



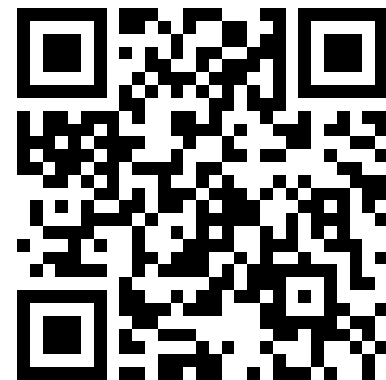
Food Insecurity, Inflation and Government Aid: Evidence from a Household Survey in Developing Asia

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Tackling Food Insecurity During Economic Turbulence: Exploring Solutions for Financial Strain and Inflation Impacts on Vulnerable Families

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ADB Working Paper Series

**FOOD INSECURITY, INFLATION
AND GOVERNMENT AID:
EVIDENCE FROM A HOUSEHOLD
SURVEY IN DEVELOPING ASIA**

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Photo: Green Bazar (Almaty) 29 Aug 2024 at 5PM

Introduction

Inflation became much higher in 2022–2023

Table 1. Consumer and Food Price Inflation

	Consumer price inflation					Food price inflation				
	2019	2020	2021	2022	2023	2019	2020	2021	2022	2023
Developing Asia	3.2	3.2	2.6	4.4	3.3	3.7	5.7	5.9	12.0	9.8
Caucasus and Central Asia	6.8	7.4	9.6	12.9	10.5	8.1	10.5	11.8	16.7	10.1
Afghanistan	2.3	5.6	5.8	7.8	10.8	3.8	10.0	5.7	19.2	-6.8
Armenia	1.4	1.2	7.2	8.6	2.0	1.9	0.3	11.3	13.0	-0.4
Georgia	4.9	5.2	9.6	11.9	2.5	8.2	10.6	10.9	17.9	3.9
Kazakhstan	5.3	6.8	8.0	15.0	14.5	8.1	10.4	10.8	18.8	15.5
Kyrgyz Republic	1.1	6.3	11.9	13.9	10.8	1.4	11.6	18.1	16.2	8.5
Mongolia	7.3	3.7	7.3	15.2	10.4	10.7	7.1	13.8	18.6	15.8
Pakistan	6.8	10.7	8.9	12.2	29.2	10.6	15.5	10.6	24.7	38.7
Tajikistan	8.0	9.4	8.0	4.2	3.8	11.0	11.7	10.5	7.3	3.8
Uzbekistan	14.6	12.9	10.7	11.4	10.0	17.0	17.2	14.4	15.0	11.7
Southeast Asia	2.2	1.5	2.0	5.3	4.1	2.6	4.8	2.3	7.5	9.5
Cambodia	1.9	2.9	2.9	5.3	2.1	2.1	4.6	2.7	5.0	3.2
Indonesia	2.8	2.0	1.6	4.1	3.7	1.5	4.9	2.8	6.0	4.9
Lao People's Dem. Rep.	3.3	5.1	3.8	23.0	31.2	4.7	8.7	3.0	21.8	39.5
Malaysia	0.7	-1.1	2.5	3.4	2.5	1.7	1.3	1.8	5.7	4.9
Philippines	2.4	2.4	3.9	5.8	6.0	2.1	2.7	5.2	4.5	7.9
Thailand	0.7	-0.8	1.2	6.1	1.2	2.3	1.2	-0.1	6.9	2.6
Viet Nam	2.8	3.2	1.8	3.2	3.3	4.1	10.0	0.7	2.6	3.4

Key results

- Households that had low income or experienced a decline in income and/or financial difficulties were more likely to experience food insecurity.
- Households that experienced high inflation, including food price inflation, tended to have higher food insecurity.
- Among the coping strategies adopted by households, only applying for government aid had a significant effect on reducing food insecurity. These results highlight the need to develop effective measures to reduce food insecurity among vulnerable groups (those with low income, poor financial circumstances, and larger family size)

Data

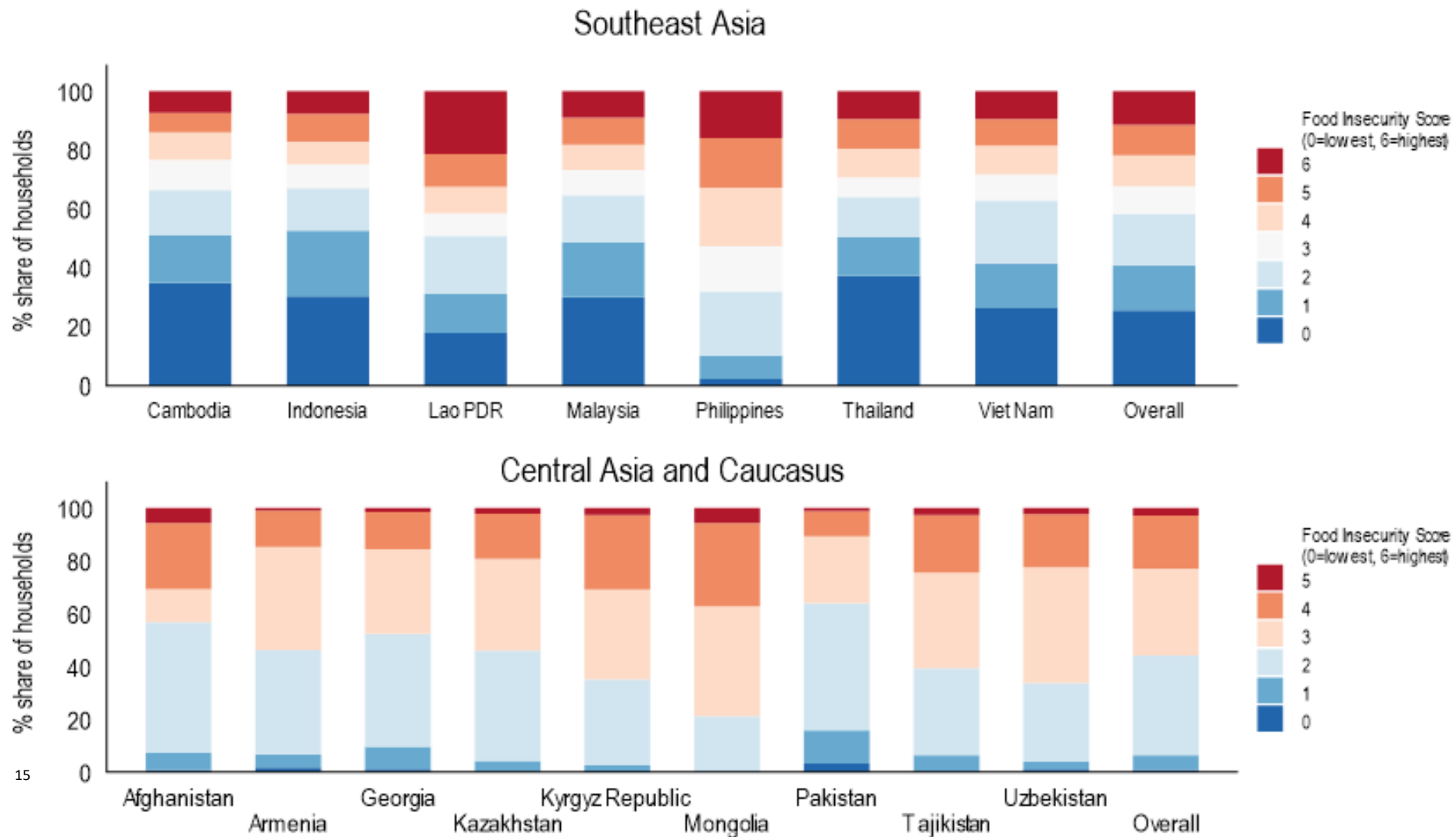
- » Study used ADBI household survey conducted between September and December 2023 across seven SEA and nine CAC countries
- » Interviews were conducted via telephone
- » Survey questionnaire covers household's characteristics, expenditure, income, financial circumstances, perception of the general and food inflation situation, challenges to food security, and coping strategies
- » Data covers 7,034 and 9,270 households from the SEA and CAC regions, respectively.

