

Regional Disparity in Accessibility to Non-Farm Economic Involvement among Rural Indonesian Households

Takayoshi Kusago

Indonesia had achieved high economic growth in the late 1980s and the first half of the 1990s. Yet rural poverty is pervasive and widespread across the country. Recently, the significance of rural non-farm economic activities has received much attention for stabilizing household income of the rural poor. This paper focuses on factors that influence rural Indonesian households' accessibility to non-farm economic activities. It has tested the propensity of non-farm economic engagement among rural households by incorporating community and household characteristics. A simple econometric analysis with the country-wide sample has found that household demographic structure, educational attainment, rural infrastructure, agricultural technology, local market and geographical factors are the major determinants. However, the econometric analysis with five regional-based sub-samples have shown that main determinants are not the same as those found in the country-wide sample, and they do vary across the different regions. This paper suggests that it is very important to understand region-specific household and community characteristics in order to design effective development policy tools and to have more viable non-farm economic activities in rural Indonesia.

Emergence of Non-Farm Economic Activities and Poverty Reduction

Rural development has regained its attention lately as the discussion over poverty reduction has come to fore. The level and sources of income for rural poor households have become far more important than ever. In particular, the role of non-farm income has received much attention from policy-

makers and researchers, partly because such income could minimize seasonal farm-income fluctuations and reduce overall household economic risks (IFAD 2001).

Empirical evidences on the impacts of non-farm economic activities on local economy can be found in Choe and Lo (1986), Saith (1992), FAO (1998), and IFAD (2001). Rural non-farm activities have

grown and become a more significant determinant of the level of household income for the poor. In Latin America and the Caribbean, as Reardon, Berdegue and Escobar (2001) have shown, rural non-farm economic activities have represented a very high portion of total income among poor households — more than 40 per cent of total rural income in the late 1990s. Moreover, they have clearly pointed out that some rural non-farm activities surpass income earned in other services, and even in the manufacturing sector.

In Asia, the extent of rural non-farm activities has become significant. The proportion of rural workforce engaged in rural non-farm activities was between one-quarter to one-half of all gainfully employed people in most of the Asian countries (Ahmed 1995/96). The number of non-farm employment in Asia has also been on the rise over the recent decades.

With the rising importance of non-farm economic activities, especially for rural poor households, economists have started to analyse various forms of non-farm economic activities and availability of such non-farm activities in rural areas.

Some have considered non-farm economic activities as a productive economic means. It has been argued that small-scale non-farm economic activities provide jobs with high productivity in rural areas, compared with what large-scale enterprises provide because of their low cost per unit of labour (Naya 1985; Vijverberg 1991). Ranis and Stewart (1993) have explained how Taiwan accomplished its expansion of rural non-farm activities based on its successful human capital development, provision of rural infrastructure, and linkages of small-scale and large-scale industries in its production of tradable goods.

Non-farm rural development has received much attention because the involvement of non-farm business could increase income inequality among those living in rural areas (Reardon, Stamoulis, and Berdegue 1998). Diversity in rural income and its implications on the household income have been raised and discussed among development researchers. Gordon (2000) has raised the issue of access rather than availability of non-farm

employment opportunities at the household level. However, not much effort has been done to examine the determinants of non-farm business involvement by combining household and community level characteristics to identify what factors influence the access to non-farm income earning opportunities among rural households.

Indonesian Experiences in Non-Farm Economic Activities

In Indonesia, the issue of non-farm employment has been discussed recently. In the early 1980s, major reasons for being interested in rural non-farm economic activities were to counter the weak absorption of labour in Indonesian agriculture (Abey, Booth, and Sundrum 1981), but the type of non-farm economic activities analysed was limited to hired labour. Kasryno (1986) has also explained an increasing trend in wage employment and wage rate in the context of structural changes in rural and urban economies in Indonesia.

Rietveld (1986) has shown that income from non-farm activities is much more important for landless and small-scale landholders than large-scale landholders. In the 1990s, however, less attention was given to non-farm employment, mainly because higher economic growth obtained through outward-looking industrialization, especially in urban export processing zones, obscured the marginal impact of the non-farm based activities on rural household income. After the economic crisis seriously hit the country in 1997 and 1998, non-farm activities received attention once again, and the discussion now revolves around small-scale rural industries and businesses (Tambunan 2000).

