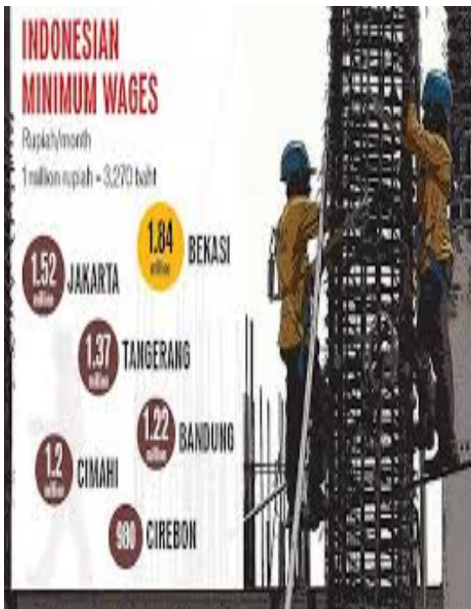


Minimum Wage, Informality and Economic Development

Case study for Indonesia

Jin Ho Kim

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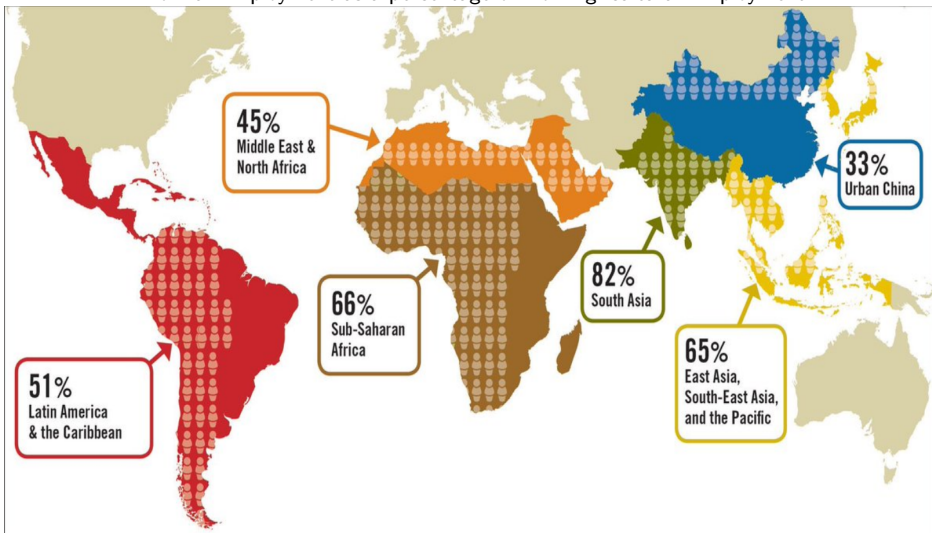
Research Question

- ▶ What is the
Can minimum wage policy reduce informal sector economic activity? If it does, through which mechanism?

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- ▶ What is the
Can minimum wage policy reduce informal sector economic activity? If it does, through which mechanism?
- ▶ Informal Economy: Any economic activity that are unregistered and do not pay taxes.
- ▶ In developing countries, the portion of the informal economy is significant.

Informal Employment as a percentage of Non-Agricultural Employment



Main Motivation

- ▶ The size of the informal sector does matter
 - ▶ Taxes, Inefficient allocation of resources in the economy, Unfair competition
- ▶ Available Policy intervention?
 - ▶ Reduce Taxation, Monitoring, enforcement, Reduce rigid labor market regulation such as Minimum Wage, entry cost/firing cost....
- ▶ In our paper, we focus on the impact of minimum wage on formal/informal sector economy
 - ▶ Minimum wage law is the single most widely used labor market policy in the developing countries
- ▶ No consensus in the existing literature (Empirics, Theory)
 - ▶ Different views on the characteristics on labor market, different estimation method

What we do

- ▶ We use IFLS data to document the features of informal sector economy and conduct regression analysis to study for the occupational shift between formal and informal economy.
- ▶ We use IS data to study the monopsonistic behavior of the manufacturing firms.
- ▶ We suggest the search model with wage posting that contains both formal and informal labor market characteristics.

What we find out: Minimum Wage hike in Indonesia

▶ 1. Main Results

- ▶ employment status change in response to minimum wage hike between informal sector and formal sector employee.
 - ▶ Induced sizable number of self-employed to sort into formal sector.
 - ▶ This result is driven by increased part-time worker in the formal sector.
- ▶ Strong Evidence for underpayment
 - ▶ employer's bargaining power against laborers.
 - ▶ monopsonistic competition among employers

Our Contribution

- ▶ Literature on formal/informal sector economy: Harris and Todaro (1970); Rauch (1991); De Soto (1989,2000); La Porta and Shleifer (2014); Rothenberg et al.(2016); Manning (2003, 2008, 2011); Brummond (2012); Naidu et al.(2016)

⇒Contribution

- ▶ Confirms the characteristics of the indonesian formal/informal sector economy
- ▶ Provide an evidence for monopsonistic behavior of firms.

Our Contribution

- ▶ Literature on minimum wage in Indonesia: Magruder(2014), Rama(2001), Atlantas and Cameron (2008), Comolla and Mello (2011), Capiro et al. (2012), Hohberg and Lay (2015)

⇒Contribution

- ▶ Empirical evidence for the impact of minimum wage on labor market (formal/informal).

Our Contribution

- ▶ Literature on theoretical model on formal/informal sector economy
 - ▶ Search Model: Mortensen and Pissarides(1994); Burdett and Mortensen(1998); Albrecht, Navarro, and Vroman(2009), Prado(2011); Meghir et al.(2015)
 - ▶ Heterogeneous firm Model: Ghironi Melitz (2005), Prado (2011), Ulyssea (2017)

⇒Contribution

- ▶ Propose a model that combines important insight of the existing literature on the nature of labor market in the formal and informal sector into the framework of search with monopsonistic competition developed by Burdett and Mortensen.

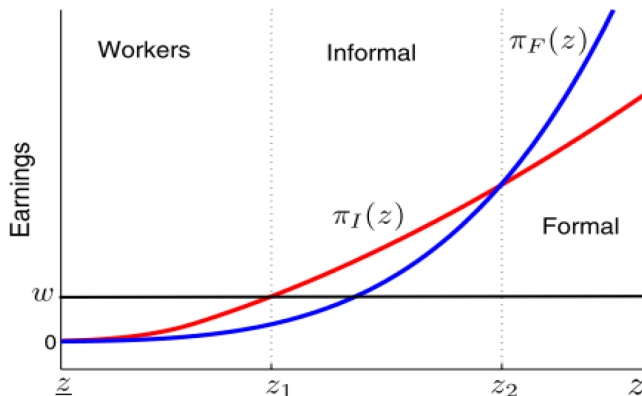
Outline

- ▶ **Theoretical Framework**
- ▶ Labor Market in Indonesia
- ▶ Data and Estimation Method
- ▶ Empirical Results
- ▶ Model
- ▶ Discussion

