



Determinants of Premium and Penalty of Worker Income in Indonesia

Yunisvita^{1✉}, ²Muhammad Teguh, ³Rosmiati Chodijah, ⁴Arika Kurniawan, ⁴Sitti Fildzah Rahma

^{1,2,3,4,5}Department of Development Economics, Faculty of Economics, Universitas Sriwijaya

Article Information Abstract

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The worker may be paid more than the worker with whom he is associated or may receive a penalty. This study provides (1) proportion of workers into the following categories: self employed; paid workers; formal workers and informal workers, (2) determinants of segmented workers' income premiums and penalties. Using micro data from the results of the National Labor Force Survey (Sakernas) in February 2020, this study measures the proportion of workers' income and uses a multiple regression model to analyze the determinants of segmented workers' income premiums and penalties in Indonesia. Our findings show that the proportion of income premium and penalty is almost the same, when workers are divided into formal, informal and self-employed, which is predominantly occupied by workers receiving income penalties. A larger proportion of income premiums are received by paid workers or labourers. Years of schooling and the square of years of schooling show a significant effect on the income premium of self-employed and the opposite results on the income penalty. The same thing was found in formal workers. Age, age squared, gender, area of residence show a significant effect on the income penalty of self-employed and income premium of formal workers.

INTRODUCTION

Wage inequality in Indonesia has shown an increasing and fluctuating trend over the last decade. If it is observed based on gender differences, there are one third of the number of provinces experiencing an increase in inequality and another third experiencing fluctuations in wage inequality. On the other hand, the characteristic of the labor market in developing countries, including Indonesia, is the high proportion of workers who are self-employed (entrepreneurs) or work in the informal sector. Although there is still consensus on the extent to which entrepreneurs and informal sector workers are in the sector because they are excluded from formal sector employment or because they choose to be in the sector based on financial or non-financial factors.

Premium wages are the average amount of wages for members of a certain group that is greater than the population as a whole. Penalties on earnings for self-employed and informal workers are often interpreted as evidence of exclusion from higher paid formal workers. Many studies have examined income differences between informal and formal employment, and self-employment and wages, for individual countries or for some regions of the world such as Latin America. However, comparative literature on how and why there are income differences across countries is sparse (Gindling *et al.*, 2016).

The segmented labor market theory postulates that informal workers are usually subject to lower remuneration than similar workers in the formal sector. Study results (Tansel & Kan, 2012) in line with the traditional theory that formally salaried workers are paid much more than their informal counterparts. Confirming heterogeneity within informal employment, they found that self-employed often earn lower wages than those who are salaried. Not so with (Arabsheibani & Staneva, 2012). They found significant informal employment wage premiums across income distributions. This

contrasts with previous research and casts doubt on recent literature showing that the informal sector is under-rewarded. It seems that informal work in Tajikistan is the main source of income. In addition, unskilled workers in the labor market segment benefit more from wage premiums that increase over time, while skilled workers enjoy wage premiums when they migrate as well as time wage increases. Furthermore, for unskilled workers wage growth over time is mainly due to the accumulation of human capital (Matano & Naticchioni, 2013).

Other explanation on the size-wage gap have been provided in the literature. For example, Criscuolo (2000) shows that premium wages are paid by large employers as efficiency wages to increase worker productivity.

In a regional context, (Araújo, Almeida & Gonçalves, 2020) states if and when these groups of workers benefit differently from the agglomeration effect, including estimates of the urban wage premium (UWP) for informal workers, and based on a focus on developing countries. UWP is a positive wage differential across a dense geographic area. It is quite common to identify UWP using administrative registers filled in by the company, limiting the analysis to male workers with formal contracts. This restriction is a problem for Brazil because informal workers have an impeccable participation in the workforce. By analyzing the Brazilian labor market using the Brazil National Continuing Sample Household Survey, a comprehensive longitudinal database covers the period from Q1 2012 to Q3 2019, which allows analysis of heterogeneity of formality status,

In Indonesia there is a phenomenon of premium and penalty income, as shown in Figures 1 and 2. The difference between the wages of professional workers and entrepreneurs in the Riau Islands Province, DKI Jakarta and West Papua experiences an income penalty condition while other provinces experience the opposite. Income penalties based on the difference between the wages of formal and informal workers also occur in the three

provinces, in addition to three other provinces, namely West Java, Central Kalimantan and Papua.

