the years. Their ability to increase wages through collective bargaining depends on their bargaining strength, which in turn depends on their ability to decrease the supply of labour to the employer and employer's willingness to accept to pay above market wages (Freeman & Medoff, 1984).

Furthermore, as observed from the estimates in Table 4, the union wage premium has increased between 2012/2013 and 2015, in spite of the persistent decline in union coverage between the two periods. This is contrary to literature; Blanchflower and Bryson (2007) argued that, when the number of workers covered by collective bargaining certificate decreases, it increases the cost competitiveness of employers leading to a decline in the union wage premium . Thus, based on the findings, it could be deduced that the effectiveness of collective bargaining by unions is not only dependent on membership strength. Other factors such as the bargaining skills of union representatives and that of employers as well as the regulatory environment may influence the outcome of collective bargaining. In summary, our finding is consistent with the postulation of the Dunlop Model that unions maximize the size of the wage rate for their members.

5.3. Result 2; Union wage premium across earnings (monthly wage) quintiles

To estimate the selectivity corrected wage quantile equation (Equation 2), we first construct a graph of Kernel Earning Distribution to verify the normality nature of the monthly earnings distribution. This is because quantile regression is based on an implicit assumption that the dependent variable (monthly earnings) is not normally distributed. Thus, we construct a Kernel Earnings Distribution Curve to ensure that this assumption is satisfied before estimating the quantile regression model/equation. The Kernel Earnings Distribution Curves as shown in Figures 1A and 2A in the Appendix indicate irregular bell-shaped distributions. This shows that, the monthly earnings distribution is not normal (for all two datasets). Hence, it implies that the Heckman Selection Model (HSM) estimates of the union wage premium (in Table 4) could be biased and misleading (see Baffour, 2016). Thus, the quantile regression technique is additionally employed by the study to estimate the union wage premium or union wage effect. Table 5 therefore presents the quantile regression estimates of the union wage premium across the different wage quantiles (25^{th}, 50^{th} and 75^{th} quintiles).

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Table 4. Heckman`s two-step estimates of the union wage premium from 2005/2006 to 2015 (Observed wage equation)

	GLSS 6 (2012/2013)		GLFS (2015)	
Dependent Variable: Log of Real Monthly Earnings	**Coef.**	**z-cal.**	**Coef.**	**z-cal.**
Log of hours of work	0.152***	4.58	0.100**	2.46
Union Present	**0.123*** **	**2.83**	**0.131** **	**2.28**
Labour market Exp.	0.020***	8.34	0.029***	6.12
Age	0.036***	2.92	0.037*	1.89
Age^2	−0.000**	−3.06	−0.001**	−2.14
Education: Basic	0.197	0.82	0.121**	1.19
Secondary	0.385	1.58	0.092***	0.75
Tertiary	0.993***	4.04	0.847***	5.12
Male	0.361***	7.98	0.314***	5.77
Sector :Industrial	0.528***	6.37	0.047	0.33
Service	0.263***	3.38	−0.299**	−2.26
Urban	0.171***	4.33	0.105*	1.78
Formal employment	0.378***	8.27	0.274***	4.24
Firm size	0.000	0.52	—-	—-
Firm $size^2$	−0.000	−0.45	—-	—-
Constant	−2.895***	−7.27	−0.405	−0.79
Inverse Mills Ratio	−0.126*	−1.73	−0.117	−1.11
rho	−0.146		−0.151	
sigma	0.951		0.774	
Wald Chi2	**848.42**		**253.98**	
Prob. > Chi2	**0.000**		**0.000**	
No. of observations	**5 863**		**5 061**	
Censored Observations	**3 525**		**4 088**	
Uncensored Observations	**2 338**		**973**	

Notes: ***, ** and * means significant at 1%, 5% and 10% respectively.

Source: Author`s Estimation based on GLSS 6 and GLFS (2015) datasets.

In summary, it is generally observed from the results in Table 5 that the estimated union wage premium is higher at the 25^{th} quantile than at the 50^{th} quantile, and similarly, it is higher at the 50^{th} quantile than at the 75^{th} quantile (results based on both the GLSS 6 and 2015 GLFS sampled data). Thus, it could be concluded that unions benefit low-wage earners (employees at the 25^{th} wage quantile) more than average-wage earners (employees at the 50^{th} wage quantile) and high-wage earners (those at the 75^{th} wage quantile) respectively. This finding attests to the "sword of justice effect of trade unionism", the ability of unions to compress the wage distribution (Butcher & Rouse, 2001). In order words, this finding spells the impression that unions in Ghana have the ability to minimize dispersion in wages. This could be due to the reason that low-wage earners in Ghana are mostly the vulnerable employees in terms of labour exploitation. Therefore, when such employees become members of a trade union, they tend to benefit more from unionization, in the form of wage increment, than their high-wage counterparts. Also, it has been established in the literature that low-wage workers are usually unskilled and have

Table 5. Quantile regression estimates of the union wage premium (2012/2013 and 2015)

