

DETERMINANTS OF HOUSEHOLD FOOD SECURITY IN INDONESIA: An Ordinal Logistic Model

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A stylized silhouette of a mountain range in shades of brown and tan, positioned at the bottom of the slide against a blue and green gradient background.



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Introduction

- Following monetary crisis in 1997, trade liberalization in Indonesia was accelerated as conditionality of Lol to IMF
- The government has no longer implemented food price stabilization
- Food prices become more unstable
- A question may arise to what extent the unstable food prices would affect household food security in Indonesia



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- Indonesia has been experienced by excess demand for food
- With population about 230 millions food security become critical and very sensitive issue
- Strong macro food security is not sufficient to attain food security at micro level

→ It is important to study micro level food security



Objectives

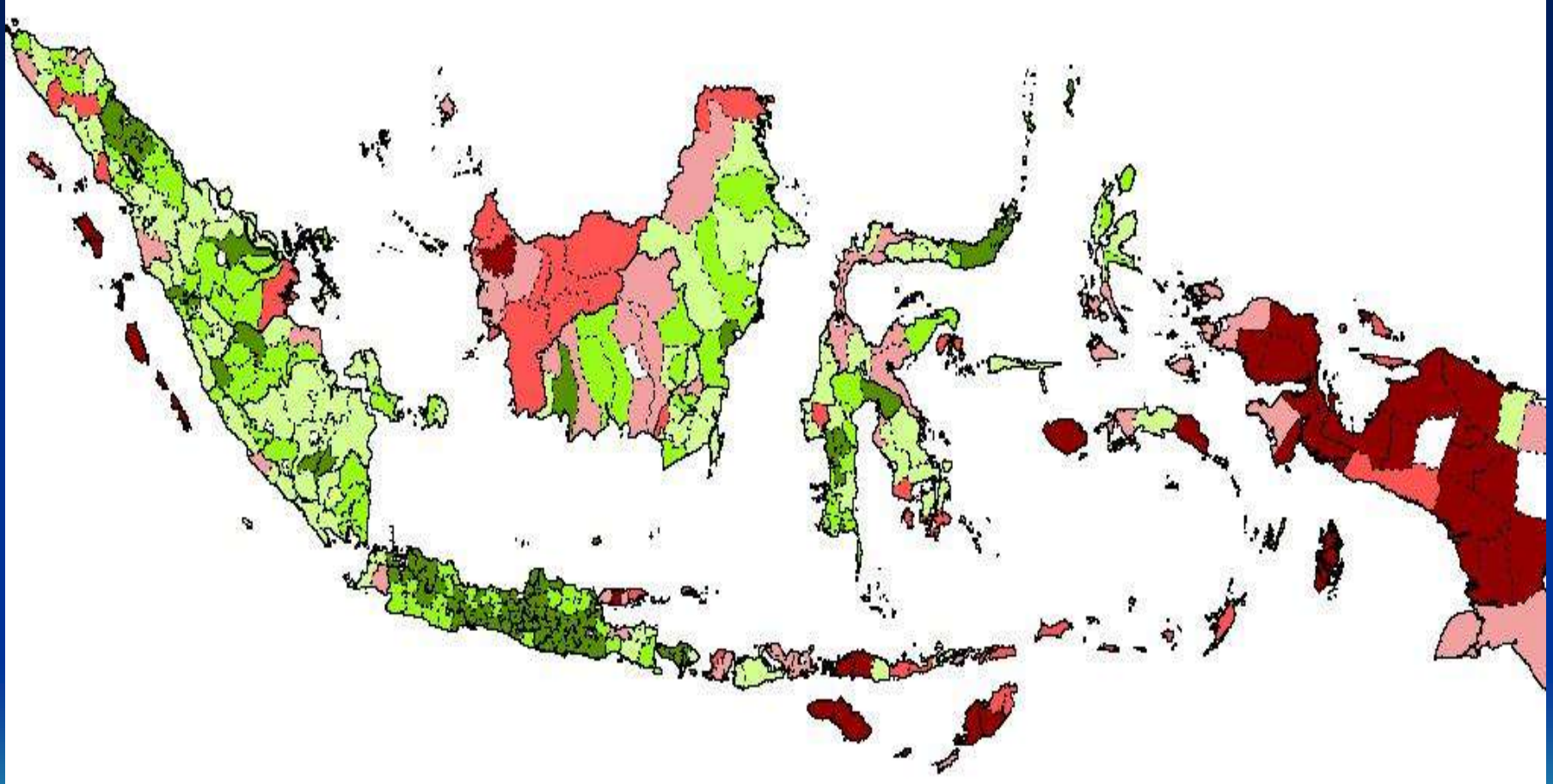
1. To investigate food security at household level
2. To identify determinants of Indonesian household food security



