Food and Agriculture Organization of the United Nations

Why are women more food insecure than men?

Exploring socio-economic determinants of the gender gap and the role of COVID-19 in the UNECE region

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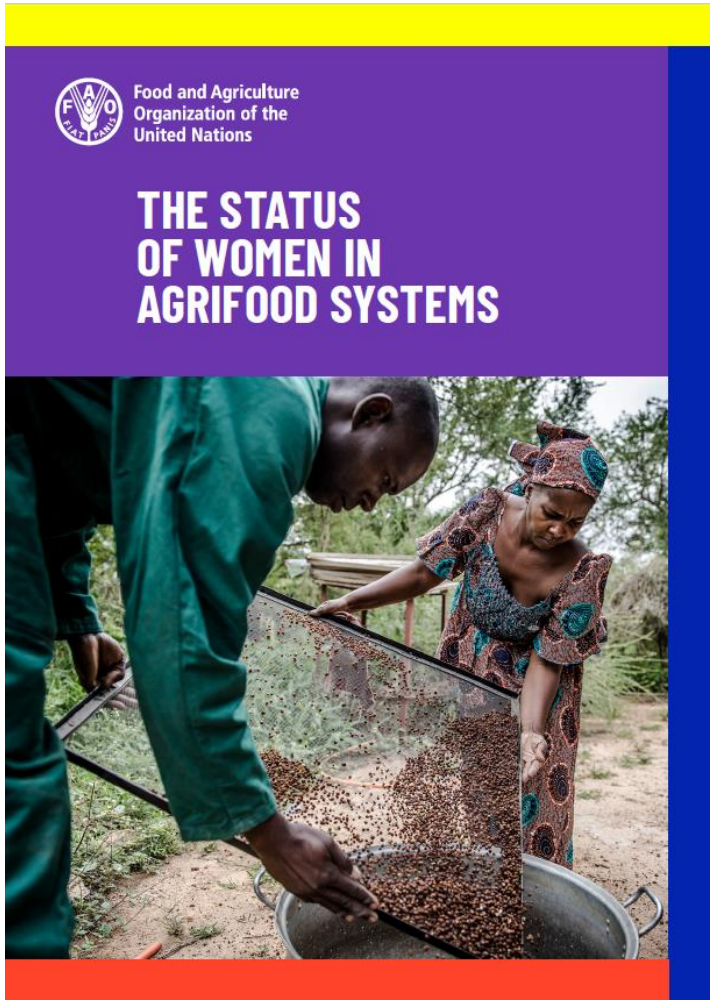
Outline



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FAO. 2023. The status of women in agrifood systems. Rome. DOI: https://doi.org/10.4060/cc5343en

Background and motivation

- In 2021, 31.9 percent of women in the world were moderately or severely food insecure compared to 27.6 percent of men, hence, 126 million more women than men aged 15 or older experienced moderate to severe food insecurity (FAO et al., 2022).

- The gender-based gap in food security is due to several factors, including
  - Discrimination and poverty
  - Lack of access to education, limited opportunities of employment and income-generating activities
  - Limited access to assets, productive resources, technologies, extension services, credit and markets (FAO, 2023)

- COVID-19 exacerbated the gender gap in food insecurity and posed a constant challenge to men's and women’s ability to ensure healthy and nutritious food.

- Most existing surveys and data collect food and nutrition data at the household level, limiting our understanding of the vulnerabilities of population subgroups, including sex and age.

Contribution to the literature

- The limited empirical evidence on the role of gender and its interaction with food insecurity acknowledges the role of women in ensuring food security (Doss et al., 2020; Argarwal & Herring, 2015; Quisumbing et al., 1996).

- Socio-economic determinants of food insecurity have rarely been investigated due to the lack of individual and sex-disaggregated data. (Broussard, 2019; Sinclair et al., 2019; Viviani et al., forthcoming)

- The impact of COVID-19 on food security has been widely documented at the household level:
    - For a review, see Bene et al.(2021)
    - Among others: Niles et al. (2020)

but less is known about how gender interacts with food security and COVID-19.

