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Economic Participation Status and Household Welfare: Identifying Which Food Insecurity Experiences Are Most Affected

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ABSTRACT

This study examines how the economic participation status of the household head is associated with household food insecurity, using nationally representative survey data and experience-based food insecurity indicators. Instead of relying on a single index, the analysis uses eight separate Food Insecurity Experience Scale (FIES) items to capture worry about food, diet quality, quantity reductions, and severe deprivation. Linear probability models are estimated for each outcome to identify which dimensions of food insecurity are most sensitive to labour force status. The results show that households headed by unemployed individuals face a markedly higher likelihood of both moderate and severe food insecurity. Households with employed heads generally experience lower risk, although food-related hardship is not entirely absent. By contrast, households with heads not in the labour force often exhibit equal or even lower vulnerability than employed-headed households. These findings highlight the need to distinguish labour force categories when designing social protection and employment-related policy responses.

KEYWORDS

Economic participation, Food insecurity, Labour market status, Household welfare

Introduction

Economic participation is a central pathway through which households secure livelihoods, build resources, and protect their well-being in low- and middle-income settings. Where formal labour markets are limited and employment opportunities unstable, a household's position in the labour force matters greatly. It shapes consumption stability, exposure to shocks, and overall social well-being. Employment provides income, but it also offers protection. It helps households smooth consumption and shield themselves from deprivation. When households face unemployment or withdraw from the labour force, these protections weaken. Economic stress and material hardship become more likely. One of the clearest outcomes of this vulnerability is food insecurity, which directly affects health, dignity, productivity, and human development (Jensen, 2002; Bartfeld & Dunifon, 2006).

Food insecurity remains a serious welfare concern in Pakistan and underscores the urgency of examining the household conditions associated

with it. Recent official evidence from the Pakistan Social and Living Standards Measurement (PSLM) 2019-20 shows that 16.44 percent of households in Pakistan were moderately or severely food insecure, while 1.80 percent faced severe food insecurity (Pakistan Bureau of Statistics, 2020 pg. 574). The burden is not evenly distributed across regions. Balochistan records the highest incidence, with 23.36 percent of households experiencing moderate or severe food insecurity and 3.55 percent facing severe food insecurity, followed by Sindh at 17.52 percent, Punjab at 15.66 percent, and Khyber Pakhtunkhwa at 14.44 percent (Pakistan Bureau of Statistics, 2020 pg. 575). The situation also appears highly sensitive to shocks, as COVID-19 period estimates suggest a sharp rise in food stress. This broader national picture highlights that food insecurity in Pakistan is not a marginal issue, but a widespread and unevenly distributed challenge that warrants closer attention to labour market vulnerability and household welfare.

Food insecurity is widely recognised as a key dimension of household welfare, even when food is available at the national level. Many households still struggle to access sufficient, safe, and nutritious food due to economic constraints. Income instability, rising costs, and competing financial needs make these challenges worse. Evidence consistently links food insecurity with poor health, psychological stress, and reduced economic capability (Higashi et al., 2017; Brady et al., 2021). Existing research also shows that low income, limited assets, and economic shocks raise the risk of food hardship (Anwar et al., 2024). Financial strain, healthcare costs, and unstable earnings intensify this risk, while stronger assets and resources help households maintain consumption during crises (Huang et al., 2010; Choi et al., 2017). This evidence highlights how closely food insecurity is tied to labour market conditions and economic participation.

A related body of research examines the role of institutions and policy. Social safety nets and food assistance programmes can reduce food insecurity, although their effectiveness varies with design and household vulnerability. Studies from the United States suggest that participation in food assistance programmes is generally linked to lower food insecurity, even though the most vulnerable households are often those who participate (Mykerezi & Mills, 2010; Jensen, 2002). Contextual studies also show that state-level policy environments, accessibility of support systems, and broader socio-economic conditions shape household food security outcomes (Bartfeld & Dunifon, 2006). In developing countries, research shows that economic crises, inflation, and shocks worsen food insecurity. Many households rely on coping strategies such as borrowing, dissaving, or selling assets. These strategies may provide short-term relief but often signal vulnerability and can weaken long-term resilience (Shair et al., 2024; Shair et al., 2023).

Recent methodological advances also emphasise the value of experience-based food insecurity measures. These tools capture a progression of experiences, such as worrying about food, reducing food quality, lowering dietary variety, skipping meals, and eating less than needed (Grimaccia & Naccarato, 2019). Studies using such measures show that food insecurity is

multidimensional. It does not always follow the same path across different populations. Specific social and economic vulnerabilities may link to particular forms of deprivation. Evidence also shows that very low food security often arises from combined risks such as poor health, disability, financial strain, and social disadvantage, rather than from a single factor alone (Choi et al., 2017; Higashi et al., 2017).

