DOES SOCIAL CAPITAL IMPROVE FOOD SECURITY? EVIDENCE FROM THE INDONESIAN FAMILY LIFE SURVEY

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ABSTRACT

The government of Indonesia has launched various programs to increase community resilience, but the effectiveness of these programs has yet to be discovered. Previous studies have found a relationship between social capital and improving community food security. However, only limited tracing of rural and urban typologies has been conducted, especially in Indonesia. Therefore, this study analyzes whether social capital improves food security in rural and urban communities in Indonesia. We use data from 10,301 rural and 13,946 urban individuals obtained by the Indonesian Family Life Survey 5 (IFLS5) and employ three variables—bonding, bridging, and community participation—to examine the effect of social capital on food security. The ordered probit regression analysis results show that bridging and community participation significantly increase food security in rural and urban communities. Meanwhile, bonding has no significant effect. We recommend the implementation of efforts to increase social capital, primarily bridging and community participation, in rural and urban areas in Indonesia.

Contribution/Originality: This study assesses the effect of social capital on the food security of rural and urban communities. We employ three social capital variables, namely bonding, bridging, and participation in community activities. Our findings contribute to the literature by proving the impact of social capital based on an urban-rural typology model estimation.

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1. INTRODUCTION

Food security and the diet of the population are crucial challenges in global development (Szabo et al., 2018). FAO (2018) reported that two billion people suffer from malnutrition; 155 million children under 5 are underweight and 41 million are overweight. Food security has become one of the most important goals of governments and international organizations. Indeed, it has been included in the sustainable development goals (SDGs), which pledge to achieve zero hunger, reduce food inequality, and boost nutrition by 2030 (Nkomoki, Bavorová, & Banout, 2019). Efforts to eradicate food insecurity in developing countries have been widely implemented. For instance, the government of Indonesia (GoI) aims to improve its national food security by establishing the Logistics Affairs Agency (BULOG), launching initiatives such as the Special Initiative for Rice, Corn, and Soy (*Upaya Khusus Padi, Jagung dan Kedelai*) and the Special Initiative for Pregnant Cows (*Upaya Khusus Sapi Induk Bunting*), expanding agricultural land and infrastructure, rolling out the

Sustainable Food House Area program (KRPL), Internet-based food price updates (BKP Food Price Panel), and local food industry development programs (Arif, Isdijoso, Fatah, & Tamyis, 2020).

However, FAO, IFAD, UNICEF, WFP, and WHO (2021) have stated that 31 percent of Indonesian households are undernourished, and 38 percent had to cut their food consumption in 2020 compared to the previous year, suggesting that the government's efforts have not been effective. Moreover, FAO data has shown that in 2018-2020, the food insecurity rate in Indonesia rose, and more people fell within the moderate category compared to the period 2014-2016. One possible driver is that the GoI does not consider social capital in its policy formulation. However, social capital plays an essential role in improving economic outcomes (Kairiza, Kembo, Magadzire, & Chigusiwa, 2021; Muringani, Fitjar, & Rodríguez-Pose, 2021; Nugroho, Hanani, Toiba, & Sujarwo, 2022) including food security. Social capital may increase food security through the synergy created by community members' interrelationships at every level of the food supply chain, from production to consumption (Nosratabadi et al., 2020).

Extensive research on the impact of social capital on food security has been carried out to examine its role in the achievement of SDGs (Rabbi, Hasan, & Kovács, 2021). The results suggest that social capital positively correlates with food security (Niles, Rudnick, Lubell, & Cramer, 2021). The impact is indirect yet effective; greater trust and reciprocal relationships strengthen social networks that provide mutual assistance when needed (Gallaher, Kerr, Njenga, Karanja, & WinklerPrins, 2013; Malual & Mazur, 2022). Food security indicators—availability, access, utilization, and stability—are closely related to social capital. Bonding plays a role in the direct distribution of food, while bridging ensures food nutrition standards (Paul, Paul, & Anderson, 2019). However, Kairiza et al. (2021) argued that bonding plays a more critical role in increasing food security than bridging. Either way, people who live in areas where access to food is difficult, poverty is high, and transportation is scarce should benefit from social capital because it allows them to rely on relatives or neighbors to buy food; this reduces costs and improves food variety (Kaiser, Barnhart, & Huber-Krum, 2020).