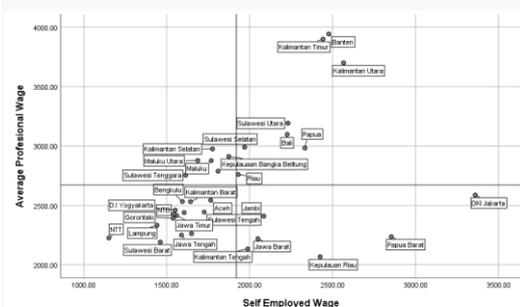


Figure 1. Average Professional Wage and Self Employes Wage (thousand rupiah)

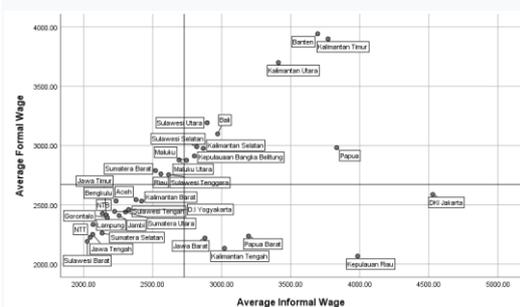


Figure 2. Average Formal Wage and Informal Wage (thousand rupiah).

Source: Sakernas Data, 2020 (processed)

Integrally, the informal sector relates to the formal sector with a pro-cyclical nature or as a complementary sector. This situation allows for income gaps between sectors even in the same education group. Thus, Wulandari, Susilo & Satria (2018) attempted to determine the effect of worker characteristics on income inequality between formal and informal employees on skilled and unskilled workers in Indonesia in 2017 using the Blinder-Oaxaca decomposition. The results showed that the discrimination factor had a greater effect than the endowment factor on the income gap and the endowment factors that played a role in increasing the income gap of the two groups were age squared, experience, and job training.

The goal of a competitive labor market model would be to bring a penalty or premium income to Self-Employed versus workers, or

workers with different types of companies. The labor market in the traditional approach in developing economies is segmented or dualistic where formal sector employment is limited by minimum wages, tax laws and labor market regulations that limit employment in the formal sector. The argument is that workers who are not capable enough to work in the formal sector will take jobs as self-employed workers or low-paid workers, or marginal informal sector companies. Thus, both entrepreneurial workers and informal workers are "expelled" from the formal sector so that the wages of formal workers remain above market wages.

In a dualistic economic development model, the formal sector in developed countries is tend to be small (Self-Employed and informal employment are large) due to lack of demand, credit, reliable inputs and export markets keep the scale and productivity low for formal sector products (La Porta & Shleifer, 2014). Therefore, formal sector firms in low-income countries tend to be less productive. As long as firms in low-income countries tend to be less productive than firms in more developed countries, the extension of the self-employment penalty is likely to be less for workers in low-income countries.

Segmentation and integration of formal and informal labor markets are two very different views on the interaction of formality and informality (Lehmann, 2014). The condition of the labor market in Indonesia is still dualistic. Dualism is reflected in the segmentation of the labor market in two sectors: formal (identical to modern), and informal (identical to traditional). This dualistic approach is still controversial, because from the results of studies in several developing countries, the validity of the dualistic hypothesis is doubtful, even though in reality the dichotomy in the two segments/sectors always exists, it is not permanent, because it is transitional, both from informal to formal, and formal to formal. informal (temporary) then return to formal (after getting the opportunity to enter this sector).

Until now, the situation of labor market competition in Indonesia is very tight, but it is not yet in perfect competition. The situation of a pure competitive/perfect competition labor market is different from that of an imperfect competition, both monopolistic and monopsonistic. From empirical studies so far the labor market in Indonesia when viewed from the aspect of wages is flexible (Witjaksono, 2009).

The issue of individual heterogeneity in the labor market in developing countries is very important to the participation of informal workers. This type of heterogeneity has been explored by many studies on labor market segmentation (Tansel & Kan, 2012; Yahmed, 2018) and the wage gap between formal and informal workers (El Badaoui, Strobl & Walsh, 2010; Chen & Hamori, 2013).

Non-professional Self Employed and informal workers face an income penalty compared to formal workers. These penalties are statistically significant except in developing countries in Europe and Central Asia, where they are small and often not statistically significant. In addition, income penalties are small (and often not statistically significant) in low-income countries for both non-professional and informal entrepreneurs. The penalty for non-professional or informal entrepreneurs increases as a country's GDP increases. The income penalties for informal workers are largest in middle-income countries, and income penalties for non-professional workers are the largest in high-income countries. Employers and professional entrepreneurs on average enjoy an income premium compared to workers, with large differences between men and women. While the largest income premiums for entrepreneurs and professionals are middle-income men and Latin American countries (Gindling *et al.*, 2016).

Wage premiums can also be observed based on the skill level of workers in urban areas. Matano and Naticchioni (2013) specifically state that skilled workers enjoy a wage premium that is balanced between the effects of wage levels during migration and the effects of wage growth.

