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PRECARIOUS EMPLOYMENT AND HOUSEHOLD WELFARE IN GHANA

ALEXANDER OPOKU

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UNIVERSITY OF CAPE COAST

PRECARIOUS EMPLOYMENT AND HOUSEHOLD WELFARE IN GHANA

BY

ALEXANDER OPOKU

A thesis submitted to the Department of Economic Studies of the School of Economics, College of Humanities and Legal Studies, University of Cape Coast, in partial fulfilment of the requirements for the award of Doctor of Philosophy degree in Economics

JANUARY 2025

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DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research work and that no part of it has been presented for another degree in this University or elsewhere.

Candidate's Signature …… Date……

Name: Alexander Opoku

Supervisors' Declaration

We hereby declare that the preparation and presentation of this thesis were supervised in accordance with the guidelines on supervision of thesis as laid down by the University of Cape Coast

Principal Supervisor's Signature…… Date……..

Name: Dr Jacob Nunoo

Co-Supervisor's Signature …… Date ……..

Name: Dr Raymond Elikplim Kofinti

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ABSTRACT

Rapid changes in global labour markets are compromising traditional employment structures, leading to increased precarious employment, particularly in developing countries, such as Ghana. Characterized by job instability, inadequate income, and a lack of essential protections, precarious employment poses significant challenges to both individual and household well-being. Although these conditions lead to adverse social and economic outcomes, evidence of precarious employment and its implications remain limited. This thesis investigates three objectives relating to precarious employment: (1) estimate the inequality of opportunity in precarious employment in Ghana; (2) examine the causal effect of precarious employment on household food insecurity; and (3) assess the impact of precarious employment on household vulnerability to multidimensional poverty. The main data were sourced from Ghana's Annual Household Income and Expenditure Panel Survey (AHIES) augmented with administrative data at the district level. Precarious employment was measured as a multidimensional index of income inadequacy, employment insecurity, lack of rights, and unsafe work environments. Food insecurity and vulnerability to multidimensional poverty were assessed using the Food Insecurity Experience Scale and the Multidimensional Poverty Index, respectively. Econometric techniques, including the inequality of opportunity approach, two-stage least squares, dominance analysis, and control function approach, were employed. The findings indicate that over 70% of the sample was engaged in precarious employment, which suggests a concerning level of inequality in access to stable and secure job opportunities. The data reveal that this inequality of employment opportunities is particularly pronounced among the youngest and oldest cohorts, as well as in rural and low-development regions. The key findings indicate that precarious employment is a primary driver of food insecurity in the study population. Among the various dimensions of precarious employment, employment insecurity was the primary predictor of food insecurity, which was exacerbated among female and rural workers, although social protection programs helped mitigate these effects. Precarious employment increases vulnerability to poverty, with female-headed, rural, and low-income households being most affected. This study recommends that the Ministry of Employment and Labour Relations enforce employment standards, enhance job security, and promote training programs. Health and social protection programs, including preventive healthcare and food assistance, should be prioritised to mitigate health shocks and alleviate food insecurity. To build human capital, the Ministry of Education must expand access to quality education and vocational training, particularly in rural areas. The Ministry of Gender, Children, and Social Protection should implement gender-sensitive policies and financial literacy programs to support asset accumulation in female-headed households. Collectively, these strategies aim to reduce inequality and support sustainable growth.

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KEYWORDS

Precarious employment

Food insecurity

Multidimensional Poverty

Vulnerability to Multidimensional poverty

Social safety net program

Ghana

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DEDICATION

To my family and Ms. Efua Yaaba Yawson

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LIST OF ACRONYMS

2SLS	Two-Stage Least Squares
AHIES	Annual Household Income and Expenditure Survey
CASEMP	Casual Employment Rate in One's Sector of Employment
CF	Control Function
COVID	Coronavirus Disease
EBFSS	Experience-Based Food Security Scales
ECOWAS	Economic Community of West African States
EPRES	Employment Precariousness Scale
FAO	Food and Agriculture Organization
FE	Fixed Effect
FIES	Food Insecurity Experience Scale
GPRS	Ghana Poverty Reduction Strategy
GLSS	Ghana Living Standards Surveys
GSS	Ghana Statistical Service
HFSSM	Household Food Security Survey Module
ILO	International Labour Organization
IOA	Absolute Inequality of Opportunity
IOP	Inequality of Opportunity
IOR	Relative Inequality of Opportunity
ISCO	International Standard Classification of Occupations
JFF	Jobs For the Future
KLS	Kinky Least Squares
MoFA	Ministry of Food and Agriculture
MPI	Multidimensional Poverty Index

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OLS	Ordinary Least Squares
PCA	Principal Component Analysis
PE	Precarious Employment
PSM	Propensity Score Matching
RS	Raw Score
SADC	Southern African Development Community
SDG	Sustainable Development Goals
SSN	Social Safety Net Programs
UN	United Nations
US	United States
VEP	Vulnerability as Expected Poverty
FIES	Food Insecurity Experience Scale
VtMP	Vulnerability to Multidimensional Poverty
VtP	Vulnerability to Poverty
WB	World Bank

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CHAPTER ONE
INTRODUCTION

The world of work today is rapidly evolving, marked by shifts in labour markets that challenge traditional employment structures (ILO, 2024). These changes manifest as rising levels of precarious employment, characterised by instability, low wages, and a lack of job security. Such conditions disproportionately affect vulnerable populations and contribute to the increasing inequality in employment opportunities and working conditions. As these dynamics unfold, they not only impact the health and well-being of workers but also exacerbate household welfare challenges, particularly concerning food security and current and future poverty levels. The implications of these issues are profound, undermining both individual and household well-being, while hindering national economic growth and social stability (Kreinin & Aigner, 2022; Raimi, 2020).

Addressing precarious employment is crucial for achieving sustainable development, as emphasised by the Decent Work Agenda and the United Nations Sustainable Development Goals (SDGs). Goals 1 (No Poverty), 2 (Zero Hunger), and 10 (Reduced Inequalities) highlight the urgent need to address the interconnected challenges of poverty, food insecurity, and inequality. This study addresses these pressing issues by estimating the inequality of opportunity in precarious employment in Ghana. Furthermore, this study examines the effects of precarious employment on household welfare, focusing on household food insecurity and vulnerability to multidimensional poverty. This thesis is organised into seven chapters, beginning with the background of the study and setting the stage for the entire thesis.

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Background to the Study

Labour market characteristics such as employment stability, wage levels, job quality, and access to social protection have long been recognised as crucial determinants of human welfare. Empirical studies consistently demonstrate that these factors are directly linked to human happiness, poverty alleviation, human capital development, and asset accumulation (Kreinin, & Aigner, 2022; Blustein, Lysova & Duffy, 2023). As a result, policymakers worldwide have continuously sought to implement strategies that improve labour market conditions to foster economic growth and social well-being. In this regard, global leaders have embedded labour market improvements as a key priority within the framework of the Decent Work Agenda and Sustainable Development Goals (SDGs), specifically under Goal 8, which promotes sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all by 2030 (United Nations, 2015).

According to the ILO, decent work is characterised by opportunities for employment and earnings, respect for labour rights, social security benefits, and the freedom to negotiate and engage in dialogue. In the African context, the African Union's Agenda 2063 prioritised employment creation and the improvement of working conditions as key components of its long-term development strategy (African Union, 2015). In Sub-Saharan Africa, regional economic communities such as ECOWAS and SADC have established labour policies designed to harmonise employment standards and bolster worker protections among their member states (ECOWAS, 2009; SADC, 2014). These initiatives have not only influenced the creation of national policies

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aimed at formalising informal employment but have also strengthened labour regulations.

Despite these efforts to promote decent work and reduce employment insecurity, the issue of indecent work, also known as precarious, continues to be a significant challenge. Recent data indicate that in 2023, over 2 billion workers, or 58% of the global workforce, were employed in informal jobs often characterised by poorer job quality and insecure work conditions (ILO, 2024). Furthermore, global statistics indicate that about 45% of the working population found themselves in vulnerable employment, a key indicator of precarious employment (World Bank, 2023). This category of employment is thought to represent poor-quality jobs with low social security, lower wages, and higher informality (Bocquier et al., 2010; Apablaza et al., 2020).

In Africa, the challenge of precarious employment is particularly pronounced, characterised by a significant prevalence of both informal and vulnerable work arrangements (Anwar & Graham, 2021). Evidence indicates that over 60% of workers in the region lack formal employment contracts, with fewer than 45% engaged in full-time, permanent positions, a trend that has been declining over time (ILO, 2023). This situation is especially critical in sub-Saharan Africa, which has the highest levels of vulnerable employment globally. As of 2022, an estimated 76% of the working population in this region holds insecure jobs (ILO, 2023).

This stark reality highlights the close relationship between vulnerable and precarious employment, which both are marked by inadequate job security and poor working conditions. This contrasts sharply with other regions: Europe and Central Asia report relatively low vulnerable employment rates of

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13.6%, East Asia and the Pacific at 41%, Latin America and the Caribbean at 33%, and North America at 4.9% (see Figure 1). The situation is particularly severe in Western and Central Africa, where vulnerability rates reach 80.3%, followed closely by Eastern and Southern Africa at 72.5% (ILO, 2023). This widespread decent work deficit in Africa can be attributed to a complex interplay of factors, including the nature of capitalist development, labour market flexibility, the sectoral composition of national economies, and the prevailing institutional infrastructure (Erkul & Külünk, 2022).

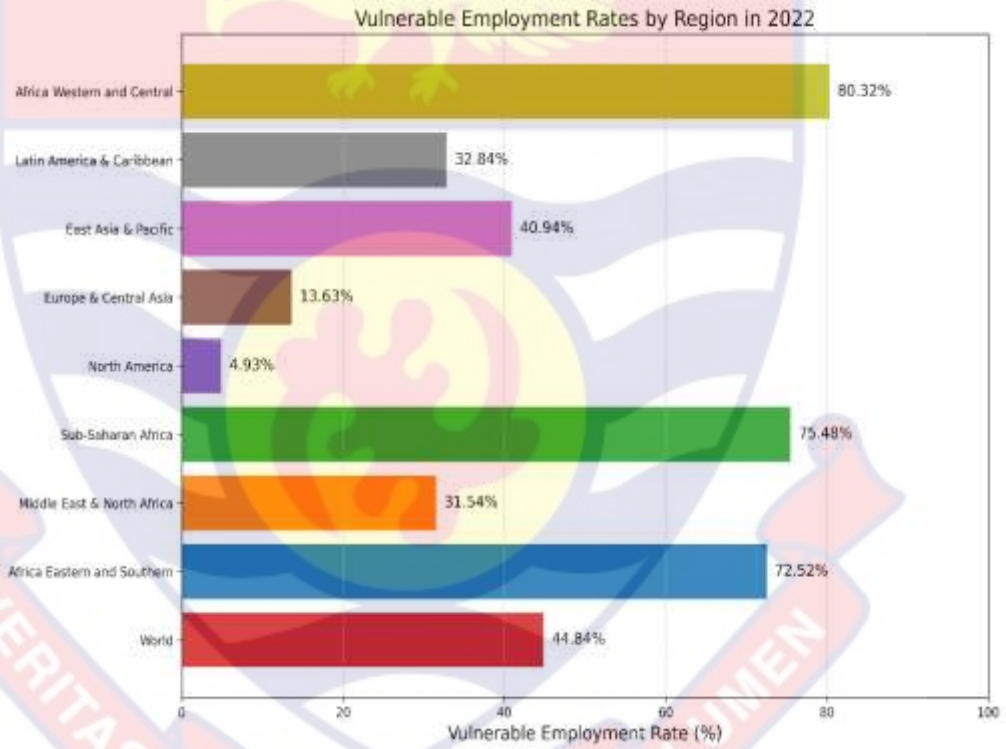


Figure 1: Vulnerable employment across regions worldwide.
Source: World Bank (2023)

The situation in Western and Central Africa exemplifies the severe extent of vulnerable employment, with the region exhibiting some of the highest rates globally. Figure 2 shows that Ghana, with a vulnerable employment rate of 69.54% in 2022, significantly exceeds the global average of 44.8% (ILO, 2023). This trend mirrors the broader labour market issues in

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Sub-Saharan Africa, where Niger (93.34%), the Central African Republic (92.16%), and South Sudan (87.73%) report even more extreme rates of precarious work (ILO, 2023). Vulnerable employment particularly affects women, who constitute 58% of the informal workforce and face compounded challenges, including lower wages, workplace discrimination, and harassment, which further degrade job quality and deepen gender inequalities (ILO, 2023; Amoako, 2023). These conditions reflect the broader structural challenges that continue to drive high rates of vulnerable employment, a key indicator of precarious employment across the continent, exacerbating economic insecurity, and reinforcing existing inequalities.

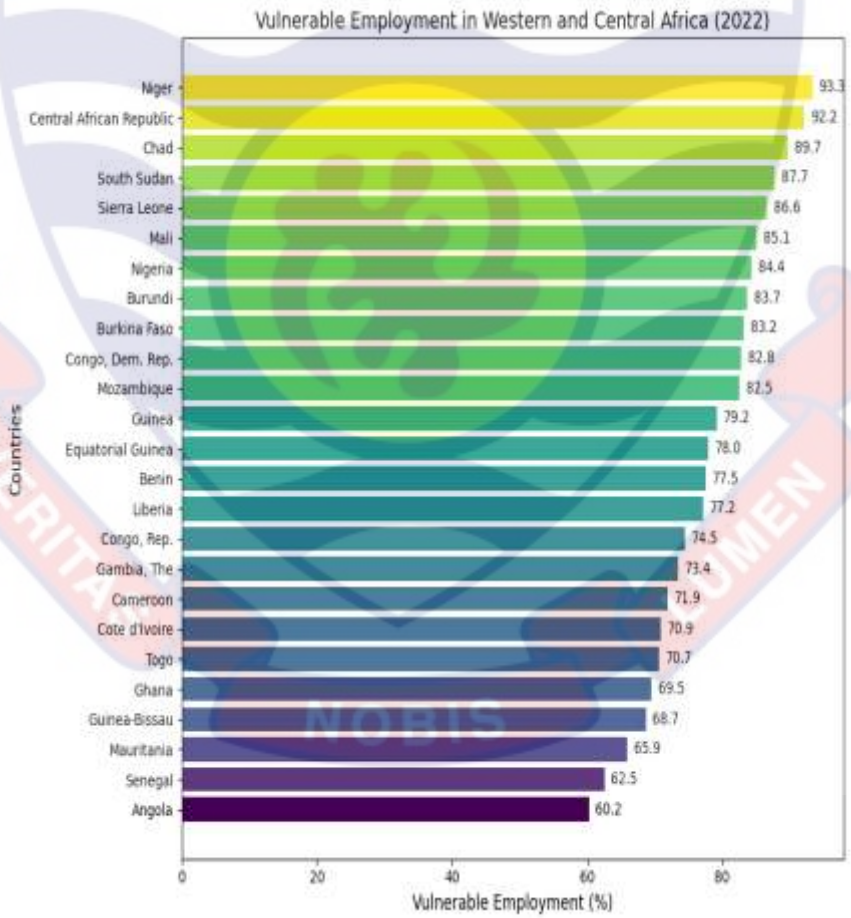


Figure 2: Vulnerable employment across Western and Central African countries.
Source: World Bank (2023)

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Ghana's path of structural transformation over the past three decades has followed a distinctive trajectory, deviating from the conventional progression seen in many developing economies, where economic activity has shifted from agriculture to a growing manufacturing sector. Rodrik (2014) suggests that Ghana's pattern of limited structural transformation, combined with premature stagnation in manufacturing, has relegated its economy to low-productivity sectors, thereby constraining its capacity to generate quality jobs. This departure from expected development patterns is evident in Ghana's employment landscape (Baah-Boateng 2004). Figure 3 illustrates the employment trends from 2000 to 2017, highlighting the persistent dominance of vulnerable employment. In 2000, 74.9% of the Ghanaian workforce was engaged in vulnerable work, which often lacked security, benefits, and social protection (Twumasi & Ackah, 2021).

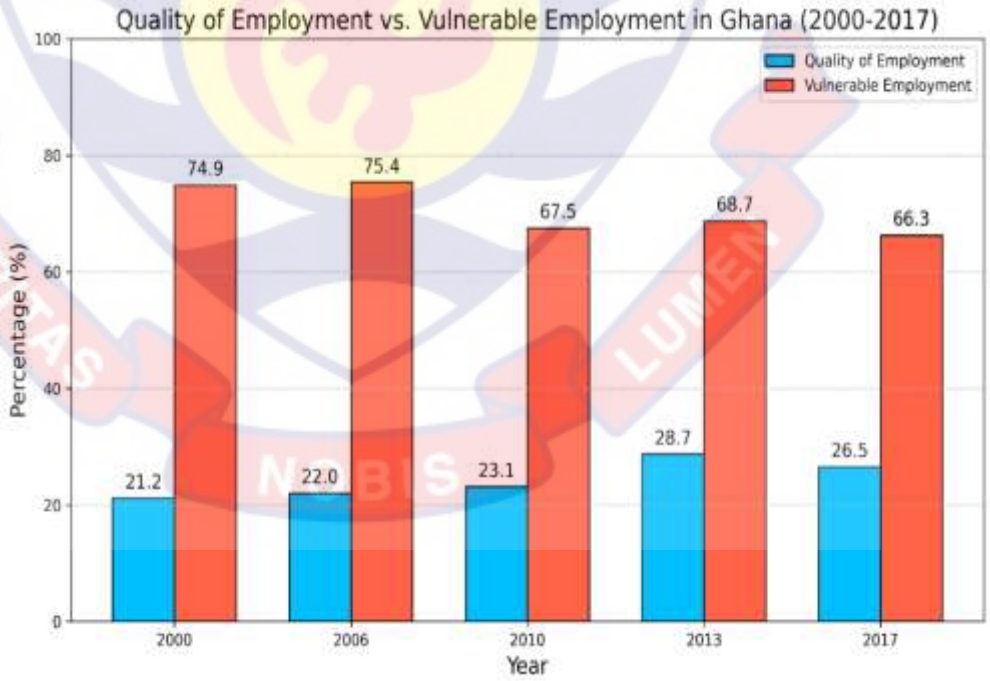


Figure 3: Employment quality and vulnerable employment in Ghana (2000-2017).

Source: Twumasi & Ackah (2021)

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Recent evidence indicates that in the first quarter of 2022, 66.7% of the employed population in Ghana was classified as being in vulnerable employment, a key indicator of precarious employment. This figure rose to 68.0% by the end of the year and continued to increase until 2023, reaching 68.5% in the third quarter. This upward trend highlights the entrenched nature of this challenge (GSS, 2023). Regarding gender, female workers consistently experienced significantly higher rates compared to their male counterparts. For instance, in Q1 2022, 76.2% of employed women were in precarious work arrangements, while only 56.1% of men faced similar circumstances. This gap persisted throughout the subsequent quarters (GSS, 2023). By Q3 2023, although the gender divide narrowed slightly, the rates of vulnerable employment remained substantially higher for women (77.8%) than for men (57.6%) (GSS, 2023).

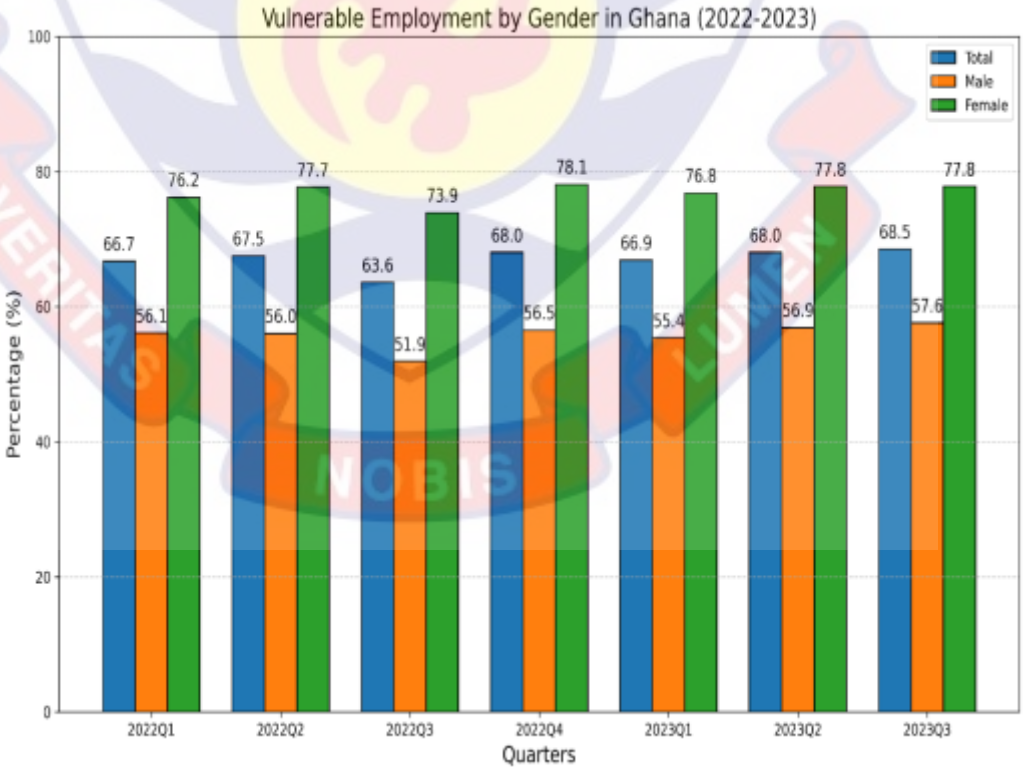


Figure 4: Ghana's vulnerable employment by sex (2022q1-2023q3).

Source: Ghana Statistical Service (2024).

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Regional analysis further reveals geographical disparities in vulnerable employment, with the Savannah and Northeast regions reporting the highest proportions of both male and female workers in precarious employment (GSS, 2023). This trend highlights the persistence of precarious work in Ghana, where much of the workforce lacks contracts, benefits, or stable employment, underscoring the challenges in building a secure job market.

The challenge of precarious employment is not uniform; it disproportionately impacts certain groups due to a variety of structural, socioeconomic, and demographic factors. Hamilton et al. (2022) highlight that structural barriers limit economic opportunities, with women often relegated to vulnerable, informal employment due to ingrained societal norms and gender roles. Beyond gender, the quality and stability of employment in Ghana and many developing countries vary significantly between urban and rural areas, as well as across different regions (Dzanku, 2019; Rains & Krishna, 2020; Ali & Newbold, 2021).

Regions with limited infrastructure and fewer economic resources tend to exhibit higher rates of precarious employment, forcing residents into low-quality jobs, regardless of their educational qualifications or skills (Ali & Newbold, 2021; Conen & Schippers, 2019). Studies such as AlAzzawi and Hlasny (2020) and Cairns et al. (2017) suggest that individuals from affluent families can leverage social networks to secure stable jobs, whereas those from disadvantaged backgrounds often face persistent challenges in escaping precarious work, irrespective of their education or skills. In regions where formal recruitment processes are less prevalent, family connections frequently

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influence access to desirable employment, reinforcing cycles of inequality and limited opportunities (ILO, 2021).

Further compounding these disparities, vulnerable workers such as immigrants, ethnic minorities, and individuals with disabilities often experience additional barriers to securing employment. Kosny, Yanar, Begum, Al-Khooly, Premji, Lay and Smith (2020) argue that immigrants often encounter legal restrictions on employment, and individuals with disabilities face workplace discrimination and inadequate protections, increasing their likelihood of precarious employment. These structural and cultural biases in the labour market exacerbate existing inequalities.

While higher education typically improves job prospects, regional economic disparities can limit access to stable employment (Royce, 2022). For instance, in Ghana, youth from well-connected families or developed regions transition more smoothly into stable employment than their rural or economically disadvantaged counterparts, despite their similar educational backgrounds (JFF (Jobs for the Future), 2020; Antonucci, 2018). This reality illustrates that structural factors frequently overshadow individual capabilities in determining employment outcomes, emphasising the persistent inequality of opportunity in the labour market (Finkelstein, Notowidigdo, Schilbach, & Zhang, 2024). This discrepancy illustrates how structural factors, rather than individual capabilities, often dictate employment outcomes.

Household welfare is a multidimensional concept encompassing income security, access to basic services, food availability, education, housing quality, and overall well-being. In Ghana and many developing countries, household welfare is intricately linked to the nature of employment available

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to household members. When employment is stable and adequately remunerated, households are better positioned to invest in children's education, healthcare, and improved living conditions (GSS, 2018; Quisumbing et al., 2020). Conversely, households dependent on irregular, informal, or insecure jobs often struggle to meet their daily needs, save for future expenses, or cope with economic shocks (World Bank, 2022). The instability of precarious work undermines household consumption and investment, perpetuating cycles of poverty and vulnerability. Moreover, as household members rely on unpredictable earnings, they are often forced to reduce essential spending or rely on coping mechanisms such as taking children out of school or foregoing medical care (ILO, 2021). This creates a feedback loop that further undermines long-term household welfare and intergenerational mobility.

A significant and often overlooked consequence of these disparities in precarious employment is its negative impact on health and well-being. This form of employment is linked to poorer health outcomes, including increased rates of occupational injuries, higher mortality, and a greater prevalence of mental health issues, compared to those in stable, permanent jobs (Benach et al., 2014; Inoue et al., 2011). The negative effects extend beyond individual health, impacting overall quality of life and household dynamics. Workers in precarious positions often experience social isolation and reduced community engagement, which can hinder their ability to form stable family connections. For instance, men with non-regular jobs are more likely to delay marriage (Lewchuk, 2017; Piotrowski et al., 2015).

Moreover, the inherent instability and lack of social protection associated with precarious employment contributes to significant health

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shocks and illnesses. Financial insecurity and limited asset accumulation further diminish workers' resilience to economic shocks, exacerbating their vulnerability (Moscone et al., 2016; Muoka & Lhussier, 2020). This financial strain, coupled with irregular work schedules, contributes to household economic insecurity and affects workers' psychological well-being and sleep quality (Schneider and Harknett 2019). This type of employment has far-reaching consequences beyond the workplace that significantly impact workers' ability to support their households (Birnbaum & De Wispelaere 2021; Kalleberg 2018).

An additional consequence of this economic insecurity is the growing prevalence of food insecurity, particularly in settings where precarious employment is common. In Ghana, a national household survey conducted in 2020 found that 11.6% of households experienced food insecurity, with 6.5% facing moderate and 5.2% facing severe food insecurity (GSS et al., 2021). Food insecurity disproportionately affects rural areas, where rates reach 18.2%, in stark contrast to 5.5% observed in urban regions. The situation is particularly severe in the northern regions, with the Upper East recording a staggering 48.7% food insecurity rate compared to just 3.5% in Greater Accra. This disparity reflects the close ties between food insecurity, poverty, and precarious employment, as many of the factors that drive food insecurity mirror those linked to poverty and economic vulnerability (GSS et al., 2021; World Bank, 2018, 2020). Further research indicates that approximately 20% of the Ghanaian population faces moderate to severe food insecurity, with approximately 1.5 million individuals experiencing severe food insecurity and another two million at risk (Koryo-Dabrah et al., 2021; MoFA, 2021).

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Precarious employment exacerbates household food insecurity through various interconnected mechanisms, often creating cycles of financial vulnerability and instability. The irregular and low earnings characteristic of precarious work disrupts income stability, leaving households unable to meet their food needs consistently (Fernandes, 2023; Lewchuk, 2017). The absence of health insurance or social protection further exposes these households to economic strain, as unexpected medical expenses can quickly deplete limited resources, especially in times of health crisis, impacting their ability to purchase food (Ghana Statistical Service (GSS), 2023; García-Gómez et al., 2013). Furthermore, precarious employment restricts households' ability to accumulate durable assets, which are essential for consumption smoothing during economic downturns (Bartfeld & Collins, 2017). This asset scarcity is particularly challenging in developing contexts, such as Ghana, where a large segment of the workforce falls into the 'working poor' category. Lacking sufficient assets and financial reserves, these households have limited risk-coping mechanisms and face barriers in diversifying their income sources, undermining their capacity to secure a consistent and nutritious diet for their families (Hanson et al., 2016; Ansah et al., 2022).

Achieving Sustainable Development Goal 1, which aims to eradicate poverty in all forms, is a critical priority for Ghana. While the country has accelerated poverty reduction, recent developments suggest that overall positive statistics may obscure a significant proportion of the population living in vulnerability to poverty (Novignon et al., 2012; Zereyesus et al., 2017; Koomson et al., 2023). Ghana has made substantial progress, with national poverty rates decreasing from 52.7% in 1991 to 24.2% in 2013, and a slight

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increase to 23.4% in 2017 (GSS, 2018). Additionally, multidimensional poverty declined from 55% in 2011 to 44.1% in 2017, and remained at 44.1% in the first quarter of 2022, indicating improvements in health, education, and living conditions (GSS, 2023).

However, vulnerability to poverty remains a pressing concern, with a rising likelihood of non-poor households slipping back into poverty (Awuni, Malerba, & Never, 2023). As Calvo and Dercon (2005) emphasize, poverty represents a current state of deprivation that can be mitigated through immediate support measures, while vulnerability to poverty involves the threat of future deprivation under uncertainty. Unlike poverty, which can often be alleviated reactively, vulnerability to poverty calls for a preventive approach focused on reducing risk exposure. Calvo and Dercon argue that, while poverty may be managed through direct interventions, vulnerability to poverty has the potential for complete eradication by implementing effective risk management strategies and addressing structural factors that heighten the probability of future hardship.

Over time, while more households have managed to rise above the poverty line, fewer have achieved a permanent escape from poverty. The Ghana Living Standards Surveys (GLSS) from 1998 to 2017 reveal a significant reduction in observed poverty, from 39.5% in GLSS 4 (1998/99) to 23.41% in GLSS 7 (2016/17), yet the rate of vulnerability to poverty has not diminished in parallel (GSS, 2018) (see Figure 5). Vulnerability rates have remained notably high, with estimates of 57.5% in GLSS 4, 56% in GLSS 5 (2005/06), 41.24% in GLSS 6 (2012/13), and 35.76% in GLSS 7 (GSS, 2018). The COVID-19 pandemic has heightened vulnerabilities in Ghana, where over

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half of households (51%) now face poverty risks, particularly in rural areas and the savannah belt (Awuni et al., 2023; GSS, 2020).

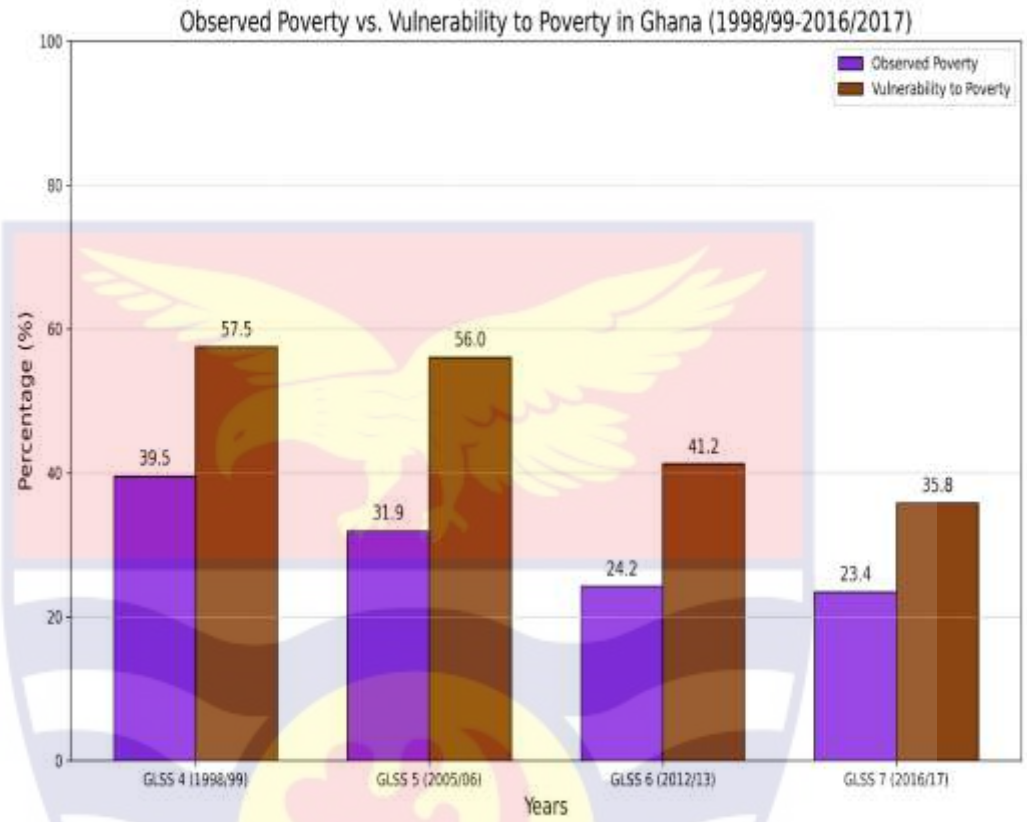


Figure 5: observed poverty and vulnerability to poverty in Ghana (1998/99-2016/17)

Source: Compiled by Awuni, Malerba and Never (2023) using GLSS data.

The inadequacy of income or consumption-based poverty measurements lies in their inability to capture the diverse and complex dimensions of poverty. While income is assumed to be the ability to meet basic physiological needs, it fails to account for critical non-monetary factors such as access to education, health, shelter, and security, which are integral to well-being. Ghana's multidimensional poverty index (MPI), introduced in 2020, addresses these limitations by measuring poverty across twelve non-monetary indicators within the dimensions of education, health, and living standards. The MPI reveals that 45.6% of the population experiences

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multidimensional poverty, almost double the 23.4% reported under consumption poverty (GSS, 2020). This disparity highlights the unequal and varied access to essential services and basic survival needs across different population groups. Vulnerabilities are further exacerbated by systemic issues, such as food insecurity, regional disparities, and structural inequities, which disproportionately affect women, rural populations, and increasingly urban households.

Vulnerability to poverty appears more prevalent among urban households compared to rural ones, with male-headed households more susceptible than female-headed ones (Awuni et al., 2023; Novignon et al., 2012). Moreover, the socioeconomic impacts of COVID-19 threaten to reverse recent poverty reduction gains, intensifying these vulnerabilities and highlighting the urgency for targeted interventions. The persistence of precarious employment in Ghana adds another dimension to the challenge, undermining efforts to achieve Sustainable Development Goals (SDGs) such as Goal 1 (No Poverty), Goal 2 (Zero Hunger), and Goal 8 (Decent Work and Economic Growth). Addressing precarious employment is essential not only for poverty alleviation but also for building resilience against future vulnerabilities that threaten household stability. Policies must go beyond immediate poverty relief to incorporate long-term strategies aimed at risk mitigation, inclusive growth, and systemic transformation.

Problem Statement

Precarious employment (PE) has become a defining feature of labour markets in many developing countries, including Ghana. This transformation of work has far-reaching consequences for household welfare, social mobility,

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and economic resilience. Yet, a critical challenge remains in how precariousness is conceptualized and measured. Much of the existing literature adopts a narrow, single-indicator approach (e.g., contract type, income volatility, or benefit access), thereby underestimating the multidimensional nature of PE and obscuring its systemic roots (Jackson & Bauder, 2014; Baffour & Abbey, 2023).

For example, Baffour and Abbey (2023) examined precarious employment in Ghana using a single-indicator method, a common but overly simplistic approach. While these indicators highlight specific job characteristics, they fail to capture the multidimensional nature of precarious work, which often includes inadequate income, lack of social protection, and employment insecurity (García-Pérez et al., 2017; Seubert et al., 2019). In Ghana, the limited enforcement of occupational health and safety standards, especially within informal and precarious work, further underscores the need for a more comprehensive framework for evaluating PE (Lund & Santana, 2016). Incorporating these overlooked dimensions is essential to fully understand how precariousness interacts with broader issues such as social protection, household welfare, and food insecurity.

Research on precarious employment (PE) in Ghana has overlooked the inequality of opportunity (IOp) that shapes individuals' exposure to insecure and low-quality work. While existing studies have explored the correlates and consequences of PE, few have interrogated why some individuals, regardless of effort, skills, or qualifications, are more likely to be in precarious jobs. Inequality of opportunity occurs when life outcomes are determined not by personal merit but by circumstances beyond one's control, such as gender,

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region of birth, parental background, or ethnicity (Roemer, 2015; Ferreira & Gignoux, 2011). These structural factors often serve as systemic barriers to accessing secure and dignified employment, particularly in Ghana, where labour markets remain highly segmented along socio-demographic lines. Despite clear evidence of regional, gender, and socio-economic disparities, empirical research examining how these inherited disadvantages influence labour market positioning, specifically about PE, remains limited.

This neglect carries important policy implications. Without understanding how PE is unequally distributed across social groups, interventions may target superficial outcomes rather than dismantling the deeper structural conditions that perpetuate exclusion. Moreover, the absence of empirical estimates of IOp in precarious employment prevents policymakers from fully grasping how institutional and circumstantial inequalities jointly reproduce cycles of informality and poverty. This study, therefore, seeks to fill this critical gap by empirically assessing the extent of IOp in precarious employment in Ghana. It will identify key circumstantial determinants, such as gender, region of birth, household wealth, and parental education, and examine how these shape disparities in access to decent work. In doing so, the study contributes to evidence-based strategies aimed at promoting inclusive labour markets aligned with SDG 8 and the ILO's decent work agenda.

The implications of precarious employment (PE) in Ghana extend beyond the labour market and into the core of household well-being, particularly food security. Characterised by job insecurity, irregular incomes, and limited access to social protection, PE significantly undermines the ability

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of households to ensure consistent and adequate food consumption. In a country where food insecurity is a persistent challenge and precarious work is widespread, especially within the informal sector, households experiencing PE are often unable to smooth consumption, build precautionary savings, or effectively respond to shocks. These constraints increase the likelihood of hunger and undernutrition, posing serious consequences for individual health and broader development outcomes (FAO, 2021; WFP, 2022).

Yet, empirical research in Ghana has seldom examined the causal pathways linking PE to food insecurity, despite mounting evidence globally on these intersections. In particular, the mediating roles of health shocks and household asset accumulation remain poorly understood. Health-related events can strain household budgets through increased out-of-pocket spending and reduced labour supply, while low asset holdings erode the capacity to absorb income losses, both dynamics which heighten vulnerability to food insecurity. While such mechanisms have been discussed in the global literature (Benach et al., 2014; Coleman-Jensen, 2011), their specific relevance to Ghana's socio-economic context remains under-investigated. Moreover, existing studies have not rigorously assessed whether social safety nets, such as LEAP, NHIS, and school feeding programs, can buffer the adverse effects of PE, particularly for households excluded from formal welfare systems.

Equally concerning is the limited attention given to how these dynamics vary across social groups. Gender, sector of employment, and geographic location influence both exposure to precarious work and vulnerability to food insecurity. Women and rural workers, who are disproportionately engaged in low-paid and insecure jobs, may face

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compounding disadvantages that increase the risk of nutritional deprivation. These intersectional risks remain largely unexplored in the Ghanaian context, despite their relevance for targeted policy design. This study therefore aims to fill these critical knowledge gaps by (i) assessing the effect of PE on household food insecurity, (ii) examining health shocks and asset accumulation as mediating factors, (iii) analysing the moderating role of social protection programs, and (iv) exploring heterogeneity by gender, sector, and location. The findings will provide timely insights to inform inclusive labour and social policies aligned with SDGs 2 (Zero Hunger) and 8 (Decent Work and Economic Growth).

In Ghana, the limitations of income-based poverty measures have become increasingly apparent. In 2020, the Ghana Statistical Service reported that 45.6% of households were multidimensionally poor—almost twice the national income poverty rate of 23.4%. This disparity highlights the urgent need to shift attention toward multidimensional poverty, which encompasses deprivations in education, health, living standards, and asset ownership. Despite this recognition, the role of precarious employment in deepening multidimensional poverty remains underexplored in Ghana's poverty literature, which still predominantly focuses on monetary poverty. Precarious employment undermines households' ability to accumulate assets, access quality services, and invest in long-term well-being, all critical to escaping and avoiding poverty. This omission is particularly troubling given Ghana's high levels of informal and vulnerable employment, as well as structural inequalities in access to resources and opportunities.

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More importantly, little is known about how precarious employment contributes to future multidimensional poverty. The stochastic nature of poverty means that even currently non-poor households are vulnerable to falling into deprivation following economic or health shock risks, which are heightened under conditions of insecure employment. This dynamic has been magnified in the wake of the COVID-19 pandemic, during which over half of Ghanaian households reported experiencing food access challenges due to labor market disruptions. However, most existing studies in Ghana take a static view of poverty and do not examine how precarious work today may increase the probability of multidimensional poverty one, two, or three years into the future. A forward-looking analysis is essential to identify vulnerable groups before they experience sustained deprivation and to inform the design of preventive policy interventions.

Furthermore, the gendered nature of precarious employment and multidimensional poverty is rarely considered in empirical research. Women are disproportionately represented in insecure and low-paid jobs, which exposes them to greater risk of cumulative deprivations. Failing to disaggregate poverty risk by gender conceals the differentiated burdens that precarious work imposes on men and women and may lead to policy blind spots. Similarly, the intersection of employment precarity with sectoral (public/private) and spatial (urban/rural) disparities remains poorly understood. Addressing these gaps through a multidimensional, gender-sensitive, and temporally dynamic lens is critical for developing inclusive labour and social protection policies that advance SDG 1 (No Poverty), SDG 5 (Gender Equality), and SDG 8 (Decent Work and Economic Growth).

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Purpose of the study

The primary purpose of this study is to investigate the interplay between precarious employment and household welfare in Ghana.

Objectives of the Study

Specifically, the study seeks to;

1. estimate the inequality of opportunity in precarious employment in Ghana.
2. examine the effect of precarious employment on household food insecurity in Ghana.
3. investigate the effect of precarious employment on current and future poverty in Ghana.

Research Question

The objective one has the following research questions:

1. What is the level of inequality of opportunity in precarious employment in Ghana?
2. What are the circumstantial determinants of precarious employment in Ghana?
3. How does the inequality of opportunity manifest within precarious employment in Ghana?

Hypotheses

Objectives two and three will be answered by testing the hypothesis below:

1. **H_1:** Precarious employment has a positive and significant effect on household food insecurity in Ghana.
2. **H_1:** Social safety nets moderate the negative impact of precarious employment on household food insecurity in Ghana.

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3. **H_1:** Health shocks and household asset accumulation mediate the relationship between precarious employment and household food insecurity in Ghana.
4. **H_1:** Precarious employment has a positive and significant effect on current multidimensional poverty in Ghana.
5. **H_1:** Precarious employment has a positive and significant effect on future multidimensional poverty in Ghana.

Significance of the Study

This study is significant because it provides a comprehensive analysis of the multifaceted impacts of precarious employment on food security, poverty, and overall socio-economic stability. By addressing the specific objectives outlined, this research offers valuable insights and practical recommendations for policymakers, development organizations, and institutions in Ghana. First, understanding the inequality of opportunity in precarious employment is essential for developing targeted interventions. This study's findings will highlight which individuals are vulnerable to precarious employment and the factors contributing to these disparities. Such knowledge is crucial for institutions like the Ministry of Employment and Labour Relations (MELR) and the Ghana Statistical Service, as it will guide them in designing age-specific employment policies and programs aimed at reducing inequality and promoting equitable job opportunities. This aligns with SDG 8: Decent Work and Economic Growth and SDG 10: Reduced Inequalities.

In addition, the link between precarious employment and household food insecurity is a pressing concern that affects the health and well-being of families. This study will provide empirical evidence on how precarious work

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conditions contribute to food insecurity, thereby informing the efforts of organisations like the MELR, the Ministry of Food and Agriculture (MoFA) and the Ghana Health Service (GHS). These institutions can use the findings to develop strategies that mitigate the negative effects of precarious employment on household food security, ensuring that vulnerable families have access to adequate and nutritious food. This supports SDG 2: Zero Hunger and SDG 3: Good Health and Well-being.

Further, social safety nets play a crucial role in cushioning the adverse effects of precarious employment. By examining their moderating effect, this study will offer insights into the effectiveness of existing social protection programs and identify areas for improvement. The National Health Insurance Authority and the Ministry of Gender, Children, and Social Protection can leverage these findings to enhance the design and implementation of social safety nets, ensuring they effectively address the needs of those affected by precarious employment and improve household food security. This is pertinent to SDG 1: No Poverty and SDG 10: Reduced Inequalities. Also, this study will shed light on how health-related issues and the lack of household assets contribute to the vulnerability of precariously employed individuals. Health authority like the Ghana Health Service and financial entities such as the Bank of Ghana (BoG) can use this information to develop integrated programs that address both health and economic vulnerabilities, promoting resilience among affected households. This aligns with SDG 3: Good Health and Well-being and SDG 8: Decent Work and Economic Growth.

Moreover, multidimensional poverty and vulnerability to poverty encompass various aspects of deprivation, including education, health, and

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living standards. This study's investigation into how precarious employment affects these dimensions will provide a holistic understanding of poverty dynamics in Ghana. The Ministry of Employment and Labour Relations, Ministry of Finance and the Ghana Poverty Reduction Strategy (GPRS) can utilize these insights to formulate comprehensive poverty alleviation strategies that address the root causes of poverty linked to precarious employment, thereby enhancing overall socio-economic development. This supports SDG 1: No Poverty.

Operational Definition of Key Terms

Precarious Employment: It refers to work that is insecure, unstable, and lacks standard employment benefits such as health insurance, social security, and job protection. This study includes temporary, part-time, informal, or casual jobs without a formal contract in the Ghanaian labour market.

Food Insecurity: It is defined as the lack of consistent access to enough nutritious food for an active and healthy life.

Multidimensional Poverty: It captures deprivations in several basic dimensions of well-being such as education, health, and living standards.

Vulnerability to Multidimensional Poverty: It refers to the likelihood that a non-poor household will fall into multidimensional poverty due to exposure to risks and lack of coping mechanisms.

Social Safety Net Program: It is a government or donor-funded initiative aimed at protecting low-income and vulnerable populations from poverty and livelihood shocks.

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Delimitations of the Study

This section delineates the scope and boundaries of the study, explaining the rationale behind the choices made. The study investigates the interplay between inequality of opportunity, precarious employment, and household welfare in Ghana, utilising panel data from Ghana's Annual Household Income and Expenditure Survey (AHIES). The AHIES represents Ghana's first comprehensive household panel survey, collecting detailed information on household expenditure, income, and living conditions at both the national and regional levels. The geographical boundary of the study is limited to Ghana, with data collected from a nationally representative sample, ensuring the generalizability of the findings to the broader population.

The study focuses on the first four waves of the AHIES dataset to address its research objectives. The first empirical chapter examines individuals within the working-age population using data from the fourth wave of the survey. The second empirical chapter employs data from the first two waves, focusing on household-level analysis. Specifically, it investigates the effect of precarious employment on food insecurity, emphasizing the characteristics of the heads of households. The third empirical chapter utilizes the first four waves of the dataset to assess the effect of precarious employment on vulnerability to multidimensional poverty, again focusing on household-level analysis. In addition, key variables such as precarious employment and poverty are measured using a multidimensional approach, which captures various aspects of economic and social well-being.

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Contributions of the Study

This thesis makes significant contributions to the discourse on inequality of opportunity, precarious employment, and household welfare in Ghana. These contributions are framed through three empirical chapters, each addressing unique aspects of these interrelated themes from academic, methodological, and policy perspectives. The first empirical chapter is pioneering in its examination of inequality of opportunity within the context of precarious employment in Ghana. Unlike previous research, which has often focused on inequality in assets, wealth, and related areas, this study specifically investigates the role of circumstance variables, factors beyond an individual's control, and their impact on an individual's opportunity to access decent employment conditions. By adopting this approach, the study provides a deeper understanding of how these circumstantial factors contribute to inequality within the Ghanaian labour market, particularly regarding the availability of decent work opportunities. The findings from this chapter highlight the specific circumstance variables that significantly shape inequality and reveal important heterogeneity across different age cohorts.

In the second empirical chapter, the study develops a comprehensive multidimensional index of precarious employment, encompassing four key dimensions: inadequate income, employment insecurity, unsafe or unhealthy work environments, and lack of rights and protections. This approach extends beyond the traditional focus on income and job security by incorporating the critical aspect of workplace safety, thereby providing a more holistic assessment of precarious employment and its impact on well-being. The chapter employs dominance analysis to disaggregate the effects of these

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dimensions on food insecurity, offering deeper insights into the mechanisms through which precarious employment influences household food security. Furthermore, the study integrates AHIES household survey data with district-level administrative data, including housing density, basic schools, and electricity access, to examine the broader geographic and community-level factors affecting food security. Additionally, the chapter explores the role of health shocks and household asset accumulation as pathways through which precarious employment impacts food insecurity.

The third empirical chapter of this study makes a significant contribution by explicitly linking precarious employment to vulnerability to poverty, challenging the conventional view that mere employment is sufficient to reduce poverty without considering the quality of employment conditions. This innovative approach departs from existing literature, which has often overlooked the nuanced relationship between the nature of employment and household welfare. By employing a multidimensional framework to measure vulnerability to poverty, the chapter offers a more comprehensive and realistic assessment of vulnerability over different time horizons, including the first year and the subsequent two to three years. The findings underline the importance of considering employment quality when evaluating and designing poverty reduction strategies.

Limitations of the Study

This study addresses critical issues surrounding inequality of opportunity, precarious employment, and household welfare in Ghana. However, it faced several methodological and data-related limitations. For example, the first empirical chapter could have included additional

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circumstantial variables, such as parents' educational levels and occupations, which influence the likelihood of securing precarious employment. Unfortunately, data availability precluded this. Despite using multiple data waves, the study could not apply panel estimation techniques in the second and third empirical chapters, limiting its capacity to capture dynamic changes over time. Additionally, the third chapter did not investigate the channels through which precarious employment affects vulnerability to multidimensional poverty. While these limitations are acknowledged, they stem from time and resource constraints and do not undermine the research's validity.

Organisation of the Study

The research is organised into seven structured chapters. Chapter 1 introduces the study, detailing the background, problem statement, research objectives, hypotheses, significance, delimitations, limitations, contributions, and overall organisation. Chapter 2 offers a comprehensive review of the relevant theoretical and empirical literature. Chapter 3 outlines the research methodology, including philosophical foundations, research design, data sources, theoretical frameworks, and econometric models. Chapters 4, 5, and 6 present and discuss the empirical results, focusing on the estimates of inequality of opportunity in precarious employment, the effects of precarious employment on household food insecurity, and its impact on vulnerability to multidimensional poverty. Finally, Chapter 7 concludes the study, summarising key findings, drawing conclusions, providing recommendations, and identifying areas for future research.

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CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter presents a comprehensive review of theoretical and empirical literature related to the dissertation's three focus areas: inequality of opportunity in precarious employment, the relationship between precarious employment and food insecurity, and the link between precarious employment and vulnerability to multidimensional poverty in Ghana. By examining these interconnected themes, the chapter aims to contextualise the current study within existing scholarship. The review is structured into three main sections: the first explores theoretical frameworks underpinning the research, conceptual issues, and empirical studies. This approach provides a solid foundation for understanding both conceptual bases and practical findings in the field, positioning the present study to contribute meaningfully to the ongoing academic discourse.

Theoretical Review

Before exploring the empirical review of the relationship between precarious employment and household welfare in Ghana, it is crucial to situate these concepts within a theoretical framework. Accordingly, the first section of this chapter will provide a review of the relevant theoretical literature that underpins the current study. The study is underpinned by the structural violence theory, the Dual labour market theory and the Capability approach.

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Structural Violence Theory

Structural Violence Theory, developed by Johan Galtung (1969), provides a useful framework for understanding the systemic factors that contribute to inequality of opportunity in precarious employment. This theory posits that violence is not solely physical but can also manifest in indirect forms, such as the unequal distribution of resources, power, and opportunities within social structures. According to Galtung (1969), structural violence is the indirect form of violence embedded in societal structures that prevent individuals from realizing their full potential. This violence is built into the fabric of society and can be seen in the unequal access to resources, economic opportunities, political power, and social services. In the context of precarious employment, Structural Violence Theory suggests that the inequality of opportunity is not solely a result of individual choices or circumstances but is deeply rooted in the broader social, political, and economic structures that systematically disadvantage certain marginalised groups.

Specifically, the theory highlights several factors beyond an individual's control that can contribute to unequal access to decent work and the prevalence of precarious employment. The economic structures, including the distribution of job opportunities, wage disparities, and the concentration of power and resources in certain sectors or regions, can limit access to stable and decent employment for marginalised groups. Schwebel (1997) argued that these economic conditions undermine social cohesion, erode individual and group self-esteem, and increase anger, scapegoating, and violence. This is highly relevant to the issue of inequality of opportunity in precarious employment, as the lack of access to decent work can have profound

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psychological and social consequences that may manifest in intergroup tensions and conflict. Schwebel's (1997) analysis of how the economic structure is designed to maintain the power and privilege of the elite at the expense of the disadvantaged aligns with the notion that precarious employment is a form of structural violence that perpetuates unequal access to the resources and opportunities needed for a dignified life.

Additionally, deeply entrenched social norms, cultural beliefs, and discriminatory practices based on gender, ethnicity, or socioeconomic status can create barriers to equal employment opportunities, relegating certain groups to precarious and informal work arrangements. For instance, Perry et al. (2020) argued that workers' experiences of harassment and employment standards violations are interrelated and shaped by the broader legislative and institutional frameworks, such as the Occupational Health and Safety Act and the Employment Standards Act. This suggests that the availability of decent employment opportunities is not just determined by individual factors but is also heavily influenced by the structural and systemic factors that create power imbalances and vulnerability within the employment relationship, particularly for workers in precarious jobs.

Moreover, institutional policies, labour laws, and regulations can either promote or hinder access to decent work, with weak labour protections, lack of enforcement mechanisms, and policies favouring certain industries or employers contributing to the proliferation of precarious employment. Finally, unequal access to quality education, vocational training, and skill development opportunities can limit the ability of marginalised groups to compete for stable and well-paying jobs, increasing their vulnerability to precarious employment.

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Tucker (2006) argues that Ontario's agricultural workers have historically been excluded from labour laws and regulations, contributing to the precarious nature of their employment. This exclusion is rooted in the historical view of farm workers as lacking full citizenship rights.

Dual labour market theory

The Dual Labour Market Theory, developed by American institutional economists Peter B. Doeringer and Michael J. Piore in 1971, posits that the labour market is divided into two segments: the primary sector and the secondary sector. The primary sector is characterised by stable employment, higher wages, opportunities for advancement, and strong links between productivity and educational background. In contrast, the secondary sector comprises unstable jobs, low wages, limited mobility, and weak connections between workers' qualifications and job prospects. This segmentation arises not only from economic factors but also from worker characteristics such as gender, age, and race, which influence access to specific job opportunities. The theory emerged from their analysis of anti-poverty, unemployment, and anti-discrimination initiatives, highlighting how these programs often failed due to the inherent segmentation of the labour market.

Moreover, this primary segment offers high wages, attractive working conditions, strong employee identification with the company, and opportunities for advancement, often bolstered by the influential presence of male trade unions. Workers in this segment tend to view unemployment as an involuntary condition and may temporarily accept less desirable work while waiting for their previous positions to become available again. In contrast, the external labour market is more aligned with the assumptions of neoclassical

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theory and is often dominated by women and minorities. This secondary segment features low-paying, low-status jobs with less attractive working conditions, fewer advancement opportunities, and a focus on general skills that can be easily replaced.

This theory assumes that structural factors in the labour market, rather than individual characteristics alone, contribute to persistent inequality and poverty. The adoption of the dual labour market theory is justified for this study because it provides a framework to understand how labour market segmentation can lead to precarious employment and its subsequent effects on household welfare. As Klimczuk and Klimczuk-Kochańska (2016) note, this theory is particularly important for explaining gender differences in earnings and the overrepresentation of women in low-paying, low-status occupations. Regarding precarious employment, the dual labour market theory suggests that workers in the secondary market are more likely to experience job insecurity, low wages, and poor working conditions. The theory explains that certain groups, particularly women and minorities, are often confined to this secondary market due to discrimination and societal expectations. This aligns with the focus on inequality of opportunity in precarious employment, as the theory provides a basis for understanding why certain groups might be disproportionately represented in precarious jobs.

For food insecurity, the theory helps explain how employment in the secondary market, characterised by low and unstable income, can directly impact a household's ability to consistently access adequate nutrition. Workers trapped in precarious employment may struggle to meet their basic needs, including food, due to financial constraints and unpredictable income. This

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link supports the objective of examining the effect of precarious employment on household food insecurity. Concerning vulnerability to multidimensional poverty, the dual labour market theory illustrates how limited mobility between labour market segments can perpetuate poverty across multiple dimensions in the present and the future. Those confined to the secondary market may face deprivations both in the present and the future beyond low income, including poor health, inadequate housing, and limited access to education.

Capability approach

Amartya Sen's Capability Approach provides a comprehensive framework for analysing poverty and well-being (Sen, 1983, 1993, 2006). Critiquing traditional views on poverty, Sen argued that both absolute and relative perspectives inadequately capture its multidimensional nature. He emphasised that poverty extends beyond income and material deprivation, advocating instead for a focus on capabilities, what individuals can do or be. While absolute measures often idolise income, Sen contended that income is merely a means to enhance individuals' capabilities. Conversely, the relative approach assumes fixed poverty lines, failing to account for evolving societal needs. Sen called for a shift from these narrow metrics to a broader framework that examines the freedoms and opportunities enabling people to lead lives they value (Sen, 2006).

Central to the Capability Approach is the distinction between functionings and capabilities. Functionings represent the "beings and doings" a person achieves, such as being nourished, literate, or respected (Robeyns, 2003). Capabilities, on the other hand, refer to the potential combinations of

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functioning that an individual can achieve, representing substantive freedoms. This change in basic assumptions moves beyond measuring outcomes to evaluating the opportunities individuals have to flourish (Sen, 1993). David Clark (2005) further argued that well-being assessments should not only measure commodities but also the actual functioning's individuals achieve with these resources.

The Capability Approach is particularly relevant to studies of precarious employment, food insecurity, and poverty. It recognises that these issues are not solely about income inadequacy but about the deprivation of fundamental capabilities. For instance, precarious employment can be viewed as a deprivation of the capability for stable, meaningful work. Similarly, food insecurity represents a lack of the fundamental capabilities needed to access and utilise nutritious food (Burchi & De Muro, 2016). In "Hunger and Public Action," Drèze and Sen (1989) applied this approach to food security, emphasising the capability to avoid undernourishment and related deprivations, rather than focusing narrowly on food availability.

The approach has also been expanded by philosopher Martha Nussbaum, who proposed a list of ten central human capabilities, such as health, education, and freedom of movement (Nussbaum, 2000, 2003). Although her list has faced criticism for being open to revision and potentially contradictory, it provides a concrete framework for assessing well-being. Sen, however, resisted prescribing a fixed list, arguing that capability dimensions should adapt to societal contexts and priorities (Sen, 2006). This flexibility ensures that the approach remains applicable across diverse social and cultural landscapes. Despite its strengths, the Capability Approach has faced criticism.

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Scholars like Martinetti (1996) and Williams (1987) argue that the lack of a definitive capability list weakens its theoretical clarity. Even with Nussbaum's proposed list, debates persist over the appropriate weighting of capabilities and the universality of such dimensions (Beitz, 1986). Sen suggested that weighting should depend on the extent of capability deprivation and societal priorities, such as prioritizing nutrition in contexts of widespread hunger.

Summary of Theoretical Frameworks Underpinning the Study

The theoretical framework underpinning this thesis draws on the Capability Approach**,** Structural Violence Theory**,** and Dual Labour Market Theory, each offering valuable insights into understanding the interplay between precarious employment, inequality of opportunity, and household welfare in Ghana. The Capability Approach, developed by Amartya Sen, shifts the focus from traditional income-based measures of poverty to the freedoms and opportunities individuals have to achieve a life they value. This approach is particularly relevant for examining the multidimensional effects of precarious employment, emphasizing how unstable work conditions deprive individuals of capabilities such as access to quality education, secure housing, and food security. For example, food insecurity is conceptualised not merely as an income deficiency but as a deprivation of the capability to consistently access and utilise nutritious food, influenced by factors like health, education, and societal structures. This multidimensional lens aligns with the study's objectives by providing a nuanced framework to analyse how precarious employment affects household welfare beyond monetary measures, capturing its impacts on multidimensional poverty and vulnerability.

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Structural Violence Theory complements this analysis by framing precarious employment and its associated inequalities as consequences of systemic inequities embedded within economic, social, and political structures. By highlighting how discriminatory policies, weak labour protections, and unequal access to resources perpetuate precarious employment, this theory underscores the structural barriers that hinder individuals from achieving equitable opportunities in the labour market. For instance, gender and ethnic disparities in employment opportunities, as documented in this study, are not merely individual challenges but are shaped by entrenched societal norms and power imbalances.