However, an important gap remains. Most studies confirm that unemployment, economic stress, and resource constraints worsen food insecurity. Yet, many analyses rely on composite indicators or broad vulnerability categories. They often focus only on the employed versus unemployed, while paying less attention to those not in the labour force. This group frequently includes discouraged workers, caregivers, older adults, and individuals facing structural barriers to work. There is also limited evidence on how specific food insecurity experiences, such as anxiety about food, reduced diet quality, skipping meals, or eating less than needed, differ across economic participation groups. As a result, policy debates often rely on general insights rather than understanding which specific dimensions of food insecurity are most sensitive to labour force status.

Addressing this gap is important for better policy responses. Differentiating between employed, unemployed, and not in the labour force groups helps identify which households are most vulnerable and what forms of deprivation they face. Unemployed households may experience sudden shocks affecting meal frequency. Those outside the labour force may face more persistent challenges, such as chronic financial stress and compromised diet quality. Recognising these differences supports smarter targeting of social protection, labour market interventions, and food support strategies.

This study contributes in three ways. First, it focuses explicitly on economic participation status by separately examining employed, unemployed, and not in the labour force households. Second, it uses individual experience-based food insecurity items rather than relying only on a single composite index. This helps identify which food insecurity experiences are most sensitive to economic participation status. Third, it draws on nationally representative survey data, enabling robust and policy-relevant analysis.

The objective of this study is to examine how economic participation status is associated with different food insecurity experiences at the household level. The study estimates econometric models for multiple food insecurity items and compares predicted probabilities across employed, unemployed, and not in the labour force households.

Data and Measurement Framework

Data Source

This study uses Pakistan Social and Living Standards Measurement (PSLM) Survey 2019-20. A nationally representative data conducted by the Pakistan Bureau of Statistics (PBS). It contains detailed data on household demographics and labour market participation and a broad range of welfare indicators, including experiences regarding food. The round 2019-20 covers a

large sample of about 160,000 households representing urban as well as rural areas of the country.

Measurement of Variables

Household food insecurity is measured by the FAO based Food Insecurity Experience Scale (FIES). The scale captures the lived experiences of households relating to food access in the preceding 12 months; from a concern over food insecurity to more severe deprivation experiences. Table 1 shows the 8 items of the FIES used in this study. These items include whether the household was concerned about food, not being able to eat healthy food, reducing the variety of foods they had, skipping meals, not being able to eat enough food, running out of food, going hungry or not being able to eat anything all day because they did not have access to food. Each of the items is recorded as a binary response, whereby "Yes" means the presence of food insecurity, and "No", "Don't know", and "Refused" responses are considered accordingly during data cleaning.

Table 1: Food Insecurity Experience Scale (FIES) Items

Item Code	Question (Reference Period: Last 12 Months)	Response Coding
FIES-1	You or others in your household worried about not having enough food to eat because of a lack of money or other resources.	Yes = 1 No = 2 Don't Know = 98 Refused = 99
FIES-2	You or others in your household were unable to eat healthy and nutritious food because of a lack of money or other resources.	Yes = 1 No = 2 Don't Know = 98 Refused = 99
FIES-3	You or others in your household ate only a few kinds of foods because of a lack of money or other resources.	Yes = 1 No = 2 Don't Know = 98 Refused = 99
FIES-4	You or others in your household had to skip a meal because there was not enough money or other resources to get food.	Yes = 1 No = 2 Don't Know = 98 Refused = 99
FIES-5	You or others in your household ate less than you thought you should	Yes = 1 No = 2 Don't Know = 98 Refused = 99

	because of a lack of money or other resources.	
FIES-6	Your household ran out of food because of a lack of money or other resources.	Yes = 1 No = 2 Don't Know = 98 Refused = 99
FIES-7	You or others in your household were hungry but did not eat because there was not enough money or other resources for food.	Yes = 1 No = 2 Don't Know = 98 Refused = 99
FIES-8	You or others in your household went without eating for a whole day because of a lack of money or other resources.	Yes = 1 No = 2 Don't Know = 98 Refused = 99

For empirical analysis, each of the FIES questions is transformed into a binary indicator, such that it has the value 1 if the condition occurred and 0 otherwise (see Table 2). This way it is possible to examine specific food insecurity experiences instead of using exclusively a composite index. The key explanatory variable in the study is economic participation status which is captured through three mutually exclusive categories in the household head: employed, unemployed and not in the labour force.

In addition, a set of socio-demographic and location controls are included to account for household and location differences. These are province indicators, residence (rural-urban), household size, gender and age of household head, and types of marital status. Together, these variables help to give a better understanding of the relationship among economic participation, different food insecurity experiences at household level.

Table 2. Definition of variables

Variable	Description
FIES_k1: Worried about food	Indicates whether the household worried about having enough food during the reference period (1 = yes, 0 = no).
FIES_k2: Unable to eat healthy food	Household was unable to consume healthy, nutritious or preferred foods due to lack of resources (1 = yes, 0 = no).
FIES_k3: Ate few kinds of foods	Household relied on limited variety of foods because of financial constraints (1 = yes, 0 = no).