For low-skilled workers, the urban wage premium is due to the effect of wage growth as wages increase over time.

Arabsheibani & Staneva (2014) show that the results of the decomposition of wage differentials show a strong income penalty for formal sector workers across the income distribution. These penalties are particularly large at the lower end of the distribution, where 48% of the observed wage gap is attributed to differential returns. Premiums in the informal sector in Tajikistan based on the theory of compensation differences will cause people to expect the wages of the informal sector to be higher than the wages of the formal sector.

According to Duranton (2016), the lower wage premium for formal workers compared to workers in the informal sector may be due to two factors: (i) it is influenced by wage premiums in more densely populated areas based more on the nature of work and type of activity rather than formality status, and (ii) as informal workers can sell their products locally, their income is more determined by local housing and transportation costs.

Wage premiums examined from a geographical aspect mainly in urban areas identify wage premiums at all urban levels due to labor productivity. This is related to (i) segregation of high-skilled workers in more densely populated areas (Behrens, Duranton, and Nicoud-Robert, 2014; Combes *et al.*, 2012) and (ii) agglomeration externalities that allow for better employer-employee matching (Baum - Snow; Pavan, 2012) and the accumulation of human capital due to the abundance of knowledge and gain from experience (Moretti, 2010; Moretti, 2013; Behrens, Duranton & Robert-Nicoud, 2014; Roca & Puga, 2017). Based on the phenomena and literature review that has been described, this study aims to estimate the determinants of premium and penalty income for workers in the Self-Employed, paid workers, formal and informal workers categories.

RESEARCH METHODS

The unit of analysis of the study is the population aged 15 years and over who have status as workers in Indonesia. The data used was obtained from the National Labor Force Survey (Sakernas) which was carried out throughout the Republic of Indonesia in February 2020. After cleaning the data according to the category and completeness of the questionnaire data according to the purpose of this study, a sample of 11,138 respondents was obtained.

To estimate the determinants of income premiums or penalties for formal workers and informal workers, both women and men as well as in the group of self-employed workers with paid workers using multiple linear regression functions with cross section data as follows:

$$\ln Y_i = \alpha + \beta E P_i + \gamma X_i + I \dots\dots\dots (1)$$

where: Y_i is the monthly income of worker i (premium and penalty income); X_i is a set of independent variables, namely length of school year (X_1), length of school year squared (X_2), age (X_3), age squared (X_4), gender dummy variable (X_5), urban/rural dummy variable (X_6); $E P_i$ (X_7) is the average income premium for (1) entrepreneurs which is calculated by the percentage difference between the income of self-employed and the income of wage workers and (2) formal workers which is calculated by the percentage difference between the income of formal and informal workers; i is a worker; and I is the Error rate.

The multiple regression model (Equation 1) used to estimate the determinants of premium and penalty income is broken down into 8 models, namely: estimation model for self-employed workers (models 1 and 2); estimation models for paid workers (models 3 and 4); estimation models for formal workers (models 5 and 6); estimation models for informal workers (models 7 and 8). Hypothesis in this study is that there is a greater proportion of workers who receive income penalties than premium income. The percentage difference in the income of self-

employed and paid workers determines the income earned by workers along with the variables of the social demographic characteristics of the workers themselves.

The variables used follow the following definitions: First, Workers are residents aged 15 years and over who are working. Second, Income is the compensation received by the workforce per month which is paid by the company/office using units of Rupiah. Premium income is the positive difference between worker's income and the average income of that group of workers. Penalty income is the negative difference between the worker's income and the average income of that group of workers. Third, the categories of workers are groups of workers with the following status: Business assisted by permanent workers; Labor/Employees; Self-employed; Trying to be assisted by non-permanent workers; casual workers in agriculture; non-agricultural workers; Family workers. Entrepreneurial workers in this study are code 3 and labor workers are groups of codes 5 and 6. For the category of type of work according to the KBJI then, Formal workers consist of the code: (1) Manager; (2) Professional; (3) Professional technicians and assistants; (4) Administrative staff. Informal workers consist of: (5) sales force and sales force; (6) skilled workers in agriculture, forestry and fisheries; (7) processing, handicraft and related workers; (8) machine operators and assemblers; and (9) manual labor. Fourth, Years of schooling are units of years of education completed by workers. Fifth, Age is information about the date of the month and year from the time of the respondent's birth according to the Gregorian calendar system. Sixth, Gender is the gender of male and female expressed in the form of a dummy, 0 for women and 1 for men. The last, Regions are expressed in dummy form, 0 for rural areas and 1 for urban areas.