Previous Studies

- Purwantini et.al (2005):(1) more than 30% of Indonesian household was food insecure, 27% in urban and 33% in rural areas, (2) 5 out of 26 provinces in Indonesia had a high level of food insecurity i.e.: East Java, East Nusa Tenggara, Central Java, Jambi and Yogyakarta; 3 out of 26 provinces had a low level of food insecurity i.e: West Sumatera, Jakarta and Bali; and the rest of provinces had a moderate level of food insecurity, (3) 47% of Indonesian household was food vulnerable, 34% in urban and 56% in rural areas, and (4) 10% of Indonesian household was food less secure, 18% in urban and 5% in rural areas

Food Insecurity Map in Indonesia



Source: BKP (2010)

Data and Measurement

- Source: National Socio-Economic Survey (Susenas) conducted by Indonesian Central Bureau of Statistic in 2007
- Number of Sample: 64,880 household
- Household food security is measured by Jonnson and Toole (1991) methods i.e.: cross analysis between share of food expenditure and consumption of energy.



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- Share of food expenditure: (1) low if $\leq 60\%$ and (2) high if $> 60\%$
- Consumption of energy: (1) sufficient if $> 80\%$ of standard requirement and (2) not sufficient if $\leq 80\%$ of standard requirement. According to national food and nutrition symposium in 2004, standard requirement of energy consumption in Indonesia is 2,000 kcal/cap/day.



Table 1. Classification of Household Food Security

Consumption of energy by adult	Share of food expenditure	
	Low ($\leq 60\%$ of expenditure)	High ($> 60\%$ of expenditure)
Sufficient ($> 80\%$ of requirement)	Secure	Vulnerable
Not sufficient ($\leq 80\%$ of requirement)	Less secure	Insecure

Source: Maxwell, D et al (2000)



Ordinal Logistic Model

$$L_i = \ln\left(\frac{P_i}{1 - P_i}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_{24} X_{24}$$

L_i = Household food security level

(1-insecure, 2-less-secure, 3-vulnerable and 4-secure)

X_1 = price of rice (Rp/cal.)

X_2 = price of root and tuber crops (Rp/cal.)

X_3 = price of fish (Rp/cal.)

X_4 = price of eggs and milk (Rp/cal.)

X_5 = price of meat (Rp/cal.)

X_6 = price of vegetables (Rp/cal.)



X_{19} = education of household head (1-not finished elementary school, 2-elementary school, 3-junior high school, 4-senior high school, 5-Bachelor, 6-undergraduate and 7-postgraduate)

X_{20} = household member (persons)

X_{21} = kind of employment (1-farm, 0-otherwise)

X_{22} = status of employment (1-entrepreneur, 0-otherwise)

X_{23} = status of household (1-complete wife and husband, 0-otherwise)

X_{24} = area (1-urban, 0-otherwise)

β_0 = constant

$\beta_1 \dots \beta_{24}$ = coefficient of regression



X_7 = price of beans (Rp/cal.)

X_8 = price of fruits (Rp/cal.)

X_9 = price of oil and fats (Rp/cal)

X_{10} = price of sugar (Rp/cal.)

X_{11} = price of spices (Rp/cal.)

X_{12} = price of mie instant (Rp/cal.)

X_{13} = price of food and beverages (Rp/cal.)

X_{14} = price of cigarette (Rp/unit)

X_{15} = Household income (Rp/cap/month)

X_{16} = asset ownership (m^2)

X_{17} = age of household head (years)

X_{18} = gender of household head (1-male, 0-others)

RESULT AN DISCUSSION



Table 2. Number and Percentage of Household by Share of Food Expenditure in 2007

Area	<u>High (> 60%)</u>		<u>Low (≤ 60%)</u>		HH
	HH	%	HH	%	
Rural	17,138	44%	22,115	56%	39,253
Urban	3,454	13%	22,173	87%	25,627
Rural+Urban	20,592	32%	44,288	68%	64,880

