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Wage Differential in Indonesian Manufacturing Industries

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ABSTRACT

This study try to examine validity of efficiency wage models in the labor surplus economy. Indonesian manufacturing sector as a core in fact pay higher wages than the outside-informal sector. The rents sharing scheme found lower than that of developed countries, especially shown by smaller elasticity of wages with respect to value added, capital intensity, concentration ratio, foreign ownership, and size. Meanwhile export orientation industry have not positive impact on wages, and female fraction shows quadratic form. The last finding shows increasing part of wages after female workers become majority. Meanwhile, production-non production groups have different wage determinants pattern. The different impact of size, export, and female fraction variables can be concluded as if the industry's policy results in wage discount, it tends to be allocated by cutting the production worker wages only. It mean that, the wage gap of managerial or white collar group between high and low paying industries tend to narrow.

BACKGROUND

Inhabited by approximately 210 millions people and its early stage of industrialization, Indonesia is characterized by labor surplus economy. Wages are relatively new sources of income. Practically there are three main categories of labor forces that receive regular wages namely civil service, manufacturing sector, and private service sector. About half of regular wages receivers dedicate in the manufacturing sector. Therefore it is interesting to study the manufacturing wages behavior that operates in the labor surplus economy.

Following the efficiency wage hypothesis (Dickens & Katz 1987; Krueger & Summers 1987; Krueger 1988), there is a tendency of wage stickiness in the 'core' sectors for not adjusting the wages although there is a big gap among industries and between the core and peripheral sectors

(Williams & Kenison 1996). This study also shows the tendency, especially in the manufacturing sector in Indonesia.

This study focuses on the inter-industry wages in the manufacturing sector, the only sector supported by documented data. Central Bureau of Statistic (BPS) regularly surveys the data.

EFFICIENCY WAGE HYPOTHESIS AND INDONESIAN INDUSTRY

The existence of the long run inter-industry wage differential, at least, is explained by efficiency wage theory under the non-competitive theories. Non-competitive wage theory is based on two main assumptions, the first is the existence of correlation between wages and profit (which is not predicted in the neoclassical), and the second is the existence of non-maximized behavior (Krueger & Summers 1987). Economists usually choose the first assumption and create alternative theory i.e. efficiency wage theory, union threat model, unemployment equilibrium model and the others (Dickens & Katz 1987). Efficiency wage theory constitutes micro foundation of Keynesian school (McCafferty 1990), which gives the basic of the existence of involuntary unemployment and the existence of industry fixed effect that cause price (wage) stickiness in the long periods (Slichter 1950; Allen 1995). In the case of wages, agents do not take any enough adjustment to eliminate the differentials among industry or even to maintain these differences in a long period.

In neoclassical model, labor is viewed as passive input. Neoclassical does not separate the use of capital and labor. From this point of view, the derivation of wages as price of labor and interest as price of capital are similar, that are, by equate wage and interest which set by each market to the marginal productivity of respective input.

Efficiency wage model is based on hypothesis that employer has not been optimum yet in the wage level set by market clearing hypothesis. In that level workers become shirk as based on the market clearing assumption, the opportunity cost of the employees dismissed is zero. It means that workers dismissed will get the same wage by entering the market and will be cleared by equilibrium. In addition the turn over of workers in the equilibrium wage level will be high. As the consequence, the high labor turn over cost (for training, recruitment, and less productivity) increases sharply. By those reasons employer (especially in the core sector) will offer the market clearing wage plus some premium.

With a wage premium over the market, there is a rent sharing principle between employer and workers, where employers give higher wage and workers give higher effort. The result of the process is an increase in productivity, output, profit, and wages (Libenstein 1963; Pugel 1980; Akerlof & Yellen 1988; Christofides & Oswald 1992; Blanchflower et al. 1996). Under the wage efficiency hypothesis it is shown a correlation between wages and profit. In this model labor is viewed as special input. As human they possible become moral hazard or possible to bargain. If labor (unionized or individually) know the employer receive abnormal profit, they will ask a form of bargain.

