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The Impact of Trade Unions on Earnings: New Evidence from Cameroon

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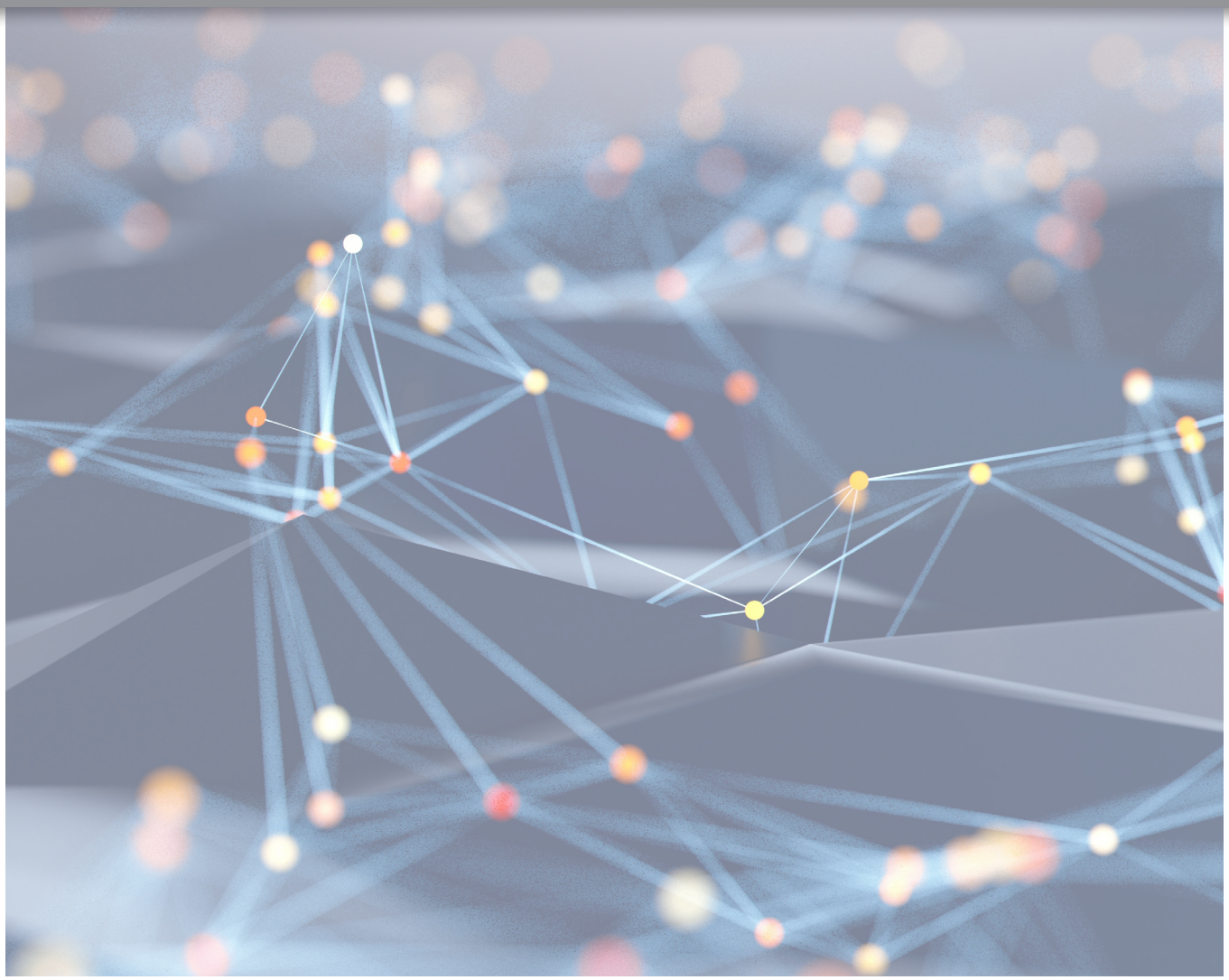

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ABSTRACT

The Impact of Trade Unions on Earnings: New Evidence from Cameroon*

The role of trade unions in the Cameroonian labour market is still a little discussed topic, despite the end of trade union monolithism in 1995 and the emergence of collective agreements that have been genuinely negotiated between the social partners since 2000. Using only the second *Survey on Employment and the Informal Sector* (EESI) – due to the unavailability to the public of data from the third wave of this survey at the time of writing – conducted by the National Institute of Statistics in 2010, this paper assesses the influence of union presence and union membership on the monthly earnings of formal and informal sector employees, highlighting the specificities of the Cameroonian industrial relations system. The empirical results – which are mainly based on the Poisson pseudo- maximum likelihood estimator – show that the presence of a trade union and/or a staff representative in a workplace has a positive and significant influence on income, except in the public sector. When the analysis is restricted to workplaces where there is at least one union, the results reveal that union membership is not an explanatory factor for the average earnings gap between union and non-union employees in the informal and public sectors. In the formal private sector, however, union members are paid less than their non-union counterparts.

JEL Classification:
J31, J51

Keywords:
union presence, union membership, union wage differential, Poisson pseudo-maximum likelihood estimator, Cameroon

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INTRODUCTION

The impact of trade unions on wages is one of the most studied topics in labour economics (BALKIN, 1989; KUHN, 1998; BLANCHFLOWER and BRYSON, 2010; FORTH and BRYSON, 2019; BARTH et al., 2020; SVARSTAD and NYMOEN, 2022). While most studies show that trade unions tend to increase wages, the exact magnitude of this increase varies considerably depending on the country in which these organisations operate, the variables included in the regression equation, the industry, the group of workers examined, the time period studied, and the type of analysis to which the data are subjected (ROSENTHAL, 1985; FANG and HARTLEY, 2022).

In fact, empirical work on the effect of trade unions on wages is abundant mainly in developed countries – particularly in the United States and Great Britain – and generally evaluates the wage premium associated with union membership (BRYSON et al., 2019; BRYSON, 2007), based on cross-sectional data (BARTH et al., 2020). Most of these studies find that union members earn on average between 5% and 26% more than non-union members, *ceteris paribus* (BRYSON, 2014). As prolific as the former, work analysing the relationship between the presence of at least one union in a workplace and wages also finds generally positive results (see for example, MORIKAWA, 2010; LAROCHE, 2004; BREDA, 2015, and MAC FLYNN, 2020).

In developing countries, however, studies on the subject are less abundant[1] and concentrated in Latin America, East Asia and South-East Asia, while African countries, with the exception of South Africa, have only a few (SALMON, 1999; FREEMAN, 2010). Therefore, the contribution of new methodologies or data sources from developing countries would be extremely beneficial to further research on the subject (FANG and HARTLEY, 2022). In these countries, most studies that have examined the effect of union membership on wages find a wage premium that ranges from 3% to 24% (see for example, FREEMAN, 2010; BHORAT et al., 2012; TORM, 2014; GUTIERREZ RUFRANCOS, 2019). As for the work that has examined the link between union presence and pay levels, the reported results are also generally positive (see for example, GE, 2014; SONG et al., 2016; LIU et al., 2020; NILSSON, 2021; N'CHO and AHOURE, 2021).

In Cameroon, the question of the influence of trade unions on wages is of little interest to researchers despite '*the retreat of state interventionism in labour relations*' since the end of trade union monolithism in 1995 and, correlatively, the emergence of collective agreements actually negotiated between the social partners since 2000, thanks to the last reform of the

[1] This is mainly due to the lack of databases (SALMON, 1999; TZANNATOS, 2008).

Labour Code on 14 August 1992 (TCHAKOUA, 2010), on the one hand, and the many demands of employees arising from the numerous strikes or attempted strikes observed over the last ten years (KEULEMBA NGANSOP, 2020),[2] on the other. The only published study to have really looked into the subject is that of TSAFACK NANFOSSO (2002) based on data from a field survey of 1,074 employees of enterprises and other economic units in the cities of Yaoundé, Douala and Bafoussam. This study shows that union members earn 14.17% more, in terms of hourly income, than their non-union counterparts.[3] However, THOMAS and VALLEE (1996)[4] find as a secondary result that union membership does not affect the level of individual hourly wages in Cameroonian manufacturing firms. It appears then that the relatively contradictory results of the existing work cannot lead to definitive conclusions and call for further investigations on the link between union membership and wages.