Views on Informal Sector Economy

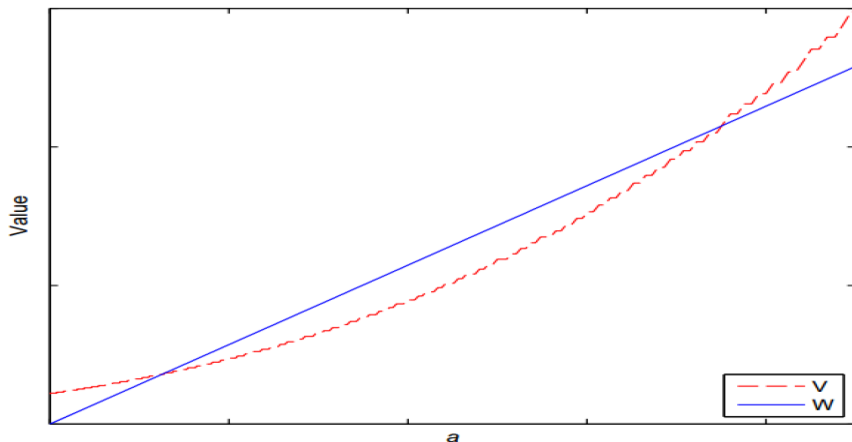
- ▶ Parasite View (Rational Exit Model)
 - ▶ Informal firms that are productive enough to survive as formal firms, but choose not to do so because it is more profitable for them to remain informal.
- ▶ De Sotos view (Exclusion Model)
 - ▶ Higher productivity informal firms that are kept out of formality by rigid labor regulation (entry, severance cost). Once these were removed, they would become formal and improve their performance, as they would no longer have the size constraints imposed by informality.
- ▶ Survival view (Dualistic Model)
 - ▶ Informal firms that are too unproductive to ever become formal. Entrepreneurs with low human capital, who are not able to find out jobs in the formal sector and who are able to survive in the informal sector because they avoid taxes and regulations.

Parasite and De Sotos view on informal economy



Both views assume that the informal entrepreneurs, in general, possess higher human capital and productivity compare to wage earners.

Survival view



Note: Selection to entrepreneurship occurs at the two extremes

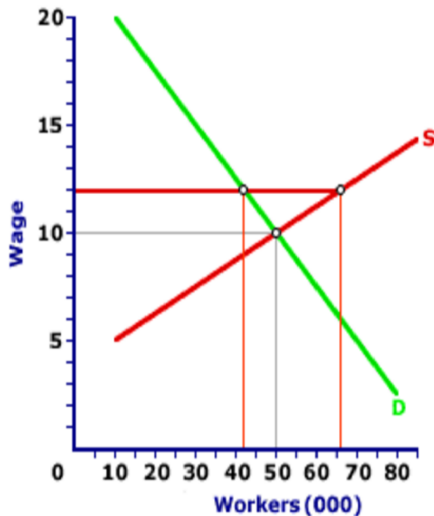
The impact of minimum wage policy

- ▶ With De Soto and Rational Exit View point on informal sector economy,
 - ▶ (1) gives adverse incentive for formal sector entrepreneurs to operate their business informally.
 - (2) may induce informal entrepreneurs to operate formally in response to market-driven demand shock.
 - (3) employment status shifts between laborers in the formal sector and informal sector.
- ▶ With Survival View point on informal sector economy,
 - ▶ (1) gives an incentive to the most capable informal sector entrepreneurs to join in the formal sector as an employee
 - (2) employment shifts happens between (i) wage earner and self-employed (ii) Entrepreneur and wage earner

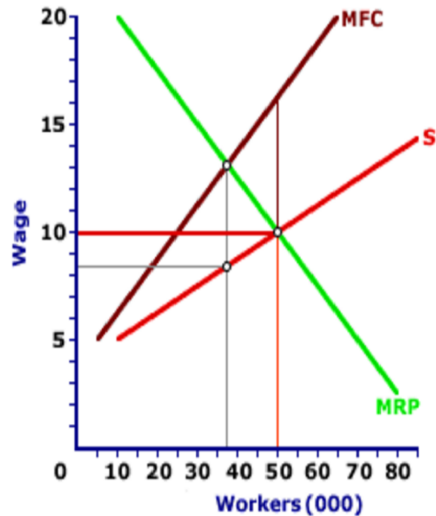
Characteristics of Formal Sector Economy

- ▶ Certain delicacy in employment decision-formal hiring, hiring "off the book", part-time hiring
- ▶ Mixture of Competitive labor market and Monopsonistic labor market-firms can engage into monopsonistic competition.

Competitive Market



Monopsony



Outline

- ▶ Introduction
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- ▶ Empirical Results
- ▶ Model
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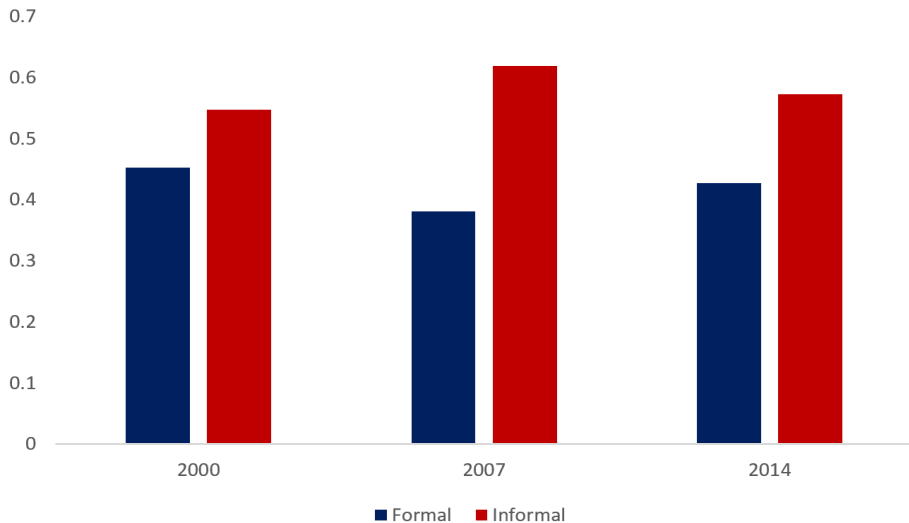
- ▶ 1 Descriptive Statistics on Formal/ Informal Sector by Year
- ▶ 2 Descriptive Statistics on Formal/ Informal Sector by Income Quantile
- ▶ 3 Minimum Wage

Provinces

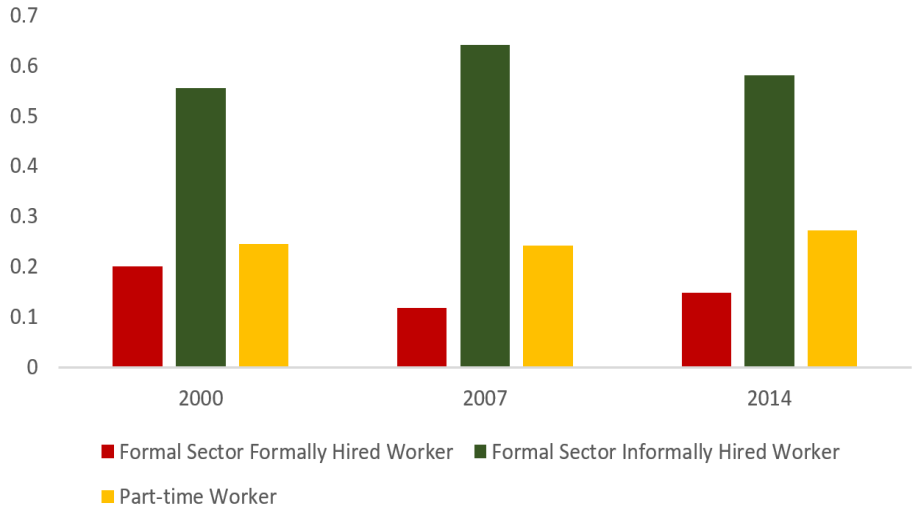


- ▶ IFLS data contains useful information that helps to categorize employment shape.
 - ▶ IW: self-employed, self-employed with unpaid family worker/temporary worker, unpaid family worker, casual worker in non-agriculture/agriculture → informal worker
 - ▶ FE: self-employed with permanent worker → formal sector entrepreneur
 - ▶ FW: government worker + private worker → formal sector worker
 - ▶ FFFW: Full-time formal sector formally employed worker
 - ▶ FFIW: Full-time formal sector informally employed worker
 - ▶ PFFW: Part-time formal sector formally employed worker
 - ▶ PFIW: Part-time formal sector worker
- ▶ Full-time (>35 hours), Formally Employed (Severance Cost, Health Insurance; Manpower law)