With a bargain principle, labor ask to share surplus simply by maximize a bargain function below (see Blanchflower et al. 1996; Booth 1995).

$$\text{Max}\ \phi \log \{[u(w)-u(\bar{w})]n\}+(1-\phi)\log\pi \qquad (1)$$

where ϕ is bargain power of workers, $1-\phi$ bargain power of employer, u(w) is worker utility from wages, and $u(\bar{w})$ utility of wage at *status quo* (if bargain fail), which will equal to market wage or wage outside industry, n is number of worker, and π is profit, where $\pi = f(n) - wn$ concave. By maximize (1) wage in specific industry can be predicted as

$$W \equiv \bar{w}+\left(\frac{\phi}{1-\phi}\right)\frac{\pi}{n}, \qquad (2)$$

This model predict that wages will vary inter industry as ϕ or $1-\phi$, and π/n varies among industries. By this model, it is possible to estimate empirical model which correlate wages and industrial market rents. In this study we model wages after controlling education, general occupation, and three main industrial location, explained by value added, capital, concentration ratio, foreign ownership, export, labor size, and female fraction. Although there are a high unemployment and huge secondary labor market, wage will be determined simply by internal bargain condition. Wage variation among industries, in fact, also exists in Indonesian industry although the industry has labor surplus environment, high unemployment, low participation or under utilization especially in traditional sector.

EMPIRICAL MODEL

To show the wages variation in the manufacturing sector, this study follows the empirical model developed by Dickens and Katz (1987) and

econometrically by Krueger and Summers (1988) that is referred by many researchers nowadays. The model consists of two-stage regression. The first regression model is intended to estimate industry fixed effect on wages by controlling labor characteristic. The estimate resulting from n–1 dummy industries that set as explanatory variables which can be interpreted as wage differential from a benchmark (intercept). The intercept itself reflected the wage level of omitted industry of n dummy industries (Kennedy 1992: 217-218). Based on the availability of Indonesian manufacturing data, the empirical equation below is employed,

$$w_{ij} = a + b_1\ \mathrm{Educ}_{ij} + b_2\ \mathrm{Ocup}_{ij} + \sum_{k=1}^{3} b_k D_k \mathrm{reg} + \sum_{j=1}^{n-1} c_j Z_j + e_{ij} \qquad (3)$$

(all variables in logarithm, but the dummies), where w_{ij} is labor cost divide by total paid workers in establishment i and industry j, Educ_{ij} is total years of schooling attained by all workers divided by total workers in establishment i and industry j, Ocup_{ij} is ratio production workers divided by non production workers establishment i and industry j, $D_k$reg is dummy variable for three main industries locations namely Jabotabek (region surround Jakarta, cover 21 percents of medium and large industry in Indonesia), Joglosemar (region in Jogyakarta, Solo and Semarang covering 7.2 percents), and Gerbangkertosusilo (center of industries surround Surabaya, which comprises 11 percents of medium and large industries). Z_j are n – 1 dummy variables of 4 digit industrial classification in manufacturing sector (consisting of 127 classifications).

Assuming that the sum of standard error equals zero, the industry fixed effect ($c_j Z_j$), then, measures the industrial wage structure after controlling the firm level of worker's characteristics. In the second stage, regress c_j on industrial characteristics to evaluate the influence of market rents of Indonesian manufacturing industries.

$$\hat{c}_j = d_0 + K_{ij} f + v_{ij} \qquad (4)$$

where $\hat{c}_j$ is vector coefficient dummy industries estimated in the first stage regression. K_{ij} is vector industry characteristic that consists of value added per worker (VA/L), capital labor ratio (KL), 4 largest firms concentration ratio (CR_4), fraction of foreign capital in the establishment (Sumod), fraction of export (Export), the total of labor in the establishment (Size),

and fraction of female workers (Frakwan). All variables in logarithm, but in term of fraction.

In fact the manufacturing data in Indonesian industries show multicollinearity and also heteroscedasticity problem, in this case the above model is regressed separately to avoid multicollinearity, and is transformed to avoid heteroscedasticity. The data have been transformed to GLS method by dividing all variables with the expected $\hat{c}_j$ value [E ($\hat{c}_j$)] (see, Gujarati 1995: 266-; Thomas 1997: 295-296).

$$\frac{\hat{c}}{[E(\hat{c}_j)]} = \frac{1}{[E(\hat{c}_j)]} + \frac{K_{ij}}{[E(\hat{c}_j)]} \mathrm{F} + \frac{U_{ij}}{[E(\hat{c}_{ij})]} \qquad (4.a)$$

DATA

Medium and large (minimum 20 workers employed) Indonesian manufacturing is surveyed annually by BPS. The survey is held by sending questionnaire to establishments listed in its directory. The data are available on CD annually from 1975 up to the recent year. The above model is tested with 1997 cross section data. It comprises 22,381 establishments. To avoid outliers and incomplete information which some of them are likely appear due to an error in the inputting process, the regression employs about 75 percent of available data sorted by excluding blank data and the extreme values.

