**Identifying club convergence of regional wage in Indonesia and their influencing factors**

Muhamad Rifki Maulana\*, Harry Aginta\*\*

*\* Junior Economist of Bank of Indonesia East Kalimantan Representative Office*

*\*\* Senior Economist of Bank of Indonesia and PhD student at Nagoya University*

**A B S T R A C T**

This paper aims to empirically evaluate regional wage convergence of 34 Indonesian provinces. By applying the club convergence techniques (Phillips and Sul, 2007, 2009) on the proxy of real wage data at province level from 2005-2020, we find three significant convergence clubs of regional wage. Furthermore, we explain the influencing factors of club convergence formation. Estimates from ordered logit model inform that the formation of club convergence is significantly explained by the following variables: initial level of wage, share of employment on manufacturing sector, investment share to GDP and labor force participation rate. Our findings support the evidence from most of club convergence studies that emphasize the role of initial condition and regional characteristics on the formation of club convergence. From a policy perspective, our result of multiple convergence clubs and their influencing factors should alert the national and regional policymakers to redesign appropriate strategies meant to

increase the economic and social cohesion at regional level.

JEL Classifications:

E24, J31, J58, R11

Keywords: Regional Wage, Club Convergence, Labour Force, Log t test, Logit Model

1. **Introduction**

Modern economic theories predict that labour that have same skills will earn equal payments in a fully integrated labour market (Marshall, 1920, book 6, Ch. 3; Hicks, 1932, Ch. 4). This theory of equalization in pay differentials is reminiscent of the so-called ‘law of one price’. The law of one price stating that the price of an identical asset or commodity will have the same price globally, regardless of location, when certain factors are considered and that theory frequently used in research on convergence in commodity prices (Federico, 2012) is also a useful metaphor for the labour market (Caruana Galizia, 2015; Rosenbloom, 1998, 2002).

Furthermore, there is another study find that the convergence in country wages was not caused by the mechanism attributable to ‘the law of one price’ alone, rather, it was caused by markets and institutions interchangeably (Svante Prado, Christer Lundh , Kristoffer Collin & Kerstin Enflo ,2021). In the other hand, another study also find that labour markets of the past have failed to confirm the theory which predict small wage differentials among workers and geographic locations, provided that human capital does not vary much because there is consistent evidence that large wage differentials across space were commonplace (Kristoffer Collin, Christer Lundh & Svante Prado 2019).

In Indonesia, topic about wage convergence or income disparity is quite relevance because it often becomes the main factor for many people do the migration which increased in the last few years. Based on theory, economy is one aspect that could influence migration and everal theories that underlie this among them were delivered by Mantra (1992) and Todaro (2003). Both agree that economic motives are one's reasons do the migration, especially migration from rural to urban areas. Work as a sources of economic livelihoods become a push factor if there is no work with feasible wages available in origin area. Indonesia Central Bureau of Statistics recorded that the percentage of population in urban areas on 2020 is 56.7% increase from 2010 which only 49.8%. Furthermore, that percentage projected to increase up to 66.6% in 2035, due to massive development in urban area which requires a lot of workers. Another study from Central Bureau of Statistics show that the number of lifetime migrants on 2019 in Indonesia is up to 29.8 million people with migrant workers of 5.4 million people. Java Island dominates the population of migrants in Indonesia, with around 51.2% of lifetime migrants and 56.5% of migrant workers residing in Java Island. The high number of migrants in java is mainly influenced by wage condition, living cost, and the availability of living facilities. Other than that, depth analysis about wage convergence is supposed to be an answer from the high number of gini ratio in Indonesia.

Examining wage convergence across regions in Indonesia is also appealing for at least two following reasons. First, it can enrich the literature by providing a comparative study on wage convergence in a developing country like Indonesia with a large diversity and unique geographical condition compared to the other countries. Second, wage convergence analysis often unveils some hidden patterns and is thus useful in understanding critical issues such as the degree of market integration among regions and the role of spatial factors especially in diverse archipelago country like Indonesia (Aginta, H 2020)

The focus of this paper lies on convergence analysis of the long-run behaviour of regional wages in Indonesia and its influenced factors. Despite numerous studies on regional income convergence, little is known about regional wage convergence in Indonesia. Furthermore, in this paper we use average net income per month of employee and laborer in 34 provinces from 2005-2020 as main indicator instead of regional minimum wage (UMR). In many cases, regional minimum wage usually influenced by local government policy and other unconditional factors, so it hasn’t optimally reflect the real market situation. We also remove the effect of inflation on regional wage by converting the data from nominal into real term using provincial Consumer Price Index (CPI) of 2005 as the base.

By applying club convergence technique (Phillips and Sul, 2007), we find three significant convergence clubs of regional wage. Interestingly, the composition of the clubs by using real wage is very similar to the one we obtained by using nominal wage, implying the existence of price-adjusted mechanism in regional wages. Provinces that converge into the higher wage clubs (Club and Club 2) have similar characteristic where there are many national strategic projects are being built and have high traffic of migrant workers. Our further analysis using ordered logit model suggests that the formation of club convergence is significantly explained by the following variables: initial level of wage, share of employment on manufacturing sector, investment share to GDRP and labor force participation rate. Our findings reveal that investment and manufacturing share to GDRP have significant role to determine the club formation. That findings also confirm the assumption of similar characteristics from those are as mentioned above.

The remaining of this paper is organized as follows. In Section 2 we review related literature and in Section 3 we discuss the methodologies and data. Section 4 presents and discusses our results on the formation of convergence clubs and the influencing factors. Finally, Section 5 concludes the paper with remarks.

