

# **Skill Differentials and Wage Inequality: A Study of the Indonesian Labour Market**

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- Study background
- Income inequality in Indonesia
- Wages inequality
- Wages inequality and skill premium
- Empirical Model and Data
- Analysis and discussion
- Conclusion

# Study Background

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- There has been considerable discussion in a wide range of countries in recent years about the possible effects of a widening income distribution on economic growth and social cohesion.
- It is feared that the concentration of income and wealth in a relatively small proportion of the population may have long term negative effects on society.
- Today's seminar will focus on an important component of the distribution of income; the distribution of earnings from employment.
- Earnings come from employment while income is a broader concept and includes a wide range of sources - in-kind goods and services, rent, dividend and transfer payments from the government.

# Study Background

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- Possible benefits from a wider earnings distribution
  - Reward for investment in education.
- Possible costs of a wider earnings distribution-
  - Some workers get stuck in low paid jobs
  - Low paid jobs workers do not have the capacity to invest in skills
  - Society may become polarised into the 'haves' and 'have nots'

- Wage inequality (Juhn et al, 1993; Piketty, 2015)
  - The main contribution of income inequality
  - Wage inequality due to human capital differences → endowments and capacities
  - Supply and demand of skilled vs. unskilled labour
  - Skill-biased technological change (globalization)
  - The supply of workers is determined by human capital investment (skill).
  - The elasticity of human capital investment is high. A lower cost of investment and higher returns, increases incentives to invest in human capital.
  - Segregation of workers with different skill levels may entrench wage inequality.

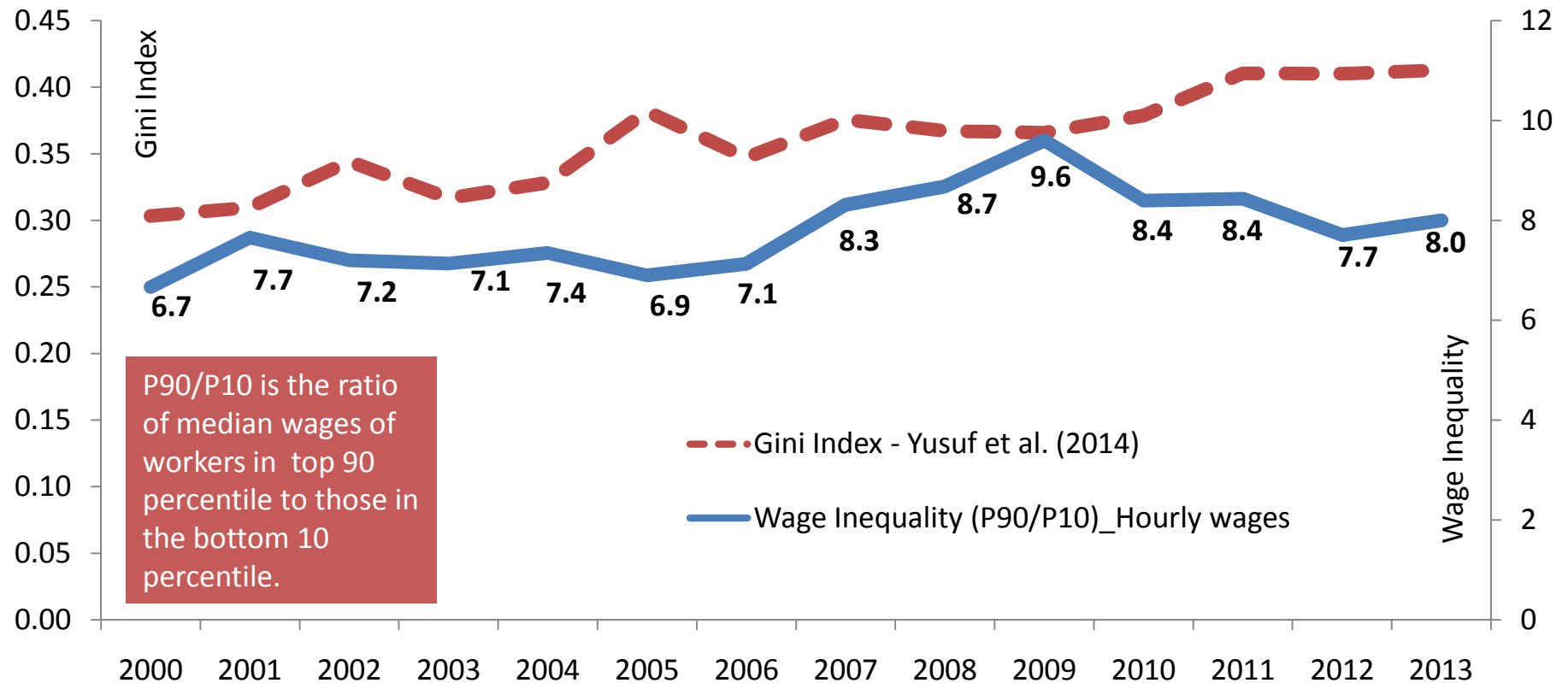
- Demand side matters, which corresponds to investment in specific technological change, industry mix (Krusell et al. 2000; Acemoglu, 2002; 2003; He and Liu, 2008; He, 2012 and Piketty, 2015)
- Supply side, i.e. demographic change which is then reflected in the composition of the labour supply, such as increasing years of education or simply a change in age structure (Blau and Kahn, 1996, 2001; He, 2012; Leuven et al. 2006)