Table 2. Household Sample Size in SEA and CAC

SEA	N	CAC	N
Cambodia	1,000	Afghanistan	1,181
Indonesia	1,029	Armenia	1,035
Lao PDR	1,000	Georgia	1,000
Malaysia	1,003	Kazakhstan	1,000
Philippines	1,000	Kyrgyz Republic	1,024
Thailand	1,000	Mongolia	1,010
Viet Nam	1,002	Pakistan	1,019
Total	7,034	Tajikistan	1,001
		Uzbekistan	1,000
		Total	9,270

Measure of Food Insecurity Score (FIS)

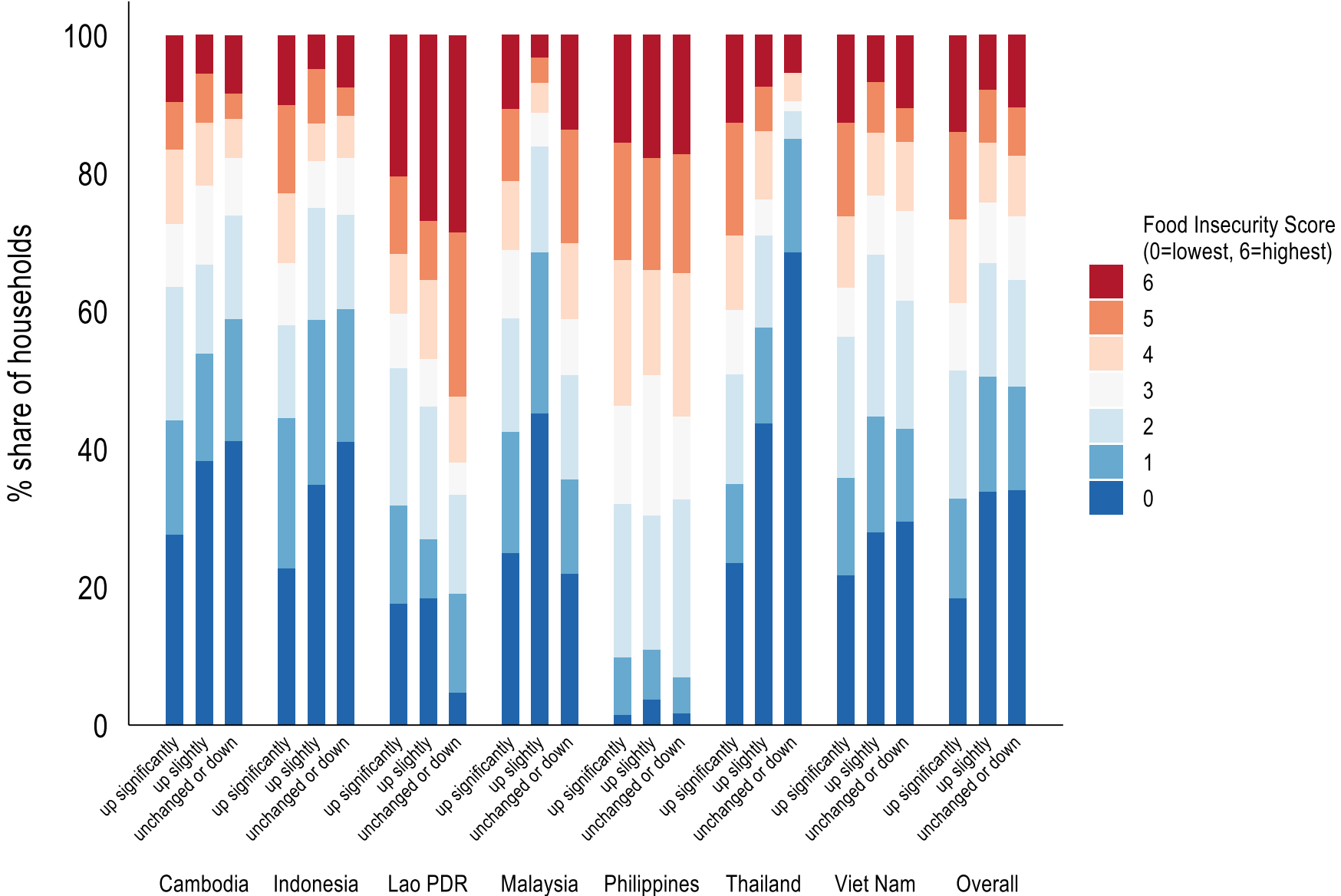
- » Computed as the number of affirmative responses to following questions:
1. The food that we bought didn't last and we didn't have money to get more. (1=often true or sometimes true; 0=never true)
 2. We couldn't afford to eat balanced meals. (1=often true or sometimes true; 0 otherwise)
 3. In 2023 to date, did you or other adults in your household ever cut the size of your meals, skip on protein (meat, seafood, eggs) or skip meals because there wasn't enough money for food? (1=yes; 0=no)
 4. What was the frequency of cutting the size of meals, skipping protein (meat, seafood, eggs) or skipping meals because there wasn't enough money for food? (1=almost every month or some months but not every month; 0=only 1 or 2 months)
 5. In January 2022 – December 2022, did you ever eat less than you felt you should because there wasn't enough money for food? (1=yes; 0=no)
 6. In January 2022 – December 2022, were you ever very hungry but didn't eat because there wasn't enough money for food? (1=yes; 0=no)
- » Responses give raw scores ranging from 0 to 6 (0 to 5 for CAC countries, as #4 omitted)
- » 0 indicating no food insecurity
- » Scores of 5 or 6 indicate a high degree of food insecurity