Furthermore, Cameroon is an interesting case study to examine the capacity of the presence of a union in the workplace to generate additional wage costs for employers in an environment characterised, among other things, by low unionisation rates (5.4% in 2010 against 5% in 2014 according to ILOSTAT) and low wage rates (14.95% in 1991; 20.36% in 2001; 20.67% in 2011; 23.5% in 2020),[5] a predominantly informal sector (90.4% in 2005; 90.5% in 2010),[6] a fairly high duration of employment, systematic violations of workers' rights (CSI, 2020), and a sluggish trade union movement despite the multitude of existing unions.

The aim of this study is to provide a good assessment, in Cameroon, of the effect of union presence and membership on the incomes of employees in the formal and informal sectors, using a statistical source as yet unused for this purpose. In addition to being the first study to take into account the two dimensions of the expression and defence of employees' interests in the workplace in Cameroon, namely the existence of at least one trade union and the existence of at least one staff representative, it also uses an estimation method not yet widely used by

[2] One of the most publicised cases in 2022 was the strike by primary and secondary school teachers in the public sector under the banner "*on a trop supporté*". Furthermore, it is worth noting that even if strikes are rare in Cameroon (1.7%), mainly because of the constraints surrounding the right to strike (KEULEMBA NGANSOP, 2020), strike notices are nevertheless frequent (41.8%) (INS, 2011).

[3] According to this author, this result is not far from the 18.2% obtained by SINANE (1995) for the city of Yaoundé.

[4] This study uses information from the World Bank's Regional Programme for Enterprise Development (RPED) survey carried out in 1993 among 210 Cameroonian manufacturing firms (wood and furniture, food and beverages, metal and small machinery, textiles and garments) for a total of 1,015 workers surveyed. The overall sample of the study is based on 119 enterprises and 713 workers.

[5] This is the World Bank's World Development Indicators (WDI) 2020 data.

[6] The informal sector is defined as all production units that do not have a tax number and/or do not keep formal accounts (INS, 2011). Data on informality rates are taken from the same source.

labour economists, which consists of estimating the union wage differential without applying a logarithmic transformation to the dependent variable.

The paper is divided into five sections. The first section is devoted to a brief review of the theoretical literature. The second explains how staff representatives and trade unions can influence wage determination. The third describes the data and variables used in the study. The fourth describes the empirical approach. Finally, the fifth section presents and discusses the results.

1. Trade unions and wages: a brief review of the theoretical literature

Theoretical literature generally views the impact of unions on wages in terms of four neoclassical models, which see the union as a "redistributive pressure group" whose aim is to maximize the utility function of its members by obtaining a monopoly on the supply of labor. These are the "union monopoly", "right to manage", "optimal contract" and "insider-dominated union" models (see CREEDY and MCDONALD, 1991). However, the right-to-manage and optimal contract models remain, without a shadow of a doubt, the most widely used to represent wage negotiations between union and employer (MAILLEFERT, 2004, p. 118).

In the right-to-manage model imagined by NICKEL and ANDREW (1983), the union and the employer only negotiate the wage under the constraint of the demand for labour (equal to the marginal productivity of labour). The determination of the level of employment is the prerogative of the employer. The negotiated wage is then determined by the bargaining power of the union. Specifically, if the union holds all the bargaining power, we end up with the solution of the simple monopoly union model imagined by DUNLOP (1944), which stipulates that the employer determines the volume of employment after the union has unilaterally set the wage. In the opposite case, we end up with the "full employment" solution insofar as the wage is fixed at the level of the reserve wage (PUCCI and ZADJELA, 2005). Overall, the model's solutions are sub-optimal given the decreasing relationship between wages and employment. However, the employer and the union can reach a Pareto-optimal solution if the negotiations focus simultaneously on employment and wages. This is the basis of the efficient contract model.

In the framework of the efficient contract model devised by MCDONALD and SOLOW (1981), agents negotiate simultaneously on wages and employment by exploiting all opportunities for mutual gain. The solution of the model is Pareto optimal, but not on the demand for labour (MAILLEFERT, 2004, p.119). Moreover, the optimality of this solution refutes the intuition of

neoclassical economists according to which trade unions are harmful to employment (PUCCI and ZADJELA, 2005). If this is the case, and as John Stuart Mill already remarked in his Principles of Political Economy, it would be "*a great mistake to condemn trade unions or the collective action of strikes as such and absolutely*" (BLAUG, 1986, p. 218).

One limitation of the above models, which reflect Anglo-Saxon industrial relations practices, is that the trade union is seen as the only means of collective expression for employees to obtain pay rises. This is not always the case in Cameroon, for example.

Moreover, most economists argue in favour of the right-to-manage model to represent wage bargaining, given the validity of the empirical results (CAHUC, 1990; MAILLEFERT, 2004, p. 120), which depends, however, on the quality of the data used, particularly as regards wages outside the sector of activity studied and the union's bargaining power (CADORET et al.,2009, p. 309). In Cameroon, the quasi non-existence of job maintenance or creation agreements[7] in collective agreements tends to favour this model. However, the objectives of unions cannot be reduced to a simple trade-off between wages and employment, as collective bargaining also covers several other aspects that affect the intrinsic and extrinsic returns to workers (NICK, 2011). Furthermore, it is important to bear in mind that the wage bargaining models developed above emanate from an Anglo-Saxon trade union context where union membership is compulsory before (*closed shop*) or after (*union shop*) obtaining a job; and where the terms of the contract negotiated by the union apply only to its members. In Cameroon, on the other hand, union membership is voluntary and unions negotiate for all employees. This then limits the scope of the analysis of the theoretical models invoked in the Cameroonian context and even in the United States today to a certain extent, since several federal States, following the *Taft-Hartley Act* in 1947, have already ratified the illegality of *closed shops* and the lack of obligation of *union shop* practices by also giving the right to any employee (whether unionised or not) to take advantage of the benefits of collective bargaining (see SAUVIAT and LIZE, 2018, pp. 21-37).

Regardless of the wage bargaining model, BOOTH (1995, p. 53) notes that the relative importance of the union rent depends primarily on the bargaining power of the union (threat of strike, ability to organise and mobilise the majority of workers, etc.) and the degree of competition to which the firm is subject. However, the author adds, even if a union controls all

[7] Considering that this type of agreement explicitly sets the number of employees hired as assumed in the efficient contract model.

the labour supplied to a particular sector, it will be difficult for it to negotiate a large increase in wages relative to the competitive level since its bargaining power depends essentially on the price elasticity of labour demand in the sector concerned (p. 57).

All in all, the theoretical developments in this section make it easy to predict that unions positively influence earnings through their participation in the wage determination process.

2. How do staff representatives and trade unions influence incomes in Cameroon?

In Cameroon, employees are defended by staff representatives and trade unions. The trade union is the spokesperson for employees' demands[8] in the context of collective bargaining. It is only within this framework that they can express their demands for new or improved benefits, such as better pay, for example.

As far as staff representatives are concerned, they are the only professional institution in the workplace which represents employees vis-à-vis the employer (SIM, 2007; TJOUEN, 1996). Most of them are union members, and must be elected in any establishment that usually employs at least twenty people. Their duties include: 1) presenting the employer with any individual or collective complaints[9] from workers and ensuring the application of labour legislation, social protection, health and safety in the enterprise; 2) communicating to the employer any useful suggestions for improving the organisation and performance of the enterprise (SIM, 2007). On the first point, staff representatives have a duty to remind the employer to apply the pay benefits contained in the collective agreement covering the branch of activity. If the employer refuses to do so, the staff representatives have a duty to inform the labour inspector and ask him to intervene to resolve the situation. On the second point, the staff representatives (whether or not there is a trade union in the workplace) can persuade the employer to increase certain elements of remuneration (bonuses, gratuities, etc.) on the grounds of increasing work productivity and hence the workplace's output. As in France, decisions taken in this context do not have the binding force of an agreement concluded with the trade union, but nevertheless constitute a commitment made by the employer.