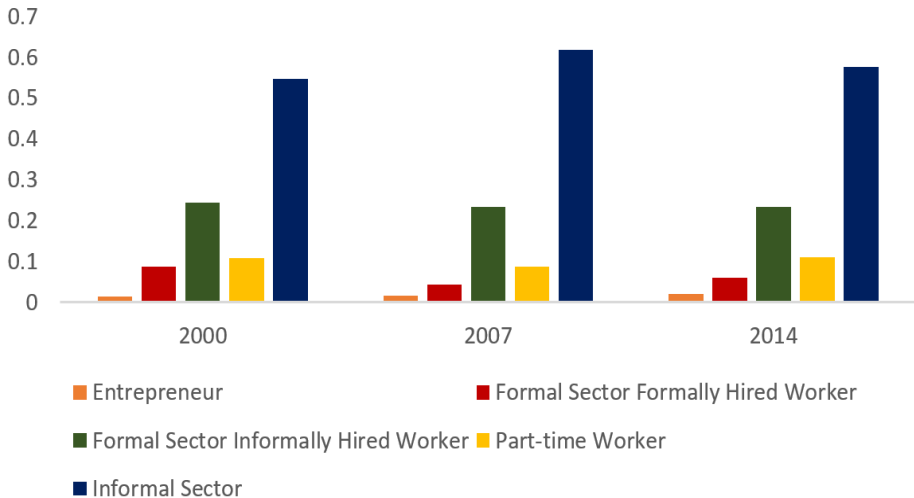
Formal/Informal Ratio

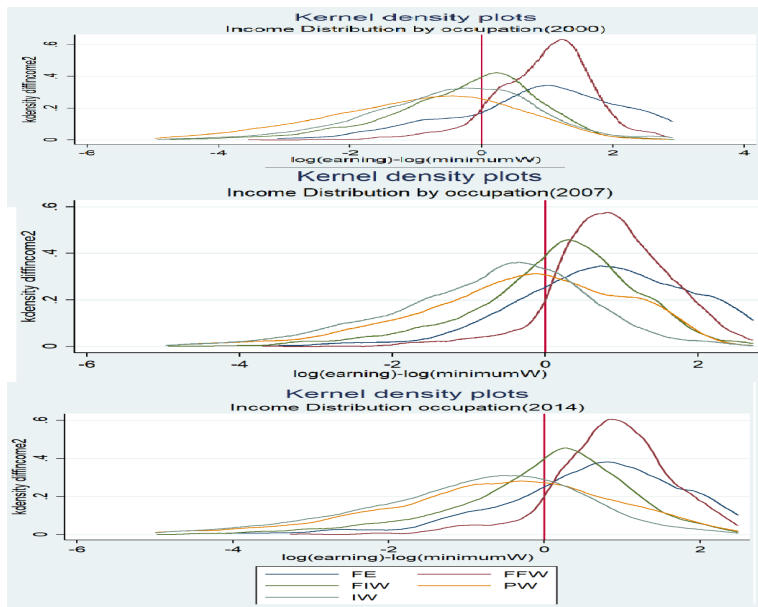


Formal Sector Division

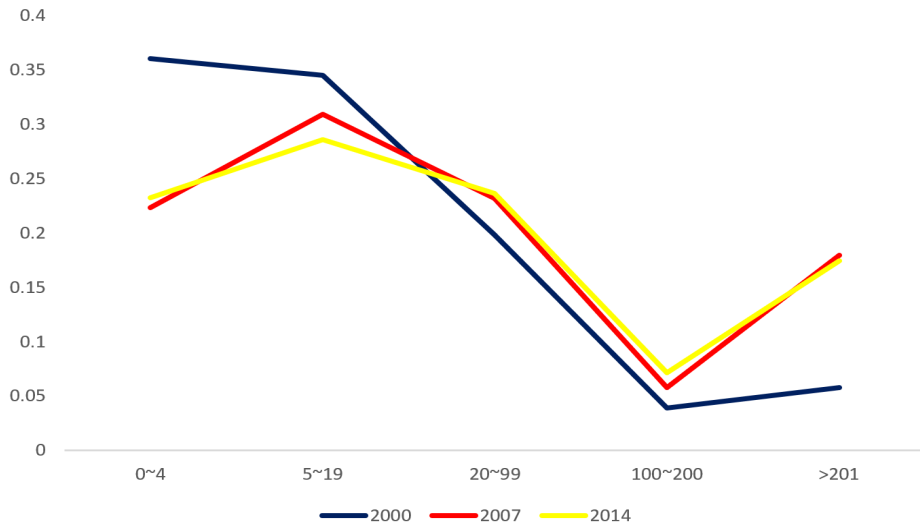


Occupation Division





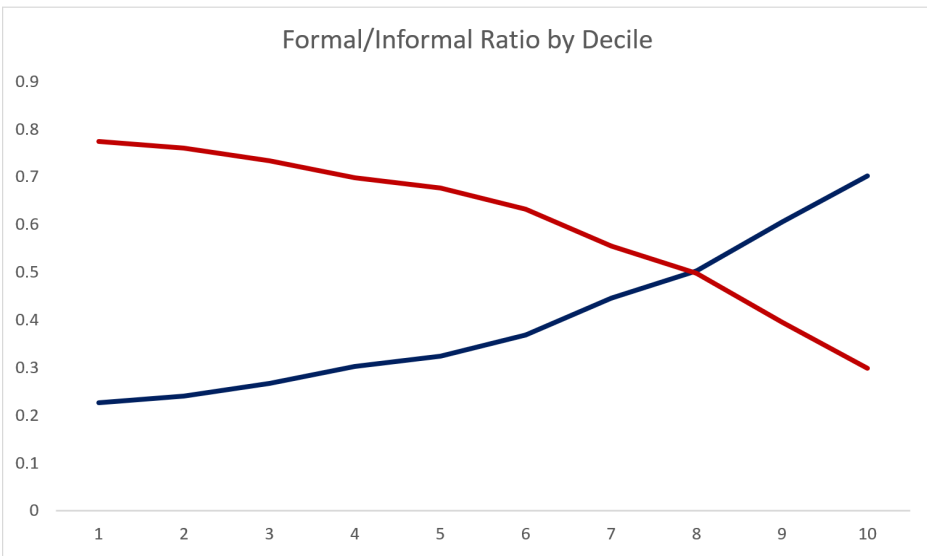
Number of Coworkers in Formal Sector Worker (IFLS)