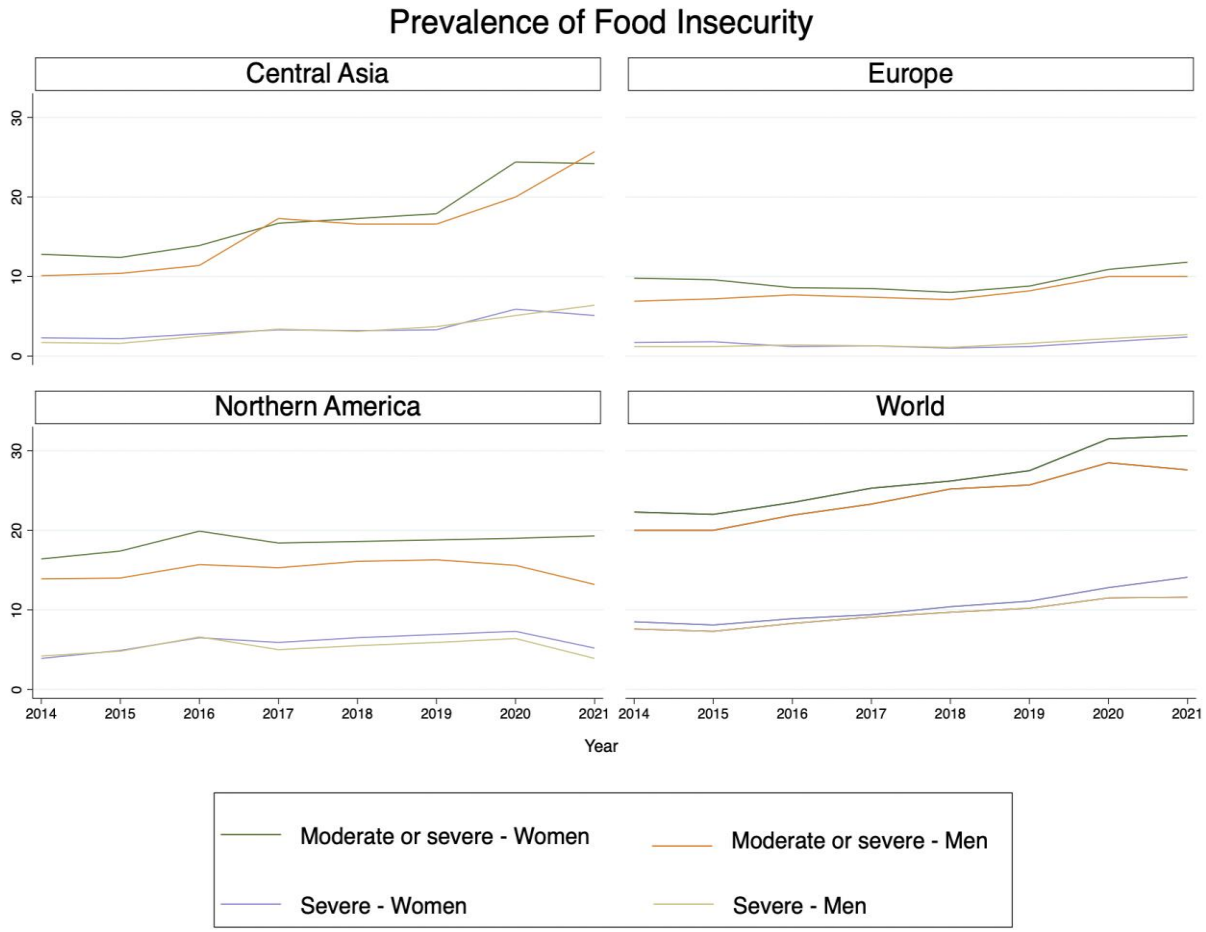
Data and methodology

- Gallup World Poll (GWP) individual cross-sectional data annually collected from 2014 to 2021
- Our sample included countries in the geographical scope of UNECE, resulting in 277,551 observations from 44 countries.
- SDG Indicator 2.1.2 - Prevalence of moderate or severe food insecurity based on Food Insecurity Experience Scale (FIES):
  - FIES survey individual/household module is composed of eight questions with simple dichotomous responses ("yes" or "no")
  - The Rasch model provides the probabilistic basis for estimating the parameters associated with both items and respondents and conducting statistical tests of the strength of association of the responses to the latent trait and of goodness of fit

- The Tobit micro econometric cross-country model:

$$Y_i^* \begin{cases} 0 & if\ Li = 0 \\ Y_i = \alpha_0 + \beta_i female + \gamma_i rural + \delta_i fem * rural + \mu_i d_{age} + \theta_i d_{age} * fem + \vartheta_i Xi + b_j + a_k + \epsilon_i & if\ \ Li > 0 \end{cases}$$