The effect of social capital on food security has not been widely researched in Indonesia. Therefore, we aim to fill this gap by exploring the effect of social capital on food security in rural and urban locations. It is essential to take the urban-rural settings into consideration because of their significant differences. Urban communities tend to be more individual than rural communities (Freeman, 1997). Individualism makes people pay more attention to cost-benefit, while collectivism encourages people to share resources (Woolcock, 1998). In terms of food variety, rural communities may not have as many options as urban communities (Sibhatu & Qaim, 2017). However, research has also shown that urban residents' purchasing power is diminishing because they have to prioritize housing costs, transportation, and electricity bills (Putra, Tong, & Pribadi, 2020). Additionally, the population growth trends differ. From 1990 to 2021, the population has increased in urban areas and decreased in rural areas, by about 3 million people and -0.24 million people, respectively (Worldbank, 2022). By creating two models based on spatial location, this study can inform policymakers to optimize variables, especially social capital variables, that increase food security in rural and urban communities. OECD (2019) states that some policies have consequences if applied to different spatial areas because each area has a different capacity to implement policies.

This study also aims to fill the gap in the literature (Chhabra, Falciglia, & Lee, 2014) by using a larger sample size to capture social capital, food security, and socio-demographics at the national level. A larger sample size represents the population more accurately (Biau, Kernéis, & Porcher, 2008). The findings are expected to be more robust and capture the social capital effect on rural and urban food security.

The remainder of this paper is organized as follows. Section 2 describes the data sources, the food security, and social capital measurements, and the analyses carried out. Section 3 presents the descriptive results, the level of food security in the communities, the level of social capital, and the correlation between the two. Section 4 concludes the paper and notes the practical implications.

2. MATERIALS AND METHODS

2.1. Data Resources

The data we used was from the Indonesian Family Life Survey 5 (IFLS5), a continuous survey conducted by RAND (a nonprofit organization that helps enhance policy and decision-making via research and analysis). IFLS5 was the fifth survey and was conducted in 2014-2015. The first survey was conducted in 1993, representing 83% of the population across 13 provinces in Indonesia (Rahman et al., 2022). The second, third, and fourth surveys were conducted in 1997, 2000, and 2007. The sample in IFLS5 was mostly the same as in the preceding surveys, i.e., family members from the households first interviewed in 1993. The sample interviewed was not 100 percent identical to the first one in the subsequent surveys. The percentage of similarity of samples between the first survey and the second, third, fourth, and fifth surveys was 94.4%, 95.3%, 93.6%, and 92%, respectively (Strauss, Witoelar, Sikoki, & Wattie, 2016).

The sample in this study was household members/individuals above 15 years old. As many as 34,265 individuals from 15,351 households met this criterion. We combined the data into one file to conduct the analyses. We only used samples that had complete data. Descriptive statistics of the sample are shown in Table 1. Samples with missing information were automatically eliminated, resulting in 24,247 individuals eligible for this study. Then we divided the samples according to their domiciles. There were 10,301 respondents from rural areas and 13,946 from urban areas. We used STATA17 to aggregate the data and perform all stages of the analyses.

2.2. Food Security Measurements

Food security was measured using the Food Consumption Score (FCS) method developed by the World Food Program (WFP), which has been used in many previous studies (Nkomoki et al., 2019; Rahman, Toiba, & Huang, 2021; Toiba, Nugroho, Retnoningsih, & Rahman, 2020; Rahman et al., 2022). It calculates food security using a person's eating frequency per week. This method was chosen because it considers more indicators than other methods. Based

on the FCS method, food security is divided into three categories—28.5 is poor, 28.5-42 is borderline, and >42 is acceptable. FCS is calculated using the following formula:

$$FCS = (a_1 . x_1) + (a_2 . x_2) + (a_3 . x_3) + (a_4 . x_4) + (a_5 . x_5) + (a_6 . x_6) \qquad (1)$$

Where a_1-a_6 is the weight of each food category; x_1-x_7 is the frequency with which a household consumes each food category in seven days; 1 is cereals and tubers (rice, sweet potatoes, instant noodles) weighing 2 points; 2 is vegetables (green leafy vegetables, carrots) weighing 1 point; 3 is fruit (bananas, papayas, mangoes) weighing 1 point; 4 is meat and fish (eggs, fish, meat) weighing 4 points; 5 is milk weighing 4 points; 6 is sugar weighing 0.5 points.