- Purnastuti, Miller and Salim (2013): return on education declined between 1993 and 2007-2008 but this did not apply to the return from the university degree which rose over the period
- Lee and Wie (2013; 2015): suggested that there was skill premium in the Indonesian labor market over the period 2003-2009, enjoyed by the most skilled workers with a university degree. By using the manufacturing sector data, the study indicates that there is link between skill premium and wage inequality.

# Wage Inequality in Indonesia

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- Wage inequality (Juhn et al, 1993; Piketty, 2015)
  - The main contribution of income inequality is wage inequality (Piketty, 2015).
  - The Gini Index and wage inequality index (P90/P10) move in the same direction.
  - By using the wages ratio of P90/P10, on average the wages inequality in Indonesia increases from 6.7 in 2000 to 9.6 in 2009 and 8.0 in 2013.



Source: Sakernas Data 2000-2013, Provincial Level Dataset (Yearly average of wage inequality of all provinces)



## Research Questions:

1. What are the determinants of skill premium across regions in Indonesia?
2. Were higher skill differentials associated with higher wage inequality across regions?

## Objectives

Investigating the skill differential across regions in Indonesia over the period 2007 to 2013 and its association with wage inequality.



These include earnings differentials between those who only have a primary school education and further educational qualifications, especially the tertiary educated.