In the light of the above, it goes without saying that the action taken by staff representatives to obtain better incomes is sometimes comparable to the role assigned to the trade union (the demand). Thus, the presence of a trade union and/or a staff representative in a workplace is likely to improve income levels. Taking account of the similarity between the role of the trade

[8] By demand, we mean the request to apply a new right.
[9] A complaint is a request to enforce an existing right.

union and that of the staff representative in improving incomes is therefore an original contribution of this study.

Following on from the above, it is important to emphasise that in Cameroon the effectiveness of staff representatives in defending workers depends on their quality, their experience and above all, according to TJOUEN (1996), the zeal they are prepared to display in carrying out their duties in the face of the risk of being unfairly dismissed or suffering any other form of trade union discrimination. As for the presence of a union in the workplace, this does not necessarily imply intense demands or the defence of workers' interests, since there are "yellow" unions with few demands (SALMON, 2000).

Finally, even if employees in the informal sector are excluded from the scope of application of labour laws, there is nothing to prevent them, in the event of demands in the performance of their jobs, from joining together or appointing a colleague to defend their interests vis-à-vis the employer. Such actions, where they exist, are similar to the ordinary role of a trade union or a staff representative.

3. Data and descriptive statistics

Due to the unavailability to the public – at the time of writing – of data from the third wave of the Survey of Employment and the Informal Sector (EESI) carried out in 2021 by the National Institute of Statistics (NIS), data from the second wave of this survey, carried out in 2010, have been used. The EESI, which was first carried out in 2005, is the main national microeconomic survey of the labour force in Cameroon.

Of the 8,160 households in the EESI 2 sample, stratified and drawn in two stages, 7,932 were identified and actually surveyed. Of the households surveyed, 22,765 individuals aged 10 years or older were successfully surveyed. Although the objective of EESI 2 is not to produce indicators on industrial relations in enterprises, it does, unlike EESI 1 in 2005, to highlight the specific nature of employee representation in workplaces (see section 2). Notwithstanding this, this survey does not provide any information on the method of wage bargaining and on the frequency of strikes in workplaces.

In addition, one of the problems with individual data from household surveys, such as EESI 2, is the difficulty in tackling omitted variable biases that influence unionisation and wages due to the absence of important characteristics of the firm employing the employees (BARTH et al., 2020). For this reason, employer-employee matched data offer more advantages and reduce

bias in the estimation of the union wage premium (BLANCHFLOWER and BRYSON, 2010). It should also be noted that the data used in this study do not allow us to establish a causal relationship between unionisation and wages.

Table 1. Means and standard deviations by union presence

		Pooled		Unionised workplaces		Nonunionised workplaces	
		Mean	SD.	Mean	SD.	Mean	SD.
Monthly income (in thousands CFA)		90.325	96.982	130.379	123.320	73.112	77.013
Log (1 + monthly_income x 1000)[10]		10.937	1.077	11.361	1.041	10.755	1.040
Education	Higher	0.229	0.421	0.364	0.481	0.172	0.377
	Not in school	0.046	0.210	0.018	0.134	0.058	0.234
	Primary	0.229	0.420	0.135	0.342	0.270	0.444
	Secondary	0.495	0.500	0.483	0.500	0.501	0.50
Job tenure		5.463	6.626	7.341	7.837	4.657	5.851
Training	No	0.755	0.430	0.635	0.482	0.806	0.395
	Yes	0.245	0.430	0.365	0.482	0.194	0.395
Age	15 – 34	0.578	0.494	0.468	0.499	0.625	0.484
	35 – 54	0.387	0.487	0.477	0.500	0.348	0.476
	55 – 64	0.036	0.185	0.055	0.228	0.027	0.163
Marital status	Single	0.417	0.493	0.288	0.453	0.472	0.499
	Married	0.427	0.495	0.540	0.499	0.378	0.485
	Widowed/separated	0.038	0.192	0.037	0.188	0.039	0.193
	Common-law	0.118	0.323	0.134	0.341	0.112	0.315
Gender	Female	0.264	0.440	0.256	0.437	0.267	0.442
	Male	0.736	0.440	0.744	0.437	0.733	0.442
Type of work	Regular	0.928	0.259	0.979	0.143	0.906	0.292
	Occasional	0.072	0.259	0.021	0.143	0.094	0.292
Institutional sector	Informal	0.556	0.497	0.314	0.456	0.660	0.474
	Public	0.286	0.452	0.421	0.494	0.228	0.420
	Formal private	0.158	0.365	0.265	0.442	0.112	0.316
Industry sector	Services	0.671	0.470	0.706	0.458	0.656	0.475
	Primary	0.050	0.217	0.029	0.168	0.059	0.235
	Industry	0.189	0.392	0.211	0.409	0.179	0.384
	Trade	0.090	0.286	0.053	0.225	0.106	0.307
Location	Rural	0.307	0.461	0.284	0.451	0.317	0.465
	Urban	0.693	0.461	0.716	0.451	0.683	0.465
Union presence	Nonunionised workplaces	0.699	0.459				
	Unionised workplaces	0.301	0.459				
Occupation	Skilled worker	0.239	0.427	0.268	0.443	0.227	0.419
	Unskilled worker	0.238	0.426	0.122	0.328	0.288	0.453
	Semi-skilled worker	0.277	0.447	0.215	0.411	0.303	0.460
	Middle management	0.150	0.357	0.218	0.413	0.121	0.326
	Senior management	0.096	0.294	0.177	0.382	0.060	0.238
	N	3658		1093		2565	

Source: EESI 2, INS, and author's calculations.

After data processing,[11] the study is based on an overall sample of 3,658 employees aged between 15 and 64. Tables 1 and 2 below show the means and standard deviations of the variables selected according to the variables of interest, i.e. union presence and union

[10] A common technique for dealing with zero values (04 in this case) in a log wage equation is to add a constant to the data before applying the log transformation. However, this technique can cause significant biases (BELLÉGO et *al*., 2022).

[11] Missing data relating to the variables "type of work", "job tenure", "training", "existence of a trade union", "existence of a staff representative", "union presence" and "union membership" were imputed using the responses of similar individuals.

membership.[12] The choice of control variables is not discussed here as they are standard in the literature.

With regard to Table 1, we note that 2,565 employees (70%) have their main job in a workplace without a union presence compared to 1,093 employees (30%) in a workplace with a union presence. These statistics suggest a strong lack of obligation to respect workers' rights in most workplaces in Cameroon. On average, employees in unionised workplaces are less mobile, better educated, better trained and occupy more privileged positions – in terms of seniority in the workplace, higher education, professional training and socio-professional category – than employees in non-unionised workplaces. 42% of employees in unionised workplaces work in the public sector compared to 23% of employees in non-unionised workplaces.

Almost 56% of employees in the whole sample are employed in the informal sector, with 66% in non-unionised workplaces compared with 31% in unionised workplaces. On average, workers in unionised workplaces receive a higher monthly income than those in non-unionised workplaces (see Table A1).[13] In the light of this finding, it is worth examining whether union presence is an explanatory factor for this wage difference. In line with the work of HIRSCH and SCHUMACHER (2012) and BLACKBURN (2021), we note that the coefficient of variation of the incomes of employees in unionised firms, both for real and logarithmic values, is lower than that of employees in non-unionised firms. Consequently, according to these authors, this difference in earnings dispersion reveals that the standard approach to estimating wage differentials based on semi-log earnings equations is inappropriate.

As regards Table 2, it can be seen that 40% of workers are union members in workplaces where there is at least one union. Moreover, union members are less mobile and better trained than non-union members, in terms of seniority and professional training respectively. Union membership would therefore reflect a low rate of staff turnover, which would tend to encourage employers to contribute to the vocational training or retraining of workers. Of the union members, 36% are young, 85% are men, 64% are married, 45% are managers, 30% work in

[12] The answers to two questions led to the construction of the "union presence" variable, which refers to the presence of at least one union and/or a staff delegate in the respondent's primary activity: (1) "Is there one (or more) union(s) in the firm/administration/organization or body where you are employed or in your main occupation?" ; (2) "Is there one or more staff representative(s) in the firm/administration/organization where you are employed or in your main occupation?" For affirmative responses to question (1), the following question is asked and allowed to construct the variable "union membership": "Are you a member of one (or more) of these unions?"

