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Determinants of gender skill differentials in Indonesia: Does regional labour market matter?

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Background and motivation

- The skill differential (skill premium) is defined as the ratio of the earnings of skilled labour to the earnings of unskilled labour and has been discussed rigorously to measure the returns to education in the labour market.
- Our previous work has found a limited but positive effect of female participation on the skill premium in the Indonesian labour market.
- This result may reflect any unique experience that females have in the labour market such as access to employment in the primary labour market, and proposed an avenue for further research.

Background and motivation

- The proportion of female workers with primary education or lower has been higher than male workers despite the proportion of each declining over time.
- The proportion of female workers who have completed tertiary education is also higher than male workers.
- Skill premium for females $>$ than skill premium for males particularly based on the wage gap between those who have tertiary education and primary education or lower

Aims

- To examine factors underlying the differential in earnings between females and males in the Indonesian labour market
- To investigate whether regional labour market plays a role in determining skill differentials across gender.
- These are our preliminary results

Research Questions

- First, do the determinants of skill differentials in Indonesia differ across gender?
- Second, what is the role of the regional labour market in explaining female and male skill differentials?

Research contributions

- There has been limited literature in the field. Although unavoidable, most discussions focused much on the issue of the gender wage gap, but not the gap within each gender itself.
- We take into account the potential that male and female labour markets are separated. Thus, the skill differential would then reflect the demand and supply conditions in each region and for each gender.
- We incorporate regional development areas in three broad categories: modern-based, resource-based and traditional-based, aggregated from district level data to examine their impacts on the skill differentials for each gender.
- Investigating this issue at the regional level is also important as regional disparity has been argued as one of the key drivers of increasing inequality in this country.

Regional development area classification

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 and Batam	Medan and Batam	Modern-based
8	Sumateran mining	Pekanbaru, Natuna and Dumai	Resource-based
9	Sumateran Rural	Rest of Sumateran	Traditional-based
10	Balikpapan and Samarinda	Balikpapan and Samarinda	Resource-based
11	Greater Makassar	Makassar, Takalar Regency, Gowa Regency, Maros Regency of South Sulawesi	Modern-based
12	Others	Rest of regions that are not coded as 1-11	Traditional-based

Modifying Manning (1998), a geographical classification based on the structure of regional product and employment is used.

Means of skill premium across regional development area and gender

Area	Skill premium (1) the ratio of median wages of workers with Tertiary Degree (DIII/S1/S2/S3) to workers with Primary School or below		Skill premium (2) the ratio of median wages of workers with Tertiary Degree (DIII/S1/S2/S3) to workers with Senior High School Education included DI/DII	
	Male	Female	Male	Female
Greater Jakarta	3.51	4.72	2.23	2.07
Greater Bandung	4.10	5.16	2.49	2.29
Greater Semarang	3.12	3.81	2.53	2.12
Greater Surabaya	2.39	3.09	2.01	1.87
Java Urban	3.74	4.14	2.83	2.68
Java Rural	3.95	4.63	2.76	2.75
Medan and Batam	2.72	3.33	2.23	1.93
Sumateran Mining	3.05	4.02	2.34	2.38
Sumateran Rural	2.90	3.40	2.22	2.19
Balikpapan&Samarinda	2.75	3.52	1.99	2.03
Greater Makassar	3.48	4.84	2.62	2.61
Others	3.28	4.84	2.09	2.07
TOTAL	3.25	4.04	2.36	2.25

The skill differential may differ between males and females for a number of reasons

- Occupational segregation may crowd females into a limited range of occupations
 - proportion of females working in mining/ construction/ transportation and utilities is much lower than males.
- Industries or occupations where there are substantial compensating differentials which may favour a certain gender.
- The gender labour markets might not be segregated at all skill levels; for example, male and female university graduates may compete in the same labour market
 - high proportion of females in modern services
- The mix of field of qualification may differ between males and females such that males have more vocational qualifications such as engineering and medicine and females have more general university qualifications such as an art degree.