WAGES DISTRIBUTION

Distribution of wages in the medium and large manufacturing sector is shown in Table 1. In 1997 the very low wages still exist (1418 establishments = 6.3 percent) which has average wage is less than 500 thousand rupiah a year (about US $ 50-60). The range between the 5 percent highest wages and the 5 percent lowest ones is almost fifty times. This figure shows how wide the industry characteristic of Indonesian manufacturing is.

The relationship between wage class and some characteristics of manufacturing industry is shown in Table 2. The table shows the consistency between wages and value added, and also capital intensity. There exist also correlation between wages and concentration ratio, although at

TABLE 1. Wages distribution in the medium and large manufacturing industry in Indonesia, 1997

Wage class (000 rupiah/year)	Number of establishment	Percent
Up to 100	288	1.3
100.1 – 500	1130	5.0
500.1 – 1000	2682	12.0
1000.1 – 1500	4557	20.4
1500.1 – 2000	4747	21.2
2000.1 – 2500	3329	14.9
2500.1 – 3000	1711	7.6
3000.1 – 5000	2492	11.1
5000.1 – 10000	1088	4.9
> 10000	358	1.6
Total	22382	100.0

Sources: Central Bureau of Statistic (electronic data). 1 US $ = +/– 10.000 rupiah.

TABLE 2. Relations of wage class and industrial characteristic in the medium and large manufacturing industry in Indonesia, 1997

Wage class (000 rupiah/year)	Value added per labor (000 rupiah)	Capital per labor (000 rupiah)	CR- 4	Export fraction	Firm size	Female fraction
s.d. 100	744	1763	0.73	5.8	118.5	0.61
100.1 – 500	2978	9004	0.56	7.4	110.4	0.52
500.1 – 1000	3101	11969	0.42	5.9	87.8	0.50
1000.1 – 1500	4522	20297	0.42	6.4	104.6	0.45
1500.1 – 2000	10658	32888	0.41	9.3	147.6	0.38
2000.1 – 2500	10626	22618	0.41	11.2	208.4	0.34
2500.1 – 3000	15087	88956	0.44	12.8	270.7	0.30
3000.1 – 5000	23111	60012	0.43	16.2	354.7	0.29
5000.1 – 10000	46205	134995	0.50	17.6	370.3	0.24
> 10000	140588	261592	0.53	18.9	338.5	0.22
Total	13513	40605	0.44	10.0	184.8	0.39

Sources: Central Bureau of Statistic (electronic data).

some point shown an anomaly. In fact some traditional sector with high concentration pay a lowest wages.

The lowest wage with high concentration ratio is found in some decreasing industries such as traditional tobacco (rokok klobot), and some others traditional industries. The relation of wages and firm size seems inconsistent, and, in the last column, the table shows a consistency of negative relation between wages and female fraction.

Table 3 is drawn from another BPS's survey, Sakernas (a survey of national labor forces). This table shows wage differential among occupations and the share of each occupation that is captured by the survey. The average wage of the highest occupation (managers) is about 15 times than that of the lowest one. This survey actually can not capture the range of wages as wide as the range in the industrial survey. The smoothing also occurs in the average figure as shown in Table 3. Unfortunately Sakernas only gathers information that can be classified in two-digit ISIC.

TABLE 3. Monthly average wage/salaries by occupational classification in Indonesian manufacturing Industry, 1997

KJI	Occupation classification	Average wages/ salaries (000 rupiah/ month)	Labor share
1	Professionals	256	0.7
2	Managers	1502	0.4
3	Administrative staff	358	4.1
4	Sales workers	300	0.8
5	Security, building maintenance etc.	242	1.5
7	Processing workers of metal, wood, food product, textile, leather etc.	108	54.7
8	Workers of making, carpenter, forming, assembling, for leather, wood, metal, electric and machines	128	22.2
9	Workers for making, printing, crafting, coloring, operating driving, etc.	83	15.4
	Total/average	127*	100
	N		14,390

Central Bureau of Statistic: Sakernas 1997 (electronic data).
*. Including small industries.