Figure 1. Food Insecurity Scores of SEA and CAC countries

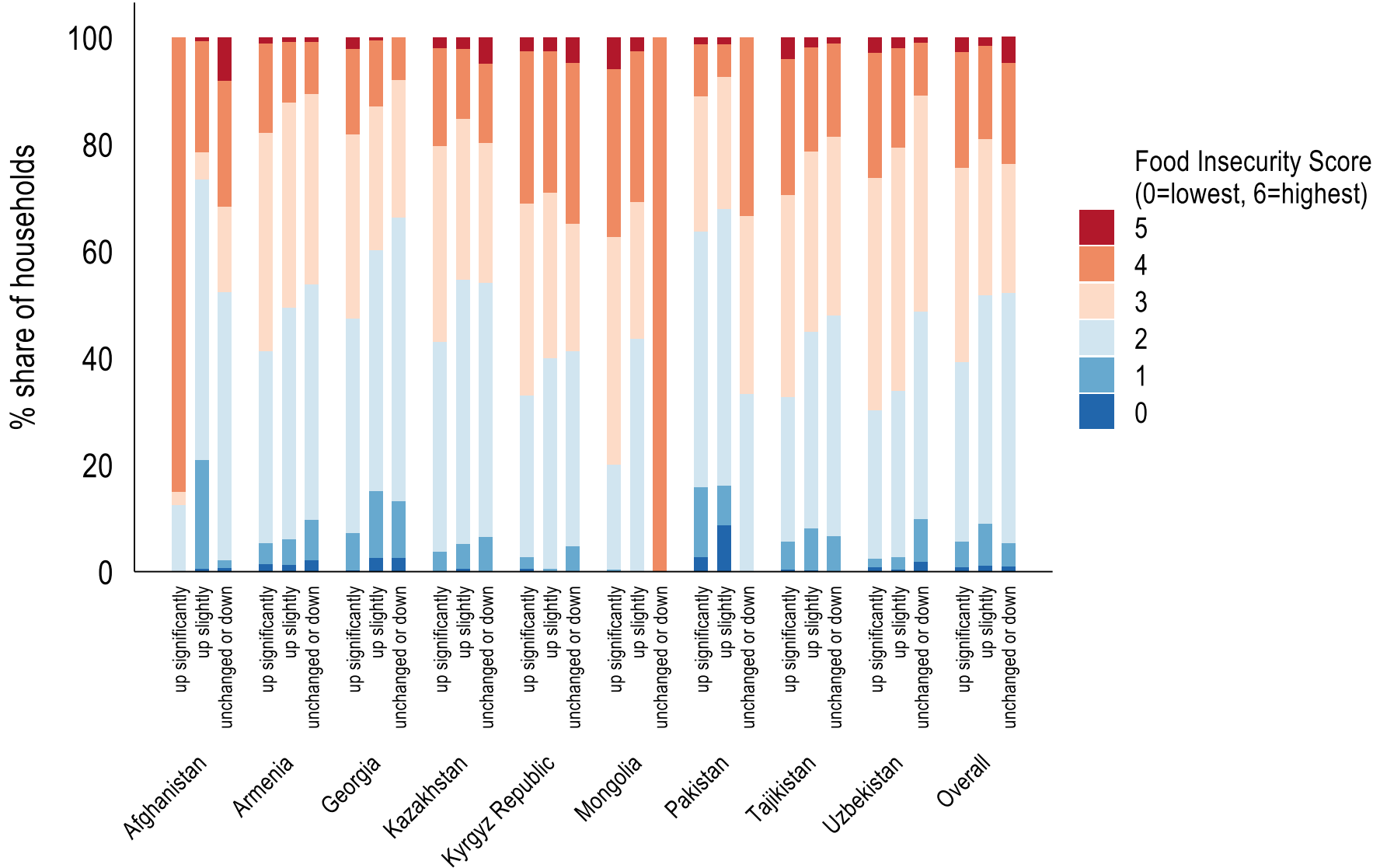
Food Insecurity Scores (FIS)

- » In SEA countries about 10% of households reported the highest score of 6 and another 10% reported a score of 5, indicating high food insecurity.
- » The Lao PDR and the Philippines showed considerably higher shares of households with scores of 5 or 6.
- » About 25% of households in SEA countries reported a score of 0 (i.e., no food insecurity).
- » In CAC countries only a very small fraction of the population reported a score of 5, while almost 20% reported a score of 4. Afghanistan, the Kyrgyz Republic, and Mongolia reported the highest shares of households with scores of 4 or 5.
- » Interestingly, almost no households reported a score of 0 for food insecurity
- » These scores are roughly comparable with those in the UN report (FAO et al. 2023).