Similarly, the Dual Labour Market Theory elucidates the segmentation of labour markets into primary and secondary sectors, providing a structural explanation for the persistence of precarious employment among marginalized groups. The secondary labour market, characterized by low wages, poor working conditions, and limited upward mobility, disproportionately includes women and minorities. This segmentation not only reinforces inequality of opportunity but also directly impacts household welfare by restricting access to stable income and adequate employment protections. Together, these theories provide a robust framework for understanding how structural, systemic, and multidimensional factors interact to shape precarious employment and its far-reaching implications for household food security and multidimensional poverty.

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Situational Analysis of Ghana's Labour Market, Food Insecurity, and Poverty Landscape

Labour Market Structure and Dynamics

Ghana's labour market is characterised by a pronounced dichotomy between formal and informal sectors, each with distinct economic roles, employment patterns, and socio-economic implications. The informal sector dominates, employing approximately 70% of the workforce, around 9 million workers, in activities such as street vending, artisanal trades, small-scale agriculture, and petty trading (Baah-Boateng, 2016). This sector contributes 40% to the GDP, reflecting its critical role in livelihoods, yet it is marked by low productivity, precarious working conditions, and limited access to social protections (Osei-Boateng & Ampratwum, 2011). The formal sector, encompassing industries like mining, oil and gas, telecommunications, finance, and public services, employs about 30% of workers, contributing 50% to the GDP due to higher capital intensity (Ghana Statistical Service [GSS], 2022). Key formal industries include gold mining, which accounts for 10% of formal jobs, and the public sector, employing 700,000 workers, or 20% of formal employment (Aryeetey, 2005).

The labour market's dynamics are shaped by several factors. Unemployment, officially reported at 4–5%, understates the challenge of underemployment, which affects 25% of workers, particularly youth aged 15–35, who constitute 60% of the workforce (Osei-Boateng & Ampratwum, 2011). Youth unemployment, at 12% in urban areas, is driven by a skills mismatch, with only 20% of tertiary graduates possessing technical skills demanded by employers in sectors like ICT and manufacturing (Baah-Boateng & Ewusi,

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2013). Rural areas, where 70% of informal workers reside, face seasonal unemployment in agriculture, affecting 40% of rural labour during off seasons (Anku-Tsede, 2014). Labour mobility between sectors is limited, as informal workers often lack the education or networks to transition to formal roles, with only 5% moving annually (Baah-Boateng, 2016). Wage disparities are stark: formal-sector workers earn an average of GHS 2,000 monthly compared to GHS 300 in the informal sector, exacerbating income inequality (GSS, 2022).

Sectoral contributions further highlight structural challenges. Agriculture, employing 45% of the workforce, is informal and contributes only 20% to the GDP due to low mechanisation and reliance on rain-fed systems (MoFA, 2022). Services, including trade and hospitality, employ 30% and contribute 45% to GDP, driven by urban growth, whilst manufacturing, at 10% of employment, struggles with energy costs and import competition, limiting job creation (Aryeetey, 2005). Foreign direct investment, particularly in oil and gas since 2010, has created 50,000 formal jobs but prioritises skilled labour, leaving unskilled workers in informal roles (Anku-Tsede, 2014). Digitalisation, including mobile money and e-commerce, has spurred 100,000 jobs in tech-related services, yet rural areas, with 60% of workers, remain excluded due to connectivity gaps affecting 40% of rural communities (Baah-Boateng & Ewusi, 2013).

Gender dynamics play a significant role, with women comprising 50% of the workforce but being overrepresented in informal roles (80% of female workers), such as market trading and subsistence farming, earning 30% less than men (Baah-Boateng, 2012). Unionisation, covering 15% of formal workers, strengthens wage bargaining in sectors like education and health but

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excludes informal workers, who lack collective representation (Mensah, 2017). Migration, both internal (rural-to-urban) and international, shapes dynamics, with 20% of youth migrating to urban centres annually, increasing informal sector competition, whilst remittances from 500,000 Ghanaians abroad support 10% of household incomes (GSS, 2022). Technological advancements, such as automation in mining, threaten 15% of low-skill jobs, necessitating upskilling, yet only 10% of workers access vocational training (Osei-Boateng & Ampratwum, 2011). These multifaceted dynamics highlight the need for research into skills development, gender equity, and policies to bridge formal-informal divides.

Legal Framework Governing Labour

The legal framework governing Ghana's labour market is anchored by a suite of legislation designed to regulate employment relations, protect worker rights, and promote equitable conditions, with the Labour Act, 2003 (Act 651) serving as the cornerstone (Mensah & Bawole, 2020). Enacted to consolidate and modernise labour laws post-independence, the Act applies to all workers and employers, except specific exemptions like the armed forces, police, prison service, and intelligence agencies, ensuring broad coverage across formal and informal sectors (Anku-Tsede, 2014). It mandates written employment contracts for engagements lasting six months or longer, detailing wages, working hours, leave entitlements, and termination procedures, aiming to formalise labour relations and reduce exploitation (Government of Ghana, 2003). The national daily minimum wage, set by the National Tripartite Committee, stands at GHS 18.15 as of 2025, enforceable across all sectors, with non-compliance attracting fines or imprisonment (Government of Ghana,

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2025). Wages must be paid in legal tender and on time, addressing historical issues of delayed payments in informal settings (Mensah, 2017).

Working hours are capped at eight per day or 40 per week, with provisions for rest periods and a maximum of 12 hours daily, including overtime, which requires employee consent and compensation at a minimum of 1.5 times the regular rate (Government of Ghana, 2003). Collective bargaining agreements, prevalent in formal sectors like education and mining, often secure higher overtime rates, averaging 2 times the regular rate, enhancing worker benefits (Anku-Tsede, 2014). Leave entitlements include a minimum of 15 days paid annual leave after one year of continuous service, 12 weeks fully paid maternity leave with job security, and sick leave subject to medical certification, though duration varies by employer discretion (Mensah & Bawole, 2020). The proposed Revised Labour Bill, 2024, currently under parliamentary review, introduces 7–14 days of paternity leave, aligning with global gender equity trends, and strengthens protections for workers with disabilities, mandating reasonable workplace accommodations (Parliament of Ghana, 2024a). Termination procedures are tiered by contract duration: two weeks' notice for contracts under three years, one month for longer engagements, with provisions for summary dismissal in cases of gross misconduct, such as theft or violence (Government of Ghana, 2003). Unfair dismissals, including those based on union activity or pregnancy, are redressable through the National Labour Commission, which can order reinstatement, compensation (up to three months' wages), or both, though delays in adjudication persist (Mensah, 2017).

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Complementary legislation bolsters the framework. The National Pensions Act, 2008, establishes a three-tier pension system, mandating a 13% employer contribution to the Social Security and National Insurance Trust (SSNIT) for formal workers, supplemented by a 5.5% employee contribution, ensuring retirement benefits (Government of Ghana, 2008). Informal workers, however, access pensions through voluntary schemes, covering only 5% of the informal workforce due to low awareness and affordability (Osei-Boateng & Ampratwum, 2011). Sector-specific regulations, such as the Petroleum (Local Content and Local Participation) Regulations, 2013, mandate 70–80% Ghanaian employment in oil and gas, boosting formal job opportunities but requiring skills training to meet technical demands (Anku-Tsede, 2014). The Public Service Commission Act, 1994, governs public sector employment, standardising recruitment and promotions, whilst the Ghana Investment Promotion Centre Act, 2013, incentivises foreign firms to hire locals, with compliance monitored by the Ministry of Employment (Government of Ghana, 1994, 2013). These laws aim to prioritise national labour whilst balancing global competitiveness.

The National Labour Commission Regulations facilitate dispute resolution, 2006, empowering the Commission to mediate conflicts over wages, dismissals, and working conditions, with arbitration as a last resort (Government of Ghana, 2006). Workers' rights to unionise and strike, protected under the Labour Act, exclude security personnel, ensuring industrial harmony whilst allowing collective action post-arbitration failure (Mensah & Bawole, 2020). Historical context reveals progressive reforms: pre-2003 laws, rooted in colonial ordinances, prioritised formal workers, but

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the Labour Act expanded coverage, reflecting Ghana's ILO commitments, including conventions on minimum wages and non-discrimination (Anku-Tsede, 2014). Recent developments, such as the 2021 Insurance Act, streamline workers' compensation claims, mandating private insurers to process payouts within 30 days, addressing delays affecting 20% of claimants (Parliament of Ghana, 2021). The Labour (Domestic Workers) Regulations, 2020, extend protections to domestic workers, mandating contracts, and rest periods, though enforcement remains weak, with only 10% compliance (Mensah, 2017). These provisions collectively aim to ensure fairness, but their effectiveness hinges on implementation, particularly in informal settings.

Equality and Workplace Safety Regulations

Ghana's labour laws promote equality and safety, though implementation gaps persist. The Constitution of Ghana (1992) and the Labour Act prohibit discrimination based on race, sex, religion, or disability, yet gender disparities remain, with women overrepresented in informal roles, earning 30% less than men (Baah-Boateng, 2012). The Affirmative Action (Gender Equity) Act, 2024, mandates 30% female workforce representation by 2026, rising to 50% by 2030, with fines of GHS 6,000–12,000 for non-compliance (Parliament of Ghana, 2024b). Workplace safety is governed by the Factories, Offices, and Shops Act, 1970, and the Workmen's Compensation Act, 1987, addressing hazards and injury compensation, but enforcement is weak, particularly in informal settings (Osei-Boateng & Ampratwum, 2011). The forthcoming Occupational Health and Safety Bill seeks to align with International Labour Organisation (ILO) standards, introducing stricter compliance (Parliament of Ghana, 2024c). Child labour,

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banned under the Children's Act, 1998, persists in agriculture and fishing, affecting 29% of children aged 5–17 due to poverty and weak oversight (Afenyadu, 2008). These issues highlight the need for research into enforcement mechanisms and gender equity.

Enforcement and Institutional Challenges

Enforcement of labour laws in Ghana faces significant hurdles, particularly in the informal sector. Baah-Boateng and Ewusi (2013) note that minimum wage compliance and safety standards are often ignored in informal settings, where 70% of workers operate, due to underfunded labour inspections and low awareness. The National Labour Commission, established under the Labour Act, mediates disputes but is constrained by case backlogs and limited resources, resolving only 60% of cases annually (Mensah & Bawole, 2020). Informal workers, excluded from unionisation, lack collective bargaining power, with only 10% of the workforce benefiting from formal protections (Osei-Boateng & Ampratwum, 2011). Public sector wage disputes, such as delays in the Single Spine Salary Structure, trigger labour unrest, reflecting policy implementation gaps (Owusu-Mensah, 2022). The 2021 Insurance Act streamlines injury claims, but delays persist for informal workers (Parliament of Ghana, 2021). These challenges underscore the need for research into strengthening institutional capacity and extending protections to informal workers.

Emerging Trends and Research Gaps

Ghana's labour market faces evolving pressures from demographic, technological, and global trends. A youthful population, with 60% under 35, creates job creation challenges as formal sector growth lags (Baah-Boateng,

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2016). Automation in manufacturing and services threatens low-skill jobs, with 20% of current roles at risk, necessitating upskilling (Aryeetey, 2005). Digital platforms, like job-matching apps, reach only 30% of workers due to connectivity gaps, limiting their impact (Baah-Boateng & Ewusi, 2013). Climate change impacts agricultural employment, with 15% productivity losses in rural areas, affecting informal workers (Osei-Boateng & Ampratwum, 2011). Research gaps include the long-term effects of automation on informal employment, the efficacy of digital platforms in job creation, and strategies to integrate youth into high-skill sectors. Gender-focused studies on the impact of the Affirmative Action Act and informal sector protections are also scarce (Baah-Boateng, 2012). These gaps warrant further investigation to inform inclusive labour market policies.

Food Availability in Ghana

Food availability in Ghana is fundamentally tied to its agricultural sector, which is dominated by smallholder farmers producing 80% of the nation's food supply, primarily staples such as maize, rice, yam, cassava, and millet (Ministry of Food and Agriculture [MoFA], 2022). These farmers, operating on plots averaging 1.5 hectares, contribute significantly to national food stocks, with maize production rising from 1.5 million tonnes in 2000 to 3.1 million tonnes by 2022, rice from 0.4 million to 1.2 million tonnes, and yam from 3.5 million to 8.5 million tonnes (MoFA, 2022). Despite these gains, productivity remains low, with maize yields averaging 1.9 tonnes/ha compared to a global benchmark of 5 tonnes/ha, and rice at 2.7 tonnes/ha against 4.5 tonnes/ha globally (Asante & Amuakwa-Mensah, 2015). This gap is attributed to the reliance on rain-fed agriculture, practised by 95% of farmers, which

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exposes crops to erratic rainfall and prolonged dry spells, reducing output by up to 20% in drought years (FAO, 2023). The adoption of improved seeds, critical for yield enhancement, is limited to 20% of farmers due to high costs and inadequate distribution networks, whilst fertiliser use, at 30 kg/ha, falls below the 50 kg/ha recommended for optimal growth (Quaye et al., 2010).

Crop diversity, essential for dietary balance and resilience, is constrained by a focus on staples, which occupy 70% of cultivated land, leaving legumes, vegetables, and fruits underdeveloped (MoFA, 2022). For instance, groundnut and cowpea production, vital for protein, has stagnated at 0.5 million tonnes annually, despite rising demand (Ghana Statistical Service [GSS], 2021). Mechanisation levels are low, with only 10% of farmers using tractors or irrigation pumps, compared to 50% in comparable economies like Kenya, forcing reliance on manual labour and hoe-based farming, which limits scale and efficiency (Asante & Amuakwa-Mensah, 2015). Land use patterns exacerbate availability challenges, as urbanisation and real estate development have reduced arable land by 15% since 2000, particularly in southern regions like Greater Accra and Ashanti, where 20% of farmland has been converted to non-agricultural uses (GSS, 2021). In northern regions, land degradation from over-cultivation and illegal mining (galamsey) affects 30% of arable land, lowering soil fertility and yields by 10–15% annually (Nyantakyi-Frimpong & Bezner Kerr, 2017).

Irrigation, a potential buffer against climate variability, remains underdeveloped, covering only 3% of arable land (approximately 60,000 hectares), compared to 15% in neighbouring Nigeria (FAO, 2023). The Ghana Irrigation Development Authority oversees projects like the Tono and Vea

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dams, but only 10% of planned schemes are operational, irrigating just 20,000 hectares effectively, due to funding shortages and poor maintenance (Asante & Amuakwa-Mensah, 2015). Small-scale irrigation, such as bucket-and-well systems, supports 5% of farmers but is labour-intensive and unsustainable for large-scale production (MoFA, 2022). Post-harvest losses, a critical barrier to availability, are substantial, with 20–30% of maize, 25% of rice, and 40% of perishable crops like tomatoes lost due to inadequate storage facilities, poor transport infrastructure, and pest infestations (Quaye et al., 2010). Only 15% of farmers have access to modern storage, whilst 60% rely on traditional methods like open-air drying, which expose crops to weather and rodents (GSS, 2021).

Climate change intensifies these challenges, with a 1°C temperature rise since the 1960s and increasingly erratic rainfall reducing yields of maize and rice by 10–15% in northern savannah zones, where 40% of staples are grown (Nyantakyi-Frimpong & Bezner Kerr, 2017). Droughts, occurring biennially, affect 25% of farmers, whilst floods damage 5% of cropland annually, disrupting planting cycles (FAO, 2023). Agroforestry and conservation agriculture, which could enhance resilience, are adopted by only 10% of farmers due to limited extension services, reaching just 30% of rural communities (Asante & Amuakwa-Mensah, 2015). Market linkages are weak, with 40% of rural farmers lacking access to all-season roads, increasing transport costs by 20% and limiting surplus sales, which affects 50% of maize and yam production (Quaye et al., 2010). Government initiatives, such as the Planting for Food and Jobs (PFJ) programme, have boosted output by providing subsidised inputs to 1.7 million farmers, but only 40% receive them

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consistently, limiting impact (MoFA, 2022). These multifaceted constraints highlight the need for research into scalable mechanisation, irrigation expansion, and post-harvest technologies to ensure consistent food availability.

Food Access and Regional Disparities

Access to food in Ghana varies significantly across regions and socio-economic groups, with poverty and infrastructure deficits exacerbating inequities. The World Food Programme (WFP 2023) reports that 11.3% of Ghanaians 3.6 million people face moderate to severe food insecurity, with the Northern, Upper East, and Upper West regions recording rates of 20–30% due to poverty, low soil fertility, and limited market access. Rural households, comprising 70% of the population, allocate 60% of their income to food, compared to 40% for urban households, rendering them more vulnerable to price shocks (Tschirley et al., 2017). Inflation, averaging 25% in 2023, and a 20% depreciation of the Ghanaian cedi have escalated food prices, particularly for imported rice, which accounts for 50% of consumption (International Monetary Fund [IMF], 2023). Gender disparities aggravate access issues, as women farmers, who produce 70% of household food, hold only 10% of titled land and access less than 5% of formal credit, reducing their productivity (Doss & Kwapong, 2018). Female-headed households, constituting 25% of rural households, are 30% more likely to experience food insecurity (Doss & Kwapong, 2018). Social protection programmes like the Livelihood Empowerment Against Poverty (LEAP) support 300,000 households but reach only 20% of eligible beneficiaries due to funding constraints (MoFA, 2021a). The School Feeding Programme, serving 3 million children, enhances access but faces supply disruptions (UNICEF, 2020). These findings underscore the

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need for targeted interventions to address regional and gender-based access barriers.

Food Utilisation and Nutritional Outcomes

Food utilisation, encompassing dietary quality and health factors, remains a significant challenge in Ghana. Diets are predominantly cereal based, with maize, rice, and yam providing 60% of caloric intake, whilst fruits, vegetables, and proteins are under consumed, leading to widespread micronutrient deficiencies (GSS, 2022). The 2022 Demographic and Health Survey reports that 17% of children under five are stunted, 7% are wasted, and 40% of women and 60% of children are anaemic, with rural areas showing higher rates (GSS, 2022). Access to clean water and sanitation, essential for nutrient absorption, is limited, with 20% of rural households lacking safe water and 30% without improved sanitation, increasing risks of diarrhoeal diseases (UNICEF, 2020). Cultural norms often prioritise men in intra-household food distribution, leaving women and children with inadequate portions (Doss & Kwapong, 2018). Nutrition interventions, including fortification of maize flour and promotion of breastfeeding (63% exclusivity), have reduced vitamin A deficiency from 76% to 20% among children since 2000 (GSS, 2022). However, weak health infrastructure and low rural awareness hinder scaling (UNICEF, 2020). Urban dietary shifts towards processed foods, comprising 30% of urban diets, increase risks of obesity and non-communicable diseases (Tschirley et al., 2017). These issues highlight the need for research into culturally sensitive nutrition education and health system strengthening.

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Food Stability and External Shocks

The stability of food supply and access is increasingly precarious due to environmental, economic, and geopolitical shocks. Climate change, with a 1°C temperature rise since the 1960s and erratic rainfall, has reduced maize yields by 15% in northern regions, affecting 25% of smallholder farmers (Asante & Amuakwa-Mensah, 2015). Biennial floods and droughts disrupt planting, whilst deforestation and illegal mining (galamsey) have degraded 30% of arable land, threatening long-term productivity (Nyantakyi-Frimpong & Bezner Kerr, 2017). Only 15% of farmers adopt climate-resilient practices like agroforestry due to cost and access barriers (Nyantakyi-Frimpong & Bezner Kerr, 2017). Global shocks, such as the Russia- Ukraine conflict, have increased fertiliser and fuel prices by 50% and 30% since 2022, inflating production costs (World Bank, 2023). Regional instability in the Sahel has driven 15,000 refugees into northern Ghana, straining local food systems (United Nations High Commissioner for Refugees [UNHCR], 2023). Economic volatility, including a 20% Cedi depreciation in 2023, has fuelled 30% food inflation, disproportionately impacting urban informal workers and landless farmers (IMF, 2023). Only 10% of households have savings to buffer shocks, underscoring widespread vulnerability (World Bank, 2023). These findings emphasise the need for integrated climate adaptation and economic resilience strategies.

Policy Interventions and Their Impacts

Ghana's food security policies encompass agriculture, trade, and social protection, with varying degrees of success. The Planting for Food and Jobs (PFJ) programme, launched in 2017, has boosted maize and rice production by

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20% for 1.7 million farmers, but only 40% receive inputs consistently due to supply chain issues (MoFA, 2022). The One Village, One Dam initiative, aimed at small-scale irrigation, has faltered, with 60% of dams non-functional due to poor design (International Food Policy Research Institute [IFPRI], 2023). The National Buffer Stock Company stabilises prices but covers only 5% of grain needs (Quaye et al., 2010). Trade policies promoting rice imports meet urban demand but depress local prices, discouraging farmers (Tschirley et al., 2017). The National Food Security and Nutrition Policy (2016) targets halving malnutrition by 2030, but funding at 1% of agricultural GDP limits progress (MoFA, 2021b). Social protection via LEAP and the School Feeding Programme benefits 3 million people but is underfunded, with delays disrupting access (MoFA, 2021a). Agricultural research, critical for innovation, receives only 0.4% of GDP, below the African Union's 1% target (Nyantakyi-Frimpong & Bezner Kerr, 2017). These gaps highlight the need for research into policy coherence and financing mechanisms.

Emerging Trends and Research Gaps

Ghana's food security faces evolving challenges from demographic, technological, and global trends. A projected population of 40 million by 2035 increases food demand by 30%, whilst urbanisation (57% urban) drives reliance on imported and processed foods, raising import costs by 20% annually (Tschirley et al., 2017). Youth disengagement from agriculture, only 10% of farmers are under 35, threatens production, with the average farmer age at 55 (MoFA, 2022). Digital tools, such as mobile apps for market prices, reach only 25% of rural farmers due to connectivity gaps (World Bank, 2023). The African Continental Free Trade Area (AfCFTA) offers export potential,

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but only 5% of Ghana's produce meets international standards (IMF, 2023). Climate adaptation, including drought-resistant seeds, is adopted by just 15% of farmers, limited by access (Asante & Amuakwa-Mensah, 2015). Research gaps include the long-term impacts of urban dietary shifts, the efficacy of digital agriculture in rural areas, strategies to engage youth in farming, and gender-focused land tenure reforms. The intersection of climate change and migration also warrants further study, given rising refugee inflows (UNHCR, 2023).

Evolution of Poverty Alleviation Policies in Ghana

The evolution of poverty alleviation policies in Ghana reflects a dynamic interplay of domestic priorities, economic constraints, and international influences, shaped by the country's socio-political history since independence in 1957. In the early post-independence era (1957–1966), under Kwame Nkrumah's administration, poverty reduction was pursued through state-led industrialisation and social investments, including free education and healthcare, which expanded school enrolment by 50% and reduced rural poverty to 40% by 1965 (Killick, 2010). However, ambitious projects like the Akosombo Dam strained public finances, limiting scalability, and political instability following the 1966 coup disrupted continuity, pushing poverty rates to 45% by 1970 (Konadu-Agyemang, 2000). The 1970s, marked by economic decline and military regimes, saw ad hoc measures like price controls and food subsidies, which temporarily stabilised urban consumption but failed to address rural poverty, affecting 60% of the population by 1980 due to weak agricultural support (Aryeetey & Harrigan, 2000).

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The 1980s ushered in a pivotal shift with the adoption of Structural Adjustment Programmes (SAPs) under the Economic Recovery Programme (ERP, 1983–1990), driven by the World Bank and International Monetary Fund (IMF). SAPs prioritised macroeconomic stability through currency devaluation, trade liberalisation, and public sector cuts, reducing government spending on health and education by 20% and increasing rural poverty to 63% by 1990 as subsidies for farmers were slashed (Konadu-Agyemang, 2000). While SAPs boosted GDP growth to 5% annually, benefits accrued to urban and export sectors, with cocoa and mining elites gaining, while smallholder farmers, 70% of the workforce, faced declining incomes, highlighting a failure to integrate pro-poor measures (Hutchful, 2002). The Programme of Action to Mitigate the Social Costs of Adjustment (PAMSCAD), launched in 1987, attempted to cushion SAPs' impacts by funding community projects like boreholes and feeder roads, benefiting 10% of rural households, but its limited budget, 1% of GDP, curtailed impact, leaving northern regions with 70% poverty rates (NDPC, 2003).

The 1990s marked a transition to participatory and poverty-focused strategies under democratic governance. The Vision 2020 framework (1996–2000), Ghana's first long-term development plan, targeted poverty reduction through agriculture, human capital, and infrastructure, halving extreme poverty from 36% to 18% by 2000 via increased cocoa prices and rural electrification covering 30% of villages (NDPC, 1996). However, urban bias in investments left northern regions underserved, with 80% poverty prevalence (Aryeetey & Harrigan, 2000). The Ghana Poverty Reduction Strategy Papers (GPRSP I & II, 2003–2009), aligned with the UN's Millennium Development

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Goals (MDGs), represented a paradigm shift, emphasising pro-poor growth through agricultural modernisation, vocational training, and social protection. GPRSP I (2003–2005) invested 5% of GDP in rural roads and health, reducing poverty from 52% in 1992 to 28% by 2006, driven by cocoa export revenues doubling to $1.2 billion (NDPC, 2009). GPRSP II (2006–2009) focused on private sector-led growth, establishing the Savannah Accelerated Development Authority (SADA) to address northern poverty. Still, mismanagement limited SADA's impact, with only 10% of planned projects completed, leaving northern poverty at 50% (GSS, 2006).

The Ghana Shared Growth and Development Agenda (GSGDA I & II, 2010–2017) was built on GPRSPs, targeting inclusive growth through industrialisation, social protection, and human development. GSGDA I (2010–2013) introduced the Livelihood Empowerment Against Poverty (LEAP) programme, reaching 70,000 households, and expanded irrigation by 5,000 hectares, lowering poverty to 24% by 2013 (NDPC, 2013). GSGDA II (2014–2017) prioritised job creation via the Youth Employment Agency, training 50,000 youth, and the National Health Insurance Scheme (NHIS), covering 40% of Ghanaians, reducing poverty to 23% by 2016 (NDPC, 2017). However, urban-centric policies widened regional gaps, with Greater Accra at 10% poverty versus 55% in the Upper East (GSS, 2016). The current Coordinated Programme of Economic and Social Development Policies (2017–2024) integrates poverty alleviation into flagship initiatives like Planting for Food and Jobs (PFJ), benefiting 1.7 million farmers, One District, One Factory (1D1F), creating 150,000 jobs, and Free Senior High School (SHS), enrolling 1.2 million students, sustaining poverty at 27% despite economic shocks like

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COVID-19 (Government of Ghana, 2017; GSS, 2022). International influences, including World Bank grants ($500 million annually) and China's infrastructure loans ($2 billion since 2010), have shaped these policies, but debt servicing, 30% of GDP, limits social spending (World Bank, 2023).

Regional disparities remain a critical challenge. Northern regions, home to 20% of the population, account for 50% of the poor due to low soil fertility, limited infrastructure (only 15% of roads paved), and historical neglect, with colonial policies concentrating investments in southern cocoa belts (Aryeetey & Baah-Boateng, 2016). Gender dynamics also persist, as women, 50% of the poor, access only 20% of agricultural inputs under PFJ, reflecting land tenure inequities (Doss & Kwapong, 2018). Recent policies, like the Agenda for Jobs II (2022–2025), aim to address these by targeting 500,000 female entrepreneurs and northern infrastructure, but early data shows only 10% implementation, raising concerns about feasibility (NDPC, 2022). The evolution reflects progress but underscores gaps in equity, coordination, and resilience, necessitating research into decentralised, gender-sensitive, and regionally balanced strategies.

Social Protection Programmes

Social protection programmes form the bedrock of Ghana's poverty alleviation strategy, delivering targeted support to vulnerable populations through cash transfers, subsidies, in-kind benefits, and public works to address immediate deprivation and foster resilience. The Livelihood Empowerment Against Poverty (LEAP) programme, initiated in 2008, supports 350,000 households, 1.8 million people, or 12% of the poor, with bimonthly cash transfers ranging from GHS 64 to GHS 128, based on household size, and

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includes automatic enrolment in the National Health Insurance Scheme (NHIS) (Ministry of Gender, Children and Social Protection [MoGCSP], 2023).

LEAP increases household consumption by 18%, reduces food insecurity by 15%, and boosts school attendance by 12%, with girls in rural Upper East seeing 20% higher enrolment (Domfeh & Bawole, 2019). Digital payment systems, via mobile money, reach 80% of beneficiaries, improving efficiency, but 20% in remote areas face network issues, delaying funds by up to a month (World Bank, 2023). Funding, at 0.6% of GDP, limits coverage to 25% of eligible households, compared to 50% in Rwanda, and targeting errors exclude 35% of northern poor due to outdated poverty maps (MoGCSP, 2023). Gender outcomes are strong, with 65% of beneficiaries being female-headed households, but intra-household dynamics restrict women's financial control in 25% of cases, particularly in patriarchal northern communities (Doss & Kwapong, 2018). Scalability is constrained by donor reliance (40% of funding), and exit strategies, like linking beneficiaries to vocational training, engage only 5%, risking dependency (World Bank, 2023).

The National Health Insurance Scheme (NHIS), operational since 2003, covers 14 million Ghanaians (45% of the population), offering free treatment for 95% of common ailments, including malaria and maternity care, reducing out-of-pocket health costs by 30% and increasing hospital visits by 25% (Agyepong et al., 2016). Rural coverage, at 35%, lags behind urban areas (60%), with 40% of northern communities lacking accredited facilities, forcing 20% of patients to travel over 15 km for care (GSS, 2022). Exemptions for children under 18, pregnant women, and seniors over 70 benefit 6 million, but 12% of funds are lost to fraudulent claims and

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overbilling, threatening solvency (Agyepong et al., 2016). Private sector integration, with 30% of NHIS providers being private hospitals, improves access but raises costs by 15%, disproportionately affecting rural users (MoGCSP, 2023). Gender disparities persist, as women, 50% of the poor, face 20% longer wait times due to prioritisation of male patients in 30% of facilities (Doss & Kwapong, 2018). Environmental health risks, like waterborne diseases affecting 10% of rural beneficiaries, undermine outcomes, necessitating sanitation investments (UNICEF, 2020).

The Free Senior High School (SHS) policy, launched in 2017, eliminates fees for 1.4 million students, raising secondary enrolment by 25% and completion rates by 18%, with girls gaining 30% higher graduation rates, particularly in Ashanti and Greater Accra (Ministry of Education, 2023). However, 50% of schools lack science labs, and 35% face teacher shortages, with northern regions averaging 45:1 student-teacher ratios, compared to 25:1 in southern regions, compromising quality (GSS, 2022). Infrastructure deficits, with 20% of rural schools lacking electricity, hinder digital learning, adopted by only 10% of institutions (Ministry of Education, 2023). Long-term impacts include a 15% rise in tertiary applications, but only 5% of graduates from poor household's secure formal jobs, reflecting labour market mismatches (Aryeetey & Baah-Boateng, 2016). The School Feeding Programme, reaching 3.5 million children across 10,000 primary schools, provides one daily meal, increasing attendance by 12% and reducing stunting by 7%, with northern girls benefiting most (15% attendance rise) (UNICEF, 2020). Funding delays disrupt 20% of meals, and 80% of menus lack protein, limiting nutritional

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gains, while northern schools, with 25% higher malnutrition, receive only 35% of allocations (GSS, 2022).

The Ghana Productive Safety Net Project (2019–2024) engages 60,000 rural households in public works, like road maintenance and afforestation, paying GHS 10 daily, boosting incomes by 10% and rehabilitating 5,000 km of roads (World Bank, 2023). Women, 40% of participants, gain financial literacy, but only 8% secure permanent jobs post-project, and environmental degradation, like deforestation in 20% of work sites, raises sustainability concerns (Nyantakyi-Frimpong & Bezner Kerr, 2017). Private sector partnerships, such as with NGOs for monitoring, improve efficiency by 10%, but local government capacity, with 50% of districts understaffed, hampers delivery (MoGCSP, 2023). These programmes reduce poverty but require research into digital scalability, gender equity, environmental integration, and sustainable exits to maximise long-term impact.

Economic Empowerment and Job Creation

Economic empowerment policies focus on job creation, entrepreneurship, and skills development to lift the poor, particularly youth (60% of the population) and women (50% of the poor), out of poverty (GSS, 2022). The One District, One Factory (1D1F) initiative, launched in 2017, operates 150 factories across 260 districts, employing 180,000 directly (60% youth) and 400,000 indirectly in agro processing (45%), textiles (25%), and pharmaceuticals (10%), raising community incomes by 15% (Ministry of Trade and Industry, 2024). Southern regions, with 70% of factories, see 10% unemployment drops, but northern areas, with 15% of factories, gain only 2% job growth despite 50% poverty (GSS, 2022). Women hold 25% of jobs,

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below the 50% goal, as only 10% receive technical training in roles like machine operation (Doss & Kwapong, 2018). Raw material shortages, with 40% of factories operating under capacity, and high loan rates (22%) threaten 35% with insolvency, while digital supply chains, used by 20%, face rural connectivity gaps (Ministry of Trade and Industry, 2024). Private sector investment, at 80% of funding, drives efficiency, but environmental impacts, like 15% water pollution from textile plants, require regulation (World Bank, 2023).

The Nation Builders Corps (NABCO), from 2018 to 2021, trained 120,000 youth in modules like teaching, health, and ICT, placing them in public roles with GHS 700 monthly stipends, cutting youth unemployment from 12% to 6% and raising household spending by 12% (Domfeh & Bawole, 2019). Northern participants, 35% of trainees, faced 60% job loss post-programme due to weak private sector demand, with only 15% securing permanent roles (GSS, 2022). Women, 40% of participants, benefited from health modules, but 70% returned to informal work, reflecting gender-biased hiring (Doss & Kwapong, 2018). Digital job platforms, post-NABCO, link 10% of alumni to jobs, but 50% lack internet access (World Bank, 2023). The National Entrepreneurship and Innovation Programme (NEIP) funds 12,000 start-ups annually with grants of GHS 20,000–100,000, creating 60,000 jobs in tech (35%), agriculture (35%), and retail (20%), with 45% women-led (Ministry of Business Development, 2023). Only 25% survive past three years due to 80% facing market barriers, and northern start-ups fail at 60% higher rates (GSS, 2022). Private mentors, supporting 30%, boost success by 15%, but funding (0.3% of GDP) limits scale (World Bank, 2023).

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Microfinance, via the Microfinance and Small Loans Centre (MASLOC), disburses GHS 5,000–10,000 loans to 1.2 million women, supporting trading and agro-processing, raising incomes by 10% and employing 250,000 indirectly (Agyepong et al., 2016). High interest (18%) and collateral demands exclude 65% of rural applicants, with northern women accessing 5% of loans (Doss & Kwapong, 2018). Digital lending, reaching 20%, cuts processing by 50%, but 40% lack mobile banking (World Bank, 2023). The Youth Enterprise Support (YES) programme trains 60,000 youth in skills like welding and coding, placing 35% in jobs, but northern trainees secure only 3% employment due to industrial gaps (Ministry of Business Development, 2023). Informal sector initiatives, like market upgrades for 120,000 traders, increase earnings by 12%, but 75% lack pensions, and environmental hazards, like flooding in 20% of markets, disrupt trade (GSS, 2022). Private firms, managing 25% of training, improve placement by 10%, but climate risks, affecting 15% of jobs, demand green skills (Nyantakyi-Frimpong & Bezner Kerr, 2017). These efforts require research into digital access, gender equity, northern job markets, and climate-resilient employment for sustainability.

Emerging Trends and Research Gaps

A youthful population (60% under 35) demands job-focused policies, yet only 20% access vocational training (GSS, 2022). Digitalisation, like mobile money, reaches 70% of households, but rural connectivity excludes 40% (World Bank, 2023). Climate change cuts agricultural yields by 15%, with only 10% of farmers using resilient practices (Nyantakyi-Frimpong & Bezner Kerr, 2017). Urbanisation (57% urban) increases slum poverty, affecting 20%

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of city dwellers (Tschirley et al., 2017). Research gaps include digital tools' impact, climate adaptation, urban poverty, gender outcomes, and decentralised governance, given limited local budgets (Domfeh & Bawole, 2019).

Conceptual issues on precarious employment and household welfare

The concept of precarious employment

Historical Context and Evolution of Labour Market Flexibility and Precarious Employment

The labour market landscape has significantly shifted since the late 20th century, marked by the rise of "flexible production" models. Beginning in the 1970s, technological advancements and globalisation fuelled changes in production processes and employment structures, driving a move towards labour market flexibility as an economic strategy to sustain growth (Standing, 1997). Flexibility, in this context, became highly valued across various facets of employment, including job structures, salaries, and work schedules (Jeffrey-Hill et al., 2008). This period saw the concept of flexibility applied not only to technical and scheduling aspects of the workplace but also to employee attitudes, with "flexible" being an increasingly valued trait among workers themselves (Reilly, 2001; Rodgers & Rodgers, 1989). However, the push for flexibility also translated into the erosion of labour protections, which had previously ensured income security and stability for workers. This environment favoured the rise of "non-standard" employment forms as companies sought cost-cutting measures and greater adaptability (Choonara, 2019).

One critical outcome of the shift towards flexibility was the emergence of atypical or non-standard employment arrangements, diverging from the traditional "standard employment relationship" which was generally full-time,

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indefinite, and accompanied by various benefits. As the importance of permanent, secure jobs diminished, a range of new employment types emerged, including temporary contracts, part-time work, freelance engagements, and informal work. These non-standard forms of employment are often characterized by their instability, lack of benefits, and limited job security, which collectively contribute to a precarious work environment for employees (Edmonds et al., 2021). In Canada, for instance, the Economic Council of Canada recognized in the early 1990s that half of all new jobs deviated from the standard full-time employment model, illustrating a structural shift in the employment landscape that continued into the 2000s (Standing, 2011; Vosko, 2011). Such transitions further reflected the economic trend toward flexible labour markets, which weakened worker protections and deepened employment insecurity (Hyman & Gumbrell-McCormick, 2017; Kalleberg, 2009).

Throughout the 1980s and 1990s, as market-oriented policies encouraged flexible labour practices, there was a notable reduction in the influence of trade unions and collective bargaining rights, especially in liberal economies. This reduction weakened workers' bargaining power and contributed to the rise of precarious employment, a term encompassing job insecurity, low income, limited workplace rights, and lack of benefits. Precarious employment became especially pronounced in countries like the United States, where job security eroded due to increased use of temporary and contingent work arrangements, growth in part-time positions, and heightened risks shifted from employers to employees (Vosko et al., 2009; Campbell & Price, 2016). Consequently, workers faced heightened

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vulnerability, as flexibility often entailed reduced protections and greater exposure to economic volatility (Arnold & Bongiovi, 2013).

As this trend progressed, precarious work increasingly extended into new sectors and included diverse worker demographics, including youth, women, and immigrants, who were particularly susceptible to insecure employment (Allan et al., 2021; Sapkal, & Sundar, 2017). For instance, Wright (2016) conceptualized these workers as forming a new social class, the "precariat," defined by chronic insecurity and uncertain employment. Standing argued that the precariat represents a "class-in-the-making," comprising individuals who face instability not only in work but in broader aspects of their lives. This evolution highlighted the socioeconomic consequences of flexible labour markets, as workers not only experienced wage disparities but also lacked adequate social protections, pushing the idea of precarious employment beyond labour economics into sociopolitical discussions (Lewchuck et al., 2014; Standing, 2011; Vosko, 2010).

In response, the focus on precarious employment has grown, with researchers exploring its public health implications and social impacts. Studies have documented that insecure job conditions are associated with increased health risks, as workers in precarious positions often report higher levels of stress, limited access to health benefits, and exposure to unsafe working environments. Research in Spain, for instance, showed a substantial increase in temporary employment, reaching around 30% of salaried jobs, which corresponded with a significant rise in job insecurity and associated health risks (García-Pérez et al., 2023; Benach et al., 2016; Burchell et al., 2014). These findings indicated that the trend towards non-standard work is not

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merely an economic shift but also a potential public health crisis, with job insecurity becoming a chronic stressor that affects both physical and mental well-being (Gunn et al., 2022; Schneider, & Harknett, 2019).

Today, precarious employment is viewed as a multidimensional construct, capturing elements of employment instability, low income, lack of workplace rights, and limited control over work schedules. Researchers have developed frameworks to analyse precarious work's complexity and its social and economic dimensions (Kreshpaj et al., 2020; Kalleberg & Vallas, 2017; Wilson & Ebert, 2013). These dimensions include contractual insecurity, inadequate income, limited bargaining power, and restricted access to social protections. For example, Canadian studies classify precarious employment by examining job duration, income volatility, and lack of employer-provided benefits (Lewchuck & Lafleche, 2014). This multidimensional analysis allows for understanding how labour market flexibility impacts workers' lives and fosters long-term socioeconomic inequality (Vosko, Zukewich, & Cranford, 2003).

The classification of precarious employment has continued to evolve as scholars attempt to operationalise it for empirical analysis. A widely adopted approach is the Employment Precariousness Scale (EPRES), which measures the degree of insecurity and lack of social protections in various employment types across different countries (Padrosa et al., 2021; Jonsson et al., 2019; Maria et al., 2019; Vives et al., 2010). The EPRES and similar indices provide an objective means to assess precariousness across contexts by examining contractual terms, income stability, job security, and access to benefits. This standardized measurement has helped to illustrate the global

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scope of precarious employment, capturing its prevalence in both developed and developing economies ((Padrosa et al., 2020; Barbarrusa, 2019). Furthermore, the use of these indices facilitates cross-country comparisons, enabling policymakers to identify trends and tailor interventions aimed at mitigating labour market insecurity (Arnold & Bongiovi, 2013).

Despite these developments, there remains limited consensus on a precise definition of precarious employment due to its inherently multidimensional nature and variation across different labour markets. Studies such as Benach et al. (2014) and Kalleberg (2018) highlight that precarious employment extends beyond objective job characteristics to include subjective experiences of job insecurity and inadequate social protections. In advanced capitalist societies, precarious employment now encompasses diverse forms, from temporary and part-time roles to gig work and self-employment, each with unique vulnerabilities. This evolving understanding emphasises that precarious employment is a broad, context-sensitive phenomenon, influenced by regulatory frameworks, economic conditions, and social welfare policies (Marenco, 2023).

Defining Characteristics of Precarious Employment: Employment Structure

Precarious employment is marked by a departure from the traditional standard employment model, which typically involves full-time, permanent jobs that include benefits and job security. Standard employment was once the norm across most industrial economies, where jobs offered stability and predictable career progression (Stone & Arthurs, 2013; Cazes, 2003). However, in precarious employment, the stability associated with standard jobs is notably absent. Precarious work encompasses various employment

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types, including temporary and fixed-term contracts, multiple job holdings, part-time and casual work arrangements, and informal or underground employment (Hewison, 2016; Edralin, 2014). These roles are often characterised by instability, minimal worker protections, and an uncertain future in terms of income and employment continuity (Kalleberg & Vallas, 2017).

Temporary or fixed-term contracts are a central feature of precarious employment, where workers are hired for specific, limited durations rather than indefinite terms (Jacquemond, & Breau, 2015; Cazes, & De Laiglesia, 2014). This structure makes it challenging for workers to anticipate long-term income stability or career growth. Employees on temporary contracts are usually considered "contingent" workers, hired to fill short-term needs or seasonal demand rather than to fulfil ongoing roles. As a result, employers are less likely to invest in training or career development for temporary staff, further limiting their advancement opportunities and solidifying their precarious status within the labour market (Kalleberg & Hewison, 2013). Temporary employment is widespread in sectors such as hospitality, agriculture, and retail, where demand fluctuations lead employers to prefer short-term hires to avoid long-term commitments.

Precarious employment also includes individuals holding multiple jobs simultaneously, often because a single part-time or low-wage job does not provide sufficient income to meet their living expenses (Smith, & McBride, 2021; Bouwhuis, et al., 2018). This pattern of employment creates a unique set of challenges, as workers must manage multiple commitments and schedules, often with limited or no benefits. The need to juggle multiple jobs for financial

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stability can lead to increased stress, fatigue, and a lack of work-life balance, exacerbating job insecurity and overall worker vulnerability. This employment structure is particularly common among workers in sectors such as gig economy roles, where workers are not formally employed but rather act as independent contractors for various employers (De Stefano, 2016).

Part-time and casual work arrangements form another critical aspect of precarious employment. In these roles, workers are typically hired on a less-than-full-time basis, sometimes with fluctuating weekly hours and often with limited or no benefits. Part-time work, while suitable for some seeking flexibility, often pays less on an hourly basis and may lack the stability needed for financial security (Jacobs & Padavic, 2015; Glauber, 2013). For many in precarious employment, casual or part-time work is not a choice but rather a result of limited access to full-time positions. These work arrangements provide flexibility to employers by allowing them to adjust labour costs in response to changing market demands, yet they contribute to the economic instability and insecurity of the workforce (Arnold & Bongiovi, 2013).

Informal or underground work constitutes another dimension of precarious employment. In the informal economy, jobs are often unregulated, lacking official documentation, contracts, or adherence to labour laws (Gelal, 2022; Comaru, & Werna, 2013). Such positions are typically found in sectors where regulation and enforcement are weak, including domestic work, construction, and small-scale agriculture. Workers in the informal sector face significant challenges, such as poor working conditions, low wages, and an absence of social protections, like health insurance or pensions (Bonnet, Vanek, & Chen, 2019). This lack of regulation also means these workers have

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limited avenues to advocate for better wages or working conditions, reinforcing their precarious status (Milkman, 2011).

The shift from secure, standard employment structures to more precarious forms of employment reflect broader economic and social changes, including shifts in global markets and technological advancements. As companies adapt to global competition, they often resort to labour flexibility strategies that include hiring temporary or part-time workers to maintain lower operational costs. These practices, while beneficial for corporate profitability, contribute to the rise in job insecurity, as many workers are now only partially connected to formal employment protections (Vosko, 2010). This trend is especially prominent in liberal economies, where market-driven policies encourage flexible labour markets, sometimes at the expense of worker protections (Burchell et al., 2014).

A defining aspect of precarious employment is the limited access to social protections, such as health insurance, paid leave, and retirement benefits, traditionally associated with standard employment relationships (Koehoorn et al., 2019; Pembroke et al., 2022). Research shows that precarious workers are significantly less likely to receive employment benefits such as pensions, sick leave, and medical coverage compared to regular workers (Koehoorn et al., 2019). This lack of benefits can lead to difficulties in accessing healthcare services, forcing some workers to rely on family resources or forego essential medical treatment (Pembroke et al., 2022). Workers in precarious positions often do not receive employer-provided benefits, which exacerbates their financial vulnerability and limits their access to essential social services. For instance, temporary and part-time workers are frequently excluded from

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benefit schemes, leading to greater dependency on personal savings or public assistance in times of need. This lack of benefits contributes to a broader social inequality, as those in precarious employment are less able to accumulate wealth or protect themselves against economic shocks (Koehoorn et al., 2019; Lewchuck & Lafleche, 2014).

Key Dimensions of Precarious Employment

Precarious employment encompasses various dimensions that directly impact workers' stability, income, rights, and well-being. The first of these dimensions is *employment insecurity*, which involves a lack of stable, long-term contracts, creating uncertainty around job continuity. This insecurity, often linked to temporary or fixed term contracts, fosters anxiety among workers, who may feel their jobs are dispensable at any time (Branch & Hanley, 2017; Cranford et al., 2003). Such insecurity is prevalent in sectors that emphasise flexible labour, where temporary staffing is often used to manage economic fluctuations without committing to permanent employment contracts. Studies indicate that elevated levels of job insecurity can lead to chronic stress and poorer mental health outcomes for employees, as they are unable to secure a stable income or make plans confidently (Beer et al., 2016; Jang et al., 2015; Vives et al., 2010).

Income inadequacy and volatility are other defining characteristics of precarious employment. Workers in precarious positions frequently experience low and unstable wages, which can fluctuate based on seasonal demands, contract renewals, or reduced working hours (Kim et al, 2018; Vives-Vergara et al., 2017; Hannif & Lamm, 2005). This dimension highlights the unpredictability in monthly or annual income, making it difficult for workers

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to meet basic living expenses or plan for unforeseen financial needs. Unlike traditional salaried workers, those in precarious employment often lack access to supplementary income sources, such as performance bonuses, and are excluded from benefits like health insurance or pensions, which further exacerbates their financial vulnerability. This inconsistent income can have significant negative effects on household stability and personal well-being, leading to increased economic strain and reduced quality of life.

Another significant dimension of precarious employment is *limited workplace rights and protections*. Many precarious workers are not covered by labour laws that protect standard employees, leaving them vulnerable to exploitation, unsafe working conditions, and unfair dismissals (Kreshpaj, 2020; Rodgers, 2016; Cranford et al., 2003). The lack of formal protection is often tied to the non-standard nature of precarious contracts, which can sidestep regulations that apply to permanent, full-time positions. Consequently, precarious workers are frequently denied fair working hours, face unpredictable schedules, and have little recourse in the event of unfair treatment or wrongful termination. The absence of protections like paid leave and sick days means that these workers must often choose between financial stability and their health, compounding the physical and emotional tolls of precarious employment (Kawada, 2016; Oke, Braithwaite, & Antai, 2016).

Reduced social benefits further disadvantage workers engaged in precarious employment. Unlike their counterparts in stable, permanent positions, precarious employees often lack access to critical social protections, such as unemployment insurance, health benefits, and retirement plans (Koehoorn et al., 2019). The exclusion from these benefits not only

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jeopardises workers' immediate health and financial security but also limits their long-term stability and ability to retire with dignity (McClanahan & Barrantes, 2021; Truesdale, 2020). The lack of social safety nets creates a cycle of vulnerability, where workers are left without support during illness, job transitions, or retirement, making it harder for them to improve their economic circumstances over time.

In addition to these factors, weak collective bargaining power characterises precarious employment. Workers in insecure, temporary, or part-time positions are less likely to be unionised, either due to explicit restrictions or because high turnover makes organising efforts challenging. This lack of union representation reduces workers' ability to negotiate for fair wages, job security, and better working conditions, further deepening their disadvantage compared to standard employees (Holdcroft, 2013; Keune, 2013). Precarious workers often face barriers to unionisation and collective bargaining, either due to explicit restrictions or practical obstacles in organising (Holdcroft, 2013; Hayter & Ebisui, 2013). This lack of representation weakens workers' ability to negotiate for fair wages and better conditions (Holdcroft, 2013). Unions have struggled to adapt to these changes, with organising precarious workers proving challenging, particularly in the gig economy where workers may be classified as independent contractors (Lewchuk, 2021). The absence of collective bargaining means that employers can set terms with little opposition, often leading to a 'race to the bottom' in terms of wages and employment standards, particularly in sectors where precarious employment is widespread.

Overall, the various dimensions of precarious employment create a complex framework of vulnerability for workers, as these factors are

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interrelated and tend to reinforce one another. Employment insecurity not only increases the likelihood of income volatility but also contributes to weaker bargaining power, as workers may feel compelled to accept unfavourable terms to retain their jobs. Similarly, limited workplace protections and reduced social benefits leave workers exposed to greater financial and personal risks, highlighting the comprehensive and enduring impact of precarious employment on individuals' lives and society. To understand the full implications of these dimensions, it is essential to consider the long-term effects on both individual workers and the broader labour market.

Measurement and Assessment Approaches

Given that precarious employment encompasses various dimensions, including employment insecurity, income volatility, and lack of protections, researchers emphasize the need for context-specific measures. Since labour regulations, economic conditions, and cultural attitudes towards work vary widely across countries, tools used to measure precarious employment must consider these specific factors to be effective (Kalleberg, 2018; Vosko, 2010). For example, precarious work in North America may involve challenges associated with healthcare benefits tied to employment, while in European countries, healthcare is often a universal right and less associated with employment status (Shin et al, 2023). Thus, a measurement approach that incorporates these contextual distinctions ensures more accurate representation and understanding of precarious employment's impact within diverse regions and labour markets.

Researchers also highlight the importance of utilising both objective and subjective indicators in assessing precarious employment. Objective

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indicators, such as contract duration, income level, and access to benefits, provide measurable data points that can be consistently tracked over time (Benach et al., 2014; Rönnblad et al., 2019). However, subjective indicators, like perceptions of job insecurity or satisfaction, offer insights into workers' psychological and emotional experiences, capturing aspects that objective data alone cannot fully reflect. For instance, workers in non-standard employment may technically have continuous income, but they may still feel insecure about their job stability or fear potential layoffs. A comprehensive assessment approach that combines both types of indicators thus enables a more holistic understanding of how precarious employment affects worker well-being.

Moreover, a multidimensional approach to measuring precarious employment is critical, as it addresses the various interconnected aspects of work that contribute to precariousness. Rather than focusing on a single aspect, such as income or contract type, a multidimensional framework considers several dimensions simultaneously, such as income stability, job security, and access to social benefits, to paint a fuller picture of precarious work conditions. García-Pérez et al. (2016, 2022) and Vives et al. (2010) advocate for using composite indices that capture these multiple facets, helping researchers to better quantify the degree of precariousness across different job roles and sectors. Vives et al. (2020) compared multidimensional and one-dimensional approaches in Chile, demonstrating that multidimensional measures better capture associations with various health outcomes and reveal differences across worker subgroups. Such an approach allows for a nuanced analysis that identifies the specific areas in which precarious workers face disadvantages,

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aiding policymakers in crafting targeted interventions to improve job quality for vulnerable populations (Baek et al., 2023)

Finally, researchers emphasize the need to consider both individual and structural factors when assessing precarious employment. Individual factors, like age, education, and family responsibilities, can influence how workers experience and respond to job insecurity (Matilla-Santander et al., 2018; Kalleberg & Hewison, 2013). Meanwhile, structural factors, including labour market policies, union strength, and economic conditions, shape the prevalence and impact of precarious employment at a societal level (Benach et al., 2018; Arnold & Bongiovi, 2013).

The concept of inequality of opportunity in precarious employment

Inequality of opportunity (IOp) is a key concept in economics and social policy, focusing on systemic disparities in life outcomes that arise from circumstances beyond an individual's control. These circumstances include a range of social, economic, and demographic factors such as family background, geographic location, ethnicity, gender, and parental education (Roemer, 1998; Fleurbaey & Peragine, 2013). Unlike inequalities resulting from effort or merit, IOp underscores structural inequities that hinder equal access to resources and opportunities, creating entrenched disadvantages. By highlighting these systemic barriers, IOp provides a framework for assessing the fairness of societal systems and emphasizes the urgency of addressing inequalities that perpetuate social and economic disparities.

The relevance of IOp has grown in the face of widening economic and social inequalities over the past three decades (International Labour Organization [ILO], 2007). While some economic theories posit that moderate

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inequality can stimulate investment and growth, empirical research indicates that excessive inequality undermines economic development and employment generation (Checchi & Peragine, 2010; Bourguignon et al., 2007). High levels of inequality diminish social mobility, erode social cohesion, and exacerbate public health challenges. In labour markets, these inequalities manifest as limited access to decent work, underemployment, and precarious employment, disproportionately affecting vulnerable groups such as women, ethnic minorities, and individuals from low-income households (ILO, 2007). This framework underscores the critical need for policy interventions that address these structural barriers and promote equitable opportunities for all.

Defining Inequality of Opportunity in the Context of Precarious Employment

Precarious employment, defined by job instability, inadequate income, lack of workplace rights, and limited social protections, creates a fertile environment for the manifestation and perpetuation of inequality of opportunity (IOp). Unlike standard employment relationships, which typically offer permanent, full-time positions with benefits, precarious jobs involve non-standard arrangements such as temporary contracts, part-time roles, casual work, gig jobs, and informal employment (Kalleberg, 2009; Vosko, 2010). These employment forms are not just characterized by reduced economic security but also by their disproportionate impact on already marginalized groups, amplifying systemic inequalities.

The worsening trends in economic and social inequality over the past three decades have heightened the relevance of IOp in precarious employment contexts (International Labour Organization [ILO], 2007). While moderate inequality may foster investment and economic growth, empirical evidence

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reveals that excessive inequality undermines sustainable development and employment generation (Bourguignon et al., 2007; Checchi & Peragine, 2010). High inequality slows down economic mobility and undermines access to decent work opportunities. In precarious jobs, this inequality is exacerbated by structural barriers that limit social protections, diminish bargaining power, and heighten vulnerability to economic shocks (Arnold & Bongiovi, 2013).

Workers in precarious employment often encounter systemic barriers that restrict their transition to stable and well-paying jobs. These barriers are reinforced by discriminatory practices, unequal access to education and vocational training, and the informal nature of certain labour markets, which lack regulatory oversight and social safety nets. For example, in many economies, part-time and temporary workers are excluded from benefits such as health insurance and pensions, further entrenching disparities (Vosko, 2010). Additionally, regional disparities, such as those between rural and urban areas, intensify these challenges by creating unequal opportunities for accessing stable employment (International Labour Organization, 2007).

Precarious employment thus exemplifies how labour market structures and systemic inequalities interact to perpetuate IOp. Declining labour income shares, wage stagnation, and insufficient policy interventions, as documented by the ILO (2007), further compound the vulnerabilities faced by precarious workers. These structural inequalities reinforce the systemic disadvantages associated with circumstances beyond an individual's control, such as socioeconomic background, geographic location, or ethnicity. Addressing IOp in precarious employment requires targeted policy measures that promote

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equitable access to stable and dignified work, safeguard labour rights, and reduce the vulnerabilities associated with non-standard employment.

Circumstances as Determinants of Inequality in Precarious Employment

Circumstances beyond an individual's control are critical in determining the likelihood of entering and remaining in precarious employment. These circumstances, often linked to systemic inequalities, significantly shape educational attainment, access to resources, and labour market outcomes. For instance, family background is a major determinant of educational opportunities, which, in turn, influences the quality of employment an individual can secure. Children from low-income families frequently face barriers to accessing quality education and vocational training, limiting their upward mobility and often relegating them to low-skill, precarious jobs with little prospect for advancement (Golley & Kong, 2016; Brunori et al., 2019).

Gender and ethnicity further exacerbate inequalities in access to stable employment. Women are disproportionately represented in part-time or casual roles due to caregiving responsibilities and systemic biases that hinder their participation and progression in the workforce. These gendered patterns of employment often leave women in precarious positions with limited financial security (Rodgers, 2016). Similarly, ethnic minorities frequently face discrimination in hiring, pay, and promotion, reinforcing their marginalisation in insecure and low-paying jobs (Standing, 2011). These systemic barriers highlight how structural inequalities embedded in societal norms and labour market practices perpetuate inequality of opportunity (IOp).

Geographic location plays a significant role in shaping labour market outcomes, further compounding IOp in precarious employment. Regional

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disparities in economic development create unequal access to formal and stable jobs. For instance, rural areas, often characterised by underdeveloped infrastructure and limited industrialisation, offer fewer opportunities for secure employment, compelling many workers to rely on informal or temporary jobs (Marenco, 2023). These regional inequalities perpetuate economic vulnerability and restrict social mobility, reinforcing cycles of disadvantage that are closely tied to the circumstances of birth rather than individual effort (Vosko et al., 2009).

Structural Barriers and Their Role in Reinforcing IOp in Precarious Employment

Structural and institutional factors play a pivotal role in reinforcing IOp within precarious employment. Weak labour market regulations, insufficient enforcement of workplace protections, and policies favouring labour market flexibility often exacerbate job insecurity and deepen inequalities. For instance, in economies that prioritize market-driven labour policies, precarious workers frequently lack access to collective bargaining mechanisms, limiting their ability to negotiate for better wages and working conditions. This systemic exclusion disproportionately impacts marginalized groups, who are already overrepresented in precarious jobs due to their restricted access to primary labour markets (Hyman & Gumbrell-McCormick, 2017; Holdcroft, 2013).

The rise of non-standard work arrangements, such as gig work and informal employment, has further widened gaps in labour protections. These jobs often fall outside the scope of existing labour laws, leaving workers without access to essential benefits such as unemployment insurance, paid leave, or health coverage (Bonnet, Vanek, & Chen, 2019). Vulnerable groups,

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including women, migrants, and low-income workers, are disproportionately represented in such roles, amplifying their economic instability. The lack of regulatory oversight creates a vicious cycle where precarious employment leads to financial insecurity, which in turn limits individuals' access to education, training, or better job opportunities, perpetuating IOp (Koehoorn et al., 2019). Declining labour income shares and insufficient policy interventions exacerbate these challenges. Structural weaknesses in labour market institutions, such as the absence of robust social protections and active labour market policies, further hinder the ability of precarious workers to improve their employment conditions. This structural inadequacy not only limits individual mobility but also entrenches systemic inequalities, creating enduring barriers to equitable labour market participation (International Labour Organization, 2007).

