The Effects of Unionisation on Labour Income Share in Developed Economies

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Abstract. The role of unions becomes a critical issue since it has prominent effects, not only to the improvement of workers benefits, but it is also related to the employers' objectives. Consequently, a significant challenge has emerged for unions in the past three decades. Union membership level has declined significantly in the advanced capitalist economies. This paper investigates the effects of unionisation on labour income share in developed economies using the dynamic panel data estimation with maximum likelihood approach. This study applies panel data of twenty-five developed countries, and the study period is seven years annually covered from 2011 to 2017. The research finding defines that the trade unions have a positive and significant impact on labour income share through its membership and its role in improving collective bargaining coverage as one of the primary goals of trade unions in the labour market.
Keywords: Unionisation, Labour Income Share, Developed Economies

1 Introduction

The unions have drawn more attention because they are typically bargaining over all aspects of an employment contract including wages, working hours regulation, overtime pay, fringe benefits, employment security, and the coverage of health and safety standards in the working environment. It made the future of trade unions unclear since the late 1970s [1]. Study of [2] distinguished union challenges in terms of a different country group. In the advanced capitalist economies, union membership level has declined significantly. Study of [3] has stated that over the past decades unions have lost many members. According to [4] and [5], *"union density equals the proportion of wage-earners who are unionised, and collective bargaining coverage equals the proportions of wage-earners who are covered by collective agreements"*. Extracts from [6] and [7] defined compensation of employees are given as follow: *"The compensation of employees comprises all payments by producers of wages and salaries to their employees"*. The labour share is defined as the share of value-added, which has paid out to workers. It is, therefore, often also called the wage share or the labour share. Study of [8] elaborated the wage share as it assumed that value-added produced with capital and labour as input factors. According to [9],*"the capital share includes all non-labour income including interest income and economic profit which can be added together and defined as accounting profit"*. Besides, Keynes has focused on three specific real variables: wages, employment, and output [10,11]. In their book *History of Trade Unionism*, defined a trade union as: *"a continuous association of wage-earners*

L. Rini Sugiarti et al. (eds.), *Proceedings of the 1st International Conference on Social Environment Diversity (ICOSEND 2024)*, Advances in Social Science, Education and Humanities Research 905,
https://doi.org/10.2991/978-2-38476-366-5_32

for the purpose of maintaining or improving the conditions of their employment." [12] They made this change to exclude the implication that trade unions have always contemplated a continuance of 'a capitalist or wage system' [13].

The terminology of collective bargaining in the discussion of industrial relations was introduced by [14], which indicated collective bargaining as the collective labour contract [15]. Moreover, the study of [16] determined collective bargaining further into a remarkable question undertaken by associating between collective bargaining and the distributive income of labour. In addition, a study of [17] defined collective bargaining as: "*a procedure for the joint determination of labour contracts"*. [18] Several studies have examined the impact of unionisation and its policy toward labour share. A paper of [19] found a positive and significant impact of the trade union towards labour share. Moreover, the study of [20], researched intending to determine the effects of bargaining power of labour, which was approximated by union density on wage shares with control variables [20]. Likewise, [21] investigated the relationship between union density and the wage share. Correspondingly, collective bargaining has developed in many perspectives as well as theoretical approaches. [22] elaborated the inter-linkage between macroeconomic performance and collective bargaining from an international perspective. Most countries in the developed economies conduct a specific policy in order to deregulate labour markets and encourage the decentralisation of collective bargaining [23]. Finally, it is verified that decreasing the bargaining power of unions could reduce employment and growth if the unions are employment-oriented instead [24].

The industrial value-added, as an approximation of technological change, has a statistically significant negative effect on labour income share [25,26]. Correspondingly, a study of [27] also indicated a negative effect of capital-output ratio and total factor productivity on the labour share. Recently, a study of [28] showed that a decline in the labour income share is driven by strongly capital-biassed technical change in the manufacturing sector. Thus, there has been a shift in income distribution for labour upon skilled labour [27,28]. Consequently, technological change is also used to explain changes in functional income distribution. A study of [29] provided evidence that the labour share shifted by capital-augmenting technological progress, which was measured by capital-output ratio. [30] identified that there is a negative relationship between labour productivity and labour share. Increasing labour productivity is associated with a fall in labour share for the post-globalisation era. Meanwhile, a paper of [31] showed various results. While technological innovation has a positive and significant effect on the labour share, technological mechanisation is negatively associated [32]. Hence, this study uses the strictness of EPL index by the OECD and the World Bank, as one of the control variables of the labour market institution which vary across countries. A paper of [33] showed that job protection deregulation has contributed about 15 percent to the average labour share decline in advanced economies.