2.3. Social Capital Measurements

We assess two types of social capital, namely bonding and bridging. Two indicators in IFLS5 are used to evaluate bonding. Firstly "*Taking into account the diversity of ethnicities in the village, I trust people with the same ethnicity as mine more*", and secondly "*Taking into account the diversity of religions in the village, I trust people with the same religion as mine more*". Meanwhile, three indicators are used to assess bridging. The first is "*I am willing to help people in this village if they need it*", the second is "*In this village, I have to be alert or someone is likely to take advantage of me*", and the third is "*I would be willing to ask my neighbors to look after my house if I leave for a few days*". The answers in IFLS5 are a 4-point Likert type scale, where 1 means strongly disagree, 2 disagree, 3 agree, and 4 strongly agree. For the second indicator on bridging, we score the opposite of the Likert answer, because it is a negative statement. Individuals who answered strongly agree on the question had high distrust/insecurity (low bridging). Therefore, the score for "strongly agree" answers is 1, and so on. That way, the results are consistent when added together.

Following previous studies, we used individual community participation as a social capital proxy (Cao & Rammohan, 2016; Sujarwoto & Tampubolon, 2013; Sujarwoto & Tampubolon, 2012). The types of participation included religious activities, village improvement programs, the village financing community, the village security watch, toddler integrated service centers, elderly integrated service centers, political parties, the National Community Empowerment Program (PNPM), village libraries, cooperatives, community meetings, youth community activities, water management systems, health funds, community services, the waste management system, and Family Well-being Building (PKK) activities. The answers to the survey questions were dichotomous, with 1 if participating and 0 if not participating. The total value of individual participation was obtained by adding up the value of each participation type. A high individual score indicates a high degree of community participation.

2.4. Analyses

We applied ordered probit regression to examine the effect of social capital on food security in rural and urban communities because the variable outcome is an ordinal type of data—sequential and regular in nature—but the categories' distance has no value. The three categories in the study were 1 for poor, 2 for borderline, and 3 for acceptable. According to Greene (2012), ordered probit analysis is conducted on latent outcome variables, shown by the following equation:

$$Y_i^* = X_i\beta + \varepsilon_i \qquad (2)$$

Where Y_i^* is the unobserved latent variable; X_i shows the observed explanatory variables, namely social capital, household heads' demographics, household facilities, and household assets; β shows the coefficient of the explanatory variable; ε_i indicates the error term; and i indicates the food security category ($i = 1, 2, 3$).

In ordered probit analysis, there is a cut-off or threshold in each food security category. The following equation shows the model to be analyzed:

$$Y_i = \begin{cases} 1 \ if \ Y_i^* \le a_1 \ (Poor) \\ 2 \ if \ a_1 < Y_i^* \le a_2 \ (Borderline) \\ 3 \ if \ Y_i^* > a_2 \ (Acceptable) \end{cases} \qquad (3)$$

Where Y_i indicates the food security proxy score; a_1 and a_2 indicate the cut-off points of the categories.

3. RESULTS AND DISCUSSION

This section is divided into three sub-sections. The first presents the descriptive statistics and explanatory variables. We show the variable codes as a guide for future researchers who intend to examine the food security of the Indonesian population using similar IFLS5 data. We also show each variable's mean and standard deviation for rural and urban communities. The second part presents the states of food security in rural and urban communities, grouped into poor, borderline, and acceptable categories. The third section describes social capital, detailing the level of bonding, bridging, and community participation. We also measured the differences in social capital levels between rural and urban communities. The fourth section uses ordered probit regression analysis to explain the effect of social capital (bonding, bridging, community participation) on food security in rural and urban communities.

