

Impact of Trading International and Competition Industry to Wage Gaps in Industry Manufacturing in Indonesia

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Abstract

This research analyzes the impact of international trade and industrial competition on the wage gap between skilled and unskilled workers in Indonesia's manufacturing industry. The study uses firm-level panel data, specifically the Large and Medium Industry Statistics (IBS) from BPS and provincial minimum wage data from the Ministry of Manpower and Transmigration. Model modifications are made for different industrial groupings, namely general manufacturing, labor-intensive manufacturing, and capital-intensive manufacturing. The empirical analysis presented in this research shows that an increase in international trade contributes to a reduction in the wage gap between skilled and unskilled workers in Indonesia's manufacturing industry. However, increased industrial competition has the opposite effect. Additionally, this research conducts a comparative analysis of the impact of international trade and industrial competition on labor-intensive and capital-intensive industries.

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1. INTRODUCTION

Industry manufacture is sector holding industry role important for growth Indonesian economy . In the beginning 1990s , industry Indonesian manufacturing experienced high growth , so capable speed up Indonesia's transformation from economy agrarian become semi- industrialists . This matter as impact from policy *outward looking* 1985 which aims push industry oriented export . In the golden age Currently , Indonesia has become an exporting country product sufficient manufacturing significant in the world. However , in a crisis Asian financial 1997-1998, performance industry manufacture decline sharp and giving far reaching contribution more little on GDP growth (Figure 1).

Post Asian crisis , performance industry manufacture Not yet succeed back to its golden age . However after in 2010, industry manufacture start experience increase is due exists recovery global economy after crisis global economy 2009. Based on *Industrial Development Report* , Indonesian manufacturing experienced enhancement ranking Power competitive from 43 in 2009 to ranked 38th in 2017. However If Compared to countries in the ASEAN region , Indonesia is lagging behind Enough far below other countries . Where is Singapore is at far above with occupy ranked 12th, while Indonesia is only is narrowly above the Philippines in 4th position .

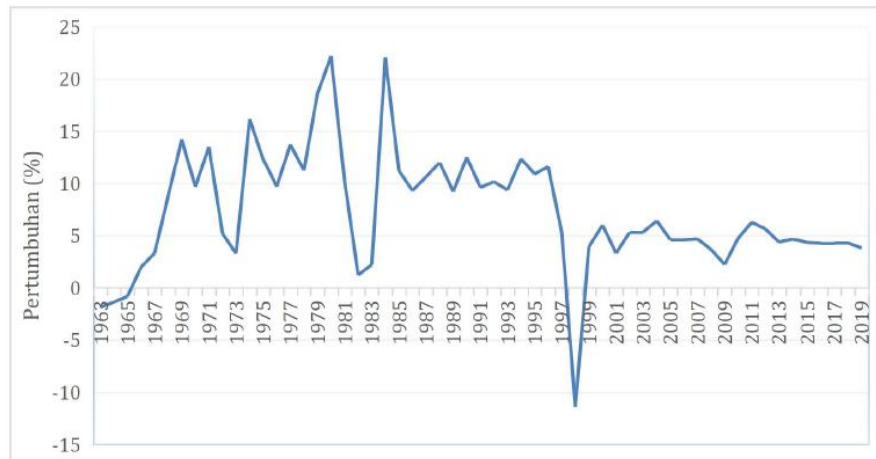


Figure 1. Growth mark plus Manufacturing (1963-2017)

Source : Calculations World Bank staff

Based on theory trading modern international in Hecksher Ohlin Samuelson's theorem (H–O–S), existence trading international can influence distribution wages . In the H–O–S theorem , that a country will do specialization production and exporting commodity factors the production relatively abundant and cheap . Then increase profits in the sector industry that does export , so can increase wages on factors production power Work .