The gender gap in food security from 2014-2021

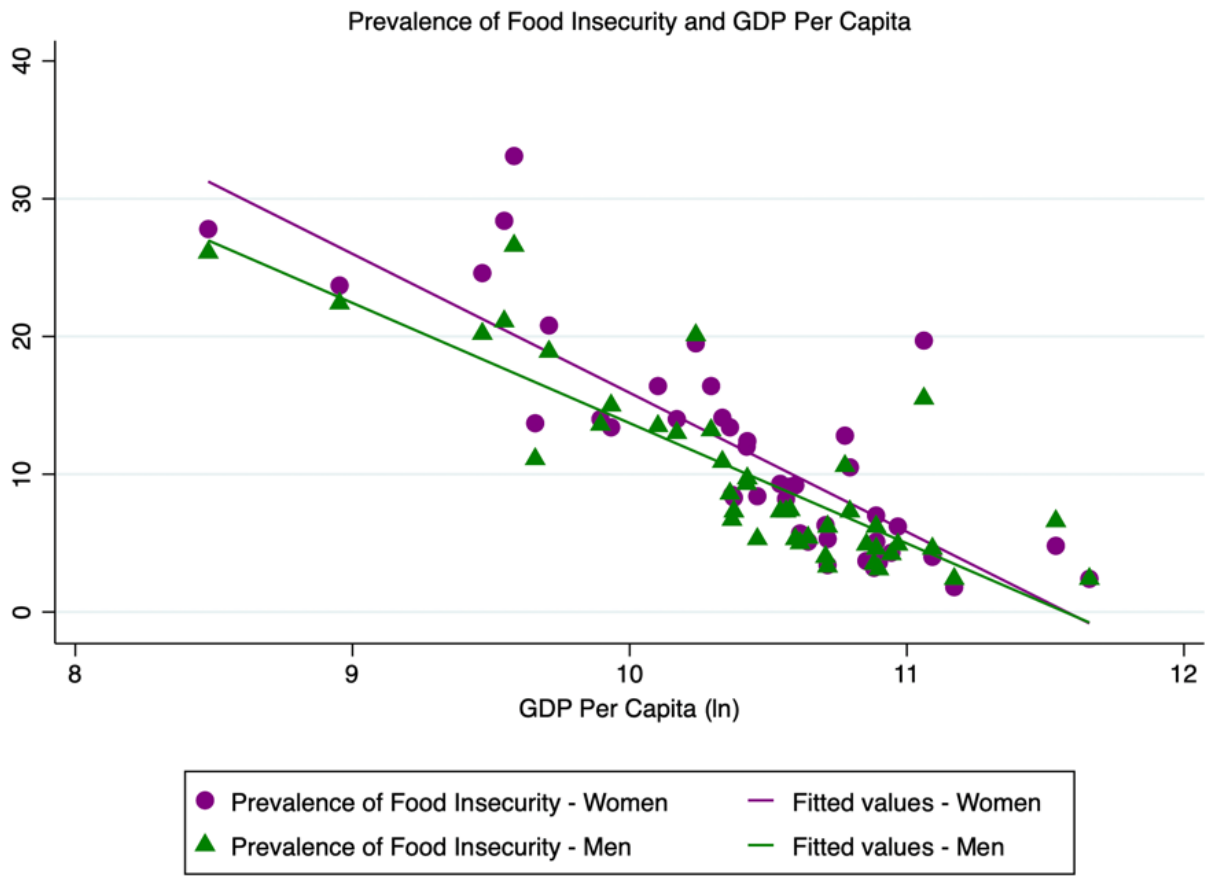


Source: FAOSTAT, Suite of Food Security Indicators

The gender gap in food security increased significantly in North America and Europe during COVID-19

- Globally, the gender gap has more than doubled during the pandemic: from 1.7 percentage points in 2019 to 4.3 percentage points in 2021
- At the UNECE sub-regional level:
  - The gender gap in North America: from 2.5 percentage points in 2019 to 6.1 percentage points in 2021
  - In Europe: from 0.6 to 1.8 percentage points during the same period.
  - In Central Asia: after a widening of the gender gap in 2020, food insecurity among men has increased by 5.7 percentage points in 2021