3.1. Descriptive Statistics

Based on the Food Consumption Score (FCS) calculations, individuals in rural communities (57,865) had a lower average level of food security than those in urban communities (62,399). The calculation also shows that most urban and rural individuals' food security levels fall into the acceptable category. However, individuals in rural communities had higher social capital, with bonding scoring a higher average than bridging. Meanwhile, the average participation in rural communities was 2,092 activities, higher than that in urban communities.

The average age of the household heads in rural communities was 1.305 years higher than in urban communities. Regarding gender, 93 percent and 91.5 percent of the household heads were male in rural and urban settings,

respectively. We calculated the proportion of working family members against the total and found no significant difference in the ratios in rural and urban communities. Most of them were married, and very few were divorced. Marital status mattered more in rural areas than in urban areas. On average, rural people's level of education was low, with 47% having graduated from elementary school. Meanwhile, most urban people's education level was high school; some had even graduated from a university.

In terms of access to facilities, more people had access to cellphones, the Internet, and electricity in urban areas than in rural areas. Almost 100% of the sample population had access to electricity. Concerning water, urban households had to purchase more drinking water than rural households. Regarding asset ownership, such as vehicles, household equipment, credit, savings, and jewelry, the rate was higher in urban areas than in rural areas.

Table 1. Definitions and descriptive statistic variables in rural (10,301) and urban (13,946) households.

Variable	Definition	Code	Rural	Urban	Diff.
FCS	Food consumption score	FM	57.865	62.399	-4.534***
Food security	The level of food security: 1 if poor, 2 if borderline, and 3 if acceptable	FM	2.622	2.738	-0.116***
Bonding	Bonding social capital	TR	6.012	5.655	0.357***
Bridging	Bridging sosial capital	TR	8.079	7.930	0.149***
Participation	Total individual participation in the community	PM	2.092	1.896	0.195***
Age	Age of head of household	AR09	45.165	43.860	1.305***
Sex	1 if head of household male, 0 otherwise	COV5	0.930	0.915	0.015***
Worksize	Proportion of total working family members to family size	SC17	0.485	0.485	-0.001
Married	1 if the head of the household is married, 0 otherwise	COV4	0.918	0.893	0.024***
Unmarried	1 if the head of the household is unmarried, 0 otherwise	COV4	0.013	0.036	-0.023***
Separated	1 if the head of the household is separated, 0 otherwise	COV4	0.004	0.005	-0.001
Divorced	1 if the head of the household is divorced, 0 otherwise	COV4	0.015	0.018	-0.002
ES	1 if the head of the household graduated from elementary school, 0 otherwise	AR16	0.470	0.299	0.171***
JHS	1 if the head of the household graduated from junior high school, 0 otherwise	AR16	0.175	0.159	0.016***
SHS	1 if the head of the household graduated from senior high school, 0 otherwise	AR16	0.194	0.340	-0.146***
College	1 if the head of household graduated from college, 0 otherwise	AR16	0.070	0.165	-0.095***
Cellphone	1 if the household has a cell phone, 0 otherwise	DL03b	0.659	0.799	-0.140***
Internet	1 if the household has internet access, 0 otherwise	DL03d	0.239	0.433	-0.194***
Electricity	1 if the household uses electricity, 0 otherwise	KR11	0.987	0.997	-0.010***
Water	1 if the household buys drinking water, 0 otherwise	KR13b	0.242	0.511	-0.268***
Housing	1 if the household has its own house, 0 otherwise	KR03	0.857	0.655	0.201***
Vehicle	1 if the household owns cars, boats, bicycles, motorbikes, etc., 0 otherwise	HR01	0.712	0.810	-0.098***
Savings	1 if the household has savings/certificate of deposit/stocks, 0 otherwise	HR01	0.218	0.363	-0.144***
Appliances	1 if the household has a radio, tape recorder, tv, fridge, sewing or washing machine, VCD player, handphone, etc., 0 otherwise	HR01	0.968	0.989	-0.021***
Receivables	1 if the household has receivables, 0 otherwise	HR01	0.106	0.130	-0.024***
Jewelry	1 if the household owns jewelry, 0 otherwise	HR01	0.430	0.510	-0.080***

Note: *** indicates a 1% level of significance.