# REGIONAL DEVELOPMENT AREA DATASET

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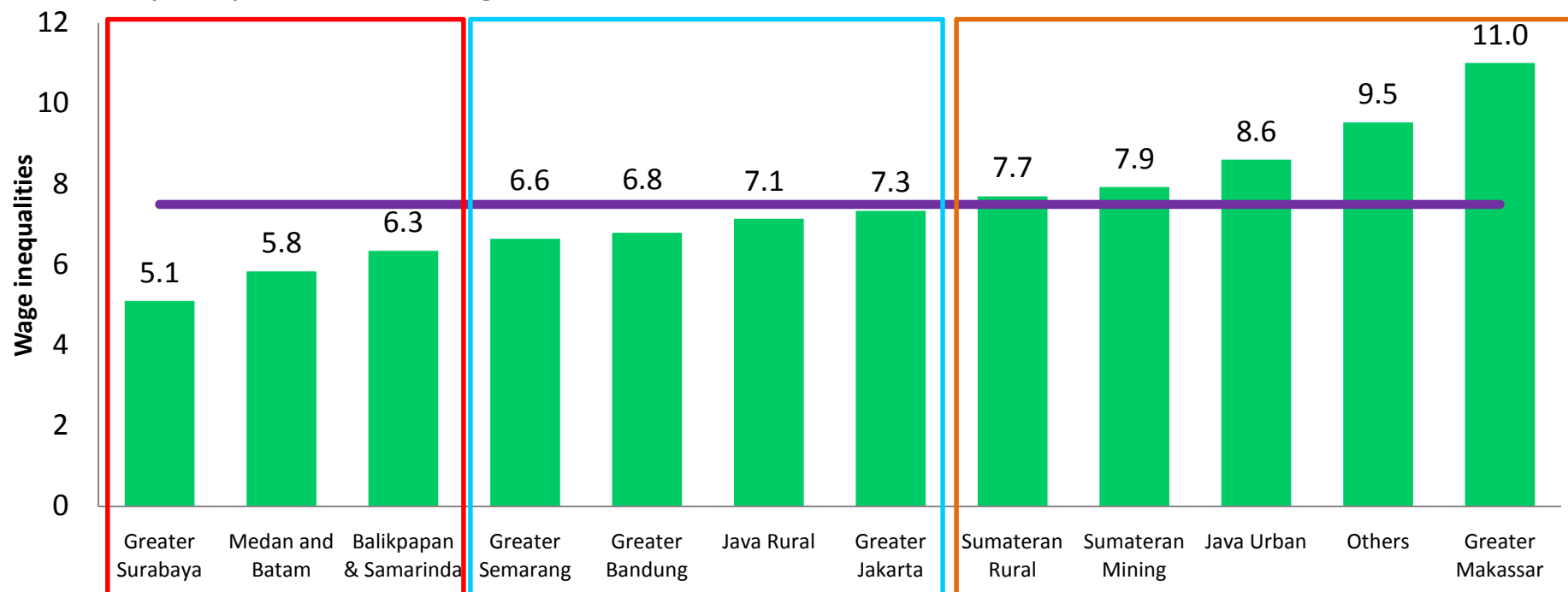
Code	Regional Development	Districts	Classification
1	Greater Jakarta	Central Jakarta, West Jakarta, East Jakarta, South Jakarta, North Jakarta, Bogor, Depok, Tangerang, Bekasi	Modern-based
2	Greater Bandung	Bandung Municipality, Bandung Regency, West Bandung Regency, Cimahi, East Bogor Regency and Purwarkarta Regency	Modern-based
3	Greater Semarang	Semarang Municipality and Semarang Regency, Salatiga, Kendal, Grobogan Regency, and Demak Regency	Modern-based
4	Greater Surabaya	Surabaya Municipality, Gresik Regency and Sidoarjo Regency	Modern-based
5	Java urban	Rest of Municipality in Java	Modern-based
6	Java rural	Rest of Regency in Java	Traditional-based
7	Medan & Batam	Medan and Batam	Modern-based
8	Sumateran mining	Pekanbaru and Dumai	Resource-based
9	Sumateran Rural	Rest of Sumateran	Traditional-based
10	Balikpapan & Samarinda	Balikpapan and Samarinda	Resource- based
11	Greater Makassar	Makassar, Takalar Regency, Gowa Regency, Maros Regency of South Sulawesi	Modern-based
12	Rest of regions	Rest of regions that are not coded as 1-11	Traditional-based

- 2007 onwards, BPS increased the number of observation for SAKERNAS.
- The sample is representative at Distric level, thus this is enable us to classify the regions into development area to capture the regional characteristic.

# WAGES INEQUALITY ACROSS REGIONS

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- Wages inequality varied across regions.
- Between 2007 and 2013, on average wages inequality was higher in rural Sumatera, Sumateran mining, urban Java, most of rural Indonesian regions (coded as others) and Greater Makassar.
- The level of wages inequality in Greater Semarang , Greater Bandung, and Java rural and Greater Jakarta was similar to the average of Indonesia.
- Finally, Greater Surabaya, Medan and Batam, Balikpapan and Samarinda had lower wages inequality than others regions in Indonesia.