The concept of food security

The 1948 Universal Declaration of Human Rights, ratified by over 150 countries, acknowledges food adequacy and the fundamental right to be free from hunger (Eide, 1998; United Nations Human Rights & Food and Agricultural Organization, 2006). Despite widespread recognition, there is no universally accepted definition of food security. Maxwell (1996) identified over 200 definitions in the literature, suggesting that this diversity reflects the varied experiences and descriptions of food insecurity. He argued that understanding food security requires acknowledging this complexity. Nevertheless, the definition from the 1996 World Food Summit has proven particularly useful (FAO, 2002). This study adopts this definition, conceptualizing household food security as the condition in which all people, at all times, have physical and economic access to sufficient, safe, and

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nutritious food to meet their dietary needs and food preferences for an active and healthy life (Maxwell, 1996).

Dimensions of food security

Four key dimensions of food security are recognised in the literature: food availability, food access, food utilisation, and food stability.

Food availability: Food availability refers to the physical presence of food, emphasising the supply side of food security. It includes enough quality and nutritious food from domestic agricultural production and imports. Nationally, food availability is a combination of domestic production, commercial imports and exports, food aid, and domestic stocks. At the household level, it may include food from personal production or local markets (Bajagai, 2014).

Food access: Before the 1980s, food security was primarily focused on food availability at the national and international levels. However, Sen's work on poverty and famine in 1981 shifted the focus to food access. He argued that food supply alone does not guarantee food security if physical or economic access is hindered. Food access means that household members have sufficient resources to obtain adequate and nutritious food. This access depends on household resources, as well as the social and policy environment. Changes in these areas can adversely affect food production and access. Thus, food access refers to the ability to secure sufficient and balanced diets to meet nutritional needs (Bajagai, 2014).

Food utilisation: Food utilization involves the consumption of food by individuals within a household, including the timing and methods of food preparation, in-house food distribution, water and sanitation, and food safety

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practices. It measures the ability of individuals to derive optimal nutritional benefits from the food they consume (Kuwornu, Suleyman, & Amegashie, 2013).

Food Stability: The stability dimension encompasses the consistency of the other three dimensions over time. Political instability, economic factors such as price volatility and unemployment, and adverse weather conditions can significantly impact the availability, access, and utilization of food (Food and Agricultural Organization, 2008).

Measuring Food Security

Indicators of food security are vital for global monitoring, directing food and economic aid, assessing programs, and shaping policy. These indicators must be capable of measuring food security consistently across different regions worldwide. This need for comprehensive and comparable measurement has been a significant focus for many years (Perez-Escamilla, Gubert, Rogers, & Hromi-Fiedler, 2017). However, despite its importance, there is no universally agreed-upon "gold standard" indicator that captures all dimensions of food security (Clay, 2002; Rosen, Meade, Fuglie, & Rada, 2016; Upton, Cissé, & Barrett, 2016).

Before the 1980s, food security was primarily assessed through food availability. This focus was due to the economic and political context of the time, particularly concerns about food supply following conflicts and the post-World War II era (Jones, Ngure, Pelto, & Young, 2013). In 1981, a significant shift occurred, moving the emphasis from food availability to food access. During this period, proxy measures like dietary diversity and anthropometric indicators became common methods for assessing food security at the

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household level (Maxwell, 1996). In the early 1990s, tools designed to capture individuals' experiences of hunger through subjective, experience-based questions emerged. This marked a shift from objective to more subjective indicators (Radimer, 2002; Webb et al., 2006). Although these experience-based questions are often preferred today for assessing food security at both household and individual levels, several tools are still in use, some of which are explained below.

Anthropometric Indicators

Anthropometric indicators are widely used to measure the health and nutritional status of individuals, indirectly reflecting the impact of food security. Common anthropometric indicators include weight-for-age (underweight), height-for-age (stunting), and weight-for-height (wasting) among young children and infants (Pérez-Escamilla & Segall-Corrêa, 2008; Perez-Escamilla et al., 2017). These measures provide critical insights into an individual's nutritional status. For instance, the weight-for-age index can identify both chronic and acute undernutrition, while weight-for-height is useful for detecting short-term nutritional stress due to illness or food shortages (World Health Organization, 1995). Although anthropometric indicators offer an affordable and standardized method for assessing nutritional status, they should be considered alongside other factors such as maternal care and household sanitation conditions (Jones et al., 2013).

Experience-based food security scales

Experience-Based Food Security Scales (EBFSS) are designed to directly assess the access component of food security by focusing on behavioural responses to food shortages. The development of EBFSS is

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grounded in ethnographic research conducted by a team from Cornell University, who studied the food insecurity experiences of low-income women in upstate New York. This research, which highlighted how these women managed food insecurity, laid the foundation for the experience-based scales that categorize food insecurity along a continuum of severity (Radimer, Olson, Greene, Campbell, & Habicht, 1992). The study revealed that food-insecure women shared common experiences, which were used to create the scales. The initial and least severe experiences of food insecurity involved worry or anxiety about food access, followed by a decline in diet quality. As food insecurity worsened, the quantity of food intake decreased, ultimately leading to situations where individuals skipped meals or went days without food (Cafiero, Melgar-Quinonez, Ballard, & Kepple, 2014; Melgar-Quinonez et al., 2006; Radimer et al., 1992; Webb et al., 2006).

Unlike other food security measures, EBFSS can rank the severity of food insecurity by asking specific questions about experiences, behaviours, and conditions that are otherwise challenging to identify (Ballard, Coates, Swindale, & Deitchler, 2013; Nord, 2014). These scales are often preferred for measuring food security at both household and individual levels because they provide direct measures rather than relying on proxy indicators. Among the four dimensions of food security, EBFSS uniquely evaluates the access component directly (Food and Agriculture Organization, 2014). Additionally, EBFSS are cost-effective and facilitate timely monitoring of food security (Food and Agriculture Organization, 2014).

The straightforward interpretation of results makes EBFSS an excellent tool for policy development, tracking global trends, and evaluating

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interventions (Food and Agriculture Organization, 2014). The first EBFSS, developed by Radimer and colleagues in 1992, was the U.S. Household Food Security Survey Module (US HFSSM). This tool included an 18-point scale that asked respondents about their concerns of running out of food and the need to reduce the quality or quantity of their food intake. Based on the number of affirmative responses, individuals were classified as food secure, mildly food insecure, moderately food insecure, or severely food insecure (Pérez-Escamilla & Segall-Corrêa, 2008).

Subsequently, the Food Insecurity Experience Scale (FIES) was introduced in 2013 by the Food and Agriculture Organization (FAO) as part of the Voices of the Hungry Project. The Food Insecurity Experience Scale (FIES) is a tool designed to measure food access at both the individual and household levels. Unlike traditional methods that assess food security indirectly through factors like food availability or malnutrition, the FIES focuses directly on the lived experiences of food access constraints. This experience-based measure of food insecurity evaluates the severity of food insecurity by asking respondents about their concerns and behaviours related to obtaining adequate food.

In addition, the FIES highlights the anxiety and uncertainty individuals or households face when they cannot secure enough food, which often leads to reduced food consumption or consumption of less nutritious food. However, it does not measure the actual quantity or quality of food consumed or the nutritional status of respondents. The FIES Survey Module (FIES-SM) consists of eight binary response questions ("yes"/"no"), typically applied with a 12-month reference period. These questions can be directed at individuals or

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households and can be extended with additional questions for more severe food insecurity cases (Food and Agricultural Organization [FAO], 2014). The FAO recommends two primary indicators for global monitoring: the percentage of individuals experiencing moderate or severe food insecurity (FIMOD+SEV) and those experiencing severe food insecurity (FISEV). The FIES is intended to provide consistent and comparable data on food insecurity across different contexts and populations, enabling detailed analysis and informed policy interventions.

Theoretical Challenges in Poverty Measurement

The theoretical framework for measuring poverty, notably since the influential contributions of Amartya Sen in 1976, involves two primary steps: identification and aggregation of the poor. The identification step focuses on establishing a poverty line to distinguish the poor. This step's complexity varies depending on whether the approach is unidimensional or multidimensional. In a unidimensional framework, the identification is straightforward, often using an income threshold that reflects the cost of a basic basket of goods and services to demarcate poverty (Alkire & Foster, 2011). Conversely, in a multidimensional context, the process becomes more intricate due to multiple dimensions, each with its deprivation threshold, necessitating a comprehensive evaluation of deprivations across various life aspects (Alkire & Foster, 2011). The aggregation step then involves compiling data from individuals to form an overall poverty measure.

Sen et al. (1987) highlighted two significant challenges in poverty measurement design. The first is the relevance of the measure, questioning whether the chosen standard of living metric adequately captures poverty. This has spurred debates on whether poverty measures should be based solely on

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resource availability or should also consider outcomes achieved with those resources. The second challenge is the usability of poverty measures, addressing the practicality and feasibility of implementing these measures in real-world assessments. These challenges not only influence the type of information required but also the methodologies employed in poverty evaluation.

The measurement of poverty is sometimes viewed as subjective and arbitrary, while others see it as a methodologically rigorous process. This dichotomy introduces substantial value judgments into poverty measurement design. Laderchi, Saith, and Stewart (2003) emphasise the importance of clarity regarding the source of these value judgments, whether they stem from governments, policymakers, industry, or development partners. Alkire et al. (2015) argue that such value judgments are inherent in the normative decisions within multidimensional poverty measurement design. These normative choices link the measurement framework to the lives and values of the poor and align with policies aimed at poverty reduction. These choices encompass the measurement space, the measure's purpose, the unit of identification and analysis, the dimensions considered, the indicators used, deprivation cutoffs, weights, and the poverty line. Additionally, Johnson (2009) notes that geographical and temporal contexts should be factored into poverty assessments to provide a comprehensive perspective.

The Purpose of Measurement

The purpose of measurement is multi-faceted and can extend to policy applications, which require accurate and relevant data to inform decisions and strategies. The reference population, which denotes the group of individuals or

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entities being studied, is critical in ensuring that the measurement outcomes are representative and applicable. Dimensions refer to the various aspects or categories that the measurement aims to cover, such as economic, social, or health-related factors. The time horizon indicates the period over which the measurement is conducted and analysed, which can influence the relevance and applicability of the results. Sen and Foster (1997) emphasize that the choice of a poverty measure is problem-specific, suggesting that different issues may require different approaches. Stiglitz et al. (2009) argue that the purpose of measurement is heavily dependent on the features considered in the assessment, influenced by value judgments. This implies that subjective perspectives play a significant role in determining what is measured and how it is interpreted. Alkire and Seth (2015) note that measurement can have multiple purposes, serving various stakeholders with different interests and objectives. Moreover, external factors, such as political economy and institutional contexts, can influence the purpose and design of the measurement process.

The Choice of Space

The choice of space in measurement involves selecting the indicators that will be used to assess the situation. Indicators can vary widely, including economic measures like income and consumption expenditure, access to resources, or more subjective measures like utility and personal satisfaction (Alkire, Foster, et al., 2015). Laderchi et al. (2003) stress that the chosen space must be appropriate to the context of the measurement. This choice has practical implications for the methodology, influencing how data is collected, analyzed, and interpreted. The space chosen can affect the comprehensiveness

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and accuracy of the measurement. For instance, focusing solely on income might overlook other important aspects like health, education, and social connections. Including a broader range of indicators can provide a more holistic understanding of poverty and well-being.

Units of Identification and Analysis

The unit of analysis is crucial in shaping the results and their interpretation. Common units include individuals and households, each offering different insights and implications. Corak, Lietz, and Sutherland (2005) note that households and individuals are the most common units in poverty measurement. Analysing individuals allows for a detailed examination of personal characteristics and experiences, aligning with human rights policies and enabling gender and age-specific analysis. This approach can highlight disparities and inequalities within populations. On the other hand, analysing households captures the collective experiences and benefits of shared resources and responsibilities. It recognizes the intra-household dynamics, such as caring and sharing, which can significantly impact well-being (Corak, 2006). Alkire and Santos (2014) suggest that the choice of the unit of analysis should consider the policy focus, ensuring that the measurement aligns with the objectives and available data. The comparability of data across different units and contexts is also a critical consideration in selecting the appropriate unit of analysis.

Choice of Dimensions and Indicators in Multidimensional Poverty Measurement

Multidimensional poverty measures necessitate the careful selection and valuation of various deprivations to provide a comprehensive understanding of poverty. According to Sen (1992), the evaluation process

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must address two fundamental questions: identifying the objects of value and assessing the worth of these objects within the context of the evaluation. This dual approach ensures that both the intrinsic value and relevance of the chosen dimensions are considered. Grusky and Kanbur (2006) emphasize the urgent need for attention in selecting appropriate dimensions, as there is no consensus among economists on which indicators are most significant or even on what constitutes significance in this context. This lack of agreement underscores the complexity of the selection process and the necessity for a thoughtful and rigorous approach.

Alkire (2002) outlines three guiding principles for selecting dimensions in poverty measurement. First, deliberation and public reasoning involve engaging with stakeholders to identify relevant dimensions through inclusive discussions. This approach ensures that diverse perspectives are considered in the selection process. Second, legitimate consensus refers to using official documents, such as the Declaration of Human Rights, national development plans, and international agreements like the Sustainable Development Goals (SDGs), to guide the selection of dimensions. This ensures that the chosen indicators are recognised and accepted at both national and international levels. Third, theoretical arguments involve drawing from established theoretical frameworks and conceptual models to select dimensions, ensuring that the indicators are rooted in robust theories.

Sen and Himanshu (2004) argue that deliberative engagements are essential rather than relying on a pre-determined list of dimensions. This approach allows for a dynamic and inclusive selection process, ensuring that the chosen dimensions are relevant and reflective of current realities.

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Legitimate consensus, as mentioned earlier, involves selecting dimensions based on official documents. This linkage to official documents is crucial, as multidimensional poverty measures are often not isolated from these documents (Alkire et al., 2015). Additionally, dimensions can emerge from theoretical frameworks or conceptual models, providing a robust foundation for their selection.

In practice, the choice of indicators is often influenced by empirical considerations focusing on normative and policy issues. According to King, Renó, and Novo (2014), most guidelines suggest that indicator selection should align with policy objectives, ensuring that the chosen indicators are relevant to the specific policy context. Atkinson and Marlier (2010) classify indicators into several categories:

1. *Stock or Flow*: Stock indicators measure a static state at a given point in time, while flow indicators measure changes over a period.
2. *Subjective or Objective*: Subjective indicators are based on individuals' perceptions and experiences, while objective indicators are based on measurable data.
3. *Relative or Absolute*: Relative indicators compare individuals or groups to others, while absolute indicators measure conditions against a fixed standard.
4. *Static or Dynamic*: Static indicators measure conditions at a single point in time, while dynamic indicators measure changes over time.

The choice of indicators is also influenced by the ease of interpreting results for the intended audience. Ensuring that the findings are accessible and understandable is crucial for effective communication and policy

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implementation. Alkire et al. (2015) note that as the field of multidimensional poverty measurement evolves, established conventions and standards will increasingly guide the selection of indicators and the calibration of their parameters, particularly in the context of monetary poverty. This evolution will help standardize the measurement process and ensure consistency and comparability across different studies and contexts.

Deprivation Cut-offs and the Imposition of a Weighting Scheme

The concept of deprivation cut-offs is a critical component in the measurement of multidimensional poverty, reflecting normative judgments about what constitutes a minimum acceptable standard of living. Deprivation cut-offs are normative standards that define the threshold below which an individual is considered deprived in each specific indicator (Gordon et al., 2003; Townsend, 1979). Bourguignon and Chakravarty (2010) highlight the importance of these cut-offs, noting that they are essential for understanding the joint distribution of deprivations. This is because being non-deprived in one indicator does not necessarily preclude deprivation in another, underscoring the multifaceted nature of poverty. To justify deprivation cut-offs, researchers often reference international or national standards. For instance, Alkire and Santos (2014) and Townsend (1979) discuss how these standards provide a benchmark for determining whether an individual meets the minimum requirements in each indicator. These benchmarks ensure that the cut-offs are rooted in widely recognized and accepted criteria, enhancing the credibility and comparability of the poverty assessments.

In the context of multidimensional poverty assessment, a fundamental normative decision is whether to impose a relative weighting scheme on the

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dimensions under consideration. The need for a weighting scheme arises from the recognition that different individuals and societies may place varying levels of importance on different dimensions of poverty. As Sen (2009) points out, the appropriate weighting scheme is a matter of ongoing debate and lacks a definitive consensus. This debate underscores the subjective nature of assigning weights to different dimensions and the importance of reflecting diverse values and priorities in the assessment process. The imposition of a weighting scheme involves assigning various levels of importance to various dimensions based on their perceived value. This process is crucial because it acknowledges that not all dimensions of poverty are equally significant to all individuals or societies. Some dimensions may be considered more critical than others, and the weighting scheme should reflect these differences in importance. The challenge lies in determining the appropriate weights that accurately capture the relative importance of each dimension.

One approach to establishing weights is through participatory methods, where stakeholders, including those affected by poverty, are involved in the decision-making process. This ensures that the weighting scheme reflects the values and priorities of the community. Another approach is to use statistical methods to derive weights based on the observed relationships between different dimensions and overall well-being. Regardless of the method used, the weighting scheme should be transparent and justifiable. Researchers must clearly explain the rationale behind the chosen weights and ensure that they are grounded in empirical evidence or robust theoretical arguments. By doing so, the assessment process becomes more credible and reliable, providing valuable insights into the nature and extent of multidimensional poverty.

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Empirical review

This section presents a thematic review of empirical studies examining two key areas: (1) inequality of opportunity in precarious employment, and (2) the impact of precarious employment on food insecurity, poverty, and vulnerability to poverty. The review synthesises the existing evidence on these important topics, aiming to consolidate the relevant findings and insights from the literature to better understand the complex relationships between precarious work, inequality of opportunity, and household welfare outcomes.

Empirical review on inequality of opportunity in precarious employment

Inequality of opportunity in labour market outcomes

Family Background and Socioeconomic Circumstances

Research shows that family background significantly influences labour market outcomes, with socioeconomic and demographic factors affecting earnings and job access differently across regions. Pistolesi (2008) explored the role of family background in income inequality in the U.S. from 1968 to 2001, distinguishing between circumstances beyond personal control and individual effort. Using semi-parametric econometric techniques, the study found that family background contributed between 20% and 43% to total earnings inequality, though this influence decreased over time, reaching about 18% by 2001. Turning to urban India, Singh (2010) examined wage inequality among men, finding that family background accounted for 11% to 17% of income disparities. A follow-up study, Singh (2011), expanded this research to include rural regions, identifying factors such as parental education, caste, and region of birth as critical determinants. The study showed higher opportunity inequality in urban than rural areas, suggesting that regional context impacts how family background shapes economic outcomes.

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El Enbaby and Galal (2015) and Galal (2017) focused on Egypt, analyzing how factors such as birthplace and parental education affect income and asset inequality. El Enbaby and Galal found that family background explained 9% to 11% of income inequality and 30% to 33% of asset inequality, with assets reflecting long-term welfare impacts more than earnings. Expanding this perspective, Galal and El Enbaby (2020) found that family background's role was more pronounced in asset inequality (26%-32%) compared to earnings (8%-10%), underscoring the influence of socioeconomic factors on wealth disparities. In Russia, Lukiyanova (2015) studied income inequality in both formal and informal sectors, finding that informal employment intensified inequality. Family background had a stronger impact on income for informal workers, with inequality declining over time in both sectors. This study highlights how labour market structures, like informality, can compound the effects of socioeconomic background.

Using data from Jordan, Alkasasbeh (2024) examined family background's role in wage inequality, focusing on gender and region. The study found higher opportunity inequality for women and those from northern and southern regions, with parental education and occupation as primary drivers. This aligns with the findings of Abras et al. (2013), who used the Human Opportunity Index across Europe and Central Asia, showing how social background, such as parental occupation, varies in impact based on regional labour market characteristics and societal attitudes toward fairness.

In Chile, Contreras et al. (2009) analysed income inequality, identifying parental education as a key contributor. The study noted that older cohorts experienced more significant inequality due to family background than

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younger ones, potentially reflecting the positive effects of more recent equalizing policies. This shift suggests that while family background remains influential, policy interventions may mitigate its impact over time. Luongo (2010) in Italy and Booysen (2022) in South Africa further expand on these findings. Luongo observed disparities in job access among graduates based on family background, while Booysen showed that factors like race, gender, and parental employment significantly affect income in South Africa. Both studies highlight the persistent role of family background even among well-educated individuals in developed and developing economies.

Gender and Labour Market Inequality

Research consistently highlights gender as a significant factor influencing labour market outcomes, though findings reveal context-specific variations across regions and industries. Golley et al. (2019), for example, investigated labour earnings inequality in China, identifying gender as the most influential determinant among other circumstances like region and parental background. The study's findings suggest that gender differences in labour outcomes in China cannot be attributed solely to personal effort, implying deeply rooted structural biases. In Sweden, Hederos et al. (2017) similarly found that gender played a critical role in income inequality, though to a lesser degree than in China. Using a Shapley-value decomposition, they attributed up to 13% of income inequality to gender, with an additional 31% attributed to other background circumstances. These findings highlight a persistent gender disparity within income distribution, even in progressive contexts like Sweden.

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Ahmed et al. (2020) extended this analysis to Sudan, where gender differences emerged as the primary factor in employment access. The study noted a 73% contribution of gender-based inequality to opportunity gaps, interpreting much of this gap as discrimination. Using decomposition methods, Ahmed et al. found that gender differences explained nearly all of the male-female employment gap, illustrating how starkly cultural norms influence labour outcomes in Sudan compared to other regions. Durbin and Fleetwood (2010) contributed a theoretical perspective, identifying the internal and external causes of gender inequality across the occupational lifecycle, such as biases in recruitment and negative societal stereotypes. This study frames the empirical findings by others within broader social dynamics that perpetuate gendered employment disparities.

Exploring these issues further, Ji, Wu, Sun, and He (2017) examined gender inequality in China's labour market post-reform. They found that the withdrawal of state-supported gender equality initiatives has led to a decline in women's labour opportunities. This study highlights how cultural and policy shifts within China's socialist-to-market transition have reinforced gender disparities, underscoring the influence of both state policies and traditional gender norms. In contrast, Awad and Hussain (2023) examined youth employment in the Democratic Republic of the Congo and Madagascar, finding that parental factors strongly influenced labour outcomes for youth, though effort-based inequalities also played a role. This study illustrates how gender and family background intersect in shaping youth labour access, highlighting the multifaceted nature of opportunity gaps.

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Meanwhile, Sanoussi et al. (2020) focused on Benin, Liberia, and Togo, where they found that inequality of opportunity in labour access was more pronounced in urban centres. Their findings emphasise the role of parental characteristics in determining youth employment, with variability across countries based on regional demographics and cultural factors. Adding a psychological dimension, Gesiarz et al. (2020) conducted experiments on how opportunity gaps affect motivation, finding that unequal reward distributions negatively impact willingness to exert effort, even for relatively privileged individuals. This study implies that opportunity inequality, especially gender-based, can impact productivity and morale, suggesting potential ripple effects on broader labour market dynamics. Shi (2024) investigated rural China and found that younger cohorts experience less income inequality overall but face increasing opportunity gaps based on gender and other factors, such as family background and region. This study provides a generational perspective, showing that despite reduced overall income inequality, structural barriers remain significant for women and marginalized groups.

Educational Attainment and Job Accessibility

The role of education in shaping labour market outcomes has been studied, particularly in regions facing structural challenges. Dimova and Stephan (2020), for instance, analysed youth unemployment across the Middle East and North Africa (MENA) and found that a lack of high-skill jobs, coupled with undervaluation of vocational training, creates significant barriers for educated youth. Their findings underscore a critical mismatch between the education system's output and labour market demands, with many educated youths opting for self-employment due to limited formal job opportunities.

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This issue echoes globally, where skill mismatches and education-labour market misalignment remain recurring themes.

Building on the idea of constrained job access, Pinilla-Roncancio and Gallardo (2023) focused on employment disparities among individuals with disabilities across Latin America. Their study found that people with disabilities, especially women in rural areas, face pronounced inequality of opportunity. This work expands the conversation on how access disparities are compounded by intersecting factors like gender, geographic location, and disability status, emphasising that educational background alone cannot fully address these inequalities in job accessibility.

In Malaysia, Uchiyama, Furuoka, and Akhir (2022) brought a new dimension by examining gig economy conditions, where traditional social protections are lacking. This study highlights how, even with education, workers in flexible gig roles (such as e-hailing and delivery drivers) face precarious conditions. The absence of worker-centred policies in this rapidly expanding labour market illustrates how education's role in securing stable employment is increasingly complex. This context of limited protections and temporary work also resonates with findings from Gebel and Giesecke (2009) in Germany, where the shift toward temporary contracts, especially for lower-educated workers, demonstrates that job stability remains elusive even in traditionally well-regulated labour markets.

Further examining structural influences, Awad and Hussain (2021) studied youth employment in sub-Saharan Africa, focusing on factors beyond individual control, such as parental occupation, across six countries. While they identified parental background as a significant factor in some regions,

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they also noted that effort-based factors played a larger role than typically assumed, adding nuance to the discussion on opportunity inequality by highlighting that some individuals navigate these challenges successfully through effort. Pasquier-Doumer (2024) expands this theme by exploring social origin's impact on job access in West Africa, where public sector job access is strongly associated with educational background, particularly in landlocked cities like Bamako and Niamey. This study demonstrates how educational attainment can act as a mediator for social origin, emphasizing that, in less fluid job markets, education remains a primary means of upward mobility.

In Europe, Duta and Iannelli (2018) provided insights into how geographic mobility affects job outcomes for UK graduates. They found that graduates relocating to areas with high professional opportunities experience reduced social class disparities, a finding that suggests education's effect on job outcomes is moderated by regional job availability. This supports Barbieri and Cutuli (2015)'s study, which examined employment protection reforms across Europe, noting that while deregulation temporarily boosts employment, it fails to create lasting stability. Both studies imply that regional labour market characteristics significantly impact the effectiveness of educational attainment in securing stable employment. De Sandi (2023) in Ghana added to this conversation by using machine learning to track inequality of opportunity (IOp) across generations. Their findings indicated that IOp has decreased among younger cohorts, but that birthplace and ethnicity still present barriers. This approach provides a fresh perspective on how long-standing social

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structures shape employment opportunities despite educational gains over time, resonating with the broader discussion on enduring disparities.

Geographic and Regional Disparities

Geographic location is a significant determinant of labour market outcomes, with inequality of opportunity varying by urban and rural divisions, accessibility to job centres, and regional economic structures. Singh (2011) investigated inequality of opportunity among Indian men, finding that factors like parental education, caste, and birthplace contributed to significant disparities. Urban areas exhibited higher opportunity inequality in earnings (11%-19%) than rural areas (5%-8%), indicating that birthplace and social background considerably influence access to employment and income levels in different regional contexts. In the São Paulo Metropolitan Region (SPMR) in Brazil, Haddad and Barufi (2024) examined the impact of job accessibility on wage disparities. Using a spatial general equilibrium model, they found that higher accessibility to job centers significantly increased wages, with low-income residents in the city's periphery experiencing the greatest disadvantage due to limited access. This study underscores the spatial inequality within urban centers, where job location and housing costs combine to limit economic mobility for those living in less connected areas.

Pasquier-Doumer (2024) analysed labour market access across West African cities, noting marked inequalities between landlocked and coastal capitals. The study found that social origin, such as paternal occupation, directly influenced public sector employment opportunities, especially in cities with fewer job market opportunities. This research highlights how geographic isolation and social background jointly constrain labour market access,

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emphasising a nuanced view of regional opportunity inequality. Similarly, Dimova and Stephan (2016) assessed youth employment in the Arab world, showing that structural characteristics, like a lack of high-skill jobs and undervaluation of vocational training, restrict employment for educated youth, particularly in rural or underdeveloped areas. The findings suggest that regional labour market characteristics, combined with limited demand for specific skills, exacerbate unemployment in these regions.

Awad and Hussain (2023) explored employment inequality in the Democratic Republic of the Congo and Madagascar, finding that factors like parental background influenced youth employment more than effort-based factors, which were more prominent in other regions. This study aligns with findings from Sanoussi et al. (2020) in Benin, Liberia, and Togo, where they noted that parental characteristics and demographics varied in their impact on job access across countries, with rural areas exhibiting more pronounced opportunity gaps. In the United States, Wolcott (2021) focused on the employment gap between low- and high-skilled men, noting that automation and shifts in labour demand contributed to lower employment among low-skilled workers. Wolcott's findings reflect broader trends in labour market polarization, where regional economic changes increasingly favour high-skilled jobs, contributing to spatial and skills-based disparities.

While Wolcott study provides valuable insights into the extent and dynamics of inequality of opportunity in the labour market, the specific issues of inequality of opportunity in precarious employment have not been adequately explored. Existing research has primarily focused on traditional employment arrangements, overlooking the unique challenges posed by the

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growth of non-standard, insecure work, such as gig work, temporary contracts, and other forms of precarious employment. Furthermore, the study's cohort-based approach fails to capture the potential heterogeneity in these dynamics across different age groups, as individuals at various stages of their careers may face distinct work conditions and labour market challenges. Addressing these research gaps would not only enhance our theoretical understanding of the interplay between inequality of opportunity and the changing nature of work but also inform the development of targeted policy interventions to promote more equitable access to secure and fulfilling employment opportunities, particularly for vulnerable groups.

Synthesis on unequal opportunity in the Labour Market

The reviewed literature underscores the significant role of socioeconomic and demographic factors in shaping inequality of opportunity (IOp) in labour market outcomes. Family background, including parental education, occupation, and geographic location, consistently emerges as a key determinant, perpetuating intergenerational inequality by influencing access to employment and income levels. Gender disparities further exacerbate IOp, with systemic biases, caregiving responsibilities, and discriminatory norms disproportionately hindering women's access to stable and equitable employment opportunities, as evidenced in contexts ranging from China and Sudan to Sweden. Education, while a potential equaliser, often fails to bridge opportunity gaps due to mismatches between labour market demands and educational outputs, particularly in regions such as the Middle East and North Africa. Geographic disparities amplify these inequities, as urban areas exhibit competitive and stratified labour markets, while rural regions face structural limitations such as inadequate infrastructure and fewer formal job

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opportunities. Moreover, the rise of precarious employment, marked by job instability, inadequate income, and lack of protections, disproportionately impacts marginalised groups, compounding existing inequalities. The interplay of these systemic barriers and socioeconomic factors highlights the urgent need for targeted policy interventions, such as enhanced labour protections, alignment of education with market demands, and regional development initiatives, to address IOp and foster equitable access to stable employment.

Empirical review on precarious employment and household food insecurity

This section reviews empirical studies on the interplay between precarious employment and household food insecurity. It explores how precarious employment conditions, characterised by job instability, low wages, and lack of protections, contribute to food insecurity across diverse contexts. Additionally, the section examines broader employment-related factors, such as unemployment, non-farm employment, and economic policies, that shape food security outcomes. Particular attention is given to the main determinants of food insecurity in Ghana and Sub-Saharan Africa, highlighting the economic, environmental, and social factors that exacerbate food vulnerability.

Employment Conditions and Food Insecurity

McIntyre et al. (2012) aimed to examine the correlates of food insecurity among households reliant on employment income in Canada. The researchers analysed data from the 2007-2008 Canadian Community Health Survey, excluding households with income from social assistance. found that while the overall rate of food insecurity was lower among working households in Canada compared to the general population, certain factors, such as lower education, lower income, and employment in specific industry sectors,

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increased the likelihood of food insecurity. Similarly, Walsh et al. (2022) reported that two-thirds of private sector service workers in Finland were food insecure, with over a third experiencing severe food insecurity. Factors associated with an increased risk of severe food insecurity included financial difficulties, young age, low education, and employment in the hospitality industry.

Building on this, Coleman-Jensen (2011) used data from the Current Population Survey in the United States and found that households with heads in non-standard work arrangements, such as multiple jobs, part-time, or varied hours, were more likely to experience food insecurity compared to those with heads in full-time employment. The study also highlighted that the relationship between non-standard work and food insecurity was stronger for single-parent and single-person households. More recently, Sheely (2024) examined the link between food insecurity and the characteristics of low-quality jobs, such as involuntary part-time work and job loss, among employed lone mother households in the United States. The findings suggest that the relationship between low-quality work and food insecurity is not solely determined by low financial resources, but also by the uncertainty and inadequate resources associated with these types of employment arrangements.

Mabli et al. (2022) took a longitudinal approach, investigating the association between changes in employment and earnings with changes in food security status among participants in the Supplemental Nutrition Assistance Program (SNAP) Employment and Training program in the United States. Their findings indicate that job losses and earnings reductions are linked to a higher likelihood of transitioning from food security to food

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insecurity, but employment or earnings gains did not necessarily lead to a transition from food insecurity to food security. Expanding the geographical scope, Blekking et al. (2019) examined the relationship between formal/informal employment and urban food security in Lusaka, Zambia. They found significant differences in food security measures between households with majority formal employment and those engaged in informal employment, highlighting the importance of considering the broader socioeconomic context. Additionally, McIntyre et al. (2012) identified residence in Quebec as a protective factor against food insecurity among working households in Canada, suggesting the role of contextual policies and programs.

During the COVID-19 pandemic, Singleton et al. (2022) explored the associations between pandemic-related changes in employment status, SNAP participation, and household food insecurity among a diverse sample of Black and Latino adults in Illinois. Their findings suggest that all changes in employment status, including job loss, reduced hours, and anticipated job loss, were significantly associated with increased odds of low food security, particularly among SNAP participants. Focusing on a specific occupational sector, Loh, Oddo, and Otten (2021) examined the association between food insecurity and depression among early care and education (ECE) workers in the United States, a population often employed in precarious conditions. Their study found that very low and low food insecurity were associated with higher odds of depression, underscoring the need for targeted interventions to address the interrelated challenges faced by this vulnerable group of workers.

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Other Employment-Related Factors and Food Insecurity

Research highlights employment as a significant determinant of food security, with both job availability and employment policies shaping household access to food across various contexts. Etana and Tolossa (2017) investigated urban Ethiopian households, finding that unemployment correlated strongly with food insecurity, affecting 55.9% of unemployed households in Addis Ababa and Munessa. The study underscored that pathways such as education and economic resilience are critical; lack of education limited job opportunities and quality, while poor households struggled with rising food prices, linking unemployment to heightened food insecurity risks. During the COVID-19 pandemic, Milovanska-Farrington (2021) examined job loss and food insecurity in the U.S., revealing that employment disruptions led to a marked increase in food insecurity and deteriorating child nutrition. Hispanic households and those with lower educational levels were particularly vulnerable, emphasizing the importance of targeted policy interventions for these groups.

Shifting focus to rural areas, Do et al. (2019) in Cambodia and Bui and Hoang (2020) in Vietnam highlighted the stabilizing effect of nonfarm employment on food security. Do et al. found that nonfarm jobs in Cambodia enhanced household food access and income stability, particularly when economic shocks hit rural areas. Similarly, Bui and Hoang discovered that nonfarm employment in Vietnam reduced food poverty by around 19%, underscoring its potential as a buffer against food vulnerability, especially in regions with high food insecurity like northwest Vietnam. In the United States, Stansel and Wu (2024) linked economic freedom and minimum wage policies

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to food security, finding that higher economic freedom (particularly labour market flexibility) correlated with lower food insecurity across states. Complementing this, Piekarz-Porter et al. (2024) explored employment policies beyond the minimum wage, proposing that local policies supporting stable, well-paid employment could be crucial in reducing food insecurity by addressing gaps left by federal wage policies alone.

In Indonesia, Sari and Cahyono (2019) identified a different employment-related dynamic, showing that severe food insecurity prompted married women to join the labour force at higher rates, often due to economic hardship. Factors such as husband's employment and education further influenced labour force participation, pointing to how economic strain drives households, particularly women, to pursue employment in response to food insecurity. Reeves et al. (2021) assessed the role of wage-setting policies globally, finding that countries with collective bargaining or high minimum wages had lower food insecurity rates, especially among part-time and full-time workers. However, these policies had limited effects on the unemployed and informal workers, highlighting the need to address the informal sector in food security policy. Lenhart (2021) demonstrated how California's paid family leave program helped reduce food insecurity, particularly among low-income families. The study showed that PFL reduced the likelihood of child food insecurity, suggesting that policies supporting stable family income, like paid leave, could indirectly enhance food security, particularly for children in vulnerable households.

Bui and Hoang (2020) analysed the effects of non-farm employment on food poverty in rural Vietnam, finding that participation in non-farm jobs

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decreased the likelihood of food poverty by 19%. Their study highlights those regions such as northwest Vietnam, which exhibit greater vulnerability, could benefit from targeted policies that improve access to non-farm employment as a strategy to buffer against food insecurity. Expanding the discussion to economic policies in the U.S., Stansel and Wu (2024) investigated the relationship between economic freedom, minimum wage policies, and food security at the state level. They found that higher economic freedom, particularly in labour markets and government spending, correlated with reduced food insecurity rates, suggesting that policy flexibility can enhance food access. In contrast, Piekarz-Porter et al. (2024) argue for examining a wider range of employment policies beyond minimum wage, noting that while minimum wage policy has been extensively studied, broader local policies, such as those at the municipal or county levels, might offer underutilized solutions for improving food security, especially as precarious employment rises.

The link between employment status and food security is also evident in the studies conducted in developing countries. Sari and Cahyono (2019) found in Indonesia that severe food insecurity often drives married women into the labour force. Their findings underscore that when households face economic hardship, women are 6.3% more likely to seek employment, with factors like husband's employment status and education level influencing this decision. This aligns with Etana and Tolossa (2017), who studied Ethiopian households and observed that food insecurity was significantly higher among those with unemployed heads. They noted that limited job opportunities and economic instability hindered these households from adapting to food price

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increases. Both studies highlight the economic challenges that push household members, especially women, to join the workforce in an attempt to mitigate food insecurity.

In high-income settings, however, precarious employment itself becomes a risk factor for food insecurity. Walsh et al. (2022) conducted a cross-sectional study on food insecurity among Finnish private sector workers, revealing that 65% experienced food insecurity, with severe cases affecting over one-third. Risk factors included financial strain, low education, and employment in sectors like hospitality, suggesting that even in developed countries, job instability can substantially elevate food vulnerability, a concern shared by Milovanska-Farrington (2021) in her study on the impact of COVID-19-related job loss on food insecurity in the U.S. Milovanska-Farrington noted that job loss during the pandemic particularly affected Hispanic and low-education households, highlighting how economic disruptions can intensify food insecurity in marginalized groups.

Review of Main Determinants of Food Insecurity in Ghana and Sub-Saharan Africa

Food insecurity across Sub-Saharan Africa (SSA) and Ghana is driven by a complex interplay of remittances, income diversification, climate impacts, and social factors such as education and gender. Sulemana et al. (2019) explored the role of international remittances in supporting household food security across 32 SSA countries, revealing that remittances were positively associated with higher food security. Notably, the frequency of receiving remittances played a significant role in reducing food insecurity, indicating that sustained income inflows can provide a safety net for vulnerable

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households. However, the study's cross-sectional design limits conclusions on causation, signalling a need for further investigation into how remittances interact with household spending behaviours on food security.

Focusing on Ghana, Atuoye et al. (2017) also examined remittances, specifically in the Upper West Region. Unlike Sulemana et al., they found that remittances alone did not alleviate food insecurity, as households in rural and urban areas that received remittances remained food insecure. This suggests that, in regions where economic opportunities are limited, remittances may not be a sufficient mechanism for tackling persistent food insecurity. The authors called for alternative livelihood strategies beyond migration and remittances to address the structural challenges of food access in rural Ghana. Gender and household structure also impact food security in Ghana. Essilfie et al. (2020) examined how women's empowerment influences food security, finding that higher levels of female education and decision-making autonomy correlate with improved household food security. This study highlights the importance of addressing gender disparities in educational and employment opportunities as part of broader food security strategies. Empowering women in Ghana appears crucial, as they often manage household food provisioning and face unique challenges related to income security and food access.

Economic and environmental factors further complicate food security dynamics in Ghana. Atanga and Tankpa (2021) analysed the impact of climate change and flood disasters on food production in northern Ghana, showing how climate-induced events disrupt agricultural output, damage infrastructure, and threaten local livelihoods. Their findings underscore the vulnerability of agricultural communities to environmental shocks, particularly as floods

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increase in frequency and severity due to climate change. Such disruptions directly impact food security, as they reduce household resilience and contribute to poverty in regions heavily dependent on agriculture. Income diversification strategies have also been explored as potential buffers against food insecurity. Atuoye et al. (2019) examined the role of income diversification in the Upper West Region, revealing that even with diverse income sources, severe food insecurity persisted among poorer households and those headed by widows. This finding suggests that while income diversification is necessary for survival, it may not always reduce food insecurity in resource-constrained settings. Households often rely on low-return activities that do not significantly enhance their economic security, indicating that policy interventions should consider not only diversification but also quality and stability of income sources.

Similarly, Danso-Abbeam, Asale, and Ogundeji (2021) in Northern Ghana identified demographic factors and assets as critical determinants of food insecurity. They found that households with more assets, participation in non-farm activities, and access to extension services adopted fewer coping strategies during food shortages, while those with higher dependency on agricultural income used more intensive coping mechanisms, such as meal reduction. This highlights the importance of asset accumulation and diversified economic activities in enhancing resilience to food insecurity. The effects of broader socioeconomic shocks are highlighted by Bukari et al. (2022), who examined the impact of the COVID-19 pandemic on food insecurity and poverty across Ghana. They found a strong link between COVID-19 exposure and increased rates of food insecurity and poverty, as

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reduced income and limited access to resources heightened household vulnerability. This study reinforces the need for robust social support systems to buffer against sudden economic disruptions, especially for food-insecure households in the region.

Synthesis of review on precarious employment and Food Security

The literature reviewed underscores the multifaceted relationship between precarious employment, household food insecurity, and socioeconomic vulnerabilities. Key socioeconomic variables influencing these dynamics include income levels, employment stability, education, gender, and geographic factors. Precarious employment emerges as a critical determinant of food insecurity, disproportionately affecting vulnerable groups such as single-parent households, women, and workers in informal or low-wage sectors. Education plays a dual role, with limited access and mismatches between educational outputs and labour market demands exacerbating vulnerabilities, while higher education and skill acquisition mitigate risks.

Gender disparities are particularly salient, as women often face compounded challenges of caregiving responsibilities and limited access to stable employment, amplifying household food insecurity. Geographic and environmental factors further exacerbate vulnerabilities, with rural regions and areas affected by climate change or economic instability experiencing heightened food insecurity. Additionally, broader structural issues such as inadequate social protection policies and labour market inequities underscore the urgent need for targeted interventions to address these interrelated challenges, fostering more equitable and resilient labour market outcomes and food security systems.

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Empirical review on precarious employment and Vulnerability to Poverty

This section presents a thematic review of empirical studies examining the relationship between precarious employment and vulnerability to poverty. It synthesizes research on how employment-related factors, including job instability, income insecurity, and precarious working conditions, contribute to household poverty risks. Additionally, the review explores key determinants of vulnerability to poverty, such as household size, educational attainment, health status, economic assets, gender disparities, social networks, and environmental factors. Further emphasis is placed on how occupation type, social protection programs, and climate shocks interact with these determinants to exacerbate or mitigate poverty vulnerability. Lastly, the section discusses the measurement approaches used to assess vulnerability to poverty, highlighting methodologies that capture the multidimensional and dynamic nature of poverty risks.

Employment-Related Factors and Vulnerability to Poverty

Research on employment-related factors and poverty reveals that job quality, employment type, and labour market policies significantly influence poverty levels, with several studies emphasizing that mere employment does not always shield individuals from poverty. Autor and Houseman (2005) examined temporary agency employment within Michigan's welfare-to-work program, finding that although temporary placements provided short-term earnings boosts, they offered limited long-term poverty reduction benefits compared to direct-hire jobs. This highlights the need for government employment programs to reconsider the emphasis on rapid job placements, as temporary roles may not provide sustained poverty alleviation.

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In support of this, Van Arsdale (2013) analysed the rise of temporary and flexible employment in the U.S., observing that the proliferation of insecure, low-paying temporary jobs since the 1970s has led to an increase in in-work poverty. The findings underscore that the shift toward temporary staffing undermines poverty reduction efforts by depriving workers of stable income and job security. Horemans (2017) echoed these concerns in Europe, examining part-time and temporary workers' poverty risk and finding that while these workers benefit from certain income protections through government transfers, they remain vulnerable to poverty, with non-standard employment less likely to provide adequate income security.

Studies in South Africa further underscore these dynamics. Dunga and Sekatane (2014) examined household employment in Bophelong Township, finding that while employment is a significant determinant of poverty status, over one-third of employed households still live below the poverty line. The findings highlight that job quality, rather than mere job availability, is vital for poverty alleviation. Similarly, Zizzamia (2018) analyzed employment among low-skilled, urban South Africans and found that decisions to accept or reject job offers often depend on the perceived costs of employment, such as low wages and unstable income, which may perpetuate poverty cycles even for those employed.

International perspectives from Alaniz, Gindling, and Terrell (2011) in Nicaragua and Liotti and Canale (2020) in Europe reveal the complexities of labour market policies and poverty. Alaniz et al. found that minimum wage increases positively impact household poverty reduction for workers near the wage floor but often lead to reduced employment due to layoffs. Liotti and

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Canale, on the other hand, show that labour market flexibility in European countries is associated with increased monetary poverty, indicating that while flexibility may benefit employers, it exacerbates poverty risks for low-income workers. McBride and Smith (2021) explored the experiences of UK workers in multiple low-paying jobs, finding that even with secondary employment, workers remained entrenched in poverty due to structural challenges like insufficient wages and high living costs. These "Forgotten Workers" reflect the reality that holding multiple jobs does not necessarily translate to financial security, a sentiment also mirrored by Scott et al. (2020) in the U.S., where secondary earnings among low-education households slightly alleviated poverty but did not fully address underlying financial precarity.

Determinants of Vulnerability to Poverty

Household size and dependency ratios

Research consistently identifies household size and dependency ratios as key determinants of vulnerability to poverty, particularly in low-income countries. Yemata (2018) found that in Ethiopia, larger households with high dependency ratios face increased poverty risks due to a greater financial burden and fewer income-generating opportunities per capita. Similarly, Soseco et al. (2022) observed in Indonesia that households with larger sizes, especially those led by older individuals, are more vulnerable to poverty. This relationship between household size and poverty risk highlights how increased consumption needs, coupled with limited resources, exacerbate economic vulnerability. Demissie and Eshetu (2017) further argue that households with more dependents are more exposed to income instability, as they have higher consumption demands without a proportional increase in income. These

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findings suggest that policies aimed at alleviating poverty must consider family size and dependency structures, as they significantly shape a household's economic resilience.

Educational attainment

Educational attainment emerges as a crucial factor in reducing vulnerability to poverty across various contexts. Melak and Anupama (2019) argue that in rural Ethiopia, low educational levels among household heads restrict access to stable and well-paying jobs, thereby limiting households' resilience to economic shocks. This finding aligns with Yemata (2018), who emphasizes that higher education levels improve income-earning potential and reduce poverty vulnerability. Haughton and Khandker (2009) further substantiate this by showing that in developing countries, educational attainment enhances job opportunities and income stability, thus buffering households against poverty. The consensus across studies underscores the role of education not only in individual economic advancement but also in enhancing overall household stability, suggesting that educational interventions are vital for long-term poverty alleviation.

Health status and access to healthcare

Health emerges as a significant determinant of poverty vulnerability, especially when considering households with limited access to healthcare services. Hernández and Zuluaga (2022) found in Colombia that poor health conditions and restricted healthcare access increase household poverty risks, as medical expenses often divert resources from other essential needs. Similarly, Adetoro et al. (2023) highlighted that inadequate living conditions, such as poor sanitation and housing, intensify poverty vulnerability in South

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Africa, as they compound health risks. These studies reveal a cyclical relationship between poor health, inadequate living standards, and poverty vulnerability, suggesting that improving healthcare and sanitation can directly enhance economic resilience. Gallardo (2020) also emphasises that health shocks, particularly in households without health insurance, can lead to catastrophic financial losses, which plunge households into poverty. This underscores the importance of accessible healthcare services in mitigating poverty vulnerability.

Economic assets and employment stability

Access to economic assets and stable employment are critical determinants of poverty vulnerability. In South Africa, Demissie and Eshetu (2017) showed that access to productive assets, crop diversification, and credit significantly reduce poverty vulnerability by stabilizing income. Kurosaki (2006) further supports this, noting that in Pakistan, households with productive assets such as land or livestock have a stronger capacity to withstand economic downturns, as these assets provide alternative income sources during financial stress. Similarly, Edoumiekumo et al. (2013) in Nigeria argue that occupational diversity and asset ownership reduce poverty vulnerability, as households with multiple income sources are better equipped to handle income fluctuations. These findings collectively suggest that policies promoting asset accumulation and diversified employment can be effective in poverty alleviation.

Gender disparities and female-headed households

Gender disparities, particularly those affecting female-headed households, are significant contributors to poverty vulnerability. Tulu Doti et

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al. (2021) found that in Ethiopia, female-headed households experience higher poverty risks due to structural barriers limiting women's access to resources and employment opportunities. Similarly, Edoumiekumo et al. (2013) in Nigeria observed that gendered barriers to asset and credit access exacerbate poverty risks for women. These studies highlight the need for gender-sensitive policies that address the specific vulnerabilities of female-headed households, as they often face compounded economic challenges. Skoufias and Quisumbing (2005) argue that targeted interventions, such as credit access and vocational training, can significantly reduce poverty risks for women, emphasizing the role of gender equity in poverty alleviation.

Social support networks and remittances

Social support networks and remittances provide critical safety nets for vulnerable households, particularly in regions with limited formal social protections. Adetoro et al. (2023) demonstrated in South Africa that remittances help households cope with economic shocks by supplementing income. Similarly, Soseco et al. (2022) noted that in Indonesia, social networks offer financial and employment support during downturns, reducing poverty vulnerability. Carter et al. (2007) argues that social capital, including community ties, acts as an informal insurance mechanism that provides both financial and emotional support. These findings underscore the importance of social support systems in enhancing household resilience, suggesting that strengthening community-based networks could be an effective strategy in poverty reduction efforts.

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Geographic and environmental factors

Geographical location and environmental conditions significantly affect poverty vulnerability, particularly for rural households. Fujii (2016) found that in areas with limited access to resources and employment opportunities, households are more vulnerable to poverty. Similarly, Nkondze et al. (2013) observed in South Africa that rural household's dependent on agriculture are more exposed to poverty risks due to climate variability and limited infrastructure. These studies emphasize that geographical isolation and environmental challenges increase poverty vulnerability, advocating for regional development policies that improve infrastructure and economic access. Nguyen and Nguyen (2018) further support this by showing that households in disaster-prone areas in Vietnam face higher poverty risks due to climate disruptions, stressing the need for environmental resilience initiatives.

Debt burden and financial insecurity

High debt levels create a financial strain that increases poverty vulnerability by limiting disposable income. Kang (2015) found in Korea that households with high debt are more likely to experience poverty due to repayment obligations that reduce their financial flexibility. This finding aligns with Deressa (2013), who noted that in Ethiopia, debt burdens restrict households' capacity to save or invest, making them more vulnerable to economic shocks. These studies suggest that reducing debt levels through financial education and accessible credit options can improve household resilience against poverty.

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Social protection and cash transfer programs

Social protection mechanisms, such as cash transfer programs, play an essential role in reducing poverty vulnerability. Barrientos and Hulme (2008) argue that cash transfers provide a critical income buffer, particularly during economic downturns, helping households avoid falling into poverty. Gallardo (2020) emphasizes that social protections, including healthcare access, are vital for mitigating poverty risks, especially for households with limited income. These findings suggest that expanding social protection policies can prevent vulnerable households from slipping into poverty during financial crises.

Occupation type and economic diversification

Occupation type and economic diversification also influence poverty vulnerability. Kurosaki (2006) in Pakistan found that households engaged in diversified occupations are less susceptible to poverty, as varied income sources provide financial stability. Gunther and Harttgen (2009) similarly observed that households with a single source of income are more vulnerable, as they lack the income diversity needed to withstand economic shocks. These studies highlight the importance of promoting occupational diversity to reduce poverty vulnerability.

Environmental shocks and climate change

Environmental factors and climate change significantly increase poverty vulnerability, especially for agricultural households. Nguyen and Nguyen (2018) argue that households in climate-sensitive regions face higher poverty risks due to the frequent occurrence of natural disasters, which disrupt agricultural productivity. This view is supported by Gallardo and Gallardo

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(2019), who advocate for climate adaptation policies to enhance household resilience in vulnerable regions. These studies highlight that environmental resilience is crucial for poverty reduction, as climate risks disproportionately affect low-income households.

Cultural and community ties

Social capital and cultural ties also play a role in reducing poverty vulnerability. Carter et al. (2007) found that strong community ties help households manage economic shocks by providing informal support. This aligns with findings from Adetoro et al. (2023), who suggest that community-based networks serve as crucial safety nets for vulnerable populations. These insights emphasize that fostering social capital can enhance household resilience, particularly in low-income communities.

Measurement of vulnerability to poverty

Vulnerability to poverty is a concept that measures the likelihood of falling into or remaining in poverty in the future (Ouoya, 2021). Various approaches have been developed to measure this vulnerability, including welfarist, expected poverty, and axiomatic methods (Fujii, 2016). Recent advancements include the Vulnerability to Multidimensional Poverty Index (VMPI), which extends unidimensional measurements to multidimensional space and can be applied to various Multidimensional Poverty Index designs (Gallardo, 2019). Another approach decomposes vulnerability into expected incidence, intensity, and variability below the poverty line, providing insights for risk-management policies (Celidoni, 2015). Empirical studies have shown that poverty and vulnerability are related but distinct concepts, with education and location often being key determinants of vulnerability (Fujii, 2016). The

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measurement of vulnerability to poverty is crucial for implementing sustainable poverty alleviation strategies, as it considers both current and potential future poverty status (Ouoya, 2021).

In recent years, understanding and measuring vulnerability to poverty have become crucial in designing effective poverty alleviation strategies. Unlike poverty, which assesses current deprivation, vulnerability to poverty focuses on the likelihood that households or individuals will fall into poverty in the future. This future-oriented perspective is essential, as it takes into account various risk factors and socioeconomic indicators that may predict poverty, allowing policymakers to take proactive measures. Multiple approaches have been developed to measure vulnerability, reflecting the complex and multi-dimensional nature of poverty risk. Vulnerability to poverty is a concept that measures the likelihood of falling into or remaining in poverty in the future (Ouoya, 2021). Various approaches have been developed to measure this vulnerability, including welfarist, expected poverty, and axiomatic methods.

Gallardo (2019) introduces a multidimensional framework for assessing vulnerability to poverty, termed the Vulnerability to Multidimensional Poverty Index (VMPI). Gallardo expands the traditional mean-risk and downside deviation approach by integrating the Alkire-Foster method, which allows for a flexible examination of both binary and continuous welfare indicators. This approach demonstrates that vulnerability encompasses more than income alone, reflecting multiple dimensions of poverty that give a comprehensive view of household risks. Fujii (2016) reinforces this complexity by outlining three distinct approaches to

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vulnerability measurement: the welfarist approach, which anticipates welfare outcomes; the expected poverty approach, centered on the probability of future poverty; and the axiomatic approach, providing a formal framework for assessing vulnerability. By categorizing these methods, Fujii highlights the necessity of diverse approaches to capture both the probability and intensity of poverty risk, underscoring that each approach offers unique insights into different facets of vulnerability.

Similarly, Ouoya (2021) explores various methodologies, emphasizing income/consumption, asset-based, livelihood, and capability approaches to vulnerability measurement. According to Ouoya, while income or consumption approaches assess the probability of a household's future consumption falling below the poverty line, asset-based methods evaluate a household's resilience through its asset portfolio. This distinction illustrates how different approaches address varied aspects of household resilience, with each method contributing to a multi-dimensional understanding of vulnerability.

In examining individual vulnerability, Celidoni (2015) employs a decomposed Foster-Greer-Thorbecke (FGT) index that captures expected poverty incidence, intensity, and variability. This approach provides a granular analysis by breaking down poverty risk into distinct components, thereby offering policymakers a tool to identify areas where interventions may have the most significant impact. By contrast, Dutta et al. (2014) adopt a multidimensional approach using data from the India Human Development Survey, moving beyond income measures to consider dimensions such as health, education, and living standards. Both studies contribute to the

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argument for multidimensional frameworks, indicating that vulnerability to poverty cannot be fully understood through income alone.

Focusing on predictive modelling, Bah (2013) employs a panel data method in Indonesia to estimate future poverty risk based on household characteristics, using conditional mean and variance estimates of consumption. This forward-looking approach provides insights into the probability of future poverty, identifying households at high risk. Gallardo and Gallardo (2018) expand on this predictive approach by applying a Bayesian Network Classifier in Latin America, incorporating probabilistic elements and risk parameters to assess vulnerability. Their Bayesian approach highlights the importance of accounting for uncertainty and interdependencies between poverty dimensions, highlighting how advanced statistical techniques can strengthen vulnerability assessments.

Hernández and Zuluaga (2022) utilize the Vulnerability as Expected Poverty (VEP) approach in Colombia, which calculates the likelihood of household welfare levels falling below a poverty threshold. This method integrates income forecasts and multi-dimensional data to produce a probabilistic view of future poverty risks, underscoring the importance of anticipating poverty to better target at-risk households. Bronfman (2014) offers a similar forward-looking perspective, estimating vulnerability in Chile by examining households at risk of near-term poverty. Bronfman's findings reveal that the proportion of vulnerable households often surpasses current poverty statistics, underscoring the need for a proactive stance in poverty analysis.

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In rural India, Jha et al. (2018) apply the VEP approach to assess both ex-ante (future risk) and ex-post (current) poverty. Their dynamic model offers a dual perspective that considers present conditions and future risks, a framework useful for designing policies aimed at preventing poverty relapse. This two-tiered approach highlights how comprehensive vulnerability measurement can assist in policymaking, revealing not only who is currently poor but also who is at risk of becoming poor. Celidoni and Procidano (2014) emphasise the significance of data volume in enhancing the predictive power of vulnerability measurements, arguing that more detailed data can improve reliability. This assertion underscores the importance of high-quality, extensive datasets for accurate vulnerability assessments, pointing to a need for investment in data collection.

Naudé et al. (2014) explore the spatial dimensions of vulnerability in developing countries, showing how vulnerability varies significantly across regions. By advocating for subnational data collection, Naudé et al. emphasise the importance of local context, arguing that regional data allows for more targeted and effective poverty alleviation measures. Their approach highlights that vulnerability is not only multi-dimensional but also spatially variant, suggesting that addressing regional inequalities can be crucial for poverty reduction. These studies collectively illustrate that measuring vulnerability to poverty requires a multi-faceted approach, incorporating income, assets, social factors, and predictive frameworks. Each method and metric, from multidimensional indices to probabilistic models, reveals various aspects of vulnerability, contributing to a more nuanced understanding that can support targeted policy interventions.

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Synthesis of Key Socioeconomic Determinants Linking Precarious Employment and Poverty Vulnerability

The empirical review highlights that precarious employment significantly heightens vulnerability to poverty, underscoring the critical role of socioeconomic variables in shaping labour market outcomes. Key determinants such as household size, educational attainment, and employment stability emerge as pivotal in influencing poverty risks. Larger households with high dependency ratios face greater economic burdens, while low educational attainment restricts access to stable and well-paying jobs, perpetuating financial precarity. Employment quality, rather than mere job availability, is emphasized as essential for reducing poverty vulnerability, with stable and diversified income sources providing a buffer against economic shocks. Gender disparities are also prominent, with female-headed households disproportionately affected due to structural barriers limiting access to resources and stable employment. Geographic factors further exacerbate these challenges, as rural and disaster-prone areas often lack infrastructure and employment opportunities, compounding poverty risks. The review also underscores the importance of social protection programs, such as cash transfers, in mitigating poverty vulnerability, alongside informal support networks like remittances and community ties.

In summary, while the literature provides valuable insights into the general determinants of precarious employment, food insecurity, and multidimensional poverty, several critical gaps remain that this study addresses. First, there is a dearth of evidence on inequality of opportunity in precarious employment, particularly in Ghana, where socio-demographic and

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circumstantial factors, such as gender, parental education, and region of birth, are seldom explored in this context. This study fills that gap by quantifying inequality of opportunity and identifying its key drivers using a robust econometric framework. Second, although many studies link employment type to household well-being, the specific mechanisms through which precarious employment leads to food insecurity, such as health shocks and inadequate asset accumulation, remain underexplored. This research advances the literature by unpacking these pathways.