The FCS consumption indicators are shown in Table 2. Urban households had higher weekly consumption rates for almost all food indicators. In the staple food indicator, weekly rice consumption was the highest compared to sweet potato and instant noodle consumption. Rural and urban households consume rice almost every day because the general belief is that it is not a real meal if it does not include rice, and one will not sleep well if they have not had a rice-based meal (Bhanbhro, Kamal, Diyo, Lipoeto, & Soltani, 2020). Meanwhile, consumption of sweet potatoes and instant noodles was relatively low as the average weekly consumption is 0.620 and 1.694 days (rural); 0.658 and 1.747 days (urban). This shows that, on average, rural and urban communities consume sweet potatoes and instant noodles fewer than two days a week.

As for vegetable consumption, there was no further explanation in the IFLS5 dataset about the two categories: green leafy vegetables and carrots. We assume that the vegetables in question were vegetables other than carrots. The results show that rural communities consumed more vegetables each week than urban communities, most probably because they had easier access to vegetable yields (Walsh & Van Rooyen, 2015). However, in general, the vegetable consumption of both urban and rural communities was high; they consumed vegetables 4-5 days a week. Regarding carrot consumption, rural people's weekly consumption was significantly lower than urban people's, in line with past research (Lucier & Lin, 2011).

Meanwhile, for eggs and meat, the weekly consumption in urban areas was higher than in rural areas, while fish consumption was the opposite. On average, the weekly consumption of eggs, fish, and meat was between 1 and 3 days. Regarding milk and sugar, consumption was higher in urban communities. We do not discuss any recommended or ideal consumption patterns for each food product because the IFLS5 dataset does not include complete data on the number of products consumed by the individuals.

Table 2. Statistical descriptive of FCS indicators based on rural (10,301) and urban (13,946) locations.

Variable	Rural		Urban		Mean diff.
	Mean	Std. dev.	Mean	Std dev	
1. Cereals and tubers	9.273	2.319	9.365	2.288	–0.092***
Sweet potatoes	0.620	1.162	0.658	1.239	–0.037**
Instant noodle	1.694	1.942	1.747	1.884	–0.052**
Rice	6.958	0.445	6.961	0.431	–0.002
2. Vegetables	4.753	3.167	5.029	3.439	–0.276***
Green leafy veg.	4.121	2.624	3.997	2.637	0.124***
Carrot	0.631	1.401	1.032	1.678	–0.400***
3. Fruits	2.759	3.197	2.998	3.331	–0.238***
Banana	1.363	1.937	1.431	1.979	0.068***
Papaya	0.412	1.050	0.628	1.353	–0.215***
Mango	0.984	1.873	0.939	1.763	0.045*
4. Meat and fish	6.811	4.105	7.293	4.012	–0.483***
Egg	2.276	2.086	2.692	2.080	–0.416***
Fish	3.306	2.710	2.799	2.450	0.507***
Meat	1.229	1.633	1.803	1.916	–0.574***
5. Milk	0.935	2.008	1.354	2.329	–0.419***
6. Sugar	1.650	2.377	2.108	2.553	–0.457***

Note: ***, **, and * indicate 1, 5, and 10% levels of significance, respectively.

3.2. Community Food Security

Food security was generally lower in rural areas than in urban areas, as shown in Figure 1, with more people falling into poor and borderline categories. In urban areas, more people fell into the acceptable category. The average FCS scores for rural communities in the poor, borderline, and acceptable categories are 22.882, 35.901, and 68.294, respectively; while urban communities are 23.582, 36.385, and 70.225, respectively. These results indicate that rural communities are more vulnerable than urban communities, which is in line with the results of past studies (Sibhatu & Qaim, 2017; Walsh & Van Rooyen, 2015). There are two plausible explanations for this finding. First, the urban infrastructure is more established; this is an essential driver of economic growth and welfare Sen (2012). Meanwhile, poor road infrastructure may hinder the rural communities' access to the markets. Markets play an essential role in maintaining people's food security by ensuring price stability. Poor infrastructure may lead to inefficiency and seasonal price fluctuations. Traders may also choose to increase food prices because the distribution is difficult and costly. Overall, this reduces rural consumers' access to food.
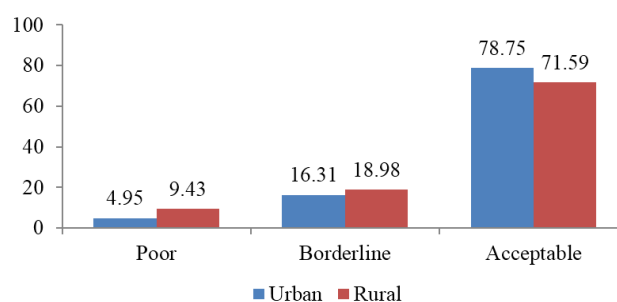
Figure 1. Food security levels in rural and urban populations in Indonesia.