Food Insecurity Score by Perceived General Inflation in SEA

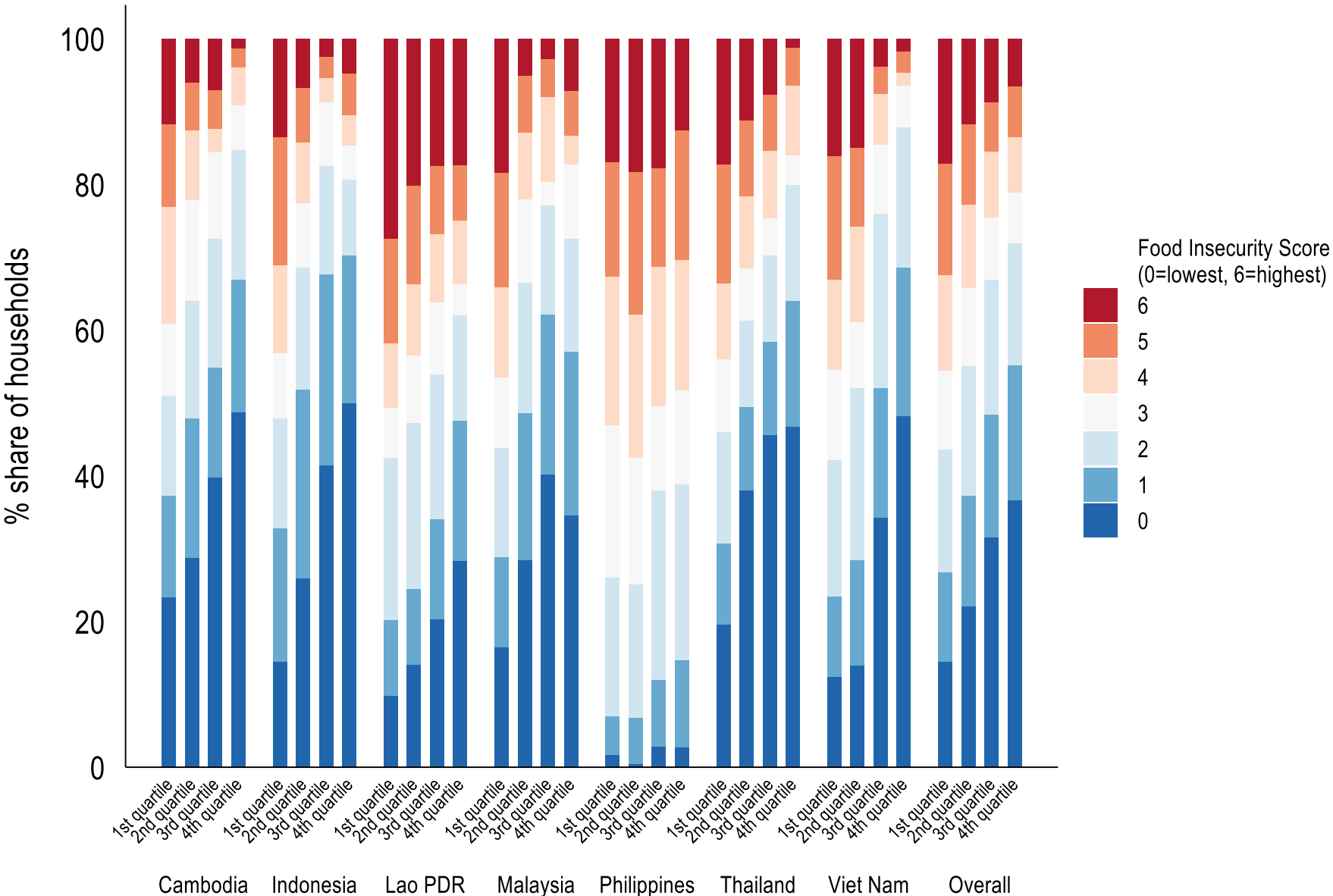


Food Insecurity Score by Perceived General Inflation in CCA

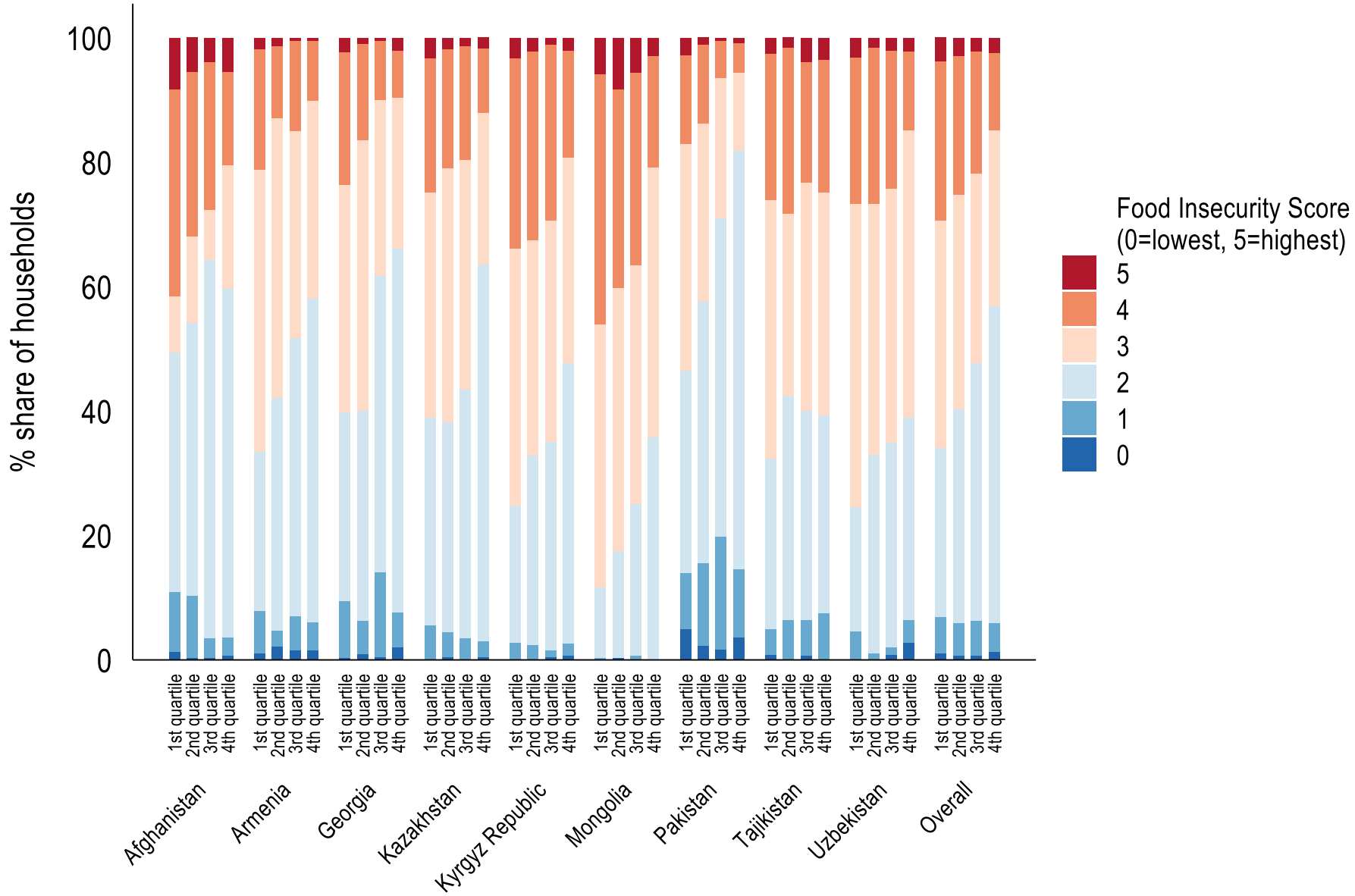