2 Method

There are three alternatives in solving the endogenous problem in the estimation, given as follows: (1) to replace it with fitted values in the second stage of a 2SLS (Two Stage Least Square) estimation procedure [34,35]; (2) to use Instrumental Variables (IV)

estimation [36,35]; (3) to apply a quasi-maximum likelihood estimation (QMLE) using the Hamilton filter [37-39]. As we have learned that one of the most encountered challenges in empirical labour economics is identification of model parameters in the presence of endogenous regressors [40]. First, union density rate is considered as an endogenous regressor as well as collective bargaining coverage level [41-44]. Second, the unobserved heterogeneity across countries may lead to the presence of cross-sectional dependence. To overcome this problem, the first difference estimation for controlling any of the country-specific effects is implemented as one of the alternative estimation methods [41,45,30,19,46] . Third, the modified Wald test for groupwise heteroskedasticity has been commonly used to check for the presence of heteroskedasticity [47]. Fourth, instrument validity and serial correlation. Overall, the estimate of the unionisation affects the labour income share have mostly been estimated by applying multivariate equations in the context of either time-series or cross-sectional analysis. Moreover, the combination of both analysis of a panel data analysis has also been implemented by [19,21,25,26,30,44-46,48]. The Arellano-Bond dynamic panel data estimation using Stata $xtabond$ command with $vce(robust)$ option. A better estimate of the standard errors, proposed by [49], can be obtained by using the $vce(robust)$ option. As for the one-step estimator, these standard errors permit heteroskedasticity in the disturbances [50]. The panel GMM estimator discussed in Arellano and Bond (1991) is the most popular estimation method for estimating dynamic panels with unobserved heterogeneity and predetermined regressors [51]. The recommended alternative is thus the linear dynamic panel data estimation using maximum likelihood which has been introduced by [51-55] using the Stata $xtdpdml$ command that implements this estimator. Following this background, therefore this research has adopted the dynamic panel model using maximum likelihood proposed by [51,52,54-56] as an alternative for the panel GMM estimator in estimating the unionisation effects on labour income share. The investigation of the effect of unionisation on the labour income share in developed economies can be expressed in the following dynamic model specification as:

$$LIS_{i,t} = \alpha_0 + \alpha_1 LIS_{i,t-1} + \alpha_2 UNION_{i,t-1} + \alpha_3 CB_{i,t-1} + \alpha_4 LKL_{i,t} + \alpha_5 LICT_{i,t} + \alpha_6 LKHOURS_{i,t} + \alpha_7 EP_{i,t} + \varepsilon_{i,t} \quad (1)$$

All these variables are expressed as percentages except the strictness of employment protection which has been measured as an index. This study uses the share of labour income as a percentage of GDP based on [25,26,42,43,57] studies. The explanatory variables are the trade union density rate and the collective bargaining coverage level rate. For the degree of automation variables, the study has followed [25,26,43] studies. Following [58,59], therefore this study has utilised panel data model analysis to produce statistical robustness. In the context of a particular form of endogeneity in the form of lagged dependent variables [60]. Ultimately, following [52,54-56], this study has applied dynamic panel data modelling using maximum likelihood method in particular includes a cross-lagged panel model and predetermined regressors, which is considered as an alternative to AB method. This ML estimation has been applied in the estimates using Stata $xtdpdml$ command.

3 Result and Discussion

Table 1 presents the regression results for the estimated models.