A number of research that uses H–O–S context finds that enhancement trading international impact on inequality wages worker . Like research by Bo Chen (2016), found enhancement trading proxied international with export company impact on decline gap wages worker skilled and not skilled , in intensive industry worker No skilled in China. However research by Anwar and Sun (2012) found different results . That enhancement intensity export company precisely contribute to improvement gap wages skilled-no skilled in the industry Chinese manufacturing . There are differences impact from enhancement trading international to gap wages worker skilled and not skilled this , makes matter This interesting to be scrutinized more carry on .

along with increasing intensity trading internationally on the industry , visible exists change in conditions competition industry manufacture . Before period Asian crisis , trends concentration industry manufacture seen decrease . Where is the average weighted CR4 in 1975 was 55 % , then down to 44% in 1993 (Bird, 1999). However Then experience enhancement post 1997 Asian crisis , recorded in 2002 the CR4 figure was by 68%, then increase Again to 70% in 2012 (Damuri , 2017).

Changes in conditions competition industry this can also be done influence gap wages worker . A number of studies empirical find that increased competition industry own different impacts on inequality wages worker . Maria Guadalupe (2003), identifies that increasing competition industry as source from gap wages worker skilled and not skilled in England . Different results shown in research by Anwar and Sun (2012), where the increase market competition in fact contributed to the decline gap wages worker skilled-no skilled in industry Chinese manufacturing . There is a change in conditions competition industry manufacturing and not yet he explained impact to gap wages worker make matter This interesting For researched more carry on .

Study This will discuss impact from trading international and competitive industry to gap wages between worker skilled and not skilled in industry Indonesian manufacturing , as well in a way special see impact grouping industry that is congested labor and capital intensive . For objective study this , writer use approach that worker skilled is non-production workers and workers No skilled is worker production . This matter in accordance with study previously (Suryahadi et al (2001); Amiti and Cameron (2012)).

Research purposes This namely : (1) Analyze impact from trading international to gap wages worker skilled and not skilled in the industry manufacturing in Indonesia; (2) Analyze impact from competition industry to gap wages worker skilled and not skilled in the industry manufacturing in Indonesia; (3) Analyze comparison impact from intensity exports and competition industry to gap wages worker skilled and not skilled in manufacturing congested labor and capital intensive .

2. THEORETICAL REVIEW

2.1. Determinants of Wages

Following a number of theory about determinant wages . First , theory productivity marginal from neo- classical theory 19th century , stated that company will add power Work until product marginal power minimum work is the same with wages given (Sari, 2000). Second , theory compensation by Adam Smith in *The Wealth of Nations* , states that company must offer wages more tall For a job that doesn't pleasant To use interesting workers (Sari, 2000). Third , human capital theory by Schultz (1960) and Becker (1962), states that worker with skills and education more tall will get wages more tall Because increase productivity . Fourth , theory *Job-Matching* by Jovanovic (1979), states that There is correlation positive between wages and length of service , where only suitable worker with the job will be still work and earn wages more tall . Difference characteristics in determinant wages This cause gap wages between worker

2.2. Trading Theory International

Trading theory Modern internationalism was put forward by economists Swedes Eli Heckscher (1919) and Bertil Ohlin (1933), later interpreted by Samuelson (1948). This theory state that difference *opportunity costs* something product between countries due to differences factor production owned by each country. The H–O–S theorem explains that trading international increase wages real power work in the country that does export and specialization production , however No explain is worker skilled or No skilled people who benefit . Therefore that , research This will analyze impact trading international to gap wages worker skilled and not skilled in Indonesia, a developing country dominated by workers No skilled .

2.3. Relationship Theory Market Competition and Wages

Based on literature theoretically , Wälde and Weiß (2007) illustrate connection between market competition and wages with assumption competition *cournot* , where the company compete through amount of output. Increased competition cause company must maintain efficiency For still survive , incl do efficiency cost production with reduce amount power work on level wages real certain . However , theory This No explain is worker skilled or No reduced skills . Therefore that , research This will analyze impact competition industry to level wages worker skilled and not skilled in Indonesia.

3. PRIOR RESEARCH

3.1. Trading International and the Wage Gap

Bo Chen (2016), investigates impact from share export company to gap wages skilled and not skilled in industry manufacturing in China. Share export the company is measured with ratio from mark exports and total sales . Analysis carried out is level company with period time 2000-2007 . Results found is that gap wages in industry upstream more critical rather than downstream and in between share company export his more tall . Next , found that in intensive industries worker No skilled , increase in share export company contribute in lower gap wages worker skilled and not skilled .