FIES_k4: Skipped meals	Household skipped meals due to insufficient food or lack of resources (1 = yes, 0 = no).
FIES_k5: Ate less than needed	Household had to reduce the quantity of food consumed (1 = yes, 0 = no).
FIES_k6: Ran out of food	Household completely ran out of food due to lack of money or resources (1 = yes, 0 = no).
FIES_k7: Whole day without eating	Household members went a whole day without eating because of lack of food (1 = yes, 0 = no).
FIES_k8: Severe hunger experience	Household experienced severe food deprivation consistent with extreme food insecurity (1 = yes, 0 = no).
Employed	Household head is employed (1 = yes, 0 = no).
Unemployed	Household head is unemployed and actively seeking work (1 = yes, 0 = no).
Not in labour force	Household head is not participating in labour market (students, elderly, homemakers, disabled etc.) (1 = yes, 0 = no).
Province dummies (KP, Punjab, Sindh, Balochistan)	Indicator variables identifying the province of residence (1 = province, 0 = otherwise).
Rural / Urban	Indicator of place of residence (1 = category, 0 = otherwise).
Household size	Total number of household members.
Male household head	Household head is male (1 = yes, 0 = no).
Female household head	Household head is female (1 = yes, 0 = no).
Age of household head	Age of the household head in completed years.
Never married	Household head has never been married (1 = yes, 0 = no).
Formerly married	Household head is widowed, divorced, or separated (1 = yes, 0 = no).
Currently married	Household head is currently married (1 = yes, 0 = no).

Econometric Model

This study is an attempt to examine the comparison of household food insecurity experiences at the different economic participation status. Since each FIES outcome is binary (1 = experienced the condition, 0 = otherwise), the analysis applies a Linear Probability Model (LPM). The LPM is intuitive and easy to interpret, as estimated coefficients directly represent changes in the probability of experiencing a particular food insecurity condition.

For each FIES item $FIES\_k_i$, the model is specified as:

$$FIES_{ki} = \beta_0 + \beta_1 Unemployed_i + \beta_2 NotLF_i + \boldsymbol{\gamma}\mathbf{X_i} + \epsilon_i$$

Where $FIES_{ki}$ represents one of the eight food insecurity outcomes (worry about food, eating less, skipping meals, running out of food, etc.). Unemployed and Not in Labour Force are the key explanatory variables, while Employed serves as the reference category. $\mathrm{X_i}$ is a vector of household and demographic controls, including province dummies, rural-urban residence, household size, gender and age of household head, and marital status categories. ϵ_i is the error term. All specifications include provincial fixed effects, with Khyber Pakhtunkhwa as the omitted category, and a rural-urban residence control to account for geographic heterogeneity in food insecurity across Pakistan.

The LPM allows us to interpret coefficients as percentage-point differences in the probability of experiencing a particular food insecurity condition relative to employed households. For example, a positive and significant coefficient on Unemployed implies that households headed by unemployed individuals face a higher probability of experiencing that specific food insecurity item.

Descriptive Analysis

Descriptive statistics

Table 3 reports descriptive statistics for the full estimation sample and includes both the eight FIES outcome variables and all explanatory variables used in the regression models. Means and standard deviations are presented for labour-force-status indicators, province indicators, residence, household size, gender, age, and marital-status variables, alongside the food insecurity measures. Table 3 presents descriptive statistics for the full sample of around 160,000 households. Most variables are binary indicators taking values of 0 or 1, so the mean can be read as the proportion of households with that characteristic. The table therefore gives an initial picture of the distribution of food insecurity experiences, economic participation status, and basic household characteristics in the dataset.

The FIES items show a clear gradient from milder to more severe forms of food insecurity. Around one fifth of households report worrying about having enough food, while roughly one third report being unable to eat healthy or preferred foods or having to rely on only a few kinds of foods. These

experiences reflect psychological stress and compromise on diet quality rather than outright food shortage.

By comparison, quantity-related and severe deprivation indicators are less, but still notable in their prevalence. Around 9 percent of households reported skipping meals and around 15 percent reported that they ate less than they felt they needed to eat. Close to 6-7 per cent report running out of food or a household member going a whole day without eating and around 5 per cent report severe hunger. These patterns indicate that extreme deprivation is less common, but a large proportion of households are living with chronic anxiety and recurrent compromises in diet quality and quantity.

Economic participation of household heads is biased towards employment. More than four out of five heads are employed, around 1 percent are unemployed, and around one in every six is outside the labour force. This distribution underscores the importance of economic participation status as the key for the analysis. Small differences in vulnerability between these groups, particularly those not in the labour force, may translate into meaningful differences in particular food insecurity experiences.