Third, prior analyses on poverty largely focus on income dimensions and current states; however, evidence on how precarious work influences future vulnerability to multidimensional poverty is limited. This study contributes novel insights by forecasting future risk trajectories over 1-, 2-, and 3-year horizons. Finally, it offers a broader operationalization of precarious employment that includes occupational safety and health conditions—an often overlooked but crucial dimension in labour market studies. Collectively, these contributions position the study at the intersection of employment, inequality, and household welfare, advancing both academic discourse and practical policy formulation in support of SDGs 1, 2, and 8, as well as the AU Agenda 2063.

Chapter Summary

This chapter delved into the theoretical foundations and empirical evidence review that is relevant to the thesis. It explored key theoretical frameworks, including Sen's capabilities approach and social stratification theories, to establish a conceptual underpinning for the study. The empirical literature review focused on two primary themes: inequality of opportunity in

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labour market opportunities and the relationships between precarious employment and both food insecurity and poverty/vulnerability. The examination highlighted diverse methodological approaches employed by researchers to investigate unequal employment conditions, precarious work, and their impacts on household well-being.

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CHAPTER THREE

RESEARCH METHODS

Introduction

This study examines the interplay among inequality of opportunity, precarious employment, and household welfare in Ghana, cantering on three core themes: (a) inequality of opportunity within precarious employment, (b) the effect of precarious employment on household food insecurity, and (c) the influence of precarious employment on multidimensional poverty and vulnerability to poverty. The chapter provides a comprehensive outline of the research methodology used to achieve these objectives. The structure of this chapter proceeds as follows: it begins with an overview of the research paradigm, followed by a detailed description of the data sources employed in the study. Subsequent sections delve into the study's specific objectives, the theoretical frameworks applied, the model specifications, and the estimation techniques utilized in each of the three empirical sections. Procedures for conducting post-estimation diagnostics are then discussed, ensuring the robustness of the findings.

Research Paradigm

A research paradigm is a foundational framework that underpins the entire research process, guiding the study's approach to understanding phenomena through its ontological, epistemological, and methodological assumptions (Guba & Lincoln, 1994; Scotland, 2012). Ontology addresses the nature of reality, questioning whether it is objective and external to the observer or shaped by subjective experiences. Epistemology, on the other hand, explores the nature of knowledge, how it is acquired, validated, and

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communicated (Bryman, 2016; Cohen et al., 2007). Together, these foundational elements influence the research methodology, shaping the techniques and processes used to investigate the research problem (Crotty, 1998). By defining how a researcher views the world and interprets data, the paradigm provides a coherent framework that aligns the study's purpose with its methodological approach.

This research adopts a positivist paradigm, which is grounded in a realist ontology and an objectivist epistemology, emphasizing empirical rigor and the pursuit of generalizable knowledge through the systematic application of the scientific method (Friedman, 1966; Cohen et al., 2007; Creswell, 2009; Hovenkamp, 1990). By leveraging secondary data from Ghana's Annual Household Income and Expenditure Survey, the study utilizes positivism to examine the interplay between inequality of opportunity, precarious employment, and household welfare, seeking to identify patterns, establish causal relationships, and make predictions about these complex socio-economic phenomena through objective measurements and testable hypotheses. This philosophical approach aligns with the research objectives, as it facilitates the use of large datasets and statistical analysis to provide evidence-based insights that can contribute to policymaking within the region.

Research Approach

This study adopts a deductive research approach, which aligns with the principles of the positivist paradigm. The deductive approach begins with established theories or frameworks, from which hypotheses are formulated and tested through empirical observation (Crowther & Lancaster, 2008). This approach ensures that the research is grounded in existing knowledge while systematically building upon it through rigorous analysis. In this study,

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hypotheses are drawn from theoretical and empirical literature on inequality of opportunity, precarious employment, and household welfare. These hypotheses are then tested using statistical methods applied to the Ghana Annual Household Income and Expenditure Survey, enabling the research to validate or refine theoretical constructs. The deductive approach is particularly advantageous for studies seeking to quantify relationships and test predictions in well-defined contexts. It allows for a structured exploration of how socio-economic variables interact, offering insights that are both replicable and generalizable. Moreover, the deductive approach's reliance on objective measures ensures that the findings are free from researcher bias, strengthening their credibility and applicability across similar contexts.

Research Design

The research design adopted for this study is a repeated cross-sectional design, which leverages multiple independent cross-sectional surveys conducted at different time points to facilitate the examination of changes in population characteristics and relationships across time, supporting both pooled OLS and individual cross-sectional analyses that align with the study's positivist philosophy and deductive approach (Creswell, 2014). By utilising nationally representative secondary data, the research ensures a robust sample size, enhancing the reliability and generalizability of its findings, while the quantitative focus on collecting and analysing numerical data enables the researchers to test hypotheses and identify patterns, relationships, or causal links among the variables of precarious employment, inequality of opportunity, and household welfare within the Ghanaian context, with the descriptive component summarising the characteristics of these phenomena

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and the explanatory component seeking to uncover their underlying causal mechanisms, providing a comprehensive understanding of the issues and their interplay.

Description of Data Sources

This study draws upon data from the Annual Household Income and Expenditure Survey (AHIES), Ghana's first nationally representative, high-frequency household panel survey administered by the Ghana Statistical Service. AHIES serves as a robust source of quarterly and annual data on household consumption, demographics, and welfare metrics, including labour, food security, multidimensional poverty, and health indicators. These data provide critical insights into national and regional trends, aiding research, policy formulation, and development planning. The AHIES survey is an essential tool for analysing household welfare and living standards across Ghana. It generates vital macroeconomic indicators, such as quarterly and regional GDP, unemployment and underemployment rates, inequality measures, and multidimensional poverty indexes. This comprehensive information assists policymakers, researchers, and development partners in crafting and evaluating various development programs. Furthermore, AHIES aligns with multiple Sustainable Development Goals (SDGs), offering key data on labour, poverty, food security, and health to monitor progress toward these targets.

The survey sample was drawn from the 2021 Population and Housing Census, comprising 10,800 households from 600 Enumeration Areas (EAs) across Ghana. This includes 304 urban and 296 rural EAs, ensuring a balanced representation for national and regional estimates. A random sampling

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technique was employed, selecting 18 households per EA, which allows for representative expenditure estimates that inform GDP calculations. In this research, data from AHIES were utilized across three empirical chapters. The first chapter focuses on data from the fourth quarter, analysing Ghana's individual working population. The second chapter uses data from the first two quarters to concentrate on Ghanaian households, while the third chapter employs data from the first four quarters/full year to meet the study's final objective related to household-level analysis. The following sections delve into each data source in greater detail, outlining the specific use and scope in this research.

Data for the first empirical chapter

This study's first empirical chapter utilizes data from the final quarter of the 2023 Annual Household Income and Expenditure Survey (AHIES), referred to as Wave 4, which encompasses 50,289 individuals (See Figure 6). Wave 4 was selected because it offers comprehensive end-of-year data, minimizing seasonal distortions and providing a representative snapshot of employment conditions in Ghana. To align with the study's objective of examining precarious employment and inequality of opportunity, the sample was refined to include only individuals aged 18–60 who reported being employed for at least seven days during the survey's reference period. This yielded a working subsample of 23,194 individuals. To ensure consistency and continuity in household-level responses, datasets were merged across survey modules using unique household identifiers.

Following the merger, a rigorous data cleaning process was undertaken. First, respondents with missing or inconsistent values in key variables, such as employment status, income, education, parental background, region of birth,

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and access to social protection, were excluded. These variables are central to constructing the precarious employment index and measuring inequality of opportunity. The largest share of exclusions stemmed from missing information on parental education and employment status, which are critical for capturing intergenerational disadvantages. After removing individuals with incomplete data, the final analytical sample consisted of 15,531 individuals (see Figure 6). This cleaned dataset provides a high-quality, representative sample for evaluating precarious employment dynamics and inequality of opportunity across Ghana's labour market.

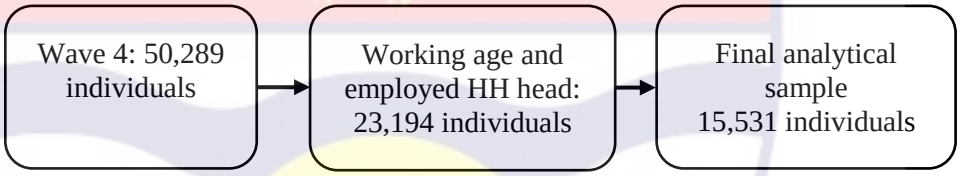


Figure 6: Sample selection process (Waves 4).

Data for the second empirical chapter

For the second empirical chapter, the study employs the first two quarters (referred to as waves 1 and 2) of the 2023 AHIES were analysed (see Figure 7). The choice of waves 1 and 2 (January–June) aligns with Ghana's agricultural calendar, capturing the transition from the dry season to the major planting season, a critical period for understanding how precarious employment and food insecurity intersect with seasonal agricultural activities and household dynamics. Wave 1 includes data from 10,761 households, while wave 2 encompasses 10,628 households, giving a total sample of 21,389 households across both waves. These waves are organized as a balanced panel of 21,240 households, allowing for longitudinal analysis of household behaviour and welfare indicators over time. The focus on a balanced panel is particularly valuable for monitoring changes within households over the study

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period, providing robust data on income stability, employment status, and living standards. To refine the sample for this study's analysis, we focused on working individuals aged 18–60 who reported being employed for at least seven days within the survey's reference period. This selection criterion aligns with the study's goal of examining employment-related factors and precarious employment dynamics in Ghana. Limiting the sample to this age group and employment status reduced the dataset to 17,232 households across the two survey waves.

To ensure data integrity and analytical rigor, the datasets from both waves were merged using unique household identifiers, which facilitated the linkage of household responses across quarters. Following this merge, we conducted further data cleaning to remove observations with missing values in key variables essential to the study's objectives. This process of refining the dataset allowed for the creation of a high-quality analytical sample comprising 15,596 households, ensuring robust and reliable results for evaluating employment trends, household welfare, and income stability across different demographic segments.

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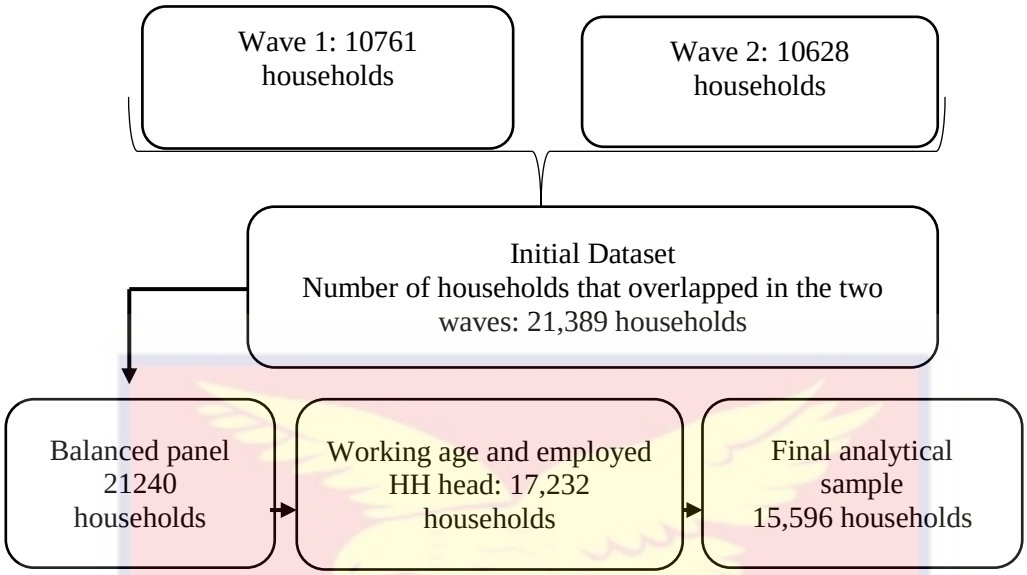


Figure 7: Sample selection process (Waves 1 & 2).

Data for the third empirical chapter

For the third empirical chapter, the study utilises four quarters (waves 1-4) of the 2023 AHIES data (see Figure 8). The choice of all four waves ensures a comprehensive year-round analysis, capturing seasonal variations and economic fluctuations critical for understanding the relationship between employment dynamics and poverty, while leveraging the longitudinal structure of the dataset to track household-level changes over time. The dataset comprises Wave 1 with 10,761 households, Wave 2 with 10,628 households, Wave 3 with 10,469 households, and Wave 4 with 10,112 households, yielding a total sample of 41,970 households across all four waves. These waves are structured as a balanced panel of 39,468 households, enabling comprehensive longitudinal analysis of household dynamics and welfare indicators over an extended period.

To optimize the sample for this study's analytical objectives, we concentrated on working individuals aged 18-60 who reported being employed for at least seven days during the survey's reference period. This selection

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criterion aligns with the study's focus on examining employment-related factors and household economic dynamics in Ghana. Applying this age and employment status filter reduced the dataset to 32,980 households across the four survey waves. To maintain data quality and analytical precision, the datasets from all four waves were merged using unique household identifiers, facilitating the connection of household responses across quarters. Following this merger, comprehensive data cleaning was performed to eliminate observations with missing values in key variables central to the study's objectives. This meticulous refinement process resulted in a final analytical sample of 30,464 households.

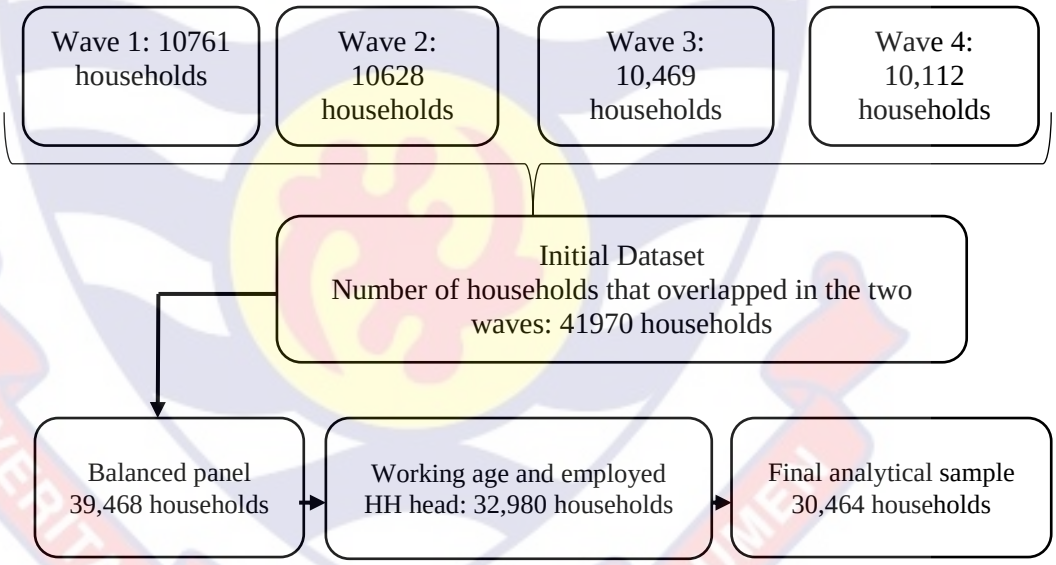


Figure 8: Sample selection process (Wave 1 to 4).

Data Validity and Reliability

Validating secondary data is essential for ensuring the dataset's integrity and accuracy. This process confirms the measurement validity of the variables used in the analysis and assesses the dataset's suitability. Furthermore, reliability involves ensuring that the data is precise; under the same conditions, re-measured variables should yield consistent results. In the

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AHIES, the data underwent a thorough inspection to ensure its integrity and relevance for understanding living standards in Ghana. We began by describing the variables to confirm that the existing coding was valid for our research objectives. Each relevant variable was independently examined and validated against the codebook. During this process, we needed to re-code variables to better align with our specific research objectives, enhancing both their accuracy and clarity. Reliability was a key focus; we aimed to ensure that the measured variables produced consistent results when re-evaluated under the same conditions.

Theoretical Frameworks and Data Analyses Procedure

The following sections outline the theoretical frameworks and data analysis procedures for the three empirical chapters. Each chapter includes details on model specification, estimation techniques, variable definitions, variable measurements, and a priori expectations where applicable.

Inequality of opportunity in precarious employment in Ghana

This empirical chapter addresses three main questions. First, it assesses the level of inequality of opportunity in precarious employment in Ghana. Second, it identifies the circumstantial determinants that contribute to precarious employment, such as gender, region of birth, ethnicity, and family background. Third, it examines how inequality of opportunity manifests within precarious employment, focusing on how disparities in employment outcomes vary across different demographic and socio-economic groups.

Model specification

Recent years have seen a surge in interest surrounding inequality of opportunity. Economist Paul Roemer proposed a framework for dissecting total inequality into two components: effort-based inequality and inequality

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arising from circumstances beyond individual control, which he terms opportunity inequality. The model employed in this study builds upon this foundational concept.

Consider a society of N individuals that possess a unique set of characteristics. These characteristics can be divided into two categories: controllable and uncontrollable. Uncontrollable characteristics, represented by a vector of circumstances $S_i, i \in \{1, \dots, N\}$, (e.g., gender), are factors beyond an individual's influence. We assume that S_i consist of K distinct circumstances k, and each element S_i^k takes on a finite number of values, $x_k, \forall\, i$. This helps partition the population into V types, sets of persons with the same set of circumstances, given by $\Pi \in \{T_1, T_2, T_3, \dots, T_v\}$ such that $T_1 \cup \dots \cup T_v = \{1, \dots, N\}$, $T_p \cap T_z = \Omega, \forall\, p, z$ and $S_t = C_k, \forall\, t, k/t \in T_v\, k \in T_k, \forall\, v$. The maximum possible number of types is given by $V = \Pi_{k=1}^{k} x_k$.

Measuring Inequality of Opportunity in Precarious Employment

This study adopts the concept of inequality of opportunity (IOp) to explore the extent to which disparities in precarious employment outcomes in Ghana are attributable to circumstances beyond individuals' control, such as gender, region of birth, or family background, rather than to effort or merit. In this context, "opportunity" refers to the fair chance individuals should have to access secure and decent employment regardless of their background characteristics. When individuals from disadvantaged groups face systematically higher risks of precarious employment—despite similar effort levels, it reflects an inequality of opportunity, which is ethically and economically concerning.

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To estimate IOp in precarious employment, individuals are grouped into "types" based on shared combinations of circumstance variables (e.g., gender and birth location). For example, combining two gender categories (male/female) with two birth location categories (urban/rural) yields four basic types. These types represent the defined reference groups whose average outcomes can be compared. The intuition is that inequality between types is due to effort or other unobserved factors, while inequality *between* types reflects differences in opportunity.

In empirical IOp literature, two dominant approaches exist for estimating such disparities: non-parametric and parametric methods. The non-parametric approach estimates IOp by comparing the smoothed outcome distributions across types (i.e., assigning each individual the average outcome of their type). While robust and distribution-based, this method requires sufficiently large samples within each type to yield reliable estimates. Due to data limitations in this study, particularly sparsity across certain circumstance-defined types, the non-parametric approach was deemed infeasible.

Instead, this study adopts a parametric approach grounded in Roemer's (1998) equal opportunity framework and developed further by Ferreira and Gignoux (2011), which is widely used when facing sample size constraints. Specifically, a linear model is employed to estimate the share of total variation in precarious employment outcomes explained by circumstances. This is not done to model causal determinants per se, but to decompose outcome inequality into circumstance- and effort-related components. The model specification is as follows:

$$\rho_i = f(S_i, E(S_i, v_i), u_i)$$

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Where: ρ_i is the predicted probability of precarious employment for individual i, S_i denotes a vector of circumstance variables, $E(S_i, v_i)$ captures how effort may depend on circumstances and other unobservables, and u_i is the error term.

The explanatory power of the model—measured through the R-squared statistics interpreted as the share of variation in precarious employment explained by circumstances, thus serving as a proxy for IOp. Although the use of a linear model may resemble traditional regression analysis aimed at identifying determinants, the objective here is fundamentally different: it is to quantify inequality due to exogenous factors, not to infer causality.

The examiner rightly notes that commonly used tools for inequality analysis, such as the Lorenz curve, Gini coefficient, Theil index, Palma ratio, or decile ratios, are valuable in summarising income or welfare inequality. However, these indices are best suited for analysing overall outcome inequality rather than isolating the share of inequality attributable to unfair circumstances. In contrast, the parametric decomposition employed here directly estimates the inequality of opportunity component within total inequality. Nevertheless, to strengthen the analysis, the study includes robustness checks using the mean log deviation (MLD)—a decomposable Theil-like index—on both the total and smoothed outcome distributions. This additional step confirms the magnitude of inequality attributable to circumstance-defined types, thereby reinforcing the findings derived from the linear decomposition.

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Parametric estimation of inequality of opportunity in precarious employment

Building upon the frameworks established by Bourguignon et al. (2007) and Ferreira and Gignoux (2011) for measuring inequality of opportunity, we apply this approach to analyse inequality of opportunity in precarious employment within the Ghanaian context.

Based on Eq. (1), a linear model is specified in the form below:

$$\rho_i = S_i\alpha + E_i\beta + u_i \quad (2)$$

$$E_i = S_i\gamma + v_i \quad (3)$$

This translates to a reduced-form model (2) and (3) is $\rho_i = S_i(\alpha + \beta\gamma) + v_i\beta + u_i$, which can be estimated by OLS as follows:

$$\rho_i = S_i\varphi + \varepsilon_i \quad (4)$$

Based on the estimated parameter value φ and the actual characteristics of individuals (circumstances), the counterfactual distribution is given by:

$$\tilde{\rho}_i = \exp(S_i\hat{\varphi}) \quad (5)$$

In this counterfactual distribution where ρ is replaced with its prediction, all within-type inequality is eliminated since the circumstance is identical for all individuals in each type. It thereby provides two measures of inequality of opportunity in precarious employment: absolute measure of inequality of opportunity in precarious employment, $IOA = I(\{\tilde{\rho}_i\})$, and a relative share of inequality of opportunity IOR= I($\{\tilde{\rho}_i\}$). The absolute measure of inequality of opportunity (IOA) quantifies the overall level of inequality of opportunity in precarious employment. The relative share of inequality of opportunity (IOR) represents the proportion of the total inequality that can be

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attributed to differences in opportunities, as opposed to differences in individual efforts or circumstances.

The study employs the General Entropy index of degree zero (GE(0)) for decomposing inequality, as it provides a path-invariant result. Common indices within the generalized entropy class include GE(0), GE(1) (Theil index), and GE(2) (half the coefficient of variation). Unlike previous research using the Gini coefficient, GE(0) and GE(1) cannot be used here due to the properties of the precarious employment variable. Specifically, it ranges from 0 to 1, with many values at the bounds, so taking the log is not possible. This leaves GE(2) as the only applicable index from the generalized entropy family. To confirm the path-invariance, inequality of opportunity is calculated using two decomposition approaches. While the results are not expected to differ greatly given the choice of GE(2), calculating both paths serves to validate the property holds. In summary, the selection of GE(2) is necessitated by the bounded nature of precarious employment as the outcome measure being analysed, justifying its usage and the dual-path calculation for validation purposes.

It is important to note that omitted circumstance variable bias may be present, given data limitations. If some unobserved circumstances captured in the error term are correlated with observed circumstances, the estimated coefficients will be biased. However, the aim here is not to establish causal effects of specific circumstances but rather to provide reasonable measures of inequality associated with all factors linked to observed circumstances. IOA and IOR can thus be interpreted as lower-bound estimates of the 'true inequality of opportunity' - the amount that would be identified if complete

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data captured all impactful circumstances. This acknowledges that due to unavailable circumstance variables, the measured inequality attributable to circumstances is likely conservative (Ferreira and Gignoux, 2011; Golley and Kong, 2016).

Partial contributions of each of the circumstances

Whiles the previous section estimated the overall inequality of opportunity in precarious employment, this segment will discuss the partial contributions of each of the circumstance variables. To estimate the share of inequality of opportunity associated with each circumstance K, the following alternative counterfactual distribution is constructed as per Ferreira and Gignoux (2011):

$$\rho_i^k = \exp(\bar{S}^k \hat{\varphi}^k + S_i^{k\neq K} \varphi^{k\neq K} + \hat{\varepsilon}_i) \quad (6)$$

We then assign the average level of circumstance K to individuals for one circumstance at a time to calculate absolute and relative measures of inequality of opportunity in precarious employment $IOA_L^K = \mathrm{I}(\{\rho_i\}) - \mathrm{I}(\{\tilde{\rho}_i^K\})$ and $IOR_L^K = 1 - \mathrm{I}(\{\tilde{\rho}_i^K\})/\mathrm{I}(\{\rho_i\})$.

While Ferreira and Gignoux's (2011) initial approach seemed promising, their subsequent corrigendum (Bourguignon et al., 2013) revealed limitations in its reliability. Therefore, we adopt a Shapley value decomposition, building on the methods proposed by Shorrocks (1982, 2012) and Björklund et al. (2011). This approach involves estimating inequality measures for all possible re-arrangements of the circumstance variables. By calculating the average impact of each circumstance on the overall inequality of opportunity measure, we can assess their relative contributions. This method offers two key advantages over the previous approach. First, it

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acknowledges that the order in which circumstances influence inequality can be important. Second, the individual contributions of each circumstance variable sum up to the total inequality of opportunity, ensuring a clear and verifiable breakdown (Juarez & Soloaga, 2014).

We proceed to build four cohorts according to the relevant Ghanaian historical events to examine how labour market experiences may have varied across different eras. As shown in Table 1, Cohort 1 consisted of individuals aged 18-30 years old born between 1992-2004, representing those entering the Ghanaian labour market during a period of economic growth and development. Cohort 2 comprised ages 31-40 born 1982-1991, a group further along in their careers when the country was working to boost education and industry after a regime change in the early 1980s. Cohort 3 covered the 41-50 age range born from 1972-1981, joining the workforce as Ghana solidified policies to address national development challenges through new programs and initiatives. The oldest cohort, Cohort 4 aged 51-60 born from 1962-1971, offered insight into those with significant work experience from earlier in Ghana's development after independence when systems and institutions were still being formed. The table presents the years each cohort is composed and the sample size without missing values.

Table 1: Cohort Description

Cohort	Date of birth	Years (old)
1	1992-2004	18–30 years
2	1982-1991	31–40 years
3	1972-1981	41–50 years
4	1962-1971	51-60 years

Source: Author's Construct, 2024

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Definition, justification and measurement of variables

Precarious employment

We adapt the precarious employment measurement using the most current conceptualization of precarity as a multidimensional construct (Fernandes, 2023; González et al., 2021; Garca-Pérez et al., 2017). Our multidimensional measure incorporates employment categorization and encapsulates precariousness features of various types of work that imply high levels of precarity (Baek et al., 2023; Burgess & Campbell, 1998). Four dimensions (see Appendix S2) are considered in this study: (i) income inadequacy, (ii) employment insecurity, (iii) lack of rights and protection and (iv) unsafe or unhealthy work environment (González et al., 2021; Rönnblad et al., 2019; García-Pérez et al., 2017). To signify precarity or deprivation, each dimension is represented as a binary variable ("No" = 0; "Yes" = 1). Following Alkire and Foster's (2011) technique, we gave equal weight (1/4) to each category and computed a multidimensional precarious employment score (González et al., 2021; Garca-Pérez et al., 2017). As a result, a rise in the precarity score suggests a greater intensity of precarious employment.

$$PE_i = w_1 I_{1i} + w_2 I_{2i} + w_3 I_{3i} + \cdots + w_d I_{di} \quad (7)$$

Where PE_i denote a household precarious employment score, I_{di} = 1 if household i is deprived in indicator d (and I_{di} = 0 otherwise) and w_d is the weight associated with indicator i with $\sum_{d=1}^{D} w_d = 1$. We use a dual threshold technique and set the cut-off at 0.5, as in prior research (Nkansah & Battaglia, 2023; Koomson & Churchill, 2022). This implies that if an individual precarity score exceeds 0.5, we give a value of 1 to represent more precarity; otherwise, we assign a value of 0. To check the sensitivity of the main results,

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we also use other two sources of energy, i.e., gasoline and coal, to test whether the main results are robust by examining inequality of opportunity in precarious employment.

Circumstantial independent variables

Following the idea of inequality of opportunity literature (Palmisano, Biagi, & Peragine, 2022; Gustafsson, & Sicular, 2021; Vega, Lekuona, & Orbe, 2020; Carrieri and Jones, 2018; Mage-Bertomeu et al., 2017; Singh, 2012; Ferreira and Gignoux, 2011; Bourguignon et al., 2007), this paper uses five circumstance variables including gender, place of birth, household head education and occupation and, ethnicity. All these variables are beyond the control of individuals.

Gender

Gender, as a variable, captures the significant disparities in precarious employment, where women, especially those with caregiving responsibilities, experience heightened vulnerability compared to men (Albelda et al., 2020; Allmang & Franke, 2020). Studies reveal that women are more likely to remain in unstable employment due to historical labour divisions, sex-based discrimination, and structural factors that reinforce job insecurity (Betti, 2016). Furthermore, precarious work impacts health differently by gender, with women experiencing distinct stress responses (Julià et al., 2022). This study measures gender as a binary variable (1 for female, 0 for male) to examine these differential impacts and to underscore the need for gender-focused interventions in precarious employment.

Place of Birth

Place of birth is a key variable that reflects the disparities in precarious employment based on urban and rural backgrounds. Research demonstrates

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that individuals born in rural areas often face restricted access to economic opportunities compared to their urban counterparts due to geographical and infrastructural limitations (Afridi et al., 2015). This divide is rooted in systems like China's hukou registration, which has historically restricted rural residents' mobility and access to urban employment, reinforcing economic inequality between regions. The concept of "place precarity" further emphasizes how local labour market conditions contribute to employment instability, particularly affecting individuals from economically disadvantaged rural regions (Simpson et al., 2021). In this study, place of birth is measured as a binary variable, coded as 0 for urban and 1 for rural, to analyse how one's birth location influences their likelihood of experiencing precarious employment, providing insights into the need for location-targeted policies to reduce labour market inequalities.

Region of Birth

Region of birth is included as a variable to capture the disparities in employment outcomes associated with different geographical origins within Ghana. Ghana exhibits considerable regional diversity, with areas at varying stages of socio-economic development. For instance, the Savannah region, predominantly rural, often faces limited access to infrastructure and economic opportunities, which may heighten the likelihood of individuals from this area experiencing precarious employment. Conversely, Greater Accra is the country's economic hub, offering more employment opportunities and access to resources compared to other regions, which justifies its distinction from the Coastal region in this study. The Coastal and Forest regions, each with unique economic characteristics, further contribute to the varied landscape of

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opportunity and employment conditions in Ghana (Kanbur & Zhang, 2005; Cheong & Wu, 2014). By categorizing region of birth into four groups, Savannah (0), Greater Accra (1), Coastal (2), and Forest (3), this study aims to examine how regional disparities in socio-economic development and access to resources influence precarious employment, providing insight into the role of birthplace in shaping labour market experiences.

Ethnicity

Ethnicity serves as an important variable to capture the disparities in precarious employment experienced by different ethnic groups. Research highlights that ethnic minorities and migrant workers often face higher levels of job insecurity, limited career progression, and discriminatory work practices (Arday, 2022; Zhang et al., 2021). For example, studies show that firm-level segregation and discordance between workers and managers contribute to unstable scheduling and lower job security for non-white employees, with particularly pronounced effects on women in minority groups (Storer et al., 2020). Additionally, precarious employment has been linked to greater energy poverty risks, especially for marginalized ethnic groups, as shown in a South African context where Black workers experienced higher energy poverty compared to other racial groups (Koomson & Churchill, 2022). This study measures ethnicity as a categorical variable with five groups: 0 = Akan, 1 = Ga-Dangme, 2 = Ewe, 3 = Mole-Dagbani, and 4 = Others, to better understand how ethnic background influences exposure to precarious employment and to inform the need for targeted policy interventions addressing ethnic disparities in the labour market.

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Household Head Occupation

Household head occupation is a critical variable in examining economic security and household welfare, as it reflects the type of employment and associated income stability accessible to the family. Research highlights that the occupation of a household head significantly influences a household's socioeconomic status, affecting access to resources, job security, and vulnerability to precarious employment (Singh, 2012; Ferreira & Gignoux, 2011). In this study, household head occupation is categorized into five groups: Public Wage Earner (0), Unpaid Private Worker (1), Private Wage Earner (2), Self-Employed (3), and Other (4). This classification enables an analysis of how varying occupational types contribute to income variability and economic resilience within Ghana. For instance, public wage earners often have more stable income sources compared to those in private, self-employed, or unpaid positions, which may influence household vulnerability to economic shocks. By examining these occupational categories, this study aims to capture the nuanced impacts of employment type on household welfare and stability in Ghana.

Household Head Education Level

Household head education level is included as an essential indicator to measure family background, as it significantly influences economic opportunities and living standards within Ghana. Research shows that family background, particularly the educational attainment of the household head, can have profound implications for household income, resource access, and overall consumption patterns (Singh, 2012; Ferreira & Gignoux, 2011). A household head with higher educational qualifications is likely to have better

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employment prospects, which can increase household income and improve living conditions. For this study, household head education is classified into four categories: illiterate (0), below secondary (1), secondary (2), and tertiary (3), with illiterate serving as the reference group. This variable allows us to examine how differences in educational attainment among household heads impact economic stability and vulnerability, particularly regarding access to resources and employment security in Ghana's labour market.

Household Wealth Quintiles

Household wealth quintiles are an essential measure of socioeconomic status, capturing the disparities in asset ownership and access to resources within households. Studies have shown that wealth is a significant determinant of household well-being, influencing access to education, healthcare, and basic utilities (Singh, 2012; Ferreira & Gignoux, 2011). In this study, household wealth is categorized into five quintiles: Poorest Quintile (0), Poor Quintile (1), Middle Quintile (2), Wealthy Quintile (3), and Wealthiest Quintile (4). This classification allows for an analysis of how wealth distribution impacts household consumption patterns and economic resilience in Ghana. Households in the wealthiest quintiles typically enjoy greater access to amenities and financial security, while those in the poorest quintile are more susceptible to economic shocks and may face challenges in meeting basic needs. By examining these quintiles, the study aims to capture the relationship between household wealth and vulnerability, offering insights into how economic disparities shape the living conditions and stability of Ghanaian households. Table 2 presents the summary of definition and measurement of variables.

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Table 2: Definition and Measurement of Variables

Variable	Description	A priori sign
Precarious employment score	Multidimensional index of employment precarity on continuous 0 to 1 scale.	+
Precarious employment (0/1)	Binary variable (1 = precarity score exceeds 0.5 threshold)	+
Gender	Binary variable (1 = female, 0 = male)	+
Place of Birth	Binary variable (0 = urban, 1 = rural)	-
Region of Birth	Categorical variable: Savannah (0), Greater Accra (1), Coastal (2), Forest (3)	+/-
Ethnicity	Categorical variable: Akan (0), Ga-Dangme (1), Ewe (2), Mole-Dagbani (3), Others (4)	+/-
Household Head Occupation	Categorical variable: Public Wage Earner (0), Unpaid Worker Private (1), Wage Earner Private (2), Self-Employed (3), Other (4)	+/-
Household Head Education Level	Categorical variable: Illiterate (0), Below Secondary (1), Secondary (2), Tertiary (3)	+
Household Wealth Quintiles	Categorical variable: Poorest Quintile (0), Poor Quintile (1), Middle Quintile (2), Wealthy Quintile (3), Wealthiest Quintile (4)	+

Source: Author's Construct, 2024

Precarious employment and household food insecurity in Ghana

This is the second empirical chapter of the study. To summarize, this chapter has four main objectives. The first is to examine how precarious employment influences food insecurity in Ghana. The second objective investigates the relative effects of various dimensions of precarious employment on food insecurity. The third objective looks at the moderating effect of social safety nets on the relationship between precarious employment

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and household food insecurity. Finally, the fourth objective examines the role of health shocks and household asset accumulation as potential pathways through which precarious employment affects food insecurity.

Model specification

In this facet, we outline the empirical model that examines the relationship between precarious employment (PE) and food insecurity in Ghana. Specifically, we specify the household demand function for PE as follows:

$$FII = H(PE, Z) \tag{8}$$

where FII is the food insecurity level for the household, PE is the precarious employment status of a household, and Z compresses the household head characteristics, household variables, district variables and ecological zone. These variables include gender, age, education level, marital status, household size, dependents, safety net program, sector of employment, location, ecological zones, farm households, basic schools in a district, share of a district's housing density, and district electricity access. Based on equation 8, the explicit econometric model that can be estimated is expressed as follows:

$$FII_{it} = \alpha + \gamma PE_i + \eta Z_i + \psi_p + \mu_t + \nu_i \tag{9}$$

Aside FII, PE and Z that is explained above, i and t denote specific household and time respectively. Furthermore, the model accounts for fixed effects, including ψ_p representing ecological zone fixed effects and μ_t representing month-fixed effects. The inclusion of ecological zone fixed effects help controls for time-invariant, location-specific characteristics that may influence agricultural production and food availability, while month-fixed effects account for seasonal fluctuations in food production, prices, and access

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- factors rooted in the seasonality of food and crucial for understanding food security dynamics in the study context. The random error term is denoted as v. Using the variables itemised in the previous section, equation (9) is represented with the mismeasured regressor and control variables as:

$$FII_{it} = \alpha + \gamma_1 PE_i + \gamma_2 age_i + \gamma_3 female_i + \gamma_4 edu_i + \gamma_5 rural_i + \gamma_6 hhsize_i + \gamma_7 hhsizesquare_i + \gamma_8 marital_status_i + \gamma_9 SP_i + \gamma_{10} sector_i + \gamma_{11} farm_hh_i + \gamma_{12} head_dis_i + \gamma_{13} basic_sch_i + \gamma_{14} hous_density_i + \gamma_{51} access_electr_i + \psi_p + \mu_t + \nu_i \quad (10)$$

where age denote age of the household head, $female$ denote sex of the household head, edu denote level of education of the household head, $rural$ denote residence or location of the household head, $hhsize$ denote number of members of a particular household, $hhsizesquare$ denote square of the household size, $marital_status$ denote marital status of household head, SP denote whether any member of the household is under a Social safety net program, $sector$ denote the sector of employment of the head, $farm_hh$ denote if the household is into farming, $head_dis$ denote household head who is disabled, $basic_sch$ denote Number of Basic schools per district, $hous_density$ denote Share of district's housing density, and $access_electr$ denote district access to electricity.

Identification

In empirical research, identification is the process of ensuring that the observed relationship between variables reflects a true causal effect rather than being distorted by factors like omitted variables, reverse causality, or measurement error (Bollen & Pearl, 2013). In the context of studying the effect of precarious employment (PE) on food insecurity (FII), three primary

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sources of endogeneity are noted: omitted variable bias, reverse causality, and measurement error. Each of these sources is critical to consider for ensuring the validity and robustness of the empirical findings.

Sources of Endogeneity

One major source of endogeneity is *omitted variable bias*, which occurs when key factors influencing both precarious employment and food insecurity are left out of the model. For instance, household characteristics such as access to informal support networks, resilience, or even regional economic conditions, like unemployment rates, could influence both a household's likelihood of being in precarious employment and its level of food security. If these factors are not included in the analysis, their effects could be wrongly attributed to precarious employment, resulting in biased estimates. Previous studies (e.g., Nkansah & Battaglia, 2023; Koomson & Churchill, 2022) emphasize that ignoring such factors can lead to incorrect conclusions about the relationship between employment conditions and household welfare.

Another source of endogeneity is *reverse causality*, which arises when the direction of causation between PE and FII is unclear or bidirectional. Precarious employment can lead to food insecurity by reducing income stability and limiting the ability of households to afford adequate nutrition. Conversely, food-insecure households may accept precarious jobs out of desperation to meet basic needs. For example, a household struggling with severe food shortages might take on temporary, low-paying work to avoid hunger, even if the job lacks long-term stability. This mutual causation makes it difficult to determine whether PE causes FII, or vice versa, creating ambiguity in the interpretation of results (Nunoo et al., 2018).

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The third challenge is measurement error, which can arise when variables are not accurately measured. For instance, precarious employment might be underreported due to misclassification, as some individuals may perceive their jobs as stable despite facing low wages or job insecurity. Similarly, food insecurity may be underreported due to stigma or misunderstanding of survey questions. This is further compounded by the fact that both precarious employment and food insecurity are constructed as indices, which can introduce additional measurement error and affect the relationship between these variables. Measurement errors create a correlation between the explanatory variable and the error term, weakening the accuracy of the results and potentially leading to misleading conclusions (Carter & Barrett, 2006).

Addressing Endogeneity

To address the potential endogeneity issue, we apply the Two-Stage Least Squares (2SLS) instrumental variable approach, as outlined in equations (11) and (12). In the first stage, equation (11) represents the reduced-form equation. This stage involves regressing the endogenous variable (PE) on the instrumental variable(s) and any exogenous covariates to generate predicted values that are uncorrelated with the error term. These predicted values are then used in the second stage to estimate the effect of PE on food insecurity, effectively mitigating any bias from endogeneity. The equation (11) specifies the reduced form equation in stage 1:

$$PE_i = \psi + \phi \text{CASEMP}_i + \beta X_i + \gamma_{jt} + \vartheta_i + \varepsilon_i \quad (11)$$

Whereas equation (22) specifies the structural equation in stage 2 as:

$$FII_{it} = \beta_0 + \beta_1 \widehat{PE}_i + \beta_2 X_i + \gamma_{jt} + \vartheta_i + \varepsilon_i \quad (12)$$

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In equations (11) and (12), all variables are as previously defined in equation (10), except for the casual employment rate within an individual's sector of employment (CASEMP), which is used as an instrumental variable for PE. The selection of CASEMP as an instrumental variable for PE rests on two critical criteria: relevance and exogeneity. Regarding relevance, CASEMP is directly linked to the likelihood of experiencing precarious employment. Sectors with higher rates of casual employment are generally characterized by unstable working conditions, lack of job security, and minimal benefits, making them a significant determinant of precarious employment prevalence (Hopkins, 2016). This strong correlation ensures that CASEMP captures meaningful variations in precarious employment, satisfying the relevance condition required for a valid instrument.

In terms of exogeneity, the assumption is that CASEMP affects food insecurity solely through its influence on precarious employment. While higher rates of casual employment may lead to greater acceptance of precarious work due to limited alternatives, this variable is not expected to have a direct impact on a household's food security status. The indirect pathway—where casual employment rates influence food insecurity through their effect on PE—supports the validity of CASEMP as an instrument. This satisfies the exogeneity condition, which requires that the instrument is uncorrelated with the error term in the structural equation, ensuring that any observed relationship between CASEMP and food insecurity is mediated through precarious employment. Thus, any observed relationship between CASEMP and food insecurity is mediated through precarious employment (Wooldridge, 2010).

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The Mitigating Role of Social Safety Nets in the Precarious Employment-Food Insecurity Nexus

The relationship between precarious employment (PE) and food insecurity (FII) is complex and influenced by multiple socio-economic factors. This study explores social safety nets (SP) as a key mitigating factor in addressing food insecurity among precariously employed households. Social safety nets have demonstrated effectiveness in addressing structural vulnerabilities by providing immediate relief and enhancing households' capacity to invest in productive activities. For households engaged in precarious employment, these interventions can offset negative income effects, stabilize consumption, and reduce reliance on unstable work arrangements. Research evidence from low- and middle-income countries suggests that social safety nets play a crucial role in mitigating the adverse effects of economic and employment shocks on household welfare (Barrientos & Hulme, 2008; Gentilini et al., 2019).

To investigate how social safety nets moderate the relationship between precarious employment and food insecurity, we extend the baseline empirical model specified in Equation (10). The modified model explicitly includes interaction terms between precarious employment and social safety nets, as well as the direct effects of safety nets. The extended model is specified as follows:

$$FII_{it} = \alpha + \eta_1 \widehat{\boldsymbol{PE}}_i + \eta_2 age_i + \eta_3 female_i + \eta_4 edu_i + \eta_5 rural_i + \eta_6 hhsize_i + \eta_7 hhsizesquare_i + \eta_8 marital_status_i + \eta_9 \boldsymbol{SP}_i + \eta_{10} \boldsymbol{PE} * \boldsymbol{SP}_i +$$

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$$\eta_{11}sector_i + \eta_{12}farm_hh_i + \eta_{13}head_dis_i + \eta_{14}basic_sch_i + \eta_{15}hous_density_i + \eta_{16}access_electr_i + \psi_p + \mu_t + \nu_i \quad (13)$$

Potential pathway analysis

This study explores the relationship between precarious employment and food insecurity, with a focus on health shock and asset accumulation as potential mediating pathways. A two-step approach is employed to understand how these factors interact to influence food insecurity. In the first step, we establish a significant connection between precarious employment, health shock (shck), and asset accumulation (asset). Initially, we specify the relationship between the independent variable (precarious employment, PE) and the mediator (health shock), aiming to assess how health shocks might influence or mediate the impact of precarious employment on food insecurity.

$$\boldsymbol{PE}_{it} = \alpha + \rho_1 \boldsymbol{shck}_i + \rho_2 age_i + \rho_3 female_i + \rho_4 edu_i + \rho_5 rural_i + \rho_6 hhsize_i + \rho_7 hhsizesquare_i + \rho_8 marital_status_i + \rho_9 SP_i + \rho_{10} sector_i + \rho_{11} farm_hh_i + \rho_{12} head_dis_i + \rho_{13} basic_sch_i + \rho_{14} hous_density_i + \rho_{15} access_electr_i + \psi_p + \mu_t + \nu_i \quad (14)$$

In the second step, the health shock ($shck$) variable was included as an additional covariate in the food insecurity model (equation 15) to evaluate its effect on the relationship between PE and food insecurity (FII):

$$\boldsymbol{FII}_{it} = \alpha + \rho_1 \widehat{\boldsymbol{PE}}_i + \rho_2 \boldsymbol{shck}_i + \rho_3 age_i + \rho_4 female_i + \rho_5 edu_i + \rho_6 rural_i + \rho_7 hhsize_i + \rho_8 hhsizesquare_i + \rho_9 marital_status_i + \rho_{10} SP_i + \rho_{11} sector_i + \rho_{12} farm_hh_i + \rho_{13} head_dis_i + \rho_{14} basic_sch_i + \rho_{15} hous_density_i + \rho_{16} access_electr_i + \psi_p + \mu_t +$$

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(15)

Similarly, we apply the same approach to examine household asset accumulation. First, we specify the relationship between the independent variable (PE) and the mediator (household durable asset accumulation):

$$\boldsymbol{PE}_i = \alpha + \rho_1 \boldsymbol{asset}_i + \rho_2 age_{it} + \rho_3 female_i + \rho_4 edu_i + \rho_5 rural_i + \rho_6 hhsize_i + \rho_7 hhsizesquare_i + \rho_8 marital_status_i + \rho_9 SP_i + \rho_{10} sector_i + \rho_{11} farm_hh_i + \rho_{12} head_dis_i + \rho_{13} basic_sch_i + \rho_{14} hous_density_i + \rho_{15} access_electr_i + \psi_p + \mu_t + \nu_i$$

(16)

In the subsequent stage of analysis, the household durable asset accumulation variable was included as an additional covariate in the food insecurity model (equation 17) to examine its influence on the relationship between PE and food insecurity (FII). This approach allows for a clearer understanding of how the independent variable (PE) and the mediator (health shock) jointly affect the dependent variable (FII):

$$\boldsymbol{FII}_{it} = \alpha + \rho_1 \widehat{\boldsymbol{PE}}_i + \rho_2 \boldsymbol{asset}_i + \rho_3 age_i + \rho_4 female_i + \rho_5 edu_i + \rho_6 rural_i + \rho_7 hhsize_i + \rho_8 hhsizesquare_i + \rho_9 marital_status_i + \rho_{10} SP_i + \rho_{11} sector_{it} + \rho_{12} farm_hh_i + \rho_{13} head_dis_i + \rho_{14} basic_sch_i + \rho_{15} hous_density_i + \rho_{16} access_electr_i + \psi_p + \mu_t + \nu_i \quad (17)$$

Definition, justification and measurement of variables

Precarious employment

In this study, we adapt the precarious employment measurement using the most current conceptualization of precarity as a multidimensional

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construct (Fernandes, 2023; González et al., 2021; Garca-Pérez et al., 2017). Our multidimensional measure incorporates employment categorization and summarises precariousness features of various types of work that imply high levels of precarity (Baek et al., 2023; Burgess & Campbell, 1998). Four dimensions (see Appendix S2) are considered in this study: (i) income inadequacy, (ii) employment insecurity, (iii) lack of rights and protection and (iv) unsafe or unhealthy work environment (González et al., 2021; Rönnblad et al., 2019; García-Pérez et al., 2017). To signify precarity or deprivation, each dimension is represented as a binary variable ("No" = 0; "Yes" = 1). Following Alkire and Foster's (2011) technique, we gave equal weight (1/4) to each category and computed a multidimensional precarious employment score (González et al., 2021; Garca-Pérez et al., 2017). As a result, a rise in the precarity score suggests a greater intensity of precarious employment.

$$PE_i = w_1 I_{1i} + w_2 I_{2i} + w_3 I_{3i} + \cdots + w_d I_{di} \quad (18)$$

Where PE_i denote a household precarious employment score, I_{di} = 1 if household i is deprived in indicator d (and I_{di}= 0 otherwise) and w_d is the weight associated with indicator i with $\sum_{d=1}^{D} w_d = 1$.

We use a dual threshold technique and set the cut-off at 0.5, as in prior research (Nkansah & Battaglia, 2023; Koomson & Churchill, 2022). This implies that if a household's precarity score exceeds 0.5, we give a value of 1 to represent more precarity; otherwise, we assign a value of 0. While the precarity score is our main analytical metric, we also use a binary version for robustness tests and other weighting and cut-off as a sensitivity analyses.

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Household food insecurity

In this study, food insecurity is measured using the Rasch model applied to a standardized set of eight basic Yes/No questions (where "Yes" is coded as 1 and "No" as 0, as shown in Appendix Table S1). Based on these questions, the Food Insecurity Experience Scale (FIES) which has been extensively embraced in the literature as an objective assessment of households' food insecurity was used (Koomson & Churchill, 2021; Cafiero et al., 2018; FAO, 2013). Household food insecurity is measured using a model developed by Rasch that is based on the one-parameter logistic model. Equation (1) describes the Rasch model formula:

$$P_{ij} = P\left(X_{ij} = 1 \middle| \omega_j, \beta_i\right) = \frac{\exp(\vartheta_j - \beta_i)}{1+\exp(\vartheta_j - \beta_i)} \quad (19)$$

where, X_{ij} to the probability that household i gives affirmative response to FIES item j. The level of difficulty or severity component of the FIES items is expressed by β_i, while ϑ_j reflects an individual's capacity to accurately reply to the FIES question and shows the extent of food insecurity within the household. If β remains constant and ϑ increases, food insecurity is more likely (Koomson & Churchill, 2021). The total food insecurity score goes from 0 to 1, with a higher value indicating greater food insecurity. In addition, the study incorporated established measures of food insecurity in addition to Rasch's modelling of the FIES, including the multidimensional index, principal component analysis, and raw score (additive index). This allowed the researchers to validate the Rasch results by comparing them to other measures, providing a more robust assessment by leveraging each technique's strengths (Koomson et al., 2023). These multiple measures from the FIES engender a

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more comprehensive cardinal and ordinal insights into the nature, prevalence, and impact of food insecurity

Age of head

The *Age of Household Head* is a continuous variable measured in years and is included to capture the potential influence of age on the relationship between precarious employment and food insecurity. Age can act as either an increasing or decreasing factor in vulnerability to poverty, as life stage influences access to resources, stability, and social capital (Luzzi et al., 2008). Younger household heads may face greater risks of food insecurity due to limited assets and less stable employment, whereas older household heads might have accumulated more experience and resources, which could help mitigate these risks. This variable accounts for possible age-related variations that affect a household's ability to withstand economic shocks, providing insights into how age dynamics interact with precarious employment to influence food security.

Sex of head

The variable *Sex of Household Head* is a binary measure, with 1 indicating a female-headed household and 0 representing a male-headed household. This variable helps capture differences in resource allocation and priorities between male- and female-headed households, especially in the context of precarious employment and food insecurity. Research suggests that female-headed households often allocate more resources toward basic needs such as food, shelter, and healthcare, directly influencing household welfare and food security (Blumberg, 1991). Female-headed households, particularly in rural areas, may also experience additional vulnerabilities, including lower

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incomes, limited access to resources, and sociocultural barriers that constrain economic empowerment (Essilfie et al., 2021). Given the added burden of unpaid care work, female-headed households are often more susceptible to the adverse effects of precarious employment on food security.

Level of education

The *Level of Education* variable measures the educational attainment of the household head and is included as a categorical variable in the analysis, coded as follows: 0 = No education, 1 = Primary education, 2 = Junior High/Middle School, 3 = Secondary/High School, and 4 = Tertiary education. Education is a critical factor in understanding household resilience to food insecurity, as studies show that higher educational attainment is often associated with greater income stability, increased access to resources, and improved decision-making capabilities in managing household needs (McIntyre, Bartoo, & Emery, 2012). Additionally, education can improve nutritional knowledge and resource allocation, which can positively impact food security, particularly in precarious employment situations where income may be unstable (Gallegos et al., 2022; Loofbourrow & Scherr, 2023). In households where the head has limited education, there may be higher susceptibility to food insecurity due to reduced employment opportunities and lower wages, limiting the household's ability to meet basic needs.

Location of residence

The *Location of Residence (Res)* variable is included to capture differences in the effect of precarious employment on food insecurity across rural and urban households. In this study, households in urban areas are coded as 1, while rural households are coded as 0. This variable is essential given

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that food insecurity dynamics differ by location, with rural areas often facing greater poverty and economic vulnerability due to their reliance on precarious agricultural and informal work (Coulombe & Wodon, 2007; GSS, 2014). Previous research highlights that precarious employment in rural areas, especially in agriculture, restricts households' ability to secure consistent income and access to sufficient, nutritious food (Ramsey et al., 2012). In contrast, urban households may face food insecurity due to high living costs, despite relatively better job access, as informal, low-skilled jobs still lead to income instability. Including this variable provides insights into how precarious employment impacts food security differently across locations, underscoring the need for location-specific interventions to address the unique challenges faced by rural and urban households.

Household size

Household size is included as a continuous variable to account for the varying needs across households of different sizes. Larger households typically have greater consumption needs, which may not be fully met, especially under precarious employment conditions. Consequently, households with more members may experience higher levels of food insecurity due to the challenge of meeting extensive demands with limited resources (Lanjouw & Ravallion, 1995; Székely, 1998). This is particularly relevant as precarious employment can exacerbate resource constraints, making it difficult to ensure adequate food access for all members (Gallegos et al., 2022; McIntyre et al., 2012).

To further capture the non-linear effects of household size on food insecurity, we include *Household Size Squared (hhsizesquare)* This variable

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allows us to assess whether the impact of household size on food insecurity increases at a diminishing rate as household size grows. Including the squared term enables a more nuanced understanding of how additional household members might incrementally strain resources, while also accounting for potential efficiencies or coping mechanisms that larger households may develop (Deaton & Paxson, 1998). This dual measure ensures a robust assessment of the relationship between household size and food insecurity in the context of precarious employment.

Marital Status

The Marital Status (Marital_status) variable represents the marital status of the household head, included as a categorical variable coded as follows: 0 = single, 1 = married, and 2 = separated. This variable accounts for the diverse socio-economic vulnerabilities associated with different marital statuses, which can impact a household's food security under precarious employment conditions. Married household heads may benefit from shared resources and support, potentially buffering against food insecurity. In contrast, single or separated household heads may face heightened financial pressures, as they often have sole responsibility for household needs, which can be particularly challenging when employment is unstable (McIntyre et al., 2012; Gallegos et al., 2022).

Social Safety Net Programs

The *Social Safety Net Programs (SSN)* variable captures household participation in social protection schemes designed to provide economic support to vulnerable groups, particularly those impacted by precarious employment. This variable includes programs like national health insurance

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and cash transfers aimed at stabilizing household finances by reducing out-of-pocket healthcare expenses and supplementing household income. Research suggests that economically disadvantaged households, often more exposed to food insecurity, are more likely to qualify for and benefit from these programs (Swann, 2017; Schmidt, Shore-Sheppard & Watson, 2016). For instance, health insurance coverage allows households to allocate more resources toward nutritious food rather than medical expenses, buffering against the income instability and health risks associated with precarious employment (Kantor, 2001).

Sector of employment

The Sector of Employment (sector) variable classifies the household head's employment sector into three main categories: agriculture, industry, and services. This classification is crucial for understanding how employment in different sectors influences household food insecurity, particularly under precarious employment conditions. Households with heads in the agriculture sector, for instance, often face high levels of income volatility and job insecurity due to seasonal work patterns, limited access to social protections, and reliance on informal work, making them especially vulnerable to food insecurity (Coulombe & Wodon, 2007; Annim, 2018). In contrast, household heads employed in industry and services may have access to more stable income opportunities; however, private sector jobs in these areas, particularly in low-skilled positions, often lack robust labour protections, regular income, and social benefits, further exacerbating food insecurity risks. Though the service sector, particularly public services, is generally associated with greater job stability, precarious conditions can still arise due to factors such as budget

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cuts or organizational restructuring, impacting job security and household food access (Señoret, Ramirez & Rehner, 2022; Tremblay, 2016).

Farming household

The Farming Household (Farmhh) variable identifies whether a household engages in farming activities, coded as 1 for farming households and 0 for non-farming households. This variable is essential for analyzing food insecurity under precarious employment conditions, as farming households often face unique challenges related to income stability and food security. Agricultural livelihoods are typically affected by seasonal income fluctuations, market price volatility, and limited access to social protections, which can make farming households more vulnerable to food insecurity, especially during off-seasons or periods of poor crop yield (Coulombe & Wodon, 2007; Annim, 2018). Additionally, farming households may rely on subsistence agriculture, which could buffer against food insecurity during productive periods but may leave them exposed when crop production is insufficient to meet household needs. Including the Farming Household variable allows the analysis to distinguish the specific vulnerabilities and resilience factors associated with agricultural work, providing insight into how precarious employment in farming affects household food security differently compared to non-farming households.

Disabled Head

The Disabled Head (Disability) variable identifies whether the household head has any form of disability, coded as 1 if the head has a disability and 0 if otherwise. This variable is crucial for examining food insecurity under precarious employment conditions, as households led by

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individuals with disabilities often face additional socio-economic challenges. Disability can limit employment opportunities, lead to lower earnings, and increase household expenses, particularly for healthcare, making such households more susceptible to income instability and food insecurity (Groce et al., 2011; Mitra, 2018). Households with disabled heads may also encounter barriers to accessing adequate social support and resources, which can further exacerbate their vulnerability in times of economic uncertainty or limited employment opportunities.

Number of Basic Schools per District

The Number of Basic Schools per District variable measures the number of basic schools within each district, represented as a continuous variable. This variable serves as an indicator of educational access at the local level, reflecting the proportion of basic education facilities available in a given district. Higher availability of basic schools may indirectly influence household food security by providing better educational opportunities, which are often associated with improved economic prospects and access to stable employment for household members in the long term (McIntyre et al., 2012). Districts with more basic schools may enable children from low-income or precariously employed households to gain foundational skills, ultimately enhancing the household's resilience against food insecurity.

Share of District's Housing Density

The Share of District's Housing Density variable measures the concentration of housing within a district, providing an indication of population density and urbanization level. This continuous variable captures the proportion of housing relative to the district's area, reflecting variations in

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residential density across regions. Housing density can impact food security indirectly, as districts with higher density often face distinct economic pressures, such as increased competition for resources, higher living costs, and limited access to space for food production (FAO, 2020). Higher housing density is typically associated with urban or semi-urban areas, where residents may rely more on market-based food sources and be more vulnerable to price fluctuations and economic instability. In the context of precarious employment, households in high-density districts might experience greater food insecurity due to these compounded factors.

District Access to Electricity

The District Access to Electricity variable represents the proportion of households within a district that have access to electricity, measured as a continuous variable. This indicator reflects the level of infrastructure development and access to essential services in a district, which can significantly impact household well-being and resilience. Access to electricity is often associated with improved economic opportunities, access to information, and enhanced quality of life, as it supports small businesses, extends productive hours, and enables refrigeration and cooking—factors that contribute to food security (World Bank, 2019).In districts with higher rates of electricity access, households, especially those with precarious employment, may have better options for income generation and food storage, potentially buffering against food insecurity. Conversely, limited access to electricity can exacerbate food insecurity by reducing economic stability and increasing dependence on costly or less efficient energy sources.