The skill differential may differ between males and females for a number of reasons

- Women may work shorter hours in paid employment because of their unpaid work and so, their choice of employment may be circumscribed
- Women may face a glass ceiling and have limited opportunities for employment at high levels in organisations.
- There may be systemic discrimination against women so that women doing the same job as men are paid a lower wage.

Industrial segregation (SAKERNAS 2007 and 2013)

	2007		2013	
	Males (%)	Females (%)	Males (%)	Females (%)
Agriculture	63	37	64	36
Manufacture	58	42	60	40
Mining	88	12	92	8
Modern services	61	39	59	41
Utilities	88	12	87	13
Construction	97	3	97	3
Trade, restaurant and accommodation	50	50	49	51
Transportation, communication and storage	94	6	93	7
Other services	58	42	55	45

Female Labour Participation

Industrial segregation – sub sector data

2013

Sub - sector	Number of workers	Proportion of the total female workers in the sub sector
Food and beverages manufacture	1,140,022	56%
Tobacco manufacture	393,820	71%
Textile manufacture	1,490,347	61%
Plastic manufacture	122,143	60%
Retail Trade services	6,898,495	54%
Accommodation services	2,022,333	56%
Education – Elementary level	1,468,458	56%
Personal services – domestic helper	1,434,560	76%

Data and Methodology

- Data is based on the Indonesia Labour Survey collected by the Indonesia Bureau of Statistics (SAKERNAS)
- Fixed effect of panel data is employed to estimate the determinants of skill premium between 2007 and 2013 across regional development areas.
- Dependent variables:
 - Premium 1: the ratio of median wages of workers with Tertiary Degree (DIII/S1/S2/S3) to workers with Primary School or below
 - Premium 2: the ratio of median wages of workers with Tertiary Degree (DIII/S1/S2/S3) to workers with Senior High School Education included DI/DII
- The regressions focus on the correlations between chosen demand and supply characteristics in the regional labour markets rather than attempting to identify a full demand and supply model.

Data and Methodology

- Independent variables:
 - Supply of labour: the proportion of workers with tertiary degree (tertiary), the proportion of female workers (female) and the proportion of casual workers (casual). We also include marital status to incorporate the potential impact of having family may have on the supply of labour.
 - Demand: by the proportion of workers employed in the manufacturing sector (manufacture), the mining sector (mining), the modern services, and those with managerial positions (managerial).
- The characteristics of each region is captured by regional fixed effects which refer to the 12 regional development areas as discussed earlier.
- Regional differences are captured by the constants in the equation (fixed effects).
- The base category is Greater Jakarta

Econometric Estimation

- Males

$$\begin{aligned} Premium_{1, 2, it} = & \beta_{10} + \beta_{11} . Tertiary_{it} + \beta_{12} . \\ & Female_{it} + \beta_{13} . Managerial_Male_{it} + \beta_{14} . \\ & Manufacture_Male_{it} + \beta_{15} . Mining_Male_{it} \\ & + \beta_{16} . Casual_Male_{it} + \beta_{17} . Married_Male_{it} \\ & + \beta_{18} . Modern_Services_Male_{it} + \varepsilon_{it} \end{aligned}$$

- Females

$$\begin{aligned} Premium_{1, 2, it} = & \beta_{10} + \beta_{11} . Tertiary_{it} + \beta_{12} . Female_{it} \\ & + \beta_{13} . Managerial_Female_{it} + \beta_{14} . \\ & Manufacture_Female_{it} + \beta_{15} . Mining_Female_{it} + \beta_{16} . \\ & Casual_Female_{it} + \beta_{17} . Married_Female_{it} + \\ & \beta_{18} . Modern_Services_Female_{it} + \varepsilon_{it} \end{aligned}$$

- In order to manage the risk of reverse causality between education and the skill premium and omitted variables bias, this study employs 2SLS Fixed Effects (FE) using lag of endogenous variable of tertiary as an instrumental variable