Different results found in research by Anwar and Sun (2012), conducted analysis level companies in the industry manufacturing in China in 2000, 2003 and 2006. Research This use intensity export company as level trading international , namely the average intensity export companies in 4-digit industries . Analysis empirical served is that enhancement trading international has contribute to improvement gap wages skilled-no skilled in the industry Chinese manufacturing .

A number of study similar carried out in Indonesia, as was done by Surhayadi et al . (2001), who analyzed level company in industry manufacture before crisis Asian finance . Study This evaluate impact expansion exports and competition import to the energy market work in Indonesia. Research result show that enhancement expansion exports and competition import contribute to improvement request relatively For worker No skilled in the industry Indonesian manufacturing .

3.2.Competition and the Wage Gap

Research by Guadalupe (2003) examines gap wages in the UK using panel data from 1975 to 1999. Research This test hypothesis is increasing market competition increases gap wages between worker skilled and not skilled . Research result show that enhancement market competition creates company more tend employ worker skilled , which is the end increase gap wages between worker skilled and not skilled in more sectors competitive .

Research by Anwar and Sun (2012) shows different results . They using the Herfindahl Hirschman Index (HHI) for measure level market competition and take into account characteristics company like productivity workers , capital intensity , size company , age company , location company , and ownership status . Research result This show that enhancement Market competition contributed to the decline gap wages between worker skilled and not skilled .

3.3.Framework Think

Framework think in study This presented in Figure 2.

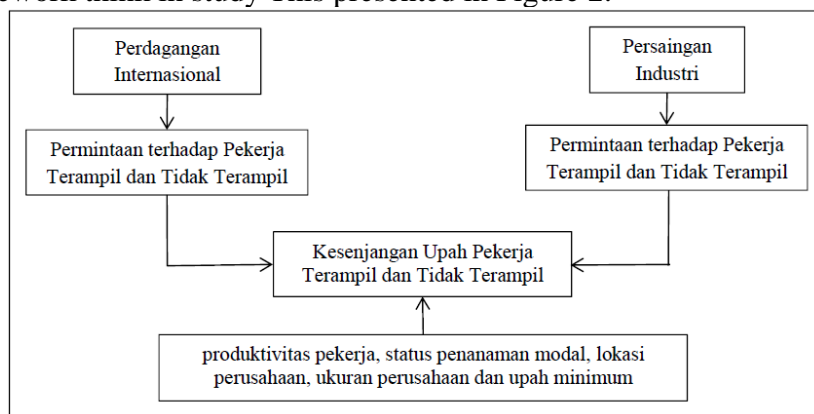


Figure 2. Framework Think Study

Source : Processed Data

4. METHOD

4.1.Data

Study This using statistical data Large and Medium Industries provided by the Indonesian Central Statistics Agency (BPS). This data form survey annual company with period observation for 8 years , that is from 2008 to 2015. Scale company industry currently has total power work 20-99 people, meanwhile scale industry big own more of 100 workers . In addition , Provincial Minimum Wage (UMP) data was obtained from the Indonesian Ministry of Manpower . Research Model modified based on grouping different industries , namely total industry , manufacturing congested works ,

and manufacturing capital intensive . Grouping This referring to the Minister of Industry Regulation No. 51/M-IND/PER/10/2013 concerning Definition , Limitations, and Classification manufacture congested work . Manufacture capital intensive includes sector industry besides congested works , while total industry covers all over double-digit industry on industry processing according to the 2015 KBLI.

4.2.Model Specifications

Model modifications were made with referring to the model built by Anwar and Sun (2012), the model used is in study This is :

$$wagegap_{it} = \beta_0 + \beta_1 (int_export)_{it} + \beta_2 (HHI)_{it} + 3 \beta_3 (labprod)_{it} + 4 \beta_4 (wage_min)_{it} + 5 \beta_5 (size)_{it} + \beta_6 (fdi_share)_{it} + \beta_7 (d_jawa)_{it}$$

Where:

- wage gap = gap wages company i at time t
- int_export = intensity export company i at time t
- HHI = industry HHI value i at time t
- Labprod = productivity worker company i at time t
- min_wage = average real minimum wage at time t
- size = size company i at time t
- fdi_share = percentage of fdi capital company i at time t
- d_jawa = dummy location company i at time t

4.3.Variable Hypothesis

Study This evaluate impact trading international and competitive industry to gap wages between worker skilled and not skilled in the sector manufacturing , as well consider other variables that can influence gap wages . Research hypothesis shown in Table 1, where sign positive show variable increase gap wages , marks negative show variable lower gap wages , and marks neutral show variable No influential to gap wages .

