BEYOND HOUSEHOLD INCOME: SOCIAL DETERMINANTS OF CHILD FOOD INSECURITY IN ITALY

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Abstract. Food insecurity is the inability to acquire or consume adequate or sufficient food, in socially acceptable ways. So, people are food insecure when they lack regular access to enough safe and nutritious food for normal growth and development, and an active and healthy life. Household food security in high-income countries has received increasing attention from policymakers and researchers over the past decades. An emerging body of literature has linked food insecurity to a variety of negative outcomes, particularly for children, confirming the importance of food security as an indicator of well-being and a legitimate target of public concern. In particular, children in food-insecure households may be at risk of poor health, developmental or behavioural problems. Understanding the determinants of food insecurity is crucial for developing child-specific effective national and local policies. While household income level is definitely linked to food insecurity, recent studies have also shown that socio-demographic factors – such as, education level – play a significant role. This study aims to identify, beyond the income-related measures, the social factors that impact on child food insecurity in the Italian context, using data from the European Union Statistics on Income and Living Conditions (EU-SILC, hereafter) national survey. Households with minors have been targeted from the dataset for this study. Through multivariate statistical analysis, the principal social determinants of child food insecurity have been investigated.

1. Introduction

Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food, that meets their dietary needs and food preferences for an active and healthy life (FAO, 1996). Food security is a broad concept; it includes not only the quality and quantity of food availability, but also physical, social and economic access to food, as well as food preferences.

Food security is a key priority in the international agenda and it is strictly related to the 2030 Agenda for Sustainable Development (Szydło, 2023). SDG 2 aims to end hunger, achieve food security and improved nutrition, and promote sustainable

agriculture. In particular, target 2.1 addresses the universal access by all people, in particular those in vulnerable situations, to safe, sufficient and nutritious food[1].

Monitoring food security requires systematic measurement, which is essential for accurately assessing its current state, identifying vulnerable populations, tracking changes over time, and informing effective policy and intervention strategies (Jones *et al.*, 2013). Over the past half-century, academic and political debates on the definition and measurement of food security have led to the proposal of hundreds of indicators. These range from quantifying food supplies to detailed assessments of food consumption, and include measures of nutritional outcomes, such as growth patterns and nutrient deficiencies (Cafiero *et al.*, 2014). At the global level, the most widely used indicators of food insecurity fall into two main categories: those based on the adequacy of food consumption, and those that define food insecurity through shared behavioral and experiential responses observed across cultures.

Though commonly associated with low-income contexts, food insecurity also affects large portions of the population in wealthy countries (Pollard and Booth, 2019). In Europe, in 2024, 6.8% of the total population have experienced moderate or severe food insecurity[2] (FAO, 2025), meaning they had not regular access to adequate food. The prevalence reached 10.7% in Northern America.

Recent data show that food insecurity is growing in wealthy nations, as well as in low-income countries (Zaçe *et al.*, 2020). According to Food and Agriculture Organization (FAO), global food insecurity is on the rise starting from mid-2014, with nearly 1 out of 3 people in the world living in this condition (28% in 2024, compared to 21.5% of 2015). In high-income countries, food insecurity has started increasing after COVID-19 pandemic. In Europe, food insecurity has increased of 0.4 percentage points from 2019 to 2024, around 3 p.p. in Northern America. Not only regular access to adequate food has decreased, but also the share of people who can afford a healthy diet. Food prices rose throughout 2022, pushing up the average cost of a healthy diet globally. COVID-19 pandemic and the war in Ukraine contributed to significant increases in international food and energy prices, exacerbating inflationary pressures. At the global level, from 2019 to 2024, the

[1] Nevertheless, food security implicitly affects several SDGs: hunger is an effect of monetary poverty (Goal 1); malnutrition is closely linked to physical and mental health problems (Goal 3); food insecurity affects child educational outcomes (SDG 4); marginalized and vulnerable people are more exposed to food insecurity (Goal 10); climate change worsens food insecurity, especially in vulnerable regions (Goal 13).

[2] The prevalence of moderate or severe food insecurity (SDG Indicator 2.1.2) measures the percentage of individuals in a population who have experienced difficulties in accessing adequate food during a specified reference period. It is based on the Food Insecurity Experience Scale (FIES), a globally validated, experience-based metric that captures the severity of food insecurity at the individual or household level, through a standardized set of questions addressing food-related behaviours and experiences (Cafiero *et al.*, 2018).

average cost of a healthy diet increased of around 35%, nearly 36% in Europe (FAO, 2025).