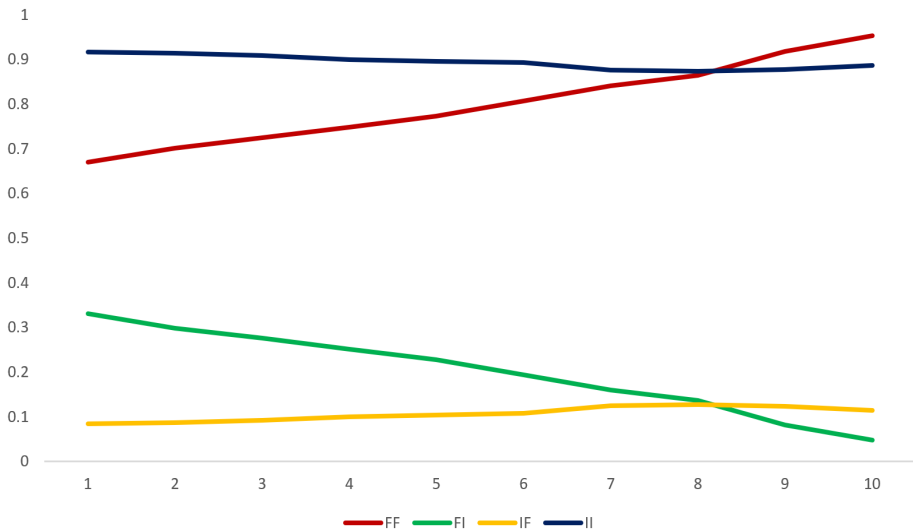
Key Observation

- ▶ On Average, we observe that the characteristics of informal sector is close to survival view
 - ▶ Average education and income of the informal sector workers are substantially lower than formal sector.
- ▶ During 2000-2014 period, we do observe formal sector formal employment decreases, whereas we observe formal sector informally hired workers increase.
- ▶ About 70 percent of the formal sector workers are either working in the very small firms (<20) or big firms (>200)→missing middle.

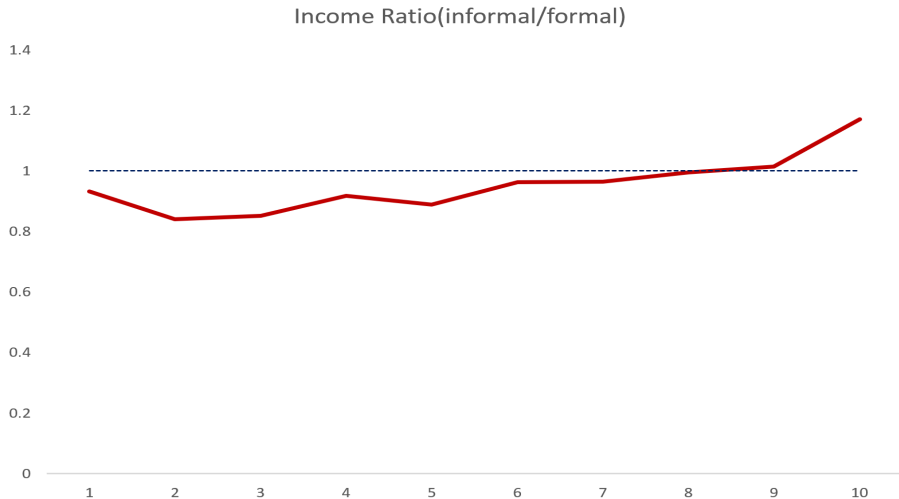
Income Quantile



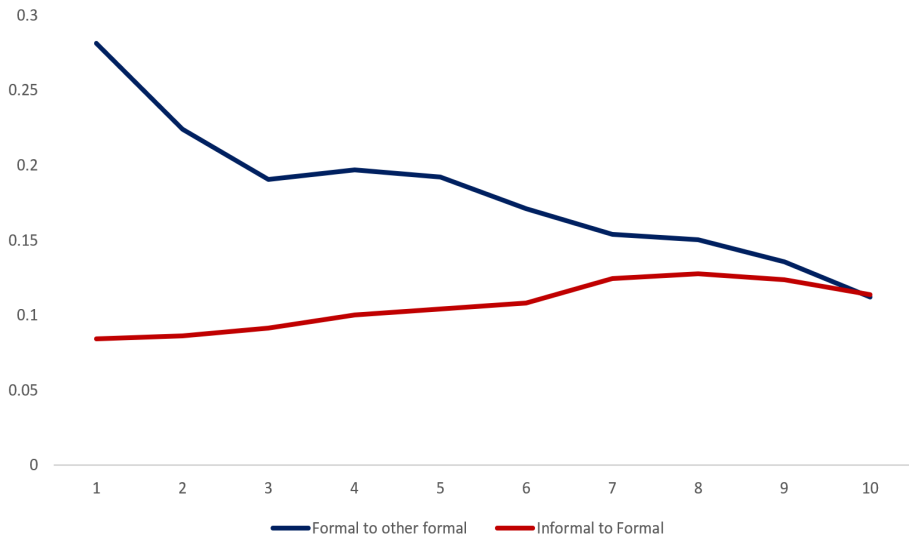
Average Annual Employment Status Change by Decile



Income Ratio(informa/formal) by Income Decile



Probability of working in the new formal firm



Key Observation

- ▶ As expected, we see high proportion of laborers in the low income decile are engaged in informal sector economic activity.
- ▶ Unlike the previously suggested theory of informal economy, there exists a substantial heterogeneity in informal sector employment.
 - ▶ Significant portion of self-employed get more than minimum wage.
 - ▶ Even in the top 10th quantile of income division, we observe 30 percent of workers are engaged into informal sector economic activity.
 - ▶ In the 10th quantile, we even observe that average income of informal workers is higher than average income of formal sector workers.

Key Observation

- ▶ It seems that informal sector workers are mixture of both: (1) people who are rationed out (2) people who choose to stay there
- ▶ Significant portion of formal sector workers are part-time, or full-time informally hired.
- ▶ Probability of finding a formal sector jobs are higher once the worker is in the formal sector. Rarely informal workers find out jobs in the formal sector, but the proportion of finding a formal jobs increases with decile.
- ▶ Attrition Rate get smaller with higher income decile. And probability of getting a formal job increases with decile.
- ▶ Once in the formal sector, the worker likely stay in the formal sector. This tendency reinforces as income decile increases.

The History of the Minimum Wage

- ▶ Minimum wage law in Indonesia has existed from 1970, largely unenforced before 1990.
- ▶ Due to depreciation in the exchange rate during the Asian Crisis in 1997, economy got shock which led Suharto to step down from his regime
- ▶ Until the end of 2000, provincial minimum wages were established nationally by the central government. Starting from 2001, Indonesia launched an ambitious scale decentralization program.
- ▶ Decentralization allowed each local government to make autonomous policies in consideration of the local economy, including the determination of minimum wage rates.

The Purpose of the Minimum Wage

Ministry of Manpower's regulation No.01 of 1999

1. In order to materialize decent income for workers, some considerations are taken into account that includes raising the welfare of workers without ignoring company's productivity and its advancement as well as a consideration on general economic conditions.
2. Determination of realistic regional and sectoral minimum wage should take into account some aspects such as company's capability to pay, conditions of the sector in which the company operates and the regional economy where the firm is located, it is also necessary to determine regional and sectoral minimum wage.