Some rural households have started non-farm economic activities, notwithstanding the pros and cons of these activities. The reasons behind the decision to start non-farm activities vary among countries, areas, and households. However, this involvement could make a major impact on the well-being of household members. If non-farm activities do help rural households improve their economic welfare, major determinants of the level of the accessibility need to be identified by

incorporating both community and household characteristics.

ANALYSIS OF ACCESSIBILITY TO NON-FARM ECONOMIC ACTIVITIES

Data

The Indonesian Family Life Survey 1993 (IFLS-1), collected jointly by RAND Corporation and the University of Indonesia, was used for this analysis. The IFLS household sample design selected areas first, then households for interviews, and then selected respondents within the households. The IFLS sampling scheme was stratified into provinces, then randomly sampled enumeration areas (EAs)¹ within provinces using the 1993 SUSENAS (Indonesian Socio-Economic Survey) sampling frame designed by the Indonesian Central Bureau of Statistics (BPS). Within an EA, households² were randomly chosen by field teams, based on the 1993 SUSENAS listings obtained from regional offices of the BPS. The IFLS-1 covers a sample of over 7,200 urban and rural households in 321 EAs spread across 13 provinces. The provinces encompass around 83 per cent of the Indonesian population. The IFLS-1 provides detailed information of individuals and households ranging from economic well-being, education, labour market outcomes to health. It also provides information about the EAs where the households were located, including rural infrastructure, the physical and social environment, and the main economic sector.

For the analysis of non-farm business in rural Indonesia, the household and community modules of the IFLS-1 were used. A file for the rural households was created with its community information after the data were analysed. The samples used in this study were selected if their households had some labour-income, and were categorized according to the working status of the household heads: self-employed, wage-employed, engaged in family work, and unemployed. In the process, households and communities with

incomplete information were removed from the compiled file. In total, the file consists of 3,364 rural households and 131 EAs.³

Descriptive Statistics

The main concern of this study is which household and community factors influence the access of households to non-farm business activities in rural Indonesia. First, the dataset used in this analysis is described to show its main characteristics. Then, it is examined in a quantitative manner.

As shown in Table 1, 1,014 households (30.1 per cent) have non-farm household business, and the Java regions have the most number of families running non-farming business.

Rural Infrastructure

Rural basic infrastructure might influence the households' decisions to start non-farm business. As the country-wide data show, slightly less than half (46.6 per cent) of main rural roads are covered with asphalt. Nearly one-fourth (23.7 per cent) is still dirt roads. However, there are regional variations to this composition. For example, asphalt covers more than half of rural roads in East Java, while it does only less than one-third in central part of the Java Island. In other regional groups, more than 90 per cent of rural roads are covered with asphalt or paved. More than 80 per cent of rural communities have electricity services in 1992-93.⁴ However, this coverage is very low in Sumatra (66.7 per cent). The level of rural infrastructure might influence households' decision to start a non-farm business.

Agricultural Technology

Most rural families depend on farming for their livelihood. If the households live in a community fully equipped with higher agricultural technology, which yields higher agricultural productivity, they are less likely to have non-farm business. The type of irrigation systems and the presence of extension services could measure the level of agricultural technology in a rural community. More than 60

TABLE 1
Descriptive Statistics of Rural Households and Communities

	Indonesia		Sumatra		West Java		Central Java		East Java		Other Islands	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<i>Households (number)</i>	3,364	100.0	800	23.8	537	16.0	633	18.8	725	21.5	669	19.9
Own Non-farm Business	1,014	30.1	217	27.1	187	34.8	178	28.1	243	33.5	189	28.3
<i>Communities (number)</i>	131	100.0	33	25.2	20	15.3	24	18.3	29	22.1	25	19.1
A. Rural Infrastructure												
Type of Local Roads												
Asphalt	61	46.6	13	39.4	9	45.0	7	29.2	15	51.7	17	68.0
Paved	39	29.8	7	21.2	6	30.0	15	62.5	5	17.2	6	24.0
Dirt	31	23.7	13	39.4	5	25.0	2	8.3	9	31.0	2	8.0
Electricity	106	80.9	22	66.7	18	90.0	21	87.5	25	86.2	20	80.0
B. Agricultural Technology												
Irrigation (number)	81	61.8	11	33.3	19	95.0	18	75.0	21	72.4	12	48.0
Extension Services	98	74.8	24	72.7	15	75.0	21	87.5	17	58.6	21	84.0
C. Economic Institutions												
Local Markets	32	24.4	8	24.2	1	5.0	7	29.2	9	31.0	7	28.0
Any Factories	21	16.0	4	12.1	5	25.0	3	12.5	6	20.7	3	12.0
Public Works Programmes	15	11.5	4	12.1	2	10.0	5	20.8	1	3.4	3	12.0
Financial Institutions	57	43.5	5	15.1	10	50.0	19	79.2	13	44.8	10	40.0
D. Geographical Conditions												
Plains	72	55.0	14	42.4	16	80.0	13	54.2	17	58.6	12	48.0
Mountainous	19	14.5	6	18.2	1	5.0	3	12.5	7	24.1	2	8.0
Hilly	40	30.5	13	39.4	3	15.0	8	33.3	5	17.2	11	44.0
Coastal	21	16.0	5	15.2	1	5.0	1	4.2	9	31.5	5	20.0