Despite international commitments to the right to food[3], social policies in wealthy nations often fall short of effectively preventing or alleviating food insecurity. The increasing dependence on food banks and charitable organizations suggests that responsibility is frequently shifted to the third sector, while the root causes remain unaddressed (Spring *et al.*, 2022). One of the main challenges in preventing and addressing food insecurity globally is the persistent lack of reliable data. Many high-income countries – particularly in Europe – do not regularly collect comparable data on food insecurity, making it difficult to design and implement effective and timely policies (Carrillo-Álvarez *et al.*, 2021).

As widely reported in the literature, food insecurity in high-income countries is often associated with economic inequality, poverty, and unemployment. Low-income families, unemployed individuals, and those in precarious employment are particularly at risk (Gundersen and Ziliak, 2015). Income is a fundamental determinant of food insecurity; however, there is not a one-to-one correspondence between income poverty and food insecurity: not all individuals living in poverty are food insecure, and not all food-insecure individuals live in poverty (Rose, 1999). This divergence highlights the limitations of income-based poverty measures in accurately identifying food-insecure households, as research has shown that other socio-demographic factors also play a significant role. In fact, the likelihood of experiencing food insecurity is higher also among households with children, single-parent households, individuals without a university degree and younger adults. Other contributing factors may include disability and household composition (Eicher-Miller *et al.*, 2023). Previous studies have identified a range of socio-economic and demographic factors associated with food insecurity across various countries. However, most of this research has focused on developing countries, where the prevalence of food insecurity tends to be higher. In high-income contexts, seminal studies have been conducted in the United States since the early 1990s (for an extensive review, see Gundersen and Ziliak, 2018).

The emerging interest in food insecurity determinants lie in the fact that food insecurity is closely linked to physical and mental health problems, such as malnutrition, obesity, diabetes and mental health disorders. This applies especially when referring to children (for an extensive review, see Gallegos *et al.*, 2021). Children in food-insecure families are more likely to exhibit physical symptoms

[3] The right to food is a universal human right that guarantees every person regular, permanent, and unrestricted access to sufficient, safe, and nutritious food necessary to live in dignity and free from hunger, food insecurity, and malnutrition. This right is enshrined in Article 11 of the International Covenant on Economic, Social and Cultural Rights (ICESCR), which is legally binding on over 170 countries (Mechlem, 2004).

(such as headaches), consume more unhealthy foods, and face a higher risk of overweight and obesity (Zaçe *et al.*, 2020). Investigating food insecurity during childhood is then essential, as it affects not only children's immediate well-being, but also their long-term health, educational achievement, and social integration (Magaña-Lemus *et al.*, 2016).

Building on these introductory considerations, the objective of this study is to identify the socio-demographic determinants of child food insecurity in Italy, going beyond income-based measures. Given that children's access to food is largely determined by the household they live in, the analysis is conducted at the family level, considering all Italian households with at least one minor.

The classification of food-secure household is achieved through the use of eleven questions related to access to food from the 2024 EU-SILC survey, and a nationally representative dataset containing detailed household-level information. Several social dimensions were considered in the analysis (in addition to income- and employment-related measures): educational attainment, nationality, household structure and composition, health-related limitations and informal social support networks. In past research, social support has already been linked to individual access to food, showing that social support – whether emotional or material – can buffer the negative effects of food insecurity, while loneliness and social isolation consistently increase the risk of being food insecure (Burris *et al.*, 2021). However, these studies have mainly focused on adults and the elderly, while the role of social support networks in reducing child food insecurity has not been examined in depth.

To the best of the author's knowledge, the study fills a gap in the literature, as previous research has not analyzed social determinants of child food insecurity at the national level in Italy.

2. Data and methodology

In Italy, relevant food insecurity indicators are collected through the annual EU-SILC survey by the Italian Institute of Statistics (ISTAT). EU-SILC survey is the main source for comparative statistics on income distribution and social inclusion in the European Union. It is a multi-purpose survey, which focuses on income components, at household and individual level, and social exclusion. Particular attention is paid to material and social deprivation, providing information on housing conditions, labour, education and health.