[13] The comparison of means test indicates a statistically significant difference at 1% level of significance. The same is true when we take into account the difference between the existence of at least one trade union and the existence of at least one staff representative in the workplace (see Table A2 and Table A3).

the formal private sector and 69% in the service sector. According to the institutional sector, 30% of non-union members work in the informal sector, compared with 26% of union members; 43% in the public sector, compared with 45% of union members; 27% in the formal private sector, compared with 30% of union members. This suggests that employees in the public and informal sectors are less interested in union membership than those in the formal private sector. It is also observed that union members seem to earn a higher income than non-union members. However, this difference is not statistically significant according to the results of the means-comparison test (see Table A4). Thus, union membership would not influence the level of income. The results of the econometric estimations will allow us to better appreciate this finding.

Table 2. Means and standard deviations by trade union membership

		Pooled		Unionised		Nonuniosed	
		Mean	SD.	Mean	SD.	Mean	SD.
Monthly_income (in thousands CFA)		143.370	127.061	153.734	124.417	136.424	128.483
Log (monthly_income x 1000)		11.487	0.979	11.560	1.028	11.437	0.944
Education	Higher	0.361	0.481	0.347	0.477	0.371	0.484
	Not in school	0.015	0.123	0.009	0.094	0.020	0.139
	Primary	0.146	0.353	0.146	0.354	0.146	0.353
	Secondary	0.477	0.500	0.497	0.501	0.463	0.499
Job tenure		7,665	7.897	9.684	8.567	6.311	7.11
Training	No	0.611	0.488	0.571	0.496	0.639	0.481
	Yes	0.389	0.488	0.429	0.496	0.361	0.481
Age	15 – 34	0.447	0.497	0.360	0.481	0.504	0.501
	35 – 54	0.491	0.500	0.556	0.498	0.448	0.498
	55 – 64	0.062	0.242	0.084	0.277	0.048	0.214
Marital status	Single	0.267	0.443	0.189	0.392	0.320	0.467
	Married	0.544	0.498	0.635	0.482	0.483	0.500
	Widowed/separated	0.042	0.201	0.020	0.140	0.057	0.232
	Common-law	0.147	0.354	0.156	0.363	0.140	0.348
Gender	Female	0.243	0.429	0.153	0.360	0.304	0.460
	Male	0.757	0.429	0.847	0.360	0.696	0.460
Type of work	Regular	0.980	0.140	0.983	0.130	0.978	0.147
	Occasional	0.020	0.140	0.017	0.130	0.022	0.147
Institutional sector	Informal	0.281	0.450	0.255	0.437	0.299	0.458
	Public	0.438	0.496	0.446	0.498	0.433	0.496
	Formal private	0.281	0.450	0.299	0.459	0.268	0.444
Industry sector	Services	0.723	0.448	0.686	0.465	0.748	0.435
	Primary	0.020	0.141	0.021	0.145	0.020	0.139
	Industry	0.218	0.413	0.255	0.437	0.193	0.395
	Trade	0.039	0.193	0.038	0.192	0.039	0.195
Location	Rural	0.253	0.435	0.250	0.434	0.254	0.436
	Urban	0.747	0.435	0.750	0.434	0.746	0.436
Union membership	Nonunion member	0.599	0.491				
	Union member	0.401	0.491				
Occupation	Skilled worker	0.261	0.440	0.266	0.443	0.258	0.438
	Unskilled worker	0.111	0.314	0.066	0.249	0.141	0.349
	Semi-skilled worker	0.203	0.402	0.215	0.412	0.194	0.396
	Middle management	0.234	0.423	0.252	0.435	0.221	0.416
	Senior management	0.192	0.394	0.201	0.402	0.185	0.389
N		718		268		450	

Source: EESI 2, INS, and author's calculations.

4. Methodology

4.1. Which econometric method should be used to estimate the union wage differential?[14]

Despite the variety of methods and databases mobilised to obtain unbiased and consistent estimators of the impact of unionisation on wages, it is clear that no estimation method is currently the subject of a consensus among researchers because of the difficulty of identifying the true causal effect of unionisation on wages (HIRSCH, 2004; BRYSON, 2007; EREN, 2007; CHOI and RAMOS, 2023). On this basis, the choice of the method for estimating the union wage differential is then left to the researcher (BLUNCH and VERNER, 2004).

The average impact of unionization on wages – via a specification of the earnings equation in Mincerian form – is usually estimated from ordinary least squares (OLS), panel data regression methods (usually fixed effects) and selection and endogeneity bias correction methods ; although propensity score, quantile and discontinuity regression methods are also of interest to researchers (FANG and HARTLEY, 2022). However, it should be noted that several authors criticise and consider inappropriate the standard practice for economists to estimate earnings and even expenditure equations via a semi-log model on both cross-sectional and longitudinal data (see for example BLACKBURN, 2007, 2008, 2021; HIRSCH and SCHUMACHER, 2012; KAISER, 2016; FISHER, 2016; MELSTROM, 2016; PETERSEN, 2017; POWELL and SEABURY, 2018). Indeed, these authors generally raise two problems inherent in using such an approach. First, observations for which the dependent variable is zero are eliminated from the estimation sample, which leads to a source of bias. Secondly, the estimation of the semi-log model only provides consistent estimators if the error term is normally distributed and homoscedastic.[15] In the present study, the homoscedasticity assumption is violated since the variance of the error term (conditional on the control variables) is related to the dummy variables union presence and union membership respectively. This leads to the abandonment of the semi-log model for estimating the union wage differential.

As a substitute for the standard log-linear and semi-log models, SANTOS SILVA and TENREYRO (2022, 2011, 2006) advocate the use of the Poisson pseudo-maximum likelihood (PPML)

[14] The union wage differential is defined as the percentage increase in expected pay for an employee with characteristics X when moving from non-union status (or from the status of not covered by a union presence or a collective agreement) to union status (or covered by a union presence or a collective agreement) (BLACKBURN, 2008).

[15] Nevertheless, PETERSEN (2017) demonstrates that "homoscedasticity for error terms is neither a necessary nor a sufficient condition for estimation on the logged dependent variable to give unbiased estimators for the coefficients for the relative arithmetic means".

estimator among all the pseudo-maximum likelihood (PML) estimators belonging to the linear exponential family. Indeed, these authors justify the predilection for the PPML estimator by the following main arguments it allows to keep the observations for which the dependent variable is null; it changes very little if the estimation is carried out by excluding the observations for which the dependent variable is null; it assigns the same weight to all the observations with respect to the Normal-PML and Gamma-PML estimators; it remains robust in the face of a misspecification of the conditional distribution of the model; it converges towards the true value of the parameter even in the presence of heteroskedasticity; it generally behaves well even when the conditional variance is far from being proportional to the conditional mean.

Although BLACKBURN (2007, 2008) and KAISER (2016) use several estimators of the PML (including the PPML estimator) to estimate the union wage differential in the United States, this study adopts the approach recommended by SANTOS SILVA and TENREYRO (2022, 2011, 2006) since it now seems to be the consensus among researchers. Moreover, the choice of this approach is supported by the fact that the results of the decomposition of the union wage differential by the "doubly robust" weighted Poisson quasi-maximum likelihood (WPQML) estimator developed by KAISER (2016) are strongly similar to those of the PPML estimator.

In addition to the bias resulting from the use of the log wage, potential self-selection and endogeneity biases must also be taken into account when estimating the union wage differential (BRYSON, 2007; KAISER, 2016; FANG and HARTLEY, 2022).

When estimating the impact of union presence on wages, it is important to consider a possible self-selection bias in the wage equation since most authors (e.g. SALMON, 2000) assume that the employee chooses to work in a unionised firm if the income W_U net of the costs C of unionisation is greater than the income associated with the non-unionised firm W_N. Even better than the previous logic, FARBER (1983) considers that a worker will only be unionised if he wants a unionised job, on the one hand, and if he is hired by a potential unionised firm, on the other. In other words, the union status of workers is the result of separate decisions taken by the workers themselves and the potential employers of unionised firms. Although authors generally attempt to control for the self-selection bias mentioned above, this study does not do so since the data used contain no information to do so, following the logic of FARBER (1983). Moreover, taking this bias into account in the estimation of the wage equation may be negligible in the Cameroonian context since, according to the results reported by YOGO (2011),

individuals rely more on the social network (friends and relatives) not only to obtain a salaried job, but also a good job in the sense of a higher wage.