Relation between food insecurity and income

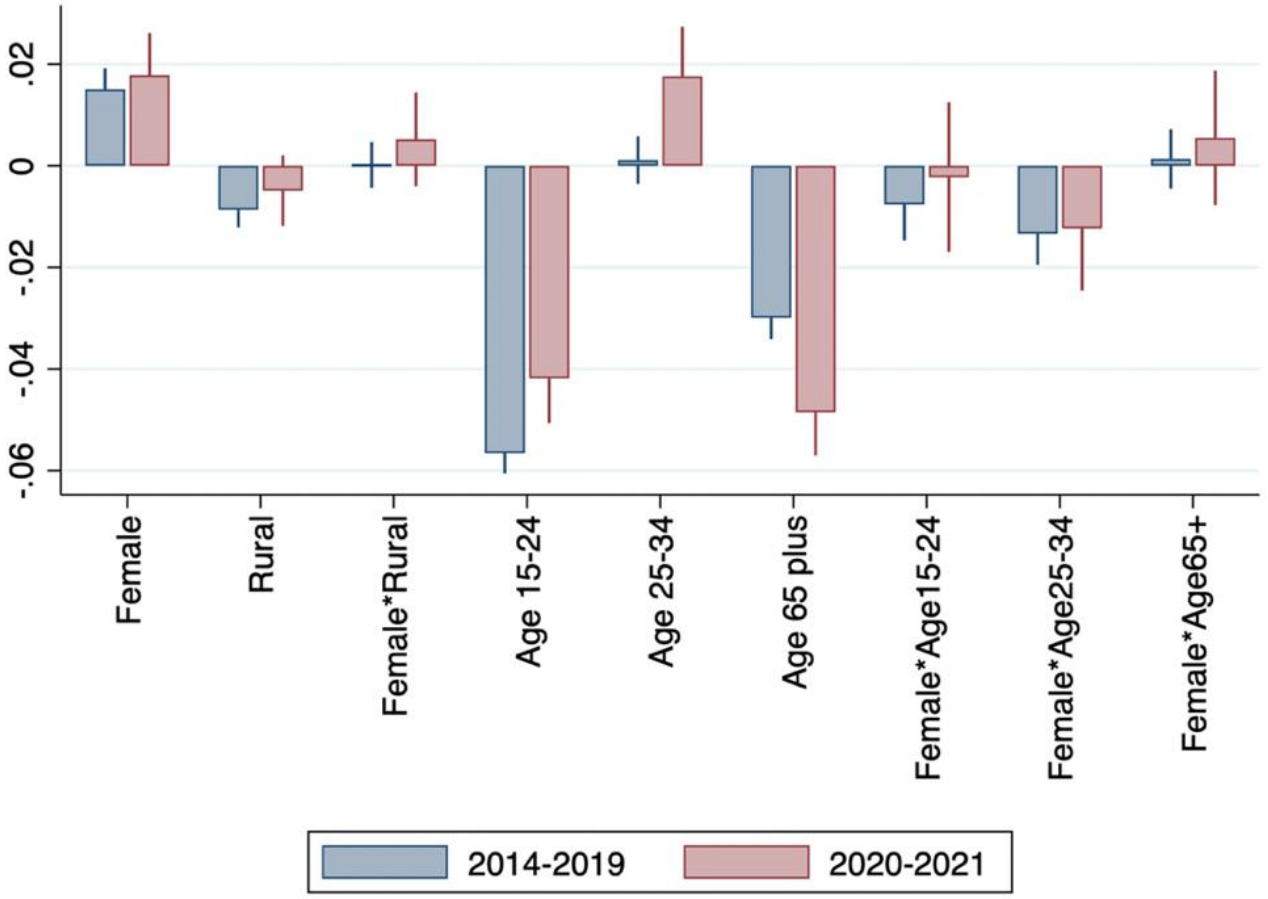


Both food insecurity and the gender gap fall with income

- The fitted line for women is above the fitted line for men, meaning higher food insecurity among women

Source: FAOSTAT, Suite of Food Security Indicators & World Bank, World Development Indicators