per cent of the rural communities have irrigation systems and half of them have technical irrigation systems. The spread of such irrigation systems is most prevalent in West Java (95 per cent), while the least coverage is identified in Sumatra (33.3 per cent). Extension services are found across the country except in East Java.

Economic Institutions

Households might consider their own local economic market situations: product, capital, and labour markets. The conditions of these local markets might influence the households' decisions on non-farm business. The presence of a local market could positively influence the decision, while the presence of factories and public works programmes, which provide job opportunities for rural families, could negatively influence the decision. A local market is present in about one-fourth of the rural communities. However, in West Java, this ratio is extremely low (5 per cent).⁵ There are not many communities with factories of any type in their own territory, except West Java. Surprisingly, the number of rural communities with public works programmes is very low across the regions. The presence of financial institutions might affect the households' decision to start their own non-farm business. Less than half of the communities have financial institutions. Sumatra has the lowest number of communities with at least one financial institution.

Geographical Characteristics

Each community has its unique geographical characteristics. The location of a community might affect rural households to start a business although this mostly depends on the type of non-farm business they operate in. The share of the rural communities in hilly areas amounts to 30 per cent. But again there are regional variations, and in other islands, mostly Kalimantan, nearly half are located in hilly areas. In East Java, the share of the number of communities along the coast is the highest among the five regional groups, partly because this group includes the island of Bali.

Factors of Accessibility to Non-Farm Rural Economic Activities

The IFLS-1 asked each household if it has non-farm business solely owned by the family. Using this information as the dependent variable, this study carried out a simple econometric exercise over the main factors determining the access to non-farm business activities among rural households.

The dependent variable is a binary choice: 1, if households have non-farm business activities by its own; and 0, if not. The independent variables consist of household and community level factors.

The first group of variables considers household characteristics. These include household demographic compositions by age and gender, educational attainment, and religious orientation. The second group of variables considers rural communities through a number of indices. These indices include the geographical characteristics of the communities, the presence of a local market, the presence of irrigation systems, the presence of agricultural extension services, the type of main local road, the availability of electricity, the presence of factories, and the presence of financial institutions. These characteristics could measure the local economic environment directly or indirectly. (See the Appendix for the variable definitions.)

Country-wide Sample Analysis

Table 2-A presents the results of the multivariate probit estimation for all rural Indonesian households. The analysis consisting of household and community level factors are found to be significant determinants of non-farm business.

At the household level, the family composition variables by gender and age have shown some interesting contrasts. The estimated coefficients of both the number of middle-aged and senior male members are negative and significant at 5 per cent and 1 per cent levels, respectively, while the estimated coefficients of middle-aged females are positive and significant at 1 per cent level. This implies that women are most likely to engage in