REGRESSION ANALYSIS

The result of the first regression is shown in Table 4. The wage differential (in percentage) an industry to the benchmark (ISIC 3909 with average wage

TABLE 4. Inter industry wage differential in Indonesian manufacturing sector, 1997

$$\text{Ln } w_{ij} = a + b_1 \text{ Educ}_{ij} + b_2 \text{ Ocup}_{ij} + \sum_{k=1}^{3} b_k D_k \text{reg} + \sum_{j=1}^{n-1} c_j Z_j + e_{ij}$$

Industrial classification	Wage differential from intercept (*benchmark*)	Normalized differential[a]
Intercept */benchmark*	5.391***	
Food Industries		
KLUI 3111	0.028	0.114
KLUI 3112	0.185*	0.271
KLUI 3113	–0.083	0.003
KLUI 3114	–0.287***	–0.201
KLUI 3115	–0.103***	–0.017
KLUI 3116	–0.304***	–0.218
KLUI 3117	–0.272***	–0.186
KLUI 3118	–0.144**	–0.058
KLUI 3119	–0.036**	0.050
KLUI 3122	–0.198***	–0.112
KLUI 3121	–0.349***	–0.263
KLUI 3123	–0.179***	–0.093
KLUI 3124	–0.091	–0.005
KLUI 3125	–0.171***	–0.085
KLUI 3126	0,066	0,152
KLUI 3127	–0,233***	–0,147
KLUI 3128	0,044	0,130
KLUI 3131	–0,096	–0,010
KLUI 3132	–0,041	0,045
KLUI 3133	–0,040	0,046
KLUI 3134	–0,188***	–0.102
KLUI 3141	–1.717***	–1.631
KLUI 3142	–0.137***	–0.051
KLUI 3143	0.787***	0.873
KLUI 3144	–0.589***	–0.503
KLUI 3149	–0.297**	–0.211

cont.

TABLE 4. *continue*

Industrial classification	Wage differential from intercept (*benchmark*)	Normalized differential[a]
Textile Industries		
KLUI 3211	–0.030	0.056
KLUI 3212	–0.134***	–0.048
KLUI 3213	–0.101**	–0.015
KLUI 3214	0.240	0.326
KLUI 3215	0.091	0.177
KLUI 3216	–0.308***	–0.222
KLUI 3219	0.129	0.215
KLUI 3221	–0.035*	0.051
KLUI 3222	0.234*	0.320
KLUI 3229	–0.227***	–0.141
KLUI 3231	–0.023	0.063
KLUI 3233	–0.168***	–0.082
KLUI 3234	–0.046	0.040
KLUI 3241	–0.140***	–0.054
KLUI 3242	–0.285***	–0.199
Durable Goods		
KLUI 3811	–0.033	0.053
KLUI 3812	–0.059	0.027
KLUI 3813	0.043	0.129
KLUI 3814	0.125	0.211
KLUI 3819	0.027	0.113
KLUI 3820	0.056	0.142
KLUI 3821	0.173	0.259
KLUI 3822	–0.099	–0.013
KLUI 3823	–0.082	0.004
KLUI 3824	0.046	0.132
KLUI 3825	0.045	0.131
KLUI 3829	0.179**	0.265
KLUI 3830	–0.100	–0.002
KLUI 3831	0.007	0.093
KLUI 3832	0.149***	0.235
KLUI 3833	–0.150	–0.064
KLUI 3839	0.053	0.139
KLUI 3840	–0.050	0.036
KLUI 3841	0.077	0.163
KLUI 3843	0.080*	0.166
KLUI 3844	–0.138***	–0.052

cont.