The sample is also mainly rural since approximately two thirds of households reside in rural regions and one third in urban ones. Punjab contributes approximately fifty percent of the sample, and Sindh and Khyber Pakhtunkhwa contribute a lesser proportion than that of Balochistan. The size of houses is slightly above five people and there are very large households of more than five people. Most of the households are headed by males and most of the heads are married and in mid-adulthood with an average age of mid-forties. These patterns of description give the econometric analysis that follows a vital context particularly in understanding the variation of the risks of food insecurity among economic participation groups and various household profiles.

Table 3. Descriptive statistics for food insecurity outcomes and explanatory variables

Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**
fies_k1: Worried about food	159,781	0.220	0.414	0	1
fies_k2: Unable to eat healthy food	159,424	0.354	0.478	0	1
fies_k3: Ate few kinds of foods	159,100	0.347	0.476	0	1
fies_k4: Skipped meals	158,824	0.091	0.288	0	1
fies_k5: Ate less than needed	158,587	0.146	0.353	0	1
fies_k6: Ran out of food	158,626	0.064	0.245	0	1

fies_k7: Went a whole day without eating	158,469	0.061	0.240	0	1
fies_k8: Severe hunger experience	158,273	0.046	0.210	0	1
Employed	160,619	0.825	0.380	0	1
Unemployed	160,619	0.012	0.108	0	1
Not in labour force	160,619	0.164	0.370	0	1
Khyber Pakhtunkhwa	160,654	0.178	0.383	0	1
Punjab	160,654	0.496	0.500	0	1
Sindh	160,654	0.231	0.421	0	1
Balochistan	160,654	0.095	0.293	0	1
Rural	160,654	0.689	0.463	0	1
Urban	160,654	0.311	0.463	0	1
Household size	160,654	5.416	2.602	1	42
Male household head	160,654	0.915	0.278	0	1
Female household head	160,654	0.085	0.278	0	1
Age of household head	160,654	44.254	13.444	14	99
Never married	160,654	0.019	0.137	0	1
Formerly married	160,654	0.067	0.250	0	1
Currently married	160,654	0.914	0.281	0	1

Cross-Tabulation

Table 4 compares the distribution of food insecurity experiences, between households with employed, unemployed and not-in-labour-force household head using row percentages and Pearson chi-squared tests. The figures offer a clear descriptive picture of the relationship between different positions in the labour force and both moderate and severe forms of food insecurity and of whether these differences are statistically meaningful.

The results show a consistent pattern in which unemployed households face the greatest food insecurity burden. For the milder indicators, 29.7 percent of unemployed households report worrying about food, compared with 22.5 percent of employed households and 18.5 percent among those not in the labour force. Similarly, 49.5 percent of the unemployed report being unable to eat healthy food, compared with 36.5 percent of the employed and 29 percent of the not-in-labour-force group. Limited dietary variety follows the same pattern, affecting 51.4 percent of unemployed households, 35.8 percent of employed households, and 28.4 percent of those not participating in the labour market. More severe indicators also rise sharply among the unemployed.

Skipping meals is reported by 24.1 percent of unemployed households, compared with 9.1 percent among the employed and 8.2 percent among the not-in-labour-force. Eating less than needed is experienced by 29.3 percent of unemployed households, versus 15 percent of employed and 11.7 percent of those outside the labour force. Extreme experiences show the same gradient: running out of food affects 18.5 percent of unemployed households, relative to about 6 percent in the other two categories. Going hungry without eating affects 16.8 percent of unemployed households compared with about 6 percent of employed and 5.6 percent of non-participants, while 13.1 percent of unemployed households report going a whole day without food, compared with 4.5 percent of employed and 4.4 percent of those not in the labour force.

There is also a clear severity gradient across all groups. Psychological stress and diet quality problems are more common than severe deprivation, but unemployed households consistently face the highest risk at every level of intensity. The Pearson chi-square statistics with p-values all of 0.000 indicate that these differences across labour force categories are statistically significant. Overall, these descriptive findings suggest a strong association between unemployment and high food insecurity risk, whereas employment lessens but does not eradicate vulnerability, justifying econometric analysis of these relationships with greater rigour.

Table 4. Food Insecurity Experiences by Labour Force Status (Row %)

FIES Indicator	Employed (%)	Unemployed (%)	Not in Labour Force (%)	Pearson χ^2 (p-value)
Worried about food (FIES-K1)	22.54	29.70	18.50	273.50 (0.000)
Unable to eat healthy food (FIES-K2)	36.46	49.52	28.96	700.89 (0.000)
Eating few kinds of foods (FIES-K3)	35.75	51.37	28.42	745.18 (0.000)
Skipping meals (FIES-K4)	9.08	24.12	8.20	531.84 (0.000)
Eating less than needed (FIES-K5)	14.95	29.27	11.70	508.85 (0.000)
Running out of food (FIES-K6)	6.28	18.53	6.09	463.77 (0.000)
Hungry but not eating (FIES-K7)	6.06	16.77	5.56	380.69 (0.000)

Whole day without eating (FIES-K8)	4.54	13.13	4.36	309.21 (0.000)

The figure 1 provides a visual comparison of the experiences of food insecurity in the households by three labour force categories of the household head: employed, unemployed and not in the labour force. Each cluster of bars indicates the proportion of households reporting a given FIES experience, making it possible to get an intuitive sense of the severity, as well as the pattern, of food insecurity among different groups.