TABLE 2
Probit Estimations on Rural Households with Non-Farm Businesses

A. Rural Indonesia (n = 3364)				B. Sumatra (n = 800)			
Variable	Coefficient	S.E.	z	Variable	Coefficient	S.E.	z
m_youth	-0.0668	0.0412	-1.6200	m_youth	-0.0545	0.0882	-0.6180
f_youth	0.0159	0.0440	0.3620	f_youth	-0.1579	0.0927	-1.7030
m_middle	-0.1225	0.0597	-2.0530*	m_middle	-0.1370	0.1381	-0.9920
f_middle	0.1761	0.0571	3.0850**	f_middle	0.0676	0.1425	0.4740
m_senior	-0.2507	0.0672	-3.7310**	m_senior	-0.2837	0.1562	-1.8170
f_senior	0.1164	0.0606	1.9200	f_senior	0.0950	0.1434	0.6620
n_sch	-0.0139	0.0221	-0.6310	n_sch	-0.0849	0.0525	-1.6190
primary	0.0507	0.0202	2.5120*	primary	0.0790	0.0435	1.8180
j_high	0.0834	0.0348	2.3990*	j_high	0.1180	0.0710	1.6620
s_high	0.0925	0.0421	2.1960*	s_high	0.1965	0.0876	2.2430*
pos_sec	0.0636	0.1000	0.6360	pos_sec	0.3128	0.1951	1.6030
muslim	0.2708	0.0798	3.3940**	muslim	0.7388	0.1993	3.7070**
asphalt	0.0246	0.0662	0.3720	asphalt	-0.1197	0.1633	-0.7330
paved	-0.0602	0.0703	-0.8560	paved	0.1238	0.1607	0.7700
electricity	0.3932	0.0719	5.4670**	electricity	0.2528	0.1357	1.8630
irrigation	-0.0104	0.0536	-0.1940	irrigation	0.0250	0.1366	0.1830
extension	0.1287	0.0590	2.1810*	extension	0.5090	0.1716	2.9670**
market	0.1183	0.0571	2.0730*	market	-0.1450	0.1537	-0.9430
factory	0.1280	0.0680	1.8820	factory	0.3861	0.1782	2.1660*
pub_work	-0.0207	0.0738	-0.2800	pub_work	-0.2315	0.2197	-1.0540
mountain	-0.0097	0.0761	-0.1280	mountain	-0.1052	0.2615	-0.4020
hilly	-0.1500	0.0558	-2.6860**	hilly	-0.3323	0.1316	-2.5250*
coastal	0.1877	0.0679	2.7640**	coastal	0.6544	0.2160	3.0290**
f_inst	-0.0016	0.0232	-0.0690	f_inst	0.3364	0.1759	1.9130
_cons	-1.3782	0.1350	-10.2070**	_cons	-1.8863	0.3044	-6.1970**

non-farm activities, while men control farming in rural Indonesia. The results also imply that the type of work could be small-scale services and trades where women workers tend to be dominant in rural areas. Regarding the human capital formation of rural households, the estimated coefficients of educational attainment variables are all positive, and it shows that educational background is helping families to start non-farm activities. However, the estimated coefficient of post-secondary school is not significant, which implies that higher level of educational attainment has no influences over the non-farm business engagement. This might be an issue, which requires further examination together

with migration flows from rural to urban areas among those who have advanced to the tertiary education. Interestingly, Muslim families tend to have non-farm business in rural Indonesia, though this study has no further information to analyse why and how Muslims are more involved in non-farm activities.

At the community level, the results suggest that communities located in coastal areas are more likely to have non-farming business activities and those in higher altitude (more than 700 metres) are less likely to have non-farm activities both at 1 per cent significance level. The presence of a local market is positively significant, at 5 per cent level,

TABLE 2 (cont'd)