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Table 3: Definition and Measurement of Variables

Variable		A prior sign
FIES	Food insecurity score estimated using Rasch model scaling	-
FIES Dummy (0/1)	Binary variable (1=food insecurity scores below 0.5 cut-off based on Rasch model)	-
FIES (MPI)	Multidimensional measure of household food insecurity on 0 to 1 scale.	-
FIES (RS)	Food insecurity score calculated by adding all eight elements on the FIES scale	-
FIES (PCA)	The food insecurity index was calculated using principal factor analysis.	-
Precarious employment score	Multidimensional Index of employment precarity on continuous 0 to 1 scale.	+
Precarious employment (0/1)	Binary variable (1=precarity score exceeds 0.5 threshold)	+
Precarious employment (Add)	Employment precarity accumulates as measured by the additive index for all four measures.	+
Age	Age in years of household (HH) head.	-
Female	Binary (1=HH head is female).	+
No formal education	Binary (1 if HH head has no formal education)	
Primary	Binary (1 if HH head has primary education)	+
JHS/Middle	Binary (1 if HH head has Junior high school education)	+
secondary	Binary (1 if HH head has secondary education)	+
Tertiary	Binary (1 if HH head has tertiary education)	+
Rural Household	Binary (1 if HH is located in a rural area)	-
Household size	Number of persons in the household	+
Household size squared	Square of household size value	-
Never married	Binary (1 if HH head is never married)	
Married	Binary (1 if HH head is married)	-
Separated	Binary (1 if HH head is widowed/divorced/separated)	+
Social safety net program	Binary (1 if HH head is covered under National health insurance)	-
Agriculture	Binary (1 if HH head is Agriculture)	+/-
Industry	Binary (1 if HH head is Industry)	+/-
Service	Binary (1 if HH head is service)	+/-
Greater Accra	Binary (1 if household is located in Greater Accra areas)	+/-
Savannah	Binary (1 if household is located in Savannah areas)	+/-
Coastal	Binary (1 if household is located in Coastal areas)	+/-
Forest	Binary (1 if HH is located in forest areas)	+/-

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Household farm	Binary (1 if HH is involved in engaged in farming)	+
Household with disabled worker	Binary (1 if HH has a disabled worker)	+
Health shock	Binary (1 if household member is illness or injury)	+
Asset accumulation index	Household asset index computed using PCA	-
Employment instability	Multidimensional of Employment instability score ranging from 0 to 1	+
Income inadequacy	Multidimensional of Income inadequacy score ranging from 0 to 1	+
Lack of right and protections	Multidimensional of lack of right and protections score ranging from 0 to 1	+
Unsafe or unhealthy work environment	Multidimensional of unsafe or unhealthy work environment score ranging from 0 to 1	+
Basic schools	Number of basic schools in a district	-
Share of a district's housing density	Number of housings in a district	-
Access to electricity	Access to electricity in a district	-

Source: Author's Construct, 2024

Two-Stage Least Squares (2SLS) Model

Two-Stage Least Squares (2SLS) is a robust econometric technique widely employed to address endogeneity issues in regression analysis. Endogeneity arises when explanatory variables are correlated with the error term, resulting in biased and inconsistent Ordinary Least Squares (OLS) estimates. This correlation can stem from omitted variable bias, reverse causality, or measurement error, among others, which makes the causal inference challenging (Wooldridge, 2010). The 2SLS method resolves these challenges using instrumental variables (IVs), which must satisfy two fundamental properties. First, relevance requires that the IV is strongly correlated with the endogenous variable to capture meaningful variation. Weak instruments undermine the precision of 2SLS estimates, as highlighted by Staiger and Stock (1997), who emphasized the importance of a high first-stage F-statistic (e.g., greater than 10). Second, exogeneity ensures that the IV

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is uncorrelated with the error term, meaning it affects the dependent variable only indirectly through the endogenous variable, thereby eliminating any direct causal pathways. The method involves two distinct steps. First, the variation in the endogenous variable that is uncorrelated with the error term is isolated using the instrument. This predicted variation is then used in the second stage to estimate the relationship of interest.

The Structural Equation

The primary model, known as the structural equation, is specified as:

$$F_i = \theta_0 + \theta_1 P_i + \varepsilon_i \quad (20)$$

Where: F_i is the dependent variable, P_i is the endogenous explanatory variable, ε_i is the error term, which may be correlated with $P_i, i.e. Cov(P_i, \varepsilon_i) \neq 0$. The goal is to estimate θ_1, the causal effect of P_i on F_i. However, the endogeneity of P_i makes OLS estimates inconsistent.

First Stage

The first stage aims to address endogeneity by isolating the exogenous variation in P_i. This is achieved by regressing P_i on the instrumental variable(s) (Z_i)and other exogenous covariates (X_i):

$$P_i = \alpha_0 + \alpha_1 Z_i + \alpha_2 X_i + \eta_i \quad (21)$$

Where: Z_i represents the instrumental variable(s), X_i includes additional exogenous covariates, η_i is the error term. The predicted values from this regression, denoted by $\hat{P}_I$, represent the variation in P_i that is uncorrelated with ε_i.

Second Stage

In the second stage, the predicted values $\hat{P}_i$ are substituted into the structural equation to estimate the causal effect:

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$$F_i = \lambda_0 + \lambda_1 \hat{P}_i + \lambda_2 X_i + \xi_i \qquad (22)$$

Where: λ_0 measures the causal effect of P_i on F_i, ξ_i is the error term in the second stage. By using $\hat{P}_i$ instead of P_i the estimation ensures consistency, as $\hat{P}_i$is uncorrelated with ε_i.

Post-Estimation Tests

Instrumental variables (IV) regression requires robust post-estimation tests to ensure that the instruments are valid, relevant, and that the model is correctly specified. These tests are essential to verify that the instruments are effectively addressing endogeneity and provide confidence in the reliability of the estimates. One of the primary post-estimation tests is the under-identification test, which is a Lagrange Multiplier test designed to determine if the equation is identified—meaning that the excluded instruments are relevant and sufficiently correlated with the endogenous regressors. This test evaluates the hypothesis that the equation is under-identified, where a significant p-value would lead to the rejection of the null hypothesis in favour of the alternative that the model is adequately identified. This approach demonstrated consistent estimates by combining both internal and external instruments to address endogeneity (Kofinti et al., 2023). This test is particularly useful when using instruments generated through heteroskedasticity-based identification techniques, as it helps confirm that the instruments meet the necessary criteria for traditional IV analysis.

Another important test is the Sargan-Hansen test, which assesses the validity of overidentifying restrictions. This test evaluates the joint null hypothesis that the instruments are valid (uncorrelated with the error term) and correctly excluded from the estimated equation. The test statistic follows a chi-

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squared distribution with degrees of freedom equal to the number of overidentifying restrictions $(L - K)$, where (L) is the number of instruments and (K) is the number of endogenous regressors. If the test yields a significant result, this will cast doubt on the validity of the instruments, suggesting that they may be correlated with the error term or incorrectly specified in the model.

Weak identification is another critical issue in *IV* estimation, occurring when the correlation between the excluded instruments and the endogenous regressors is weak. Weak instruments can lead to biased and inconsistent *IV* estimators, significantly distorting the results (Stock & Yogo, 2005). To ensure robust identification, it is essential that excluded instruments have a strong, meaningful correlation with the endogenous variables. A common test for weak instruments is the Anderson-Rubin Wald test, which is specifically designed to be robust in cases where instruments may be weak. This test examines whether the instruments are sufficiently relevant by testing the hypothesis that the instruments have a statistically significant relationship with the endogenous variables (Anderson & Rubin, 1949).

Robustness checks

Lewbel's (2012) heteroscedastic-adjusted instrument method

To enhance the robustness and reliability of our findings on the relationship between precarious employment (PE) and household food insecurity (FII), we employ Lewbel's (2012) heteroscedastic-adjusted instrumental variable (IV) method as a complementary strategy to the standard two-stage least squares (2SLS) approach. While 2SLS is widely regarded as a robust tool for addressing endogeneity, it is limited by its reliance on strong,

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external instruments that meet the criteria of relevance and exogeneity. However, in empirical research, finding suitable external instruments is often challenging due to weak instrument issues or the difficulty of satisfying the exogeneity condition (Stock & Yogo, 2005). Weak instruments can severely compromise the reliability of IV estimates, leading to biased results that are as problematic as those obtained from Ordinary Least Squares (OLS). This limitation underscores the need for an alternative identification strategy.

Lewbel's heteroscedastic-adjusted instrument method offers a compelling solution to these challenges by generating internal instruments from the data itself. Specifically, Lewbel's method leverages the presence of heteroscedasticity, variability in the error term's variance across observations, to construct instruments. These instruments are derived from the product of residuals of an auxiliary regression and mean-centred exogenous variables, effectively bypassing the need for strong external instruments (Lewbel, 2012). By constructing instruments internally, Lewbel's approach strengthens the identification strategy while addressing potential biases associated with weak or absent external instruments. In our study, we assess the strength of the internally generated instruments using the Cragg-Donald Wald F-statistic, which is a standard metric for evaluating instrument strength. The adoption of Lewbel's method is supported by recent empirical literature, which highlights its effectiveness in addressing endogeneity in diverse research contexts (Koomson et al., 2023; Martey, 2022).

Kinky Least Squares (KLS) approach

To further substantiate the robustness of our findings, we employed the Kinky Least Squares (KLS) approach, a novel econometric method that offers

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an alternative to instrument-based techniques. The reliance on valid and strong instruments in conventional two-stage least squares (2SLS) methods is a significant limitation, particularly in contexts where suitable instruments are difficult to identify or their validity is questionable (Kripfganz & Kiviet, 2021; Kiviet, 2020). Weak or invalid instruments can bias estimates, widen confidence intervals, and undermine the reliability of causal inference.

The KLS approach circumvents these challenges by leveraging endogeneity bounds instead of relying on traditional orthogonality conditions between instruments and the error term. This method directly addresses the limitations of 2SLS and provides an effective tool for scenarios where instrument selection is constrained or uncertain. The KLS technique identifies relationships by assuming a bounded range for the correlation between the endogenous variable and the error term. This approach replaces the need for external instruments with an interval-based sensitivity analysis of endogeneity. By postulating a plausible range of endogeneity correlations, KLS constructs consistent point estimates and asymptotically valid confidence intervals. This assumption allowed us to systematically explore how varying levels of endogeneity might influence our results, providing a deeper understanding of the relationship between PE and household food insecurity.

Propensity Score Matching

Propensity Score Matching (PSM) was employed as an additional robustness check to address limitations inherent in conventional econometric methods, particularly Two-Stage Least Squares (2SLS). While 2SLS effectively mitigates endogeneity using instrumental variables (IVs), it often relies on strong assumptions about the validity and strength of the chosen

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instruments. Weak or invalid instruments can lead to biased estimates and undermine the reliability of causal inferences. Moreover, 2SLS does not directly address self-selection bias, which can arise when households in precarious employment (PE) systematically differ from those not in PE due to unobservable or observable characteristics influencing both employment status and food insecurity outcomes.

PSM offers a complementary approach by estimating the counterfactual: the level of food insecurity for households in PE compared to those not in PE, while accounting for self-selection bias. By matching treated (households in PE) and untreated (households not in PE) units based on similar observable characteristics, PSM isolates the treatment effect of precarious employment. This method enables a direct comparison between treated and control groups that share comparable covariate distributions, thus reducing bias from observable confounders (Rosenbaum & Rubin, 1983). Furthermore, PSM allows for estimating the Average Treatment Effect on the Treated (ATT), which aligns with the study's objective of understanding the specific impact of PE on affected households.

Mathematical specification of PSM

Let $D_i$denote the treatment status, where $D_i = 1$ for treated households (in PE) and $D_i = 0$ for control households (not in PE). The propensity score, $p(x)$, represents the conditional probability of receiving treatment given pre-treatment covariates, X, such that:

$$p(x) = Pr(D = 1 \mid X) = E(D \mid X) \qquad (23)$$

The matching process involves estimating $p(x)$ using a probit or logit regression model, where the covariates X include observable characteristics

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such as age, sex, dependency ratio, and other household or district-level factors. The treatment effect is then computed by comparing outcomes Y (food insecurity) between treated and matched control households. For matched pairs, the ATT is defined as:

$$ATT = E\left[Y_1 - Y_0 \mid D = 1 \right] \qquad (24)$$

Where: Y_1 is the observed outcome for treated households. Y_0 is the counterfactual outcome for treated households if they had not been treated, approximated using matched control households.

Matching techniques and robustness

To ensure robust and reliable estimates, five distinct matching techniques were employed: nearest neighbour, kernel, radius, local linear regression, and Inverse Probability Weighting Regression Adjustment (IPWRA). Each of these methods offers unique advantages in addressing potential biases and enhancing the validity of the propensity score matching (PSM) analysis. Nearest Neighbour Matching pairs each treated household with the closest control household based on propensity scores, ensuring a direct and intuitive comparison. Kernel Matching, on the other hand, uses a weighted average of multiple control units within a specified bandwidth, allowing for greater utilization of available data. Radius Matching selects control households within a defined calliper distance from the treated unit, ensuring tighter matches by setting a maximum acceptable difference in propensity scores. Local Linear Regression improves precision by adjusting for differences between matched pairs, particularly useful when the relationship between treatment and covariates is complex. Finally, IPWRA enhances robustness by combining propensity score weights with regression

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adjustment, providing double protection against model misspecification (Negi & Wooldridge, 2022). The use of these diverse techniques ensures a comprehensive and nuanced analysis of the treatment effect.

Covariate balancing and validation

The first-stage propensity score model incorporated critical covariates, including the age and sex of the household head, dependency ratio, participation in social safety nets, and district-level factors such as housing density. These covariates were carefully selected based on their theoretical and empirical relevance, aligning with established literature on food insecurity and precarious employment. Covariate balance between treated and control groups was assessed using standardized differences, ensuring that the two groups were comparable across all included covariates. Additionally, the common support assumption was rigorously tested to confirm sufficient overlap in propensity scores between treated and untreated groups. This overlap is a critical requirement for valid PSM results, as it ensures that every treated unit has a suitable counterpart in the control group for comparison.

Average adult household characteristics

In a fourth robustness check, we conducted a sensitivity test using average adult household characteristics to capture household composition variations. Specifically, we included the average number of adults in precarious employment relative to working adults and analysed average age, gender composition, education levels, and marital status of household members. This approach allows for a deeper understanding of the influence of PE on food insecurity by accounting for household demographic factors that may indirectly affect food insecurity. The results across all models using these

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household characteristics consistently supported the primary findings, reinforcing the validity of the main conclusions.

Alternative cutoffs for measuring precarious employment and food insecurity index

For a fifth robustness check, we analysed the impact of using alternative cutoffs for measuring precarious employment. First, we applied a union cutoff of 0.33 for the PE index, a threshold commonly used in related studies (Appendix Table A6). Additionally, in one analysis we assigned equal weights to each dimension of precarious employment to evaluate how this weighting scheme impacts the results. Finally, we utilised an additive PE index to assess its relationship with the main measure of food insecurity. Across these specifications, results consistently supported the conclusion that precarious employment contributes to heightened household food insecurity, demonstrating the robustness of the findings across different measurement approaches.

Lastly, to further test robustness, we applied different thresholds and weights in constructing the food insecurity index. Departing from the conventional 0.5 cutoff, we adopted an alternative threshold of 0.33, aligning with approaches found in prior studies (Martey, 2022; Adusah-Poku & Takeuchi, 2019; Kofinti et al., 2023; Koomson & Churchill, 2022). Additionally, we assigned a higher weight of 0.20 to the dimension "GOING A WHOLE DAY WITHOUT FOOD" (WFOOD_1DAY), reflecting the heightened impact of severe food deprivation on overall food insecurity. These adjustments enabled us to evaluate the stability of the findings under varying definitions of food insecurity. The primary results remained consistent,

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reinforcing the conclusion that precarious employment exacerbates food insecurity across multiple specifications and measurement thresholds. The combination of these methods addresses potential biases, validates alternative model specifications, and strengthens the empirical foundation of the findings.

Dominance Analysis

In addition to the main analysis, this study conducts a disaggregated examination of the specific effects of various dimensions of precarious employment—such as employment insecurity, income inadequacy, lack of rights and protection, and unsafe or unhealthy work environments—on household food insecurity. Using dominance analysis (Budescu, 1993), the study calculates general dominance weights to assess the relative importance of each dimension. This method provides a ranking of each dimension's incremental contribution to food insecurity, offering insights into which aspects of precarious employment most strongly impact household well-being and where targeted interventions may be most effective.

Dominance analysis calculates general dominance weights by averaging a given predictor's incremental validity across all possible sub-models that include that predictor. Here, the incremental validity of predictor i in a sub-model is defined as the additional explanatory power that predictor i contributes to the model, helping to rank predictors based on their influence on the dependent variable:

$$\Delta\mathcal{R}_{ih}^{2} = \Upsilon_{y.xixz}^{2} - \Upsilon_{y.xz}^{2} \qquad (25)$$

In this context, x and y represent the independent and dependent variables, respectively. The term xh denotes a unique subset of k predictors within a sub-model, while xi is the $k+1$-th variable added to this sub-model.

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The average incremental validity for predictor xi across all sub-models of size k is calculated by averaging the additional explanatory power that xi contributes when included in each possible sub-model of that size. This average incremental validity provides insight into the importance of xi relative to other predictors in explaining the variance in y.

$$C_{xi}^{k} = \sum_{k=1}^{p-1} k \frac{\Delta\mathcal{R}_{ih}^{2}}{\frac{p-1}{k}} \quad (26)$$

In this context, $\Delta\mathcal{R}_{ih}^{2}$ represents the incremental change in $\mathcal{R}^2$ (the coefficient of determination) when predictor x_i is added to a subset h of k predictors, as defined in equation (8). Here, h refers to one unique subset of k predictors, and $\frac{p-1}{k}$ is the combination function, calculated as $\frac{p1}{K!(p-1-k)!}$, which gives the number of unique subsets of size k that can be formed from the $p-1$ predictors.

$$C_x = \frac{\sum_{k=1}^{p-1} kC_{xi}^{(k)}}{p-1} \quad (27)$$

General dominance weights offer two key advantages. First, each general dominance weight reflects the average contribution of a predictor to the outcome variable, considering both its independent impact and its effect when combined with other predictors in the model. Second, the sum of all general dominance weights across predictors equals the overall $\mathcal{R}^2$ of the model, providing a straightforward interpretation of each predictor's relative influence on the explained variance (Budescu, 1993).

Heterogeneity Analysis

In this heterogeneity analysis, we explore the impact of PE on food insecurity across three critical dimensions: gender of the household head, location (rural versus urban), and sector of employment (private versus

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public). Each dimension offers unique insights into how PE affects different groups, helping to inform targeted policy responses to address food insecurity more effectively. To investigate gender differences in the impact of PE on food insecurity, we divide the sample into male-headed and female-headed households. This analysis is particularly relevant because female-headed households often encounter compounded vulnerabilities, such as lower average incomes and limited access to resources, which may exacerbate the adverse effects of PE on food security (Essilfie et al., 2021; Koomson & Churchill, 2022). Understanding the gendered effects of PE is crucial for developing gender-sensitive interventions, as women often face additional socioeconomic challenges, including unpaid care responsibilities, which can limit their access to stable employment and increase their susceptibility to food insecurity (World Bank, 2018).

To capture the regional disparities in the impact of PE, we stratify the sample by location, distinguishing between rural and urban households. Separate IV models are estimated for each group to examine whether the rural-urban context influences the relationship between PE and food insecurity. Rural and urban areas often have distinct economic characteristics, such as employment opportunities, access to resources, and living costs, which may shape how PE affects household food security (Ramsey et al., 2012). Rural households, for example, are frequently engaged in agriculture or informal work, often characterized by irregular income and limited social protection, which can heighten food insecurity risks in the context of PE. Conversely, urban households may experience higher costs of living, making them

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vulnerable to food insecurity if PE restricts their ability to maintain a stable income (FAO, 2020).

Finally, we examine how the effect of PE on food insecurity differs across employment sectors by categorizing household heads into private and public sector employees. This dimension of analysis considers whether the public sector's traditionally perceived stability offers any protective effect against food insecurity associated with precarious employment. The private sector often lacks strong labour protections, with employees facing greater risks of job insecurity, lower benefits, and income volatility, all of which can increase the risk of food insecurity (Señoret, Ramirez & Rehner, 2022; Tremblay, 2016). Public sector employees, while generally enjoying more stable employment conditions, may still encounter precariousness due to budget constraints, political factors, or organizational restructuring (Quinlan, 2012).

Precarious employment and vulnerability to multidimensional poverty in Ghana

This chapter, the third empirical section of the study, focuses on assessing the impact of precarious employment on vulnerability to multidimensional poverty in Ghana. The chapter begins with a descriptive analysis, exploring precarious employment, current poverty, and anticipated future poverty. This includes examining the incidence of multidimensional poverty among households in Ghana, assessing vulnerability to poverty over the next one to three years, and evaluating vulnerability distinctions between poor and non-poor households within this period. Additionally, the analysis considers locational, gender, and ecological zone dimensions of vulnerability

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to poverty, providing insights into the geographic and demographic variations in Ghana. The study further examines how precarious employment influences both current poverty and vulnerability to poverty in the future, and whether there are significant differences in its effects on present versus future poverty. The analysis further examines the effect of precarious employment on current and future poverty across gender and locational dimension in Ghana.

Model specification

In this section, we outline the empirical model used to investigate the impact of precarious employment (PE) on current and future poverty in Ghana. Specifically, we specify the household poverty function in relation to PE as follows:

$$P(Vulpov_i = 1 \mid PE_i, X_i) = G(PE, X_i) \quad (28)$$

where P_{it} denotes the poverty status of household i at time t, with a distinction between current poverty (measured at the time of the survey) and future poverty (projected based on vulnerability indicators). Here, PE represents the precarious employment status of the household, and X_{it} encapsulates a vector of control variables including household head characteristics, household-specific variables, district-level variables, and ecological zone indicators. These variables encompass factors such as gender, age, education level, marital status, household size, household dependency ratio, participation in a social safety net program, sector of employment, location, ecological zones, farming status, number of basic schools per district, district housing density, and district electricity access.

Building on equation (28), we specify the econometric model to estimate the impact of precarious employment on poverty as follows:

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$$P(Vulpov_i = 1 \mid X) = \alpha + \beta_1 PE_i + \beta_2 X_i + \delta_z + \theta_t + \epsilon_i \quad (29)$$

where: P_i represents the current and future poverty level of the household, PE_{it} is the precarious employment status of the household, X_i includes control variables such as age of household head, gender of the head, education level, residence (rural/urban), household size, squared household size, marital status, participation in social safety nets, sector of employment, farming status, disability status of the head, number of basic schools per district, district housing density, and district access to electricity, δ_z represents ecological zone fixed effects, θ_t captures time-fixed effects, and ϵ_i is the random error term.

This general model can be explicitly expanded as follows:

$$P(Vulpov_i = 1 \mid X) = \alpha + \beta_1 PE_i + \beta_2 age_i + \beta_3 female_i + \beta_4 edu_i + \beta_5 rural_i + \beta_6 hhsize_{it} + \beta_7 hhsizesquare_{it} + \beta_8 maritalstatus_{it} + \beta_9 sector_{it} + \beta_{10} farmhh_i + \beta_{11} headdis_i + \beta_{12} basicsch_i + \beta_{13} housdensity_i + \beta_{14} accesselec_i + \delta_z + \theta_t + \epsilon_i \quad (30)$$

In the above equation: age denote age of the household head, $female$ denote sex of the household head, edu denote level of education of the household head, $rural$ denote residence or location of the household head, $hhsize$ denote number of members of a particular household, $hhsizesquare$ denote square of the household size, $maritalstatus$ denote marital status of household head, $sector$ denote the sector of employment of the head, $farmhh$ denote if the household is into farming, $headdis$ denote household head who is disabled, $basicsch_i$ denote Number of Basic schools per district,

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housdensity denote Share of district's housing density, and *accesselec* denote district access to electricity.

Identification

Identification is a critical component of empirical research that ensures observed relationships between variables reflect true causal effects rather than being distorted by factors such as omitted variables, reverse causality, or measurement error. In examining the impact of precarious employment (PE) on current multidimensional poverty and future vulnerability to poverty in Ghana, identification challenges are addressed to ensure the robustness of causal inferences. Three primary sources of endogeneity are identified in this study: omitted variable bias, reverse causality, and measurement error. These issues can compromise the reliability of empirical results if not addressed adequately.

Potential Endogeneity

The relationship between precarious employment (PE) and poverty is susceptible to endogeneity due to three primary factors: omitted variable bias, reverse causality, and measurement error. Each of these issues can distort causal inferences if not adequately addressed, underscoring the importance of robust econometric techniques in empirical analysis.

Omitted variable bias arises when critical factors that influence both precarious employment and poverty are excluded from the model. For instance, household-level characteristics such as access to informal social support networks, resilience, or financial literacy may simultaneously affect a household's likelihood of experiencing precarious employment and its susceptibility to poverty. At the regional level, variations in economic conditions, such as unemployment rates or disparities in public service

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provision, can also influence both outcomes. For example, districts with robust informal networks or economic activity might exhibit lower poverty rates and fewer instances of precarious employment (Nkansah & Battaglia, 2023; Koomson & Churchill, 2022). Failing to account for these omitted factors can lead to biased estimates, as the effect of these unobserved variables may be erroneously attributed to precarious employment. Such bias not only undermines the validity of the analysis but also risks misguiding policy interventions.

Reverse causality poses a significant challenge in establishing the direction of causation between precarious employment and poverty. On one hand, precarious employment can lead to poverty by reducing income stability, access to benefits, and opportunities for upward mobility. Households in precarious jobs often struggle to afford basic needs, exacerbating their vulnerability to multidimensional poverty. On the other hand, poverty itself may drive households to accept precarious jobs as a means of survival. For example, families facing severe economic deprivation may resort to temporary or low-paying jobs to meet immediate financial needs, despite the lack of long-term security (Nunoo et al., 2018). This bidirectional relationship creates ambiguity, making it difficult to disentangle the causal pathways without addressing endogeneity.

Measurement error is another critical source of endogeneity in the relationship between precarious employment and poverty. Precarious employment might be misclassified due to subjective perceptions, where individuals might underreport job instability or categorize unstable jobs as stable. Similarly, poverty measurements may suffer from inaccuracies,

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particularly when self-reported, as stigma or misunderstandings about survey questions can lead to underreporting of economic hardships. These errors introduce a correlation between the explanatory variables (e.g., precarious employment) and the error term, leading to attenuation bias and inconsistent estimates (Carter & Barrett, 2006). For example, households experiencing hidden forms of poverty might also face precarious employment but fail to report accurately, compounding the issue of mismeasurement.

Relevance and Excludability of Candidate Instruments

To address endogeneity in the analysis of PE and its impact on multidimensional poverty, this study employs the Control Function (CF) Approach with two instrumental variables (IVs): the District Labour Force Rate and the District Casual Employment Share. Unlike the previous chapter, which used only the Casual Employment Share within one's sector of employment as an instrument, the inclusion of two instruments in this chapter is justified by the flexibility of the CF method, which permits multiple instruments to capture exogenous variation in the endogenous variable more effectively.

The District Labour Force Rate complements the Casual Employment Share by reflecting broader labour market dynamics, such as competition and limited job opportunities, which drive precarious employment (Cao et al., 2023). This dual-instrument approach strengthens the first-stage model by increasing explanatory power and addressing concerns about weak instruments, as evidenced by F-statistics exceeding conventional thresholds for instrument strength (Stock & Yogo, 2005). Both instruments meet the relevance condition due to their strong correlation with PE and satisfy the excludability condition, as their effects on poverty are mediated exclusively through precarious

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employment rather than directly influencing household-level outcomes (Wooldridge, 2015).

Relevance Condition

The relevance condition requires that the instruments are strongly correlated with the endogenous variable (precarious employment). District Labour Force Rate and District Casual Employment Share are theoretically and empirically justified as relevant instruments. Districts with higher labour force participation rates and greater shares of casual employment are likely to exhibit a higher prevalence of precarious employment. These conditions arise due to increased job competition and limited availability of stable, formal employment opportunities in such districts (Cao et al., 2023). For example, higher casual employment shares directly reflect precarious job conditions, where workers often face temporary contracts, low wages, and a lack of benefits, thus increasing the likelihood of households experiencing precarious employment. Empirically, the relevance of these instruments is validated by their strong correlation with precarious employment, confirmed through first-stage F-statistics exceeding the threshold of 10, which rules out concerns of weak instruments (Stock & Yogo, 2005). This ensures that the instruments effectively capture the variation in precarious employment needed for consistent estimation.

Excludability Condition

The excludability condition requires that the instruments affect multidimensional poverty solely through their impact on precarious employment, without any direct effect on poverty. This assumption is supported by the fact that both District Labour Force Rate and District Casual

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Employment Share are measured at the district level and are unlikely to directly influence household-level poverty outcomes. For instance, while these variables may capture district-level employment dynamics, they do not directly dictate household-level poverty conditions, such as access to basic services or individual consumption patterns. Instead, their influence on poverty operates indirectly through their effect on precarious employment. Although the excludability condition cannot be directly tested, it is supported by theoretical reasoning and empirical precedent. Similar studies have successfully used district-level variables as instruments for household-level outcomes, arguing that the aggregate nature of these variables minimizes direct household-level effects (Hassan & Mahmud, 2024; Das, & Sarkhel, 2023; Hasanujzaman & Omar, 2022). Any potential confounding effects, such as the allocation of district resources, are mitigated by including control variables like district development scores, basic school enrolment, and ecological zone fixed effects.

Model specification for addressing endogeneity

To correct for endogeneity in the relationship between precarious employment and multidimensional poverty, the study adopts a two-step Control Function (CF) Approach. This method uses the residuals from a first-stage auxiliary regression as additional regressors in the main model, effectively accounting for unobserved factors causing endogeneity.

The first-stage auxiliary regression is specified as follows:

$$PE_i = \psi + \phi District_labor_rate_i + \lambda District_casual_emp_i + \beta X_i + \gamma_j + \theta_t + \epsilon_i \quad (31)$$

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where PE_i is the precarious employment status for household i; *District Labour Force Rate* and *District Casual Employment Share* serve as instruments; X_i includes household demographic and socio-economic characteristics; and γ_j and θ_t denote fixed effects for ecological zones and survey months, respectively. The residuals ϵ_i from this auxiliary regression capture the unexplained variation in PE, controlling for endogenous effects.

In the second stage, these residuals are incorporated into the main model to correct for endogeneity in estimating the impact of PE on vulnerability to poverty. This stage involves regressing poverty on PE, the covariates, and the residuals from the first stage:

$$P(Vulpov_i = 1 \mid X) = \beta_0 + \beta_1 PE_i + \beta_2 X_i + \lambda \hat{\epsilon}_i + \gamma_j + \theta_t + u_i \quad (32)$$

where P_{it} represents current poverty or future vulnerability to poverty; X_{it} denotes control variables, including demographic factors, education, and household characteristics; and $\hat{\epsilon}_i$ serves as the control function residuals to account for endogeneity. Including $\hat{\epsilon}_{it}$ allows us to interpret β_1 as the causal effect of PE on poverty by isolating exogenous variation.

Heterogeneity Analysis

In this heterogeneity analysis, we assess the impact of precarious PE on current and future multidimensional poverty across two critical dimensions: gender of the household head and location (rural versus urban). Each dimension provides insights into how PE influences different groups, which is essential for designing targeted interventions to mitigate multidimensional poverty more effectively. To examine gender-based differences, we separate the sample into male-headed and female-headed households. Gender

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disparities in the experience of PE and its consequences on multidimensional poverty are well-documented, as female-headed households often face compounded vulnerabilities, including lower household incomes and restricted access to resources (Essilfie et al., 2021; Koomson & Churchill, 2022). Additionally, women may encounter greater socioeconomic challenges, such as the burden of unpaid care responsibilities, which can restrict their access to stable, well-paying employment and heighten their susceptibility to multidimensional poverty (Al-Ahmadi et al, 2024).

The study also investigates the role of location by categorizing households as either rural or urban. This distinction allows us to explore how different socioeconomic conditions in rural and urban settings influence the relationship between PE and multidimensional poverty. Rural areas often have limited employment opportunities, reliance on agricultural or informal work, and constrained access to services, which can increase the poverty risks associated with PE. Conversely, urban households may face higher living costs, making them vulnerable to multidimensional poverty if precarious work limits their capacity to secure a stable income (Ramsey et al., 2012; FAO, 2020).

Definition, justification and measurement of variables

Multidimensional Poverty (Current Poverty)

The measure of current poverty in this study is based on the global Multidimensional Poverty Index (MPI) framework developed by Alkire and Santos (2010, 2014) in collabouration with the UNDP's Human Development Report Office. This framework has become a widely accepted standard for assessing acute poverty, especially in developing countries, by utilizing a dual-cutoff method introduced by Alkire and Foster (2011). The MPI identifies

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household deprivations across multiple indicators, where a first cutoff identifies deprivation levels for each indicator, and a second, the poverty cutoff, determines if households experience poverty by being deprived in more than one of the three dimensions: health, education, and living standards. If households face deprivation across more than 33.3% of weighted indicators, they are classified as multidimensionally poor. This approach incorporates ten binary indicators categorized into three equally weighted dimensions, which include health (nutrition, child mortality), education (years of schooling, school attendance), and living standards (measured through indicators such as access to cooking fuel, sanitation, drinking water, electricity, housing quality, and asset ownership).

Vulnerability to Multidimensional Poverty (Future Poverty)

Vulnerability to multidimensional poverty (VMP) reflects the probability that households may enter multidimensional poverty in the near term, considering their current deprivation levels and exposure to various risk factors. The literature highlights three primary econometric approaches for measuring vulnerability: the Vulnerability as Expected Poverty (VEP) approach, vulnerability to expected low utility, and vulnerability as uninsured risk exposure (Celidoni & Procidano, 2015; Feeny & McDonald, 2016; Hernández & Zuluaga, 2022; Hoddinott & Quisumbing, 2010). These methodologies all incorporate two essential elements: welfare and time. Welfare is frequently gauged through consumption expenditure (Azeem et al., 2018; Gaiha & Imai, 2008; Jamal, 2009; McCarthy et al., 2016), while recent multidimensional poverty studies apply household deprivation scores as a welfare indicator (Azeem et al., 2018; Calvo, 2008; Feeny & McDonald, 2016; Gallardo, 2020; Hernández & Zuluaga, 2022). The temporal dimension varies

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according to the defined threshold, covering anything from immediate to longer-term risk horizons (Azeem et al., 2018; Koomson et al., 2020; Novignon, 2010). For measuring vulnerability to expected low utility or uninsured risk exposure, panel data is required, whereas the VEP approach is compatible with cross-sectional data (Azeem et al., 2018; Chaudhuri et al., 2002).

Due to the cross-sectional nature of our data and the focus on VMP, we employ the VEP approach, consistent with recent studies (Feeny & McDonald, 2016; Gallardo, 2020; Hernández & Zuluaga, 2022). This method defines vulnerability as the likelihood of households becoming multidimensionally poor in the future. We estimate vulnerability using deprivation scores as the welfare indicator and apply a three-stage Feasible Generalized Least Squares (FGLS) approach, as outlined by Amemiya (1977) and explained by Chaudhuri et al. (2002). While Chaudhuri et al. (2002) originally used consumption expenditure to gauge vulnerability to monetary poverty, we align with studies (Feeny & McDonald, 2016; Gallardo, 2020; Hernández & Zuluaga, 2022) that apply deprivation scores d_i) for VMP assessment. The baseline equation for household deprivation scores (d_i) is specified as:

$$d_i = X_i\beta + e_i \quad (33)$$

In this model, d_i represents the deprivation level of household i, while X_i encompasses the household's characteristics and additional covariates relevant to the analysis. β denotes Coefficient vector capturing the effect of each covariate in X_i on deprivation. Since households face different degrees of risk and employ varied strategies to manage these risks, the disturbance term (e_i)

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is included to capture the fluctuations in well-being over time (Chaudhuri et al., 2002; Hernández & Zuluaga, 2022). To address heteroscedasticity, the model assumes that the variance of the disturbance term varies with the observable characteristics X_i, and is defined as:

$$\sigma_{e,i} = X_i\theta + u_i \tag{34}$$

$$u_i = N(0, \sigma_I^2)$$

Where: $\sigma_{e,i}^2$: Variance of the error term (e_i) for household i, X_i: Household-level covariates influencing the variability in deprivation scores, θ: Coefficient vector for the heteroscedasticity model, u_i: Error term assumed to follow a normal distribution, $u_i \sim N(0, \sigma_I^2)$, representing random shocks.

Hernández and Zuluaga (2022) and Feeny and McDonald (2016) highlight that the three-stage approach yields consistent estimates of the error term, enabling the transformation of the model to achieve homoscedasticity. In the initial stage, Ordinary Least Squares (OLS) is applied to estimate Equation (33), with the squared residuals then used as the dependent variable in Equation (34). This setup in Equation (34) allows the model to adjust for variance heterogeneity, facilitating asymptotically efficient estimates through the Feasible Generalized Least Squares (FGLS) method in the second stage.

$$\frac{\hat{e}_{ols,i}^2}{X_i\hat{\theta}_{ols}} = \left(\frac{X_i}{X_i\hat{\theta}_{ols}}\right)\theta + \frac{u_i}{X_i\hat{\theta}_{ols}} \tag{35}$$

In the final stage, the model uses the predicted standard deviations, denoted as $\hat{\sigma}_i = \sqrt{X_i}\hat{\theta}_{FGLS}$, which provides a consistent estimate of the variance of the error term for household deprivation as estimated in Equation (35). This predicted standard deviation is then employed to transform Equation (33),

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allowing for an efficient estimation of the parameters while addressing any heteroscedasticity in the model.

$$\frac{d_i}{\hat{\sigma}_i} = \left(\frac{X_i}{\hat{\sigma}}\right)\beta + \frac{u_i}{\hat{\sigma}_i} \quad (36)$$

Equation (36) facilitates the calculation of the asymptotically efficient estimate of $\hat{\beta}_{FGLS}$, which is essential for obtaining reliable parameter estimates within the model. Using this estimate, the vulnerability to poverty (VtP) for a household at a specific time can be expressed as the probability that the household will experience deprivation above a defined threshold in the future. This probability, denoted by $\hat{V}_{i,t}$, is calculated as follows:

$$\hat{V}_{i,t} = \hat{P}_r\left(d_{i,t+1} > z \middle| X_i\right) = \Phi\left[\frac{X_i\hat{\beta}_{FGLS-K}}{\sqrt{X_i\widehat{\theta_{FGLS}}}}\right] \quad (37)$$

Where: $\hat{V}_{i,t}$ denotes Vulnerability to poverty for household i at time t, z denotes Deprivation threshold, often set at 33.3% for the global multidimensional poverty index, Φ denotes Cumulative distribution function of the standard normal distribution, $\hat{\beta}_{\text{FGLS}}$ denotes Estimated coefficients from the FGLS model., $\sqrt{X_i\hat{\theta}_{\text{FGLS}}}$ denotes Predicted standard deviation of the disturbance term, capturing variance in household deprivation. This approach allows the model to go beyond current poverty status, providing a forward-looking assessment that identifies households at risk of slipping into multidimensional poverty.

Vulnerability Threshold and Time Horizon

The vulnerability threshold is determined by adopting a benchmark poverty probability rate of 0.5, with a time horizon (j) of 2 years, following

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the approach used in prior studies (Azeem et al., 2018; Chaudhuri et al., 2002; Novignon et al., 2012; Zhang & Wan, 2008). This threshold rate implies that a household with a 50% or higher probability of falling into poverty in the near future is classified as vulnerable to poverty. The benchmark serves as a baseline indicator, effectively marking households that are not currently in poverty but are significantly at risk of becoming impoverished. This framework is essential for evaluating vulnerability, as it considers not only a household's current poverty status but also the likelihood of experiencing poverty within a specified future timeframe.

The application of a time horizon is crucial because vulnerability to poverty is dynamic and can vary over different periods. In this study, we assess vulnerability to poverty over 1, 2, and 3 years to capture both immediate and extended future risks. Based on the benchmark probability rate of 0.5, the threshold probabilities for vulnerability across these different time horizons are calculated as follows: 0.50 for a 1-year horizon, 0.29 for a 2-year horizon, and 0.21 for a 3-year horizon. These thresholds indicate that if a household has a probability of poverty v^* greater than 0.29 in a 2-year period, or above 0.21 in a 3-year period, it is considered vulnerable to multidimensional poverty. This approach acknowledges that vulnerability is inversely proportional to the length of the time horizon, as risk accumulates and compounds over time. Thus, a longer time horizon lowers the threshold required to classify a household as vulnerable, acknowledging that the probability of falling into poverty generally increases as more time elapses.

To mathematically formalize this, we calculate v^* as follows:

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$$v^* = 1 - \sqrt[n]{1 - v_n} \quad (38)$$

where v^* represents the probability that a household will fall below the multidimensional poverty line within the specified time horizon, and n is the number of periods under consideration. The formula allows for the conversion of the benchmark probability into time-adjusted vulnerability thresholds, making it applicable across different future time horizons.

This calculation framework provides a nuanced view of vulnerability by accommodating short- and long-term perspectives on poverty risk. By identifying households with high future poverty probability, the vulnerability measure serves as a proactive tool for policymakers and social planners. Rather than focusing solely on current poverty, it enables the identification of households on the edge of poverty, thereby allowing targeted interventions to prevent future poverty. The thresholds derived from this approach can guide policy measures aimed at cushioning those most susceptible to economic shocks or adverse events, with the goal of reducing the likelihood of these households becoming impoverished in the specified timeframe.

Precarious Employment (PE)

Precarious Employment (PE) serves as a primary independent variable in this study, reflecting the household head's employment status in terms of job insecurity, low wages, and lack of social protections. This variable is a binary indicator, where households with insecure or unstable jobs are coded as 1, and those with more stable employment as 0. Including PE is essential as precarious employment significantly heightens vulnerability to poverty by restricting access to stable income, social safety nets, and essential services, all

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of which are crucial for resilience. Households with precarious employment often experience income instability and lack benefits such as health insurance and retirement plans, which exacerbates their susceptibility to multidimensional poverty.

Existing research highlights that households reliant on precarious employment are more likely to fall into poverty, particularly during economic downturns or health crises, due to limited financial buffers and resources (Koomson et al., 2020; Cao et al., 2023). This impact is even more severe for marginalized groups, such as female-headed and rural households, who face compounded vulnerabilities in the absence of secure income (Thabane, 2015). By assessing PE's effects on both current poverty and vulnerability to future poverty, this study underscores the critical role of stable employment in enhancing household resilience and mitigating multidimensional poverty risks.

Age of Household Head

The Age of Household Head is a continuous variable measured in years, capturing the potential impact of age on a household's susceptibility to multidimensional poverty and vulnerability to poverty. Age can either amplify or mitigate poverty risks, as it influences a household's access to resources, life experience, and social support systems. Younger household heads, often in the early stages of career building, may lack stable income sources, adequate assets, or access to social networks that provide economic support during financial downturns, increasing their vulnerability to poverty (Luzzi et al., 2008). Conversely, older heads may have accumulated financial resources, savings, or social capital, which can act as buffers against income shocks and provide resilience in the face of precarious employment. Studies show that age

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can serve as a protective factor in building household resilience, yet older heads may also face age-related job insecurity or health risks, which could weaken their economic stability and increase poverty vulnerability over time (Cao et al., 2023; Novignon et al., 2012). This variable captures age-related factors that influence the likelihood of a household transitioning into poverty, offering insights into how age intersects with employment stability to impact poverty outcomes.

Sex of Household Head

Sex of Household Head is a binary variable coded as 1 for female-headed households and 0 for male-headed households, providing insights into gender-based differences in multidimensional poverty and poverty vulnerability. Gender is a critical determinant of household economic resilience, as it shapes access to resources, social support networks, and economic opportunities. Female-headed households are often more vulnerable to poverty due to gendered economic disadvantages, including lower wages, limited access to credit, and additional caregiving responsibilities that may limit income-generating opportunities (Essilfie et al., 2021). These challenges are compounded in contexts of PE, which place additional strain on household welfare. Research consistently shows that female-headed households allocate more resources toward essential needs, such as food and healthcare, despite having fewer economic opportunities (Blumberg, 1991; Thabane, 2015). Additionally, female-headed households are often more exposed to economic shocks due to limited savings and restricted access to social safety nets. This variable allows the study to examine the extent to which gender-based

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vulnerabilities contribute to multidimensional poverty and economic instability, particularly within precarious employment contexts.

Level of Education of Household Head

Level of Education of Household Head is represented as a categorical variable, capturing the highest educational attainment of the household head: 0 = No education, 1 = Primary education, 2 = Junior High/Middle School, 3 = Secondary/High School, and 4 = Tertiary education. Education is widely recognized as a significant factor in poverty reduction, as it enhances access to higher-paying and more stable employment, improves financial literacy, and fosters better decision-making in resource management. Studies have shown that higher educational attainment is associated with increased household income stability, greater resilience to economic shocks, and reduced vulnerability to poverty (McIntyre, Bartoo & Emery, 2012; Gallegos et al., 2022). For households led by individuals with low or no education, precarious employment exacerbates poverty risks due to limited skills, restricted job options, and susceptibility to low-wage or informal sector jobs without social protections. In contrast, more educated heads may navigate precarious employment challenges more effectively, leveraging skills and qualifications to access more secure or diversified income sources (Feeny & McDonald, 2016; Hernández & Zuluaga, 2022). This variable thus provides insights into how educational attainment influences household resilience to poverty, particularly within the framework of precarious employment, emphasizing the importance of educational investments in poverty alleviation strategies.

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Location of Residence

The Location of Residence variable, coded as 1 for urban households and 0 for rural households, captures the differential impact of precarious employment on multidimensional poverty across regions. Households in rural areas often experience elevated poverty risks due to limited job opportunities, seasonal employment in agriculture, and restricted access to social services and infrastructure (Coulombe & Wodon, 2007; Ghana Statistical Service, 2014). In contrast, urban households, while having greater access to employment, often face high living costs, which can exacerbate poverty, especially when combined with precarious job conditions. Including this variable allows for a comprehensive examination of how poverty determinants vary between urban and rural settings, offering insights into location-specific vulnerabilities and resilience factors.

Household Size and Household Size Squared

Household Size is a continuous variable representing the number of household members, and Household Size Squared captures non-linear effects by indicating how the impact of additional members may vary. Larger households tend to have increased consumption needs, potentially heightening their poverty risk, particularly under precarious employment conditions where resources are limited (Lanjouw & Ravallion, 1995). However, economies of scale in larger households may partially offset these risks, with additional members contributing to shared resources and support networks, thereby lessening individual poverty impacts at a diminishing rate (Deaton & Paxson, 1998). This dual measure enables an in-depth analysis of how household size

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influences vulnerability to poverty and its interactions with precarious employment.

Marital Status of Household Head

The Marital Status of Household Head is a categorical variable coded as follows: 0 = single, 1 = married, and 2 = separated. This variable reflects the socioeconomic disparities linked to different marital statuses, as marital arrangements affect income pooling and resource sharing within households. Married heads, often benefiting from dual incomes and shared financial responsibilities, may have greater resilience against poverty, while single or separated heads, particularly in precarious employment, face heightened financial pressures due to the lack of a partner's support (McIntyre et al., 2012). Including marital status provides valuable insights into how these dynamics shape poverty risk and household vulnerability, helping to capture the complexity of household resilience.

Sector of Employment of Household Head

The Sector of Employment variable categorizes the primary employment sector of the household head into three sectors: agriculture, industry, and services. Employment within the agricultural sector is often associated with elevated poverty risks due to seasonal work patterns, income instability, and limited access to social protections, particularly in rural areas (Coulombe & Wodon, 2007; Annim, 2018). Although industry and service sector jobs may offer slightly more stability, they still expose workers to poverty risks, especially in low-skilled positions within the private sector where labour protections and income consistency are often lacking. By including this variable, the study gains insight into how the employment sector

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influences household vulnerability to poverty, highlighting sector-specific risks tied to precarious employment and income insecurity.

Number of Basic Schools per District

The Number of Basic Schools per District is a continuous variable that measures the availability of basic educational institutions in each district, reflecting local educational access. Districts with a higher number of basic schools may provide better educational opportunities for children, which can, over time, bolster household resilience against poverty by enhancing human capital and improving employment prospects for future generations (McIntyre et al., 2012). This variable thus helps explore how educational infrastructure supports poverty reduction by equipping household members with skills that contribute to income stability and socioeconomic mobility, and how disparities in educational access may impact multidimensional poverty outcomes across regions.

District Labour Force Rate

The District Labour Force Rate variable reflects the share of the district's population actively engaged in the labour market, either through employment or job-seeking activities. This measure serves as an indicator of local economic vitality and the availability of work opportunities within the district. A higher labour force participation rate suggests a relatively active job market, which theoretically could mitigate poverty risks by enabling more households to secure income through employment. However, if a significant portion of this labour force is involved in precarious employment, characterized by unstable job conditions and insufficient earnings, the impact on poverty reduction may be limited. Since precarious employment often lacks

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social protection and regular income, households reliant on such employment remain vulnerable to poverty despite high labour force participation. As an instrumental variable (IV) for precarious employment, District Labour Force Rate enables an analysis of how workforce participation—when predominantly in precarious forms—translates to higher vulnerability to multidimensional poverty, highlighting the link between labour force dynamics and socioeconomic risk (ILO, 2016; Koomson et al., 2020).

District Casual Employment Share

The District Casual Employment Share measures the proportion of the district's workforce engaged in casual or temporary employment, capturing a subset of labour that is generally marked by economic insecurity. Casual employment often involves low wages, irregular working hours, and a lack of benefits, placing households at heightened risk of poverty. High levels of casual employment in a district suggest widespread economic vulnerability, as reliance on temporary jobs can lead to fluctuating incomes and limited access to social protection. As an IV for precarious employment, these variable underlines how high rates of casual employment contribute to a district's overall precarious employment landscape, which in turn increases household vulnerability to poverty by limiting financial stability and access to essential resources. Including this variable helps capture how the concentration of casual labour within a district exacerbates poverty risks, particularly when these temporary jobs constitute a significant share of available employment options (Fields, 2011; Standing, 2014; ILO, 2016).

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District Development Score

The District Development Score is a continuous composite indicator that assesses the level of development within a district. This score typically accounts for factors such as infrastructure, healthcare, educational facilities, and overall economic growth, providing a broad picture of a district's resource availability and living conditions. Districts with higher development scores are generally more equipped to support household resilience against poverty, as residents have better access to essential services that can buffer against income fluctuations and economic shocks. Improved infrastructure and social services are often associated with reduced poverty rates, as households in well-developed districts benefit from enhanced health, education, and job opportunities. The District Development Score allows for an analysis of how regional development disparities affect multidimensional poverty, shedding light on the role of resource allocation and access in mitigating poverty vulnerability across different districts (World Bank, 2019; GSS, 2014; UNDP, 2022).

District Population Share

The District Population Share variable represents each district's population as a proportion of the national population, indicating its relative demographic size within the country. Districts with a larger population share may face higher competition for resources and public services, which could increase the risk of poverty and exacerbate vulnerabilities. A high population share can strain local infrastructure, healthcare, education, and housing, particularly in resource-limited districts. This variable provides insights into how population pressures affect the availability of essential services and

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resources, as larger districts may experience crowding effects that hinder poverty alleviation efforts. Additionally, the relative population size is crucial for understanding the distribution of poverty vulnerabilities, as densely populated areas often grapple with inadequate resource allocation, affecting household resilience against multidimensional poverty (UN-Habitat, 2018; GSS, 2014). A summary of the definition and measurement is presented on Table 4.

Table 4: Definition and Measurement of Variables of Objective Three

	Description	A prior expectation
Panel A: Dependent Variables		
Multidimensional poverty dummy	Dummy variable equals to 1 if household multidimensional deprivation scores exceed 0.333.	n/a
Vulnerability to Multidimensional poverty in the Next 1 year	Dummy variable equals 1 if household is at risk of multidimensional poverty within the next year	n/a
Vulnerability to Multidimensional poverty in the Next 2 year	Dummy variable equals 1 if household is at risk of multidimensional poverty within the next two years	n/a
Vulnerability to Multidimensional poverty in the Next 3 year	Dummy variable equals 1 if household is at risk of multidimensional poverty within the next three years.	n/a
Panel B: Main Independent Variables		
Precarious employment score	Multidimensional Index of employment precarity on continuous 0 to 1 scale.	+
Precarious employment (0/1)	Binary variable (1=precarity score exceeds 0.5 threshold)	+
Precarious employment (Add)	Employment precarity accumulates as measured by the additive index for all four measures.	+
Panel C: Household control Variables		
Age of household head	Age of the household head	+
Age of household head	Age of household head squared	-

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squared		
Female headed household	Binary variable equals 1 if household head is male	+
Household size	Number of persons in the household	+
Household size square	Number of persons in the household squared	-
No formal education	Binary (1 if HH head has no formal education)	+
Primary	Binary (1 if HH head has primary education)	+/-
JHS/Middle	Binary (1 if HH head has Junior high school education)	+/-
secondary	Binary (1 if HH head has secondary education)	+/-
Tertiary	Binary (1 if HH head has tertiary education)	+/-
Not married	Binary variable equals 1 if household head not married	
Married household head	Binary variable equals 1 if household head is married	-
Private sector employee	Binary variable equals 1 if household head is private sector employee	+/-
Rural household	Binary variable equals 1 if household is rural	+
Panel D: District Control Variables		
District development score	Continuous variable of district development score	-
Basic schools	Number of basic schools in a district	-
District population share	Share of a district's population in total population in 2017	+
Panel E: Locational Dummies		
Regional effects	Categorical: reference category are households residing in Western region	+/-
Panel F: Instrumental Variables		
District labour force rate	Share of a district's Labour force in 2021 population census	+/-
District causal employment share	Share of a district's causal employment	+

Source: Computed from AHIES and Administrative and constructed data

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Control Function Approach for Nonlinear Models

The Control Function (CF) Approach is an econometric method designed to address endogeneity in regression models, particularly when one or more explanatory variables are correlated with the error term. Endogeneity can arise from omitted variable bias, measurement error, or reverse causality, leading to biased and inconsistent parameter estimates. The CF approach is applicable in both linear and nonlinear contexts, including probit models where the outcome variable is binary. It corrects for endogeneity by incorporating a residual term from the first-stage regression into the main structural equation, which accounts for the unobserved factors driving the endogeneity (Wooldridge, 2015).

In probit models, the dependent variable is binary, and the structural equation models the probability of an event occurring as a function of explanatory variables. The CF approach is particularly well-suited for nonlinear models as it provides a computationally efficient alternative to joint maximum likelihood estimation. By using instrumental variables (IVs), the CF method isolates the endogenous variation in the explanatory variable through a reduced-form residual, which is then included as a control function in the main equation (Smith & Blundell, 1986). This adjustment ensures that the estimates are unbiased and consistent, even in the presence of endogeneity. The justification for employing the CF approach in this study lies in the binary nature of the dependent variable (e.g., poverty status) and the nonlinear structure of the probit model. Standard methods such as Two-Stage Least Squares (2SLS) are not suitable for nonlinear models because they assume linearity in the relationship between variables. The CF approach, on the other

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hand, explicitly accounts for the nonlinearity inherent in probit models and allows for a robust correction of endogeneity. This method is particularly advantageous when valid instruments are available to explain the endogenous explanatory variables (Petrin & Train, 2010).

Structural Equation for the Probit Model

The main structural equation specifies the probability of the binary outcome (Y_i) as:

$$P(Y_i = 1 \mid X_i, W_i, Z_i) = \Phi(X_i\gamma + \alpha W_i + \epsilon_i) \quad (39)$$

Where: Y_i denote Binary dependent variable indicating the event of interest (e.g., poverty status), X_i denote Vector of exogenous covariates (e.g., age, education, household characteristics), W_i denote Endogenous explanatory variable (e.g., precarious employment), Z_i denote Instrumental variables used to address endogeneity in W_i, Φ denote Cumulative distribution function (CDF) of the standard normal distribution, γ,α denote Coefficients to be estimated, ϵ_i denote Error term capturing unobserved factors. This structural equation models the likelihood of the event occurring ($Y_i = 1$) as a nonlinear function of the explanatory variables.

Reduced-Form Equation for the Endogenous Variable

To address endogeneity, the CF approach first estimates a reduced-form equation for the endogenous variable (W_i) as a function of the instruments and exogenous covariates:

$$W_i = Z_i\,\pi + X_i\,\beta + \nu_i \quad (40)$$

Where: Z_i denote Instrumental variables, ensuring exogenous variation in W_i, π, β denote Coefficients to be estimated, ν_i denote Residual term capturing unobserved variation in W_i. The residual term ν_i reflects the part of W_i that is

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not explained by the instruments and covariates, effectively capturing the endogeneity.

Control Function Specification

The CF approach assumes that the correlation between W_i and ϵ_i can be captured by the residual term v_i from the reduced-form equation. Specifically, the structural error term is decomposed as:

$$\epsilon_i = \lambda v_i + \eta_i \quad (41)$$

Where: λ is the coefficient capturing the relationship between $v_i$and ϵ_i, η_i is the adjusted error term, uncorrelated with Z_i and W_i.

Substituting this decomposition into the structural equation, the model becomes:

$$P(Y_i = 1 \mid X_i, W_i, Z_i) = \Phi(X_i\gamma + \alpha W_i + \lambda v_i + \eta_i) \quad (42)$$

In this specification, v_i acts as a control function to adjust for the endogeneity in W_i.

Extensions for Robustness in the Control Function Approach

To account for more complex relationships and potential model misspecifications, the Control Function (CF) approach can be extended by incorporating additional terms into the structural equation. One common extension involves including the squared residual (v_i^2), which captures potential nonlinearities in the relationship between the residual (v_i) and the structural error term (ϵ_i). Nonlinearities may arise when the endogenous explanatory variable (W_i) exhibits varying effects across different ranges or intensities. For instance, the marginal impact of precarious employment on poverty might differ across socioeconomic strata, necessitating a more flexible functional form to accurately model these dynamics (Petrin & Train, 2010).

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The inclusion of v_i^2 allows the CF approach to account for such complexities, improving the robustness and precision of parameter estimates.

Another significant extension involves the interaction term between the endogenous variable and the residual ($W_i v_i$). This term captures heterogeneity in the effect of W_i, addressing scenarios where the impact of the endogenous variable varies depending on unobserved factors. For example, the influence of precarious employment on multidimensional poverty might depend on regional or household-specific characteristics that are partially explained by the residual term. By including the interaction $W_i v_i$, the model adjusts for these differential effects, ensuring that the estimated relationship between W_i and the outcome variable (Y_i) is both accurate and generalizable (Blundell & Powell, 2003). This extension is particularly valuable in policy-oriented research, where understanding the heterogeneity of treatment effects is crucial for targeted interventions.

Additionally, the CF approach can incorporate higher-order polynomials or interaction terms among control variables to address complex dependencies and improve model flexibility. These extensions allow the model to better capture nonlinear or interaction-driven relationships that are common in economic data. For example, interactions between demographic variables, such as education and household size, might influence poverty outcomes in a non-additive manner. By including these terms, the CF approach enhances its capacity to model intricate relationships, ensuring that the correction for endogeneity remains robust across various specifications (Wooldridge, 2015).

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Post-Estimation Diagnostics

Post-estimation diagnostics are critical to ensuring the validity and reliability of results obtained using the Control Function (CF) approach in probit models. A key diagnostic involves testing for the presence of endogeneity. This is achieved by evaluating the significance of the coefficient (λ) on the residual term (v_i) included in the structural equation. A statistically significant (λ) confirms the presence of endogeneity in the endogenous variable (W_i), justifying the use of the CF approach. Conversely, an insignificant (λ) indicates that W_i is exogenous, suggesting that simpler estimation methods, such as standard probit models, might suffice (Wooldridge, 2015; Petrin & Train, 2010).

Another important diagnostic is assessing the goodness-of-fit of the probit model. Metrics such as the pseudo$-R^2$ and log-likelihood values are used to evaluate how well the model explains the observed data. Higher pseudo-R^2 values indicate better model fit, though they do not carry the same interpretation as R^2 in linear models. Additionally, the validity of the instrumental variables (IVs) used in the first stage is examined through relevance and exogeneity tests. The first-stage F-statistics assess instrument strength, with values exceeding 10 indicating sufficient relevance (Stock & Yogo, 2005). Over-identification tests, such as Hansen's J-test, are used to evaluate the exogeneity of the instruments. A non-significant J-test statistic supports the assumption that the instruments are valid and uncorrelated with the error term in the structural equation (Baum et al., 2007; Wooldridge, 2015).