That is to say, good infrastructure would make it easier for rural communities to access more affordable and diverse foods (Memon & El Bilali, 2019; Sibhatu & Qaim, 2017). Therefore, the construction of rural infrastructure needs to be prioritized through investment in roads, bridges, clean water sources, sanitation, irrigation, energy, telecommunications, warehousing, and storage facilities (Memon & El Bilali, 2019). The second possible cause of lower rural food security is the different economic conditions. Individuals in urban communities earn higher incomes than

those in rural communities, so their purchasing power is higher (Walsh & Van Rooyen, 2015). As centers of economic growth, cities have technological resources, economies of scale, and a significant market share. Meanwhile, the countryside has more natural and production resources. Mutualist relationships should be fostered to resolve the problems facing both urban and rural areas (McGee, 2008).

3.3. Community Social Capital

We assessed social capital levels by examining bonding, bridging, and community participation. The results show that the social capital level in rural communities is higher than in urban communities (see Table 3), which aligns with previous research (Kairiza et al., 2021). Activities among community members of the same religion and ethnicity were common in rural areas. Bonding increases with the length of time people have lived in rural areas (Sørensen, 2014) as does bridging. Sen (2012) stated that bridging is higher in rural communities because they have traditional ceremonies or local culture that must be observed by all community members regardless of status/class. These do not exist in urban areas, where the only social events that bring people together are weddings and funerals. In rural areas, there are also cooperatives where members can socialize during meetings. Sedana, Ambarawati, and Windia (2014) found that cooperatives improve community interactions and foster trust among people. Regarding community participation, on average, individuals in rural and urban communities participated in 2.092 and 1.896 activities, respectively. Participation in rural communities is higher because society is more communal and collectivist. Meanwhile, urban communities tend to be more individualistic (Ma, Pei, & Jin, 2015).

Table 3. Differences in social capital and participation in rural (10,301) and urban (13,946) communities.

Social Capital	Rural	Urban	Difference	t value
Bonding	6.012	5.655	0.357	25.667***
Bridging	8.078	7.929	0.149	12.388***
Participation	2.092	1.896	0.195	8.049***

Note: *** indicates a 1% level of significance.

Table 4. Results of ordered probit regression analysis.