C. West Java (n = 537)				D. Central Java (n = 633)			
Variable	Coefficient	S.E.	z	Variable	Coefficient	S.E.	z
m_youth	-0.0919	0.0993	-0.9260	m_youth	-0.0901	0.1022	-0.8820
f_youth	0.1200	0.1236	0.9710	f_youth	-0.1358	0.1246	-1.0900
m_middle	-0.1380	0.1503	-0.9180	m_middle	-0.1068	0.1498	-0.7130
f_middle	0.2740	0.1537	1.7830	f_middle	0.3579	0.1523	2.3490*
m_senior	-0.1020	0.1767	-0.5770	m_senior	-0.2057	0.1548	-1.3290
f_senior	0.0838	0.1552	0.5400	f_senior	0.2056	0.1502	1.3690
n_sch	-0.0379	0.0539	-0.7030	n_sch	0.0017	0.0653	0.0250
primary	0.0631	0.0523	1.2060	primary	0.0731	0.0546	1.3370
j_high	-0.0368	0.0994	-0.3700	j_high	0.1892	0.0876	2.1590*
s_high	-0.0325	0.1286	-0.2530	s_high	-0.0297	0.1056	-0.2810
pos_sec	-0.7040	0.5853	-1.2030	pos_sec	-0.1910	0.2826	-0.6760
asphalt	0.3327	0.1844	1.8040	muslim	0.2717	0.2848	0.9540
paved	-0.1306	0.2388	-0.5470	asphalt	-0.2730	0.3151	-0.8670
electricity	0.7093	0.2688	2.6390**	paved	0.3030	0.3698	0.8190
irrigation	0.6890	0.3950	1.7440	electricity	0.5385	0.3451	1.5600
extension	-0.2657	0.2225	-1.1940	irrigation	-0.1864	0.1848	-1.0090
market	-0.8842	0.3817	-2.3170*	extension	0.0069	0.3347	0.0210
factory	-0.0669	0.2406	-0.2780	market	0.3993	0.1528	2.6140**
pub_work	-0.0819	0.2196	-0.3730	factory	0.2959	0.2287	1.2940
mountain	-0.9496	0.3610	-2.6300**	pub_work	0.7178	0.2090	3.4340**
hilly	0.0144	0.2547	0.0570	mountain	-0.0876	0.2644	-0.3310
coastal	0.1266	0.3117	0.4060	hilly	0.4459	0.2072	2.1520*
f_inst	0.0539	0.0962	0.5610	coastal	0.8786	0.3852	2.2810*
_cons	-1.7668	0.5272	-3.3510**	f_inst	0.0769	0.0703	1.0940
				_cons	-2.3224	0.6051	-3.8380**

to influence non-farm business activities. The presence and the quality of local roads are not major factors to influence local households' access to the non-farm economic activities. The estimated coefficient of factory variable is positive but not significant for non-farm business engagement, which could be an issue for further analysis in line with the effectiveness of Indonesian rural industrial development policy. The estimated coefficient of presence of public works programme is not significant at all, and this could question the effectiveness of such government employment generation programme in generating non-farm employment opportunities among rural Indonesian people. The presence of agricultural

extension services is positive and significant at 5 per cent level for non-farm business involvement, while irrigation is indifferent to the outcome.⁶

Regional Variations in Determinants of Accessibility to Non-Farm Economic Involvement

We have thus far seen the determinants of non-farm business activities at the country level. However, Indonesia consists of big and small islands with different cultural heritage, ethnicity, language, and natural resources. Although the number of samples used for the country-wide exercise was large, it might not capture "regional-

TABLE 2 (cont'd)

E. East Java (n = 725)				F. Other Islands (n = 669)			
Variable	Coefficient	S.E.	z	Variable	Coefficient	S.E.	z
m_youth	-0.2849	0.1029	-2.7690**	m_youth	0.0530	0.0978	0.5420
f_youth	-0.1661	0.1051	-1.5810	f_youth	0.2359	0.0917	2.5730**
m_middle	-0.1228	0.1291	-0.9510	m_middle	-0.1472	0.1420	-1.0370
f_middle	0.0330	0.1247	0.2650	f_middle	0.1966	0.1199	1.6400
m_senior	-0.3956	0.1457	-2.7150**	m_senior	-0.2493	0.1668	-1.4950
f_senior	0.0697	0.1326	0.5260	f_senior	0.1338	0.1473	0.9080
n_sch	-0.0341	0.0557	-0.6110	n_sch	-0.0051	0.0512	-0.1000
primary	0.0806	0.0499	1.6140	primary	0.0244	0.0473	0.5160
j_high	0.2259	0.0940	2.4040*	j_high	0.1191	0.0786	1.5150
s_high	0.2459	0.1070	2.2990*	s_high	0.1685	0.0927	1.8170
pos_sec	0.1846	0.2333	0.7910	pos_sec	-0.0188	0.2085	-0.0900
muslim	-0.0248	0.1785	-0.1390	muslim	1.0081	0.2641	3.8170**
asphalt	0.1718	0.1767	0.9730	asphalt	-0.6524	0.2885	-2.2620*
paved	-0.5402	0.2028	-2.6640**	paved	-0.7057	0.3931	-1.7950
electricity	0.4706	0.2387	1.9720*	electricity	0.1672	0.1858	0.9000
irrigation	-0.2919	0.1500	-1.9450	irrigation	0.0124	0.1567	0.0790
extension	0.0440	0.1378	0.3190	extension	0.2347	0.2066	1.1360
market	0.4616	0.1463	3.1560**	market	-0.1538	0.1548	-0.9930
factory	0.1181	0.1657	0.7130	factory	-0.2883	0.2314	-1.2460
pub_work	-0.0066	0.2938	-0.0220	pub_work	-0.1780	0.2040	-0.8730
mountain	0.0800	0.1503	0.5320	mountain	-0.1472	0.3514	-0.4190
hilly	0.3702	0.1970	1.8790	hilly	-0.0199	0.1659	-0.1200
coastal	-0.1465	0.1898	-0.7720	coastal	0.1649	0.1787	0.9230
f_inst	-0.0707	0.0826	-0.8550	f_inst	0.1727	0.0576	2.9970**
_cons	-0.7848	0.3683	-2.1310*	_cons	-1.6396	0.4309	-3.8050**