RESULTS AND DISCUSSION

The research variables described descriptively include the minimum, maximum, average and standard deviation shown in Table 1 below:

Table 1. Descriptive Statistics Results

Variable	Min	Max	mean	Std. Deviation
Age	15	65	41.6625	11.79651
Level of education	1	15	6.3435	3.57824
Income/earnings (IDR)	15000	10000000	1713141	1315567

Source: Sakernas Indonesia, 2020 (processed)

Based on the income level, it shows that the respondent who has the lowest income is IDR 15,000, while the highest income is IDR 10,000,000, the average income of the respondent is IDR 1,713,141, with a standard deviation of 1,315,567. Shown in more detail in Table 2, most of the respondents have incomes ranging from IDR 501,000-1,500,000/month as many as 4,892 people (43.9 percent). Meanwhile, for the highest income category, which is more than Rp. 3,000,000/month as many as 1,077 people (9.7 percent). The condition of workers' income in Indonesia is dominant in a lower direction, seen from the lowest income category, which is less than Rp. 500,000/month in a relatively high proportion, namely 13.8 percent or 1,535 people.

The lowest level of education from the highest diploma is never attended school/does not have a diploma, while the highest education level is Strata 2 (S2). The highest average level of education completed based on the highest diploma is SMP with a data distribution value of 3,578. The table 2 shows the Frequency Distribution of Income, Education and Age of respondents.

Table 2. Frequency Distribution of Income, Education and Age

Income (Rupiah/Month)	Number of Respondents (Person)	Percentage (%)
< 500,000	1535	13.8
501,000-1,000,000	2542	22.8
1.001.000-1.500.000	2350	21.1
1,501,000-2,000,000	1721	15.5
2.001.000-2.500.000	928	8.3
2,501,000-3,000,000	985	8.8
>3,000,000	1077	9.7
Total	11138	100.0

Level of education		
Elementary School/Not Finished Elementary School (SD/not SD)		
	5063	45.5
junior high school (SMP)		
	2498	22.4
senior High School (SMA)		
	3143	28.2
Diploma		
S1	162	1.5
S2	262	2.4
	10	.1
Total	11138	100.0

Age		
15-24	945	8.5
25-34	2300	20.7
35-44	3264	29.3
45-54	2812	25.2
55-64	1702	15.3
> 64	115	1.0
Total	11138	100.0

Source: Sakernas Indonesia, 2020 (processed)

Regarding the education level of the respondents, it can be seen from the highest diploma which can be seen in Table 2. Two-thirds of Indonesian workers are categorized as low-educated, namely elementary school / not graduated from 5,063 people (45.5 percent) and 2,498 junior high school workers (22.4 percent) . As for the higher education category, namely Diploma-Strata Two (S2), only 4 percent or as many as 272 people.

The average age of the respondents is 42 years with a standard deviation of 11.797. Most of the respondents aged 25-54 years as many as 8,376 people (75.2 percent). Meanwhile, the highest age category was 55->64 years with 1,820 people (16.3 percent) and half of the lowest age category was 15-24 years, which was 945 people (8.5 percent). It can be said that the respondents are the dominant group of productive workers.

Table 3 Frequency Distribution by Gender, Place of Residence, Status and Type of Work

Gender	Number of Respondents (Person)	Percentage (%)
Man	7507	67.4
Woman	3631	32.6
Total	11138	100.0
Residence		
Urban	4246	38.1
rural	6892	61.9
Total	11138	100.0
Type of work		
formal	385	3.5
Informal	10753	96.5
Total	11138	100.0
Job status		
Self-employed	7980	71.6
Laborer	3158	28.4
Total	11138	100.0

Source: Sakernas Indonesia, 2020 (processed)

Table 3 explains that workers in Indonesia are dominated by men as many as 7,507 people (67.4 percent) while for women workers only one third or 3,631 people (32.6 percent). Seen from this context, it means that male workers are the main workers in the general hierarchy of society, in other words, female workers are still secondary workers. In addition to gender, the conditions of workers are also differentiated based on the classification of the area of residence, namely rural and urban areas. In line with the distribution of male workers, almost the same number of workers in Indonesia live in rural areas as many as 6,892 people (61.0 percent) while the remaining 4,246 people (38.1 percent) are workers in urban areas. This data shows that employment in rural areas still provides wide opportunities where rural areas are characterized by the dominant agricultural sector coloring the economic structure in Indonesia. Further can be observed from the following explanation.

Type of work occupied by the category of workers is divided into formal and informal sector workers. The formal sector consists of the following codes: 1. Manager; 2. Professional; 3. Professional technicians and assistants; 4.