With regard to the endogeneity of union presence, it is based less on the employee's individual decision (individual unobserved heterogeneity) than on the specific characteristics of unionised workplaces (workplace unobserved heterogeneity). Unfortunately, the database used in this study does not have a reliable instrument for correcting the potential endogeneity bias of union presence. For example, a reliable instrument would have been: 1) a personnel management policy that was rather advantageous to workers, with a relative benevolence towards trade union presence; 2) a particularly harsh personnel management policy, encouraging employees to mobilise and turn to staff representatives or the trade union to defend them (LECLAIR and PETIT 2004).

With regard to the self-selection bias linked to union membership, it is very unlikely in the Cameroonian context that an employee would decide to join a union in order to obtain a higher income than that of his or her non-union counterpart, since labour legislation favours the equitable distribution of the fruits of collective bargaining among all employees, whether unionised or not.[16] TSAFACK NANFOSSO (2002) checks this source of selection (and also endogeneity) and confirms this reality. This leads us to disregard it in this study.[17]

In addition to the simultaneity bias mentioned above, the endogeneity of union membership may also be related to unobservable individual characteristics that may jointly affect the wage and the membership decision. Unfortunately, the data used in this work do not provide reliable instruments, according to the literature, to correct for this source of endogeneity.[18] By way of illustration, we might mention the following potential instruments: family socialisation, measured either by the fact that the individual lives in the same household with other union members (BHORAT et al., 2012), or by the perception of the parents' attitude towards unions (CAMPOY, 1997); the existence of non-collective benefits for the exclusive use of union workers (OLSON, 1978); the employer's attitude towards unions and/or the worker's perception of this attitude (WRIGHT, 1995). In the end, this study does not also control for the potential

[16] BRYSON (2007) and MAC FLYNN (2020) consider that it is not relevant to assess the effect of union membership on wages in such a context, but rather the effect of collective bargaining on the level of wages and the distribution of wages.
[17] This choice is further supported by the fact that RIOS-AVILA and HIRSCH (2014) indicate that the selection bias associated with union membership cannot cause a significant bias in the estimation of the average wage differential between union members and non-union members.
[18] According to Lewis (1986) cited by BLANCHFLOWER and BRYSON (2010), the use of instrumental variables often leads to unstable estimates that are often much larger than those obtained by other methods.

endogeneity bias of union membership, following the example of the study conducted by Blanchflower and Bryson (2010) in the British context.

In summary, this study is limited to using the PPML estimator to estimate the union wage differential. However, the OLS estimator of the semi-log model will be used as a benchmark since most of the work on the subject has used it.

4.2. Presentation of the econometric model[19]

Following the logic of BLACKBURN (2021), who refers to WOOLDRIDGE (2010, pp. 919-920), a parameter interpretable as the average treatment effect for the treated (ATT) can be estimated for both linear and non-linear models by a standard interactive specification. Thus, the semi-log specification of the income equation is as follows:

$$\log(w_i) = \beta_1 U_i + \beta_2' X_i + \beta_3' U_i (X_i - \bar{X}_U) + \varepsilon_i \quad (1)$$

where w_i is the monthly wage income defined as the sum of direct wages or salaries, remuneration for hours not worked, bonuses and gratuities, and allowances received by individual *i*; *U* is a dummy variable taking the value 1 if the workplace is unionised (or if the individual is a union member) and 0 otherwise; X the vector of control variables; $\bar{X}_U$ the vector of averages of the variables of the sample of unionised workplaces (or of union members) and ε_i the error term. Subtracting $\bar{X}_U$ from X_i implies that β_1 can be interpreted as:

$$\beta_1 = E\left[\log(w) \middle| T = 1, X = \bar{X}_U\right] - E\left[\log(w) \middle| T = 0, X = \bar{X}_U\right] \quad (2)$$

i.e. the log difference in expected earnings between workers in unionised workplaces (or union members) and workers in non-unionised workplaces (or non-union members) for an individual with the average characteristics of the sample of workers in unionised workplaces (or union members). However, the problem of the log transformation remains but can be dealt with either by assuming that equation (1) is normally distributed (and estimating a variance function) or by directly estimating the exponential regression by pseudo-maximum likelihood. In the latter case, the equation to be estimated is written as:

[19] The econometric model presented here is based on the study by Blackburn (2021) in which he estimates, for the United States, the relative earnings differentials between public sector teachers and equivalent non-teachers in the private sector.

$$w_i = e^{\gamma_1 U_i + \gamma_2' X_i + \gamma_3' U_i (X_i - \bar{X}_U)} + v_i \quad (3)$$

which, if correctly specified, can be used as a consistent estimate of the union wage differential for any individual with the average characteristics of the sample of workers in unionised workplaces (or unionised employees), i.e. when $X_i = \bar{X}_U$. When $X_i = \bar{X}$ (the vector of average characteristics of the overall sample) then the estimated parameter can be interpreted as the average treatment effect in the whole population (ATE).

The percentage conversion of the estimated union wage differential can easily be obtained using the *seldum* command in Stata. Indeed, this command calculates the "virtually unbiased" estimator proposed by KENNEDY (1981), while taking into account the unbiased estimator of its minimum variance as proposed by VAN GARDEREN and SHAH (2002).

5. Results and discussion

The main findings of the study are presented in the following paragraphs. As the focus here is on the union wage differential, the results for the control variables are not discussed in detail. It should also be noted that all estimates of the regression models take into account the sample design.

5.1. A positive link between union presence and wages

Table 3 above presents all the results of the estimations obtained from equations (1) and (2). At first sight, it can be seen that the values and signs of the coefficients of the control variables do not change when the parameter of interest is interpretable as the ATT or the ATE. Furthermore, the observable income differential between employees in unionised and nonunionised workplaces is positive and significant only in columns 2, 3 and 4. In other words, the presence of a union in a workplace has a positive effect on earnings. This result supports the view that workplaces with a union presence appear to pay more for labour input than those without. Another observation related to the above result is that the OLS estimates overestimate the wage differential compared to the PPML estimates.

Regarding the control variables, as expected, education level, training, age, marital status, gender, institutional sector, industrial sector and occupational category have a positive and significant influence on income as shown by the results of the exponential model estimates (Table 3, columns 2 and 4). Surprisingly, an additional year of job tenure has no significant

influence on income regardless of the estimation method used; neither does the type of work when applying the PPML estimator.

To test the robustness of the estimates of the union wage differential contained in Table 3, equations (1) and (2) were estimated for the different institutional sectors.[20] The results obtained are interesting (see Table 4).

Table 3. Union presence and wages (pooled)