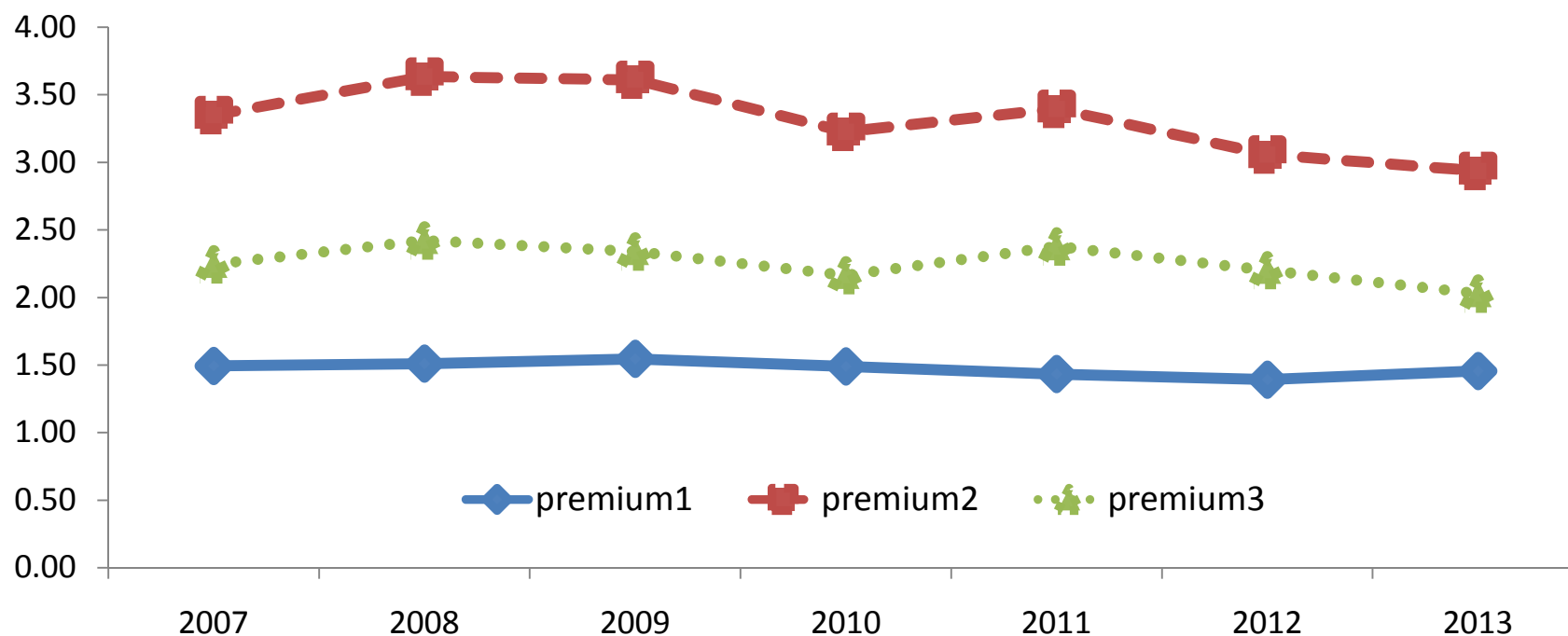


Source: Sakernas Data 2007-2013, an average wages inequality for each regional development area. Purple line is the national average (means) wage inequality between 2007-2013 . The means is 7.49

# Skill Premium Across Times

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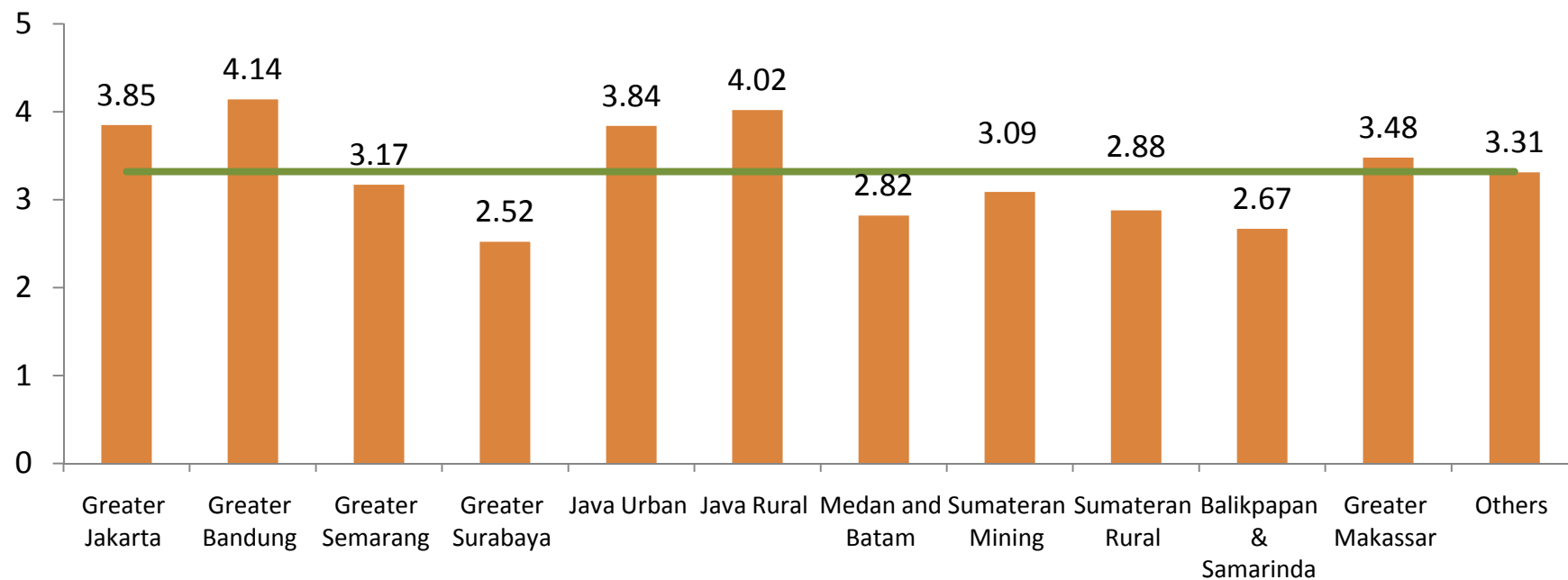
- The earnings gap between tertiary educated to the unskilled workers is the highest.
- On average, between 2007 and 2013, the skill premium was 3.32 meaning that the tertiary educated workers earn 3.32 times the unskilled ones.
- The premium of workers with senior high school/ Diploma I/ Diploma II to unskilled workers is 1.47.