Administrative staff. The informal sector consists of: 5. Sales force and sales force; 6. skilled workers in agriculture, forestry and fisheries; 7. processing, handicraft and related workers; 8. machine operators and assemblers; and 9. manual labor. In general, almost all respondents are workers with jobs in the informal sector as many as 10,753 people (96.5 percent) while workers in the formal sector are 385 people (3.5 percent). Meanwhile, if distinguished from their employment status, most of the respondents were entrepreneurs, namely 7,980 people (71,

When workers are divided into formal and informal workers, the proportion of premium and penalty income shows almost the same conditions. Both are dominantly occupied by workers who receive an income penalty with a ratio of premium or income penalty of 2:5. That is, the difference between the income of respondents and the average income of formal and informal workers is negative. The income of workers is lower than the average income in their respective sectors.

A different situation is found when workers are categorized into self-employed workers and workers. The dominant proportion of income penalty is still found in the group of self-employed workers, as well as formal and informal workers. Gindling et al (2016) stated that the income penalty for self-employed and informal workers does not depend on the segmentation of the labor market. Workers maximize utility over income. If self-employment is preferred over paid workers, it can be seen that there is an entrepreneurial income penalty.

A larger proportion of income premiums are received by paid workers or laborers. The comparison of 51.5 percent : 48.5 percent is shown by the calculation results for the group of laborers. Referring to this, it can be said that the income of laborer respondents exceeds the average income of all workers. In nominal terms, the average monthly income for formal workers is IDR 1,776,638.88; informal workers is IDR 1,708,307.475; self-employed is IDR 1,825,800.798 and Labor is IDR 1,459,563.867. Observing this figure and the proportion of

income premium or penalty as shown in Figures 3 and 4, it can be stated that the income of the respondents compared to the average income of formal, informal and self-employed workers is lower than the average income in each of these categories, however different if the respondent's income is compared to the average worker's income. Thus, overall workers in Indonesia receive an income penalty. Only when compared to the average worker's income, the proportion of respondents' income shows an income premium.

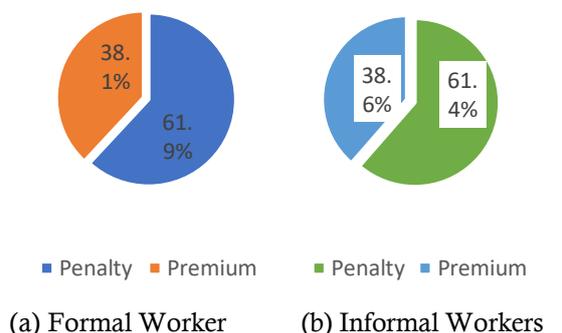


Figure 3. Proportion of Premium and Penalty of Income for Formal and Informal Workers

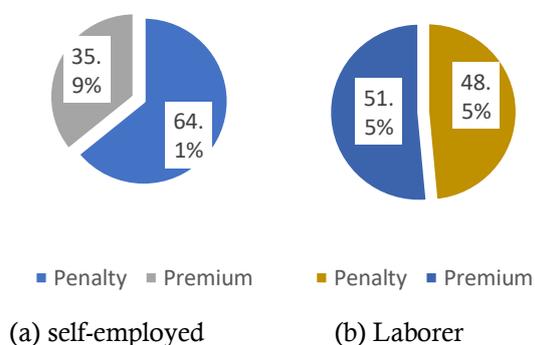


Figure 4. Proportion of Premium and Penalty of Income for self-employed and Labor Workers
Source: Sakernas Indonesia 2020 (processed)

The results of the estimation using the multiple regression model can be written in the obtained equation, namely: Self-employed Income. The multiple regression estimation model for the category of workers as self-employed is presented in Table 4 which is divided into self-employed Premium and self-employed Penalty models.

Table 4. self-employed Income Estimation Results

Variable	Model 1 (self-employed Premium)	Model 2 (self-employed Penalty)
Constant	2161032.**	-1566909.**
X1	-63947.54**	8424,716
X2	7580,227**	-24.77860
X3	-783.6014	23671.07**
X4	59.69795	-265.8279**
X5	-74072.32	215351.9**
X6	21631.65	92388.20**
X7	-51255.81**	264.0366**
n	3994	7144
R2	0.436831	0.108406
Prob (F statistic)	0.000000	0.000000

** significant at = 5%
Source: Processed data (2021)

There are striking differences in the two models. Model 1 shows that the determinants of income for self-employed workers are statistically significant length of school and the square of the length of schooling. On the other hand, in model 2, the length of schooling variable and the square of the length of schooling are not variables that have significant effect on the self-employed income penalty. This contrast implies that in the self-employed group that has a premium income, the length of school plays significant role in changing the level of income. The negative sign in the squared coefficient of years of schooling indicates that the premium pattern of self-employed income initially with increasing years of schooling reduces income but at a certain point increasing years of schooling will increase income. This means that when the number of squared years of schooling has not reached certain standard, self-employed has not had positive effect from increasing level of education.