TABLE 4. *continue*

Industrial classification	Wage differential from intercept (*benchmark*)	Normalized differential[a]
KLUI 3845	0.181	0.267
KLUI 3849	0.021	0.107
KLUI 3852	–0.051	0.035
KLUI 3853	–0.268*	–0.182
Wood, Rattan, Bamboo		
KLUI 3311	–0.138***	–0.052
KLUI 3312	–0.116**	–0.030
KLUI 3313	–0.236***	–0.150
KLUI 3314	–0.222***	–0.136
KLUI 3315	–0.626***	–0.540
KLUI 3319	–0.341***	–0.255
KLUI 3321	–0.069***	0.017
KLUI 3322	–0.425***	–0.339
KLUI 3323	–0.238**	–0.152
Paper and Allied Products		
KLUI 3411	–0.012	0.074
KLUI 3412	0.008	0.094
KLUI 3419	–0.087	–0.001
KLUI 3420	–0.163***	–0.077
Chemical and Allied Products		
KLUI 3511	0.248***	0.334
KLUI 3513	0.172**	0.258
KLUI 3514	0.368***	0.454
KLUI 3521	0.032	0.118
KLUI 3522	0.179***	0.265
KLUI 3523	0.032	0.118
KLUI 3529	0.305***	0.391
KLUI 3530	0.083	0.169
KLUI 3531	0.490	0.576
KLUI 3541	0.023	0.109
KLUI 3542	0.139	0.225
KLUI 3543	–0.202	–0.116
KLUI 3560	–0.059	0.027
KLUI 3561	–0.097***	–0.011

cont.

TABLE 4. *continue*

Industrial classification	Wage differential from intercept (*benchmark*)	Normalized differential[a]
Non Ferum Mining		
KLUI 3611	–0.132*	–0.046
KLUI 3621	–0.103	–0.017
KLUI 3622	0.234*	0.320
KLUI 3631	0.943***	1.029
KLUI 3633	–0.076	0.010
KLUI 3641	–0.251*	–0.165
KLUI 3642	–0.288***	–0.202
KLUI 3643	–0.051	0.035
KLUI 3691	–0.232***	–0.146
KLUI 3692	–0.288***	–0.202
KLUI 3693	–0.103	–0.017
KLUI 3699	–0.360***	–0.274
Basic Metal		
KLUI 3710	0.133**	0.219
KLUI 3720	0.121*	0.207
KLUI 3721	0.159	0.245
Not Specified Industries		
KLUI 3901	–0.256***	–0.170
KLUI 3902	–0.141	–0.055
KLUI 3903	0.457***	0.543
KLUI 3904	–0.134*	–0.048
KLUI 3905	–0.042	0.044
KLUI 3906	–0.476***	–0.390
Control Variables		
Ln educ	1.061***	
Ocup	–0.068***	
Location		
Jabotabek	0.328***	
Joglosemar	–0.123***	
Gerbangkts	0.027*	
R-squares	0.334	DW = 1.7
F	74	Heteroscedastisity (0)

*) t-statistic significant at 10 percent, **) significant at 5 percent, and ***) significant at 1 percent.

[a] normalized differential computed by: $d = \hat{c}_i - \sum(\hat{c}_k S_k)$ where is industry effect coefficient, s labor's share of k industry (see Fields & Wolff 1995; Krueger & Summers 1988).

about Rp 2,000.000 = US $ 210) are shown as coefficient of dummy industries in Table 4. Two main industries namely food and textile which have comparative advantage and highly export orientation, demonstrate as low wage industries. The negative sign shows that the industries pays below the weighted mean wage level. This result differ from US industries, where food and especially tobacco get a positive or premium wages (see Fields & Wolff 1995).

Conversely, conform to US or others developed countries (Chang & Miller 1996) durable good industries i.e. machinery, electrical, transportation, and professional device commonly give a premium wages. The three industries discussed above have dominant labor share (63.3%) in Indonesian manufacturing sector. Also consistent with developed countries, chemical industries commonly shows higher wages which contributed by KLUI 3511 (manufacture of basic inorganic and organic chemical); synthetic rubber industries, pesticides, pharmaceutical preparation, adhesive-explosive manufacture, petroleum industry etc. Unfortunately, the labor's share of these industry only about 7%.

Finally, Table 4 shows how low Indonesian manufacturing wages because majority industries pay below the benchmark as US $ 210 a year. This figure give a part of explanation of international migration legally or illegally of Indonesian workers to neighbor countries, advanced economy Asian countries, and to middle east (Derks 2000; Mantra 2000).