The Purpose of the Minimum Wage

Ministry of Manpower's regulation 2014

- ▶ Worker/labor wages might fall to the lowest level as a result of labor market imbalance. Therefore, it is necessary to harmonize the minimum wage policy to ensure the continuity of businesses and improve the living standard of workers/laborers.

* It is clear that the aim of minimum wage is not only to raise the welfare of the workers, but also to guarantee the betterment of firms productivity and to sustain the countrys economic growth.

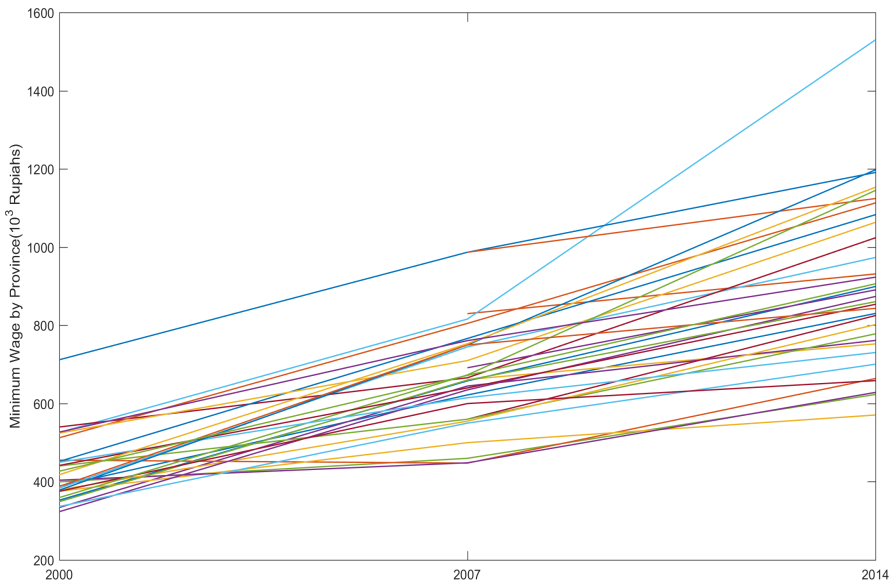
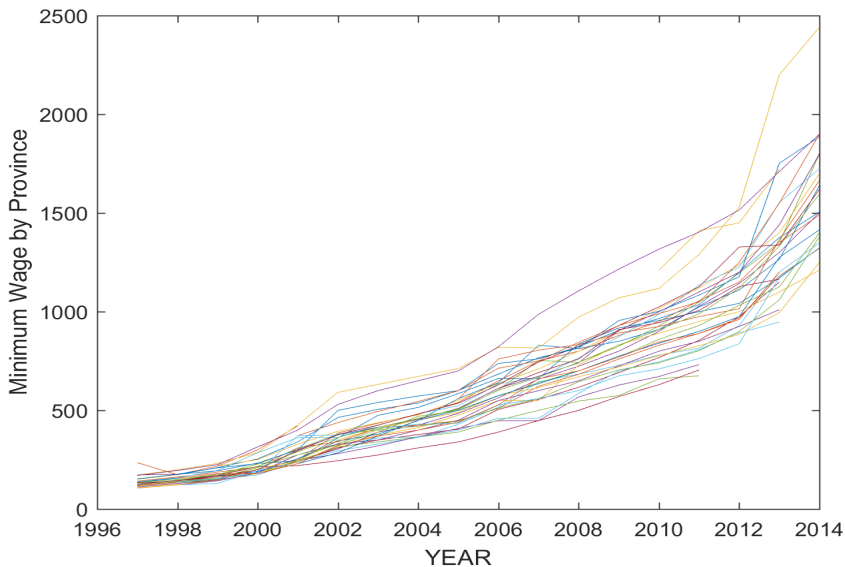


Fig.1. Real Minimum Wage trend by Province



Data

- ▶ Indonesian Family Life Survey (IFLS)
 - ▶ Individual/Household level Panel Data Set
 - ▶ 5 rounds of survey were conducted (1993, 1997, 2000, 2007 and 2014), which we use 3 rounds (IFLS3-IFLS5)
 - ▶ The data represents 83
- ▶ Household Decision Making Indicators
 - ▶ It has a data on severance payment and health insurance offered by employer (Man Power Law 2003).
 - ▶ Enable us to distinguish different kinds of formal sector employment.

Identification Strategy: Two Way Fixed Effect Regression

$$y_{st} = \beta_{mw} \ln MW_{st} + \beta_X X_{st} + \delta_s + \eta_t + trend^k \delta_s + \epsilon_{st}$$

- ▶ y_{st} : the dependent variable of interest for district s at time t
- ▶ $\ln MW_{st}$: the log real minimum wage in district s at time t
- ▶ X_{st} : a vector of district level level controls—average age, average educational attainment, average wealth, average job size, and urbanization rate.
- ▶ δ_s : a district fixed effect, which is assumed not to change across time.
- ▶ η_t : Overall Macroeconomic effect
- ▶ $trend^k \delta_s$: district-specific time trend, $k = 1, 2, 3, 4$.

Identification Strategy: Two Way Fixed Effect Regression

$$y_{st} = \beta_{mw} \ln MW_{st} + \beta_X X_{st} + \delta_s + \eta_t + trend^k \delta_s + \epsilon_{st}$$

- ▶ The most widely implemented method in the Minimum wage literature.
- ▶ Long-debate on minimum wage—whether minimum wage affects employment, or general labor market condition shapes minimum wage policy.

Identification Strategy: Two Way Fixed Effect Regression

$$y_{st} = \beta_{mw} \ln MW_{st} + \beta_X X_{st} + \delta_s + \eta_t + trend^k \delta_s + \epsilon_{st}$$

- ▶ The most widely implemented method in the Minimum wage literature.
- ▶ Long-debate on minimum wage—whether minimum wage affects employment, or general labor market condition shapes minimum wage policy.
- ▶ I include province-varying time specific trend to control omitted variable bias.
 - ▶ Card (2015): The regression analysis on minimum wage policy is sensitive to time-trend.

Identification Strategy 2: Spatial Difference

$$y_{st} = \beta' X_{st} + \gamma \ln MW_{st} + \delta_{st} + u_{st}$$

- ▶ y_{st} : the dependent variable of interest for district s at time t
- ▶ $\ln MW_{st}$: the log real minimum wage in district s at time t
- ▶ X_{st} : a vector of district level controls—average age, education, value of the asset, jobsite and urbanization.
- ▶ δ_{st} : a district-specific time trend, which captures time-varying local labor market.

Identification Strategy 2: Spatial Difference

$$y_{st} = \beta' X_{st} + \gamma \ln MW_{st} + \delta_{st} + u_{st}$$

$$\begin{aligned} y_{st} - \sum_{s': d(s, s') < \epsilon} \frac{y_{s't}}{n_s(\epsilon)} = \\ \beta' (X_{st} - \sum_{s': d(s, s') < \epsilon} \frac{X_{s't}}{n_s(\epsilon)}) + \gamma (\ln MW_{st} - \sum_{s': d(s, s') < \epsilon} \frac{\ln MW_{s't}}{n_s(\epsilon)}) + \\ (\delta_{st} - \sum_{s': d(s, s') < \epsilon} \frac{\delta_{s't}}{n_s(\epsilon)}) + (u_{st} - \sum_{s': d(s, s') < \epsilon} \frac{u_{s't}}{n_s(\epsilon)}) \end{aligned}$$

- ▶ This procedure allows minimum wages to be related endogeneously to labor market condition of the district, but requires that endogeneity is shared among spatially approximate districts.
- ▶ In other words, it is robust to the different trends among districts as the model allows observations to have non-parametric trends so long as those trends are shared among nearby districts.