Different findings on the income premium of self-employed by gender are shown by Gindling et al, (2016). Male self-employed enjoy a higher income premium than women. This gender difference factor also means that female self-employed are more likely to receive low income as compensation for their flexibility as self-employed. In general, self-employed who receive an income premium reflect not only their greater productivity but also their return on

capital and risk. In other word, self-employed receive positive income to make up for the additional costs or risks of starting their business. From an economic and sociological perspective, added by (Killewald, 2012) that fathers earn more than men who do not have children.

In model 2, a negative sign on the squared coefficient of years of schooling implies the same as the age-earnings profile. When the number of squares of years of schooling increases, the entrepreneurial income penalty also increases, but when the number of squares of years of schooling increases, the penalty of income decreases. This result is in line with the findings of Gindling et al (2016), both the premium and the entrepreneurial penalty are significantly influenced by education. Gender differences affect the income penalty (Weeden, Cha, & Bucca, 2016). As it is also known in economics literature in the form of maternal penalty. Mothers earn less than women who do not have children (Staff & Mortimer, 2012; García-Manglano & Bianchi, 2014).

The equation of the two estimation models for self-employment is shown by the significant effect of the percentage difference in the income of self-employed and workers. The direction of the income response due to changes in the independent variable is different from one another. In the entrepreneurial group with an income premium, there is an inverse relationship between income and the percentage change. This means that the greater the difference in income, the smaller the premium of self-employed income (the difference between the income of self-employed respondents and the average income of self-employed is getting smaller). The opposite event is found in model 2. Every one percent increase in the difference in income of self-employed and laborer will increase the penalty for labor income by Rp. 264.0366.

The second analysis is Laborer Income, Still using the same determinant variable as the self-employed group, in the complementary worker group, quite a different thing happened. It is shown in Table 5, that almost all of the determining variables significantly affect the premium of workers' income.

Age and gender dummy are the dominant determinants of income in both the premium and penalty laborer income groups. Both have the same direction of relationship to laborer income. Age has a positive effect and the square of age with an inverted U pattern on income. The value of the age coefficient is greater in the premium group, where every additional one year of the respondent's age will increase the income premium of IDR 36,930.18. The smaller nominal that occurs in the change in laborer income penalty indicates that each respondent's age increases by one year, it is suspected that the income penalty will only increase by one-tenth of the change that occurs in the income premium. Meanwhile, gender differences cause premium and income penalties to also differ. In line with Gindling et al (2016), male and female income penalties on paid workers (laborer) are also significant. From the results of this estimate, the amount of premium or income penalty in nominal terms is greater for male laborer. For the premium group, it is Rp. 34,354.7.

The area where the respondent lives does not statistically make a difference to the respondent's income penalty. On the contrary, there is a difference in income due to the area of residence for the premium group of laborer income, ie respondents who live in urban areas receive higher income premium than respondents in rural areas.

Table 5. Worker's Estimated Income (Paid Workers)

Variable	Model 3 (Labor Premium)	Model 4 (Labor Penalty)
Constant	-184532.7	6443724.**
X1	-30771.21	3197,101
X2	7158.188**	-133.7591
X3	36930.18**	4765,814**
X4	-346.2847**	-51.61703**
X5	218887.4**	26618.06**
X6	153031.9**	788.4575
X7	-474,4194**	-118168.7**
n	5734	5404
R2	0.071306	0.812526
Prob (F statistic)	0.000000	0.000000

** significant at = 5%

Source: Processed data (2021)

The third analysis is Formal Workers. The estimation of the formal worker regression model shows the similarity of the results with the self-employed worker regression model. This is possible because the self-employed worker profile of its characteristics is in line with that of formal workers. Self-employed worker builds their businesses with the resources and capabilities they have. Formal sector workers must also really consider everything that has to do with the sector. Need to see its ability to provide capital, recruit workers, sales targets and other things. The difference between the two groups of workers is only from the nominal coefficient on each of these significant determinant variables.

Based on the estimation results shown in Table 6, it can be explained that an increase in the age of formal workers will increase the income penalty by IDR 23,391.60, but the effect is not statistically significant on the income premium. The same thing happened to the age square variable, gender dummy and the area of residence dummy. For formal workers who are penalized, these four variables significantly affect income. In contrast to Gindling *et al* (2016) which states that the penalty for male and female formal workers is the same. For male workers living in urban areas, the income penalty is higher than for female workers living in rural areas.