Food Security	Rural			Urban		
	Coefficient	Std err	z value	Coefficient	Std err	z value
Bonding	–0.004	0.013	–0.27	–0.011	0.011	-1.02
Bridging	0.026*	0.014	1.82	0.028**	0.013	2.13
Participation	0.031***	0.007	4.32	0.046***	0.007	6.64
Age	0.003**	0.001	2.43	0.003***	0.001	2.80
Sex	–0.113	0.069	–1.63	–0.016	0.059	–0.28
Worksize	0.036	0.058	0.63	–0.031	0.053	–0.59
Married	0.216***	0.076	2.82	0.048	0.073	0.67
Unmarried	0.130	0.136	0.95	0.111	0.095	1.17
Separated	0.250	0.225	1.11	0.020	0.173	0.11
Divorced	0.117	0.120	0.97	–0.058	0.100	–0.58
ES	–0.176***	0.046	–3.78	–0.078	0.060	–1.29
JHS	–0.005	0.055	–0.09	0.074	0.065	1.14
SHS	0.127***	0.056	2.27	0.188***	0.063	3.00
College	0.408***	0.079	5.16	0.435***	0.071	6.17
Cellphone	0.173***	0.030	5.83	0.152***	0.031	4.85
Internet	0.201***	0.035	5.69	0.270***	0.028	9.55
Electricity	–0.012	0.107	–0.11	0.407**	0.185	2.2
Water	0.257***	0.032	7.96	0.203***	0.025	8.13
Housing	0.083**	0.039	2.14	0.105***	0.028	3.82
Vehicle	0.054*	0.029	1.85	0.057*	0.030	1.86
Savings	0.164***	0.035	4.62	0.126***	0.028	4.52
Appliances	0.366***	0.070	5.26	0.215**	0.102	2.11
Receivables	0.192***	0.047	4.08	0.204***	0.041	5.02
Jewelry	0.191***	0.028	6.85	0.123***	0.025	4.82
/cut1	–0.122	0.201	–0.61	–0.028	0.253	–0.11
/cut2	0.670***	0.201	3.33	0.885***	0.253	3.49
LR Chi2(24)	765.660			988.440		
Prob.	0.000			0.000		
Pseudo R2	0.048			0.056		
Obs.	10,301			13,946		
Log likelihood	–7623.588			-8328.329		

Note: ***, **, and * indicate 1, 5, and 10% levels of significance, respectively.

3.4. Effects of Social Capital on Food Security

Table 4 demonstrates that there are different approaches to improving food security. Socializing with different groups (bridging) and community participation positively affect the probability of increasing food security in rural and urban communities. Meanwhile, bonding has no significant effect.

This finding is sufficient to show the importance of social capital in increasing food security, in line with previous studies (Cheevapattananuwong, Baldwin, Lathouras, & Ike, 2020; Gray, Guzman, Glowa, & Drevno, 2014; Martin, Rogers, Cook, & Joseph, 2004; Nosratabadi et al., 2020; Olivier & Heinecken, 2017; Paul et al., 2019; Sseguya, Mazur, & Flora, 2018). Community networks allow people to exchange information, resources, and support when facing problems such as high food demand but low supply (Nosratabadi et al., 2020). Hence, individuals with high social capital tend to have better food security. For example, they find it easier to obtain food, money, and vehicle loans from relatives, friends, or other communities. They may also receive food from the community or group during events (Martin et al., 2004; Paul et al., 2019). The impact of bridging is also apparent in Indonesia. When an area experiences natural disasters such as floods, tsunamis, earthquakes, etc., which often result in heavy losses, people from other regions provide assistance and relief regardless of familial, ethnic, or religious ties. Cheevapattananuwong et al. (2020) conducted a study in Thailand and found the same result: people were actively involved in helping other groups in times of crisis, regardless of their backgrounds and geographical areas.

The GoI has created a community garden program to boost community food security, namely the Sustainable House Food Area. Judging from the decreasing food insecurity, we can assume the program has emphasized social capital or that the program nurtures social capital by default. Community gardens naturally foster networking because planting, caring for, and harvesting plants requires collaboration among community members (Gray et al., 2014). Urban farming impacts income, psychological well-being, and food security in urban communities by increasing social capital. Higher social capital provides access to external resources because the network among community members is more robust. People find it easier to access foods during shocks such as decreased productivity and crop failure (Niles et al., 2021; Olivier & Heinecken, 2017). Sseguya et al. (2018) stated that the importance of bridging lies in the ability to reach external facilities. These include access to inputs, markets, training, information, and agricultural credit. This kind of access supports community development, which in turn strengthens food security.

We also found that bridging and community participation are more sensitive in increasing food security. We assume that urban people are pragmatic and prefer to engage in profitable activities such as business practices. They network with other individuals with the same business interests to support their goals and increase their income, impacting their welfare and food security. In addition, urban people are also more selective in choosing friends. They prioritize those who can give them added value. A study in Austria found that rural people interact more with family, while urban people interact more with friends (Glatz & Bodi-Fernandez, 2020).