The socio-economic determinants of food insecurity pre and post-Covid-19

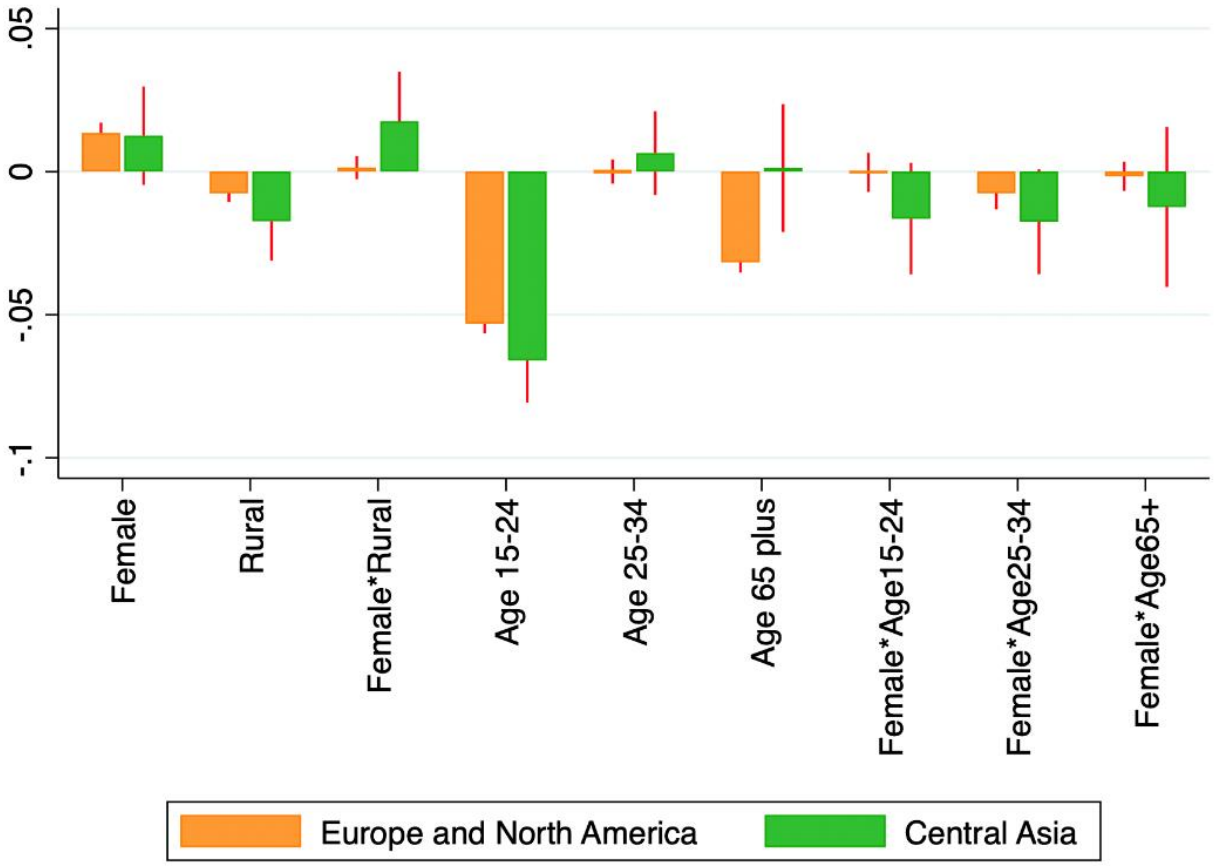


Pre and post-pandemic, women are more food insecure than men within the UNECE region.

- Individuals aged 25-34, regardless of gender, have been disproportionally affected during the pandemic
- Individuals in rural areas were significantly less likely to experience moderate or severe food insecurity before COVID-19.
- Women in the 25-34 age group are more food secure than those in the 35-64 age group and men in the 25-34 age group.

Source: Gallup WP 2014-2021 for the UNECE countries.

The socio-economic determinants of food insecurity by region



Women are more likely than men to be food insecure, particularly in the rural areas of Central Asia

- Rural areas seem to act as an insurance mechanism against food insecurity for both men and women.
- But women in the rural areas of Central Asia are more likely to experience food insecurity compared to rural men.
- Individuals aged 15-24 are, on average, less likely to be food insecure, and the ones aged 65+ are less likely to experience food insecurity in Europe and North America.
- In Central Asia, females aged 15-34 are less likely to be food insecure compared to those in the 35-64 age group.

Source: Gallup WP 2014-2021 for the UNECE countries.

What if we close the gaps in education, employment and income?