1. **Literature Review**
   1. **Related studies on wage convergence**

Analyzing wage convergences within a country has some benefits. The main benefit is it will improves and provides a deeper understanding of wage dynamics across different regions. In a labour market context, the ‘law of one price’ would entail that wages across workers and locations would converge as transports and communication technologies increase labour mobility (Prado S, Lundh C, Collin K. 2020). Several studies provide evidence that regional wages seems to have converged since pre-industrial times, whether for the distribution of wages across space in the late twentieth and the early twenty-first century was rather flat (Collin, Lundh, & Prado, 2019). However, another study shows the empirical implication of the law of one price in a labour market context is that wages will converge across space in line with huge improvements in transports and communications expanding the geographical extent of labour markets. In the absence of migration barriers, migration from low-wage regions to high-wage regions tends to decrease regional wage differentials (Collin K, Lundh C, Prado S. 2018). Based on that study, there should be an interesting finding in Indonesia due to the vast transportation and communications infrastructure development in the last decade. One of proofs rapid development of transportation infrastructure in Indonesia was shown by the number of airport in Indonesia which increase from 148 unit in 2004 to 235 unit in 2018. As a result, the traffic of domestic passengers was skyrocketing during that period from 34 million passengers per year in 2004 to 94 million passengers per year in 2018. Meanwhile, there is also a rapid development in communication infrastructure due to massive base transceiver station (BTS) construction which built by Indonesia’s telco state-owned enterprise from only around 26 thousands unit in 2008 to 231 thousands in 2020.

On the other hand, our research also possible to examine which factors are the driving forces behind the formation of multiple steady states of wages across Indonesia regions. Some studies has investigate whether initial conditions put forward by a certain class of theoretical models (e.g, Azariadis and Drazen, 1990) are responsible for the observed convergence clubs. Moreover, in order to address that issue, there is a study that propose a two-step procedure consisting of first step which endogenously identify groups of regions that converge to the same steady state level and the second step investigationg the role of starting conditions for club membership while controlling for the regions structural characteristics (Bartkowska M, & Riedl A. 2012). That study also is most closely related to the work of Corrado et al. (2005), who analyze per capita income across European NUTS1 regions (where NUTS stands for Nomenclature of Territorial Unites for Statistics). Based on their study, convergence clubs are determined endogenously using cointegration test proposed by Hobijn and Franses (2000). Furthermore, from the work of Bartkowska M et al. (2012) revealed that European regions form six separate grups converging to their own steady state paths. Their finding stated that starting conditions such as a region’s initial level of human capital and per capita income, can indeed explain to which club it will belong, hence they conclude that initial condition play a crucial role in determining a region’s equilibrium steady state level.

There is another study trying to examine the territorial real wage convergence across Romanian countries and using Phillips and Sul (2007) methodology (Neagu, O.2020). They found that from the total of 42 counties there are 4 convergence subgroups consisting of 33 counties and 9 diverging counties. 4 of these 9 diverging counties are situated in Southern regions, indicating consistent disparities between the Northern and Southern regions. Moreover, they stated that the paper's findings are relevant for the local and regional policymakers, in designing appropriate strategies meant to increase the economic and social cohesion at regional and county level and also relevant for the identification of tendencies of the convergence process in Romania and to suggest new governmental actions meant to reduce income inequalities in the next programming period (Neagu, O. 2020).

* 1. **The contribution to previous studies**

The present paper brings a huge contribution for the existing literature as none of the studies have analyzed the club convergence of real wages in Indonesia. Previously, there are several studies examine convergence in Indonesia but mainly focused in GDP per capita and total GDP in each provinces. Firdaus, M & Yusop, Z. (2009) study examines income convergence among provinces in Indonesia using dynamic panel data approach. The results show that static and dynamic panel data approaches produce different results of convergence patterns. Furthermore, their study showed that convergence process prevails among provinces in Indonesia for the period 1983 – 2003, however the speed of convergence is relatively very slow (0.29) compared to other studies in developing countries. Another study which conducted by Kharisma,B and Saleh,S. (2013) try to analyze the income dispersion and test both absolute convergence and conditional convergence of income among 26 provinces in Indonesia during 1984- 2008 using static and dynamic panel data approach. There was a strong indication of the existence of absolute convergence and conditional convergence among 26 provinces in Indonesia during 1984-2008. Thus, there was evidence that the economy of poorer provinces tends to grow faster compared to the more prosperous provinces. The last suggests that there was a tendency to catch up. Based on the system GMM estimation, it is found that the provinces in Java have faster speed of convergence comparatively to those outside Java.

Meanwhile another study conducting by Vidyattama, Y. (2006) try to examine the pattern of inequality and convergence of Indonesia’s regional income since the 1970’s. It shows the pattern has been affected by a few major changes in Indonesian policies and economic development, including macroeconomic conditions and structural change. On the other hand, there is a study that using club formation methodology which similar to this paper but has different object. Aginta, H. (2020) try to identify convergence clubs in regional price across 34 provinces in Indonesia and investigate conditioning factors of club formation. Their study analyze regional monthly consumer price data from January 2012 to December 2019 with a novel club convergence test developed by Phillips and Sul (Econometrica, 2007) and show that regional consumer price does not converge into a single universal equilibrium. Instead, there are four convergence clubs identified.

As conclusion, to the best of our knowlegde, none of previous studies investigates club of wage convergence in Indinesia. The present article fills this research gap with its attempt to reveal the determining factors of wage convergence clubs identified endogenously by club convergence test.