The questionnaire is composed of three parts, which are in turn divided into sections dedicated to specific aspects: the general form, the household questionnaire, and the individual questionnaire. Questions related to household access to food are included in two sections of the household questionnaire: *economic conditions* and

eating habits. The section on economic conditions includes three questions related to access to food[4]. The section on eating habits includes eight questions from FAO Food Insecurity Experience Scale (FIES) module, allowing for the calculation of the SDG indicator (2.1.2) on the prevalence of moderate or severe food insecurity. The FIES module, developed by FAO, consists of 8 yes-or-no questions[5] designed to capture household access to adequate food over the previous 12 months. The questions are progressively more severe in terms of food insecurity experiences. Following Greece, Italy is the second country in the EU adopting the FIES module into the national statistical system.

In this paper data from the 2024 EU-SILC survey have been used. The dataset includes a sample of more than 30,000 households, providing detailed socio-economic and demographic information. The total sample is statistically representative of the resident population in Italy. In order to investigate child-specific food insecurity, only households with at least one child aged less than 18 have been selected, obtaining a final dataset of 5,413 families.

A Multiple Correspondence Analysis (MCA – Greenacre and Blasius, 2006) has been implemented on targeted variables to detect and represent underlying structures in the dataset. The MCA eigenvalues have been revaluated according to Benzécri method[6] (Benzècri, 1979). FactoMineR R package was employed for the analysis (Husson *et al.*, 2015).

Twelve active variables have been identified for the analysis (Table 1). As outcome dimension, an index of food insecurity has been constructed, considering eleven questions in EU-SILC survey related to access to food at household level[7].

[4] (1) Inability to afford a meal with meat, chicken, fish or vegetarian equivalent every second day; (2) Inability to afford sufficient food to meet household needs; (3) To rely on support from individuals who have donated essential supplies (including food).

[5] (1) Was there a time when you were worried you would not have enough food to eat? (2) Was there a time when you were unable to eat healthy and nutritious food? (3) Was there a time when you ate only a few kinds of foods? (4) Was there a time when you had to skip a meal? (5) Was there a time when you ate less than you thought you should? (6) Was there a time when your household ran out of food? (7) Was there a time when you were hungry but did not eat? (8) Was there a time when you went without eating for a whole day?

[6] MCA processes data by transforming each categorical variable into multiple binary columns. This encoding approach introduces artificial dimensions, since a single categorical variable is represented by several columns. As a result, the total inertia of the solution space becomes artificially inflated, which in turn leads to a significant underestimation of the proportion of inertia explained by the first dimension. In fact, it can be demonstrated that any factor with an eigenvalue less than or equal to 1 divided by the number of active variables included in the analysis (K) merely reflects these artificially induced dimensions. The most used correction formula is the one proposed by Benzécri (1979), which excludes those eigenvalues smaller than $1/K$.

[7] The questions selected are: the three household-related questions on access to food (see note no. 4) and the eight household-related questions of the FIES module (see note no. 5).

The index consists of four levels of food insecurity severity, obtained from the sum of the answers from the original questions (1 was assigned to each answer when there is limited access to food and 0 when there is access to food)[8].

Table 1 – *Active variables selected for MCA.*

Variable name	Definition and variable levels [ ]
Food insecurity	Household access to food. [*Food security, Mild food insecurity, Moderate food insecurity, Severe food insecurity*]
At risk of poverty	Households with a net equivalent income below the 60% of the median of the individual distribution of net equivalent income. In 2024, the poverty threshold is equal to 12.363 euros per year for a household of one adult member. [*Yes/No*]
Low work intensity	Households where the adults worked a working time equal or less than 20% of their total combined work-time potential during the previous year. [*Yes/No*]
Income quintiles	Households have been sorted by equivalised income (from the bottom to the top), dividing them in five groups of equal size (quintiles). The first quintile contains the 20% of individuals with the lowest income. [*First to Fifth*]
Making ends meet	Subjective non-monetary indicator of enforced inability for the household to make ends meet. [*With difficulty, With some difficulty, Fairly easily, Easily*]
Education attainment	Maximum education level completed by household members. [*Up to secondary education, Tertiary education*]
Nationality	Nationality of household members. [*All-Italian, Mixed, All-foreign*]
Reference person age	Age of the person interviewed, who provides information about the household's income and living conditions. [*18-34, 35-49, 50-64, 65+*]
Limitations	Presence of household members who have limitations in activities people usually do because of health problems (by any on-going physical or mental health problem, illness or disability) for at least the past six months. [*Major limitation, Minor limitation, No limitation*]
Family type	Household composition. [*Couples with children, Single parent with children*]
Number of children	Number of children aged less than 18. [*One child, Two children, Three or more children*]
Social support network	Presence of unpaid persons (e.g., grandparents, relatives, friends, neighbours) who take care of the child/children when not at school or with parent(s). [*Yes/No*]

As explanatory variables, eleven economic and socio-demographic variables have been selected. In order to control the sampling design effect on the final model, also three sampling design variables have been considered as supplementary

[8] The four levels have been constructed as follow: [0] The family is food secure; [1] Mild food insecurity; [2 to 4] Moderate food insecurity; [5 to 11] Severe food insecurity. The four level classification of the index is based on both expert judgment and data-driven cut-offs.

variables: sampling strata, municipality and auto-representative municipality (AR)[9]. Sampling weights have also been included in the model, to assign to each household the right significance.

