

Comparison of Two Different Approaches to Measuring Economic Access to Food and Insecurity: an Application on Household Income and Expenditure Survey in Mexico

Comparazione di due approcci per valutare l'insicurezza alimentare: un'applicazione sui dati ENIGH in Messico

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Abstract The UN SDG 2 establishes the achievement of food security by 2030. However, the pandemic has exacerbated inequalities and what was primarily a problem of emerging countries now also characterizes developed countries. Measuring economic access to food properly is an important issue to be addressed in order to allow a constant official monitoring of the phenomenon. By using the Mexican National Survey of Household Income and Expenditure data, the aim of this paper is to assess the convergence between a qualitative assessment of food insecurity and an indicator of economic access to food obtained from Household Budget Surveys, usually carried out in several countries. As the first analyses suggest, when quality assessment of food insecurity is difficult to obtain, the food access economic indicator can be used instead to support data driven policy decisions.

Abstract *L'Obiettivo di Sviluppo Sostenibile 2 stabilisce il raggiungimento della sicurezza alimentare entro il 2030. Purtroppo, la pandemia ha aumentato il livello di disuguaglianza anche nei Paesi sviluppati con situazioni di marginalità sociale che includono anche l'insicurezza alimentare. Sono quindi necessarie misure appropriate per il monitoraggio della capacità di soddisfare i bisogni primari di alimentazione. In questo lavoro utilizziamo i dati della "Mexican National Survey of Household Income and Expenditure" con l'obiettivo di valutare la convergenza tra una misura di insicurezza alimentare qualitativa basata su domande specifiche e una quantitativa basata sulla spesa per alimenti. Come confermato dalle prime analisi, la misura quantitativa, più facilmente ottenibile dalle indagini correnti re-*

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alizzate dagli uffici nazionali di statistica in moltissimi Paesi, può rappresentare una preziosa fonte di informazioni per decisioni politiche basate sui dati.

Key words: food expenditure, qualitative assessment, SDG 2

1 Introduction

The UN Sustainable Development Goals have set clear targets on global poverty, hunger and malnutrition to be achieved by 2030, which have prompted academics and policy-makers to identify and define useful strategies and measures as well as proper methods to assess drivers effectively. Specifically, SDG 2 foresees the reduction of food insecurity by reducing chronic hunger, defined as situation that exists when people lack access to sufficient amounts of nutritious food for an active and healthy life as measured by the Prevalence of Undernourishment (PoU), in accordance with SDG Indicator 2.1.1 ([1]).

Food insecurity is a complex problem, manifesting as obesity and malnutrition in addition to extreme hunger and starvation ([2]) and it is commonly defined as “*having at all times, physical, social and economic access to sufficient, safe and nutritious food that meets dietary needs and food preferences for an active and healthy life*” ([3]).

Food insecurity and the related notion of economic access to food may appear to refer exclusively to developing countries, but in actual fact it is a phenomenon that was also present in developed and affluent countries ([4]) including Europe ([5]) and more generally OECD countries, even before the outbreak of Covid-19 pandemic even if the pandemic has exacerbated inequality, with almost 811 million people faced hunger in 2020, according to figures by the Food and Agriculture Organization of the United Nations.

In this perspective a correct and proper measurement of this phenomenon is essential. Focussing on measuring economic access to food and (in)security both qualitative scales and indicators based on the household income expenditure have been proposed. However, these measures have been used as alternatives or as single dimensions within a multidimensional perspective capturing availability, access, utilization and stability of food.

However, since in developed countries it is the task of official statistics to conduct the survey on household consumption by collecting household expenditures for different categories of expenditure (i.e. the so-called Household Budget Surveys, HBSs) it would be good to investigate to what extent measures based on data of an economic nature (income or consumption) are aligned with qualitative measures and scales that are already well explored and widely developed, instead, in emerging countries.

The statistical robustness and correspondence of information and classification between different approaches may in fact allow for the extension of the use of HBSs (but also surveys on income) for further purposes that go beyond or, even better,

complement the analyses that have so far been conducted on poverty in general, expanding them towards the analysis of poverty and food insecurity.

In this study, we focus on Mexico and specifically on the National Survey of Household Income and Expenditure (ENIGH) carried out every two years by the National Institute of Statistics and Geography (INEGI). We aim to compare two measures of food insecurity. The first is based on the ENIGH set of questions to measure food insecurity from a qualitative perspective. The latter is based on household consumption expenditures - and specifically household consumption expenditure on food - that is also surveyed in ENIGH. Therefore, the possibility of referring to a double perspective within the same survey has motivated us to explore the statistical reliability of these two approaches in measuring a unique phenomenon.