Result: Overall Employment (Multinomial Logit)

Table. Employment Status and Minimum Wage

Marginal Effect	(1) Entrepreneur	(2) Full time Formal Employment	(3) Full time Informal Employment	(4) Part time Employment	(5) Self- Employment
Part A. All					
Log Minimum Wage	-0.001 (0.006)	0.006 (0.005)	0.116*** (0.041)	0.015 (0.022)	-0.137*** (0.039)
Observation	59,856	59,856	59,856	59,856	59,856
Part B. Female					
Log Minimum Wage	-0.001 (0.005)	-0.002 (0.006)	0.090*** (0.043)	0.029 (0.024)	-0.117*** (0.034)
Observation	25,545	25,545	25,545	25,545	25,545
Part C. Male					
Log Minimum Wage	-0.001 (0.008)	0.010** (0.005)	0.130*** (0.041)	0.014 (0.024)	-0.152*** (0.043)
Observation	34,311	34,311	34,311	34,311	34,311

Note: *, **, *** indicate statistical significance at the 0.10, 0.05 and 0.01 levels respectively. Robust standard errors are clustered in province level. Each panel reports separate regressions of equation. The dependent variable is an indicator for employment status of an individual, as measured in the Indonesian Family Life Survey from round 3,4 and 5. We regress employment status on the minimum wage as well as the controls included. Individual controls are household assets, dummy variable for urban/rural residence, dummy variable for Labor Force Participation, age and age polynomial as the controlled variables.

Result: Overall Employment (OLS)

Table. Minimum Wage Elasticities for Full-Time/Part-Time Formal Employment Controlling for Time Varying Heterogeneity, District-Level IFLS Data, 2000-2014

	(1)	(2)
Formal Sector Entrepreneur		
Log Minimum Wage	-0.000 (0.008)	0.018 (0.014)
Formal Sector Worker		
Log Minimum Wage	0.095*** (0.027)	0.156*** (0.046)
Informal Sector		
Log Minimum Wage	-0.095*** (0.023)	-0.179*** (0.032)
Year Fixed Effect	Yes	Yes
Individual Fixed Effect	Yes	Yes
Occupation Fixed Effect	Yes	Yes
Provincial Quadratic Time Trend	No	Yes
Observation	59,881	59,881

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Result: Formal Sector (OLS)

Table. Minimum Wage Elasticities for Full-Time/Part-Time Formal Employment Controlling for Time Varying Heterogeneity, District-Level IFLS Data, 2000-2014

	(1)	(2)
	Full-Time Formally Hired Workers	
Log Minimum Wage	0.008 (0.023)	0.026 (0.075)
	Full-Time Informally Hired Workers	
Log Minimum Wage	0.069*** (0.023)	0.123*** (0.041)
	Part-Time Informally Hired Workers	
Log Minimum Wage	0.017 (0.014)	-0.008 (0.023)
Year Fixed Effect	Yes	Yes
Individual Fixed Effect	Yes	Yes
Provincial Quadratic Time Trend	No	Yes
Observation	59,881	59,881

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Result: Overall Employment(SD)

Table. Minimum Wage Elasticities for Average Employment Status with Spatial Difference Method, District-Level IFLS Data, 2000-2014

VARIABLES	(1) Formal Employment	(2) Informal Employment	(3) Formal Employer
30 miles	0.072 (0.053)	-0.069 (0.058)	-0.002 (0.008)
35 miles	0.074 (0.051)	-0.072 (0.056)	0.001 (0.008)
40 miles	0.099** (0.049)	-0.096* (0.053)	0.000 (0.008)
45 miles	0.119*** (0.049)	-0.120** (0.054)	0.003 (0.010)
Observations	59,881	59,881	59,881

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Controls: household assets belonging to wife and to husband, dummy variable for urban/rural residence, age and age polynomial as the controlled variables

Result: Formal Sector (SD)

Table. Minimum Wage Elasticities for Full-Time/Part-Time Formal Employment Controlling for Time Varying Heterogeneity, District-Level IFLS Data (SD), 2000-2014

VARIABLES	(1) Formal Sector Full Time Formally Hired	(2) Formal Sector Full Time Informally Hired	(3) Formal Sector Part Time
25 miles	-0.017 (0.049)	0.100*** (0.031)	0.06 (0.08)
30 miles	-0.002 (0.048)	0.073** (0.038)	0.04 (0.07)
35 miles	0.020 (0.045)	0.053 (0.043)	0.09 (0.10)
40 miles	0.056 (0.050)	0.043 (0.044)	0.02 (0.04)
Observations	59,856	59,856	59,856

Note: *, **, *** indicate statistical significance at the 0.10, 0.05 and 0.01 levels respectively. Robust standard errors are clustered in province level. Each panel reports separate regressions of equation. The dependent variable is an indicator for employment status of an individual, as measured in the Indonesian Family Life Survey from round 3,4 and 5. We regress employment status on the minimum wage as well as the controls included. Individual controls are household assets, dummy variable for urban/rural residence, dummy variable for Labor Force Participation, age and age polynomial as the controlled variables.

Result: Wage and Profit (FE, SD)

Table. Minimum Wage Elasticities for Average Wage and Net Profit
Individual Level IFLS Data, 2000-2014

VARIABLES	(1) Log Wage (FE)	(2) Log Wage (SD)	(3) Log Net Profit (FE)	(4) Log Net Profit (SD)
25 miles	0.336*** (0.107)	0.171* (0.095)	0.101 (0.099)	-0.081*** (0.029)
30 miles		0.203*** (0.068)		0.023 (0.046)
35 miles		0.099 (0.098)		0.013 (0.046)
40 miles		0.048 (0.097)		0.046 (0.049)
Observations	36,316	36,316	30,200	30,200

Income Quintile (FE)

Minimum Wage Elasticities for Income by Decile, District-Level IFLS Data, 2000-2014 (Fixed Effect)

	1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th
lnminW2	0.422 (0.434)	0.292 (0.230)	0.187 (0.205)	0.417*** (0.134)	0.565*** (0.186)	0.431*** (0.122)	0.421*** (0.123)	0.135** (0.053)	0.064 (0.096)	0.084 (0.114)
Observations	5,015	5,043	5,004	5,074	5,027	5,018	5,033	5,047	5,079	5,113
R-squared	0.097	0.113	0.129	0.136	0.217	0.194	0.214	0.247	0.268	0.346
Number of pidlink2	3,723	3,160	2,970	2,925	2,828	2,862	2,927	2,953	3,061	3,062

Note: *, **, *** indicate statistical significance at the 0.10, 0.05 and 0.01 levels respectively. Robust standard errors are clustered in province level. Each panel reports separate regressions of equation. The dependent variable is an indicator for employment status of an individual, as measured in the Indonesian Family Life Survey from round 3,4 and 5. We regress employment status on the minimum wage as well as the controls included. Individual controls are job size, dummy variable for urban/rural residence, dummy variable for Labor Force Participation, age and age polynomial as the controlled variables.