- To achieve observational equivalence between women and men on income, education, and employment: Coarsen Exact Matching (Iacus et al.2012) and Entropy balancing matching (Hainmueller, 2012)

	Mean difference (Female - Male)	
	Unbalanced	Balanced
Education	- 0.0261	0.0000
Income (ln)	- 0.0959	0.0000
Self-employment	- 0.0424	0.0000
Full employment	- 0.1046	0.0000

Source: GWP 2014-2021 data.

- Compare the differences in the predicted conditional mean for the probability of moderate or severe food security for men and women through parametric regression models (OLS) in non-matched and matched samples

- More than half (55%) of the current gap in food insecurity between women and men would be reduced by eliminating gender gaps in education, labour force participation and income.

Conclusions

- In the UNECE region, food insecurity has significantly increased after the outbreak of the pandemic, widening the gender gap.
- Women are more likely than men to be food insecure, particularly in the rural areas of Central Asia, while individuals aged 25-34, regardless of gender, have been disproportionally affected during the pandemic.
- If gender gaps in education, income and labour force participation were closed, the gender gap in food insecurity would fall by almost 55%. The remaining gap is due to other inequalities and unobserved discriminatory factors, including gender norms and stereotypes.
- Individual-level data are key in addressing gender inequality in food security and in monitoring SDG indicators to support evidence-based policies and programme.

Appendix: descriptive statistics by sex, UNECE countries

VARIABLES	(1) All Sample	(2) Women	(3) Men	(4) Difference in mean Women-Men
Prob. moderate or severe food insecurity	0.115	0.125	0.105	**0.02**
	(0.001)	(0.001)	(0.001)	
Prob. severe food insecurity	0.022	0.023	0.021	**0.002**
	(0.000)	(0.000)	(0.000)	
female	0.521	1.000	0.000	-
	(0.001)	(0.000)	(0.000)	
rural	0.599	0.600	0.598	0.002
	(0.001)	(0.002)	(0.002)	
age	45.212	46.211	44.127	**2.084**
	(0.043)	(0.059)	(0.063)	
married	0.524	0.516	0.531	**-0.015**
	(0.001)	(0.002)	(0.002)	
employed (full-time)	0.363	0.313	0.417	**-0.104**
	(0.001)	(0.001)	(0.002)	
employed (part-time)	0.114	0.120	0.108	**0.012**
	(0.001)	(0.001)	(0.001)	
self employed	0.072	0.052	0.094	**-0.042**
	(0.001)	(0.001)	(0.001)	
unemployed	0.051	0.049	0.052	**-0.003**
	(0.001)	(0.001)	(0.001)	
out of labour force	0.401	0.467	0.329	**0.138**
	(0.001)	(0.002)	(0.002)	
education (elementary)	0.210	0.229	0.190	**0.039**
	(0.001)	(0.001)	(0.002)	
education (secondary)	0.598	0.573	0.626	**-0.053**
	(0.001)	(0.002)	(0.002)	
education (tertiary or above)	0.191	0.198	0.184	**0.014**
	(0.001)	(0.001)	(0.001)	
number of adults	2.689	2.637	2.745	**-0.108**
	(0.003)	(0.004)	(0.005)	
number of children	0.665	0.684	0.643	**0.041**
	(0.003)	(0.004)	(0.004)	
income per capita (international USD)	13511.475	12333.895	14791.48	**-2457.585**
	(90.292)	(105.135)	(149.807)	
income per capita (log int. USD)	8.714	8.668	8.764	**-0.096**
	(0.004)	(0.006)	(0.007)	
Observations	277,551	153,518	124,033	277,551

Source: Gallup WP 2014-2021 for UNECE's countries.

Note: The descriptive statistics are weighted averages within each country but are not weighted with the population of each country. Hence, the estimates presented here are not official aggregated statistics of the region. Variables in bold if t-test of equality of means between women and men rejected at the conventional 5% level. Chi-square tests were performed on the probabilities of food insecurity.