Table 3. Share of Household Food Expenditure in Indonesia in 2007

Area	High (> 60%)	Low (\leq 60%)	Average (%)
Rural	68%	48%	57%
Urban	66%	42%	45%
Rural+Urban	68%	45%	52%



Table 4. Number and Percentage of Household by Energy Consumption in Indonesia in 2007

Area	<u>Not sufficient</u> (≤ 1600) kcal		<u>Sufficient</u> (> 1600 kcal)		HH
	HH	%	HH	%	
Rural	7,995	20%	31,258	80%	39,253
Urban	5,777	23%	19,850	77%	25,627
Rural+Urban	13,772	21%	51,108	79%	64,880



Table 5. Household Energy Consumption in Indonesia in 2007

Area	Not Sufficient (≤ 1600) (kcal/cap/day)	Sufficient (> 1600) (kcal/cap/day)	Average (kcal/cap/day)
Rural	1,375	2,374	2,171
Urban	1,377	2,316	2,105
Rural+Urban	1,376	2,352	2,145

Table 6. Number and Percentage of Household by Food Security Level in Indonesia in 2007

Area	<u>Insecure</u>		<u>Less-secure</u>		<u>Vulnerable</u>		<u>Secure</u>		HH
	HH	%	HH	%	HH	%	HH	%	
Rural	3,136	8%	4,859	12%	14,002	36%	17,256	44%	39,253
Urban	580	2%	5,197	20%	2,874	11%	16,976	66%	25,627
Rural+Urban	3,716	6%	10,056	15%	16,876	26%	34,232	53%	64,880



Regression Analysis: Prices factors

Variables	Exp sign	Rural	Urban	Rural+Urban
Price of rice	-	-0.031905 ***	0.002210	-0.007700
Price of root and tuber crops	-	-0.000972	-0.000784 *	-0.000797 **
Price of fish	-	-0.001537 ***	-0.000260	-0.000806 ***
Price of meat	-	-0.000449	-0.000609 *	-0.000484 **
Price of eggs and milk	-	-0.001839 ***	-0.002393 ***	-0.002062 ***
Price of vegetable	-	-0.000102	-0.001119 ***	-0.000631 ***
Price of beans	-	-0.001538	-0.003060 ***	-0.002656 ***
Price of fruit	-	-0.001158 ***	-0.000819 ***	-0.000931 ***
Price of oil and fats	-	0.002162	-0.003606	-0.002962
Price of sugar	-	0.002219	-0.001410	-0.000306
Price of spices	-	0.000131	4.44E-05	7.13E-05
Price of mi instant	-	-0.000403	-0.002234	-0.001024
Price of food and beverages	-	-0.002580 ***	-0.001073 ***	-0.001540 ***
Price of cigarette	+/-	8.03E-05	2.42E-06	3.32E-06
Income	+	8.69E-06 ***	5.42E-06 ***	6.38E-06 ***

Regression Analysis: Non-Prices factors

Variables	Exp sign	Rural	Urban	Rural+Urban
Asset ownership	+	0.005330 **	0.000457	0.001813 **
Age	+/-	0.010059	0.018977 ***	0.014551 ***
Gender	+/-	0.228625	0.545113	0.383750
Education	+	0.120434 **	0.073828 *	0.084176 ***
Household member	+/-	-0.046728	-0.200297 ***	-0.138437 ***
Kind of employment	+	-0.563385 ***	-0.125874	-0.409679 ***
Status of employment	+	0.165862	0.041214	0.083009
Status of household head	+	-0.120761	-0.205368	-0.095595
Area	+			-0.119845
Log likelihood		-914.2749	-1344.188	-2396.299
LR statistic (21 df)		401.6111	425.0585	795.2915
Probability(LR stat)		0.000000	0.000000	0.000000
LR index (Pseudo-R2)		0.180082	0.136524	0.142324
N		1335	2253	3588

CONCLUSION

- Indonesian household is classified into food secure household 53%, food vulnerable household 26%, food less secure household 15%, and food insecure household 6%.
- Probability of household food security was sensitive to prices changes, income, asset ownership, age, education, number of household member and kind of employment
- Probability of household food security in rural and urban was not different
- Probability of farm HH FS was lower than that of non farm HH

IMPLICATION

- An integrated and parallel approach to avoid household food insecurity should be taken by establishing an effective food prices policy (especially rice); increasing household income through creating new employment opportunity and entrepreneur, improving effectiveness of family control program; improving education, and optimizing resources allocation.