Note: For Mongolia, the number of observations for prices unchanged or down is only 2

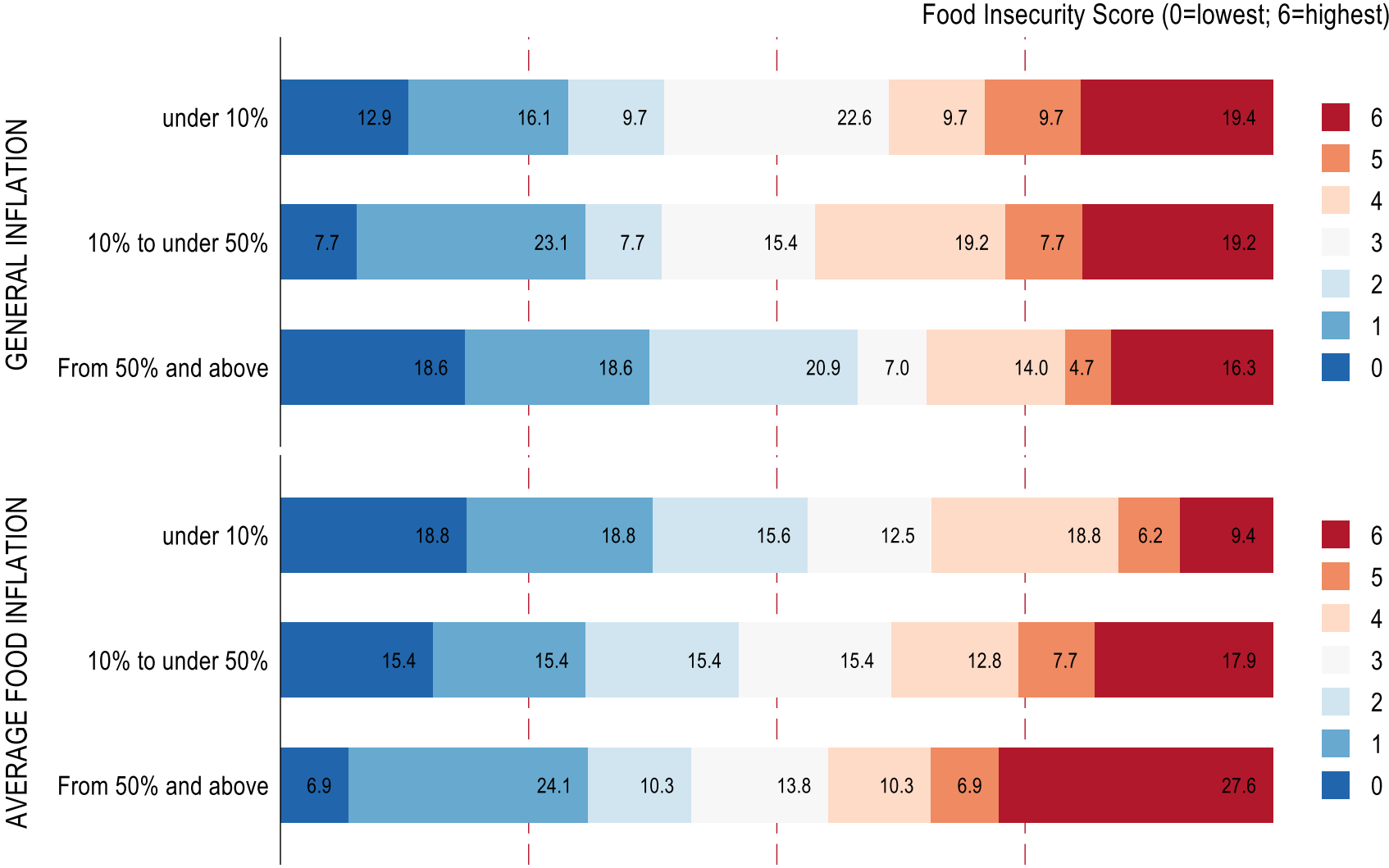
Food Insecurity Score by Income Quartile in Southeast Asia