Control variables shows the significant role of years of schooling. Based on BPS survey, education seems to be the only variable that is closely related to labor quality. Ln Ocup variable namely the ratio of production labor to non-production labor, as be expected, shows the negative impact on wage. The impact of the locations of the three main central industries on wages is shown by the dummy location coefficient (D_k reg). The three main central industries-Jabotabek, Joglosemar, and Gerbangkertosusilo cover about 21 percent, 7.2 percent and 11 percent respectively of medium and large industries. The effect of the location on wages shows 33 percent, –12 percent and 3 percent respectively of the average wages in Indonesia.

The second stage regression, try to shows rents sharing scheme, namely, relations between source of profit and wages. It examines the impact of industry characteristics on inter industry wage differential as shown in Table 4. The regression base on equation 3 and equation 3.a. Table 5 shows the result of the second regression stage. Because of multicollinearity, value added per worker (VA/L) can only be estimated with the first regression model. From the table, the elasticity of wage with

TABLE 5. The effect of industry characteristics on wage structure of medium and large industries in Indonesia in 1997

Dependent variable: industry fixed effect ($\hat{C}$) or $\hat{C} / \hat{\hat{C}}$

Predictor	Model 1 (Eq. 4) Total industry	Model 2 (GLS) (Eq.4.a.) Total industry
Constant	–0.752	–
	(–38,9)***	
$1/\hat{\hat{C}}$	–	–0.276
		(56,4)***
LN VAL	0.0657	–
	(29,4)***	
LN KL	0.0141	–
	(8,5)***	
LN KL/ $\hat{\hat{C}}$		0.0173
		(33,1)***
CR-4	–0.181	–
	(–20.9)***	
CR-4/ $\hat{\hat{C}}$		0.302
		(100.1)***
Sumod	0.0850	–
	(7,3)***	
Sumod/ $\hat{\hat{C}}$		0.0205
		(5,98)***
Ekspor	–0.0266	–
	(–3,6)***	
Ekspor/ $\hat{\hat{C}}$	–	–0.0441
		(–10.1)***
LN Size	0.0096	–
	(4,8)***	
LN Size/ $\hat{\hat{C}}$	–	0.0280
		(59,6)***
Frakwan	–0.101	–
	(–13,1)***	–
Frakwan/ $\hat{\hat{C}}$	–	0.424
		(61.3)***
Frakwan^2/ $\hat{\hat{C}}$	–	–0.416
		(–35,2)***
R-square	0.182	0.994
F statistic	483	340197
DW	1.55	1.985
Heteroscedas-ticity (LM Test)	4043	0.0

t-statistic in parenthesis: *) significant at 10 percent, **) significant at 5 percent, and ***) significant at 1 percent.

respect to value added appears low. Ten percent difference of VA/L is followed by a 0.6 percent difference of wage. This figure, however, reflect the low bargain power of labor in sharing the value added.

By and large, there is a positive relationship between capital and wage structure. Ten percent differential in capital employed is pursued by 0. 17 percent of wage. This figure caused by very wide range in capital, meanwhile, narrower range in wages. Elasticity of wages on capital is estimated one third of that in relative surplus capital countries (see Krueger & Summers 1987). Also, definition of capital was employed in this study relatively traditional (Doms et al. 1997), because it does not capture the capital devote in information technology and human resource.

Concentration ratio is an important variable and has a significant effect on wage premium. This indicates that industries with higher degree of monopolistic output market offer greater wage. In the better model (model 2), the ten point increase in concentration ratio followed by 30 percent wage premium. This figure about three fourth of that in developed countries (see Krueger & Summers 1987).

Concerning fraction of foreign capital (sumod), it, in general, shows positive effect on wage. It gives more benefits to labor. This figure will be higher if captured by dummy. Average wage in industry with present foreign ownership is 2.5 time than that without foreign ownership.

Export proportion of the total production, in general, indicates a negative effect on wage. The negative correlation between export and wage shows a basic relationship where the products that break trough the international market tend to compete in terms of wage. This indicates that importers from developed countries encourage the wage competition among the developing countries that result in low wage of export sector. This result differ from the same variable examine in Korea (Lee 1994), which found not significant.