The chart demonstrates a very clear and consistent pattern. Households with unemployed household heads have the highest rate of food insecurity in virtually every dimension. Close to one third of unemployed households have concerns about insufficient food to eat, and approximately half of households say that they cannot eat healthy food and preferred food and that relying on only few kinds of food is all they can afford. More severe outcomes also increase dramatically among this group. Around one quarter say that they skipped meals and nearly one third say they had to eat less than they felt they needed. Even extreme situations, such as running out of food, being hungry but not eating food, or being a whole day without food, are visibly higher for unemployed households than the other two groups. This emphasises that the unemployment is linked to stress not only, but also to serious deprivation for a meaningful proportion of households.

Employed households seem to be in a relatively better position, but food insecurity can still be seen. Around one fifth report worrying about food and over one third report difficulties maintaining healthy diets/food variety. Skipping meals, eating less or running out of food are not as frequent but are not negligible. This suggests that even employment does not completely protect households from food-related vulnerability, particularly where incomes are low or unstable. Households who are not in the labour force tend to lie in between the employed and unemployed groups. They have lower prevalence rates than the unemployed but nonetheless exhibit some concerningly high levels of concern, compromise in diet, and some exposure to severe deprivation.

Overall, the figure reinforces a strong gradient in food insecurity according to labour market status. Problems with psychological stress and diet quality are most common and severe deprivation is less common but much more concentrated among unemployed households. These visual patterns reflect the descriptive statistics and provide a motivation for more in-depth econometric analysis to quantify these differences in a more rigorous manner and to understand what is driving them.

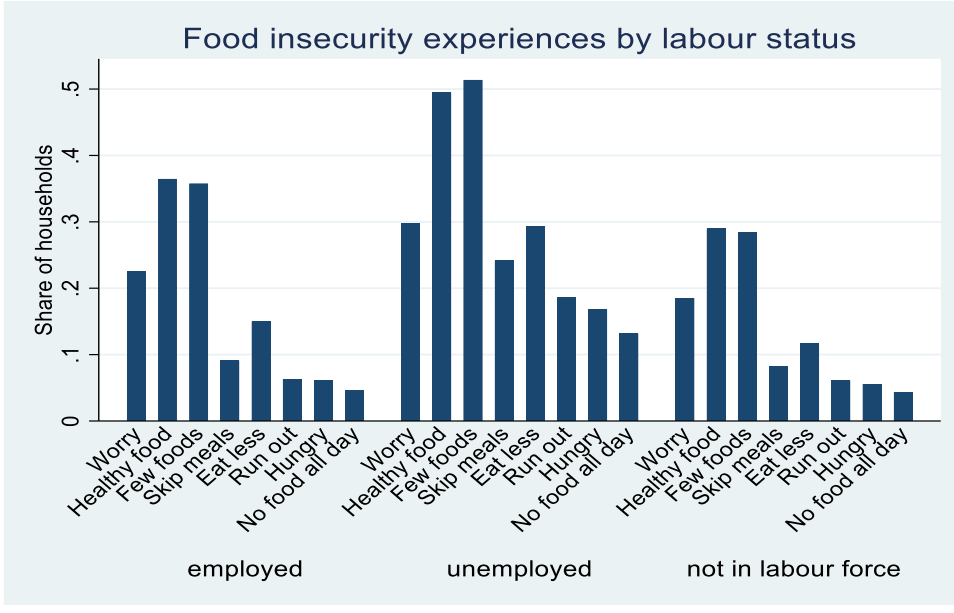


Figure 1. Comparative Pattern of Food Insecurity by Labour Participation Status

Results and Discussion

The results in Table 5 are from eight separate linear probability models, each according to the food insecurity experience. Rather than treating all the items as one index, the analysis examines worry about food, diet quality, limited variety, meal skipping, eating less, running out of food, going hungry and going a whole day without eating as separate outcomes. This item-level approach allows us to see which dimensions of food insecurity are most sensitive to labour force status and household characteristics. Figure 2, which presents the coefficient plot for employment participation status across food insecurity dimensions, summarizes this pattern in a compact statistical form.