NOTES: * 5 per cent, ** 1 per cent significance levels.

based characteristics or traits", which could be significant to some region. Thus, it is worthwhile to examine whether commonalities and differences exist across Indonesia in terms of factors influencing the non-farm business activities. This paper categorized thirteen provinces into five major geographical groups (Sumatra, West Java, Central Java, East Java, and Other Islands), and applied the same econometric model used for the country-wide analysis to each of the five regional samples. The results are presented in Tables 2-B through 2-F. The results and regional variations are shown along the same line as the analysis on the country-wide sample case: by household level

factors, such as family structure, educational attainment, religion, and by community level factors, such as economic infrastructure (road and electricity), agricultural technology (irrigation and extension services), private and public employment generation (factory and public works programmes), financial institutions, and geographical traits.

Household Level Factors

The five regional-based results have shown different pictures in household level factors for the non-farm business engagement outcome. First, the

estimated coefficients of family structure variables, which are significant at the country-wide analysis, are not significant for Sumatra and West Java. For the rest of the regions, a few of the estimated coefficients are significant for the outcome. In East Java, the estimated coefficients of male youth and senior are negatively significant at 1 per cent level. In Central Java and the Other Islands, the estimated coefficients estimates of female variables are positive and significant.

Educational attainment has shown similar variations between the country-wide analysis and the regional-based ones. All the estimated coefficients of educational terms in the country-wide case have shown that there are some positive correlation between the level of education attained by household members and their non-farm business involvement. However, in West Java and the Other Islands, none of the estimated coefficients related to educational attainment are significant for the outcome. Only in East Java, similar to the result of the country-wide analysis, the estimated coefficients related to high-school education are positive and significant.

Lastly, religious factor shows interesting variation across the regions, which was not seen in the country-wide analysis. In Sumatra and the Other Islands, the estimated coefficient of Muslim is positive and significant at 1 per cent level, while it is indifferent to the outcome in other regions.

Community Level Factors

Community level factors include range of variables: economic infrastructure (road and electricity), agricultural technology (irrigation and extension services), private-led and public-led employment generation (factory and public works programmes), financial institutions, and geographical traits. It is interesting to compare the econometric results at the country-wide analysis with the regional-based ones.

First, as for economic infrastructure, the estimated coefficients of road variables and electricity have shown wider regional variations. In Sumatra and Central Java, none of the variables are significant for the outcome. In East and West

Java, the estimated coefficient of electricity is positive and significant for the non-farm business involvement. Also, in East Java and the Other Islands, the estimated coefficients of road variables (asphalt and paved) are significant.

Second, as for agricultural technology, the estimated coefficients of irrigation and agricultural extension services are not significant except in Sumatra where agricultural extension is positive and significant at 1 per cent level. It is also found that women tend to be more involved in non-farm economic activities than men, who are dominant in farming in Indonesia.

Third, as for private and public employment generating opportunities, in Sumatra and Central Java, the estimated coefficients of factory work and public works programme are positive and significant while the estimated coefficients in the country-wide case are not. This comparison clearly shows that the level of effectiveness of rural industrial development or of public policy could be different across regions. Similarly, the estimated coefficient of financial institutions varies across the regions. In the Other Islands, it is positive and significant at 1 per cent level, while it is not significant at all for the others.

Lastly, as for geographical factors, the estimated coefficients of mountainous, hilly, or coastal areas are closely correlated to the non-farm business involvement across the cases. The estimated coefficients of mountainous and hilly areas are negative and significant, while the estimated coefficient of coastal areas is positive and significant. These results imply that geographical characteristics influence access to the non-farm business activities among the rural households.