	GLSS 6 (2012/2013)			GLFS (2015)		
Dependent Var:	**θ=0.25**	**θ=0.50**	**θ=0.75**	**θ=0.25**	**θ=0.50**	**θ=0.75**
Log of Real Monthly Earnings	**Coef.(θ_θ)**	**Coef.(θ_θ)**	**Coef.(θ_θ)**	**Coef.(θ_θ)**	**Coef.(θ_θ)**	**Coef.(θ_θ)**
Log of Hours of work	0.2070*** (5.31)	0.127*** (4.34)	0.155*** (5.08)	0.093 (1.45)	0.075* (1.70)	0.002 (0.03)
Union Present	**0.109*** (2.80)**	**0.068* (1.90)**	**0.067* (1.78)**	**0.322*** (4.07)**	**0.220*** (4.02)**	**0.088 (1.21)**
Labour Market Exper.	0.020*** (8.02)	0.018*** (7.52)	0.016*** (6.30)	0.027*** (4.76)	0.022*** (5.92)	0.025*** (4.10)
Age	0.094*** (9.25)	0.078*** (9.66)	0.060*** (6.63)	0.043* (1.70)	0.056** (2.79)	0.055* (1.86)
Age^2	−0.001*** (−8.51)	−0.001*** (−9.38)	−0.001*** (−6.17)	−0.001* (−1.79)	−0.001*** (−2.89)	−0.001*** (−1.92)
Basic Educ.	−0.228* (−1.74)	0.069 (0.64)	0.144 (0.55)	0.254** (2.13)	0.232** (2.12)	0.139 (0.82)
Secondary Educ.	−0.038 (−0.29)	0.242** (2.18)	0.300 (1.14)	0.278** (2.42)	0.290*** (2.84)	0.305** (1.56)
Tertiary Educ.	0.720*** (5.18)	0.917*** (8.09)	0.869*** (3.29)	1.169*** (7.59)	1.159*** (8.26)	1.026*** (4.55)
Male	0.336*** (10.34)	0.320*** (9.20)	0.376*** (12.11)	0.329*** (5.07)	0.264*** (5.44)	0.304*** (4.20)
Sector of Employment: Industry	0.488*** (5.18)	0.496*** (6.84)	0.527*** (6.81)	0.194 (1.07)	0.287* (1.65)	−0.121 (−0.36)
Services	0.262*** (2.90)	0.210*** (3.10)	0.180** (2.50)	−0.143 (−0.90)	−0.037 (−0.23)	−0.544* (−1.74)
Formal	0.358*** (8.91)	0.380*** (9.88)	0.349*** (8.29)	0.326*** (4.01)	0.187*** (3.12)	0.231** (2.60)
Urban	0.113*** (3.09)	0.074** (2.22)	0.108*** (3.05)	0.113 (1.51)	0.056 (0.93)	0.091 (1.36)
Inverse Mills Ratio	6.393* (1.82)	3.998 (0.85)	6.394 (1.82)	−2.051 (−0.49)	2.751 (0.72)	6.840 (1.62)
Inverse Mills $Ratio^2$	−8.027* (−1.92)	−5.900 (−1.05)	−8.027 (−1.92)	2.465 (0.64)	−2.189 (−0.64)	−5.857 (−1.52)
Constant	−0.668*** (−2.77)	0.244 (1.22)	0.866*** (2.74)	1.141 (0.84)	0.299 (0.24)	0.450 (0.30)
Pseudo R-Squared	**0.234**	**0.233**	**0.188**	**0.297**	**0.292**	**0.207**
Bootstrap Rep.	**500**	**500**	**500**	**500**	**500**	**500**
No. of observations	**3 590**	**3 590**	**3 590**	**1 095**	**1 095**	**1 095**

Notes: ***, ** and * means significance levels are at 1%, 5% and 10% respectively.

t-values are in parentheses.

Source: Author`s construction based on GLSS 6 and GLFS (2015) datasets.

low levels of educational attainment (Baffour, 2015). In most cases, such workers are vulnerable to their employers since they are ignorant about their rights in the employment relationship. Thus, when such workers join a trade union, they are protected from wage exploitation. This finding is reinforced by Chamberlain (1994), which found that among workers with industrial experience of 20 to 29 years in

Germany, the union wage premium is stronger at the lowest end of the conditional wage distribution than at the highest end, a result which is also consistent with Baah (2005). Similarly, Butcher and Rouse (2001) found that the union wage premium monotonically decreases along the wage distribution in South Africa. Cai and Liu (2007) also found that the union wage premium for males in Australia decreases as wage quantiles increase. Thus, our results are consistent with literature.

6. Conclusion and policy recommendation

Empirical studies on the union-wage effect (union-wage premium) in Ghana are quite antiquated. Since the extensive study by Baah (2005) on the subject, there has not been any extensive study on union wage effect or union wage premium. In addition to this research dearth, there has not been any novel study on union wage effect in this era of declining union membership and shrinking union coverage. Thus, this study seeks to fill these gaps in the empirical literature by using a more recent datasets (GLSS 6 and 2015 GLFS datasets). Specifically, the study attempts to re-estimate the union wage effect using recent datasets . The study also finds out whether the union wage effect varies with the various wage quantiles.