Premium1 is the ratio of median wages of workers with Senior High School/DI/DII to workers with Primary school and below.  
Premium2 is the ratio of median wages of workers with Tertiary degree (DIII/S1/S2/S3) to workers with Primary school and below.  
Premium3 is the ratio of median wages of workers with Tertiary degree (DIII/S1/S2/S3) to workers with Senior High School/DI/DII.

# Skill Premium – Regional Development Area

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*Premium2 is the ratio of median wages of workers with Tertiary degree (DIII/S1/S2/S3) to workers with Primary school and below.*

*The green line is the the national average of skill premium 2 between 2007-2013 . The means is 3.32*

## Managing endogeneity issue between wage inequality and skill premium

### The Determinants of Skill premium


$$Premium_{itj} = \beta_0 + \beta_1.Female_{itj} + \beta_2.Age_{itj} + \beta_3.Tertiary_{itj} + \beta_4.Casual_{itj} + \varepsilon_{itj}$$

## Instrumental Variable Approach to manage omitting Variable Bias

### Skill premium and Wage Inequalities

Suppose a true model is


$$Inequality_{i,t} = \alpha_0 + \alpha_1.Premium_{i,t} + \alpha_2.Managerial_{i,t} + \alpha_3.Tertiary_{i,t} + \alpha_4.Female + \alpha_5.z_{i,t} + e_{i,t}$$

$$\text{where, } z_{i,t} = \alpha_0 + \alpha_1.Age_{i,t} + \alpha_2.Casual_{i,t} + u_{i,t}$$

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If we omit  $z_{i,t}$ , then our model as below:

$$Inequality_{i,t} = \alpha_0 + \alpha_1.Premium_{i,t} + \alpha_2.Managerial_{i,t} + \alpha_3.Tertiary_{i,t} + \alpha_4.Female_{i,t} + e_{i,t}$$

$$\text{where, } e_{i,t} = \alpha_3.z_{i,t} + u_{i,t}$$

# Description of Variables

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Variable	Definition
Inequality	Wages inequality measured by ratio of P90/ P10
Premium 2	Median wages of workers with tertiary degree (DIII&above) to median wages of workers graduated from primary school and below.
Managerial	The propostion of workers with managerial level to total workers
Tertiary	The proportion of workers with tertiary education to total workers
Female	The proportion of females workers to total workers
Age	The proportion of workers aged 30 and above to total workers
Casual	The proportion of casual workers to total workers
i	Regional development area
t	Year

- Fixed-effect panel data
- National Labour Force Surve (Sakernas): all workers (excluded self-employee); worked in the past 1 week

# **RESULT & DISCUSSION**



# Descriptive Statistics

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Variable	Obs	Mean	Std. Dev.	Min	Max
Premium 2	84	3.32	0.64	2.1	4.73
Managerial	84	0.14	0.03	0.08	0.23
Tertiary	84	0.16	0.05	0.07	0.31
Female	84	0.34	0.05	0.26	0.54
Age	84	0.65	0.06	0.41	0.78
Casual	84	0.16	0.11	0.02	0.46

# Pair-wise Correlation

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	Inequality	Premium 2	Female	Age	Tertiary
<b>Premium 2</b>	0.40* (0.00)				
<b>Female</b>	-0.08 (0.45)	0.14 (0.19)			
<b>Age</b>	0.02 (0.84)	0.24* (0.027)	-0.05 (0.63)		
<b>Tertiary</b>	0.30* (0.005)	-0.27* (0.01)	-0.12 (0.28)	-0.38* (0.00)	
<b>Casual</b>	0.10 (0.36)	0.36* (0.00)	-0.04 (0.70)	0.50* (0.00)	-0.69* (0.00)