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Robustness checks

Lewbel's (2012) Heteroscedastic-Adjusted Instrument Method

While the Control Function (CF) approach is a robust method for addressing endogeneity, it has limitations, particularly in contexts where the validity of instruments is uncertain, or the exclusion restrictions are difficult to justify. CF heavily relies on finding valid external instruments, which must satisfy both relevance (strongly correlated with the endogenous variable) and excludability (uncorrelated with the error term). However, in many empirical settings, identifying such instruments can be challenging. Weak or invalid instruments can lead to biased estimates, reduce the reliability of inference, and undermine the overall robustness of the results. These limitations necessitate alternative approaches, especially when suitable external instruments are unavailable.

Lewbel's heteroscedastic-adjusted method complements the CF approach by addressing potential weaknesses in the external instrument framework. Lewbel's (2012) heteroscedastic-adjusted instrument method provides a compelling alternative in such scenarios. This method generates internal instruments using the heteroscedasticity present in the data, bypassing the need for external instruments. By leveraging the variance in error terms as a source of identification, Lewbel's approach strengthens the identification strategy and mitigates the risk of weak instruments. This feature is particularly relevant in the context of studying precarious employment (PE) and its impact on vulnerability to multidimensional poverty (VtMP), where traditional external instruments might not capture the full complexity of employment conditions or poverty dynamics. Lewbel's method enhances robustness by enabling the estimation of causal relationships even in the absence of strong,

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external instruments, making it well-suited for our study (Lewbel, 2012). The Craig-Donald Wald F-statistic was employed to assess the strength of the internally generated instruments.

Chapter Summary

The research methods chapter systematically outlines the methodological choices and analytical techniques adopted to investigate the study's core objectives: inequality of opportunity, precarious employment, and household welfare in Ghana. Beginning with a comprehensive description of the research paradigm, the chapter justifies the selection of a positivist framework to ensure objectivity and empirical rigor. The chapter elabourates on the secondary data source, Ghana's Annual Household Income and Expenditure Survey (AHIES). The chapter also details the estimation strategies and theoretical frameworks tailored to each objective. Specific econometric models, including pooled Ordinary Least Squares (OLS), Two-stage least square and control function approaches, are selected based on the nature of the data and endogeneity concerns. The use of instrumental variables addresses potential biases, while post-estimation diagnostics strengthen the reliability of findings.

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CHAPTER FOUR

INEQUALITY OF OPPORTUNITY IN PRECARIOUS EMPLOYMENT IN GHANA

Introduction

This chapter presents the empirical results examining inequality of opportunity in precarious employment within the Ghanaian workforce, utilizing data from the fourth round of the Ghana Household, Income and Expenditure Panel Survey. The objectives of this chapter are threefold: to estimate the level of inequality of opportunity in precarious employment in Ghana, to identify the circumstantial determinants of precarious employment (such as gender, place of birth, region of birth, and family background), and to understand how inequality of opportunity manifests across demographic groups. The study focuses on ex-ante inequality, which arises from circumstances beyond individuals' control, with regression analyses used to identify key determinants of precarious employment.

The analysis employs a set of circumstance variables, calculated using the dissimilarity index and Shapley decomposition. The chapter is structured into three main sections that answer the following research questions: (1) What is the level of inequality of opportunity in precarious employment in Ghana? (2) What are the circumstantial determinants of precarious employment in Ghana? and (3) How does inequality of opportunity manifest within precarious employment? The descriptive statistics provide insight into the distribution of precarious employment across circumstantial variables, while the regression analysis explores the disparities linked to these

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circumstances, followed by a heterogeneity analysis to examine variations across different groups.

Descriptive statistics

The descriptive statistics present the inherent characteristics of the employed working population in Ghana (see Table 5). The results shows that more than two-thirds (70.5%) of the sample are engaged in precarious employment, which may indicate a significant portion of the workforce lacking job security, decent working conditions, or adequate social protections. This trend aligns with the findings of Twumasi and Ackah (2021), who reported that vulnerable employment accounted for two-thirds of total employment in Ghana in 2017. Similarly, Baffour and Abbey (2023) observed that approximately two-thirds of formal workers in the country are engaged in precarious employment. These studies collectively highlight the pervasive nature of job insecurity within the Ghanaian labour market.

In addition, the gender distribution reveals a higher representation of males (52.3%) compared to females (47.2%), suggesting potential disparities in employment opportunities or participation rates between genders. Factors contributing to this disparity include traditional gender roles, where men are often expected to be the primary earners, limiting women's opportunities (Kumari, 2018; Chansa Thelma & Ngulube, 2024). Societal norms may also discourage women from pursuing certain jobs or leadership roles, particularly in sectors like STEM, where they remain significantly underrepresented (Beede et al., 2011). Additionally, women face barriers such as unequal access to education and training, inadequate mentorship, and limited childcare

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options, which hinder their workforce participation and career advancement (Chansa Thelma & Ngulube, 2024).

Moreover, the place of birth statistics reveals that 47.6% of the employed working population were born in urban areas, while 52.4% were born in rural areas. This urban-rural divide could be associated with differences in socioeconomic conditions, access to education, and employment opportunities. Furthermore, the regional distribution shows varying concentrations of employed workers across different zones, with the highest proportion in the forest zone (36%) and the lowest in coastal (31%). These zonal disparities may reflect differences in economic activities, industry compositions, and labour market dynamics across different parts of the country.

Table 5: Descriptive statistics on working population in Ghana

Variable	Categories	Obs.	Mean	Std. Dev.	Min	Max
PE	PE	15,531	0.705	0.217	0	0.917
Gender/Sex	Male	15,531	0.528	0.499	0	1
	Female	15,531	0.472	0.499	0	1
Place of birth	urban	15,531	0.476	0.499	0	1
	rural	15,531	0.524	0.499	0	1
Region of birth	Coastal	15,531	0.305	0.461	0	1
	Forest	15,531	0.336	0.472	0	1
	Savannah	15,531	0.359	0.48	0	1
Ethnicity	Akan	15,531	0.355	0.479	0	1
	Ga-Dangme	15,531	0.041	0.199	0	1
	Ewe	15,531	0.124	0.329	0	1
	Mole-Dagbani	15,531	0.236	0.425	0	1
	Others	15,531	0.244	0.429	0	1
HH head occupation	Unpaid workers	15,531	0.155	0.362	0	1
	Private Wage Earner	15,531	0.159	0.366	0	1
	Private Self-Employed	15,531	0.147	0.354	0	1
	Public Wage Earner	15,531	0.087	0.282	0	1
	Others	15,531	0.452	0.498	0	1

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HH head education	illiterate	15,531	0.252	0.434	0	1
	below secondary	15,531	0.486	0.5	0	1
	secondary	15,531	0.188	0.391	0	1
	Tertiary	15,531	0.074	0.261	0	1
HH Wealth quintiles	Poorest quintile	15,531	0.248	0.432	0	1
	Poor quintile	15,531	0.204	0.403	0	1
	Middle quintile	15,531	0.182	0.385	0	1
	Wealthy quintile	15,531	0.177	0.381	0	1
	Wealthiest quintile	15,531	0.190	0.392	0	1

Obs., Std. Dev., Min., and Max represent Observation, Standard Deviation, Minimum, and Maximum, respectively.

Source: Author's Construct, 2025

The ethnic composition of the employed working population reveals a diverse representation, with the Akan ethnic group being the largest (36%), followed by Mole-Dagbani (24%), Ewe (12%), Ga-Dangme (4%), and others (24%). This diversity indicates the importance of considering cultural and social factors that may influence employment opportunities and labour market outcomes for different ethnic groups. Additionally, the household head's occupation and education level postulate understandings into the socioeconomic backgrounds and potential intergenerational influences on the employed working population. The results shows that 15% of the household head are unpaid workers, 16% of the heads were in private wage earner, 15% heads were in Private Self-Employed whiles 9% of the heads were in public wage earner. Based on the results a significant proportion (45%) of household heads were engaged in "other" types of work, which may indicate informal or atypical employment arrangements. Furthermore, the majority (60%) of household heads had an education level below secondary, suggesting potential limitations in access to higher education and its associated benefits.

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Lastly, the wealth quintile analysis of Ghana's employed working population reveals a complex economic landscape. The distribution shows a higher concentration in the lower wealth quintiles, with the poorest and poor quintiles representing the largest shares. This suggests that a significant portion of the workforce faces economic challenges despite being employed. Interestingly, the wealthiest quintile follows, comprising 19% of the employed population, indicating notable income inequality. The middle and wealthy quintiles represent 18.2% and 18% respectively, reflecting a relatively balanced distribution in the upper middle to high wealth brackets. This pattern highlights several key issues: employment does not guarantee economic well-being, there's significant wealth inequality within the workforce, some degree of economic mobility exists, and there is a need for policies addressing job quality and economic advancement opportunities, particularly for the working poor.

Precarious employment and circumstances across birth cohorts

In this section, the study provides a clear look at precarious employment and how it relates to different circumstances among various birth cohorts in Ghana. The employment deprivation score serves as a measure of precarious employment, with higher scores indicating a greater prevalence of insecure, unstable, or inadequate employment conditions. In Figure 8, the results show that oldest cohort (born between 1962-1971, aged 51-60) exhibits the highest employment deprivation score of 0.73, suggesting that older individuals face greater challenges in securing decent employment opportunities. This is followed by those in the young cohort (born between

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1992 to 2004, aged 18-30), with those between the age bracket of 31 to 40 years' experience the lowest level of precarious employment.

This finding can be attributed to several factors that are prevalent in the Ghanaian context. For the oldest cohort (aged 51–60), their high employment deprivation score may stem from structural disadvantages such as age discrimination in the labour market, limited opportunities for retraining, and a lack of comprehensive social protection systems. Structural Violence Theory (Fraser, 2008) helps explain this outcome, as it highlights how institutional arrangements, including weak labour laws and insufficient retirement system, systematically exclude certain groups, thereby perpetuating precariousness.

In Ghana, older workers are often left to work in insecure conditions due to a lack of pension coverage or age-sensitive employment policies, leading to sustained labour market vulnerability. As industries modernise and adopt new technologies, older workers may find their skills becoming obsolete, making it challenging to compete with younger, more technologically savvy job seekers (Aubert et al., 2006; Beckmann, 2007; Schauenberg, 2007). Furthermore, the lack of comprehensive social security systems in many African nations means that older individuals may be forced to continue working in precarious conditions to sustain themselves, even as their physical capabilities decline.

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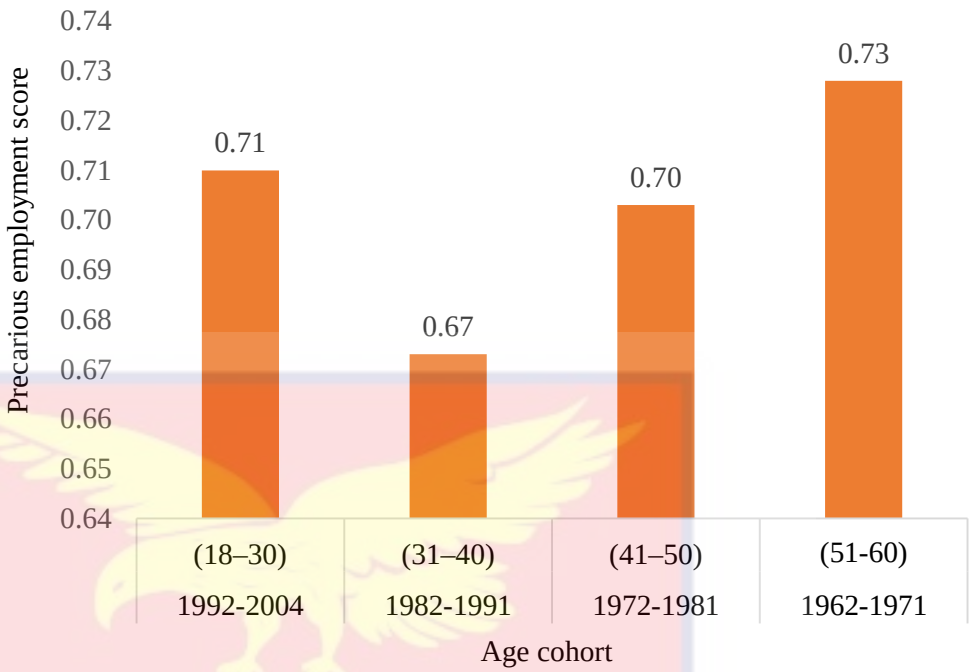


Figure 9: Level of precarious employment across birth cohorts.

Source: Author's Construct, 2025

The high employment deprivation score for young people in Ghana (aged 18-30) reflects widespread youth unemployment challenges across Africa. A significant factor is the mismatch between the skills taught in schools and the actual needs of the job market, as highlighted by research from Kalfa and Piracha (2017) and Mateos-Romero and Salinas-Jiménez (2017). This skills gap makes it difficult for many young individuals to secure stable jobs, resulting in intense competition for a limited number of available positions. Additionally, young workers often face a lack of experience and have limited access to reliable job opportunities, pushing them into precarious employment. More so, economic instability and insufficient support systems further exacerbate these challenges, forcing many into low-paying, insecure jobs that offer little to no benefits.

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The relatively lower employment deprivation score for those aged 31-40 can be explained by this group's position in their career trajectories. By this age, many workers have accumulated valuable work experience, developed professional networks, and acquired skills that make them more competitive in the job market. They may also be more likely to have secured stable positions in the formal sector or established themselves in successful self-employment ventures (Felstead, 2010; Podobas, 2018; Unson & Richardson, 2013). In the Ghanaian and African context, the informal sector plays a significant role in employment patterns. Many young people and older workers may find themselves engaged in informal, often precarious work due to the lack of formal job opportunities. While the informal sector provides a crucial source of income, it often lacks job security, benefits, and social protection, contributing to higher employment deprivation scores for these age groups.

The results also reflect the challenges of structural transformation in Ghana. As this country transition from agriculture-based to more diversified economies, older workers may struggle to adapt to new economic realities, while young people may face difficulties entering emerging sectors due to lack of experience or relevant skills. Lastly, cultural and social factors may contribute to these patterns. In many African societies, there is a strong expectation for young adults to contribute to family income, which may push them into accepting precarious employment. Similarly, older individuals may feel pressured to continue working to support extended family networks, even if it means engaging in vulnerable forms of employment (Oppong, 2013).

In Figure 9, it is observed that gender disparities in employment opportunities are evident across all birth cohorts, with females consistently

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having higher precarious employment deprivation scores compared to males. For instance, in the oldest cohort (aged 51-60), the employment deprivation score for females is 0.74, while for males it is 0.72. This can be attributed to the fact that socio-cultural norms and expectations play a significant role in shaping employment outcomes for women in Ghana and many African countries (Amankwah et al., 2024; Jayachandran, 2020; Anambane & Adom, 2018). Traditional gender roles often relegate women to domestic responsibilities and unpaid care work, limiting their participation in the formal labour market. These norms can also influence educational and career choices, steering women towards less stable or lower-paying sectors. Discriminatory practices in hiring, promotion, and wage-setting contribute to the gender gap in employment opportunities (Mukherjee & Sarkhel, 2021; Agénor, 2018; Jayachandran, 2020).

The results also indicated that in the 18-30 age cohort, the difference in precarious employment scores between genders is not pronounced. This suggests that both males and females face similar levels of precarious employment in their early working lives. This trend could be attributed to several factors, such as the increasing prevalence of gig economy jobs, internships, and contract work that often lack stability and benefits, which are commonly accessed by young workers regardless of gender (Katz & Krueger, 2019; Wood et al., 2019; De Stefano, 2016).

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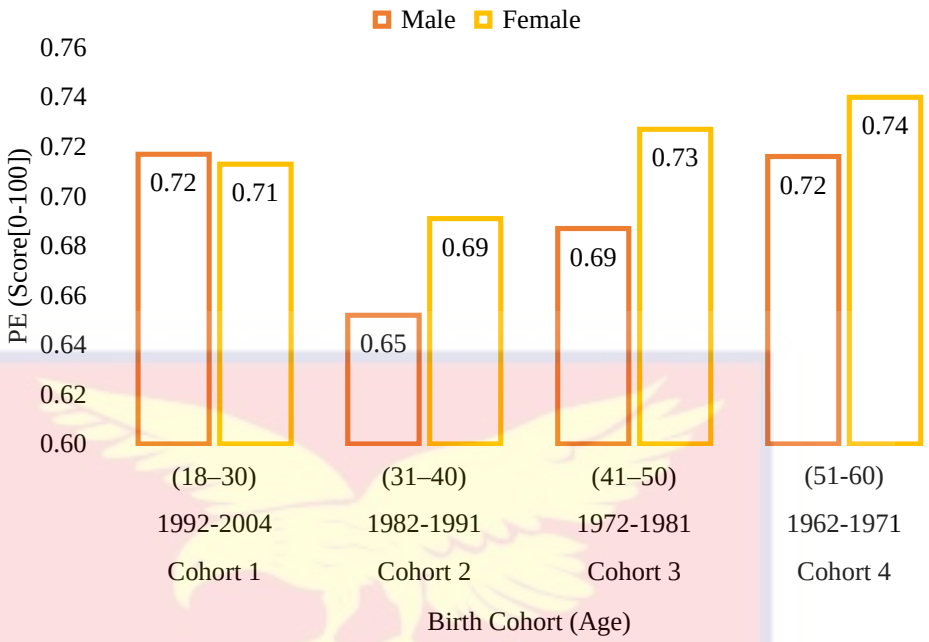


Figure 10: Precarious employment score by gender across birth cohorts

Source: Author's Construct, 2025

In addition, employers may hold biased perceptions about women's capabilities or commitment to work, particularly for married women or those of childbearing age. This can result in women being overlooked for stable, formal employment or being offered less secure positions (Correll et al., 2007; Thévenon, 2013). The disproportionate burden of unpaid care work borne by women significantly impacts their labour market outcomes (Ferrant et al., 2014). In Ghana, as in many African countries, women are often responsible for childcare, elder care, and household management. This "double burden" can limit women's ability to engage in full-time, formal employment, pushing them towards more flexible but precarious work arrangements (Duku, 2018; Tsikata, 2009).

Moreover, examining place of birth and regional variations reveals interesting insights into employment trends. Figure 10 indicates that individuals born in urban areas report higher employment deprivation scores

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than their rural counterparts, with scores of 0.70 and 0.73 for the youngest cohort (ages 18–30), respectively. This phenomenon can largely be attributed to the rapid pace of urbanization and the migration of individuals from rural areas to cities. As cities expand, they attract a significant influx of labour, leading to an oversaturation of the job market. This oversupply intensifies competition for a limited number of job opportunities, making it increasingly difficult for urban residents, especially youth, to secure stable, decent work.

This finding is well explained by the Dual Labour Market Theory (Wilson, 1972), which posits that the labour market is divided into two sectors: a primary sector with stable, well-paying jobs, and a secondary sector with precarious, low-paying, and informal work. Urban youth, particularly recent migrants, are more likely to find themselves trapped in the secondary sector, where jobs offer little security or upward mobility. The segmentation of the labour market thus perpetuates inequality and leaves many urban dwellers, despite their proximity to economic centres, vulnerable to precarious employment conditions.

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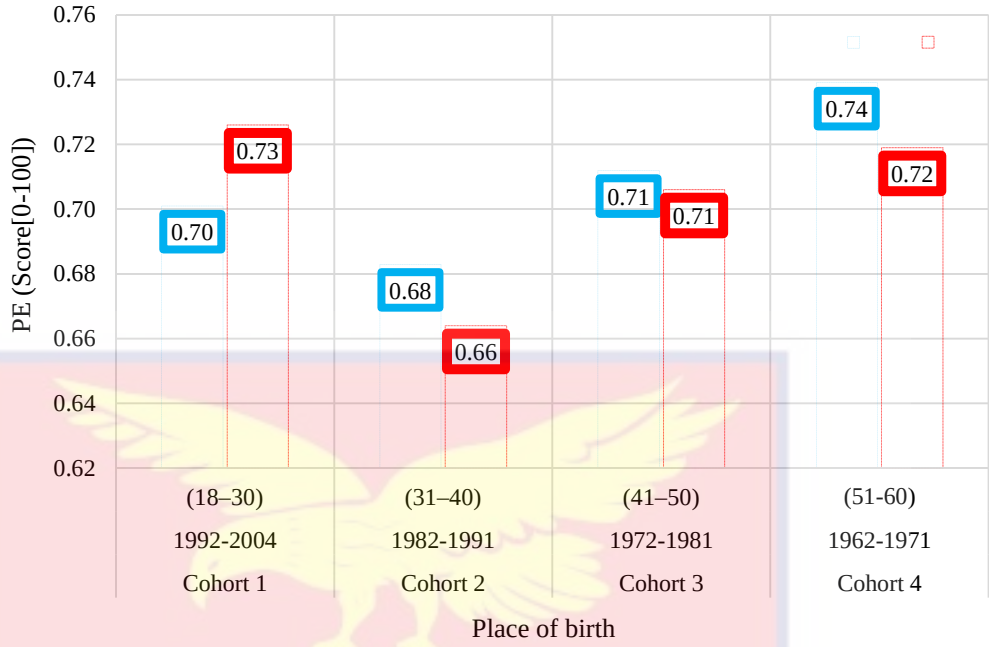


Figure 11: Precarious employment score by gender across birth cohorts

Source: Author's Construct, 2025

Furthermore, the predominance of informal sector employment in African urban areas, while providing livelihood options, often lacks job security and social protections, contributing to higher employment deprivation scores (Chen, 2012; ILO, 2018). Additionally, urban households face a cost of living that exceeds rural areas by 30–50%, on average, driven by higher housing, transportation, and food expenses (UN-Habitat, 2020). This economic pressure often forces urban workers to accept precarious employment just to meet basic needs. The exception observed in the youngest cohort (18-30) suggests that urban areas may offer better initial opportunities for youth, possibly due to enhanced access to education and entry-level positions in emerging sectors.

Regional variations also indicate that individuals born in the Savannah zone consistently face higher employment deprivation than those from the Coastal or Forest zones. The data reveals that the Savannah ecological zone

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has the highest employment deprivation scores across all age groups, with scores ranging from 0.72 for the youngest cohort to 0.76 for the oldest. This trend likely arises from the Savannah's difficult environmental conditions, limited economic diversity, and inadequate infrastructure. These factors can significantly restrict job opportunities, leading to more precarious employment situations, a pattern often observed in rural or less developed areas throughout Africa.

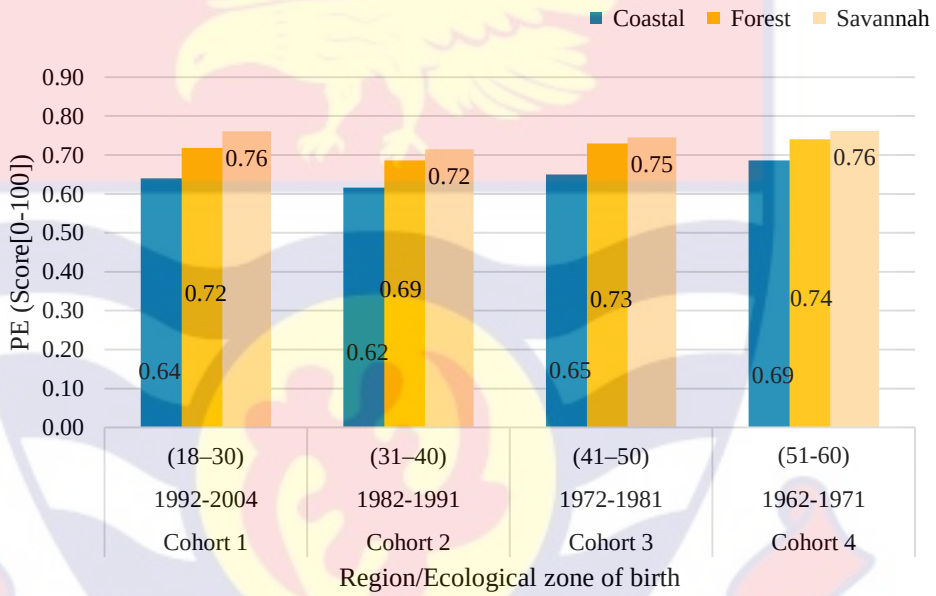


Figure 12: Precarious employment score by Region/Ecological zone of birth across birth cohorts.

Source: Author's Construct, 2025

Table 6 illustrates the ethnic variations in employment deprivation scores, education levels, and the occupation of household heads, alongside household wealth quintiles. The results indicate that certain ethnic groups, such as the Ga-Dangme, experience lower employment deprivation scores, ranging from 0.662 for the youngest cohort to 0.715 for the oldest. In contrast, groups like the Ewe show higher scores, with a range from 0.662 to 0.732, while the "Others" category scores between 0.726 and 0.764. Research by

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Akerlof and Kranton (2000) also highlights how cultural factors, and identity can influence economic behaviour and opportunities. These differences may be influenced by cultural factors, historical economic engagement patterns, and varying access to resources and social networks, which in turns affect the employability and working conditions of other ethnic groups.

Table 6: Precarious employment and circumstances across birth cohorts

Employment deprivation score		Birth Cohort (Age)			
		Cohort 1	Cohort 2	Cohort 3	Cohort 4
Variable	Categories	1992-2004 (18–30)	1982-1991 (31–40)	1972-1981 (41–50)	1962-1971 (51-60)
Ethnicity	Akan	0.662	0.626	0.689	0.715
	Ga-Dangme	0.613	0.616	0.621	0.587
	Ewe	0.703	0.662	0.690	0.732
	Mole-Dagbani	0.752	0.703	0.728	0.754
	Others	0.757	0.729	0.752	0.764
HH head occupation	Unpaid workers	0.787	0.794	0.803	0.786
	private wage earner	0.701	0.703	0.720	0.737
	private self-employed	0.793	0.787	0.803	0.799
	public wage earner	0.454	0.347	0.426	0.416
	other	0.719	0.678	0.689	0.721
HH head education	illiterate	0.798	0.785	0.784	0.781
	Below Secondary	0.747	0.721	0.726	0.725
	secondary	0.675	0.595	0.630	0.644
	Tertiary	0.509	0.336	0.312	0.388
HH Wealth quintiles	Poorest quintile	0.773	0.770	0.781	0.789
	Poor quintile	0.730	0.713	0.746	0.755
	Middle quintile	0.685	0.656	0.671	0.709
	Wealthy quintile	0.664	0.615	0.648	0.693
	Wealthiest quintile	0.679	0.593	0.673	0.678

Source: Author's Construct, 2025

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The household head's occupation, education level, and household wealth quintiles provide insights into the intergenerational and socioeconomic factors influencing employment outcomes. Individuals from households where the head is engaged in public wage employment tend to have lower employment deprivation scores, ranging from 0.347 for the second cohort (aged 31-40) to 0.454 for the youngest cohort, potentially due to the stability and benefits associated with public sector jobs. In contrast, those in households where the head is in unpaid work have significantly higher scores, ranging from 0.78 for the youngest cohort to 0.803 for the third cohort (aged 41-50), reflecting the precariousness and vulnerability often associated with these types of employment. Similarly, individuals from households with higher education levels for the head generally have lower employment deprivation scores, with those from households with tertiary education ranging from 0.312 for the third cohort to 0.509 for the youngest cohort.

Lastly, the wealth quintiles reveal a strong association between household wealth and precarious employment, with individuals from the poorest quintile consistently having the highest employment deprivation scores across all cohorts, ranging from 0.770 for the youngest cohort to 0.789 for the oldest cohort. This finding highlights the cyclical nature of poverty and the need for comprehensive strategies that address both economic and social factors contributing to precarious employment (Fields, 2011; Chen, 2012; ILO, 2018). Poverty and precarious employment are mutually reinforcing, as limited access to stable jobs perpetuates income insecurity, while economic constraints prevent investment in education, skills, and health—factors essential for breaking the cycle.

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Determinants of precarious employment across birth cohorts

Table 7 unveil crucial insights into the circumstantial determinants of precarious employment across different birth cohorts in Ghana. The results show the full sample and separately for each cohort. For the entire sample (in Column 1), all circumstance variables have the expected signs and values on precarious employment. The coefficient of gender/sex is positive and significant at 1 percent. The results show that being a female workers increase the chance of being in precarious employment compared to male workers. This disparity may stem from gender-based discrimination, cultural norms, or the disproportionate burden of unpaid care work borne by women, limiting their access to decent employment opportunities. This finding is in line with the work of Murillo-Huertas et al. (2023) who found that the intensity and incidence of precarious employment are significantly higher for women compared to men. The study by Murillo-Huertas et al. (2023) also highlights the persistence of female employment precariousness over time, while noting fluctuations linked to economic cycles and labour market regulations.

In addition, the results on the relationship between place of birth and precarious employment was found to be positive and significant at 5 percent. The results indicated that workers in a rural area increase the chance of being precariously employed compared to workers in urban areas by 0.016. This finding could be attributed to limited economic opportunities, lack of infrastructure, or challenges in transitioning to urban labour markets for those born in rural areas. This finding aligns with the work of Ananian and Dellaferrera (2024), who indicate that while individuals in rural areas are generally more likely to be employed compared to those in urban settings,

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they often occupy jobs that expose them to inadequate labour protections and lower wages. Specifically, the study indicated that rural workers earn less per hour than their urban counterparts, and only half of this wage gap can be attributed to differences in education, work experience, and occupational categories between the two groups.

Although the individual effects of sex and place of birth are not statistically significant across the disaggregated age cohorts in Table 7, their combined effect is significant in the full sample (Column 1). This can be explained by the possibility that when the full population is analysed together, there is greater variation and statistical power, which allows the combined effect to reach significance. In contrast, splitting the sample into smaller cohorts reduces the sample size within each group and increases standard errors, making it more difficult to detect significant individual effects. Therefore, the overall significant association in the full sample reflects the cumulative pattern that may not be as visible within narrower age groups.

Table 7: 'Circumstantial' determinants of precarious employment by age cohort (OLS)

	(1)	(2)	(3)	(4)	(5)
VARIABLES	ALL	Cohort 1 1992-2004 (18–30)	Cohort 2 1982-1991 (31–40)	Cohort 3 1972-1981 (41–50)	Cohort 4 1962-1971 (51-60)
Sex (Ref=Male)					
Female	0.009**	-0.004	0.008	0.007	0.014
	(0.004)	(0.005)	(0.008)	(0.009)	(0.012)
Place of birth (ref=Urban)					
Rural	0.016**	-0.012	-0.009	0.025	0.025
	(0.008)	(0.012)	(0.018)	(0.017)	(0.019)
Region of birth (ref= Savannah)					
Greater Accra	-0.134***	-0.156***	-0.094***	-0.147***	-0.123***
	(0.010)	(0.014)	(0.017)	(0.020)	(0.029)
Coastal	-0.025***	-0.031***	-0.034***	-0.022*	-0.004

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	(0.006)	(0.008)	(0.010)	(0.012)	(0.015)
Forest	0.003	0.008	0.007	0.005	-0.007
	(0.005)	(0.007)	(0.009)	(0.011)	(0.013)
Ethnicity (ref=Akan)					
Ga-Dangme	-0.006	-0.006	0.014	0.013	-0.052
	(0.012)	(0.014)	(0.024)	(0.023)	(0.033)
Ewe	0.013*	0.030***	0.019	-0.015	0.016
	(0.007)	(0.009)	(0.013)	(0.016)	(0.017)
Mole-Dagbani	0.012**	0.024***	0.016	-0.004	-0.001
	(0.006)	(0.008)	(0.011)	(0.013)	(0.017)
Others	0.028***	0.030***	0.036***	0.016	0.018
	(0.006)	(0.008)	(0.011)	(0.013)	(0.017)
HH head Occupation (Public Wage Earner)					
Unpaid worker	0.255***	0.269***	0.262***	0.230***	0.300***
	(0.009)	(0.010)	(0.014)	(0.021)	(0.024)
Private wage Earner	0.212***	0.205***	0.206***	0.216***	0.253***
	(0.009)	(0.010)	(0.016)	(0.021)	(0.027)
Private self-employed	0.261***	0.263***	0.268***	0.236***	0.304***
	(0.009)	(0.011)	(0.014)	(0.022)	(0.023)
Other	0.184***	0.207***	0.169***	0.170***	0.246***
	(0.008)	(0.009)	(0.013)	(0.019)	(0.022)
HH Head education level (ref= illiterate)					
Below secondary	-0.028***	-0.018**	-0.022**	-0.036***	-0.023**
	(0.005)	(0.008)	(0.009)	(0.010)	(0.011)
Secondary	-0.093***	-0.063***	-0.122***	-0.106***	-0.046*
	(0.007)	(0.008)	(0.014)	(0.019)	(0.026)
Tertiary	-0.283***	-0.175***	-0.321***	-0.348***	-0.262***
	(0.011)	(0.012)	(0.016)	(0.025)	(0.039)
HH wealth index	-0.043***	-0.023***	-0.061***	-0.052***	-0.019
	(0.005)	(0.006)	(0.009)	(0.010)	(0.017)
Age Cohort	Yes	No	No	No	No
Constant	0.606***	0.535***	0.541***	0.567***	0.504***
	(0.018)	(0.014)	(0.019)	(0.024)	(0.029)
Observations	15,531	3,616	2,031	1,492	1,190
R-squared	0.384	0.290	0.432	0.399	0.361

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1
Source: Author's Construct, 2025

Compared to the savanna zone, residing in the coastal zone has a negative effect on precarious employment. Specifically, the coefficients for coastal areas and the Greater Accra region were found to have a significant

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negative impact on precarious employment, with coefficients of -0.025 and -0.134, respectively. This suggests that individuals living in these areas are less likely to be engaged in precarious employment compared to those in the savanna zone. On the other hand, the forest zone has a positive but insignificant effect on precarious employment, as shown in column 1. This finding is consistent with the existing literature on the regional differences in precarious employment. Research indicates that variations in economic development, labour market policies, and socio-cultural factors contribute to significant disparities in the prevalence and nature of precarious work across regions (Standing, 2011; ILO, 2018; Fields, 2011). For example, developing regions often experience higher rates of informal and insecure employment due to limited regulatory frameworks and social protection systems, compared to more developed regions.

Given that the savanna zone in Ghana is predominantly agrarian, the higher incidence of precarious work in this region aligns with their observation. The lower levels of precarious employment observed in the coastal and Greater Accra regions may be attributed to the more diverse economic activities in these areas, which are less concentrated in the labour-intensive agricultural sector. Furthermore, Sapkal and Sundar (2017) suggested that labour-intensive sectors exposed to global import competition and rigid labour laws tend to be associated with higher levels of precarious employment. The savanna zone, with its reliance on agriculture, may be more vulnerable to these factors, leading to the higher incidence of precarious work observed in this region compared to the coastal and Greater Accra areas.

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Regarding ethnic groupings, the results indicate that workers from the Ewe, Mole-Dagbani, and other tribal groups have a higher probability of being engaged in precarious employment compared to workers from the Akan ethnic group. The coefficient results show that being Ewe, Mole-Dagbani, or belonging to other tribes increases the likelihood of precarious employment by 0.013, 0.012, and 0.028, respectively, relative to workers who are Akans. This finding suggests that there may be underlying socio-economic and cultural factors associated with different ethnic groups that contribute to the disparities in employment conditions. Potential explanations could include variations in educational attainment, access to employment opportunities, social networks, or cultural norms and practices that influence occupational choices or entrepreneurial activities among these ethnic groups.

This observation aligns with existing literature on ethnic identity and labour market outcomes. Bossert et al. (2013) found that ethnic minorities in developing countries often face barriers to quality employment, resulting in a higher incidence of precarious work due to factors like discrimination, limited social networks, and unequal access to education and training. Similarly, Munoz-Bullón (2009) emphasized the compounded disadvantages minority women face in the labour market when considering the intersection of gender and ethnicity. The higher rates of precarious employment among groups like the Ewe and Mole-Dagbani may reflect these dynamics. Additionally, Behrman et al. (2012) highlighted how cultural norms and practices shape occupational preferences and entrepreneurial activities, suggesting that variations in educational attainment and social capital across ethnic groups further contribute to the observed differences in employment conditions.

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In addition, the results in Table 7 further indicate that, compared to households where the head is a public wage worker, households with heads engaged in unpaid work, private wage work, or self-employment tend to have a higher probability of being in precarious employment. The coefficient results show that when the household head is in unpaid work, private wage work, or self-employment, is more like to be in precarious employment by 0.255, 0.212, and 0.261, respectively, relative to households where the head is a public wage worker. This finding suggests that the nature of work of the head can significantly influence the employment prospects and precariousness of the heads work. Households with heads employed in the public sector, which typically offers more stable and secure employment conditions, tend to have a lower risk of precarious employment.

Conversely, private wage work and self-employment undertaken by the household head, which may be characterised by lower job security, unstable incomes, or lack of social protection, can contribute to a higher likelihood of precarious employment among other working members of the household. Research by Kalleberg (2009) supports this notion, emphasising that precarious employment is often associated with low wages, limited job security, and inadequate labour protections, which are more prevalent in non-public sector roles. In addition, the International Labour Organization (ILO) has documented how self-employed and unpaid workers often lack access to social safety nets and resources, further exposing them to economic vulnerability. Also, the literature indicates that self-employment can lead to precarious conditions due to inconsistent income and lack of formal contracts (Fairlie, 2013).

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Moreover, the results presented in Table 3 indicate that, compared to households where the head is illiterate, households with heads who have attained education levels below secondary, secondary, or tertiary education exhibit a lower probability of being in precarious employment. The coefficient results show that when the household head has an educational level below secondary, secondary, or tertiary, it decreases the likelihood of being in precarious employment by 0.028, 0.093, and 0.283, respectively, compared to households where the head is illiterate. The findings suggest that higher education is linked to better job opportunities, higher wages, and more secure employment. Studies, such as those by Becker (1993) and Oreopoulos & Salvanes (2011), show that individuals with higher educational attainment tend to have access to a wider variety of job options and possess stronger skills to navigate the job market. For instance, a report by the Bureau of Labour Statistics (2020) highlights that higher educational levels correlate with lower unemployment rates and higher earnings.

The results indicate that the wealth level of the household has a negative and significant effect on the household head being in precarious employment. Specifically, the coefficient shows that an increase in the household wealth score reduces the likelihood of the head being in precarious employment by 0.069. This finding suggests that households with higher levels of wealth and economic resources are better positioned to mitigate the risk of precarious employment for the household head. Household wealth can contribute to improved employment prospects and reduced precariousness for the head through various mechanisms, such as providing access to better educational and skill development opportunities, serving as a buffer against

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economic shocks, and facilitating access to more secure employment opportunities through social networks and connections - as supported by the human capital theory, the literature on household assets and labour market resilience, and the importance of social capital in shaping labour market outcomes (Nor, 2022; Benati, 2007; Skoufias, 2003).

Inequality of opportunity in precarious employment

Understanding inequality in precarious employment is critical for identifying disparities in job security and social protections across different population groups. Such disparities often stem from unequal access to opportunities, driven by socio-economic, demographic, and regional factors. Analyzing these inequalities provides insights into the structural challenges within the labour market and helps guide policy interventions aimed at fostering inclusive economic growth.

Table 8 presents the results of the analysis on inequality of opportunity in precarious employment in Ghana, both for the entire sample and across different birth cohorts. The study employs two widely used inequality indices: the Gini coefficient and the Generalized Entropy (GE) index with a sensitivity parameter of 2, denoted as GE (2). These indices measure the overall inequality in the distribution of precarious employment, considering the differences between individuals or groups. For the entire sample, the total inequality in precarious employment, as measured by the GE (2) index, is 0.172. This indicates a moderate level of inequality in the distribution of precarious employment across the population. The Gini coefficient stands at 0.200 for the entire sample, further confirming the presence of inequality in precarious employment.

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When examining the inequality across different birth cohorts, the results reveal variations in the levels of inequality. The highest levels of inequality are observed for Cohort 4 (1962-1971, aged 51-60 years), with a Gini coefficient of 0.275 and a GE (2) index of 0.213. This suggests that individuals in this age group face significant disparities in their experiences of precarious employment, potentially due to factors such as accumulated career experiences, family responsibilities, or changes in labour market conditions over their working lives. Cohort 1 (1992-2004, aged 18-30 years) also exhibits relatively high levels of inequality, with a Gini coefficient of 0.222 and a GE(2) index of 0.197. This cohort represents individuals in their early career stages, where differences in educational attainment, initial job placements, and early career opportunities may contribute to the observed inequality in precarious employment.

Table 8: Inequality of opportunity in Ghana's precarious employment

	Entire Sample	Birth Cohorts			
	Mean	Cohort 1	Cohort 2	Cohort 3	Cohort 4
	ALL	1992-2004 (18–30)	1982-1991 (31–40)	1972-1981 (41–50)	1962-1971 (51-60)
Panel A					
Total (outcome) inequality					
Gini	0.200	0.222	0.137	0.138	0.275
GE (2)	0.172	0.197	0.119	0.147	0.213
Inequality of Opportunity					
Absolute (IOA)	0.023	0.042	0.014	0.013	0.027
Relative Share (IOR)	**0.301**	**0.285**	**0.215**	**0.211**	**0.351**
Panel B: Shapley decomposition (% of					

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IOR)					
Sex/Gender	7.05%	10.70%	0.97%	3.31%	1.87%
Place of birth	0.44%	1.09%	0.64%	0.72%	0.14%
Birth region	8.48%	4.13%	0.79%	8.89%	1.20%
Ethnicity	1.52%	0.91%	3.08%	0.83%	1.05%
HH head occupation	14.70%	16.65%	30.40%	36.63%	30.00%
HH head education level	45.71%	53.08%	57.29%	45.12%	49.66%
HH wealth quintiles	22.11%	13.45%	6.83%	4.50%	16.07%

Estimations using the AHIES 2023 database. Notes: GE, generalized entropy indices; IOA, absolute inequality of opportunity; IOR, relative inequality of opportunity.

Source: Source: Author's Construct, 2025

Conversely, Cohort 2 (1982-1991, aged 31-40 years) and Cohort 3 (1972-1981, aged 41-50 years) exhibit lower levels of inequality, with Gini coefficients of 0.137 and 0.138, respectively, and GE (2) indices of 0.119 and 0.147, respectively. For these middle-aged cohorts, the lower inequality may be attributed to factors such as more established career paths, stabilized employment situations, or potentially more homogeneous labour market experiences within their age groups.

In addition, Table 8 presents the results of the inequality of opportunity analysis in precarious employment in Ghana, decomposing the general inequality into two components: the inequality stemming from circumstances beyond an individual's control (inequality of opportunity) and the residual inequality attributed to other factors such as efforts, random elements, and unobserved factors. The inequality of opportunity is measured using two metrics: the absolute inequality of opportunity (IOA) and the relative share of

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inequality of opportunity (IOR). The IOA represents the absolute level of inequality that can be attributed to circumstances, while the IOR expresses the share of the total inequality that is due to these circumstances.

For the entire sample, the IOA in precarious employment is 0.020, indicating a moderate level of absolute inequality attributable to circumstances beyond an individual's control. However, the IOR, which represents the relative share of inequality due to these circumstances, is 0.135 or 13.5%. This suggests that approximately 13.5% of the overall inequality in precarious employment can be attributed to unequal circumstances, while the remaining 86.5% is due to other factors, such as individual efforts, random elements, or unobserved factors. When examining the inequality of opportunity across different birth cohorts, the results reveal variations in both the absolute and relative measures. The absolute inequality of opportunity (IOA) is highest for Cohort 2 (1982-1991, aged 31-40 years), with a value of 0.066, suggesting that this cohort faces the greatest level of inequality in precarious employment due to circumstances beyond their control.

In terms of the relative share of inequality of opportunity (IOR), Cohort 3 (1972-1981, aged 41-50 years) exhibits the highest value of 0.307 or 30.7%. This means that approximately 30.7% of the overall inequality in precarious employment for this cohort can be attributed to unequal circumstances, such as place of birth, ethnicity, or parental characteristics. Interestingly, Cohort 1 (1992-2004, aged 18-30 years) has the smallest IOR of 0.113 or 11.3%, indicating that a smaller portion of the inequality in precarious employment for this cohort is due to circumstances beyond their control. This could be attributed to factors such as increased access to

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education, evolving societal norms, or changes in labour market dynamics that may have reduced the impact of circumstances on employment outcomes for this younger generation.

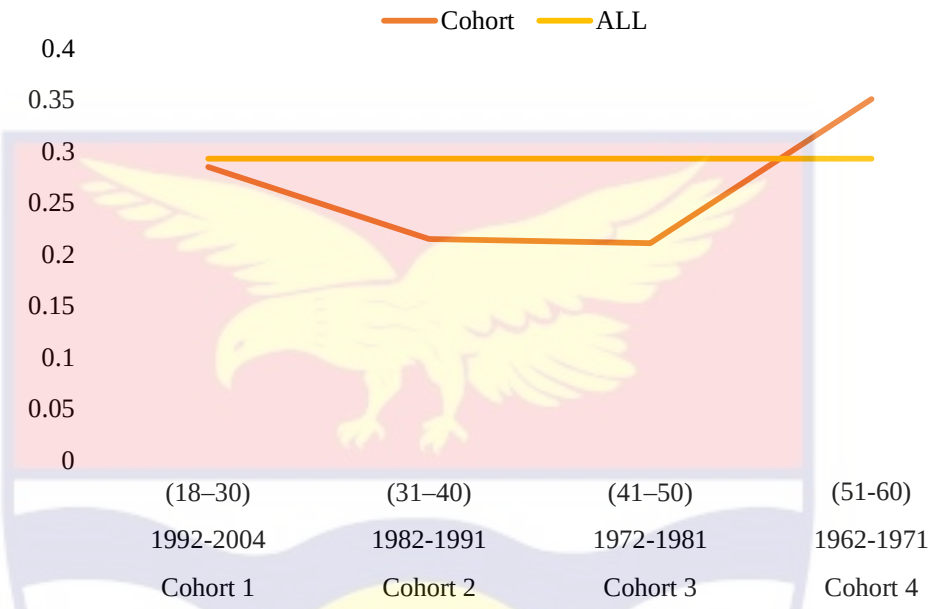


Figure 13: Inequality of opportunity in precarious employment by birth cohort (age).

Source: Author's Construct, 2025

Panel B of Table 8 and Figure 13 provides a Shapley decomposition of the relative inequality of opportunity (IOR), illustrating how various circumstances, such as gender, place of birth, ethnicity, household characteristics, and parental education, contribute to inequality in precarious employment. Among these factors, the household head's education level emerges as the most significant contributor, accounting for 45.71% of the total IOR for the entire sample, with its impact increasing to 57.29% for Cohort 2 (1982–1991). This finding underscores the persistent intergenerational effects of educational disparities, as highlighted by studies such as Pistolesi (2008) and Galal and El Enbaby (2020), which emphasise the role of parental education in shaping labour market outcomes. Similarly, household head's

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occupation accounts for 14.70% of IOR for the entire sample and peaks at 36.63% for Cohort 3 (1972–1981), reinforcing the critical role of occupational hierarchies in perpetuating labour market inequality. This finding aligns with Singh (2010, 2011) and Abras et al. (2013), who identified family occupational status as a key determinant of employment outcomes, especially in developing economies where access to formal jobs often depends on familial networks and status.

Additionally, household wealth quintiles contribute 22.11% to IOR for the entire sample, with their impact being particularly significant for Cohort 1 (1992–2004). This supports findings by El Enbaby and Galal (2015), who demonstrated that household wealth directly influences access to stable and higher-paying jobs by enabling better education and professional opportunities. Although sex/gender plays a smaller overall role, it is more pronounced in younger cohorts, contributing 10.70% of IOR for Cohort 1, which aligns with the persistent structural and cultural barriers women face in labour markets, as noted by Golley et al. (2019) and Ahmed et al. (2020).

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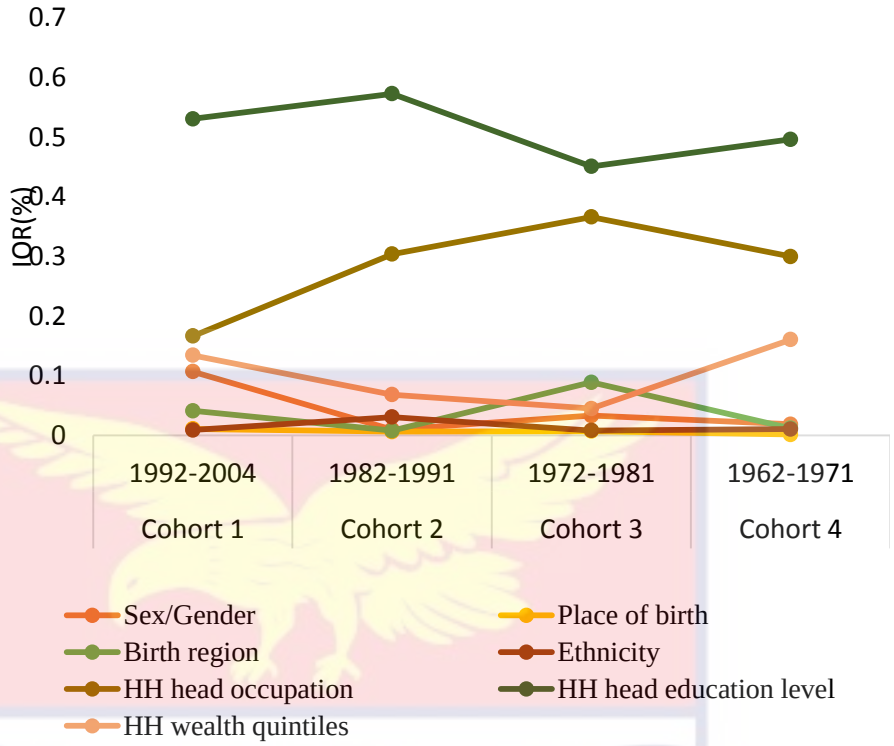


Figure 14**:** Partial contributions of each of the circumstances by birth cohort (age).

Source: Author's Construct, 2025

Furthermore, factors such as place of birth, birth region, and ethnicity, while contributing less significantly, show notable variations. For instance, birth region accounts for 8.89% of IOR for Cohort 3, indicating that regional disparities remain an influential factor in shaping employment outcomes, consistent with findings by Pasquier-Doumer (2024) and Singh (2011). These results collectively highlight the multifaceted nature of inequality in precarious employment, pointing to the critical interplay between education, household resources, regional context, and structural barriers such as gender discrimination.

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Heterogeneity analysis

Inequality of opportunity in precarious employment between gender and place of birth of the workers

The analysis in Table 9 explores the heterogeneity of inequality of opportunity (IOR) in precarious employment, offering insights into variations across subgroups defined by gender and the rural-urban divide. The findings reveal that overall inequality, as measured by the Gini coefficient and Generalised Entropy (GE) indices, is higher for males (Gini = 0.214, GE (2) = 0.178) compared to females (Gini = 0.171, GE (2) = 0.130). However, the relative share of inequality of opportunity (IOR) presents a more complex picture. While one set of results suggests that females experience slightly lower IOR (12.9%) than males (13.2%), a closer examination reveals that females face a higher IOR (12.94%) than males (7.83%). This discrepancy highlights the multifaceted challenges women encounter, such as gender discrimination, societal norms, and unequal access to stable employment opportunities (Ahmed et al., 2020; Golley et al., 2019). These results emphasise that while men might experience broader inequality in precarious employment, women are disproportionately affected by structural barriers that limit their opportunities.

The Shapley decomposition provides deeper insights into the sources of inequality. For women, the household head's education level emerges as the most significant factor, contributing 48.8% to IOR. This finding aligns with Pistolesi (2008) and Galal and El Enbaby (2020), who noted the pivotal role of parental education in shaping labour outcomes. Economic resources, as reflected in household wealth quintiles, contribute 30.63% to IOR for females,

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underscoring the importance of financial capital in overcoming employment barriers, consistent with findings by El Enbaby and Galal (2015).

Table 9: Heterogeneity of inequality of opportunity in precarious employment (Gender and Place of birth dimension)

Panel A	Male	Female	Urban	Rural
Total inequality				
Gini	0.171	0.214	0.197	0.213
GE (2)	0.130	0.178	0.168	0.139
Inequality of Opportunity				
Absolute (IOA)	0.0164	0.021	0.016	0.009
Relative Share (IOR)	**0.129**	**0.132**	**0.102**	**0.140**
Panel B				
Shapley decomposition (% of IOR)				
Sex/Gender	-	-	5.26%	8.99%
Place of Birth	0.54%	0.51%	-	-
Birth region	14.37%	3.13%	10.43%	5.70%
Ethnicity	3.29%	0.46%	2.01%	0.85%
HH head occupation	15.83%	16.46%	5.94%	34.47%
HH head education level	46.23%	48.80%	56.74%	27.43%
HH wealth quintiles	19.73%	30.63%	19.62%	22.55%

Notes: GE, generalised entropy indices; IOA, absolute inequality of opportunity; IOR, relative inequality of opportunity.

Source: Author's Construct, 2025.

Conversely, for men, household wealth plays a less significant role (19.73%), while regional disparities, such as region of birth, account for 14.37% of IOR, compared to just 3.13% for women. This suggests that geographic factors have a more pronounced impact on men's precarious employment, likely due to migration dynamics and the concentration of male-dominated industries in specific regions (Pasquier-Doumer, 2024; Singh, 2011). Ethnicity also contributes more significantly to men's IOR (3.29%) than women's

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(0.46%), reflecting persistent ethnic disparities in access to employment opportunities, as noted by Lukiyanova (2015). These findings call for targeted policies to address both gender-specific barriers and regional inequalities in precarious employment.

The analysis of the rural-urban divide in inequality of opportunity (IOR) in precarious employment reveals significant disparities. Overall inequality, as measured by the Gini coefficient and Generalised Entropy (GE) indices, is higher in rural areas (Gini = 0.213, GE (2) = 0.139) compared to urban areas (Gini = 0.197, GE (2) = 0.168). However, the relative share of inequality of opportunity (IOR) is also higher in rural areas (14.0%) than in urban areas (10.2%). This suggests that inequality of opportunity in precarious employment is more pronounced in rural settings, reflecting structural barriers such as limited access to resources and job opportunities (Singh, 2011; Pasquier-Doumer, 2024). The Shapley decomposition highlights that the household head's occupation is the largest contributor to inequality of opportunity in rural areas, accounting for 34.47% of the IOR. This finding underscores the critical role of occupations tied to agriculture or manual labour, which dominate rural economies and often perpetuate cycles of precarious employment and limited intergenerational mobility (El Enbaby & Galal, 2015).

In rural areas, the household head's education level is the second-largest contributor, accounting for 27.43% of the IOR. This emphasizes the importance of educational attainment in breaking the cycle of precarious employment, especially in contexts where access to quality education remains limited. Similarly, household wealth quintiles contribute 22.55% to the IOR in

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rural areas, highlighting the role of economic resources in shaping employment outcomes. Wealthier households are more likely to access opportunities and networks that facilitate stable and better-paying jobs, consistent with findings by Pistolesi (2008) and Galal and El Enbaby (2020).

For the urban subgroup, the household head's education level emerges as the most significant contributor, accounting for 56.74% of the IOR. This reflects the competitive nature of urban labour markets, where higher education levels are often prerequisites for stable employment opportunities (Golley et al., 2019). The household head's occupation, on the other hand, plays a smaller role in urban areas, contributing only 5.94% to the IOR. This could be attributed to the broader array of industries and occupations in urban settings, which may provide more diverse employment opportunities (Singh, 2011). Interestingly, the region of birth contributes more significantly to inequality in urban areas (10.43%) compared to rural areas (5.70%), suggesting that regional disparities and migration patterns disproportionately impact urban labour markets. Gender-based disparities are also notable. The contribution of gender to IOR is higher in rural areas (8.99%) compared to urban areas (5.26%), reflecting entrenched cultural norms and limited economic opportunities for women in rural settings (Ahmed et al., 2020; Pasquier-Doumer, 2024). This suggests that sociocultural barriers, coupled with restricted access to resources, exacerbate inequality of opportunity for women in rural labour markets.

Inequality of opportunity in precarious employment across different ecological zone/regions of birth

The analysis in Table 10 further explores the heterogeneity of inequality of opportunity in precarious employment across different regions of

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birth (ecological zone of birth) in the country. Panel A presents the total inequality and inequality of opportunity measures for subgroups defined by the three ecological zone: Coastal, Forest, and Savannah. Examining the total inequality measures, we observe that the Savannah region exhibits the highest levels of inequality in precarious employment, with a Gini coefficient of 0.290 and a Generalized Entropy (GE) measure of 0.245. The Coastal region follows with moderate levels of inequality (Gini = 0.226, GE(2) = 0.173), while the Forest region shows the lowest levels of overall inequality (Gini = 0.153, GE(2) = 0.151). These findings suggest that precarious employment conditions are most unequally distributed in the Savannah region, followed by the Coastal region, with the Forest region showing relatively more equal distribution.

When examining inequality of opportunity in precarious employment, the relative share (IOR) is highest in the Savannah region at 17.5%, closely followed by the Forest region at 16.4%, and lowest in the Coastal region at 11.1%. This indicates that circumstances beyond an individual's control, such as geographic location, parental education, and household economic resources, play a more significant role in determining employment outcomes in the Savannah and Forest regions compared to the Coastal region. The absolute inequality of opportunity (IOA) reflects a similar pattern, with the highest value in the Savannah region (0.039), followed by the Coastal (0.018) and Forest (0.013) regions. These findings highlight the pronounced inequality of opportunity in the Savannah and Forest regions, where structural factors such as limited economic opportunities, infrastructure deficiencies, and geographic

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barriers likely exacerbate precarious employment outcomes (Pasquier-Doumer, 2024; Singh, 2011).

Table 10: Heterogeneity of inequality of opportunity in precarious employment (Ecological Zone dimension)

Panel A	Coastal	Forest	Savannah
Total inequality			
Gini	0.226	0.153	0.290
GE (2)	0.173	0.151	0.245
Inequality of Opportunity			
Absolute (IOA)	0.018	0.013	0.039
Relative Share (IOR)	**0.111**	**0.164**	**0.175**
Panel B			
Shapley decomposition (% of IOR)			
Gender	14.47%	3.21%	2.75%
Location	0.70%	0.05%	4.85%
Birth region	0.00%	0.00%	0.00%
Ethnicity	0.05%	1.71%	2.32%
HH head occupation	16.18%	17.48%	9.46%
HH head education level	40.39%	63.72%	47.77%
Equivalised HH income quintiles	28.21%	13.82%	32.84%

Notes: GE, generalized entropy indices; IOA, absolute inequality of opportunity; IOR, relative inequality of opportunity

Source: Author's Construct, 2025

The disparities observed across regions align with previous research emphasizing the role of geography in shaping labour market inequalities. Pasquier-Doumer (2024) found that geographic isolation and regional economic structures play a significant role in determining labour market access in West Africa, with individuals in landlocked or less developed

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regions facing higher barriers to stable employment. Similarly, Singh (2011) highlighted that in rural and forested areas of India, limited infrastructure and reduced access to quality education perpetuate cycles of inequality. The lower inequality of opportunity in the Coastal region may reflect better economic development, enhanced access to infrastructure, and proximity to trade and urban centers, which facilitate more equitable access to employment opportunities (El Enbaby & Galal, 2015).

Panel B presents the Shapley decomposition of the contribution of each circumstance variable to the overall inequality of opportunity (IOR) for the various regional subgroups. n all three regions, the household head's education level emerges as the most significant contributor to inequality of opportunity. However, its importance varies, accounting for 63.72% of the IOR in the Forest region, 47.77% in the Savannah region, and 40.39% in the Coastal region. This finding underscores the critical role of parental education in shaping employment outcomes, particularly in the Forest region, where higher levels of education may be more strongly correlated with access to stable and better-paying jobs (Pistolesi, 2008; El Enbaby & Galal, 2015).

Equivalised household income quintiles also play a significant role, contributing 32.84% to the IOR in the Savannah region, 28.21% in the Coastal region, and 13.82% in the Forest region. This suggests that family economic status has a particularly strong influence on employment outcomes in the Savannah and Coastal regions, reflecting structural disparities in access to resources and opportunities in these areas (Galal & El Enbaby, 2020; Singh, 2011). The household head's occupation contributes more significantly to inequality in the Forest (17.48%) and Coastal (16.18%) regions compared to

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the Savannah region (9.46%), due to regional differences in economic structures and labour market dynamics. For example, labour markets in the Forest and Coastal regions may offer greater occupational diversity, magnifying the influence of parental occupation on employment outcomes.