3. Results

In 2024, more than 22% of households residing in Italy has at least one child under the age of 18. Among these families, about 56% has only one child, while nearly 8% has three or more children. More than 81% of households with children is composed entirely of Italian nationals, compared to approximately 11% in which all members are non-nationals. Nearly 60% of households with children has a reference person aged between 35 and 49, while young families (with a reference person under the age of 34) account for almost 11%. More than 23% of households with children reports tertiary education as the highest level attained by family members. More than 5% of household with children has at least one member with a health-related limitation. Around 71% of household with children cannot rely on informal social support network, to take care of the child/children when not at school or with parents/caregivers. Around 60% of households with children reports difficulty or some difficulty making ends meet, while about 7% reports that they do easily. Almost 3% of families with children cannot afford to buy the food they need, while nearly 1 out of 10 household is unable to afford a proper meal (containing meat, fish or a vegetarian equivalent every second day). 17.9% of household with children shows at least one of the eleven signs of food insecurity, used to construct the food insecurity index[10].

The first two dimension extracted of the MCA explain the 82% of the total inertia. At risk of poverty, low work intensity, income quintiles and making ends meet variables, together with food insecurity index, mainly contributed to dimension 1 (50.3% of inertia), while the social dimensions contributed more to the second dimension (31.7% of inertia).

The results of the MCA have been separated into two graphs, for a better understanding of the association between the food insecurity index and the social

[9] The sample design is based on a two-stages scheme (municipalities and households), where the primary sample units – municipalities – are stratified by population size within each region. A stratified sample of municipalities is selected in the first stage and, in the second stage, a sample of households is randomly selected from the municipalities included in the first stage. The largest municipalities are always included in the sample (therefore they are called auto-representative or AR), while the other ones are selected according to a stratified sample where strata are defined by the administrative regions and the number of inhabitants (non-auto-representative municipalities or NAR).

[10] Following the classification of food security severity here proposed, 13.1% shows mild food insecurity, 3.3% moderate food insecurity and 1.5% severe food insecurity.

and economic dimensions. All the variables have been included in the same model, but the visual representation of the first two axis has been replicated for the economic dimension (Figure 1) and the social dimension (Figure 2).

Figure 1 shows the first two axes of the MCA where the food insecurity index categories and the economic variables categories have been projected. The three categories of food insecurity (mild, moderate and severe) are positioned along the right side of the first axis, while food security category is aligned on the left side. Food insecurity is strongly associated with low work intensity, risk of poverty, the first and the second income quintile and difficulties in making ends meet. These results confirm that, in the Italian context, children living in household with limited economic resources and limited access to the labour market are much more likely to be food insecure.