The contrast between unemployed and employed household heads is very clear. Relative to employed heads, unemployment is associated with a higher probability of every single food insecurity experience, and the effect sizes are large. Being unemployed is linked to an 8.2 percentage point higher likelihood of worrying about food. The gaps are even wider for diet quality and variety. The probability of being unable to eat healthy food is 14.6 percentage points higher for unemployed households, and the chance of eating only a few kinds of foods is 16.9 percentage points higher.

For quantity-related outcomes, unemployment is again strongly associated with greater risk. Unemployed households are 15.6 percentage points more likely to skip meals and 15.3 percentage points more likely to eat less than they feel they need. For more severe experiences, the pattern continues. The probability of running out of food is 12.7 percentage points higher for unemployed households, the probability of being hungry but not eating is 11.1 percentage points higher, and the probability of going a whole day without eating is 8.9 percentage points higher. All these coefficients are

statistically significant at the 1 percent level. Taken together, they show that unemployment is linked not only with worry and compromised diet quality, but also with a much higher likelihood of severe deprivation.

Households headed by unemployed individuals show consistently higher probabilities of experiencing food insecurity. Across almost all indicators, unemployment is associated with a noticeably higher likelihood of worrying about food, compromising diet quality, skipping meals, or facing more severe deprivation. In a number of cases, the gaps are substantial, being in the range of 8-15 percentage points compared to employed households. This trend is likely related to the direct economic stress of unemployment. These households experience income instability, no regular income and uncertainty as to how long their situation will persist. Such insecurity can be translated in a short time into difficulty maintaining stable and adequate access to food.

In contrast, the behaviors of households with the head not in labour force are quite different. This group is diverse. It includes the likes of students, elderly people, homemakers, disabled people as well as other people not actively seeking a job. Many of them may depend on pensions, remittances, household income pooling, or some other regular support. They also may live in more stable household arrangements. As a result, their chances of food insecurity are often as high, or in some cases marginally lower, than those of employed households for a number of indicators, even though they are not in paid work.

The main lesson to be learned is that unemployment is a measure of acute economic stress and increased vulnerability, whereas being out of the labour force is not necessarily a marker of deprivation. These findings highlight that labour market categories are not interchangeable and that distinguishing between unemployed and not-in-labour-force groups is essential for understanding and addressing food insecurity risks.

Table 5. LPM model estimates of employment participation status

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	Worry about food	Unable to eat healthy food	Eating few kinds of foods	Skipping meals	Eating less than needed	Running out of food	Hungry but not eating	Whole day without eating
Labour participation status:								
Employed (base)								
Unemployed	0.082***	0.146***	0.169***	0.156***	0.153***	0.127***	0.111***	0.089***
	(0.011)	(0.012)	(0.012)	(0.010)	(0.011)	(0.009)	(0.009)	(0.008)

Not in labour force	-0.017***	-0.039***	-0.041***	0.006**	-0.007**	0.009***	0.007***	0.009***
	(0.003)	(0.004)	(0.004)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)
KPK (base)								
Punjab	0.039***	-0.031***	-0.048***	0.041***	0.013***	0.028***	0.028***	0.021***
	(0.003)	(0.003)	(0.003)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)
Sindh	0.072***	0.068***	0.034***	0.045***	0.065***	0.032***	0.032***	0.015***
	(0.003)	(0.004)	(0.004)	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)
Balochistan	0.128***	0.059***	0.038***	0.078***	0.064***	0.057***	0.057***	0.046***
	(0.004)	(0.005)	(0.005)	(0.003)	(0.004)	(0.003)	(0.003)	(0.002)
Urban	-0.042***	-0.106***	-0.109***	-0.025***	-0.049***	-0.018***	-0.019***	-0.013***
	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Hh size	0.003***	0.004***	0.004***	0.001***	0.001***	0.001***	0.001***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Female	-0.010**	-0.026***	-0.026***	-0.014***	-0.025***	-0.013***	-0.016***	-0.015***
	(0.005)	(0.005)	(0.005)	(0.003)	(0.004)	(0.003)	(0.003)	(0.002)
Age	-0.002***	-0.003***	-0.003***	-0.001***	-0.002***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Never married (base)								
Formerly married	0.079***	0.149***	0.148***	0.044***	0.080***	0.034***	0.027***	0.022***
	(0.009)	(0.010)	(0.010)	(0.007)	(0.008)	(0.006)	(0.006)	(0.005)
Currently married	0.002	0.037***	0.038***	-0.003	0.009	-0.004	-0.010*	-0.003
	(0.008)	(0.009)	(0.009)	(0.006)	(0.007)	(0.005)	(0.005)	(0.004)
Constant	0.241***	0.442***	0.454***	0.093***	0.181***	0.067***	0.070***	0.055***
	(0.008)	(0.010)	(0.010)	(0.006)	(0.007)	(0.005)	(0.005)	(0.005)

Observations	159,746	159,389	159,066	158,789	158,553	158,592	158,435	158,240
R-squared	0.014	0.028	0.028	0.012	0.015	0.009	0.009	0.007
N	159746	159389	159066	158789	158553	158592	158435	158240

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Households headed by individuals not in the labour force show a different profile. For the milder indicators, such households are slightly less likely than employed households to report food insecurity. The probability of worrying about food is 1.7 percentage points lower, the probability of being unable to eat healthy food is 3.9 percentage points lower, and the probability of eating few kinds of foods is 4.1 percentage points lower, all significant at conventional levels. This suggests that many out-of-labour-force households, such as students, retirees, or some homemakers, may have more stable support systems than the unemployed. However, the picture becomes more mixed for quantity-related and severe outcomes.