Estimator dependent variable		(1) **ATT with OLS** $\ln(1+w_i)$		(2) **ATT with PPML** w_i		(3) **ATE with OLS** $\ln(1+w_i)$		(4) **ATE with PPML** w_i	
		Coeff.	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**
$\widehat{\Delta}_i$		0.079	(0.057)	0.067*	(0.037)	0.099**	(0.050)	0.073**	(0.037)
Education	Higher	Ref.		Ref.		Ref.		Ref.	
	Not in school	-0.527***	(0.157)	-0.537***	(0.088)	-0.527***	(0.157)	-0.537***	(0.088)
	Primary	-0.220***	(0.075)	-0.349***	(0.058)	-0.220***	(0.075)	-0.349***	(0.058)
	Secondary	-0.096	(0.062)	-0.139***	(0.046)	-0.096	(0.062)	-0.139***	(0.046)
Job tenure		0.00668	(0.013)	0.0109	(0.009)	0.00668	(0.013)	0.0109	(0.009)
	Job tenure^2	-0.000168	(0.0004)	-0.00018	(0.0003)	-0.000168	(0.0004)	-0.00018	(0.0003)
Training	No	Ref.		Ref.		Ref.		Ref.	
	Yes	0.124*	(0.068)	0.170***	(0.045)	0.124*	(0.068)	0.170***	(0.045)
Age	15 - 34	Ref.		Ref.		Ref.		Ref.	
	35 - 54	0.081	(0.057)	0.145***	(0.051)	0.0805	(0.057)	0.145***	(0.051)
	55 - 64	0.145	(0.114)	0.303***	(0.116)	0.145	(0.114)	0.303***	(0.116)
Marital status	Single	Ref.		Ref.		Ref.		Ref.	
	Married	0.142***	(0.041)	0.131***	(0.036)	0.142***	(0.041)	0.131***	(0.036)
	Widowed/separated	0.292***	(0.078)	0.169**	(0.079)	0.292***	(0.078)	0.169**	(0.079)
	Common-law	0.264***	(0.054)	0.216***	(0.070)	0.264***	(0.054)	0.216***	(0.070)
Gender	female	Ref.		Ref.		Ref.		Ref.	
	Male	0.197***	(0.045)	0.201***	(0.039)	0.197***	(0.045)	0.201***	(0.039)
Type of work	Regular	Ref.		Ref.		Ref.		Ref.	
	Occasional	-0.225***	(0.076)	-0.120	(0.098)	-0.225***	(0.076)	-0.120	(0.098)
Institutional sector	Informal	Ref.		Réf.		Réf.		Réf.	
	Public	0.417***	(0.058)	0.375***	(0.056)	0.417***	(0.058)	0.375***	(0.056)
	Private formal	0.433***	(0.047)	0.404***	(0.042)	0.433***	(0.047)	0.404***	(0.042)
Industry sector	Services	Ref.		Ref.		Ref.		Ref.	
	Primary	-0.127	(0.141)	-0.0460	(0.084)	-0.127	(0.141)	-0.0460	(0.084)
	Industry	0.212***	(0.049)	0.248***	(0.055)	0.212***	(0.049)	0.248***	(0.055)
	Trade	0.0618	(0.084)	0.0942	(0.064)	0.0618	(0.084)	0.0942	(0.064)
Location	Rural	Ref.		Ref.		Ref.		Ref.	
	Urban	0.344***	(0.079)	0.239***	(0.066)	0.344***	(0.079)	0.239***	(0.066)
Occupation	Skilled worker	Ref.		Ref.		Ref.		Ref.	
	Unskilled worker	-0.398***	(0.063)	-0.454***	(0.057)	-0.398***	(0.063)	-0.454***	(0.057)
	Semi-skilled worker	-0.226***	(0.057)	-0.273***	(0.065)	-0.226***	(0.057)	-0.273***	(0.065)
	Middle management	0.322***	(0.061)	0.265***	(0.046)	0.322***	(0.061)	0.265***	(0.046)
	Senior management	0.603***	(0.094)	0.621***	(0.066)	0.603***	(0.094)	0.621***	(0.066)
Union presence*job tenure_centered		0,0253	(0.017)	0.0129	(0.010)	0.0253	(0.017)	0.0129	(0.010)
Union presence*job tenure^2_centered		-0.00062	(0.0006)	-0.00044	(0.0004)	-0.00062	(0.0006)	-0.00044	(0.0004)
Constant		10.32***	(0.086)	3.725***	(0.076)	10.30***	(0.085)	3.719***	(0.076)
R^2		0.406				0.406			
N		3658							

Note: *(**){***} significant coefficients at 10 % (5 %) and {1 %}. SE: linearized standard error.

[20] It is beyond the scope of this study to examine whether individuals, in terms of their unobservable characteristics influencing income, are randomly distributed between the different institutional sectors (public sector, private formal sector and informal sector).

Firstly, it is observed that union presence is an explanatory factor for income determination only in the informal and formal private sectors. The union rent in these sectors is 13.36% and 11.10% respectively (Table 4, column 2, rows 1 and 2). These results may seem paradoxical in a context of systematic violations of workers' rights, scarcity of wage employment and weakness of the trade union movement. Moreover, these results are more surprising for workers in unionised informal sector workplaces insofar as their exclusion from the scope of labour laws makes them more vulnerable to the denial of their rights by employers. Even so, these results seem to demonstrate the ability of unions and/or staff representatives in these sectors to extract monopoly gains for workers. In the same vein, TSAFACK NANFOSSO (2000, pp. 201-202), despite the use of Mincer's semi-logarithmic earnings equation, had already shown that union power over workers' hourly earnings increases each time a union is recognised and decreases each time a union is unrecognised in the workplace.

Table 4. Robustness of the wage differential related to union presence

Estimator Dependent variable	(1) **ATT with OLS** $\ln(w_i)$		(2) **ATT with PPML** w_i		(3) **ATE with OLS** $\ln(w_i)$		(4) **ATE with PPML** w_i	
	Coeff.	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**
$\widehat{\Delta}_i$ Informal sector# $n = 2008$; $n_{U_1} = 339$; $n_{U_0} = 1669$	0.193***	(0.067)	0.127**	(0.060)	0.207***	(0.059)	0.128**	(0.057)
$\widehat{\Delta}_i$ Public sector $n = 1010$; $n_{U_1} = 422$; $n_{U_0} = 588$	-0.092	(0.117)	-0.013	(0.059)	-0.065	(0.113)	-0.005	(0.063)
$\widehat{\Delta}_i$ Formal private sector $n = 640$; $n_{U_1} = 332$; $n_{U_0} = 308$	0.115	(0.075)	0.106**	(0.054)	0.132**	(0.064)	0.114**	(0.054)

Note: *(**){***} significant at 10 % (5 %) and {1 %}. SE: linearized standard error. The authors will make the detailed results available to any reader who wishes them. # rather indicates $\ln(1 + w_i)$ as the dependent variable.

Secondly, it can be seen that union presence does not have a significant influence on earnings in the public sector. This is not very surprising given the politicised nature of trade unions in this sector. In addition to this, this result can be explained by the fact that the determination of earnings in the public sector and mainly in public administration – which constitutes nearly 81% in this sub-sample against 19% for public or parapublic workplaces – is more dependent on ad hoc decisions emanating from the executive power. As an example, we can cite the presidential decrees of 2008, 2014 and 2023 raising the basic monthly salary of civil and military personnel at the rate of 15%, 5% and 5.2% respectively. In 2008, another presidential

decree increased the rate of the non-accommodation allowance paid to civilian and military personnel.

Table 5. Robustness of the wage differential related to the existence of trade unions

Estimator Dependent variable	(1) **ATT with OLS** $\ln(w_i)$		(2) **ATT with PPML** w_i		(3) **ATE with OLS** $\ln(w_i)$		(4) **ATE with PPML** w_i	
	Coeff.	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**
$\widehat{\Delta}_i$ Informal sector# $n = 2008$; $n_{U_1} = 207$; $n_{U_0} = 1801$	0.193**	(0.088)	0.197***	0.071	0.230***	(0.069)	0.199***	(0.061)
$\widehat{\Delta}_i$ Public sector $n = 1010$; $n_{U_1} = 294$; $n_{U_0} = 716$	0.115	(0.110)	0.085	(0.056)	0.122	(0.117)	0.091	(0.064)
$\widehat{\Delta}_i$ Formal private sector $n = 640$; $n_{U_1} = 217$; $n_{U_0} = 423$	0.030	(0.083)	0.057	(0.076)	0.083	(0.071)	0.099	(0.073)

Note: *(**){***} significant at 10% (5%) and {1%}. SE: linearized standard error. The authors will make the detailed results available to any reader who wishes them. # rather indicates $\ln(1 + w_i)$ as the dependent variable.