Discussions

This paper has focused on major household and community factors influencing household decisions to start up non-farm business in rural Indonesia. Both the country-wide and regional-based results have shown that there exist regional variations in the effects of household demographic factors, educational attainment, economic infrastructure, technology, and geographic factors.

There are two major contributions of this paper. One is to present regional variations over the major factors influencing the non-farm business involvement. It shows clearly that the country-wide analysis could not be fully utilized to understand why some areas or some households become much more successful than others in their non-farm income earnings. This is particularly important for Indonesia where decentralization has been started with the enactment of the regional autonomy law in 2000. A careful and region-specific research could help to design effective economic policies responsive to local needs and problems.

The other contribution is to present an analytical framework to examine the impacts of non-farm business involvement on regional inequality concerns. This paper has incorporated both household and community level variables to examine how these factors influence households' accessibility to non-farm economic activities. The poor households could diversify their income sources by investing more in education and health; however, these might not be adequate to enable them to take better positions in the local labour

market. In other words, disaggregated community level characteristics could differentiate the active involvement of households in their non-farming income-generating activities.

However, there are some drawbacks in this analysis. For instance, the dataset is not complete considering that there is no detailed information over history and type of households' non-farm businesses. This constrained us to incorporate limited number of household level factors, which might not fully capture the households' economic situation, in our reduced form estimation analysis. Thus, the results should be regarded as partial and preliminary.⁷

A careful analysis of the main factors influencing rural households' accessibility to non-farm economic opportunities could help to form a better and effective policy tool to reinforce rural household economies and reduce poverty in Indonesia. This paper suggests that rural infrastructure development and human capital formation, especially for women, could help rural poor households to start up non-farm economic activities.

APPENDIX

Variable Definitions

<i>Variable</i>	<i>Definition</i>
demography m_youth, f_youth m_middle, f_middle m_senior, f_senior	Number of male (m) or female (f) members aged between 15 and 25 Number of male (m) or female (f) members aged between 26 and 55 Number of male (m) or female (f) members aged between 56 and over
education n_sch primary j_high s_high pos_sec	Number of members with No Schoolings Number of members with Primary School Education Number of members with Junior High School Education Number of members with Senior High School Education Number of members with Post Secondary School Education
muslim	Household's Religion (Dummy; 1 if Muslim)
local roads asphalt paved	Type of local roads (Dummy; Base = Dirt roads) Asphalt Roads (Dummy) Paved Roads (Dummy)
electricity	Spread of electricity in a community (Dummy; 1 if exists)
irrigation	Presence of irrigation system in a community (Dummy; 1 if exists)

Variable Definitions (cont'd)

<i>Variable</i>	<i>Definition</i>
extension	Presence of Extension services (Dummy; 1 if exists)
market	Presence of Local Market in a community (Dummy; 1 if exists)
factory	Presence of Factories in a community (Dummy; 1 if exists)
pub_work	Presence of Public Work Programmes in a community (Dummy; 1 if exists)
f_inst	Number of Financial Institutions in a community
geography mountain hilly	Geographical information of a community (Dummy; Base = Plains) Mountainous area Hilly area
coastal	Coastal line (Dummy; 1 if coastal)

NOTES

This study was funded by the Japan Center for Economic Research (JCER) and the World Bank as a part of the project "Dynamics of Rural Sector Growth". The author is grateful to the two anonymous referees for their helpful suggestions and comments. The findings and conclusions in this paper are those of the author and do not reflect the views of the United Nations Development Programme (UNDP), JCER, and the World Bank.