**Table 1
Variable Hypothesis**

Variable	Information	Hypothesis
int_export	intensity export	+/-/ neutral
IHL	competition industry	+/-/ neutral
Lab_prod	productivity worker	+
Wage_min	minimum wage	-
Size	size company	+/-
Fdi_share	percentage of company FDI	+
D_java	dummy location company	+/-

Source : Results of Empirical Studies

4.4.Estimation Method

Study This using panel data which is combination between row time (*time series*) with shell latitude (*cross section*). Election method Panel data estimation can be done in a way theoretical and *Hausman test*. If impact from disturbance nature random , then chosen method *random effect* . And if impact from interference is assumed own permanent influence , then chosen method *fixed effects* . If in a way theoretical impact from disturbance No can determined , then method *fixed effects* still used when data is used covers all over individual in population or only a number of individual , however No taken in a way random . On the contrary when the data is taken based on sample in a way random from a large population , then used method *random effect* . After chosen method estimated fit to the model, next assumption test is carried out consisting of

classics from the multicollinearity test , heteroscedasticity test , and autocorrelation test

5. RESULTS AND DISCUSSION

Panel data used is balanced panel data , i.e amount *cross section* such as amount panel data observations are The same . Model selection in panel data processing is carried out with test chow and Hausman tests , obtained results that the estimation model best is *fixed effects* . Then done testing assumption classic , results found is there is problem heteroscedasticity and autocorrelation in the model. So for remove problem that , is done *fixed effects* with *clustered standard error* . Regression results after done adjustment can see in Figure 3, Figure 4, and Figure 5.

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Fixed-effects (within) regression
Group variable: psid
Number of obs   =   122,072
Number of groups =   15,259

R-sq:
  within = 0.0170
  between = 0.0419
  overall = 0.0228
Obs per group:
  min = 8
  avg = 8.0
  max = 8

corr(u_i, Xb) = 0.0561
F(7,15258) = 185.29
Prob > F = 0.0000

(Std. Err. adjusted for 15,259 clusters in psid)

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wage_gap	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
int_ekspor	-.0009165	.0004146	-2.21	0.027	-.0017293	-.0001038
ln_HHI	-.0249841	.0112593	-2.22	0.027	-.0470536	-.0029146
ln_size	.0940863	.0102744	9.16	0.000	.0739472	.1142253
ln_labprod	-.1026717	.0119078	-8.62	0.000	-.1260125	-.079331
ln_upahmin	-1.069513	.0342996	-31.18	0.000	-1.136744	-1.002281
fdi_share	-.0013949	.0010606	-1.32	0.188	-.0034738	.0006841
d_jawa	.0203297	.2367626	0.09	0.932	-.4437534	.4844128
_cons	8.903119	.317731	28.02	0.000	8.280328	9.52591
sigma_u	1.1857006					
sigma_e	1.5983817					
rho	.35495805	(fraction of variance due to u_i)				

Figure 3. Total Industry Regression Results

Source : Stata Data Processing Results

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Fixed-effects (within) regression
Group variable: psid
Number of obs   =   74,376
Number of groups =    9,297

R-sq:
  within = 0.0161
  between = 0.0416
  overall = 0.0249
Obs per group:
  min = 8
  avg = 8.0
  max = 8

corr(u_i, Xb) = 0.0486
F(7,9296) = 112.38
Prob > F = 0.0000

(Std. Err. adjusted for 9,297 clusters in psid)

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wage_gap	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
int_ekspor	-.0006425	.000503	-1.28	0.201	-.0016285	.0003434
ln_HHI	-.0304205	.0172675	-1.76	0.078	-.0642686	.0034277
ln_labprod	-.1158935	.0149902	-7.73	0.000	-.1452777	-.0865094
ln_size	.1082752	.0130614	8.29	0.000	.0826719	.1338784
ln_upahmin	-.993644	.0457929	-21.70	0.000	-1.083408	-.9038798
d_jawa	-.2148697	.3501673	-0.61	0.539	-.9012744	.4715349
fdi_share	-.0005819	.0014184	-0.41	0.682	-.0033623	.0021985
_cons	8.395617	.4236329	19.82	0.000	7.565204	9.22603
sigma_u	1.1950217					
sigma_e	1.5867447					
rho	.36192004	(fraction of variance due to u_i)				