Table 1. The Impact of Unionisation and the Degree of Automation on Labour Income Share in Developed Economies, 2011-2017 (Dynamic Panel Data Models using Maximum Likelihood for Dependent Variable: Labour Income Share)

Independent Variables	**1**	**2**	**3**	**4**	**5**
Lagged labour income share	1.088***	1.565***	1.491***	0.850***	0,943***
	(0.024)	(0.026)	(0.022)	-1.36E-05	(0,020)
Lagged union density	0.274***	-0.082***	-0.111***	0.051***	0,073***
	(0.025)	(0.025)	(0.021)	(0.001)	(0,010)
Lagged collective bargaining	0.074***	-0.066***	-0.290***	0.032***	0,166***
	(0.010)	0.017	(0.014)	4.141E-04	(0,006)
Capital-labour ratio	0.016	-	-	-0.836***	-0,028***
	(0.028)			-3.26E-05	(0,005)
ICT capital services	-	0.096***	-	-0.079***	0,005
		(0.009)		(0.001)	(0,004)
Capital services per hours worked	-	-	0.081***	0.824***	-
			(0.007)	(0.002)	
Employment protection legislation	-	-	-	-	0,265***
					(0,006)

Wald test of all coefficients	318214,46	6004753,71	6287692,34	209379,31	2253,56
Probability > chi2 (p-value)	0.000	0.000	0.000	0.000	0,000
Number of countries	25	25	25	25	22
Number of observations	175	175	175	175	154

Notes: Standard errors in parentheses; *, **, ***, indicates 10%, 5%, and 1% statistical significance, respectively. The first dependent variable is from period 2. Constants are free to vary across time periods. Capital labour ratio, ICT capital services, and capital services per hours worked used as proxies for the degree of automation. The strictness of employment protection legislation is used as a proxy for the labour market institution framework across countries.

Column 1 reports the result of the baseline specification model of the labour income share estimation. The result finds that the lagged labour income share has had a positive and significant effect on itself in the current year. Similar evidence has also been confirmed from other model estimates seen in column 2 to 5. This evidence has convinced that the dynamic panel models, which have been primarily applied in this study, justified the research hypothesis. In addition, the variables of interest of union density and collective bargaining have presented positive effects and are statistically significant on labour income share. Furthermore, as for the control variable used in the model, the capital-labour ratio has performed a positive effect on labour income share but is statistically insignificant. Column 2 provides the estimated result of unionisation effects on labour income share with controlling the degree of automation as approximated by the ICT capital services. The result presents the lagged union density and lagged collective bargaining have negative effects and are statistically significant on labour income share when the degree of automation is examined by the ICT capital services. In column 3, a similar result has also emerged when the proxy of the degree of automation used is the capital services per hour worked by the person employed. The result shows that the lagged union density and lagged collective bargaining have negative and significant effects on labour income share. To do so, column 4 exhibits the extended model estimates, which employed all three proxies of the degree of automation in the estimates. Specifically, the result indicates the lagged union density and lagged collective bargaining have positive and significant effects on labour income share. The degree of automation has been estimated by employing the capital-labour ratio, ICT capital services, and capital services per hour worked simultaneously. All these three proxies confirmed significant effects on labour income share. The capital-labour ratio has contributed a negative effect on labour income share. This result suggests that the rise in capital stock applied in the industries reduces the labour income share. As for the other proxies of the degree of automation, the capital services per hours worked by persons employed has confirmed a positive and significant effect on labour income share. This result defines apparent outcomes, which benefited the labour

income share. As the capital services per hour worked increased, the income shares significantly rose. Eventually, column 5 specifies the best-fitted model estimates of unionisation effects on labour income share, which generated the most significant outcomes. The findings emphasised that union density and collective bargaining have positive and significant effects on labour income share. The degree of automation has justified contributions to income share through the capital labour ratio that yields a negative and significant impact, while the ICT capital services are found to be insignificant. Accordingly, the stricter employment protection legislation implementation, the more extensive working collateral that workers could acquire. Hence, the income share would increase significantly.

4 Conclusion

The main objective of the research is to determine whether unionisation has a significant impact on labour income share. According to the outcome of all specification tests, the study has provided a robust and consistent model estimation for the baseline specifications, particularly. The findings have confirmed that unionisation as well as collective bargaining are proved to be positively and statistically significant in affecting labour income share in the context of developed economies during the period of study from 2011 to 2017.

Acknowledgments. This research is funded by the Ministry of Finance of the Republic of Indonesia through the Endowment Fund in 2016-2019. Endowment funds in the education sector are managed by LPDP in collaboration with the Ministry of Education, Culture, Research and Technology, of the Republic of Indonesia.

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