1. Random selection of the EAs oversampled urban EAs and EAs in smaller provinces to facilitate urban-rural and Javanese-non-Javanese comparisons. Thus, sampling weights provided with the data adjust for this oversampling.
2. A household was defined as a group of people whose members reside in the same dwelling and share food from the same cooking pot (the standard BPS definition). Twenty households were selected from each rural EA (Frankenberg et al. 1995).
3. The number of households omitted from the original file was about 8 per cent. The characteristics of the omitted cohort were examined to determine whether it is distinctive from the households included in this analysis. No such differences between the two cohorts were found.
4. This electricity ratio represents only samples included in the IFLS-I survey data used in this study. It is important to caution that there might be some gaps between sampled data and population-wide data.
5. This low ratio might be associated with the selection of the samples framed by BPS. In West Java, the presence of markets in the EAs might not indicate correctly the level of economic development of the areas, since the province is well urbanized and has many urban centres. Thus, rural EAs in West Java might have easy access to the urban markets and, as a result, the number of EAs with local markets are not as many as those in other provinces.
6. The interactive term was examined but no impacts over the outcome were found.
7. IFLS is a panel data, and it could give an opportunity to explore these issues in the series of the data collection in the near future. IFLS 1997 has been completed and is available. However, this study did not use it for analysis since the data collection was carried out in 1997 and 1998, when the Asian financial crisis was at its height in the country. Thus, instead of using the 1997 dataset, the author has decided to wait for the IFLS 2000, which is currently not available yet. See Estudillo and Otsuka (1999) for a panel study on the non-farm employment issues in the Philippines.

REFERENCES

- Abey, A., Anne Booth, and R. M. Sundrum. "Labour Absorption in Indonesian Agriculture". *Bulletin of Indonesian Economic Studies* XVII, no. 1 (1981): 36-65.

-
- Ahmed, M. U. "Development of Rural Nonfarm Activities: A Dynamic Approach to Poverty Alleviation in Rural Asia". *Regional Development Studies* 2 (Winter 1995/96): 1-22.
- Choe, Y.-B. and F.-C. Lo. "Rural Industrialization and Non-Farm Activities of Asian Farmers". International Seminar on the Role of Rural Industries for National Development in the Asian Region, Seoul, Korea Rural Economics Institute and Asian and Pacific Development Centre, 1986.
- Estudillo, J. P. and K. Otsuka. "Green Revolution, Human Capital, and Off-Farm Employment: Changing Sources of Income among Farm Households in Central Luzon, 1966-1994". *Economic Development and Cultural Change*, 1999, pp. 497-523.
- Food and Agriculture Organization (FAO). *Rural Non-Farm Income in Developing Countries*. Rome: FAO, 1998.
- Frankenberg, E. et al. "The 1993 Indonesian Family Life Survey: Overview and Field Report". Santa Monica, CA: Rand, 1995.
- Gordon, A. "Diversity in Rural Incomes: Issues Affecting Access at Household Level". Paper presented at the Workshop on Non-Farm Rural Development, World Bank, Washington, D.C., 2000.
- IFAD. *Rural Poverty Report 2001*. Oxford: Oxford University Press, 2001.
- Kasryno, F. "Structural Changes in Rural Employment and Agricultural Wage in Indonesia". International Seminar on the Role of Rural Industries for National Development, Seoul, Korea Rural Economics Institute and Asian and Pacific Development Centre, 1985.
- Naya, S. "The Role of Small-Scale Industries in Employment and Exports of Asian Developing Countries". *Hirosubashi Journal of Economics* 26, no. 2 (1985): 147-63.
- Reardon, T., J. Berdegue, and G. Escobar. "Rural Nonfarm Employment and Incomes in Latin America: Overview and Policy Implications". *World Development* 29, no. 3 (2001): 395-409.
- Reardon, T., K. Stamoulis, and J. Berdegue. "The Importance and Nature of Rural Nonfarm Income in Developing Countries with Policy Implications for Agriculturalist". In *The State of Food and Agriculture 1998*. Rome: FAO, 1998.
- Rietveld, P. "Non-Agricultural Activities and Income Distribution in Rural Java". *Bulletin of Indonesian Economic Studies* 22, no. 3 (1986): 106-17.
- Saith, A. *The Rural Non-Farm Economy: Processes and Policies*. Geneva: ILO, 1992.
- Ranis, G. and F. Stewart "Rural Nonagricultural Activities in Development: Critical Review of the Hymer-Resnick Z-goods Model". *Journal of Development Economics* 40 (1993): 75-101.
- Tambunan, T. T. H. *Development of Small-Scale Industries during the New Order Government in Indonesia*. Aldershot: Ashgate, 2000.
- Vijverberg, W. "Profits from Self-Employment: The Case of Cote d'Ivoire". *World Development* 19, no. 6 (1991): 683-96.

Takayoshi Kusago is Poverty Advisor at Bangkok SURF, Bureau for Development Policy, UNDP and Associate Professor at the Graduate School of Economics and Business Administration, Hokkaido University, Sapporo, Japan.