The coefficient on skipping meals is small but positive, at 0.6 percentage points, and is statistically significant at the 5 percent level. Eating less than needed is 0.7 percentage points less likely, but running out of food, being hungry but not eating, and going a whole day without eating are each between 0.7 and 0.9 percentage points more likely. Although these magnitudes are much smaller than those for unemployment, they indicate that within the not-in-labour-force group there is a subset of households that still faces meaningful risk of severe food stress.

The covariates paint a picture of strong geographic and socio-demographic disparities. Using Khyber Pakhtunkhwa as the reference province, households in Punjab show a mixed pattern. They are about 3.9 percentage points more likely to worry about food, but are 3.1 and 4.8 percentage points less likely to report inability to eat healthy food and reliance on few kinds of foods, respectively. At the same time, they are more likely to skip meals and to report running out of food and hunger-related outcomes, with coefficients typically between 1.3 and 4.1 percentage points.

Sindh and Balochistan exhibit a more consistently disadvantaged profile. In Sindh, all coefficients are positive and significant. For example, households are 7.2 percentage points more likely to worry about food and 6.8 percentage points more likely to be unable to eat healthy food, with notable increases in skipping meals, eating less, and running out of food. Balochistan shows the highest levels of vulnerability: worrying about food is 12.8 percentage points higher than in Khyber Pakhtunkhwa, and probabilities for skipping meals, eating less, running out of food, and going hungry are all elevated by 5–8 percentage points. These provincial patterns highlight strong regional inequalities in food security conditions.

Urban residence appears protective. Urban households are 4.2 percentage points less likely to worry about food, about 10–11 percentage points less likely to report poor diet quality and variety, and between 1.3 and

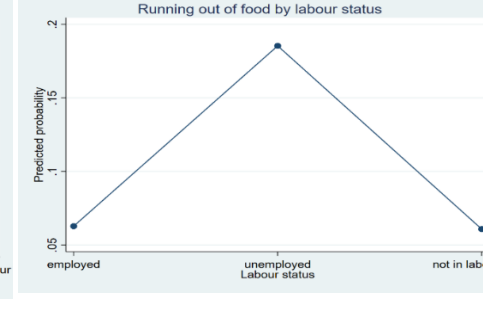
4.9 percentage points less likely to experience quantity reductions and severe deprivation. The effects are all statistically significant and point to better access to markets, services, or income opportunities in urban areas. Household size has a small but consistent association with food insecurity. Each additional member raises the probability of worry, poor diet, and other food insecurity items by about 0.1 to 0.4 percentage points, reflecting the pressure of spreading limited resources over more people.

Gender, age, and marital status of the household head also matter. Female-headed households are, perhaps unexpectedly, less likely to report food insecurity in this dataset. The coefficients are negative across all items, typically between 1.0 and 2.6 percentage points, and statistically significant. This could reflect selection into female headship, stronger coping strategies, or support networks, rather than an inherently better position, and warrants careful interpretation.

Age has a small but consistent negative association with food insecurity. Each additional year of age reduces the probability of most food insecurity experiences by around 0.1 to 0.3 percentage points, suggesting that older heads may have more stable income sources, assets, or experience in managing shocks.

Marital status shows that formerly married heads (widowed, divorced, or separated) are the most vulnerable group. Relative to never-married heads, they face substantially higher probabilities of every food insecurity item, with coefficients ranging from 3.4 percentage points for running out of food to around 15 percentage points for inability to eat healthy foods and eating few kinds of foods. Currently married heads generally sit between these two extremes, with modest increases for some diet quality indicators but little or no difference for severe deprivation. These patterns link food insecurity to more general dimensions of social and economic vulnerability.

Overall, the results of the regression analyses highlight the strong link between labour force status and the probability of various types of food insecurity and that these associations remain robust after including the variables such as location, household composition, and demographic characteristics. This multivariate analysis is crucial to isolate the effects of employment from other factors and to provide the basis of the policy discussion and robustness checks that follow.