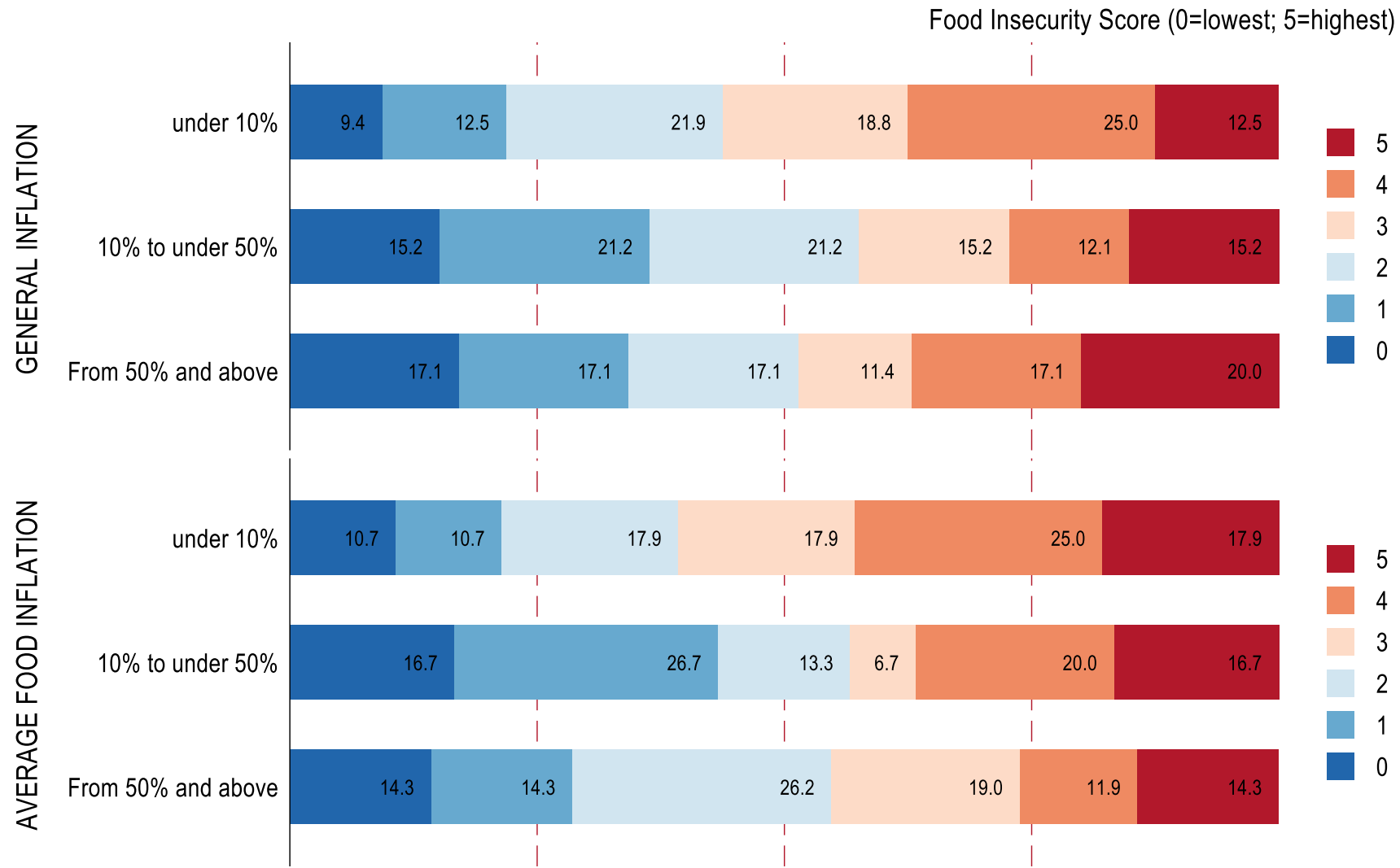
Food Insecurity by Income Quartile in CCA



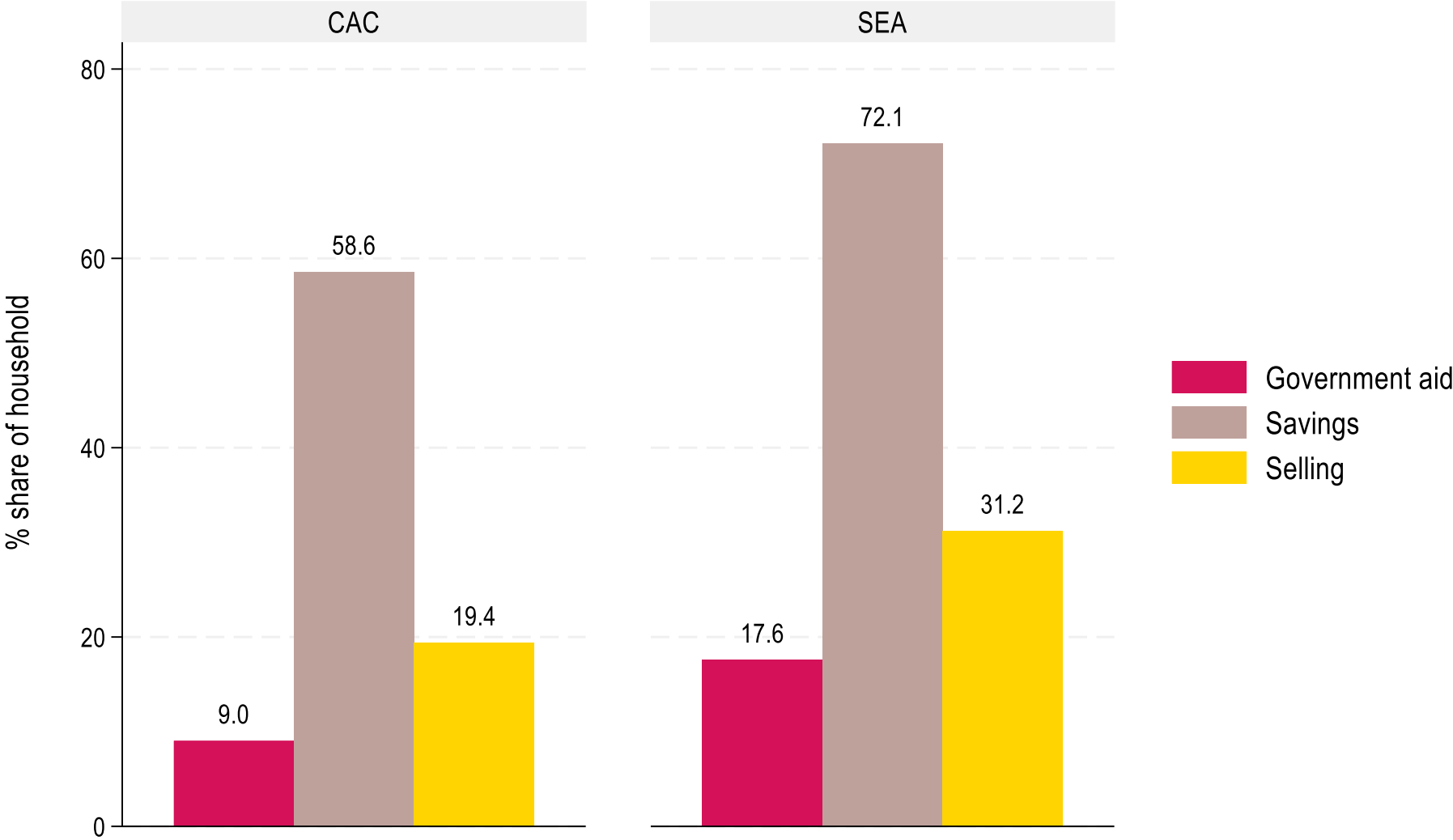
Food Insecurity by General and Food Inflation in SEA