Gender plays a more substantial role in the Coastal region (14.47%) compared to the Forest (3.21%) and Savannah (2.75%) regions. This finding indicates more pronounced gender disparities in Coastal areas, potentially due to stronger socio-cultural barriers or unequal access to resources and opportunities for women in these regions (Ahmed et al., 2020; Golley et al., 2019). Location (rural/urban) contributes more significantly to inequality in the Savannah region (4.85%) than in the Coastal (0.70%) and Forest (0.05%) regions, highlighting the critical impact of the rural-urban divide on employment outcomes in the Savannah area, where rural communities may face greater barriers to economic mobility (Pasquier-Doumer, 2024; Singh, 2011).

Inequality of opportunity in precarious employment across different educational attainment of the household head

The analysis in Table 11 examines the heterogeneity of inequality of opportunity in precarious employment across subgroups defined by the educational attainment of the household head. Panel A presents the total inequality and inequality of opportunity measures for four subgroups: Illiterate, Below Secondary, Secondary, and Tertiary education levels. When examining the overall inequality, the Gini coefficient and Generalized Entropy (GE) measure indicate that inequality in precarious employment increases substantially with higher levels of education of the household head. The inequality is lowest for the Illiterate subgroup (Gini = 0.136, GE(2) = 0.124)

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and gradually increases for the Below Secondary (Gini = 0.144, GE(2) = 0.135), Secondary (Gini = 0.247, GE(2) = 0.198), and Tertiary (Gini = 0.447, GE(2) = 0.378) subgroups.

Table 11: Heterogeneity of inequality of opportunity in precarious employment

Panel A	Illiterate	Below secondary	Secondary	Tertiary
Total inequality				
Gini	0.136	0.144	0.247	0.447
GE (2)	0.124	0.135	0.198	0.378
Inequality of Opportunity				
Absolute (IOA)	0.015	0.008	0.010	0.022
Relative Share (IOR)	**0.146**	**0.072**	**0.091**	**0.066**
Panel B				
Shapley decomposition (% of IOR)				
Gender	3.30%	20.47%	13.63%	2.87%
Location	9.81%	4.59%	3.09%	29.48%
Birth region	18.78%	25.44%	2.38%	3.16%
Ethnicity	11.48%	1.35%	0.21%	4.22%
HH head occupation	25.20%	22.87%	50.99%	18.44%
HH head education level				
Equivalised HH income quintiles	31.43%	25.28%	29.69%	41.83%

Notes: GE, generalized entropy indices; IOA, absolute inequality of opportunity; IOR, relative inequality of opportunity.

Source: Author's Construct, 2025.

The relative share of inequality of opportunity (IOR) is highest for the Illiterate subgroup (14.6%), followed by the Below Secondary (7.2%), Secondary (9.1%), and Tertiary (6.6%) subgroups. This finding suggests that household head with lower levels of education face greater inequality of opportunity in precarious employment, likely due to limited access to better

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job opportunities, lack of skills or qualifications, and other socioeconomic barriers.

Panel B in Table 11 provides a Shapley decomposition of the contributions of various circumstance variables to the overall inequality of opportunity (IOR) across different educational subgroups, highlighting the diverse factors that shape precarious employment outcomes. For the Illiterate subgroup, the household's equivalized income quintiles emerge as the largest contributor to IOR, accounting for 31.43%. This underscores the importance of economic resources in determining employment opportunities for individuals with no formal education, who often lack access to social networks and informational resources necessary for securing better job prospects (El Enbaby & Galal, 2015; Singh, 2011). Additionally, the household head's occupation and the region of birth play significant roles, contributing 25.2% and 18.78%, respectively, to the IOR. These findings suggest that both family occupational status and geographic factors critically influence employment outcomes for individuals with minimal education. Notably, ethnicity accounts for 11.48% of the IOR, indicating that ethnic disparities are pronounced in shaping employment opportunities for this group, consistent with findings from Lukiyanova (2015) on the role of ethnic factors in labour market inequality.

For the Below Secondary subgroup, the region of birth emerges as the largest contributor, accounting for 25.44% of the IOR. This emphasizes the significance of geographic disparities in determining employment opportunities for individuals with limited formal education, due to uneven regional development and access to labour markets (Pasquier-Doumer, 2024).

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The household head's occupation and household's equivalized income quintiles also contribute, with shares of 22.87% and 25.28%, respectively. Interestingly, gender plays a more significant role for this subgroup, contributing 20.47% to the IOR, suggesting that gender-based disparities are more pronounced for individuals with limited education. These findings align with research by Ahmed et al. (2020), which highlights the intersection of gender and education in labour market inequalities.

For individuals in the Secondary and Tertiary subgroups, the household head's occupation emerges as the most significant factor, contributing 50.99% and 18.44%, respectively, to the IOR. This reflects the importance of family occupational status in shaping employment outcomes for individuals with higher educational attainment, potentially due to enhanced access to social networks and intergenerational mobility (Pistolesi, 2008; Galal & El Enbaby, 2020). Economic resources also play a critical role, with the household's equivalized income quintiles accounting for 29.69% of the IOR for the Secondary subgroup and 41.83% for the Tertiary subgroup. Interestingly, the contribution of gender is relatively lower for these groups, with shares of 13.63% for the Secondary subgroup and 2.87% for the Tertiary subgroup. This suggests that higher educational attainment may help mitigate gender-based disparities in employment opportunities, consistent with findings by Golley et al. (2019) and Ahmed et al. (2020).

Inequality of opportunity in precarious employment across different occupations of the household head

The analysis in Table 12 examines the heterogeneity of inequality of opportunity in electricity consumption across different occupation of the household head. Panel A presents the total inequality and inequality of

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opportunity measures for five employment status subgroups: Unpaid Workers, Private Wage Earners, Private Self-Employed, Public Wage Earners, and Others. When examining the overall inequality, the Gini coefficient and Generalized Entropy (GE) measure indicate that inequality in electricity consumption is highest among Public Wage Earners (Gini = 0.310, GE(2) = 0.309), followed by the Other subgroup (Gini = 0.207, GE(2) = 0.158), and lowest among Unpaid Workers (Gini = 0.073, GE(2) = 0.035), Private Wage Earners (Gini = 0.048, GE(2) = 0.036), and Private Self-Employed (Gini = 0.048, GE(2) = 0.034) subgroups. Interestingly, the relative share of inequality of opportunity (IOR) is highest for Public Wage Earners (24.4%), suggesting that individuals in this employment status subgroup face the greatest inequality of opportunity in electricity consumption. The IOR is also relatively high for unpaid Workers (4.6%), indicating significant inequalities in electricity consumption opportunities for this subgroup as well.

Panel B in Table 12 presents the Shapley decomposition of the contributions of various circumstance variables to the inequality of opportunity (IOR) across employment status subgroups, providing insights into the diverse factors influencing electricity consumption opportunities. For Unpaid Workers, the household's equivalized income quintiles are the largest contributor to IOR, accounting for 52.58%. This underscores the critical role of economic resources in shaping access to electricity for individuals engaged in unpaid work, who often depend on household-level resources for their basic needs (El Enbaby & Galal, 2015; Galal & El Enbaby, 2020). The household head's education level is another significant factor, contributing 18.9% to the IOR, highlighting how parental education can influence access to

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infrastructure and resources, including electricity. These findings suggest that for unpaid workers, economic and educational disparities at the household level are key drivers of inequality in electricity consumption.

Table 12: Heterogeneity of inequality of opportunity in electricity consumption (Occupations Dimension)

Panel A	Unpaid workers	Private Wage Earner	Private Self-Employed	Public Wage Earner	Other
Total inequality					
Gini	0.073	0.048	0.048	0.310	0.207
GE (2)	0.035	0.036	0.034	0.309	0.158
Inequality of Opportunity					
Absolute (IOA)	0.002	0.003	0.001	0.059	0.012
Relative Share (IOR)	**0.046**	**0.039**	**0.031**	**0.244**	**0.075**
Panel B					
Shapley decomposition (% of IOR)					
Gender	14.26%	85.41%	1.07%	0.19%	11.75%
Location	10.88%	0.63%	2.33%	6.57%	15.93%
Birth region	1.75%	0.98%	49.72%	4.57%	13.38%
Ethnicity	1.64%	1.32%	21.44%	0.70%	2.41%
HH head occupation					
HH head education level	18.90%	2.28%	5.69%	79.79%	6.89%
Equivalised HH income quintiles	52.58%	9.38%	19.75%	8.18%	49.64%

Notes: GE, generalised entropy indices; IOA, absolute inequality of opportunity; IOR, relative inequality of opportunity.

Source: Author's Construct, 2025.

For Private Wage Earners, gender is the dominant factor, accounting for a staggering 85.41% of the IOR. This reflects the pronounced gender-based disparities in access to resources and infrastructure within this subgroup, which may stem from societal norms, discrimination, or occupational

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segregation (Ahmed et al., 2020; Golley et al., 2019). Interestingly, the contribution of household's equivalized income quintiles is relatively low at 9.38%, indicating that economic resources play a less significant role for wage earners in the private sector compared to other subgroups. For the Private Self-Employed subgroup, region of birth emerges as the largest contributor, accounting for 49.72% of the IOR. This highlights the critical influence of geographic disparities, as access to electricity often depends on regional infrastructure development and public investment (Pasquier-Doumer, 2024). Additionally, ethnicity contributes 21.44% to the IOR, suggesting that ethnic disparities in access to resources are pronounced for self-employed individuals. These findings align with Lukiyanova (2015), who noted that ethnic and regional factors significantly shape resource access and employment outcomes.

For Public Wage Earners, the household head's education level is the most significant contributor, accounting for 79.79% of the IOR. This highlights the central role of education in securing stable employment in the public sector, which often translates to better access to infrastructure, including electricity (Pistolesi, 2008; Singh, 2011). Additionally, location (urban/rural) contributes 6.57% to the IOR, reflecting disparities in electricity access between urban and rural areas. These findings emphasize the importance of targeted interventions to address rural infrastructure deficits. For the Other employment status subgroup, the household's equivalized income quintiles and location are the largest contributors, accounting for 49.64% and 15.93% of the IOR, respectively. This suggests that both economic resources and the urban-rural divide play crucial roles in shaping electricity consumption opportunities for individuals in this subgroup. The substantial

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role of location underscores the need for regionally tailored policies to improve infrastructure access in underserved areas.

Inequality of opportunity in precarious employment across different ethnic subgroups

The analysis in Table 13 examines the heterogeneity of inequality of opportunity in precarious employment across different ethnic subgroups in the country. Panel A presents the total inequality and inequality of opportunity measures for five major ethnic groups: Akan, Ga-Dangme, Ewe, Mole-Dagbani, and Others. When examining the overall inequality, the Gini coefficient and Generalized Entropy (GE) measure indicate that inequality in precarious employment is highest among the Ga-Dangme ethnic group (Gini = 0.258, GE(2) = 0.227), followed by the Ewe (Gini = 0.228, GE(2) = 0.158), Akan (Gini = 0.201, GE(2) = 0.175), Mole-Dagbani (Gini = 0.196, GE(2) = 0.148), and Others (Gini = 0.158, GE(2) = 0.129) ethnic groups. Interestingly, the relative share of inequality of opportunity (IOR) is highest for the Ga-Dangme ethnic group (30.9%), suggesting that individuals from this ethnic group face the greatest inequality of opportunity in precarious employment. The IOR is also relatively high for the Other ethnic groups (15.8%) and the Mole-Dagbani ethnic group (14.9%), indicating significant inequalities in employment opportunities for these groups as well. In Table 9, Panel B presents the Shapley decomposition of the contribution of each circumstance variable to the overall inequality of opportunity (IOR) for the various ethnic subgroups.

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Table 13: Heterogeneity of inequality of opportunity in precarious employment (Ethnicity Dimension)

Panel A	Akan	Ga-Dangme	Ewe	Mole-Dagbani	Others
Total inequality					
Gini	0.201	0.258	0.228	0.196	0.158
GE (2)	0.175	0.227	0.158	0.148	0.129
Inequality of Opportunity					
Absolute (IOA)	0.018	0.060	0.022	0.021	0.018
Relative Share (IOR)	**0.121**	**0.309**	**0.132**	**0.149**	**0.158**
Panel B					
Shapley decomposition (% of IOR)					
Gender	10.00%	12.43%	8.03%	4.37%	0.74%
Location	1.07%	4.83%	0.41%	1.73%	1.31%
Birth region	8.04%	18.75%	11.83%	0.13%	7.44%
Ethnicity					
HH head occupation	20.40%	15.04%	25.76%	11.62%	9.31%
HH head education level	44.83%	41.50%	37.27%	34.28%	63.33%
Equivalised HH income quintiles	15.65%	7.46%	16.69%	47.87%	17.87%

Notes: GE, generalised entropy indices; IOA, absolute inequality of opportunity; IOR, relative inequality of opportunity.

Source: Author's Construct, 2025.

The Shapley decomposition analysis highlights the distinct contributions of circumstance variables to inequality of opportunity (IOR) across ethnic groups, revealing how household characteristics and geographic factors shape employment opportunities. For the Akan ethnic group, the household head's education level is the largest contributor to IOR, accounting for 44.83%. This underscores the critical role of parental education in determining employment opportunities within this group, as higher education

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levels often translate into better resources, networks, and access to stable jobs (Pistolesi, 2008; Galal & El Enbaby, 2020). Additionally, the household head's occupation contributes significantly, at 20.4%, reflecting the influence of parental occupational status on employment prospects. These findings suggest that both educational attainment and occupational status of the household head are pivotal in shaping opportunities for the Akan ethnic group.

For the Ga-Dangme ethnic group, both the household head's education level (41.5%) and the region of birth (18.75%) are major contributors to inequality of opportunity. This highlights the dual impact of educational and geographic disparities in shaping employment outcomes for this group, particularly in regions with uneven economic development or limited labour market access (Pasquier-Doumer, 2024). Gender also plays a notable role, contributing 12.43% of the IOR, indicating persistent gender-based disparities in employment opportunities, consistent with findings by Ahmed et al. (2020) and Golley et al. (2019).

For the Ewe ethnic group, the household head's occupation is the largest contributor, accounting for 25.76% of the IOR. This suggests that occupational disparities significantly shape employment prospects for members of this group, particularly in traditional sectors. The household head's education level and the region of birth also play significant roles, contributing 37.27% and 11.83%, respectively, reflecting the interplay of education and geographic factors in determining opportunities for the Ewe ethnic group. The Mole-Dagbani ethnic group exhibits a distinct pattern, with household's equivalized income quintiles emerging as the largest contributor to IOR, accounting for 47.87%. This highlights the critical importance of

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economic resources in shaping employment opportunities, particularly in regions where poverty and resource constraints are more prevalent (El Enbaby & Galal, 2015; Singh, 2011). Additionally, the household head's education level accounts for 34.28%, further emphasizing the role of educational attainment in employment outcomes for this group.

For individuals from Other ethnic groups, the household head's education level is by far the largest contributor, accounting for 63.33% of the IOR. This underscores the overwhelming importance of educational attainment in determining employment opportunities, reflecting disparities in access to education and its intergenerational effects (Galal & El Enbaby, 2020). The household's equivalized income quintiles and region of birth also contribute significantly, at 17.87% and 7.44%, respectively, highlighting the role of economic resources and geographic disparities in shaping opportunities.

Inequality of opportunity in precarious employment across different wealth quintiles

The analysis in Table 14 examines the heterogeneity of inequality of opportunity in precarious employment across subgroups defined by household wealth quintiles. Panel A presents the total inequality and inequality of opportunity measures for five wealth quintiles: Poorest, Poor, Middle, Wealthy, and Wealthiest. When examining the overall inequality, the Gini coefficient and Generalized Entropy (GE) measure indicate that inequality in precarious employment generally increases with higher wealth quintiles. The inequality is lowest for the Poorest quintile (Gini = 0.040, GE(2) = 0.079) and gradually increases for the Poor (Gini = 0.136, GE(2) = 0.123), Middle (Gini = 0.224, GE(2) = 0.187), Wealthy (Gini = 0.266, GE(2) = 0.208), and Wealthiest (Gini = 0.289, GE(2) = 0.203) quintiles. Interestingly, the relative share of

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inequality of opportunity (IOR) is highest for the Middle quintile (13.4%), followed by the Poor (10.5%), Wealthy (12.2%), Wealthiest (11.2%), and Poorest (5.7%) quintiles. This finding suggests that individuals from the middle-income and relatively poorer households face greater inequality of opportunity in precarious employment, potentially due to a lack of access to stable employment opportunities and limited resources.

Table 14: Heterogeneity of inequality of opportunity in precarious employment

Panel A	Poorest quintile	Poor quintile	Middle quintile	Wealthy quintile	Wealthiest quintile
Total inequality					
Gini	0.040	0.136	0.224	0.266	0.289
GE (2)	0.079	0.123	0.187	0.208	0.203
Inequality of Opportunity					
Absolute (IOA)	0.002	0.011	0.023	0.024	0.023
Relative Share (IOR)	**0.057**	**0.105**	**0.134**	**0.122**	**0.112**
Panel B					
Shapley decomposition (% of IOR)					
Gender	8.29%	18.67%	17.92%	13.16%	0.11%
Location	10.28%	1.41%	0.48%	0.30%	0.74%
Birth region	31.64%	18.43%	2.18%	8.64%	7.09%
Ethnicity	11.26%	2.42%	0.22%	0.46%	1.15%
HH head occupation	7.16%	15.39%	22.33%	32.58%	26.12%
HH head education level	31.37%	43.68%	56.88%	44.86%	64.80%
Equivalised HH income quintiles					

Notes: GE, generalised entropy indices; IOA, absolute inequality of opportunity; IOR, relative inequality of opportunity.
Source: Author's Construct, 2025.

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Panel B in Table 14 provides a Shapley decomposition of the contributions of various circumstance variables to the overall inequality of opportunity (IOR) across wealth quintiles. This analysis highlights how factors such as educational attainment, occupation, geographic disparities, and ethnicity shape employment opportunities for individuals from different economic backgrounds. For the Poorest quintile, the household head's education level and the region of birth are the largest contributors, accounting for 31.37% and 31.64% of the IOR, respectively. These findings emphasize the critical role of educational attainment and geographic disparities in shaping employment opportunities for individuals in the poorest households. Limited access to quality education and regional infrastructure may exacerbate inequalities in employment outcomes for this subgroup (Singh, 2011; Galal & El Enbaby, 2020). Additionally, ethnicity contributes 11.26% of the IOR, highlighting the potential role of ethnic-based disparities in restricting access to labour markets and economic resources (Lukiyanova, 2015).

For the Poor quintile, the household head's education level emerges as the dominant contributor, accounting for 43.68% of the IOR. This underscores the enduring importance of educational attainment in influencing employment opportunities for individuals from economically disadvantaged households. Gender also plays a notable role, contributing 18.67% of the IOR, reflecting gender-based disparities in labour market access for individuals in this income group. These results align with studies by Ahmed et al. (2020) and Golley et al. (2019), which found that gender-based inequalities are often more pronounced in lower-income groups. In the Middle quintile, the household head's education level becomes the most significant contributor, accounting for 56.88%

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of the IOR. This indicates that as income levels rise, the role of education in shaping employment opportunities becomes increasingly critical. The household head's occupation also plays a substantial role, contributing 22.33% to the IOR.

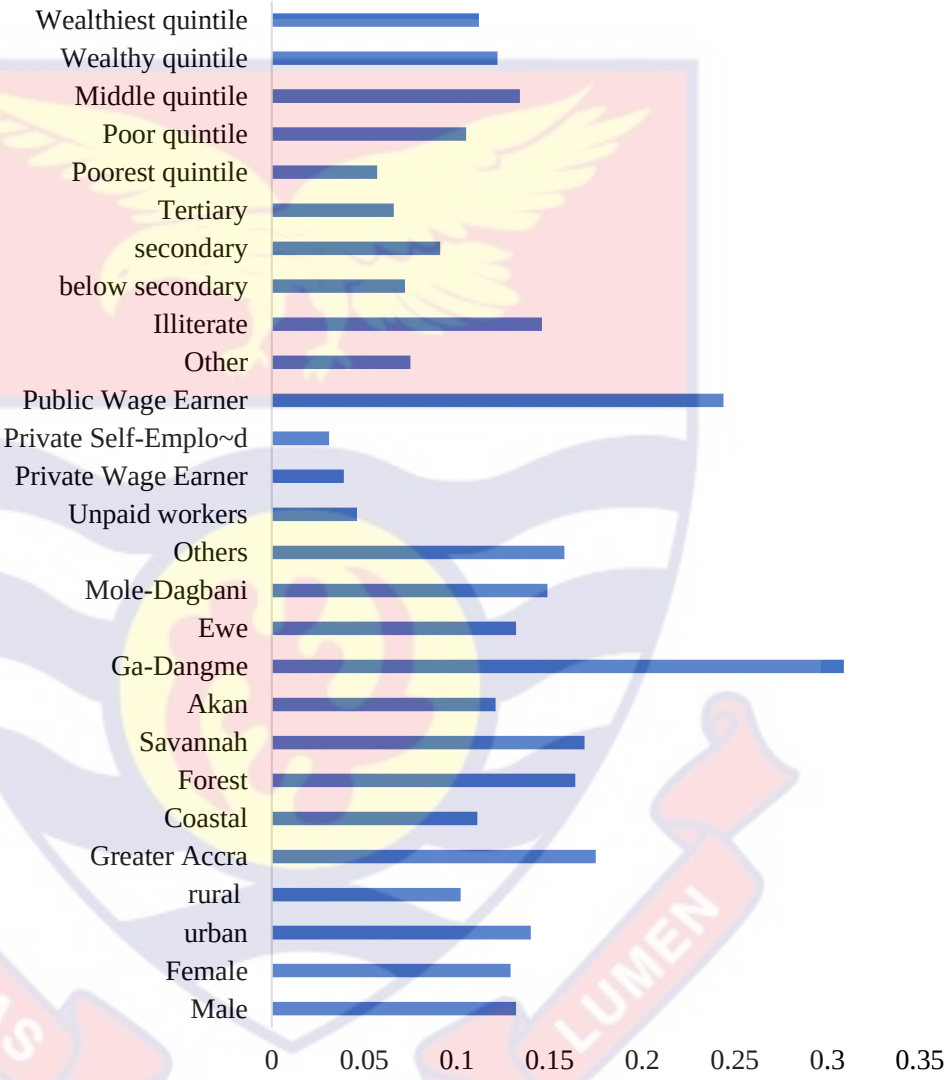


Figure 15: Heterogeneity of inequality of opportunity in precarious employment.

For the Wealthy quintile, the household head's occupation is the largest contributor, accounting for 32.58% of the IOR, while the household head's education level contributes 44.86%. This highlights the dual importance of educational attainment and occupational status in shaping

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employment opportunities for individuals from wealthier households. These results align with El Enbaby and Galal's (2015) findings on the interplay between education and occupational advantages in mitigating labour market disparities. Finally, in the Wealthiest quintile, the household head's education level dominates, contributing 64.8% of the IOR, while the household head's occupation accounts for 26.12%. This suggests that for the wealthiest households, educational attainment is the most significant driver of employment opportunities, likely reflecting its role in accessing high-status and secure jobs (Galal & El Enbaby, 2020). The substantial contribution of occupational status further underscores the importance of intergenerational transmission of resources and advantages within affluent households.

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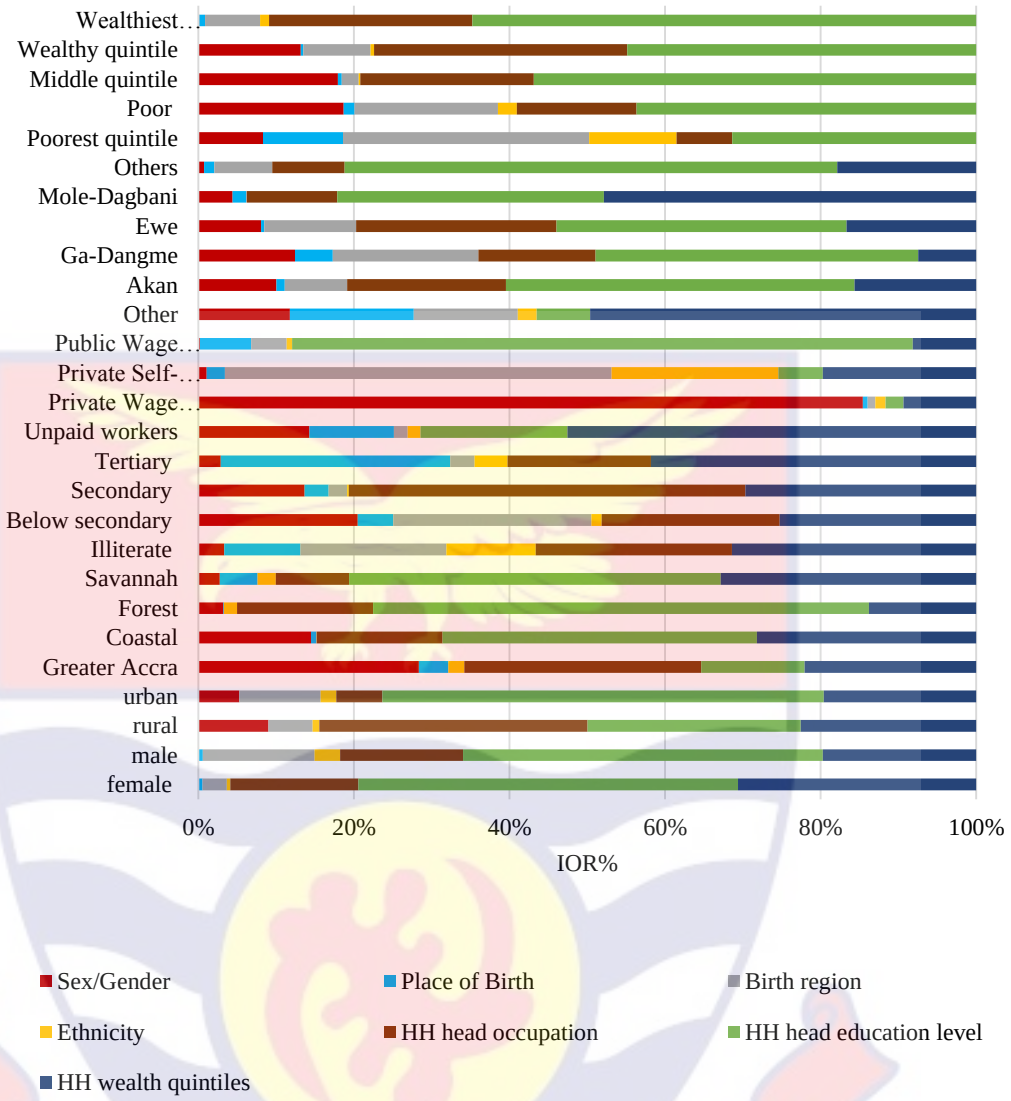


Figure 16: Heterogeneity of partial contributions.

Chapter Summary

This chapter presents the first empirical findings on inequality of opportunity in precarious employment in Ghana using data from the Ghana Household Income and Expenditure Panel Survey. The results show that over 70% of the workforce is in precarious employment, with the highest deprivation among the oldest cohort (51–60 years). Females report higher deprivation than males, and urban-born individuals face more employment challenges than their rural counterparts, except among the youngest cohort (18–30 years). The Savannah zone and ethnic minorities show greater

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disadvantage, while public sector employment and higher education are linked to lower deprivation. About 13.5% of inequality in precarious employment is due to unequal circumstances, with the rest attributed to effort or unobserved factors. Absolute inequality of opportunity is highest among those aged 31–40, while the highest relative inequality is found in the 41–50 cohort (30.7%). The youngest cohort experiences the least inequality from circumstances, with a relative share of 11.3%.

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CHAPTER FIVE

PRECARIOUS EMPLOYMENT AND HOUSEHOLD FOOD INSECURITY IN GHANA

Introduction

This chapter investigates the intricate relationship between precarious employment and household food insecurity in Ghana, employing a multidimensional approach to measure food insecurity through various methodologies, including the Rasch model, Oxford Poverty and Human Initiatives approach, principal component analysis (PCA), and an additive approach for the Food Insecurity Experience Scale (FIES). The primary objectives are to examine the direct effect of precarious employment on household food insecurity, assess the relative impact of different dimensions of precarious employment to engender policy sequencing and formulation, investigate the moderating role of social safety net programs, and explore potential pathways through which precarious employment influences food insecurity, focusing on health shocks and household asset accumulation. Utilizing the FIES-based approach and a two-stage least squares (2SLS) technique, with the casual employment rate in one's sector as an instrumental variable to address endogeneity concerns, this chapter aims to contribute to the discourse on sustainable development by uncovering the intricate linkages between decent work opportunities and food security outcomes, holding profound implications for policymakers and stakeholders seeking to enhance household resilience, promote inclusive economic growth, and safeguard the fundamental human right to food.

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Summary statistics

The summary statistics in Table 15 provide an overview of the key variables in the dataset, covering various aspects of household characteristics, employment, food insecurity, and precarity measures. The statistics are presented for the entire sample and separately for waves 1 and 2, allowing for comparisons between the two time periods. On average, households reported a moderate mean Food Insecurity Experience Scale (FIES) score of 0.030, with around 50% of households classified as food insecure based on a cut-off score of 0.5. The table presents multiple measures of food insecurity, including the multidimensional FIES (MPI) and indices calculated using principal component analysis (FIES (PCA)) and the raw sum of the FIES scale items (FIES (RS)). Regarding employment precarity, the data shows that almost two-thirds (62.3%) of sampled household heads were engaged in precarious employment, as indicated by the binary variable. The multidimensional index of employment precarity has a mean of 0.473 on a continuous scale of 0 to 1, and an additive index (Precarious employment (Add)) with a mean of 10.29 out of a possible range of 4 to 16 is also provided.

The demographic characteristics reveal that the average age of the household head is 41.032 years, and 28.7% of households are female headed. In terms of educational attainment, the table breaks down the distribution, with 25.8% of household heads having no formal education, 16.1% having primary education, 32.7% having junior high school/middle education, 16% having secondary education, and 9.3% having attained tertiary education. The average household size is 5.280, with the variable “Household size squared” capturing the squared value of the household size.

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Table 15: Summary Statistics for sampled Households

Variable	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.
FIES	0.030	0.890	0.050	0.894	0.010	0.885
FIES Dummy (0/1)	0.500	0.500	0.543	0.498	0.457	0.498
FIES (MPI)	0.428	0.360	0.469	0.369	0.387	0.345
FIES (RS)	3.422	2.878	3.750	2.956	3.094	2.761
FIES (PCA)	-0.013	1.003	0.010	0.999	-0.036	1.006
Precarious employment score	0.473	0.195	0.435	0.195	0.473	0.195
Precarious employment (0/1)	0.623	0.129	0.623	0.129	0.623	0.129
Precarious employment (Add)	10.29	2.81	10.28	2.81	10.30	2.81
Age	41.032	10.261	41.032	10.262	41.032	10.262
Female	0.287	0.452	0.287	0.453	0.287	0.453
No formal education	0.258	0.437	0.258	0.437	0.258	0.437
Primary	0.161	0.368	0.161	0.368	0.161	0.368
JHS/Middle	0.327	0.469	0.327	0.469	0.327	0.469
secondary	0.160	0.367	0.160	0.367	0.160	0.367
Tertiary	0.093	0.291	0.093	0.291	0.093	0.291
Rural Household	0.504	0.500	0.504	0.500	0.504	0.500
Household size	5.280	2.857	5.211	2.836	5.348	2.877
Household size squared	36.038	44.687	35.201	44.014	36.875	45.338
Never married	0.068	0.252	0.068	0.252	0.068	0.252
Married	0.759	0.428	0.759	0.428	0.759	0.428
Separated	0.173	0.378	0.173	0.378	0.173	0.378
Social safety net program	0.763	0.425	0.761	0.426	0.765	0.424
Agriculture	0.458	0.498	0.458	0.498	0.458	0.498
Industry	0.141	0.348	0.141	0.349	0.141	0.349
Service	0.400	0.490	0.400	0.490	0.400	0.490
Greater Accra	0.074	0.262	0.074	0.262	0.074	0.262
Savannah	0.309	0.462	0.309	0.462	0.309	0.462

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Coastal	0.276	0.447	0.276	0.447	0.276	0.447
Forest	0.340	0.474	0.340	0.474	0.340	0.474
Household farm	0.481	0.500	0.486	0.500	0.476	0.499
Household with Disable worker	0.197	0.398	0.195	0.396	0.199	0.399
Health shock	0.327	0.469	0.327	0.469	0.327	0.469
Asset accumulation index	0.485	0.103	0.506	0.091	0.463	0.109
Employment instability	0.650	0.280	0.649	0.280	0.650	0.280
Income inadequacy	0.870	0.213	0.870	0.213	0.871	0.213
Lack of right and protections	0.927	0.232	0.927	0.232	0.927	0.231
Unsafe or unhealthy work environment	0.484	0.461	0.483	0.461	0.485	0.461
Casual employment rate in sector (ISCO)	0.015	0.042	0.015	0.042	0.015	0.042
N	15,596		7,798		7,798	

Source: Author's Construct, 2025.

About 50.4% of households are located in rural areas. Regarding marital status, 75.9% of household heads are married, 6.8% have never been married, and 17.3% are separated (widowed/divorced/separated). The data also provides information on the number of dependents (members below 16 and above 65) in the household, with an average of 2.586 dependents per household. In terms of employment sectors, 45.8% of household heads are employed in the agricultural sector, 14.1% in the industrial sector, and 40% in the service sector. Access to social safety nets is captured by the variable "Social safety net program," which indicates that 76.3% of households are covered by the national health insurance scheme.

Additional variables include household involvement in farming (48.1%), the presence of disabled household members (19.7%), and the

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occurrence of health shocks, with 32.7% of households experiencing illness or injury. The asset accumulation index, computed using principal component analysis, has a mean of 0.485, suggesting a moderate level of asset ownership among households. The table also presents four multidimensional precarity sub-indices: employment instability (mean of 0.650), income inadequacy (mean of 0.870), lack of rights and protections (mean of 0.927), and unsafe or unhealthy work environment (mean of 0.484). These indices provide insights into different aspects of precarity faced by households. Finally, the table includes the casual employment rate in the sector of employment, with a mean of 0.015, indicating a relatively low rate of casual employment overall (see figure 15).

Effect of Precarious employment on Household food insecurity (Baseline Results)

Table 16 presents the baseline estimates for the relationship between precarious employment (PE) and food insecurity. The estimates for various measures of food insecurity, namely FIES, FIES (MPI), FIES (RS), and FIES (PCA), are reported in Columns 1 to 4, respectively. Standardised coefficients are interpreted because they allow for easy comparison between various estimates of both PE and food insecurity. The results consistently show a positive and statistically significant relationship between PE and food insecurity across all measures. Specifically, in Column 1, a one standard deviation increase in PE is associated with a 0.069 standard deviation increase in household food insecurity, as measured by the FIES score. Similarly, Columns 2, 3, and 4 show one standard deviation increase in PE is associated with 0.065, 0.062 and 0.065 standard deviations increase in household food

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insecurity, respectively. These findings suggest that households become more vulnerable to inadequate access to nutritious food when the job of the primary wage earner is unstable and lacks protections, making it difficult to reliably budget for basic nutritional needs. It is worth noting that these results align with previous studies that have also demonstrated the adverse impact of PE conditions on household welfare (Nor, 2022; Koomson & Churchill, 2022; Albiston & Fisk, 2021; Rönnblad et al., 2019).

Aside from PE, the results show that food insecurity is more predominant in rural households, female-headed households, households in savannah and forest ecological zones, households with dependents and households with disabled workers. Household size exhibits a non-linear (inverted-U) significant relationship with food insecurity. This suggests that as household size increases, there is a lower likelihood of experiencing food insecurity. One possible explanation is that larger households often have economically active members who contribute financially to household consumption. This includes cases where child labourers are involved, as economically active children in Ghana have been observed to contribute significantly to household farm and nonfarm income (Koomson & Churchill, 2022).

Moreover, the results show that compared to illiterate household heads, educated heads and households that own a farm experienced significantly lower levels of food insecurity. Compared to workers in the agriculture sector, workers in the service sector are associated with a decreasing level of food insecurity. These findings suggest certain household characteristics can either mitigate or exacerbate challenges in accessing adequate nutrition. The study

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also found that social safety net programs, such as health insurance, can effectively reduce household food insecurity. This finding aligns with previous research that has demonstrated the positive impacts of social safety net programs on food security and overall well-being (Schmidt, Shore-Sheppard, & Watson, 2016).

Table 16: Effect of precarious employment on food insecurity (OLS results)

VARIABLES	(1) FIES	(2) FIES (MPI)	(3) FIES (PCA)	(4) FIES (RS)
PE	0.031***	0.012***	0.032***	0.096***
	(0.004)	(0.002)	(0.005)	(0.014)
	[0.069]	[0.065]	[0.062]	[0.065]
Age of head	-0.004***	-0.002***	-0.003***	-0.014***
	(0.001)	(0.000)	(0.001)	(0.002)
	[-0.066]	[-0.066]	[-0.046]	[-0.066]
Head is female = 1, Female	0.112***	0.046***	0.109***	0.368***
	(0.020)	(0.008)	(0.023)	(0.066)
	[0.057]	[0.058]	[0.049]	[0.058]
Primary	-0.037	-0.016	-0.046*	-0.128
	(0.024)	(0.010)	(0.027)	(0.078)
	[-0.015]	[-0.016]	[-0.017]	[-0.016]
JHS/Middle	-0.120***	-0.047***	-0.115***	-0.376***
	(0.022)	(0.009)	(0.025)	(0.071)
	[-0.063]	[-0.061]	[-0.054]	[-0.061]
Secondary/MSE	-0.257***	-0.104***	-0.244***	-0.828***
	(0.027)	(0.011)	(0.030)	(0.086)
	[-0.106]	[-0.106]	[-0.089]	[-0.106]
Tertiary	-0.556***	-0.220***	-0.532***	-1.762***
	(0.031)	(0.013)	(0.037)	(0.101)
	[-0.182]	[-0.178]	[-0.154]	[-0.178]
Rural household	0.180***	0.072***	0.147***	0.579***
	(0.017)	(0.007)	(0.019)	(0.055)
	[0.101]	[0.101]	[0.073]	[0.101]
Household size	0.046***	0.019***	0.038***	0.154***
	(0.011)	(0.004)	(0.011)	(0.034)
	[0.147]	[0.153]	[0.109]	[0.153]
Household size squared	-0.003***	-0.001***	-0.003***	-0.009***
	(0.001)	(0.000)	(0.001)	(0.002)
	[-0.135]	[-0.135]	[-0.125]	[-0.135]
Married	-0.063*	-0.031**	-0.046	-0.245**
	(0.034)	(0.013)	(0.037)	(0.108)
	[-0.030]	[-0.036]	[-0.019]	[-0.036]

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Separated	0.028	0.007	0.049	0.056
	(0.038)	(0.015)	(0.041)	(0.120)
	[0.012]	[0.007]	[0.018]	[0.007]
Social safety net program (SP)	-0.054***	-0.020***	-0.040**	-0.163***
	(0.018)	(0.007)	(0.020)	(0.058)
	[-0.026]	[-0.024]	[-0.017]	[-0.024]
Industry	0.022	0.009	-0.017	0.072
	(0.025)	(0.010)	(0.028)	(0.080)
	[0.008]	[0.009]	[-0.006]	[0.009]
Service	-0.039**	-0.017**	-0.063***	-0.136**
	(0.020)	(0.008)	(0.022)	(0.064)
	[-0.022]	[-0.023]	[-0.031]	[-0.023]
Savannah	0.296***	0.114***	0.257***	0.915***
	(0.032)	(0.013)	(0.036)	(0.102)
	[0.154]	[0.147]	[0.118]	[0.147]
Coastal	0.195***	0.075***	0.216***	0.600***
	(0.030)	(0.012)	(0.034)	(0.096)
	[0.098]	[0.093]	[0.096]	[0.093]
Forest	0.086***	0.031***	0.122***	0.248***
	(0.030)	(0.012)	(0.034)	(0.095)
	[0.046]	[0.041]	[0.058]	[0.041]
Farm household	-0.139***	-0.056***	-0.100***	-0.452***
	(0.015)	(0.006)	(0.017)	(0.049)
	[-0.078]	[-0.078]	[-0.050]	[-0.078]
Households with disabled worker	0.103***	0.039***	0.113***	0.311***
	(0.020)	(0.008)	(0.022)	(0.063)
	[0.046]	[0.043]	[0.045]	[0.043]
Constant	-0.200***	0.376***	-0.296***	3.010***
	(0.063)	(0.025)	(0.070)	(0.201)
Month of survey FE	YES	YES	YES	YES
Observations	15,596	15,596	15,596	15,596
R-squared	0.133	0.142	0.091	0.142
F-statistics	110.8	125.7	73.98	125.7

Robust standard errors in parentheses, Clustered by household ID, *** p<0.01, ** p<0.05, * p<0.1. Sex (Base: Male). Education level (Base: Illiterate), Marital Status (Base: Never Married), Sector of employment (Base: Agriculture), Ecological zone (Base: Greater Accra), FE (fixed effect). Standardised coefficients in square bracket.
Source: Author's Construct, 2025.

Effect of Precarious employment on Household food insecurity

(Endogeneity-corrected results)

We acknowledge that the potential endogeneity related to PE could introduce bias into these estimates. To address this concern, we employ a

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2SLS regression framework, utilizing casual employment rate in one's sector of employment (CASEMP) as an instrumental variable. In Table 17, we present the results of the 2SLS regression. Consistent with our expectations, the first-stage regression demonstrates that a higher casual employment rate within one's sector of work directly correlates with increased personal employment precarity. In other words, the results validate our initial hypothesis that when precarious or temporary positions represent a greater share of available jobs in a given industry, employees face stronger pressures and have fewer alternatives other than taking on positions characterized by insecurity, lack of benefits, and other precarious working conditions. Specifically, a rising casualization rate in one's sector significantly increases the likelihood that an individual will endure precarious employment terms, thus confirming the instrument satisfies the relevancy condition. Importantly, all the first-stage results exhibit F-statistics greater than 10, indicating that our instrument is not weakly associated with the endogenous regressor (PE) (Stock & Yogo, 2002).

The second-stage results, presented in the top panel of Table 17, show the estimated effect of PE on food insecurity after accounting for potential endogeneity using the 2SLS approach. Consistent with the OLS estimates in Table 16, the 2SLS results confirm a positive and statistically significant relationship between PE and food insecurity across all measures. In Column 1, we observe that a one standard deviation increase in PE corresponds to a 0.114 standard deviation increase in household food insecurity. Similarly, Columns 2, 3, and 4 show one standard deviation increase in PE is associated with 0.116, 0.091 and 0.116 standard deviations increase in household food

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insecurity, respectively. Comparing our 2SLS results with the baseline, the latter produces a relatively lower coefficient, indicating that endogeneity poses a downward bias in our estimates. It is worth noting that the second-stage estimates are precisely estimated, with standard errors ranging from 0.034 to 0.042, indicating that the 2SLS estimates are statistically significant at conventional levels.

This relationship can be explained by the inherent characteristics of precarious employment, which is often characterized by unpredictable and unstable income streams, limited access to benefits and social protection measures, and heightened job insecurity. These conditions create significant challenges for individuals and their households in consistently accessing and affording adequate and nutritious food. The Capability Approach (Sen, 1999) provides a useful lens for interpreting this finding. According to this framework, well-being should not be assessed solely based on resources or entitlements, but rather on what individuals are able to do or be, their "capabilities." Precarious employment undermines individuals' capabilities by restricting their ability to lead a life of dignity, including securing stable food access and maintaining good health. Even when income is present, its irregularity and the lack of institutional support reduce the real freedoms people have to achieve food security and overall well-being.

Furthermore, precarious employment arrangements frequently lack access to benefits and social protection measures, such as health insurance, paid leave, and retirement benefits, which not only provide financial security but also act as safety nets during times of illness, job loss, or other adverse events that could disrupt household income and increase vulnerability to food

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insecurity. Job insecurity, another hallmark of precarious employment, creates a constant state of uncertainty and stress, leading to hesitancy in making long-term financial commitments or investments, including those related to food and nutrition. This precarious situation can exacerbate food insecurity, as households may prioritize other essential expenses over food in an effort to maintain their current living situation. The findings are consistent with earlier studies in developed countries, underscoring the detrimental impact of nonstandard work arrangements on household food security (Coleman-Jensen, 2011; Gruber, 2001). The findings of this study are consistent with earlier research conducted in developed countries, which has also highlighted the detrimental impact of nonstandard work arrangements, such as temporary employment, part-time work, and other forms of precarious employment, on household food security (Coleman-Jensen, 2011; Gruber, 2001).

Table 17: Precarious employment and Food insecurity (IV results)

	(1)	(2)	(3)	(4)
VARIABLES	FIES	FIES (MPI)	FIES (PCA)	FIES (RS)
PE	0.052***	0.021***	0.047***	0.171***
	(0.007)	(0.003)	(0.009)	(0.023)
	[0.114]	[0.116]	[0.091]	[0.116]
Age	-0.005***	-0.002***	-0.004***	-0.017***
	(0.001)	(0.000)	(0.001)	(0.003)
	[-0.078]	[-0.077]	[-0.057]	[-0.077]
Head is female	0.111***	0.047***	0.108***	0.379***
	(0.027)	(0.011)	(0.031)	(0.089)
	[0.056]	[0.058]	[0.049]	[0.058]
Primary	-0.032	-0.016	-0.047	-0.126
	(0.031)	(0.013)	(0.035)	(0.103)
	-0.013	-0.016	-0.017	-0.016
JHS/Middle	-0.120***	-0.047***	-0.124***	-0.374***
	(0.028)	(0.012)	(0.032)	(0.094)
	-0.063	-0.059	-0.058	-0.059
Secondary	-0.258***	-0.105***	-0.223***	-0.841***
	(0.034)	(0.014)	(0.040)	(0.114)

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	-0.106	-0.104	-0.082	-0.104
Tertiary	-0.511***	-0.205***	-0.472***	-1.639***
	(0.044)	(0.018)	(0.050)	(0.144)
	-0.166	-0.161	-0.137	-0.161
Rural	0.143***	0.058***	0.138***	0.461***
	(0.022)	(0.009)	(0.025)	(0.072)
	0.080	0.078	0.069	0.078
Household size	0.059***	0.025***	0.049***	0.197***
	(0.013)	(0.005)	(0.014)	(0.043)
	0.186	0.189	0.138	0.189
Household size square	-0.003***	-0.001***	-0.002***	-0.009***
	(0.001)	(0.000)	(0.001)	(0.002)
	-0.129	-0.130	-0.110	-0.130
Married	-0.159***	-0.070***	-0.174***	-0.562***
	(0.044)	(0.018)	(0.048)	(0.143)
	-0.076	-0.081	-0.075	-0.081
Separated	-0.025	-0.012	-0.023	-0.097
	(0.048)	(0.020)	(0.054)	(0.159)
	-0.010	-0.012	-0.009	-0.012
Social safety net	-0.049**	-0.020**	-0.029	-0.159**
	(0.023)	(0.010)	(0.026)	(0.076)
	-0.023	-0.023	-0.012	-0.023
Industry	0.004	0.004	-0.064*	0.031
	(0.032)	(0.013)	(0.037)	(0.106)
	0.002	0.004	-0.022	0.004
Service	-0.048*	-0.018	-0.110***	-0.143
	(0.026)	(0.011)	(0.030)	(0.088)
	-0.026	-0.024	-0.054	-0.024
Farming household	-0.152***	-0.061***	-0.112***	-0.490***
	(0.021)	(0.009)	(0.024)	(0.069)
	-0.085	-0.083	-0.056	-0.083
Head is disabled	0.057**	0.027**	0.092***	0.212**
	(0.025)	(0.010)	(0.029)	(0.084)
	0.025	0.028	0.037	0.028
Ecological zone FE	Yes	Yes	Yes	Yes
Month of survey FE	Yes	Yes	Yes	Yes
First stage				
Casual employment rate in sector (ISCO)	0.187***	0.187***	0.187***	0.187***
	(0.036)	(0.036)	(0.036)	(0.036)
F-statistics	180.32	180.32	180.32	180.32
Anderson-Rubin Wald test	25.58***	27.15***	17.94***	27.15***

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Observations	15,596	15,596	15,596	15,596
R-squared	0.132	0.140	0.091	0.140

Robust standard errors in parentheses, clustered by household ID, *** p<0.01, ** p<0.05, * p<0.1. FE (fixed effect). Standardised coefficients in square bracket.

Source: Author's Construct, 2025.

In addition, the age of the household head exhibits a negative and statistically significant relationship with FIES across all specifications. In Column I, a one-year increase in the household head's age reduces food insecurity by 0.005 standard deviations. This finding is consistent with previous research indicating that older household heads often possess greater work experience, higher earning potential, and more established social networks, which can buffer against food insecurity (Militao et al., 2024). Furthermore, older individuals may have acquired financial assets or developed more efficient household resource management strategies, enhancing their capacity to maintain food security. For example, Khan, Daraz and Bojnec (2023) found that older heads of households are more likely to access informal credit networks, which serve as a safety net during economic shocks.

Households headed by females are significantly more likely to experience food insecurity, as reflected by the positive and significant coefficients. Female-headed households often have fewer economic opportunities and lower access to resources, such as land or credit, compared to their male counterparts (Vo & Ho, 2023). Additionally, cultural and institutional barriers may exacerbate these disadvantages, making it harder for women to secure stable employment or social protection benefits, further increasing their vulnerability to food insecurity. In addition, education plays a

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critical role in mitigating food insecurity, as evidenced by the progressively larger negative coefficients for higher education levels. For instance, in Column (1), households with middle school education, secondary, and tertiary-educated heads experience significantly lower food insecurity. This result corroborates findings by Mutisya et al. (2016), who argue that education enhances income potential, improves nutritional knowledge, and increases access to diverse food sources. Educated household heads are more likely to secure stable and better-paying jobs, reducing the financial strain that often leads to food insecurity (Islam,).

Rural households consistently face higher food insecurity compared to their urban counterparts, with positive and significant coefficients. This finding is consistent with studies showing that rural areas in Ghana and other developing countries are characterized by limited infrastructure, reduced access to markets, and lower availability of diverse food options (IFPRI, 2020). Furthermore, reliance on subsistence agriculture, which is highly vulnerable to climate shocks and seasonal variations, exacerbates food insecurity in rural settings (Sibhatu & Qaim, 2017). Furthermore, household size positively influences food insecurity, as shown by the significant coefficients. Larger households require more resources, which can strain financial capacities and increase the likelihood of food insecurity. However, the negative and significant coefficient for the square of household size indicates diminishing marginal effects, suggesting that beyond a certain point, economies of scale or collective resource pooling might mitigate food insecurity. This non-linear relationship is consistent with studies by

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Bakhtsiyarava et al. (2021), which emphasize the complex dynamics of household size in resource allocation.

Married household heads are significantly less likely to experience food insecurity. Marriage often serves as a form of social and economic stability, providing dual incomes or shared responsibilities that enhance household resilience to food insecurity. Studies by Harris-Fry et al. (2017) indicate that married couples are more likely to invest in household nutrition and health, further reducing the risk of food insecurity. On the other hand, separated household heads do not exhibit significant results, potentially reflecting heterogeneity in their economic conditions. Moreover, participation in social safety net programs reduces food insecurity, highlighting the importance of institutional support in addressing food insecurity. Social safety nets, such as cash transfers or food aid, provide critical resources to buffer against shocks and stabilize household consumption. For instance, a study by Andrews, Hsiao, & Ralston (2018) shows that well-targeted social protection programs can significantly reduce food insecurity and improve long-term welfare.

Households engaged in farming exhibit significantly lower food insecurity. Farming households often have direct access to food through subsistence agriculture, reducing their dependence on market purchases. However, their vulnerability to seasonal and climate-related shocks necessitates policies to improve agricultural productivity and market access (Agidew & Singh, 2018). Households headed by disabled individuals face higher food insecurity. Disability often restricts economic participation, leading to lower household income and increased vulnerability to food

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insecurity. This finding aligns with studies by Heflin et al. (2019), which highlight the socio-economic challenges faced by households with disabled members, including reduced earning capacity and higher healthcare costs.

Gender and Locational dimensions of PE and food insecurity

In line with the Sustainable Development Goals' (SDGs) central goal of "leaving no one behind," the study provides findings across gender lines of household headship and locational dimensions (rural vs. urban). Panels A and B of Table 18 present the estimates for male-headed and female-headed households, respectively, while Panels A and B offer the estimates for rural and urban households, respectively. In Panel A (Column 1 of Table 18), an increase in PE increases food insecurity by 0.199 standard deviations for male-headed households. This finding is consistent across Columns 2-4, which use different measures of food insecurity (FIES (MPI), FIES (PCA), and FIES (RS)). Panel B (Column 1) shows that an increase in PE correlates with a 0.125 standard deviation increase in food insecurity for female-headed households.

Table 18: Precarious employment and food insecurity (IV results): Male-female heads

VARIABLES	FIES	FIES (MPI)	FIES (PCA)	FIES (RS)
Panel A: Male-headed household				
PE	0.091***	0.036***	0.089***	0.290***
	(0.007)	(0.003)	(0.009)	(0.023)
	[0.199]	[0.197]	[0.174]	[0.197]
Household head x'tics	Yes	Yes	Yes	Yes
Household x'tics	Yes	Yes	Yes	Yes
Ecological zone FE	Yes	Yes	Yes	Yes
Month of survey FE	Yes	Yes	Yes	Yes
First stage				
Casual employment rate in	0.201***	0.201***	0.201***	0.201***

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sector (ISCO)				
	(0.044)	(0.044)	(0.044)	(0.044)
Observations	11,116	11,116	11,116	11,116
R-squared	0.104	0.112	0.072	0.112
Panel B: Female-headed household				
PE	0.057***	0.024***	0.050***	0.189***
	(0.016)	(0.006)	(0.018)	(0.051)
	[0.125]	[0.128]	[0.098]	[0.128]
Household head x'tics	Yes	Yes	Yes	Yes
Household x'tics	Yes	Yes	Yes	Yes
Ecological zone FE	Yes	Yes	Yes	Yes
Month of survey FE	Yes	Yes	Yes	Yes
First stage				
Casual employment rate in sector (ISCO)	0.147***	0.147***	0.147***	0.147***
	(0.069)	(0.069)	(0.069)	(0.069)
Observations	4,480	4,480	4,480	4,480
R-squared	0.128	0.139	0.082	0.139

Robust standard errors in parentheses, Clustered by household ID, *** p<0.01, ** p<0.05, * p<0.1. FE (fixed effect). Standardised coefficients in square brackets.
Source: Author's Construct, 2025.

These results suggest that precarious employment consistently reduces food security to a greater extent in households headed by women compared to those headed by men. This finding aligns with the work of Koomson and Churchill (2022), who confirmed that employment precarity disproportionately affects the well-being of female-headed households relative to male-headed households. Several factors could contribute to this observed gender disparity. Female-headed households often face compounded vulnerabilities, including lower average incomes, limited access to resources, and persistent sociocultural norms that might hinder their economic empowerment (Essilfie et al., 2021). Precarious employment conditions, characterized by low wages, job insecurity, and lack of social security, can

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exacerbate these existing vulnerabilities, making it more challenging for female-headed households to maintain food security. Additionally, women frequently bear a disproportionate burden of unpaid care work and household responsibilities, which can limit their ability to engage in stable, well-paying employment opportunities. Precarious employment conditions may further strain their ability to balance work and household responsibilities, compromising their household's food security. The study's findings underscore the need for targeted interventions and policies that address the unique challenges faced by female-headed households in the context of precarious employment.

Table 19 further explores the locational dimensions of the relationship between precarious employment (PE) and food insecurity, specifically focusing on rural and urban households. Column 1 of Panel A shows that for rural households, a one standard deviation increase in PE is associated with a 0.086 standard deviation increase in food insecurity. This finding is consistent across Columns 2-4, which use different measures of food insecurity. On the other hand, Column 1 of Panel B reveals that for urban households, a one standard deviation increase in PE corresponds to a 0.136 standard deviation increase in household food insecurity. Similar to the rural household findings, this result is consistent across all models from Columns 1-4 in Panel B.

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Table 19: Precarious employment and food insecurity (IV results): Location dummies

VARIABLES	FIES	FIES (MPI)	FIES (PCA)	FIES (RS)
Panel A: Rural sample				
PE	0.045***	0.018***	0.038**	0.145***
	(0.014)	(0.006)	(0.017)	(0.046)
	[0.086]	[0.086]	[0.065]	[0.086]
Household head x'tics	Yes	Yes	Yes	Yes
Household x'tics	Yes	Yes	Yes	Yes
Ecological zone FE	Yes	Yes	Yes	Yes
Month of survey FE	Yes	Yes	Yes	Yes
First stage				
Casual employment rate in sector (ISCO)	0.157***	0.157***	0.157***	0.157***
	(0.050)	(0.050)	(0.050)	(0.050)
Observations	7,856	7,856	7,856	7,856
R-squared	0.080	0.089	0.050	0.089
Panel B: Urban sample				
PE	0.056***	0.023***	0.051***	0.183***
	(0.009)	(0.003)	(0.010)	(0.028)
	[0.136]	[0.138]	[0.107]	[0.138]
Household head x'tics	Yes	Yes	Yes	Yes
Household x'tics	Yes	Yes	Yes	Yes
Ecological zone FE	Yes	Yes	Yes	Yes
Month of survey FE	Yes	Yes	Yes	Yes
First stage				
Casual employment rate in sector (ISCO)	0.266***	0.266***	0.266***	0.266***
	(0.053)	(0.053)	(0.053)	(0.053)
Observations	7,740	7,740	7,740	7,740
R-squared	0.117	0.127	0.088	0.127

Robust standard errors in parentheses, clustered by household ID, *** p<0.01, ** p<0.05, * p<0.1. FE (fixed effect). Standardised coefficients in square bracket.

Source: Author's Construct, 2025.

The pervasive impact of precarious employment on food insecurity transcends geographic boundaries, as evidenced by the study's findings across

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rural and urban settings, corroborating the detrimental effects documented by Ramsey et al. (2012). In rural contexts, the prevalence of precarious working conditions, characterized by low and irregular incomes, lack of social protection, and limited job security, particularly in agricultural and informal employment sectors, directly undermines households' ability to secure a stable and sufficient income, consequently compromising their access to adequate and nutritious food. Conversely, in urban areas, the informal sector and low-skilled jobs are sources of precarious employment, where workers grapple with job insecurity, lack of benefits, and low wages, making it arduous for households to afford a diverse and nutritious diet, exacerbated by rising food prices and living expenses. While the adverse impact of PE on food insecurity is evident in both rural and urban settings, the estimates suggest that urban households may be slightly more vulnerable to the consequences of precarious employment on food insecurity compared to rural households. The higher estimate for urban households could be attributed to factors such as the higher cost of living in urban areas, limited access to social support networks, and greater dependence on cash income for purchasing food. Compounding these challenges, both rural and urban households affected by precarious employment often have limited access to social safety nets and support systems, heightening their vulnerability to food insecurity during periods of economic instability or unexpected shocks.

Precarious Employment and Food Insecurity Across Public and Private Sectors

The study further examined the effect of precarious employment on food insecurity across different sectors of employment, specifically focusing

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on household heads employed in the private sector and the public sector. Table 20 presents the results of this analysis. Panel A of Table 5 focuses on household heads employed in the private sector. Column 1 shows that a one standard deviation increase in PE is associated with a 0.087 standard deviation increase in food insecurity, as measured by the FIES (Food Insecurity Experience Scale) index. This finding is consistent across Columns 2-4, which use different measures of food insecurity, such as FIES (MPI), FIES (PCA), and FIES (RS). Panel B of Table 5 examines the relationship between PE and food insecurity for household heads employed in the public sector. Column 1 reveals that a one standard deviation increase in PE is associated with a 0.118 standard deviation increase in household food insecurity. Similar to the private sector findings, this result is consistent across all models from Columns 1-4.

Table 20: Precarious employment and food insecurity (Sector of employment)

VARIABLES	FIES	FIES (MPI)	FIES (PCA)	FIES (RS)
Panel A: Private sector				
PE	0.044***	0.018***	0.037***	0.147***
	(0.010)	(0.004)	(0.012)	(0.032)
	[0.087]	[0.089]	[0.065]	[0.089]
Household head x'tics	Yes	Yes	Yes	Yes
Household x'tics	Yes	Yes	Yes	Yes
Ecological zone FE	Yes	Yes	Yes	Yes
Month of survey FE	Yes	Yes	Yes	Yes
First stage				
Casual employment rate in sector (ISCO)	0.190***	0.190***	0.190***	0.190***
	(0.038)	(0.038)	(0.038)	(0.038)
Observations	13,404	13,404	13,404	13,404
R-squared	0.109	0.118	0.072	0.118
Panel B: Public sector				
PE	0.036**	0.015***	0.037**	0.122***
	(0.015)	(0.006)	(0.018)	(0.047)

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	[0.118]	[0.124]	[0.097]	[0.124]
Household head x'tics	Yes	Yes	Yes	Yes
Household x'tics	Yes	Yes	Yes	Yes
Ecological zone FE	Yes	Yes	Yes	Yes
Month of survey FE	Yes	Yes	Yes	Yes
First stage				
Casual employment rate in sector (ISCO)	0.195***	0.195***	0.195***	0.195***
	(0.007)	(0.007)	(0.007)	(0.007)
Observations	1,134	1,134	1,134	1,134
R-squared	0.124	0.142	0.099	0.142

Robust standard errors in parentheses, clustered by household ID, *** p<0.01, ** p<0.05, * p<0.1. FE (fixed effect). Standardised coefficients in square bracket.