Table 6. Robustness of the wage differential related to the existence of staff representatives

Estimator Dependent variable	(1) **ATT with OLS** $\ln(w_i)$		(2) **ATT with PPML** w_i		(3) **ATE with OLS** $\ln(w_i)$		(4) **ATE with PPML** w_i	
	Coeff.	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**
$\widehat{\Delta}_i$ Informal sector# $n = 2008$; $n_{U_1} = 232$; $n_{U_0} = 1776$	0.175**	(0.079)	0.097	(0.076)	0.187***	(0.071)	0.092	(0.072)
$\widehat{\Delta}_i$ Public sector $n = 1010$; $n_{U_1} = 339$; $n_{U_0} = 671$	-0.047	(0.136)	0.024	(0.066)	-0.008	(0.126)	0.036	(0.069)
$\widehat{\Delta}_i$ Formal private sector $n = 640$; $n_{U_1} = 302$; $n_{U_0} = 338$	0.125*	(0.076)	0.144**	(0.059)	0.147**	(0.063)	0.151***	(0.058)

Note: *(**){***} significant at 10% (5%) and {1%}. SE: linearized standard error. The authors will make the detailed results available to any reader who wishes them. # rather indicates $\ln(1 + w_i)$ as the dependent variable.

Finally, as in Table 3, we find that the estimates of the semi-log regression model overestimate the impact of union presence on the level of earnings. This finding thus echoes the work of BLACKBURN (2007, 2008) and KAISER (2016) who show that the impact of unionisation on wages is overestimated when using a log-wage equation for statistical inference.

Beyond the lessons learned from the results recorded in Table 4, it is also relevant to test the robustness of the results presented in Table 3 taking into account the difference between the presence of a staff representative and that of a trade union in the workplace (see Table 5 and 6).

The results of the PPML estimator presented in Tables 5 and 6 above reveal once again that union presence (whether the existence of at least one trade union or at least one staff representative in the workplace) does not affect earnings in the public sector.

Furthermore, the results show that there is no link between the presence of at least one trade union and pay levels in the formal private sector (see table 5). This is not surprising, on first analysis, given that "*the 1992 Labour Code and its implementing regulations do not establish any special status for trade union leaders, do not organise the trade union presence in the company and barely give any indication that the trade unions can express themselves there*" (TCHAKOUA, 2010). Given that the union's ability to improve and protect members' interests also depends on their active participation in union activities (HAMMER et al., 2009), this result may also be explained by the lack or low level of support given by union members to union officials during pay negotiations. This finding also raises the question of whether the collective agreements signed in the formal private sector are actually applied. We note, however, that the presence of at least one staff representative has a significant influence on income (see Table 6).[21] From the outset, this suggests that staff representatives play a decisive role in improving workers' wage demands. On the other hand, and based on the study by LAROCHE and BERNIER (2016) on the anti-union strategies employed by employers in two Canadian provinces, we can suspect the increased use of a practice of union discrimination which consists of employers in the formal private sector favouring dialogue with employee delegates – because they are less combative and more conciliatory with regard to the employer's interests than the union – in order to achieve a sharing of added value which is less advantageous for workers.

When the analysis focuses on the informal sector, the coefficients show that although the variables "existence of a trade union" and "existence of a staff representative" have the expected sign, this sign is only statistically significant for the first variable according to the results of the PPML estimator.

[21] It would also have been interesting to take into account the difference between unionised and non-unionised staff representatives. Unfortunately, the database used does not allow this.

Having examined the link between union presence and earnings, we now turn to the link between union membership and earnings.

5.2. Underpaid unionised employees in the formal private and industrial sectors

When we look at the income differential between union members and nonunion members in workplaces where there is at least one trade union, Table 7 shows that there is no wage premium or wage penalty linked to union membership (even if the sign of the wage differential points to a penalty for union members). This predictable result calls into question that of TSAFACK NANFOSSO (2002).[22] Consequently, non-membership in a trade union would be, as in most developed countries, the most economically rational individual strategy (SANDI, 2006) since the product of trade union action is a 'collective good' in Cameroonian labour law. This then tends to encourage free-riding and to handicap strategies for revitalising the trade union movement. Furthermore, this predictable result leads to questions about the individual determinants of the choice of union membership, since non-union members can benefit from the dividends of collective bargaining without having to bear the costs of membership and the risk of entering into conflict with the employer.[23] However, it is beyond the scope of this study to examine this issue.

In order to test the robustness of the results contained in Table 7, Table 8 reproduces the estimates of equations (1) and (2) on the sub-sample of the institutional sector and that of the industry sector. The results indicate the absence of a significant effect of union membership on the level of individual earnings in unionised workplaces in the informal and public sectors. In the industrial sector, however, union members are found to earn about 29.05% less in terms of monthly income than their non-union counterparts (Table 8, row 4, column 4). This prompts a reconsideration of the result obtained by THOMAS and VALLEE (1996). In the formal private sector, there is also a negative and statistically significant influence of union membership on earnings, regardless of the estimation method used. The log income of a union member is on average 0.321 lower than the log income of a non-union member (Table 8, column 2, row 3). This represents an estimated penalty of about 27.87%. This is not surprising if one refers to the reports of the International Trade Union Confederation (ITUC) on the situation of workers'

[22] Following the logic of TORM (2014), we can say that the result arrived at by TSAFACK NANFOSSO (2002) probably compares hourly earnings between union members (in unionised firms) and non-union members (in unionised and non-unionised firms). However, non-union members working in non-unionised firms and union members working in unionised firms may not be directly comparable, as the former were not faced with the choice of becoming union members, unless they deliberately chose to work in a non-unionised firm.

[23] Faced with this so-called "*free rider*" problem, GARELLO et al. (1990, p. 50) ask "*how can we still recruit members and subscribers, apart from a few fanatics or eternal professional protesters?*".

rights in the World. Similar results have been reported in France by BREDA (2014) and BOURDIEU and BREDA (2016) which show differences in wages at the disadvantage of union members compared to their non-union colleagues, *ceteris paribus*.

Table 7. Union membership and wages (pooled)

estimator dependent variable		(1) **ATT with OLS** $\ln(1+w_i)$		(2) **ATT with PPML** w_i		(3) **ATE with OLS** $\ln(1+w_i)$		(4) **ATE with PPML** w_i	
		Coeff.	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**	Coeff.	**SE**
$\widehat{\Delta}_i$		-0.059	(0.087)	-0.072	(0.067)	-0.027	(0.083)	-0.052	(0,068)
Education	Higher	Ref.		Ref.		Ref.		Ref.	
	Not in school	-0.254	(0.208)	-0.401*	(0.210)	-0.254	(0.208)	-0.401*	(0.210)
	Primary	-0.277**	(0.140)	-0.422***	(0.124)	-0.277**	(0.140)	-0.422***	(0.124)
	Secondary	-0.166	(0.128)	-0.170**	(0.079)	-0.166	(0.128)	-0.170**	(0.079)
Job tenure		-0.0232	(0.024)	-0.0156	(0.017)	-0.0232	(0.024)	-0.0156	(0,017)
	Job tenure^2	0.00069	(0.0007)	0.00058	(0.0005)	0.00069	(0.0007)	0.00058	(0,0005)
Training	No	Ref.		Ref.		Ref.		Ref.	
	Yes	0.0186	(0.0934)	0.163**	(0.0657)	0.0186	(0.0934)	0.163**	(0,0657)
Age	15 - 34	Ref.		Ref.		Ref.		Ref.	
	35 - 54	0.173	(0.112)	0.251***	(0.084)	0.173	(0.112)	0.251***	(0,084)
	55 - 64	0.183	(0.173)	0.321***	(0.118)	0.183	(0.173)	0.321***	(0,118)
Marital status	Single	Ref.		Ref.		Ref.		Ref.	
	Married	0.141	(0.097)	0.176***	(0.063)	0.141	(0.097)	0.176***	(0,063)
	Widowed/separated	0.238	(0.169)	0.0581	(0.106)	0.238	(0.169)	0.0581	(0,106)
	Common-law	0.393***	(0.133)	0.364***	(0.125)	0.393***	(0.133)	0.364***	(0,125)
Gender	Female	Ref.		Ref.		Ref.		Ref.	
	Male	0.184*	(0.107)	0.203***	(0.072)	0.184*	(0.107)	0.203***	(0.072)
Type of work	Regular	Ref.		Ref.		Ref.		Ref.	
	Occasional	-0.178	(0.124)	-0.396***	(0.122)	-0.178	(0.124)	-0.396***	(0.122)
Institutional sector	Informal	Ref.		Ref.		Ref.		Ref.	
	Public	0.347***	(0.108)	0.295***	(0.095)	0.347***	(0.108)	0.295***	(0.095)
	Formal private	0.306***	(0.089)	0.334***	(0.093)	0.306***	(0.089)	0.334***	(0.093)
Industry sector	Services	Ref.		Ref.		Ref.		Ref.	
	Primary	-0.151	(0.211)	-0.126	(0.151)	-0.151	(0.211)	-0.126	(0.151)
	Industry	0.346***	(0.103)	0.301***	(0.097)	0.346***	(0.103)	0.301***	(0.097)
	Trade	-0.0680	(0.215)	0.0114	(0.196)	-0.0680	(0.215)	0.0114	(0.196)
Location	Rural	Ref.		Ref.		Ref.		Ref.	
	Urban	0.302**	(0.131)	0.177	(0.114)	0.302**	(0.131)	0.177	(0.114)
Occupation	Skilled worker	Ref.		Ref.		Ref.		Ref.	
	Unskilled worker	-0.512***	(0.120)	-0.567***	(0.131)	-0.512***	(0.120)	-0.567***	(0.131)
	Semi-skilled worker	-0.329***	(0.117)	-0.267**	(0.133)	-0.329***	(0.117)	-0.267**	(0.133)
	Middle management	0.0897	(0.144)	0.140	(0.105)	0.0897	(0.144)	0.140	(0.105)
	Senior_management	0.585***	(0.156)	0.565***	(0.109)	0.585***	(0.156)	0.565***	(0.109)
Union membership*job tenure_centered		0,061**	(0.027)	0.027	(0.021)	0.061**	(0.027)	0.027	(0.021)
Union membership*job tenure^2_centered		-0.00198*	(0.0011)	-0.00077	(0.0007)	-0.00198*	(0.00108)	-0.00077	(0.0007)
Constant		10.83***	(0.207)	4.076***	(0.177)	10.80***	(0.196)	4.055***	(0.173)
R^2		0.395				0.395			
N		718							