Different findings occur in the group of formal workers who receive an income premium. For this group, it is assumed that the length of schooling and the square of the length of schooling are significant determinants of their income. The pattern of the letter U applies to the income of workers due to the behavior of the quadratic variable of school years. At first the slope decreases until it turns upward with a convex shape. The existence of an income premium caused by education and gender issues is also shown in public sector workers who tend to be formal (Antón & Bustillo, 2015). This is because the public sector is more interested in recruiting highly educated workers as a form of prestige. Meanwhile, the low level of gender discrimination reinforces the existence of an income premium.

Table 6. Estimated Result of Formal Worker's Income

Variable	Model 5 (Formal Premium)	Model 6 (Formal Penalty)
Constant	1411942.**	-1529032**
X1	-58265.76**	6725.407
X2	7938,037**	84,81616
X3	6904,594	23391.60**
X4	-8.661106	-260.0725**
X5	-45007.71	198500.3**
X6	59212.87	89261.31**
X7	-22300.42**	259.1737**
N	4248	6890
R2	0.300409	0.108699
Prob (F statistic)	0.000000	0.000000

** significant at = 5%

Source: Processed data (2021)

Slightly different from workers receiving premium income in the formal and self-employed groups, the income of informal workers is also influenced by differences in the area of residence apart from the length of schooling factor. Informal workers in urban areas statistically receive a higher income premium than workers in rural areas. The nominal difference is IDR 975,939.15. This is possible because the opportunities for doing business in the informal sector in urban areas are much wider than in rural areas. The population is large, implicitly the number of workers is also large, while the formal sector is not easy to enter, making the informal sector in urban areas a shelter for workers. In turn, it opens up greater income opportunities than in rural areas.

CONCLUSION

When workers are divided into formal and informal workers, the proportion of premium and penalty income shows almost the same conditions. Both are dominantly occupied by workers who receive an income penalty with a ratio of premium or income penalty of 2:5. When workers are categorized into self-employed workers and laborers, the dominant proportion of the income penalty is still found in the group of self-employed workers. A larger proportion of

income premiums are received by paid workers or laborers with a ratio of 51.5 percent: 48.5 percent.

The determinants of Length of schooling and the square of Length of schooling show a significant effect on the income premium of self-employed (model 1) and the opposite results on the income penalty (model 2). The same thing was found in formal workers (models 5 and 6). Meanwhile, age, age squared, gender, area of residence showed a significant effect in models 2 and 5 but not in models 1 and 6.

Age and gender dummy are the dominant determinants of income in both the premium and penalty groups of labor income (models 3 and 4). The results of the regression estimation for the informal group of penalized workers are in line with the behavior of the variables that determine the income of the group of formal workers in the same category.