Size variable shows wage differential among industries. This shows the hypothesis, the larger the firms, the higher the wages is supported by the data. Furthermore, the following model indicates that the large firms offer lower wages to production labors, meanwhile, non-production labors receive higher wages. Variable (SIZE) get many attention in developed countries, and found has significant role in wage betterment (Heywood 1986; Rebitzer & Taylor 1995; Teal 1996: 967).

Female fraction, in general, shows a negative effect both in linear and quadratic models. Such quadratic model suggests that industries that employ less female labors have positive effect on wages, on the other hand, those that employ more female labor show a lower wage tendency.

The descriptive analysis indicates that female labors are likely to be occupational crowding in low-wage industries and tend to have lower position. The figure caused by lower female wage reservation at what level the workers enter to the market. This figure, however, confirm with the same finding in developed countries.

WAGE DETERMINANTS OF PRODUCTION- NON PRODUCTION WORKERS

Table 6 shows the result of GLS-model application toward production-non-production labors. It shows different impact of a variable on wage of both labor groups. The analysis is based on the sign, the magnitude, and the role of variables tested with R-square in restriction test formula.

TABLE 6. The effect of industry characteristic on production – non production wage, medium and large manufacturing industries in Indonesia, 1997

Predictor	Non production	Production
$1/\hat{\hat{C}}$	–0.0245	–0.0149
	(–21.9)***–	(–19,1)***
LN K/L/ $\hat{\hat{C}}$	–0.0073	–0.0020
	(–8,8)***	(–3,08)***
CR-4/ $\hat{\hat{C}}$	0.336	0.274
	(99,3)***	(85,4)***
Sumod/ $\hat{\hat{C}}$	0.121	0.214
	(25,4)***	(31.0)***
Export/ $\hat{\hat{C}}$	–0.0053	–0.101
	(–1.3)	(–17,8)***
LN Size/ $\hat{\hat{C}}$	0.010	–0.0109
	(14,5)***	(–16,3)***
Frakwan/ $\hat{\hat{C}}$	0.103	–0.181
	(10.4)***	(–11.4)***
Frakwan^2/ $\hat{\hat{C}}$	–0.149	0.374
	(–11.4)***	(12,96)***
R-square	0.729	0.95
F statistic	5285	37058
DW	2,0	2,01
Heteroscedastisity (LM Test)	12	1.4
Export restriction test (F-test)	0	313,6
Frakwan restriction test (F-test)	57,8	156,8

Dependent variable: Industry Fixed Effect ($\hat{C} / \hat{\hat{C}}$) on Wage of Production – non production Workers.

*) t-statistic significant at 10 percent, **) t-statistic significant at 5 percent, ***) t-statistic significant at 1 percent.

Based on the analysis, both labor groups (production and non production) have shown different determination patterns of wage. The hypothesis of comparative advantage on low wage or labor abundance is shown by the three variables; size, fraction of female workers, and export. Size variable gives negative impact on production labors. On the other hand, its positive impact appears on non-production wage. This fact reveals surplus absorption by certain group against another. Fraction of female workers follows different pattern too. In non-production group, fraction of female workers follows inverse U curve-a positive impact in the beginning that is followed by a gradual decrease. In contrast, in production group, fraction of female labor shows U pattern. There is a decrease of income in the beginning. However, when it reaches majority, the income is increasing. As female labors become the majority, their bargaining power to share rents increases.

Generally, fraction of export gives negative impact on wages. Such impact seems significant in production labor group while it is not significant in non-production labor one. From the three examined variables, it can be concluded that if the industry tend to give a lower wages (give a wage discount) tend be allocated to production workers only.

CONCLUSION

In general, the basic of comparative advantage industries in Indonesia base on lowering wages. It shown by wage discount tendency in majority especially food and textile industries which obligate about 63 percent of manufacturing labor. Especially textile industries which contribute 33 percent export and labor's share. The second regression that examine the impact of industry characteristics on wages concluded below. Although the country has labor surplus economy, low participation, highly unemployment and highly informal sector, the analysis still shows that market rents are shared to labors. Logically, the elasticity measuring the tendency are lower than that comparing to developed countries which relatively face labor scare.

Production-non production groups have different wage determinants based on the sign and the magnitude of explanation variables and statistical test. The different impact of size, export, and female fraction variables can be concluded as if the industry's policy results in wage discount, it tends to be allocated by cutting the production worker wages only. It

mean that, the wage gap of managerial or white collar group between high and low paying industries tend to narrow.