Figure 1 – *Multiple correspondence analysis, economic dimension.*

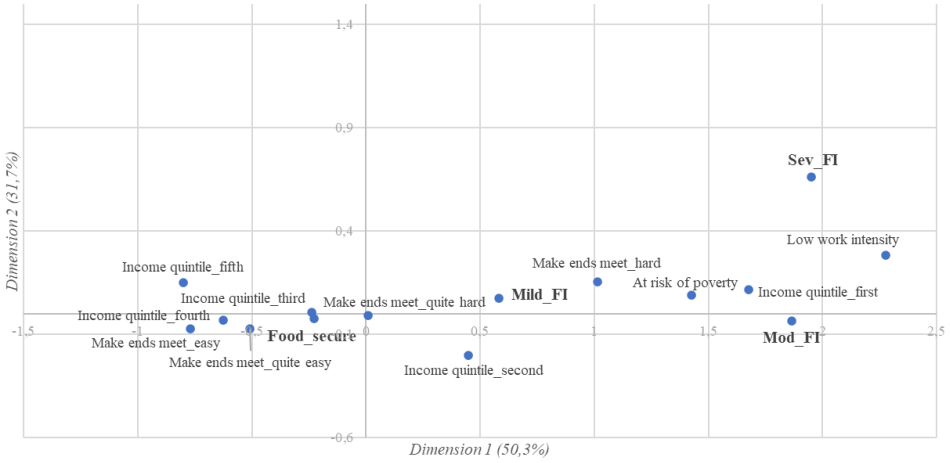

Figure 2 shows the first two axes of the MCA where the food insecurity index categories and the socio-demographic variables categories have been projected. Differently from the previous figure, moderate and severe food insecurity are more isolated, meaning that the social dimension mainly discriminates between food security and mild food insecurity, while moderate and severe food insecurity seem to be more associated with economic constraints. Mild food insecurity is strongly associated with presence of foreign components in the household, a lower education level, a higher number of children, single parent households, a young reference person aged 18-34, the presence of at least one member with minor health-related limitations and the absence of an informal social support network. On the other hand, household composed of national members, with a higher education level, couples with dependent children, relying on informal social support networks, where none

of the household members has health-related limitations, show a lower risk to be food insecure. Moreover, the risk of food insecurity increases as the number of dependent children increase and the age of the reference person decrease.

Figure 2 – *Multiple correspondence analysis, social dimension.*

4. Conclusions

Nowadays, food insecurity represents a significant challenge, even in high-income countries. Although the prevalence is generally lower than in low- and middle-income countries, millions of people in wealthy nations still face difficulties accessing sufficient, adequate and nutritious food. Food insecurity persists in high-income countries despite overall wealth, primarily because of persistent economic inequality, poverty, and social exclusion.

An emerging body of literature has linked food insecurity to a range of negative outcomes, particularly for children, underscoring the importance of food security as an indicator of well-being and a legitimate focus of public concern.

It is widely recognized that low income is a key determinant of food insecurity. However, not all low-income households experience food insecurity – particularly in high-income countries – suggesting that social factors also play a crucial role.

While several studies have examined the relationship between household economic status and food insecurity – particularly in low-income countries where food insecurity is more prevalent – relatively few analyses have considered the social

dimensions of the household and their relationship with access to food, beyond income level alone.

Shifting the focus from income alone to social factors is essential. Policies addressing food poverty in high-income countries have historically concentrated on income-based interventions – such as cash transfers, minimum wage laws, and food subsidies. While these measures remain important, they often fail to address the complex, multidimensional nature of food insecurity. Relying solely on income overlooks other critical factors that influence whether individuals and families can access sufficient, adequate and nutritious food.

The objective of this paper is to identify, beyond the income-related measures, the social factors that impact on child food insecurity in the Italian context. To this end, MCA was implemented on relevant socio-economic variables from the 2024 EU-SILC survey.

The results of the MCA have highlighted some key findings. Firstly, the analyses have confirmed that, also in the Italian context, there is a strong association between low income, economic constraint, low work intensity and food insecurity – across all levels of severity. Secondly, the results showed that the social dimension also plays a crucial role in determining the likelihood of children experiencing food insecurity. Last but not least, while severe food insecurity is primarily determined by income-related factors, mild forms of food insecurity are strongly influenced by social determinants.

Considering the social dimension, the results of the analyses have shown that households with younger heads are more likely to be food insecure than those with older heads. Older household heads may have more stable incomes and better financial management skills, reducing food insecurity risk. Single-parents households face higher risks of food insecurity, likely due to lower earnings and fewer financial resources. Higher education levels significantly reduce the risk of food insecurity. Education helps individuals access better job opportunities and manage resources more effectively. Households that include members with health-related limitations are less likely to be food secure. Caring for disabled family members increases financial strain, contributing to food insecurity. Households with at least one non-national member are more likely to experience food insecurity. Foreign communities often face economic and social disadvantages, including limited access to education and employment opportunities. Larger households with more children are at higher risk of food insecurity. Lastly, household that cannot rely on informal, no-cost social support network are more likely to be food insecure, as informal social cohesion and support often represent the first line of defence against food insecurity, especially when formal assistance is insufficient or unavailable.

This research has uncovered the complexity of child food insecurity, highlighting that it is not solely a function of household low income, but also of social context. Food insecurity in Italy is influenced by multiple factors, including education, household composition, income, ethnicity, and social support. While poverty is a major determinant, the study emphasizes the importance of monitoring the social dimension to develop effective national and local policies, and achieve child food security. A better understanding of social determinants can improve the design of policies against food insecurity, which should focus on vulnerable populations, considering the unique needs of young, single-parent households, large families and ethnic minorities.

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