REFERENCES

- Antón, J. I., & Bustillo, R. M. de. (2015). Public-private sector wage differentials in Spain. An updated picture in the midst of the Great Recession. *Investigacion Economica*, 74(292), 115–157. Available at: <https://doi.org/10.1016/j.inveco.2015.08.005>
- Arabsheibani, G. R., & Staneva, A. (2014). Is there an informal employment wage premium? Evidence from Tajikistan. *IZA Journal of Labor and Development*, 3(1). Available at: <https://doi.org/10.1186/2193-9020-3-1>
- Araújo, V. de C., Regina Ferreira de Almeida, E., & Gonçalves, S. L. (2021). Urban Wage Premium in a Labor Market with Informality. *SSRN Electronic Journal*, 55(21), 1–26. Available at: <https://doi.org/10.2139/ssrn.3721640>
- Badaoui, E. El, Strobl, E., & Walsh, F. (2010). The formal sector wage premium and firm size. *Journal of Development Economics*, 91(1), 37–47. <https://doi.org/10.1016/j.jdeveco.2009.03>
- Bargain, O., & Kwenda, P. (2011). Earnings Structures, Informal Employment, And Self-Employment: New Evidence From Brazil, Mexico, And South Africa. *Review of Income and Wealth*, 57(SUPPL. 1), 100–122. <https://doi.org/10.1111/j.1475-4991.2011.00454.x>
- Baum-Snow, N., Pavan R. (2012). Understanding the City Size Wage Gap. *The Review of Economic Studies*. 79(1). Pp 88-127.
- Behrens, K., Duranton, G., & Nicoud-Robert, F. (2014). Productive Cities : Sorting , Selection , and Agglomeration. *Journal of Political Economy*, 122(3), 507–553. Available at: <https://doi.org/10.1086/675534>
- BPS. (2020). The State of Workers in Indonesia. Sakernas February 2020.
- Chen, G., & Hamori, S. (2008). Formal and Informal Employment and Income Differentials in Urban China. In Annual Conference of the Human Development and Capability Association, New Delhi, 168(10–13), 1–30. Available at: <https://doi.org/10.1002/jid>
- Combes, P. P., Duranton, G., Gobillon, L., & Roux, S. (2012). Sorting and Local Wage and Skill Distributions in France. *Regional Science and Urban Economics*, 42(6), 913–930. Available at: <https://doi.org/10.1016/j.regsciurbeco.2012.11.003>
- Cooke, L. P. (2014). Gendered Parenthood Penalties and Premiums Across the Earnings Distribution in Australia, the United Kingdom, and the United States. *European Sociological Review*, 30(3), 360–372. Available at: <https://doi.org/10.1093/esr/jcu044>
- Criscuolo, C. (2000). Employer Size - Wage Effect : A Critical Review and an Econometric Analysis. *University Of Siena Economics Working Paper No. 277*, <https://dx.doi.org/10.2139/ssrn.223546>
- Duranton, G. (2016). Agglomeration Effects in Colombia. *Journal of Regional Science*, 56(2), 210–238. Available at: <https://doi.org/10.1111/jors.12239>
- Gindling, T. H., Mossaad, N., & Newhouse, D. (2016). How Large are Earnings Penalties for Self-Employed and Informal Wage Workers? In *IZA Journal of Labor & Development* (Vol. 5). Available at: <https://doi.org/10.1186/s40175-016-0066-6>
- Kahn, J. R., García-Manglano, J., & Bianchi, S. M. (2014). The motherhood penalty at midlife: Long-term effects of children on women's careers. *Journal of Marriage and Family*, 76(1), 56–72. Available at: <https://doi.org/10.1111/jomf.12086>
- Killewald, A. (2013). A Reconsideration of the Fatherhood Premium: Marriage, Coresidence, Biology, and Fathers' Wages. *American Sociological Review*, 78(1), 96–116. Available at: <https://doi.org/10.1177/0003122412469204>
- La Porta, R., & Shleifer, A. (2017). Informality and Development. *Indian Journal of Labour Economics*, 60(1), 109–126. Available at: <https://doi.org/10.1007/s41027-017-0080-5>
- Lehmann, H. (2015). Informal Employment in Transition Countries: Empirical Evidence and Research Challenges. *Comparative Economic Studies*, 57(1), 1–30. Available at: <https://doi.org/10.1057/ces.2014.44>
- Matano, A., & Naticchioni, P. (2016). What Drives the Urban Wage Premium? Evidence Along the Wage Distribution. *Journal of Regional Science*, 56(2), 191–209. Available at: <https://doi.org/10.1111/jors.12235>

- Moretti, E. (2010). Local Labor Markets. *NBER Working Paper, No. 15947*. Available at: <http://www.nber.org/papers/w15947>
- Moretti, E. (2013). Real wage inequality. *American Economic Journal: Applied Economics*, 5(1), 65–103. Available at: <https://doi.org/10.1257/app.5.1.65>
- Roca, J. de la, & Puga, D. (2017). Learning by working in big cities. *Review of Economic Studies*, 84(1), 106–142. <https://doi.org/10.1093/restud/rdw031>
- Staff, J., & Mortimer, J. T. (2012). Explaining the Motherhood Wage Penalty During the Early Occupational Career. *Demography*, 49(1), 1–21. <https://doi.org/10.1007/s13524-011-0068-6>
- Tansel, A., & Kan, E. O. (2012). The Formal/Informal Employment Earnings Gap: Evidence from Turkey. *SSRN Electronic Journal*, 1–45. <https://doi.org/10.2139/ssrn.2049336>
- Todaro, Michael P & Smith, Stephen C. (2011). *Economic Development*. Eleventh Edition. Erlangga Publisher. Jakarta.
- Weeden, K. A., Cha, Y., & Bucca, M. (2016). Long work hours, part-time work, and trends in the gender gap in pay, the motherhood wage penalty, and the fatherhood wage premium. *Russel Sage Foundation Journal of The Social Sciences*, 2(4), 71–102. <https://doi.org/10.7758/rsf.2016.2.4.03>
- Witjaksono, M. (2009). Labor Market Dualism and the Impact of Minimum Wages. *Journal of Economics and Development Studies*, 1(2), pp 67-73.
- Wulandari, R. D., Susilo, & Satria, D. (2018). Income Inequality between Formal-Informal Employees Based on Education Group. *Economics and Finance in Indonesia*, 64(1), 25–42. <https://doi.org/10.7454/efi.v64i1.583>
- Yahmed, S. Ben. (2018). Formal but Less Equal. Gender Wage Gaps in Formal and Informal Jobs in Urban Brazil. *World Development*, 101, 73–87. <https://doi.org/10.1016/j.worlddev.2017.08.012>