2 Data and Method

The National Survey of Household Income and Expenditure (ENIGH) is a representative sample survey conducted in Mexico every two years with the general aim of providing stakeholders with a statistical overview of income and expenses behaviour of households in terms of their amount, origin and distribution.

For our analysis we use the ENIGH 2018 wave, which involves a national sample of 87,826 housing units. INEGI uses a stratified, two-stage design, where the secondary units are the households and the primary units are municipalities, while stratification is done according to geographic characteristics.

Within the Mexican ENIGH survey the food insecurity issue is assessed through the use of the Latin American and Caribbean Food Security Scale (ELCSA) by taking advantage of 6 questions where families signal if during the past three months they had access to a limited variety of food, whether they skipped a meal, if they had eaten less than they thought they should, if they ran out of food, if they felt hungry but did not eat, and if they had not eaten for a whole day. These questions are asked twice if in the household there are children (i.e., individuals younger than 18). The second time, respondents answer for the infants living in the dwelling (Villagómez-Ornelas, 2014).

The severity of food insecurity is constructed by the number of questions that people answer affirmatively. When households without children answer "Yes" to 5-6 questions, they are Severely Insecure. If they answer 3-4 questions affirmatively, they are Moderately Insecure; 1-2 questions, Mildly Insecure; and, 0 questions, Secure. Similarly, each threshold is built for households with children. In Mexico we estimated 60.3% of people is food secure, while 39.7% are not. In particular 19.3% are mildly insecure, 12.1% are moderately insecure and 8.3% are severely insecure. There are about 49,670,000 persons who are not food secure. Figure 1 shows the proportions of persons by severity of food insecurity according to the ELCSA scale divided by households with and without children. We can observe that households with children show a higher level of food insecurity, highlighting the difficulties of such households to afford adequate nutrition.

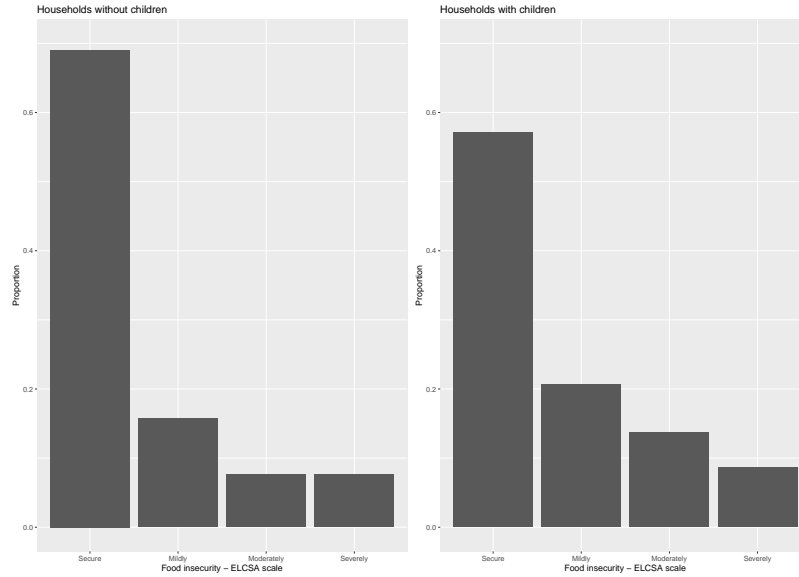


Fig. 1 Proportions of people living without (left) and with (right) children by ELCSA food insecurity scale. Source: ENIGH 2018 data.

The ENIGH surveys also information about household consumption expenditure, used to obtain the share of food expenditure and a proxy indicator of the food (in)security ([1]). Let x_i be the total expenditure and y_i the food expenditure for household i , then the share of food expenditure at household level is simply defined as $SF_i = y_i/x_i$. According to the Integrated Food Security Phase Classification (IPC, 2021), we use a four-group classification: i. no food insecurity if $SF < 40\%$, ii. mild food insecurity if $40\% \leq SF < 50\%$, iii. moderate food insecurity if $50\% \leq SF < 70\%$ and iv. severe food insecurity if $SF \geq 70\%$. We estimated at national level 48.3% of persons being food secure, 23.5% being mildly food insecure, 24.4% being moderately food insecure and 3.8% being severely food insecure. According to this measure, about 64,675,000 persons are not food secure. The picture obtained is a little bit different from the previous one, and seems to emphasize more the food insecurity phenomenon. We show in figure 2 the proportions of persons living in the different food (in)security conditions, classified by persons living with or without children. Using this measure, the difference between households with and without children are minimal, with a bigger proportion of food severely insecure for person living without children.