Food Insecurity by General and Food Inflation in CCA



Coping strategies by region



Equations for Food Insecurity Score

$$FIS_i = \beta_0 + \beta_1 IncQ_i + \beta_2 Inf_i + \beta_3 Incchg_i + \beta_4 FS_i + \beta_5 Aid_i + X_i\theta + \epsilon_i \quad (1)$$

where:

- » FIS_i is the normalized food insecurity score of household i
- » $IncQ_i$ is a dummy variable that denotes the income quartile of household i , with the 1st income quartile as the reference variable
- » Inf_i is a dummy variable that represents the general inflation i with prices unchanged or down as the reference variable
- » $Incchg_i$ is a dummy variable that indicates the income change of household i , with income increased as the reference variable.
- » FS_i is a dummy variable that describes the financial circumstances of the household i , with “better off” as the reference variable
- » Aid_i is a dummy variable that represents applying for government aid as a coping strategy to alleviate food insecurity
- » X_i is a vector of controls that include household characteristics such as the gender, age and education level of the household head, the rural or urban nature of the location, household size, work status, coping strategies, mean inflation at the district level for CAC and the regional level for SEA, and country fixed effects.

High food insecurity: Instrumental Variable approach

Probit Model

To understand factors affecting the probability of having high food insecurity, this study uses a probit model to estimate the probability of a household suffering from food insecurity

$$Pr(High\ FIS_i) = \alpha_0 + \alpha_1 IncQ_i + \alpha_2 Inf_i + \alpha_5 Incchg_i + \alpha_4 FS_i + \alpha_5 Aid_i + X_i\theta + \epsilon_i \quad (2)$$

where:

- » *High FIS_i* is a dummy variable that equals 1 if the FIS is 4–6 for SEA and 4–5 for CAC, and 0 otherwise
- » We use the same set of explanatory variables as in equation 1

Instrumental variable approach

- » To address possible endogeneity of government aid variable where people with high food insecurity are more likely to apply for government aid, we use instrumental variable following Kodama et al. (2024)
- » We used an average level of government aid applications at the district and regional levels for SEA and CAC countries, respectively, as this IV is not influenced by individual characteristics

Results

- » Households in the lower income quartiles experienced more hunger than those in the higher income quartiles
- » Inflation is a significant factor in SEA (columns 3 and 5). This result is consistent with the literature, which shows evidence of a connection between food price inflation and hunger (Jacobs 2010; Gazdar and Mallah 2013; Mahmood et al. 2023)
- » However, the above result does not hold for CAC (columns 4 and 6).

Table 4. Factors Affecting Food Insecurity

VARIABLES	Food Insecurity Score (standardized)					
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	OLS	IV (Aid=Aid regional average) SEA	IV (Aid=Aid district average) CAC
	SEA	CAC	SEA	CAC	SEA	CAC
Income Quartile (ref: 1 st quartile – low income)						
2nd quartile	-0.21*** (0.03)	-0.05 (0.03)	-0.21*** (0.03)	-0.06* (0.03)	-0.19*** (0.04)	-0.11*** (0.04)
3rd quartile	-0.42*** (0.03)	-0.16*** (0.03)	-0.42*** (0.03)	-0.15*** (0.03)	-0.42*** (0.04)	-0.22*** (0.04)
4th quartile (highest income)	-0.48*** (0.04)	-0.22*** (0.04)	-0.49*** (0.04)	-0.20*** (0.04)	-0.49*** (0.04)	-0.35*** (0.04)
General Inflation (ref: unchanged or down)						
Price gone up significantly			0.14*** (0.04)	-0.13*** (0.05)	0.24*** (0.05)	0.01 (0.05)
Price gone up slightly			-0.01 (0.04)	-0.30*** (0.05)	-0.03 (0.05)	-0.18*** (0.06)
Food inflation						
All food items	0.70*** (0.08)	0.32*** (0.06)				
Income change (ref: increased)						
income decreased	0.10*** (0.04)	0.11*** (0.04)	0.12*** (0.04)	0.04 (0.03)	0.06 (0.04)	0.04 (0.04)
income unchanged	0.02 (0.03)	0.06** (0.03)	0.03 (0.03)	0.09*** (0.03)	0.05 (0.03)	0.02 (0.03)

Results (2)

- » Households whose financial circumstances grew worse experienced more hunger
- » Coping strategies, including applying for government aid, drawing down savings and selling assets, did not mitigate the risk of hunger according to the OLS results (columns 1 to 4).
- » However, the IV estimates show that applying for government aid is effective in decreasing the intensity of food insecurity, as shown by the negative and significant coefficients of aid in both SEA and CAC countries (columns 5 and 6).