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REFERENCE

Akerlof, G. A. & J. L. Yellen. 1988. Fairness and unemployment. *American Economic Review* 78(2): 44-49.

Allen, S. G. 1995. Updated notes on the interindustry wage structure, 1890-1990. *Industrial and Labor Relations Review* 48(2): 305-321.

Blanchflower, D. G., A. J. Oswald & P. Sanfey. 1996. Wages, profit and rent sharing. *Quarterly Journal of Economics* CXI(I): 227-251.

Booth, A. L. 1995. *The Economics of the Trade Union.* Cambridge University Press. Cambridge.

Chang, A. O. & P. W. Miller. 1996. The Inter-Industri Wage Structure: Evidence from the 1991 Australian Census. *ABL* 22(1): 28-48.

Christofides L. N. & A. J. Oswald. 1992. Real wage determination and rent-sharing in collective bargaining agreement. *Quarterly Journal of Economics* 107(3): 985-1002.

Derks, A. 2000. *Combating Trafficking in South-East Asia. A Review of Policy and Programme Response.* International Organization for Migration, Migration Research Series Vol. 02.

Dickens, W. T. & L. F. Katz. 1987. Inter-industry wage differences and industry characteristics. Dalam K. Lang dan J. S. Leonard (eds.), *Unemployment and the Structure of Labor Markets.* Basil Blackwell. Inc., New York.

Doms, M., T. Dunne & K. R. Troske. 1997. Workers, wages and technology. *The Quarterly Journal of Economics* 112(1): 253-190.

Fields, J. & E. N. Wolff. 1995. Interindustry wage differentials and gender wage gap. *Industrial and Labor Relations Review* 49(1): 105-120.

Gujarati, D. N. 1995. *Basic Econometric.* 3rd ed. New York: McGraw-Hill, Inc.

Heywood, J. S. 1986. Labor quality and the concentration-earnings hypothesis. *The Review of Economics and Statistics* 68(2): 342-358.

Kennedy P. 1992. *A Guide to Econometrics.* 3rd Eds. Cambridge: The MIT Press.

Krueger, A. B. 1988. Efficiency wages and inter-industry structure. *Econometrica* 56(2): 259-293.

Krueger, A. B. & L. H. Summers. 1987. Reflection on the inter-industry wage structure. Dalam K. Lang & J. S. Leonard (eds.), *Unemployment and the Structure of Labor Market*. New York: Basil Blackwell Inc.

Lee, B. J. 1994. Determination of Inter-Industry Wage Differential: A Case of the Korean Labor Market. Ph.D. Dissertation University of Hawaii.

Leibenstein, H. 1987. The theory of underemployment in densely populated backward areas. Dalam G. A. Akerlof & J. L. Yellen (eds.). *Efficiency Wage Models of the Labor Market*. Cambridge: Cambridge University Press.

Mantra, I. B. 2000. Indonesian Labour Mobility to Malaysia. Asian Pacific Research Migration Network, University Of Wollongong Northfields Avenue, Wollongong, Australia.

McCafferty, S. 1990. *Macroeconomics Theory*. New York: Harper & Row Pub.

Pugel, T. A. 1980. Profitability, concentration and the interindustry variation in wages. *The Review of Economics and Statistics* 62(2): 248-253.

Rebitzer, B. J. & L. J. Taylor. 1995. Efficiency wages and employment rents: The employer-size wage effect in the job market for lawyers. *Journal of Labor Economics* 13(4): 679-708.

Slichter, S. H. 1950. Notes on the structure of wages. *The Review of Economics and Statistics* 32(1): 80-91.

Snowdon, B., H. Vane & P. Wynarczyk. 1995. *A Modern Guide to Macroeconomics*. Vermont: Edward Elgar.

Teal, F. 1996. The size and source of economic rent in a developing country manufacturing labor market. *The Economic Journal* 106: 963-976.

Thomas, R. L. 1997. *Modern Econometrics*. England: Addison-Wesley, Harlow.

Williams, R. M & R. E. Kenison. 1996. The way we were: Discrimination, competition, and inter-industry wage differentials in 1970. *Review of Radical Political Economics* 28(2): 1-32.

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