Findings: Skill premium 1

	Males		Females	
	Coeff.	Sig.	Coeff.	Sig.
tertiary	-31.55	**	-14.55	
managerial	7.43		-5.94	
manufacture	-0.03		-0.01	
mining	0.20	*	0.60	
casual	2.26		13.27	*
female	15.06	***	-5.34	
married	-0.07	*	0.02	
modern_services	0.07		0.11	
<i>Reg development (based: Greater Jakarta)</i>				
Greater Bandung	-0.47		-1.07	
Greater Semarang	-3.27	**	-1.55	
Greater Surabaya	-1.81	***	-1.73	***
Java Urban	-1.11	**	-0.09	
Java Rural	-2.69		-1.93	
Medan and Batam	-1.34	***	-1.33	***
Sumateran Mining	-1.18	*	-1.47	
Sumateran Rural	-3.71	***	-2.23	
Balikpapan & Samarinda	-2.63	***	-2.48	**
Greater Makassar	-1.20	**	-0.22	
Others	-4.36	***	-1.75	

Note: except for tertiary, females and regional development areas, other explanatory variables are gender specific, males in male equation and females in female equation

Findings: Skill premium 2

	Males		Females	
	Coeff.	Sig.	Coeff.	Sig.
tertiary	-15.69	*	-24.67	**
managerial	2.27		-7.73	
manufacture	-0.02		-0.04	*
mining	0.09		0.39	
casual	4.72		1.27	
female	9.86	***	-2.15	
married	0.01		0.02	
modern_services	0.04		0.17	*
<i>Reg development (based: Greater Jakarta)</i>				
Greater Bandung	-0.77		-0.72	
Greater Semarang	-1.99	**	-0.84	
Greater Surabaya	-0.80	**	-0.36	
Java Urban	-0.30		0.91	*
Java Rural	-2.08	*	-0.89	
Medan and Batam	-0.11		-0.08	
Sumateran Mining	-0.41		-1.06	*
Sumateran Rural	-1.92	**	-1.20	
Balikpapan & Samarinda	-1.08	*	-1.58	**
Greater Makassar	-0.43		-0.01	
Others	-2.49	***	-1.24	

Note: except for tertiary, females and regional development areas, other explanatory variables are gender specific: males in male equation and females in female equation

Discussions

- There are similarities and differences in terms of determinants of the skill differential for females and males
- The coefficients of tertiary workers are robust for males and significant for female in premium2
- The results show that demand of labour in terms of composition of workers across sectors is the driver of the skill differentials (industrial segregation).
 - Mining influences male skill differential while manufacturing sector and modern services influence female skill differential.
- Greater female labour supply increased the skill premium among males, so females seem to be closer substitutes for low-earning males (Acemoglu et al., 2004).
- Nevertheless, female workers may also a substitute for skilled jobs in the modern services comprised of communication, finance and professions
- Findings are limited in the case for females.
- Casualisation is significant for female workers. This reflects the fact that there is high proportion of female workers in the informal sector (Cameron, 2015)

Discussions

- There is evidence that the regional labour market influences skill differentials but there are limited patterns.
 - Once these factors have been taken into account, the results show that the skill differential was largest in Jakarta (all the regional dummies have negative coefficients).
 - For skill premium 1, the regions of Greater Semarang, Medan & Batam (modern based regions) and Balikpapan & Samarinda (mining based) are significant for both females and males
 - For skill premium 2, coefficients of regional areas which are significant are different for females and males, which may indicate that regional labour market influences each gender differently.

Conclusions

- The skill differential differs between males and females
- There is evidence that male and female labour markets are separated in Indonesia, that industrial segregation across gender exists.
- Most of regional coefficients were negative compared to Greater Jakarta, although the coefficients were not always statistically significant, meaning there were not statistically different from Jakarta
- Our preliminary results show that both supply and demand factors including the regional labour market matter
- These results suggest that Indonesia does not function as one labour market but that there are significant differences in the returns to skill between regions, but findings are limited for the case of females.

Thank you

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