Note: *(**){***} significant at 10 % (5 %) and {1 %}. SE: linearized standard error.

Even before discussing the causes of the wage penalty suffered by union members, this finding already seems to indicate hostility towards trade unionists and trade union freedoms in unionised workplaces in the formal private and industrial sectors in Cameroon. Such a finding

also seems to indicate that union involvement represents a significant occupational risk in these sectors. In such circumstances, it is difficult for unions to maintain or increase their membership on the one hand, and to encourage members to participate in union activities on the other hand.

Based on the developments of BREDA (2014) and BOURDIEU and BREDA (2016), the most convincing explanation of the wage penalty suffered by union members would result less from their lack of skills, their low productivity, their failure to individually negotiate higher incomes than their non-union colleagues or pure aversion on the part of employers to them, rather than a "strategic discrimination situation"[24] on the part of employers whose aim would then be to dissuade employees from joining unions and supporting union actions.[25] In contrast to the work in France, the data in this study do not allow us to examine whether the wage penalty is made worse by having responsibility for employee representation. Overall, the estimates produced in this analytical framework need to be confirmed with an adequate database based on a very large number of observations.

Table 8. Robustness of the wage differential related to union membership

Estimator Dependent variable	(1) **ATT with OLS** $\ln(w_i)$		(2) **ATT with PPML** w_i		(3) **ATE with OLS** $\ln(w_i)$		(4) **ATE with PPML** w_i	
	Coeff.	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**	**Coeff.**	**SE**
$\widehat{\Delta}_i$ Informal sector $n = 207$; $n_{U_1} = 69$; $n_{U_0} = 138$	-0.285	(0.174)	-0.189	(0.139)	-0.206	(0.133)	-0.116	(0.120)
$\widehat{\Delta}_i$ Public sector $n = 294$; $n_{U_1} = 108$; $n_{U_0} = 186$	0.120	(0.143)	0.038	(0.078)	0.147	(0.141)	0.054	(0.084)
$\widehat{\Delta}_i$ Formal private sector $n = 217$; $n_{U_1} = 91$; $n_{U_0} = 126$	-0.372**	(0.151)	-0.321***	(0.102)	-0.278**	(0.133)	-0.270***	(0.100)
$\widehat{\Delta}_i$ Industrial sector $n = 145$; $n_{U_1} = 67$; $n_{U_0} = 78$	-0.221	(0.146)	-0.325***	(0.110)	-0.230*	(0.135)	-0.337***	(0.108)

Note: *(**){***} significant at 10 % (5 %) and {1 %}. SE: linearized standard error. The authors will make the detailed results available to any reader who wishes them.

[24] LAROCHE and BERNIER (2016) use the term "union discrimination" instead.

[25] Because of this situation of injustice or discrimination to which they are subjected, unionised workers could participate more in union activities (strike action and related activities, for example) in order to improve their situation (see BUTTIGIED et al., 2008).

CONCLUSION

The impact of trade unions on wages is a subject that continues to interest researchers in industrialised countries, notwithstanding the multitude of empirical works already published (see for example the recent study by BONACCOLTO-TÖPFER and SCHNABEL, 2023). In developing countries, on the other hand, and in Cameroon in particular, economic reflection on the issue is still poorly addressed, mainly because of the lack of statistical data. In order to fill this gap, this paper sought to assess the influence of union presence and union membership on earnings in the formal and informal sectors, using Cameroonian data from the second *Survey on Employment and the Informal Sector* (EESI 2).

The results obtained by the PPML estimator, which is more robust than the OLS estimator, show that the presence of a trade union and/or a staff representative in a workplace is positively linked to the level of individual earnings in the sample as a whole, and in particular in the sub-samples for the informal sector and the formal private sector. Nevertheless, the robustness analyses revealed that only the presence of at least one employee representative has a significant influence on income in the formal private sector. In the informal sector, only union presence has a significant influence on earnings. The results of the study also revealed that union membership does not affect income in the sample of unionised workplaces as a whole, and particularly in the sub-samples of the informal and public sectors; whereas union members are paid less than their non-union counterparts in the sub-samples of the formal private sector and the industrial sector.

From a practical point of view, these results call for the effective application of all legal provisions concerning the participation of trade unions in collective bargaining and the protection of workers against any act of trade union discrimination. These results also call on trade union officials in the formal private sector to adopt union revitalisation strategies (such as the *organising model*, for example) in order to have a significant influence on wage bargaining.

Despite the interest of these results, one of the main limitations of this work concerns the quality of the data used. It would then be more relevant to study the influence of unionisation – and particularly collective bargaining – on wages from matched employer-employee data from a survey devoted to employee-management relations in establishments with 20 or more

employees in the market sector. A longitudinal study using this type of data should therefore remove any ambiguity about the relationship between unionisation (union presence and union membership) and pay levels. It would also be interesting to see whether the data from the third *Survey on Employment and the Informal Sector* (EESI 3) confirms the results found here.

APPENDIX

Table A1. Income mean-comparison test: unionised workplaces / nonunionised workplaces (pooled)

N: 3 658 Strata: 32 Primary sampling unit: 657 Population: 1 809 853		
	Average monthly income (in thousands CFA)	**Prob > F**
Nonunionised workplaces	73.11205	0.0000
Unionised workplaces	130.3789	

Source: EESI 2, INS, and author's calculations.

Table A2. Income mean-comparison test according to the existence of at least one trade union (pooled)

N: 3 658 Strata: 32 Primary sampling unit: 657 Population: 1 809 853		
	Average monthly income (in thousands CFA)	**Prob > F**
Absence of a union	77.420	0.0000
Existence of a union	143.370	

Source: EESI 2, INS, and author's calculations.

Table A3. Income mean-comparison test according to the existence of at least one staff representative (pooled)

N: 3 658 Strata : 32 Primary sampling unit: 657 Population : 1 809 853		
	Average monthly income (in thousands CFA)	**Prob > F**
Absence of a staff representative	76.270	0.0000
Existence of a staff represenattive	133.684	

Source: EESI 2, INS, and author's calculations.

Table A4. Income mean-comparison test: union members / nonunion members (pooled)

N : 718 Strata : 32 Primary sampling unit : 361 Population : 354 141, 73		
	Average monthly income (in thousands CFA)	**Prob > F**
Nonunion members	136.4241	0.2482
Union members	153.7339	

Source: EESI 2, INS, and author's calculations.

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