The age of the household head has a positive effect on food security both in rural and urban communities. The older and the more experienced the household head is, the lower the chances of food insecurity (Zhou et al., 2019). However, the household head's age and gender do not significantly impact the community's food security. Interestingly, marital status only affects food security in rural communities, not in urban communities. Married rural household heads have a higher level of food security than those with other marital statuses, but these statuses have no effect in urban communities. These results make sense because urban households tend to be more independent; they do not depend on other household members for food access. This is different in rural areas, where homemakers play a crucial role in determining consumption patterns.

The education of the household head is an essential factor in increasing individual food security. In both urban and rural communities, those with high school and university diplomas have higher levels of food security than those with other qualifications. This is because the higher the degree, the better-paying the jobs are (Sseguya et al., 2018). Also, for female household heads, education could help them calculate the nutritional value of the meals served to household members (Olatunji et al., 2022; Zhou et al., 2019). For those with jobs in the agricultural sector, education increases their capacity to adopt technology, access to markets, and access to cultivation information to improve productivity and income (Mango, Zamasiya, Makate, Nyikahadzoi, & Siziba, 2014). Rural household heads who completed elementary school have a lower level of food security than others. However, this does not affect urban household heads significantly, most probably because people with a low level of education can still make a living and purchase food in urban areas.

Rural and urban households with cellphone and Internet access tend to have better food security. With this access, household members can quickly gather information about healthy food, healthy lifestyles, good bargains, and more (Liang, Shrestha, Ghosh, & Webb, 2020). Information related to food can be found on the Internet, and access to this information helps people make better choices (Ezeoha, Obi, Igwe, & Ezeruigbo, 2020; Mwalupaso, Wang, Eshetie, & Tian, 2020). In addition, owning a cellphone and having Internet access indirectly increase food security by increasing household income (Liang et al., 2020). Furthermore, access to electricity in urban areas significantly affects the individual's chances of being food secure. However, this is not the case in rural areas. The reason may be that rural households do not rely 100 percent on electricity to sustain their daily lives, so it is not a determinant of food security. In contrast, urban households' access to electricity is critical and is an indicator of their welfare (Mwangi et al., 2020). Regarding access to clean water, rural and urban households that purchase drinking water show a higher level of food security than those that do not. This may be because the level of effort they put into obtaining healthy drinking means that quality food must also be available. House ownership also significantly affects rural and urban households, with those who own their homes having higher food security than those who do not (Guo, 2011).

Finally, we traced four types of household assets in this study; the results show that all assets have a positive and significant impact on individual food security. Vehicle ownership has a positive effect because it allows people to access

food stores and markets more easily (Martinez, Clark, & Gudzune, 2019) and choose food stores that sell quality products at low prices (Guo, 2011). Savings also have a positive effect because when the household faces a difficult time, they can withdraw money from the savings account (Guo, 2011; Yenerall & Jensen, 2022). Household supplies, loans, and jewelry also positively affect food security because they are indicators of household wealth. Households with these assets tend to have high incomes and can meet their food needs with sufficient quantity and quality.

4. CONCLUSIONS

This study has analyzed the effect of social capital on food security in rural and urban communities in Indonesia. We used cross-sectional data on rural and urban populations obtained from the IFLS5 data. We used the Food Consumption Score (FCS) method to assess the level of individual food security; then, we grouped the scores into three categories, namely acceptable, borderline, and poor. We used three social capital proxies, namely bonding, bridging, and community participation, and analyzed their effects using ordered probit regression analysis.

The empirical results show a significant positive effect of bridging and community participation on individual food security. Meanwhile, bonding has no significant effect. Interestingly, bridging and community participation have a more significant effect on urban individuals than on those in rural areas. In addition, we found that age, education, cellphone ownership, Internet access, electricity access, drinking water access, house ownership, and asset ownership (vehicles, savings, household equipment, loans, and jewelry) had a significant positive effect on individuals' food security.

Our results show the importance of including social capital, especially bridging and community participation, in efforts to improve the food security of rural and urban communities. We found higher levels of social capital in rural than in urban communities but lower levels of food security. This result suggests the need to maximize the role of social capital in improving the food security of rural and urban communities. We also believe that social capital will only require a low cost to implement (Rayamajhee & Bohara, 2019).

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