The findings based on the Heckman Selection Model reveal that there is a wage premium associated with trade unionism. This, in other words, means that union wage premium is evident in Ghanaian labour market, although union coverage and density have both declined over the years. The practical implication for this finding is that the potency of a trade union to increase wages of its members through collective bargaining does not necessarily depend on its membership strength but could depend on factors such as the bargaining skills of leaders of the union, the regulatory environment, the elasticity of demand and supply of organized labour among others. Future studies need to explore this.

The study also finds that the union wage premium varies along the wage distribution, with workers whose earnings are at the 25^{th} quantile having the highest estimated union wage premium compared to those at the 50^{th} and 75^{th} wage quantiles respectively. Our findings are consistent with the prediction of the Dunlop bargaining model that unions through collective bargaining maximize the size of the wage rate for their members. This implies that the Dunlop model is relevant in the case of Ghana.

Therefore, based on the findings, we recommend that workers in precarious and vulnerable employment (particularly those in the 25^{th} wage quantile group) should join a trade union in order to earn a living or decent wage. It is however concluded from the study that, unions in Ghana generally possess a high bargaining power, since they are still able to influence wages of their members despite the fact that their membership and coverage have declined over the years.

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No potential conflict of interest was reported by the author(s).

Dedication
We dedicate this article to the Late Dr. William Bekoe of the Department of Economics, University of Ghana. May his gentle soul rest in perfect peace till we meet again in Paradise.

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Note
1. World Labour Report, 1997–98

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Appendix

Table A1. Heckman`s two-step estimates of the union wage premium from 2005/2006 to 2015 (Selection equation)

	GLSS 6 (2012/2013)		GLFS (2015)	
Binary Dependent Variable: Employed	**Coef.**	**z-cal.**	**Coef.**	**z-cal.**
Age	0.137***	16.81	0.075***	4.99
Age Squared	−0.002***	−18.40	−0.001***	−4.56
Married	0.191***	3.83	0.114*	1.94
Separated	−0.127	−1.06	−0.066	−0.29
Divorced	−0.130	−1.24	−0.261	−1.57
Educ.: Basic	0.056	0.26	0.229***	3.37
Secondary	0.256	1.19	0.873***	12.48
Tertiary	0.725***	3.35	1.719***	22.98
Household Head	0.900***	21.11	0.485***	10.70
Log of Non-Labour Income of Household	−0.070***	−5.25	#	
Father`s Education	0.133***	2.88	#	
Mother`s Education	−0.027	−0.58	#	
Accra	0.334***	7.13	0.078***	1.38
Constant	− 3.109***	−11.75	−3.218***	−13.03
No. of observations	**5 863**		**5 061**	

Notes: ***, ** and * means significant at 1%, 5% and 10% respectively. # denotes the absence of variable in the dataset.

Source: Author`s Estimation based on GLSS 6 and GLFS (2015) Data sets.

Figure A1. Kernel`s earnings distribution (Based on GLSS 6–2012/2013).

Source: Author`s Construction Based on Data Extracted from GLSS 6.

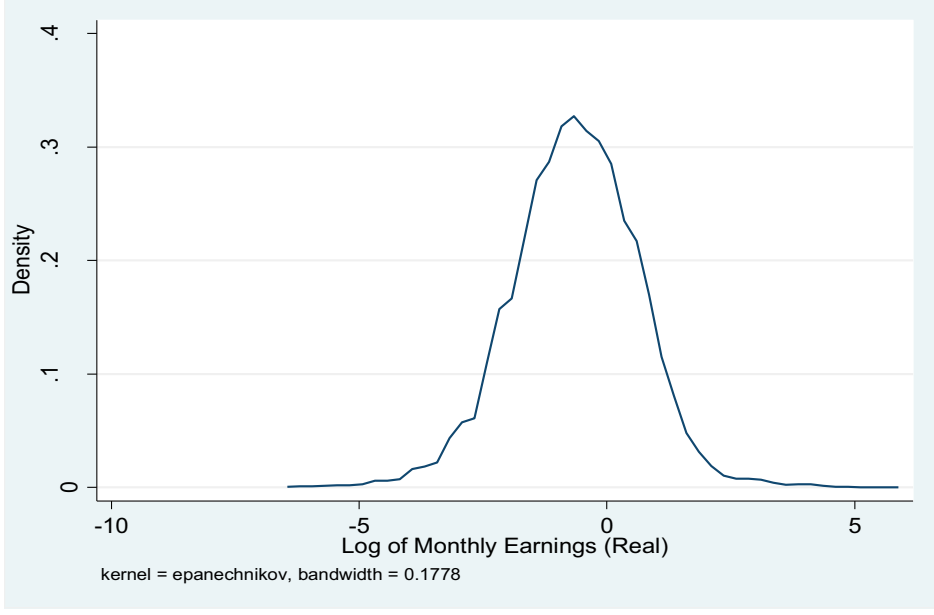

Figure A2. Kernel`s earnings distribution (Based on 2015 GLFS).

Source: Author`s Construction Based on Data Extracted from GLFS, 2015.