Appendix: Socio-economic determinants of moderate or severe food insecurity and disparities by residence and age, UNECE countries, 2014-2019 and 2020-21

VARIABLES	(1) Prob Mod-Severe 2014-2019	(2) Prob Mod-Severe 2014-2019	(3) Prob Mod-Severe 2020-2021	(4) Prob ModSev – 2020-2021
female	0.020***	0.015***	0.021***	0.018***
	(0.002)	(0.002)	(0.004)	(0.004)
rural	0.009***	-0.009***	0.008**	-0.005
	(0.002)	(0.002)	(0.004)	(0.004)
female_rural	0.002	0.000	0.004	0.005
	(0.003)	(0.002)	(0.005)	(0.005)
1.gr_age1524		-0.057***		-0.042***
		(0.002)		(0.004)
1.gr_age2534		0.001		0.018***
		(0.002)		(0.005)
1.gr_age65plus		-0.030***		-0.049***
		(0.002)		(0.004)
female_age1524		-0.008**		-0.002
		(0.004)		(0.008)
female_age2534		-0.013***		-0.012**
		(0.003)		(0.006)
female_65plus		0.001		0.006
		(0.003)		(0.007)
secondary.education		-0.059***		-0.045***
		(0.002)		(0.005)
tertiary.education		-0.106***		-0.095***
		(0.002)		(0.005)
n_child		0.011***		0.010***
		(0.001)		(0.001)
n_adults		-0.005***		-0.001
		(0.000)		(0.001)
1.married		-0.030***		-0.031***
		(0.001)		(0.003)
ln_income_pcap_USD		-0.018***		-0.018***
		(0.000)		(0.001)
1.self_empl		-0.071***		-0.065***
		(0.002)		(0.003)
1.empl_full		-0.091***		-0.082***
		(0.002)		(0.004)
1.empl_partime		-0.055***		-0.058***
		(0.002)		(0.004)
1.out_LF		-0.078***		-0.068***
		(0.002)		(0.005)
Year Fixed-Effects	Yes	Yes	Yes	Yes
Subregion-Fixed Effects	Yes	Yes	Yes	Yes
Observations	215,120	215,120	62,431	62,431

Source: Gallup WP 2014-2021 for the UNECE countries.

Note: we report the marginal effects of the censored expected value E(yi), describing how the observed variable yi∗ changes with respect to the regressors –i.e., E(yi∗|x). Standard errors in parentheses.*
**** p<0.01, ** p<0.05, * p<0.1*

Appendix: Socio-economic determinants of moderate or severe food insecurity and disparities by residence and age, by regions in the UNECE scope, all years

	Europe and North America		Central Asia	
	(1)	(2)	(3)	(4)
	Prob Mod-Sev	Prob. Mod-Severe	Prob Mod-Severe	Prob.Mod-Severe
VARIABLES	All Years	All Years	All Years	All Years
female	0.019***	0.014***	0.003	0.013
	(0.002)	(0.002)	(0.008)	(0.009)
rural	0.004**	-0.008***	0.002	-0.017**
	(0.002)	(0.002)	(0.007)	(0.007)
female_rural	0.003	0.001	0.016*	0.018**
	(0.002)	(0.002)	(0.009)	(0.009)
1.gr_age1524		-0.053***		-0.066***
		(0.002)		(0.008)
1.gr_age2534		-0.000		0.006
		(0.002)		(0.007)
1.gr_age65plus		-0.032***		0.001
		(0.002)		(0.011)
female_age1524		-0.000		-0.016*
		(0.003)		(0.010)
female_age2534		-0.008***		-0.018*
		(0.003)		(0.009)
female_65plus		-0.002		-0.012
		(0.003)		(0.014)
secondary.education		-0.052***		-0.036***
		(0.002)		(0.006)
tertiary.education		-0.098***		-0.100***
		(0.002)		(0.006)
n_child		0.010***		0.008***
		(0.001)		(0.001)
n_adults		-0.006***		-0.006***
		(0.001)		(0.001)
1.married		-0.037***		-0.026***
		(0.001)		(0.005)
ln_income_pcap_USD		-0.012***		-0.018***
		(0.000)		(0.001)
1.self_empl		-0.065***		-0.084***
		(0.001)		(0.007)
1.empl_full		-0.080***		-0.064***
		(0.002)		(0.008)
1.empl_partime		-0.047***		-0.063***
		(0.002)		(0.007)
1.out_LF		-0.064***		-0.121***
		(0.002)		(0.008)
Year Fixed Effects	Yes	Yes	Yes	Yes
Country-Fixed Effects	Yes	Yes	Yes	Yes
Observations	239,236	239,236	31,232	31,232

Source: Gallup WP 2014-2021 for the UNECE countries.

Note: we report the marginal effects of the censored expected value E(yi), describing how the observed variable yi∗ changes with respect to the regressors –i.e., E(yi∗|x). Standard errors in parentheses.*
**** p<0.01, ** p<0.05, * p<0.1*