Results

- ▶ The results suggests that there is a heterogeneous effect of minimum wage on income distribution.
- ▶ On aggregate, our results shows there were seizable portion of self-employed who found out job in the formal sector.
- ▶ Our regression result suggests that they are mostly hired on a part-time basis, without proper benefit that formally employed workers receive.
- ▶ We do not find out any evidence of employment shift between self-employed(informal sector entrepreneur) and self-employed with permanent worker(formal sector entrepreneur).

Result

- ▶ Employment shifts into part-time formal sector job is an indirect evidence for firm's bargaining power over workers.
- ▶ The descriptive statistics also suggests monopsonistic behavior of firms—most of employment is either FFIW or PFIW.
- ▶ I use firm level data to investigate this hypothesis—two different strategy is employed
- ▶ Biewen and Weiser (2014)
- ▶ Drummond (2013): Pigou's E

Biewen and Weiser(2014): Accounting Approach

- ▶ Total Revenues=Sum of costs for the different production factor, profits and taxes
- ▶ PY =capital costs+labour costs+ intermediate inputs+ profits+ taxes

$$PY = rK + wL + qM + \pi + \tau$$

$$Y = f_k K + f_L L + f_I I$$

$$\Pi = \left(\frac{\pi + \tau}{P} \right) = \left(f_k - \frac{r}{P} \right) K + \left(f_L - \frac{w}{P} \right) L + \left(f_M - \frac{q}{P} \right) I$$

Biewen and Weiser(2014): Accounting Approach

- ▶ Total Revenues=Sum of costs for the different production factor, profits and taxes
- ▶ PY =capital costs+labour costs+ intermediate inputs+ profits+ taxes

$$PY = rK + wL + qM + \pi + \tau$$

$$Y = f_k K + f_L L + f_I I$$

$$\Pi = \left(\frac{\pi + \tau}{P} \right) = \left(f_k - \frac{r}{P} \right) K + \left(f_L - \frac{w}{P} \right) L + \left(f_M - \frac{q}{P} \right) I$$

$$\pi = \beta_k K + \beta_L L + \beta_M M$$

$$PY = rK + wL + qM + \pi + \tau$$

$$Y = f_k K + f_L L + f_I I$$

$$\Pi = \left(\frac{\pi + \tau}{P} \right) = \left(f_k - \frac{r}{P} \right) K + \left(f_L - \frac{w}{P} \right) L + \left(f_I - \frac{q}{P} \right) I$$

$$PY = rK + wL + qM + \pi + \tau$$

$$Y = f_K K + f_L L + f_I I$$

$$\Pi = \left(\frac{\pi + \tau}{P} \right) = \left(f_K - \frac{r}{P} \right) K + \left(f_L - \frac{w}{P} \right) L + \left(f_I - \frac{q}{P} \right) I$$

$$\Pi = \beta_K K + \beta_L L + \beta_I I$$

$$\text{where } \beta_K = \left(f_K - \frac{r}{P} \right)$$

$$\beta_L = \left(f_L - \frac{w}{P} \right)$$

$$\beta_I = \left(f_I - \frac{q}{P} \right).$$

Introduction	Framework	Labor Market	Estimation	Conclusions	Data Identification	Result		
Variables	ISIC2:15	ISIC2:16	ISIC2:17	ISIC2:18	ISIC2:19	ISIC2:20	ISIC2:21	ISIC2:22
Log Labor-Operation	0.083*** (0.006)	0.027* (0.015)	0.058*** (0.012)	0.082*** (0.012)	0.068*** (0.022)	0.054*** (0.013)	0.033 (0.028)	0.125*** (0.025)
Log Labor-Production	0.308*** (0.014)	0.312*** (0.029)	0.315*** (0.025)	0.466*** (0.023)	0.320*** (0.040)	0.442*** (0.027)	0.322*** (0.062)	0.393*** (0.051)
Log Capital	0.028*** (0.006)	0.021 (0.014)	0.024** (0.011)	0.044*** (0.012)	0.021 (0.019)	0.052*** (0.011)	0.029 (0.025)	0.007 (0.019)
Log Intermediate	0.348*** (0.006)	0.647*** (0.013)	0.368*** (0.012)	0.349*** (0.010)	0.409*** (0.020)	0.321*** (0.011)	0.392*** (0.023)	0.419*** (0.018)
	ISIC2:23	ISIC2:24	ISIC2:25	ISIC2:26	ISIC2:27	ISIC2:28	ISIC2:29	ISIC2:30
Log Labor-Operation	0.070 (0.101)	0.112*** (0.021)	0.035** (0.014)	0.093*** (0.010)	0.164*** (0.049)	0.046** (0.021)	0.037 (0.025)	1.339* (0.182)
Log Labor-Production	0.177 (0.164)	0.395*** (0.039)	0.322*** (0.025)	0.466*** (0.022)	0.384*** (0.092)	0.462*** (0.040)	0.399*** (0.050)	-0.289 (0.215)
Log Capital	0.139* (0.076)	0.048*** (0.014)	0.034*** (0.012)	0.042*** (0.009)	-0.075* (0.038)	0.044** (0.018)	0.101*** (0.023)	-0.585 (0.144)
Log Intermediate	0.281*** (0.070)	0.382*** (0.014)	0.382*** (0.013)	0.360*** (0.009)	0.371*** (0.039)	0.296*** (0.015)	0.402*** (0.020)	-0.117 (0.053)
	ISIC2:31	ISIC2:32	ISIC2:33	ISIC2:34	ISIC2:35	ISIC2:36	ISIC2:37	ISIC2: All
Log Labor-Operation	0.021 (0.035)	0.064 (0.048)	0.243*** (0.081)	0.137*** (0.039)	0.051* (0.029)	0.065*** (0.011)	0.083 (0.051)	0.073*** (0.003)
Log Labor-Production	0.163** (0.070)	0.266** (0.108)	0.350*** (0.130)	0.312*** (0.065)	0.409*** (0.062)	0.440*** (0.020)	0.495*** (0.088)	0.365*** (0.007)
Log Capital	0.106*** (0.036)	-0.052 (0.051)	-0.045 (0.054)	-0.060* (0.033)	0.075*** (0.021)	0.026*** (0.009)	0.035 (0.034)	0.031*** (0.003)
Log Intermediate	0.381*** (0.028)	0.443*** (0.043)	0.285*** (0.057)	0.376*** (0.030)	0.430*** (0.024)	0.357*** (0.009)	0.237*** (0.041)	0.379*** (0.003)
Jin Ho Kim				Minimum Wage, Informality and Economic Development				

Pigou(1924)'s E

- ▶ Directly calculate MPL of the firm and then compare with average wage paid to labor.

$$\text{Pigou's } E: E = \frac{R'(L) - W(L)}{W(L)}$$

- ▶ Unbiased Estimator for the Cobb-Douglas production function is the key!