Figure 4. Regression Results Labor Intensive Industry

Source : Stata Data Processing Results

Fixed-effects (within) regression	Number of obs =	41,762
Group variable: psid	Number of groups =	5,966
R-sq:	Obs per group:	
within = 0.0108	min =	7
between = 0.0037	avg =	7.0
overall = 0.0068	max =	7
corr(u_i, Xb) = -0.0623	F(7,5965) =	37.75
	Prob > F =	0.0000

(Std. Err. adjusted for 5,966 clusters in psid)

wage_gap	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
int_ekspor	-.0023425	.0007846	-2.99	0.003	-.0038806 -.0008045
ln_HHI	-.0253567	.0171083	-1.48	0.138	-.0588951 .0081817
ln_labprod	-.0870429	.0213492	-4.08	0.000	-.128895 -.0451908
ln_upahmin	-1.070901	.0747844	-14.32	0.000	-1.217506 -.9242967
ln_size	.074541	.0181751	4.10	0.000	.0389113 .1101707
d_jawa	.3703634	.2645868	1.40	0.162	-.1483225 .8890492
fdi_share	-.0026298	.0017642	-1.49	0.136	-.0060882 .0008287
_cons	8.935595	.605014	14.77	0.000	7.749548 10.12164
sigma_u	1.2302896				
sigma_e	1.6866429				
rho	.34728814	(fraction of variance due to u_i)			

Figure 5. Regression Results Capital Intensive Industry

Source : Stata Data Processing Results

Follow the rules above are as follows will displayed discussion results estimation with *fixed effects* already *Best Linear Unbiased Estimator* in Table 2. Estimation use *fixed effects* carried out in model (1) , namely total industry , (2) solid labor and (3) capital intensive . Model variations were carried out with use natural logarithm (ln) on the HHI variable , size company , productivity workers and minimum wages . This matter done For equalize unit between variable , zoom out scale data and normalize data distribution . After doing it estimation can concluded that results estimation capable explained variables that influence inequality wages worker skilled and not skilled .

5.1. Analysis of Total Industry

Estimation results in model (1) for total industry show that variable intensity exports and *the Herfindahl Hirschman Index (HHI)* are influential significant to gap wages worker skilled and not skilled in the industry manufacture . Additionally , variables minimum wage , productivity workers , and size Companies also have an influence significant . Intensity export correlated negative with gap wages , with every 1% increase in intensity export lower gap wages of 0.0009%. This shows that enhancement trading international cause company employ more Lots worker No skilled , so lower gap wages . HHI is also correlated negative with gap wages , with every a 1% increase in HHI decreases gap wages of 0.02%, shows that competition more industry competitive increase gap wages Because company reduce worker skilled For efficiency costs , accordingly with study previously by Guadalupe (2003).

**Table 2
Model Estimation Results**

Variabel	(1) Total Industri	(2) Padat Karya	(3) Padat Modal
int_ekspor	-0.0009165** (0.0004146)	-0.0006425 (0.000503)	-0.0023425** (0.0007846)
ln_HHI	-0.0249841** (0.0112593)	-0.0304205* (0.0172675)	-0.0253567 (0.0171083)
ln_size	0.0940863*** (0.0102744)	0.1082752*** (0.0130614)	0.074541*** (0.0181751)
ln_labprod	-0.1026717*** (0.0119078)	-0.1158935*** (0.0149902)	-0.0870429*** (0.0213492)
ln_upahmin	-1.069513*** (0.0342996)	-0.993644*** (0.0457929)	-1.070901*** (0.0747844)
fdi_share	-0.0013949 (0.0010606)	-0.0005819 (0.0014184)	-0.0026298 (0.0017642)
d_jawa	0.0203297 (0.2367626)	-0.2148697 (0.3501673)	0.3703634 (0.2645868)
Observation	122,072	74,376	41,762
R-squared	0.0228	0.0249	0.0068