Table 4. Factors Affecting Food Insecurity

VARIABLES	Food Insecurity Score (standardized)					
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	OLS	IV (Aid=Aid regional average)	IV (Aid=Aid district average)
	SEA	CAC	SEA	CAC	SEA	CAC
Financial Circumstance (ref: better off)						
Worse off	0.29*** (0.03)	0.27*** (0.04)	0.29*** (0.03)	0.28*** (0.03)	0.26*** (0.04)	0.35*** (0.04)
Unchanged	0.04 (0.03)	0.08*** (0.03)	0.03 (0.03)	0.12*** (0.03)	0.01 (0.03)	0.12*** (0.03)
Coping strategies						
Government aid	0.23*** (0.03)	0.29*** (0.04)	0.24*** (0.03)	0.29*** (0.04)	-0.46*** (0.14)	-1.35*** (0.24)
Draw down savings	0.24*** (0.03)	0.19*** (0.03)	0.24*** (0.03)	0.23*** (0.03)	0.28*** (0.03)	0.33*** (0.03)
Sell assets	0.09*** (0.03)	0.18*** (0.03)	0.08*** (0.03)	0.19*** (0.03)	0.19*** (0.03)	0.26*** (0.03)
Gender (1=Female)	-0.03 (0.03)	0.05 (0.03)	-0.03 (0.03)	0.04 (0.03)	-0.03 (0.03)	0.04 (0.03)
Education (ref: primary)						
Secondary or high school	-0.15*** (0.04)	0.01 (0.08)	-0.14*** (0.04)	0.12* (0.07)	-0.14*** (0.04)	0.21*** (0.07)
Vocational	-0.15* (0.08)	0.04 (0.08)	-0.13 (0.08)	0.10 (0.07)	-0.05 (0.08)	0.14* (0.08)
University / college	-0.30*** (0.05)	-0.08 (0.08)	-0.28*** (0.05)	-0.07 (0.07)	-0.24*** (0.05)	-0.13* (0.08)
Graduate	-0.37*** (0.05)	-0.09 (0.08)	-0.36*** (0.05)	0.01 (0.07)	-0.45*** (0.05)	0.02 (0.08)
Don't know	-0.27*** (0.08)	-0.11 (0.32)	-0.26*** (0.08)	-0.03 (0.28)	-0.41*** (0.08)	0.03 (0.27)

Results (3)

- » Households with older household heads tend to have lower food insecurity, although the coefficients are not consistently significant, except when the head was aged 60 and over.
- » Households living in rural areas did not have significantly higher food insecurity in most cases
- » Households with a higher number of family members (household size) showed higher FIS
- » Those who are self-employed, who are often involved in running their own business, have significantly lower scores of food insecurity than those employed for a wage. Many are farmers. Those not working has higher FIS.

Table 4. Factors Affecting Food Insecurity

VARIABLES	Food Insecurity Score (standardized)					
	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	OLS	OLS	OLS	IV (Aid=Aid regional average)	IV (Aid=Aid district average)
	SEA	CAC	SEA	CAC	SEA	CAC
Age group (ref: 18-29)						
30-39	-0.03 (0.05)	-0.01 (0.04)	-0.03 (0.05)	-0.04 (0.03)	-0.07 (0.05)	-0.00 (0.04)
40-49	-0.06 (0.05)	-0.04 (0.04)	-0.07 (0.05)	-0.01 (0.03)	-0.11** (0.05)	0.02 (0.04)
50-59	-0.08 (0.05)	-0.06 (0.04)	-0.09* (0.05)	-0.01 (0.04)	-0.13** (0.05)	0.04 (0.04)
60+	-0.11** (0.05)	-0.01 (0.04)	-0.12** (0.05)	-0.04 (0.04)	-0.13** (0.06)	-0.08* (0.04)
Location (1=Rural)						
	0.03 (0.02)	-0.05** (0.03)	0.03 (0.02)	-0.01 (0.02)	-0.01 (0.03)	0.01 (0.03)
Household Size						
	0.04*** (0.01)	0.02*** (0.01)	0.03*** (0.01)	0.01 (0.00)	0.04*** (0.01)	0.01*** (0.00)
Work status (ref: wage employment)						
Self-employment						
	-0.07*** (0.03)	-0.12*** (0.03)	-0.08*** (0.03)	-0.08*** (0.03)	-0.10*** (0.03)	-0.06* (0.03)
Retired						
	-0.00 (0.05)	-0.02 (0.04)	0.01 (0.05)	0.03 (0.04)	-0.05 (0.05)	0.10** (0.04)
No work						
	0.12** (0.05)	0.04 (0.04)	0.13*** (0.05)	0.03 (0.03)	0.23*** (0.05)	0.06 (0.04)

Summary of results

Households more likely to experience food insecurity:

» with low income and income declines and/or financial difficulties

» *Implication: the above are vulnerable groups need more support*

» experienced high inflation, including food price inflation

» *Implication: need to plan more support during high inflation*

» Among the coping strategies adopted by households, only applying for government aid had a significant effect on reducing food insecurity

» *Implication: food insecurity maybe severe enough that self-coping mechanisms are insufficient to address food insecurity, and that governments should target vulnerable households for aid*

Policy Recommendations

- »» Government aid can be used to reduce food insecurity, especially in those CAC and SEA countries where there is a substantial proportion of households with a high food insecurity index level (from 4 to 6 in Figure 1).
- »» Government aid should be directed to the types of households identified as being vulnerable to food insecurity: those with low income, worse financial circumstances, larger family size, a household head who is less well educated and a non-working household head
- »» Government aid is needed more during periods of high inflation, as high inflation increases food insecurity due to a reduction of real purchasing power. In the longer term, governments should also promote good education.

Thank You!

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