*Those in the brackets are the significance level of the correlation coefficients.*

# The Determinants of Skill Premium– Development Area

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Premium 2	Fixed-Effect (FE) Coef.	Pooled Least Square (OLS) Coef.	Premium 2 Regional Development Area (Jakarta as a base)	Pooled Least Square (OLS) Coef.
Female	3.75** (1.33)	3.75** (1.27)	Bandung	-0.33 (0.37)
Age	0.99 (1.52)	0.99 (1.17)	Semarang	-1.78*** (0.36)
Tertiary	-2.19* (1.01)	-2.20* (1.64)	Surabaya	-1.59*** (0.21)
Casual	3.89* (1.93)	3.90* (1.67)	Jawa urban	-0.34 (0.21)
_cons	1.13 (1.05)	2.10 (0.87)	Jawa rural	-1.53*** (0.58)
			Medan Batam	-1.17*** (0.18)
			Sumateran Mining	-0.57*** (0.18)
			Sumateran Rural	-1.72*** (0.32)
			Balikpapan and Samarinda	-0.99*** (0.26)
			Makassar	-0.47 (0.29)
			Others	-1.18*** (0.30)

# Determinants of Skill Premium

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- The proportions of females, tertiary graduates and casual employees in the region has a significant effect on the skill differential.
- The earnings gap within female workers is higher than their male counterparts because the distribution of female workers based on their education level is skewed to the two extreme points.
- There is quite high proportion of unskilled female workers who earn lower than their male counterpart. On the other hand, earnings of skilled female workers is comparable with their male counterparts. This explain a wide earnings gap within female workers.
- In addition, the proportion of workers with tertiary education has negative influence on skill premium. While, the proportion of casual workers has positive impact on skill premium.
- Holding everything else constant, the skill differential is larger in Greater Jakarta than in the other regions.

# Skill Differential and Wage Inequality

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## First stage – Fixed Effect Instrumental Variable

Premium2	Coef.	Std. Err.	t	P> t
Tertiary	-3.31	1.93	-1.72	0.090
Managerial	6.30	2.68	2.35	0.022
Female	4.06	1.36	2.99	0.004
Age	1.33	1.19	1.12	0.267
Casual	3.54	1.61	2.20	0.031
_cons	.15	1.14	0.13	0.894
sigma_u	.61			
sigma_e	.34			
Rho	.76			
R-sq within	.3008			
F(5,67)	5.76			
	(0.0002)			
corr(u_i, Xb)	-0.4780			
F test that all u_i=0	F(11, 67) = 16.99	Prob > F = 0.000		
Obs. Number	84			
Groups	12			

# Skill Differential and Wage Inequality

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## Second stage – Fixed Effect Instrumental Variable

Inequality	Coef.	Std. Err.	z	P> z
Premium2	1.82	.98	1.86	0.063
Tertiary	-1.07	6.61	-0.16	0.871
Managerial	15.44	9.60	1.61	0.108
Female	-3.26	5.10	-0.64	0.522
_cons	.60	2.77	0.22	0.824
sigma_u	1.17			
Sigma_e	.93			
Rho	.61			
R-sq within	0.23			
Wald chi2 (4)	5,507.6			
	(0.00)			
corr(u_i, Xb)	0.08			
F test that all u_i=0	F(11, 68) =5.47	Prob > F = 0.0000		
Obs. Number	84			
Groups	12			
Instrumental variables: Age, Casual				

- Determinants of skill premium in Indonesia are proportion of female workers, proportion of casual workers and proportion of workers with tertiary degree.
- Regions with a relatively high proportion of tertiary graduates tended to have a lower skill differential. Increasing the supply of tertiary graduates in regions with a high skill differential seems likely to reduce the size of that differential.
- The regions with a relatively large proportion of unskilled workers experienced a high skill differential.

- The results show that the higher the skill differential, the higher the wage inequality in a region. The regions with the largest skill differentials had the highest wage inequality.
- The investment in human capital is still rewarding showing by the skill premium.
- Policies need to create more opportunities for further education to reduce the skill differential and wage inequality in these regions.
- Policy implications:
  - Human capital investment and widening access for higher education.



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