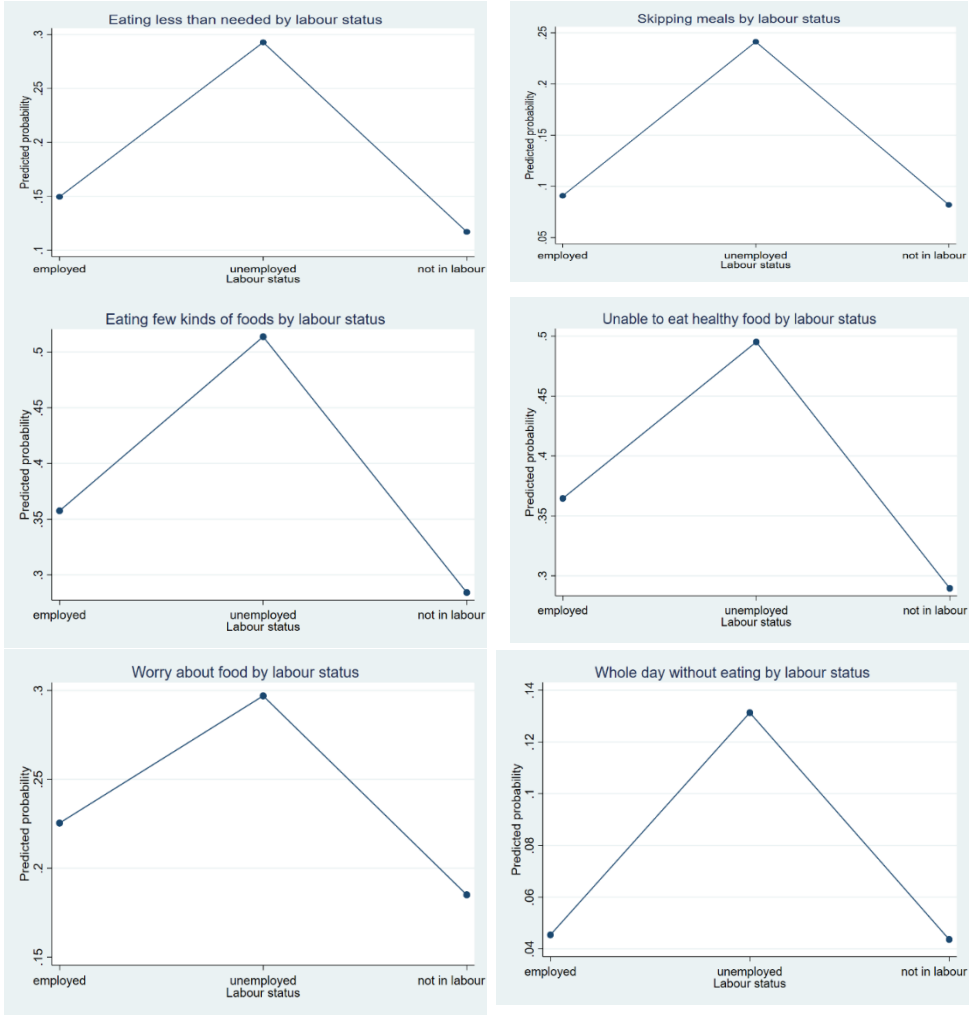


Figure 2. Coefficient plot of employment participation status and food insecurity dimensions

Conclusion

This study examined how the employment status of the household head relates to different forms of household food insecurity. By distinguishing between employed, unemployed, and not-in-labour-force household heads and by analysing eight separate FIES items, the study was able to identify which specific food insecurity experiences are most sensitive to labour market circumstances rather than relying only on a single index.

The results show that households headed by unemployed individuals face the highest likelihood of experiencing food insecurity. This applies to both moderate difficulties, such as worrying about food and being unable to maintain a healthy diet, and more severe conditions, including skipping meals,

eating less than needed, or going hungry. Households with employed heads generally fare better, although food-related hardship is not completely absent among them. In contrast, households headed by individuals who are not in the labour force often experience equal or slightly lower food insecurity than employed households, reflecting the mixed nature of this group, which includes students, elderly persons, homemakers, and those with more stable sources of support.

The findings also suggest that policy should not focus only on unemployment. Although unemployed-headed households face the highest risks, the descriptive evidence shows that food-related hardship remains substantial even among employed-headed households, indicating the presence of a working-poor segment for whom employment does not guarantee adequate food access. In Pakistan, this calls for a two-track response: first, stronger income support for low-income working households through targeted and crisis-responsive cash assistance; and second, labour-market measures that improve job quality, earnings stability, and protection for informal and low-wage workers. In this respect, linking vulnerable working households to existing social protection platforms such as BISP, while strengthening wage protection and employment-intensive recovery measures, would be a practical policy direction.

These findings suggest that labour market vulnerability remains closely linked with food security, and that unemployed-headed households should receive particular attention in social protection and employment support policies. At the same time, policies should recognise the diversity within the not-in-labour-force category rather than assuming uniform disadvantage. The study also illustrates the value of item-level food insecurity analysis and points toward the need for further research on income stability, informal support systems, and long-term dynamics of household welfare.

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