Akerber, Cave and Frazer

- ▶ $y_{it} = \beta_0 + \beta_k k_{it} + \beta_m m_{it} + \beta_l l_{it} + \omega_{it} + \epsilon_{it} = \Phi_t(m_{it}, k_{it}, l_{it}) + \epsilon_{it}$
- ▶ Second Stage: Choose a candidate $\beta_k^*, \beta_l^*, \beta_m^*$, compute $\omega_{it}(\beta_k, \beta_l, \beta_m) = \widehat{\Phi}_t(m_{it}, k_{it}, l_{it}) - \beta_k^* k_{it} - \beta_l^* l_{it} - \beta_m^* m_{it}$.
- ▶ Third Stage: using $\omega_t = \gamma_0 + \gamma_1 \omega_{t-1} + \gamma_2 \omega_{t-1}^2 + \gamma_3 \omega_{t-1}^3 + \epsilon_{it}$, get $E[\omega_{it} | \omega_{i,t-1}]$ and finally
- ▶ Fourth Stage: find out the minimum value of

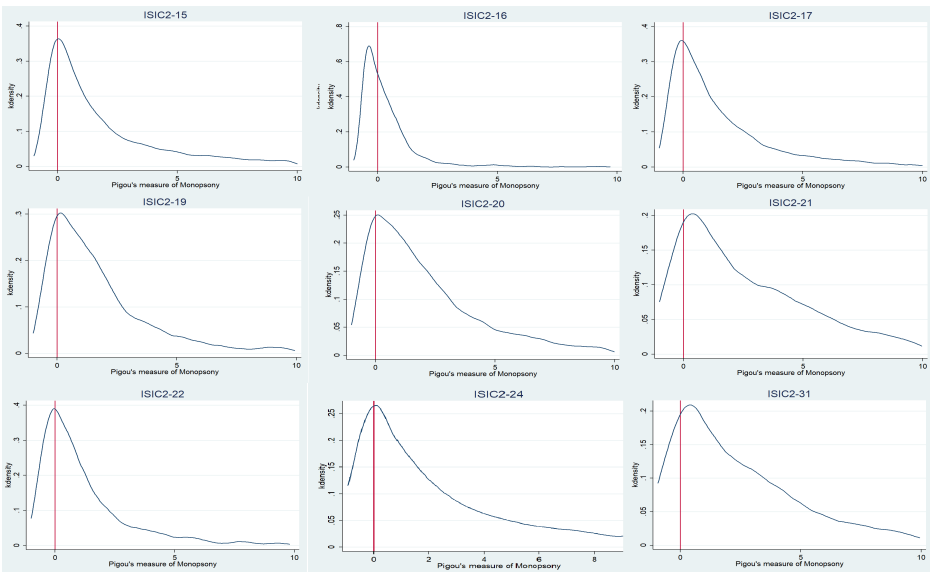
$$\min_{\beta_l, \beta_k, \beta_m} \sum \left(y_t - E[\widehat{\omega_t | \omega_{t-1}}] - \beta_l^* l_t - \beta_k^* k_t - \beta_m^* m_t \right)^2$$

from combination of $\beta_k^*, \beta_l^*, \beta_m^*$

Pigou's E

$$\text{Pigou's } E:E = \frac{R'(L) - W(L)}{W(L)} = \frac{\hat{\beta}_l(Y_{it}/L_{it}) - w_{it}}{w_{it}}$$

Pigou's E



Wage-Posting Model

$$\rho W_\theta = b_\theta + \lambda_\theta^i \int_{\underline{\omega}_\theta}^{\bar{\omega}_\theta} \max\{S_\theta(x) - W_\theta, 0\} dF_\theta(x)$$

$$\rho S_\theta(\omega) = \omega + \lambda_\theta^e \int_{\underline{\omega}_\theta}^{\bar{\omega}_\theta} (S_\theta(x) - S_\theta(\omega)) dF_\theta(x) + \delta_\theta [W_\theta - S_\theta(\omega)]$$

$$R_\theta = b_\theta + (\lambda_\theta^i - \lambda_\theta^e) \int_{R_\theta}^{\bar{\omega}_\theta} \frac{1 - F_\theta(x)}{\rho + \delta_\theta + \lambda_\theta^e (1 - F_\theta(x))} dx$$

- ▶ So, the decision rule of agents is to become a wage-earner in formal sector if $\omega > R_\theta$; remain self-employed if $\omega < R_\theta$. As we allow incomplete compliance of firm to minimum wage law, we allow for the case $\underline{\omega}_\theta < \omega^{min}$. This means that the lowest wage offer made by firms can be lower than minimum wage for some labor market θ .
- ▶ y : Household Production Good
- ▶ x : Market Production Good
- ▶ t_j : time that wife/husband spent for home production

$$dG_{\theta}(\omega, t)(1 - I_{\theta}(t))/dt = \lambda_{\theta}^i \max\{F_{\theta}(\omega) - F_{\theta}(R_{\theta}), 0\} I_{\theta}(t) - [\delta_{\theta} + \lambda_{\theta}^e(1 - F_{\theta}(\omega))] G_{\theta}(\omega, t)(1 - I_{\theta}(t))$$

$dG(\omega, t)(1 - I_{\theta}(t))/dt = 0$ and solve for $G_{\theta}(\omega, t)$, we get

$$G_{\theta}(\omega, t) = \frac{[F_{\theta}(\omega) - F_{\theta}(R_{\theta})]/[1 - F_{\theta}(R_{\theta})]}{1 + k_1(1 - F_{\theta}(\omega))} = \frac{F_{\theta}(\omega)}{1 + k_1(1 - F_{\theta}(\omega))}, \text{ where}$$

$$k_1 = \lambda_{\theta}^e / \delta$$

$$\pi(\omega_\theta, v_\theta) = \max_{\omega_\theta, v_\theta} \{ (p^\alpha \theta - \omega_\theta - \kappa \max\{0, \omega^{\min} - \omega_\theta\}) l_\theta(\omega_\theta, v_\theta) - c_\theta(v_\theta) \}$$

$dG(\omega, t)(1 - l_\theta(t))/dt = 0$ and solve for $G_\theta(\omega, t)$, we get

$$G_\theta(\omega, t) = \frac{[F_\theta(\omega) - F_\theta(R_\theta)]/[1 - F(R_\theta)]}{1 + k_1(1 - F_\theta(\omega))} = \frac{F_\theta(\omega)}{1 + k_1(1 - F_\theta(\omega))}, \text{ where}$$

$$k_1 = \lambda_\theta^e / \delta$$

Discussion

- ▶ There is a heated debate on the employment effect of minimum wage policy.
- ▶ Many times, it is lack of understanding in the nature of formal and informal sector economy.
- ▶ Unlike previous traditional assumption, we observe substantial heterogeneity among informal workers.
- ▶ The occupational shift occurs only between formal sector workers and informal sector entrepreneurs.
- ▶ With minimum wage hike, previously self-employed now find out formal sector job, though it is part-time and with no benefit.
- ▶ To part-time workers, minimum wage is not directly binding, so there should be an effect on the wage distribution due to minimum wage hike.
- ▶ Firm is capable of manipulating the wage scheme as it behaves monopsonistically.

Conclusion

- ▶ Our study finds out minimum wage hike in Indonesia reduced female's intrahousehold decision making power in consumption related indicators, but increased in home production related indicators.
- ▶ Investigation of mechanism infers that home production model and the household bargaining model play a role.
- ▶ It is important to take household economy model into the consideration for the analysis of labor market policy like minimum wage law.
- ▶ When the policy is implemented in places where strong social norm defines women's role as a household worker, minimum wage hike may reinforce traditional gender role: husband as the breadwinner, and wife the houseworker.