Both the food insecurity measures are estimated using the Horwitz and Thompson expansion estimator. Standard error are obtained using Taylor approximation and are considered small at national level.

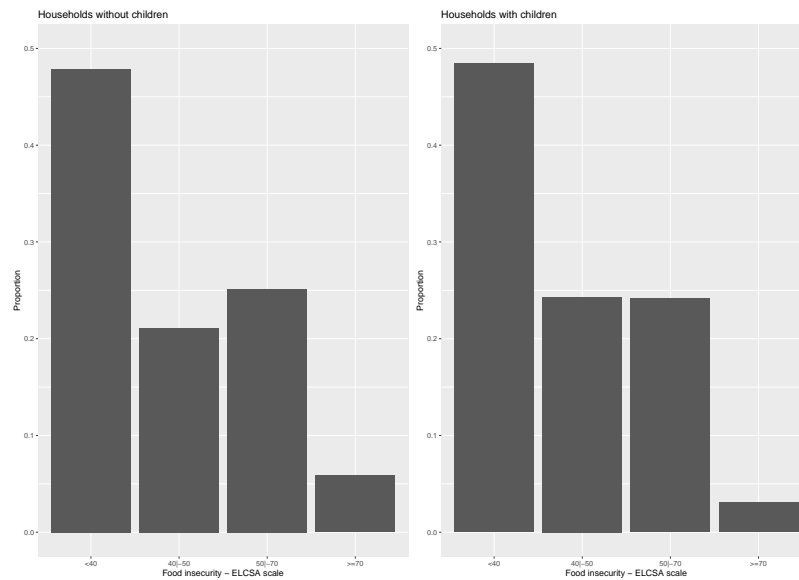


Fig. 2 Proportions of people living without (left) and with (right) children by IPC food insecurity scale. Source: ENIGH 2018 data.

3 Discussion on the comparison between food insecurity measures

In this section we compare the food insecurity measure obtained from the ELCSA scale and from the IPC scale. The first is based on specific questions aimed at investigating about properly nutrition, the latter is based on the consumption expenditure, usually surveyed in many countries.

The two measures are dependent according to the Pearson χ^2 test for contingency table with the first and second-order Rao-Scott corrections (p-value $< 2.2e - 16$) ([6]). Even if we carry out the test within regions the result does not change. We also carry out a regression model to assess the relation between the SF and the food insecurity on the quality ELCSA scale and some controlling variables (presence of children, regions and urban/rural area). The average SF is significantly different among secure, mild insecure, moderately insecure and severe insecure categories.

Although the two measures are dependent there are some differences. Figure 3 visualizes the cross classification of food insecurity level between ELCSA and IPC scale. Firstly, it is reasonable that persons classified severely, moderately or mild insecure on the IPC scale can be secure according to the ELCSA scale, this mean that a very large amount of resources are used for nutrition. What need further investigations are those persons who are secure on IPC scale (i.e. $SF < 40\%$) while mildly, moderately or severely insecure according to ELCSA scale. Indeed, these

persons devote less than 40% to consumption expenditure for food, but they have difficult to have an adequate nutrition level.

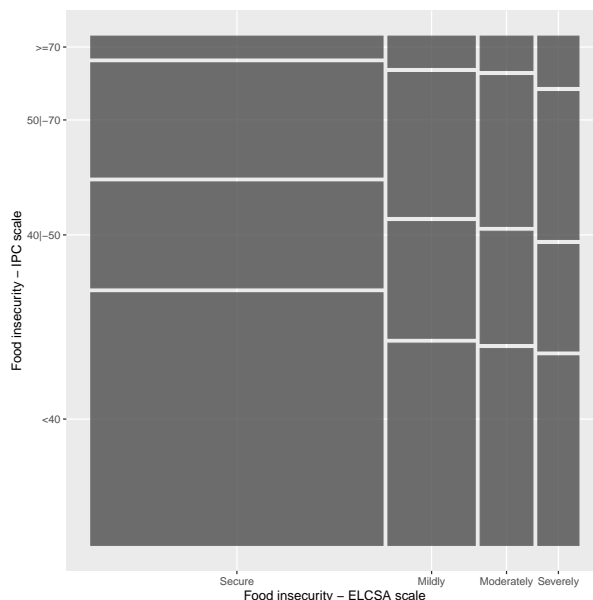


Fig. 3 Cross classification of food insecurity level between ELCSA and IPC scale. Source: ENIGH 2018 data.

We can conclude that the IPC based scale emphasizes more the problem than ELCSA scale, but exclude persons that have not access to sufficient nutrition. Future works will investigate on these issues.

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