***signifikan P<0.01 **signifikan P<0.05 *signifikan P<0.1

Source : Stata Data Processing Results

Variable size company correlated positive with gap wages and significant at the level 99% confidence , with every 1% increase in size company increase gap wages of 0.09%. This shows that company big tend employ more Lots worker skilled with wages more high , so increase gap wages . Variable minimum wages are correlated negative and significant at level 99% confidence , where every 1% increase in minimum wage lowers gap wages of 1.06%, possibly Because workers in Indonesia have Power strong bargain in negotiations wages . Productivity workers are also influential significant with coefficient -0.1026717, meaning every 1% increase in productivity lower gap wages of 0.1%. Variables that don't influential significant to gap wages is percentage of company FDI and Java island dummy.

5.2. Analysis on manufacturing congested labor and capital intensive

On manufacturing congested works , variables intensity export No influential significant to gap wages worker skilled and not skillful , show that enhancement trading international cause company employ more Lots worker skilled and not skilled at the level wages certain without change gap wages . On the other hand , in manufacturing capital intensive , variable intensity export correlated negative and significant at level 95% confidence , with every 1% increase in intensity export lower gap wages of 0.002%. This shows that enhancement trading international cause company employ more Lots worker No skilled , so lower gap wages between worker skilled and not skilled , appropriate with study previously by Bo Chen (2016).

Comparison impact HHI variable against gap wages show results different in manufacturing congested labor and capital intensive . On manufacturing congested work , competition industry correlated negative with gap wages and significant at the level 90% confidence . Every a 1% increase in HHI decreases gap wages of 0.03%, that is the more competitive competition industry , gap wages the more big Because company reduce worker skilled For efficiency cost . This result in accordance with Guadalupe research (2003). On the other hand , in manufacturing capital intensive , increasing competition industry No influential significant to gap wages , shows that company reduce request to worker skilled nor No skilled without change gap wages .

In models (2) and (3), variable size company , productivity workers , and minimum wages have an effect significant to gap wages worker skilled and not skilled

, temporary the company's FDI percentage and the Java island dummy variable do not significant . Impact size company more big in manufacturing congested works , with every a 1% increase improves gap wages at 0.1%, compared to 0.07% in manufacturing capital intensive . Productivity workers also have impact more big in manufacturing congested works , with every a 1% increase decreases gap wages of 0.11%, compared to 0.08% in manufacturing capital intensive . On the contrary , impact minimum wage is more big in manufacturing capital intensive , with every a 1% increase decreases gap wages of 1.07%, compared to 0.99% in manufacturing congested work .

6. CLOSING

6.1. Conclusion

Study show that intensity export own connection negative with gap wages , that is enhancement trading international lower gap wages worker skilled and not skilled , appropriate with H–O–S theorem and Bo Chen (2016) study . On the contrary , competition industry (HHI more small) correlated positive with gap wages , in line with theory Wälde and Weiß (2007) and Guadalupe (2003). On manufacturing congested work , trade international No significant influence gap wages , while in capital intensive , trade international lower gap wages . Competition industry increase gap wages in manufacturing congested works , however No significantly capital intensive . Other variables are significant influence gap wages is productivity worker , size companies , and minimum wages , whereas percentage of FDI capital and location company No significant .

6.2. Recommendation Policy

Study find that enhancement trading international can lower gap wages worker skilled and not skilled in the industry manufacturing , especially in manufacturing capital intensive . Therefore that's the government should increase Power competitive industry For push export manufacture capital intensive . Increasing competition industry increase gap wages in manufacturing , especially in manufacturing congested work . For overcome this , the government need compensate gap Skills through incentive training work and push company re -skilling and up-skilling its workers . Remember difference impact on manufacturing congested labor and capital intensive , government need review repeat policy minimum wage , with consider type industry besides differences per province .

6.3. Limitations Study

Study This use approach worker production and non-production For describe gap wages between worker skilled , because That suggest that research next can use approach others , like level education . Study This use export size trading international , suggests that research next can use approach others , like import . Because there is data information is not complete statistical data Industry , causes study This have limited data, such as age data firm , capital intensity , and level education . So that study This No can do Lots variation in the research model .

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