Source: Author's Construct, 2025.

The results suggest that households whose heads are employed in the private sector are significantly impacted by precarious employment conditions. Private sector employment is often characterised by weaker labour regulations, limited job security, and fewer benefits compared to the public sector (Bettoni & Santos 2024). Consequently, private sector employees facing precarious employment conditions are more susceptible to income instability and lack of access to social safety nets, which can exacerbate their vulnerability to food insecurity. While the impact of PE on food insecurity is observed in both the private and public sectors, the slightly higher estimate for public sector employees (0.118 standard deviation increase) compared to private sector employees (0.087 standard deviation increase) is noteworthy. This finding may seem counterintuitive, as public sector employment is generally perceived to offer greater job security and better benefits compared to the private sector. One possible explanation for this observation could be the presence of other factors that may contribute to precarious employment conditions in the public sector, such as budget constraints, organizational restructuring, or political

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factors affecting job security. Additionally, public sector employees may have higher expectations of job stability and benefits, which could amplify the impact of precarious employment conditions on their household's food security (Lewchuk, 2016).

This result is consistent across all models from columns 1-4 in Panels A and B of Table 20. These results suggest that precarious employment increases food insecurity for both private and public sector workers. This is an important finding, as there is often an assumption that public sector workers are less vulnerable to the precarious employment conditions typically associated with the private sector. However, these results challenge that notion, suggesting that job insecurity, irregular incomes, and limited social protections can plague workers across different sectors of the economy (Señoret, Ramirez & Rehner, 2022; Tremblay, 2016; Quinlan, 2012). This highlights the pervasive nature of precarious work arrangements and their consequences for household food security, regardless of the worker's sector of employment.

Dimensions of precarious employment and Food insecurity

Furthermore, Table 21 provides insights into the relationship between different dimensions of precarious employment and food insecurity. The findings consistently demonstrate that all dimensions of precarious employment analysed in the study are associated with an increased level of food insecurity across all models. Column 1 reveals that employment insecurity, characterized by a lack of job security and stability, is linked with a 0.170 standard deviation increase in household food insecurity. Employment insecurity can lead to income instability, uncertainty about future earnings, and hesitancy to make long-term financial commitments, ultimately

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compromising a household's ability to afford and access adequate and nutritious food consistently. Column 2 shows that income inadequacy, which refers to insufficient and unstable income levels, is associated with a 0.125 standard deviation increase in household food insecurity. When households face income inadequacy, they have limited financial resources to allocate towards food expenses, often leading to compromises in the quantity and quality of food consumed, thereby increasing their vulnerability to food insecurity.

In, addition, in Column 3, the lack of rights and protection, such as the absence of labour rights, social security benefits, and legal protections, is linked with a 0.101 standard deviation increase in household food insecurity. The absence of these rights and protections can exacerbate the precariousness of employment conditions, leaving households without safety nets or recourse during periods of income disruption or job loss, impacting their ability to maintain food security. Column 4 indicates that an unsafe or unhealthy work environment, which can pose risks to physical and mental well-being, is associated with a 0.299 standard deviation increase in household food insecurity. This dimension of precarious employment can lead to health issues, lost productivity, and potential job loss, all of which can negatively impact a household's financial stability and ability to afford adequate food.

Table 21: Precarious employment and food insecurity (dimensions of precarious employment)

VARIABLES	(1) FIES	(2) FIES	(3) FIES	(4) FIES
Employment insecurity	0.054***			
	(0.008)			
	[0.170]			
Income inadequacy		0.052***		
		(0.007)		

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		[0.125]		
Lack of rights and protection			0.039***	
			(0.005)	
			[0.101]	
Unsafe or unhealthy work environment				0.058***
				(0.009)
				[0.299]
Household head x'tics	Yes	Yes	Yes	Yes
Household x'tics	Yes	Yes	Yes	Yes
Ecological zone FE	Yes	Yes	Yes	Yes
Month of survey FE	Yes	Yes	Yes	Yes
First stage				
Casual employment rate in sector (ISCO)	0.192***	0.137***	0.152***	0.442***
	(0.066)	(0.006)	(0.031)	(0.115)
Observations	15,596	15,596	15,596	15,596
R-squared	0.134	0.127	0.132	0.047
F-statistics	96.67	96.67	96.67	96.67
Anderson-Rubin Wald test	25.58	25.58	25.58	25.58

Robust standard errors in parentheses, clustered by household ID, *** p<0.01, ** p<0.05, * p<0.1. FE (fixed effect). Standardised coefficients in square bracket.
Source: Author's Construct, 2025.

The study's findings suggest that the various dimensions of precarious employment have a positive and significant effect on household food insecurity. This comprehensive approach to analysing the multidimensional nature of precarious employment is crucial, as previous empirical studies have highlighted the need to move beyond simplistic unidimensional conceptualizations (Kalleberg & Vallas, 2018; Coleman-Jensen et al., 2012). These studies argue that the distinct dimensions of precarious work can have varying effects on household well-being, including food security outcomes. While some dimensions, such as inadequate income and employment insecurity, may directly constrain a household's ability to afford adequate food, other dimensions, such as the lack of rights and protections, as well as unsafe

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or unhealthy work environments, can indirectly contribute to food insecurity through different mechanisms.

Inadequate income and employment insecurity directly impact a household's food security by limiting financial resources and the ability to consistently purchase nutritious food. Workers in precarious employment often experience income volatility due to unstable job contracts, reduced hours, or seasonal work, which severely hampers their ability to plan for essential needs, including food (Kim et al., 2018; Vives-Vergara et al., 2017). Coleman-Jensen (2011) found that households with heads in non-standard work arrangements were significantly more likely to experience food insecurity, especially in cases of involuntary part-time work or erratic working hours. This unpredictability forces households into cycles of economic strain, making it difficult to maintain consistent food security.

The lack of rights and protections, such as labour rights, social security benefits, and legal protections, exacerbates the precariousness of employment conditions, leaving households without safety nets during periods of income disruption or job loss. Workers in precarious employment are often excluded from unemployment insurance, health benefits, and retirement plans, increasing their vulnerability to economic shocks (Rodgers, 2016; Kreshpaj, 2020). McIntyre et al. (2012) demonstrated that the absence of such protections contributed to food insecurity among working households in Canada, particularly during periods of job transition or illness. Similarly, Walsh et al. (2022) observed that over 65% of private sector service workers in Finland, many of whom lacked workplace protections, experienced food insecurity, underscoring the critical role of social safety nets.

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Unsafe or unhealthy work environments further exacerbate food insecurity by posing risks to workers' physical and mental well-being. Precarious workers often face unsafe conditions, such as long hours or hazardous tasks, which can lead to health issues, reduced productivity, and eventual job loss (Kawada, 2016; Oke et al., 2016). Loh et al. (2021) found that early care and education workers employed in precarious conditions were more likely to experience both food insecurity and depression, linking poor working conditions to heightened economic vulnerability. Increased health-related expenses arising from these conditions further strain limited financial resources, compromising households' ability to afford adequate food.

Table 22 presents the results of a general dominance analysis, which assesses the relative importance of the different dimensions of precarious employment in predicting food insecurity. Among the four dimensions examined – employment insecurity, income inadequacy, lack of rights and protection, and unsafe or unhealthy work environment – the analysis revealed that employment insecurity is the most important predictor of food insecurity. This finding highlights the significant impact that job instability and lack of employment security can have on a household's ability to maintain consistent access to adequate and nutritious food (Coleman-Jensen, 2011; Mabli et al., 2022; Walsh et al., 2022). When individuals face uncertainty about their employment status and future income streams, it becomes challenging to plan and budget for essential expenses, including food. Consequently, households may be forced to compromise on the quantity and quality of their food consumption, leading to increased vulnerability to food insecurity.

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Table 22: Dominance analysis

FIES	Dominance statistics	Standardized Dominance statistics	Ranking
Employment insecurity	0.011	0.077	3
Income inadequacy	0.004	0.033	11
Lack of rights and protection	0.009	0.063	7
Unsafe or unhealthy work environment	0.004	0.031	13
Age	0.004	0.028	16
Female	0.002	0.018	18
No formal education	0.014	0.101	2
Primary	0.004	0.033	12
JHS/Middle	0.003	0.018	17
secondary	0.005	0.039	10
Tertiary	0.018	0.130	1
Urban	0.010	0.071	6
Rural	0.010	0.071	5
Household size	0.008	0.059	8
Household size squared	0.004	0.030	15
Never married	0.000	0.003	23
Married	0.002	0.013	19
Separated	0.002	0.012	20
Social safety net program	0.001	0.008	21
Sector of employment	0.010	0.074	4
Ecological zone	0.004	0.031	14
Household farm	0.007	0.052	9
Household with disabled worker	0.001	0.005	22
Number of observations			15,596
Overall fitstat			0.1363

Source: Author's Construct, 2025.

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Following employment insecurity, the analysis identified income inadequacy as the second most important predictor of food insecurity. This dimension reflects the difficulties households face when their income levels are insufficient or unstable, limiting their financial resources available for food expenses. The lack of rights and protection, and unsafe or unhealthy work environments, while still significant predictors, ranked lower in terms of relative importance compared to employment insecurity and income inadequacy. However, it is important to note that these dimensions can indirectly contribute to food insecurity by exacerbating financial strain, reducing productivity, and increasing health-related expenses, as discussed earlier. The findings from this analysis have important policy implications, suggesting that interventions aimed at promoting more stable employment opportunities, strengthening income protection mechanisms, and enhancing workplace safety would be most effective in addressing food insecurity among households affected by precarious employment.

The moderating effect of Social Safety Net (National Health Insurance program)

Table 23 investigates the moderating role of social safety net programs (SP), with a focus on the national health insurance program, in mitigating the adverse impact of precarious employment (PE) on household food insecurity. The analysis includes two panels: Panel A, which incorporates an interaction term between PE and SP, and Panel B, which excludes the interaction term. In Panel A, the results demonstrate that precarious employment (PE) has a positive and significant effect on household food insecurity, with a one standard deviation increase in PE being associated with a 0.140 standard

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deviation increase in the FIES (Food Insecurity Experience Scale) index (Column 1). This finding is consistent across the different measures of food insecurity used in Columns 2-4 (FIES (MPI), FIES (PCA), and FIES (RS)). Notably, the interaction term between PE and SP (PE times SP) exhibits a negative and significant coefficient across all models in Panel A. Specifically, in Column 1, the coefficient of -0.011 (-0.046 when standardized) suggests that for households with a head in precarious employment, eligibility for the national health insurance program mitigates the positive relationship between PE and food insecurity by 0.046 standard deviations.

This moderating effect of social safety net programs, particularly the national health insurance program, is significant as it helps alleviate the burden of precarious employment on household food security. Access to health insurance can provide financial protection against catastrophic health expenses, reducing the vulnerability of households to income shocks and financial strain that could otherwise compromise their ability to afford adequate food. The findings in Panel B, which exclude the interaction term, further reinforce the importance of social safety net programs.

The coefficient for SP in Column 1 (-0.067, or -0.032 when standardized) indicates that eligibility for the national health insurance program is directly associated with a 0.032 standard deviation reduction in household food insecurity, regardless of employment status. These results collectively highlight the crucial role of social safety net programs, such as the national health insurance program, in mitigating the negative impacts of precarious employment on food insecurity. This result is consistent across all models from columns 1-4 of Table 7. This result is unsurprising since more

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economically disadvantaged families within this population are both more likely to qualify for social safety net programs and more likely to be food insecure.

Table 23: Precarious employment and food insecurity (Moderating effect of Social Safety Net)

VARIABLES	FIES	FIES (MPI)	FIES (PCA)	FIES (RS)
Panel A: With interacted				
PE	0.064***	0.026***	0.058***	0.210***
	(0.007)	(0.003)	(0.009)	(0.024)
	[0.140]	[0.142]	[0.112]	[0.142]
SP	-0.022	-0.007	-0.012	-0.054
	(0.020)	(0.008)	(0.023)	(0.066)
	[-0.010]	[-0.008]	[-0.005]	[-0.008]
PE × SP	-0.011***	-0.005***	-0.010***	-0.037***
	(0.002)	(0.001)	(0.003)	(0.008)
	[-0.046]	[-0.047]	[-0.037]	[-0.047]
Household head controls	Yes	Yes	Yes	Yes
Household controls	Yes	Yes	Yes	Yes
Ecological zone FE	Yes	Yes	Yes	Yes
Month of survey FE	Yes	Yes	Yes	Yes
First stage				
Casual employment rate in sector (ISCO)	0.181***	0.181***	0.181***	0.181***
	(0.036)	(0.036)	(0.036)	(0.036)
Observations	7,856	7,856	7,856	7,856
R-squared	0.080	0.089	0.050	0.089
F-statistics	36.48	36.48	36.48	36.48
Panel B: Without interacted term				
PE	0.057***	0.023***	0.051***	0.186***
	(0.007)	(0.003)	(0.008)	(0.023)
	0.125	0.126	0.100	0.126
SP	-0.067***	-0.026***	-0.052***	-0.204***
	(0.018)	(0.007)	(0.020)	(0.058)
	-0.032	-0.030	-0.022	-0.030

Robust standard errors in parentheses, Clustered by household ID, *** p<0.01, ** p<0.05, * p<0.1. FE (fixed effect). Standardised coefficients in square bracket.
Source: Author's Construct, 2025.

This finding is consistent with the existing literature, which suggests that more economically disadvantaged families are both more likely to qualify for social safety net programs and more susceptible to food insecurity (Swann,

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2017; Schmidt, Shore-Sheppard & Watson, 2016; Kantor, 2001). Social safety net programs like national health insurance appear to play a crucial role in mitigating the adverse effects of precarious employment on vulnerable household members, as it indicates that households covered by the national health insurance would have to spend less or nothing on healthcare, enabling them to channel those resources towards acquiring more nutritious food. This serves as a buffer against the income volatility, lack of benefits, and health risks associated with precarious work. Similarly, other forms of social protection, such as cash transfer programs targeted at vulnerable groups in precarious employment, can also help reduce the negative impact of precarious work on food insecurity by providing a safety net and stabilizing household finances (Beegle et al., 2018, Tiwari et al., 2016). The results emphasize the important buffering function of social safety net programs in supporting households facing the challenges of precarious work arrangements, as by improving access to essential services and resources, such as healthcare, these programs can directly alleviate the negative impacts of precarious employment on food insecurity outcomes.

Potential Channel Analyses

Following a two-step methodology used in prior studies (Koomson & Churchill, 2021, 2022; Alesina & Zhuravskaya, 2011), we examined the link between PE and health shocks as well as household asset accumulation. Household health shock is a binary variable that looks at whether any member of the household suffered from either an illness or injury. It captures if there was an unexpected medical event affecting one individual within the household, especially the household head. In addition, we measured household

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asset accumulation following the approach developed by Filmer and Pritchett (2001).

A variety of durable goods owned by each household were catalogued, consisting of possessions that could potentially be sold or used as collateral in times of financial need stemming from health issues. Examples included electronics like televisions and computers, vehicles, land ownership, household items, jewellery, and more. These assets were then subjected to principal component analysis to synthesize them into a single wealth index measuring overall asset accumulation. This technique for deriving an index from multiple indicators of durable assets and housing quality was similarly applied by Seshan (2020). The resulting asset accumulation score serves as a proxy for households' capacity to withstand economic hardship through capital resources.

In Table 24, Column 1, the results revealed a statistically significant negative relationship (at a 1% level) between PE and health shocks. Column 2 findings showed a statistically significant positive relationship (at a 1% level) between PE and asset accumulation. Our findings align with prior research that has established links between job precarity and worse health outcomes (e.g. Matilla-Santander, 2020). More precarious employment is associated with an increased incidence of health issues for workers. Separately, the relationship we observed between precariousness and household financial behaviours is consistent with the results reported by Nkansah et al. (2023), who also documented the impacts of unstable, low-quality jobs on financial decision-making and resources at the family level. Thus, the present study adds to a body of evidence illustrating how precarious work arrangements can

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transmit harm beyond just labour market outcomes to influence health and household economic well-being.

Table 24: Precarious employment, health shock and asset accumulation

VARIABLES	Health shock	Durable Assets Accumulation
PE	0.012***	-0.752***
	(0.004)	(0.070)
	[0.049]	[-0.193]
Household head x'tics	Yes	Yes
Household x'tics	Yes	Yes
Ecological zone FE	Yes	Yes
Month of survey FE	Yes	Yes
First stage		
Casual employment rate in sector (ISCO)	0.185***	0.185***
	(0.037)	(0.037)
Observations	15,596	15,596
R-squared	0.029	0.196
F-statistics	229	229

Robust standard errors in parentheses, Clustered by household ID, *** p<0.01, ** p<0.05, * p<0.1. FE (fixed effect). Standardised coefficients in square bracket.
Source: Author's Construct, 2025.

In the second step, we introduce the health shock and asset accumulation variable as an additional covariate in the food insecurity model (equations 21 & 22). We consider the variable a relevant pathway if its inclusion in the model leads to a reduction in the earlier estimated coefficient of PE or renders it statistically insignificant. To conduct this analysis, we employ the 2SLS model, comparing the coefficients from Table 19 (Panel B) with the coefficients in Panel A of Table 25 (Section A, Columns 1-4). The results in Section A, Columns 1-4 indicate that increased health shock is linked with increased food insecurity. Furthermore, we observe that in column 1, the estimates for PE are consistently lower in Panel A compared to Panel B.

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This suggests that including health shock as an additional predictor in the food insecurity model reduces the magnitude of PE.

Table 25: Precarious employment, income and food insecurity (IV mediation analysis)

	***Mediator:* Health shock**			
VARIABLES	FIES	FIES (MPI)	FIES (PCA)	FIES (RS)
Panel A: Results for mechanism				
pe_scow2	0.034***	0.027***	0.034***	0.111***
	(0.007)	(0.002)	(0.008)	(0.022)
	[0.075]	[0.146]	[0.065]	[0.076]
Health shock	0.122***	0.050***	0.140***	0.384***
	(0.016)	(0.006)	(0.018)	(0.051)
	[0.064]	[0.065]	[0.066]	[0.063]
Household head x'tics	Yes	Yes	Yes	Yes
Household x'tics	Yes	Yes	Yes	Yes
Ecological zone FE	Yes	Yes	Yes	Yes
Month of survey FE	Yes	Yes	Yes	Yes
First stage				
Casual employment rate in sector (ISCO)	0.182***	0.182***	0.182***	0.182***
	(0.037)	(0.037)	(0.037)	(0.037)
Observations	15,596	15,596	15,596	15,596
R-squared	0.132	0.122	0.093	0.140
F-statistics	127.5	127.5	127.5	127.5
Anderson-Rubin Wald test	12.23	57.56	10.73	13.02
Panel B: Initial results for comparison				
PE	0.052***	0.021***	0.047***	0.171***
	(0.007)	(0.003)	(0.009)	(0.023)
	[0.114]	[0.116]	[0.091]	[0.116]

Robust standard errors in parentheses, Clustered by household ID, *** p<0.01, ** p<0.05, * p<0.1. FE (fixed effect). Standardised coefficients in square bracket.
Source: Author's Construct, 2025.

Similarly, the results in Panel A of Table 26 show that higher asset accumulation is linked to a decreased level of food insecurity. We observe that the estimates of PE (in Panel A) are consistently smaller than those in Panel B (Section B, Columns 1-4). This suggests that incorporating asset

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accumulation as an additional covariate in the food insecurity regression diminishes the magnitude of PE. Based on the results obtained, we infer that health shock and asset accumulation are important pathways through which PE affects food insecurity.

Table 26: Precarious employment, income and food insecurity (IV mediation analysis)

	Section B-Mediator: Asset accumulation			
VARIABLES	FIES	FIES (MPI)	FIES (PCA)	FIES (RS)
Panel A: Results for mechanism				
pe_scow2	0.041***	0.017***	0.038***	0.136***
	-0.007	-0.003	-0.008	-0.023
	[0.090]	[0.092]	[0.074]	[0.092]
		-	-	
Asset accumulation	-0.017***	0.007***	0.014***	-0.057***
	-0.001	0	-0.001	-0.005
	[-0.147]	[-0.143]	[-0.104]	[-0.152]
Household head x'tics	Yes	Yes	Yes	Yes
Household x'tics	Yes	Yes	Yes	Yes
Ecological zone FE	Yes	Yes	Yes	Yes
Month of survey FE	Yes	Yes	Yes	Yes
First stage				
Casual employment rate in sector (ISCO)	0.184***	0.184***	0.184***	0.184***
	-0.036	-0.036	-0.036	-0.036
Observations	15,596	15,596	15,596	15,596
R-squared	0.148	0.156	0.099	0.156
F-statistics	134.3	134.3	134.3	134.3
Anderson-Rubin Wald test	16.74	17.99	13.39	17.99
Panel B: Initial results for comparison				
PE	0.052***	0.021***	0.047***	0.171***
	-0.007	-0.003	-0.009	-0.023
	[0.114]	[0.116]	[0.091]	[0.116]

Robust standard errors in parentheses, Clustered by household ID, *** p<0.01, ** p<0.05, * p<0.1. FE (fixed effect). Standardised coefficients in square bracket.

Source: Author's Construct, 2025.

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Robustness checks

In this segment, we conducted multiple robustness tests of our results in Table 27. First, we subject our standard 2SLS estimates to a robustness test using Lewbel's (2012) heteroscedastic-adjusted instrument method. We evaluate the robustness of the model via internally generated instruments. The Craig-Donald Wald F-statistic surpasses the 10 thresholds, signifying the significance and absence of a weak relationship between the internal instruments with financial resilience (Stock & Yogo, 2005). Our findings demonstrate that a household head in PE has a positive and significant effect on household food insecurity. Consistently, the Lewbel 2SLS estimates match our baseline and standard 2SLS estimates. This is consistent with prior research that utilizes similar approaches that have been observed in the works (Kofinti et al., 2023; Koomson et al., 2023; Martey, 2022; Marisetty, 2022).

Second, we use Kinky Least Squares (KLS) which has the advantage of being instrument-free (see, Voordeckers et al., 2023; Kripfganz & Kiviet, 2021). Given that our results suggest that the OLS estimates are biased downward, we expect that the association between PE and the error term should be negative. Hence, we set the postulated endogeneity range of PE for the KLS analysis to range from -0.5 to zero. We present the KLS figures for the relationship between PE and food insecurity in Table 26. The point estimate for PE is positive and significant over the postulated range and the magnitudes of the point estimates decrease with the postulated degree of endogeneity. The KLS results complement the previous estimates and consistently show that precarious employment is positively correlated with food insecurity among households.

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Table 27: Precarious employment and food insecurity: Lewbel 2SLS and KLS Results

VARIABLES	FIES	FIES (MPI)	FIES (PCA)	FIES (RS)
Panel A: Lewbel 2SLS with internal instruments				
PE	0.095***	0.039***	0.100***	0.312***
	(0.012)	(0.005)	(0.013)	(0.037)
	[0.209]	[0.212]	[0.195]	[0.212]
Household head x'tics	Yes	Yes	Yes	Yes
Household x'tics	Yes	Yes	Yes	Yes
Ecological zone FE	Yes	Yes	Yes	Yes
Month of survey FE	Yes	Yes	Yes	Yes
Observations	15,596	15,596	15,596	15,596
R-squared	0.110	0.118	0.074	0.118
Panel B: Kinky Regression				
PE	0.394***	0.158***	0.450***	1.262***
	(0.015)	(0.006)	(0.018)	(0.050)
	[0.864]	[0.856]	[0.876]	[0.856]
Household head x'tics	Yes	Yes	Yes	Yes
Household x'tics	Yes	Yes	Yes	Yes
Ecological zone FE	Yes	Yes	Yes	Yes
Month of survey FE	Yes	Yes	Yes	Yes
Postulated Endogeneity of FR	-0.50	-0.50	-0.50	-0.50
Observations	15,596	15,596	15,596	15,596

Robust standard errors in parentheses, Clustered by household ID, *** p<0.01, ** p<0.05, * p<0.1. FE (fixed effect). Standardised coefficients in square bracket.

Source: Author's Construct, 2025.

Fourthly, we conducted a sensitivity test by using if a member of the household is in precarious employment in Table 28. In the main analysis, household precariousness was defined based solely on the employment status of the household head. However, this may not fully capture households where other members are engaged in precarious work and contributing to resources, even if the head's job is stable. Therefore, as a sensitivity test, we re-estimated the models using an alternative indicator - a dummy variable equal to 1 if any member of the household, not just the head, held a precarious job. This test allows for a less restrictive classification of household precarious employment

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status. The results shows that there is a positive and significant on foo insecurity. The results across all four models consistently support the main finding.

Table 28: Precarious employment and food insecurity

VARIABLES	FIES	FIES (MPI)	FIES (PCA)	FIES (RS)
PE	0.126***	0.051***	0.124***	0.407***
	(0.024)	(0.009)	(0.027)	(0.075)
	0.261	0.261	0.220	0.261
Household member x'tics	Yes	Yes	Yes	Yes
Household x'tics	Yes	Yes	Yes	Yes
Ecological zone FE	Yes	Yes	Yes	Yes
Month of survey FE	Yes	Yes	Yes	Yes
First stage				
Casual employment rate in sector (ISCO)	0.187***	0.187***	0.187***	0.187***
	(0.036)	(0.036)	(0.036)	(0.036)
Observations	15,596	15,596	15,596	15,596
R-squared	0.148	0.156	0.111	0.156

Robust standard errors in parentheses, clustered by household ID, *** p<0.01, ** p<0.05, * p<0.1. FE (fixed effect). Standardised coefficients in square bracket.
Source: Author's Construct, 2025.

For a fifth sensitivity test (Appendix Table A4), we assessed our results by applying a union cut-off of 0.33 for the PE index and the corresponding outcomes are reported. In Panel B, we assigned an equal weight to each dimension of PE and analysed its relationship with our primary measure of food insecurity. Panel C utilized the additive index, or score, of PE in conjunction with the main indicator of food insecurity. Across all model specifications, the results continued to strongly support our primary finding that PE contributes to higher household food insecurity.

Lastly, we subject our results to different thresholds and weights for measuring food insecurity (see Table A6 Panel D and E). In contrast to the conventional cutoff of 0.5 used in constructing the food insecurity index

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(Martey, 2022; Adusah-Poku & Takeuchi, 2019), we adopt the approach utilized in previous studies (Kofinti et al., 2023; Koomson & Churchill, 2022) and apply alternative thresholds of 0.33. In Table A6 in Panel D, the results show that all the estimates align with our initial findings, demonstrating consistency. Moreover, we conduct additional tests by assigning higher weights of 0.20 to the dimension "GOING A WHOLE DAY WITHOUT FOOD" (WFOOD_1DAY), which contributes to the food insecurity construct. In Panel B of Table A6, our primary findings receive further support, indicating that PE exacerbates food insecurity in the overall sample. These findings remain robust across the different measures, techniques and thresholds used.

Chapter Summary

This chapter examined the relationship between precarious employment (PE) and household food insecurity in Ghana, using multiple food insecurity measures, including the Rasch model, MPI, PCA, and FIES, and addressing endogeneity via a two-stage least squares (2SLS) approach. The study pursued four objectives: assessing the direct effect of PE on food insecurity; analyzing the impact of its dimensions; exploring the moderating role of social protection; and identifying mediating pathways, namely health shocks and asset accumulation. The findings reveal that PE significantly increases food insecurity, especially among female-headed and rural households. Employment insecurity emerged as the most influential dimension, followed by lack of rights, income inadequacy, and unsafe work conditions. Social protection, particularly national health insurance, was shown to buffer the negative effects of PE. Health shocks and limited assets were identified as

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key transmission channels. The study recommends policies that enhance social protection, reduce health risks, and support asset accumulation to mitigate food insecurity among precariously employed households.

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CHAPTER FIVE
PRECARIOUS EMPLOYMENT AND VULNERABILITY TO POVERTY IN GHANA

Introduction

This chapter presents an empirical analysis of the impact of precarious employment on vulnerability to poverty in Ghana. The study measured poverty using the multidimensional approach developed by Alkire and Foster (2011). To assess vulnerability to poverty, the research employs the "vulnerability as expected poverty" approach within a multidimensional framework. Specifically, it applies a Feasible Generalized Least Squares methodology in three stages to predict the probability of a household being poor in the future over the next 1 to 3 years. The chapter begins by outlining the landscape of multidimensional poverty, vulnerability to poverty, and precarious employment in Ghana.

It also examines poverty and vulnerability to poverty for precarious and non-precarious household head workers across gender and location dimensions over the next 1 to 3 years. This is followed by an analysis of how precarious employment affects vulnerability to poverty among households in Ghana. Specifically, the study looks at how precarious employment makes households vulnerable in the next 1 to 3 years. To achieve these goals, the research utilises descriptive and inferential statistics. Additionally, the chapter includes a heterogeneity analysis, which investigates how these effects differ across various subgroups, such as gender and location. The study uses waves 1 to 4 of the Annual Household and Expenditure Panel Survey from the Ghana Statistical Service.

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Incidence of poverty and vulnerability to poverty in Ghana

Sustainable Development Goal 1, which aims to end poverty in all its forms and manifestations by 2030, remains a key policy priority for Ghana. Figure 16 illustrates the incidence of multidimensional poverty across four quarterly survey waves within a year. The study employs the Multidimensional Poverty Index (MPI) to capture the complex nature of poverty across xx, xx and xx dimensions. These indicators are categorized into essential dimensions such as health, education, and living standards, providing a holistic understanding of poverty that goes beyond income levels alone. For this analysis, we applied a cut-off threshold of 0.33, in accordance with the framework established by Alkire and Foster (2011), to measure the incidence of poverty in Ghana.

Figure 17 indicates that 55.99% of households in Ghana are classified as multidimensionally poor, highlighting a significant portion of the population that continues to face poverty despite potential economic improvements. The analysis reveals slight variations in poverty rates across the four quarterly waves, with poor households comprising 55.79% in Wave 1, decreasing to 55.4% in Wave 2, peaking at 56.98% in Wave 3, and stabilizing again at 55.79% in Wave 4. Meanwhile, the non-poor population fluctuated, reaching a high of 44.6% in Wave 2, declining to 43.02% in Wave 3, and recovering to 44.21% in Wave 4. Notably, the differences between waves suggest that some households transitioned out of poverty; for instance, the percentage of households those were poor in Wave 1 but not in Wave 2 decreased by 0.39%. Conversely, the proportion of households classified as poor in Wave 2 but not in Wave 3 increased to 56.98%, reflecting a rise of

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1.58 percentage point. This dynamic indicates that the challenges of poverty are influenced by seasonal economic patterns, consumption behaviours, and various external factors that affect household welfare throughout the year.

Poverty incidence of households in Ghana

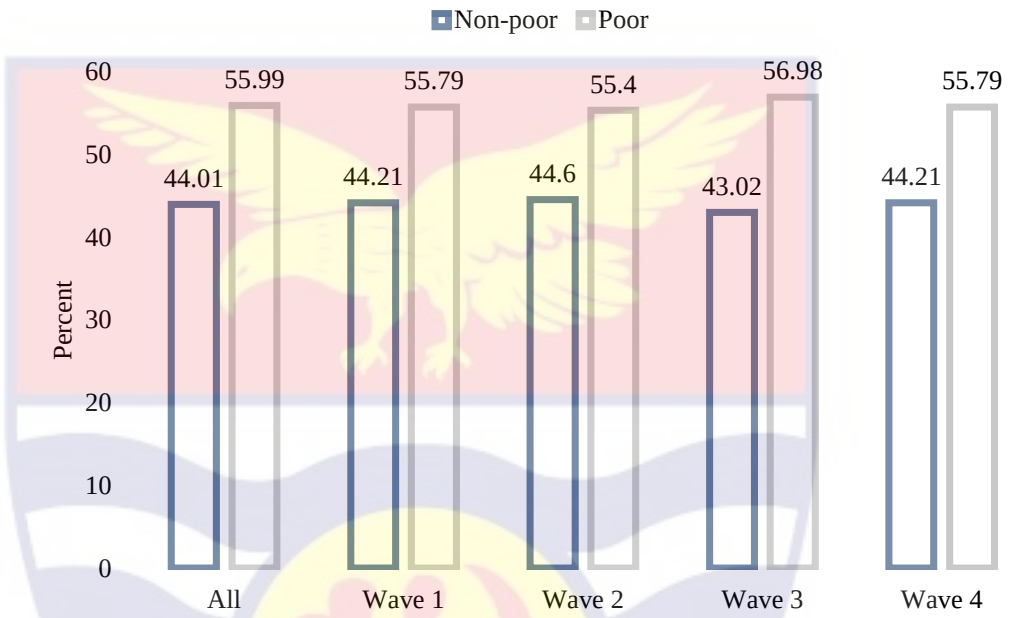


Figure 17: Poverty incidence of households.

Source: Author's Construct, 2025.

While poverty remains a pressing concern, the growing issue of vulnerability to poverty is increasingly alarming. To assess vulnerability to poverty, this study employs the "vulnerability as expected poverty" approach within a multidimensional poverty framework. Specifically, it utilizes a Feasible Generalized Least Squares methodology in three stages to predict the probability of a household becoming poor in the future, over the next 1 to 3 years. Figure 18 shows that in the next year, about 67.98% of households are deemed vulnerable to falling into poverty. This suggests that while only a portion of the population is currently poor, a much larger share of households face a significant risk of becoming poor in the near future. Looking ahead, the

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finding reveals an anticipated rise in vulnerability over time. In the second year, the vulnerability rate is expected to increase by 7.83 percentage points, reaching 75.81%. By the third year, the vulnerability rate escalates further to 87.96%, reflecting an additional increase of 12.15 percentage points. Supporting these findings, Koomson et al. (2020) report that approximately 51% of Ghanaians are vulnerable to poverty using GLSS 7, while Novignon et al. (2012) found that the average estimated vulnerability to poverty in Ghana was 56% using GLSS 5. This trend highlights a concerning situation - not only are many households currently experiencing poverty, but a substantial majority are at risk of falling into poverty in the coming years. The sharp increases in vulnerability rates over the 1–3-year horizon suggest that the risk of poverty is growing rapidly and becoming a more widespread challenge for households in Ghana.

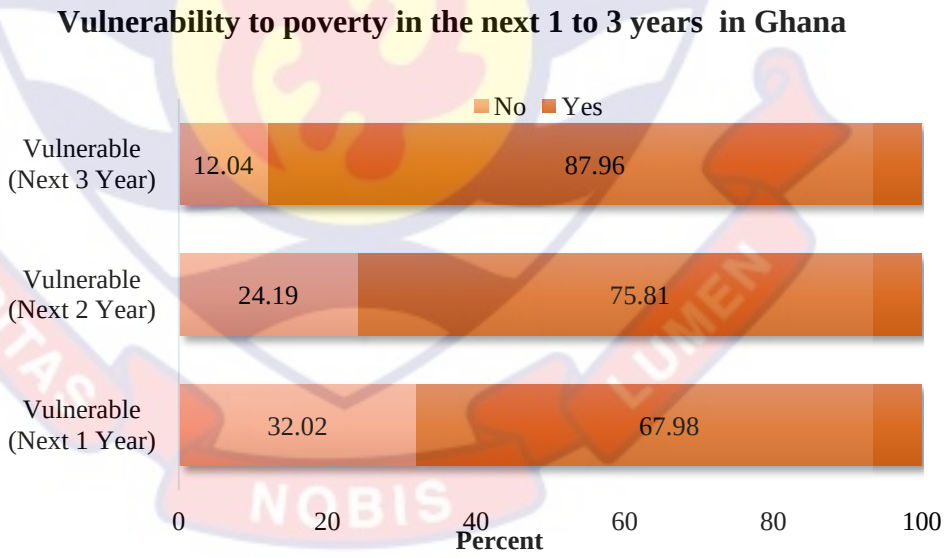


Figure 18: Incidence of poverty and vulnerability to poverty in Ghana

Source: Author's Construct, 2025.

In examining vulnerability to poverty, it is essential to analyse both poor and non-poor households over the next 1 to 3 years (see Figure 19).

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While the link between poverty and vulnerability is well recognised, the increasing risk that non-poor households may face significant vulnerabilities is particularly alarming. Figure 3 provides a detailed breakdown of vulnerability to poverty for poor and non-poor households over the next 1 to 3 years. The 1–3-year horizon is chosen to capture immediate risks households face from economic shocks and job instability, aligning with the timeframe in which poverty transitions commonly occur. This period is supported by evidence from studies, emphasizing its relevance for effective policy intervention (Koomson et al., 2020; Novignon et al., 2012). The results reveal concerning trends in the vulnerability to poverty for both poor and non-poor households. In the first year, 49.18% of non-poor households are estimated to be vulnerable to falling into poverty. This means that almost half of the households currently classified as non-poor are at risk of becoming poor in the near future.

In the second year, the vulnerability rate among non-poor households increases by 11.32 percentage points. The transition shows that the share of non-poor households that are non-vulnerable drops from 50.82% in the first year to only 39.5% in the second year. By the third year, the vulnerability rate among non-poor households escalates further to 78.81%, reflecting an additional 18.31 percentage point increase. This indicates that nearly 8 out of 10 non-poor households are now estimated to be at risk of falling into poverty. Correspondingly, the proportion of non-poor households that are non-vulnerable declines sharply to just 21.19%. For poor households, the vulnerability rates are understandably higher, starting at 82.75% in the first year and increasing to 87.84% and 95.15% in the second and third years,

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respectively. The Chi-square test indicates that the differences in vulnerability status between currently poor and non-poor households are significant at the 1% alpha level.

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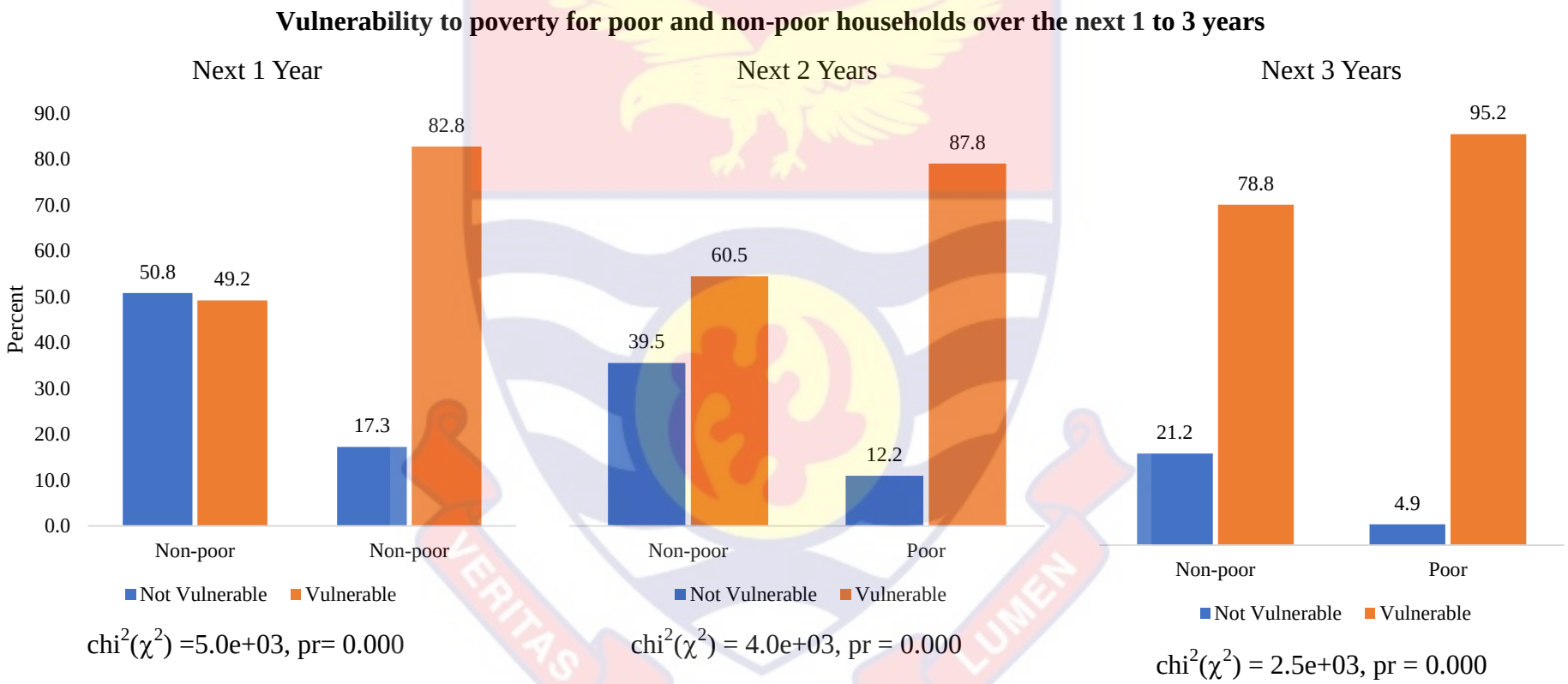


Figure 19: Vulnerability to poverty over the next 1 to 3 years in Ghana.

Source: Author's Construct, 2025

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While traditional interventions focusing on eradicating current poverty remain essential, there is an urgent need to address the growing vulnerability to poverty, particularly among non-poor households. Using the GLSS5 data from 2005/07, Novignon et al. (2012) found that 56% of Ghanaians were vulnerable to poverty, despite an observed poverty incidence of only 29%. Similarly, Koomson et al. (2020), using GLSS7 data, reported that approximately 39% of the 76.6% of the population that is currently not poor are also vulnerable. The study findings align with these trends, as the reduction in the actual poverty rate in Ghana suggests that vulnerability to poverty is likely to follow a similar trajectory. This finding highlights the entrenched nature of poverty and the substantial challenge in ensuring that poor households can escape the cycle of vulnerability. This emphasises the critical need for a change in basic assumptions in poverty reduction strategies and address the underlying factors contributing to households' vulnerability to multidimensional poverty.

Vulnerability to poverty over the next 1 to 3 years in Ghana (Locational, gender, and ecological zone dimension)

The persistent inequalities in Ghana, stemming from disparities in access to resources, opportunities, and essential services, have resulted in significant variations in vulnerability to poverty across different segments of the population. This section presents an analysis of vulnerability to poverty in Ghana over the next one to three years, offering a complete perspective that extends beyond the current poverty status. The study focuses on three critical dimensions: the urban-rural divide, gender disparities, and ecological zones. By examining these factors, we aim to reveal the complex connections between location, gender, and local regional zones in influencing households'

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risk of falling into or remaining in poverty. Through this lens, we can better identify the specific needs of households and the unique barriers they face, paving the way for more effective solutions.

Figure 20 provides a snapshot of the poor and non-poor populations in rural and urban areas in Ghana. According to GSS report 64.6% of individuals in rural areas and 27.0% in urban areas are classified as multidimensionally poor (GSS, 2020). This study reveals concerning trends in the vulnerability to poverty for both poor and non-poor households. In the first year, 33.8% of non-poor urban households are estimated to be vulnerable to falling into poverty. This means that about one-third of the households currently classified as non-poor in urban areas are at risk of becoming poor in the near future. In the second year, the vulnerability rate among non-poor urban households increases by 13 percentage points to 46.8%. By the third year, the vulnerability rate among non-poor urban households increases further to 69.4%, reflecting an additional 22.6 percentage point increase.

This indicates that more than two-thirds of non-poor urban households are now estimated to be at risk of falling into poverty. For poor urban households, 61.7% are vulnerable to remaining in poverty in the first year. This vulnerability rose to 72.1% in the second year, reflecting a 10.4 percentage point increase. By the third year, the rate escalates to 87.8%, representing a 15.7 percentage point increase from the previous year.

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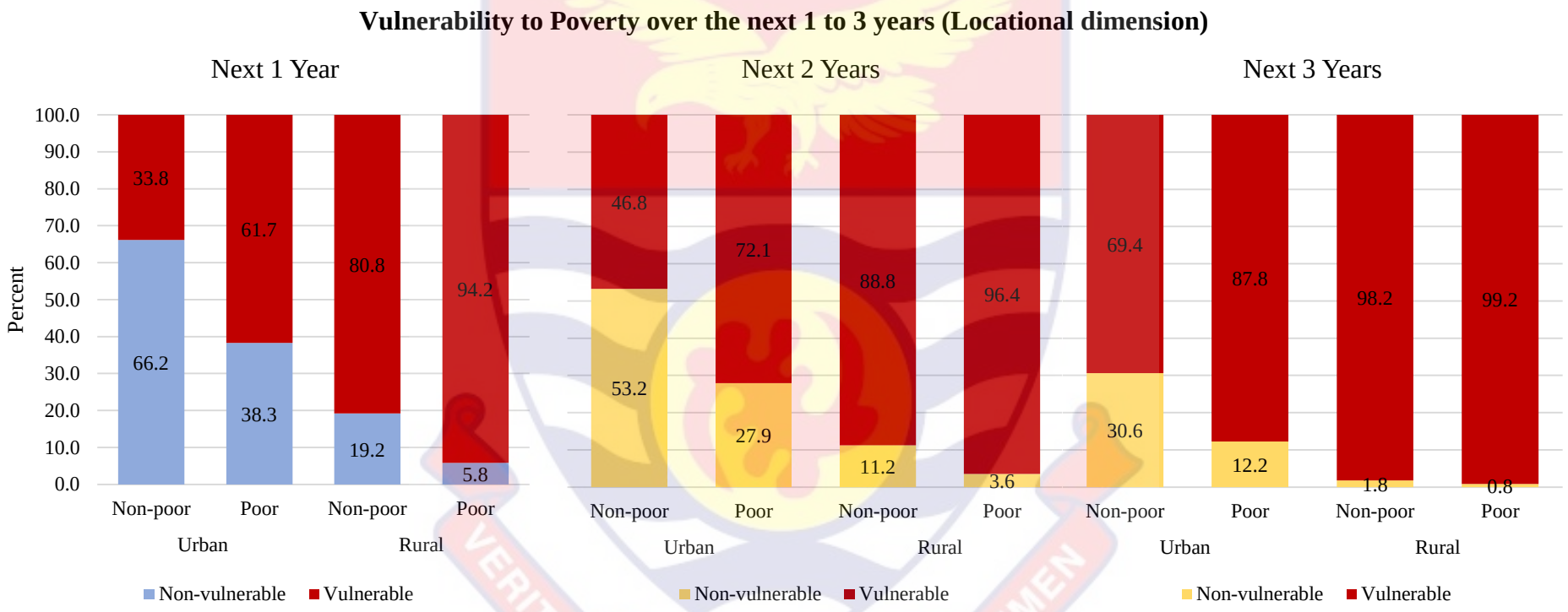


Figure 20: Vulnerability to poverty over the next 1 to 3 years in Ghana (Locational dimension)

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The situation for rural households is critical. In the first year, 80.8% of non-poor rural households are estimated to be vulnerable to falling into poverty. This means that more than four out of five households currently classified as non-poor in rural areas are at risk of becoming poor in the near future. For the second year, the vulnerability rate among non-poor rural households increases by 8 percentage points to 88.8%. This transition shows that the share of non-poor rural households that are non-vulnerable drops from 19.2% in the first year to only 11.2% in the second year. By the third year, the vulnerability rate among non-poor rural households escalates dramatically to 98.2%, reflecting an additional 9.4 percentage point increase. This indicates that virtually all non-poor rural households are now estimated to be at risk of falling into poverty.

The situation is particularly challenging for poor rural households, with 94.2% vulnerable to persistent poverty. This vulnerability rises to 96.4%, an increase of 2.2 percentage points. By the third year, the vulnerability rate approaches nearly universal levels at 99.2%, leaving just 0.8% of these households non-vulnerable. The Chi-square test shows a significant difference in vulnerability status between currently poor and non-poor households among rural and urban households. These are significant at 1% alpha level. These findings challenge the conclusions of Novignon et al. (2012), which indicated that rural households in Ghana had lower average vulnerability to poverty compared to their urban counterparts. One possible explanation for this discrepancy could be the differing measurements of poverty, as Novignon et al. utilized a monetary, or unidimensional, approach, whereas this study focuses on a multidimensional perspective. This result aligns with the findings of

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Hernández and Zuluaga (2020) in Colombia, who found that rural households (70%) are at a heightened risk of experiencing multidimensional poverty in the future compared urban households.

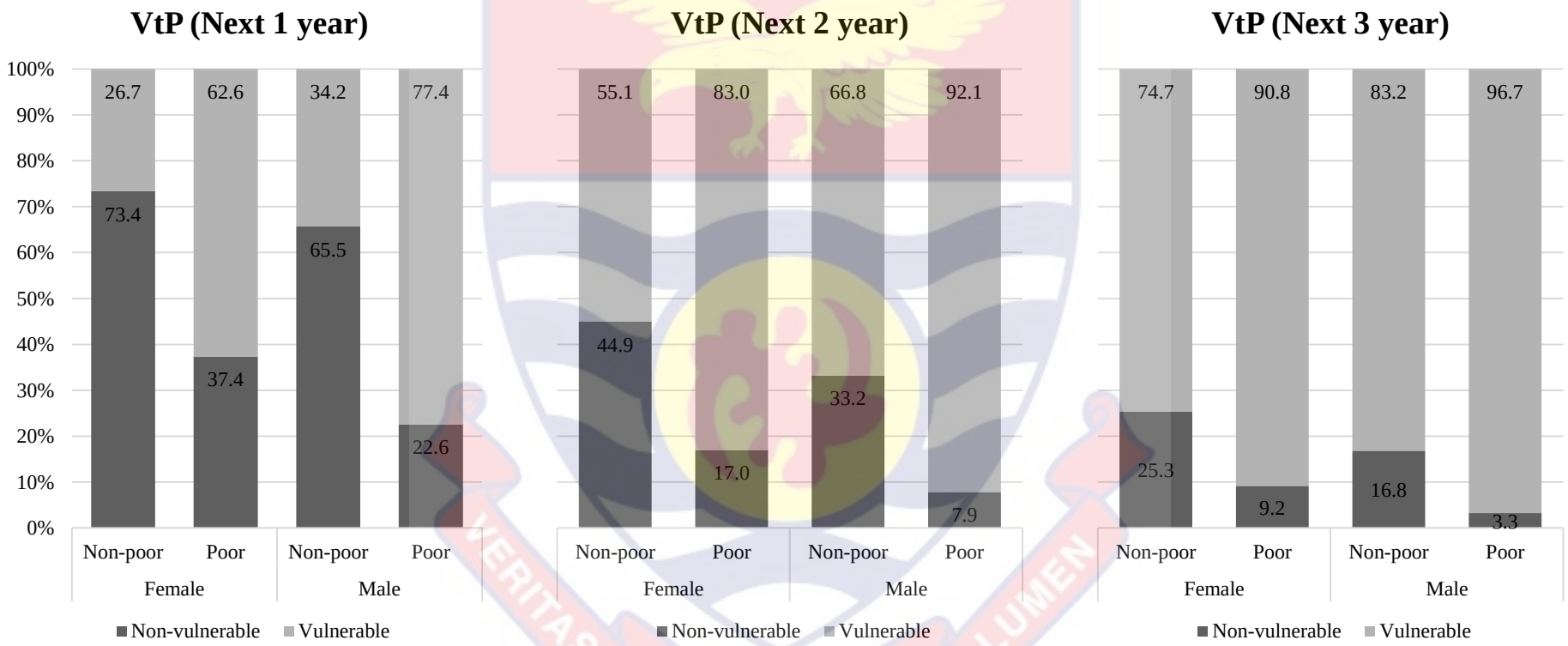
Vulnerability to Poverty over the next 1 to 3 years (gender dimension)

The analysis of vulnerability to poverty in Ghana reveals significant differences between male-headed and female-headed households. Figure 21 illustrates the trends in vulnerability to poverty for both poor and non-poor households in the near future. In the first year, 26.7% of non-poor female-headed households are estimated to be vulnerable to falling into poverty, while 34.2% of non-poor male-headed households face a similar risk. This suggests that non-poor female-headed households are relatively less vulnerable to poverty in the short term compared to their male-headed counterparts. However, the vulnerability situation deteriorates more rapidly for female-headed households over time. By the second year, the vulnerability rate among non-poor female-headed households increases to 55.1%, while for non-poor male-headed households, it reaches 66.8%. This indicates that most non-poor female-headed households are projected to be vulnerable to poverty in the medium term.

The gender gap widens further in the third year, where 74.7% of non-poor female-headed households are estimated to be vulnerable, compared to 83.2% for non-poor male-headed households. This suggests that while male-headed households face a higher level of vulnerability in the first year, the risk of impoverishment grows more pronounced for female-headed households over the longer term. The Chi-square test shows a significant difference in vulnerability status between currently poor and non-poor households among rural and urban households. These are significant at 1% alpha level.

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Female: $chi^2(\chi^2)$ 1.7e+03, pr = 0.000
Male: $chi^2(\chi^2)$ = 5.0e+03, pr = 0.000

Female: $chi^2(\chi^2)$ = 1.2e+03, pr = 0.000
Male: $chi^2(\chi^2)$ = 2.7e+03, pr = 0.000

Female: $chi^2(\chi^2)$ = 572.81, pr = 0.000
Male: $chi^2(\chi^2)$ = 1.4e+03, pr = 0.000

Figure 21: Vulnerability to poverty over the next 1 to 3 years in Ghana (Gender dimension)

Source: Author's Construct, 2025

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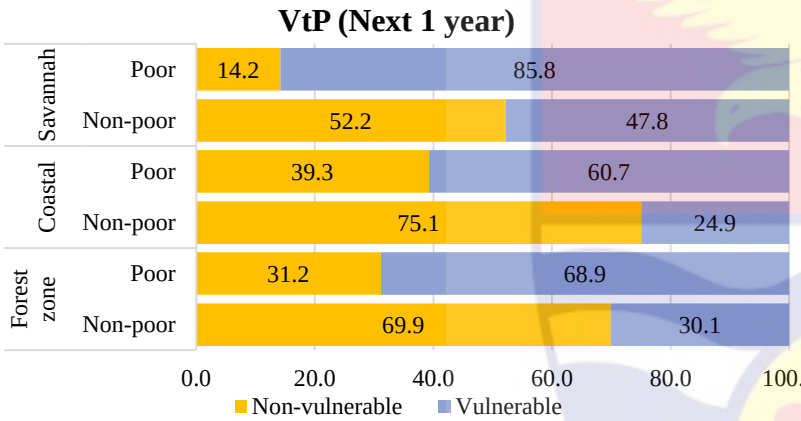
These findings are supported by research from Novignon et al. (2012) and Appiah-Kubi et al. (2005), which indicate that male-headed households in Ghana are generally more vulnerable to poverty than female-headed households in Ghana. For instance, Novignon et al. (2012) reported a vulnerability rate of 51% for female-headed households, in contrast to a higher rate of 58% for male-headed households. This evidence reinforces the notion that male-headed households face greater risks of poverty, underscoring the need for targeted interventions and policy reforms. Addressing this disparity is crucial not only for alleviating poverty among male-headed households but also for promoting overall economic stability and social equity.

Vulnerability to Poverty over the next 1 to 3 years (ecological zone dimension)

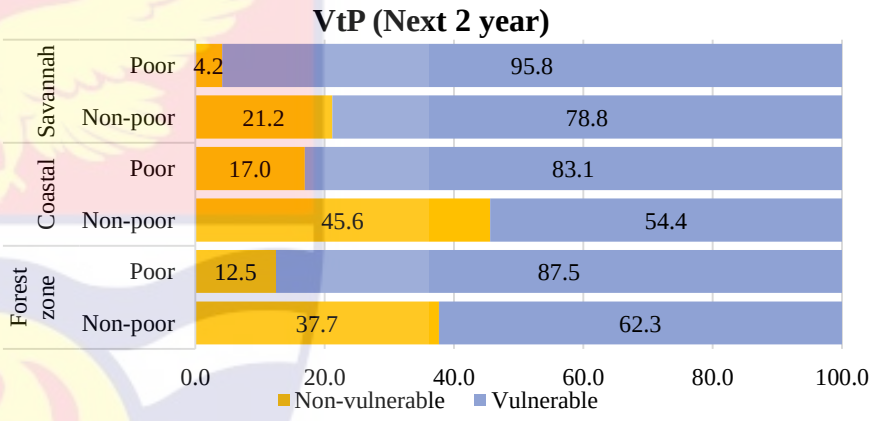
The risk of poverty in Ghana can be heavily influenced by the country's diverse ecological zones, Forest, Coastal, and Savannah. Some of these zones are particularly vulnerable to shocks, such as climate change and economic fluctuations, which can exacerbate poverty risks (see Figure 22). Meanwhile, each zone presents unique geographical dynamics that influence factors such as resource availability, economic opportunities, and environmental risks. The vulnerability to poverty in the first year varies significantly across the ecological zones. In the Forest zone, a large percentage of both non-poor (30.1%) and poor households (68.9%) are at risk of falling into poverty. While non-poor households in the Coastal zone have a lower vulnerability rate (24.9%), a significant number of poor households (60.7%) remain highly susceptible. The Savannah zone presents the most concerning situation, with 47.8% of non-poor households and 85.8% of poor households facing severe challenges.

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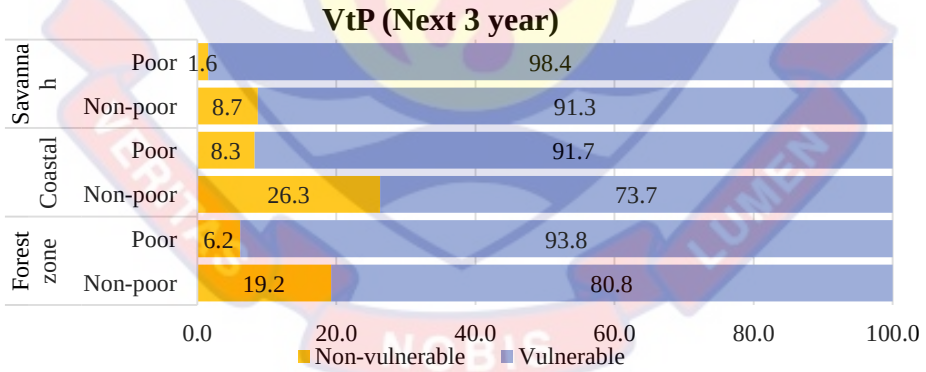
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Forest: chi^2(χ^2) 2.0e+03 pr = 0.000; Coastal: chi^2(χ^2) = 1.8e+03, pr = 0.000; Savannah: chi^2(χ^2) 2.0e+03, pr = 0.000



Forest: chi^2(χ^2) 1.1e+03, pr = 0.000; Coastal: chi^2(χ^2) = 1.3e+03, pr = 0.000; Savannah: chi^2(χ^2) 880.95, pr = 0.000



Forest: chi^2(χ^2) 503.29, pr = 0.000; Coastal: chi^2(χ^2) = 748.24, pr = 0.000; Savannah: chi^2(χ^2) 363.1467, pr = 0.000

Figure 22: Vulnerability to poverty over the next 1 to 3 years in Ghana (Gender dimension); Source: Author's Construct, 2025

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In the second year, the vulnerability to poverty has increased significantly making a most household vulnerable to multidimensional poverty. In the Forest zone, both non-poor (62.3%) and poor households (87.5%) are at a high risk of falling into poverty. The Coastal zone also shows a concerning rise, with 54.4% of non-poor households and 83.1% of poor households being vulnerable. In the Savannah zone 78.8% of non-poor households and 95.8% of poor households are at risk of poverty. By the third year, in the Forest zone, 80.8% of non-poor households will be vulnerable to poverty, while 93.8% of poor households face the risk of impoverishment. Similarly, in the Coastal zone, vulnerability rates for non-poor households rise to 73.7%, with 91.7% of poor households will be at risk of becoming poor. In the Savannah zone, as only 8.7% of non-poor households remain non-vulnerable, and an overwhelming 91.3% of poor households are at risk of poverty. The Chi-square test shows a significant difference in vulnerability status between currently poor and non-poor households among rural and urban households. These are significant at 1% alpha level. The high vulnerability of both household types highlights the urgent need for effective strategies to reduce poverty risks and strengthen resilience, particularly in the Savannah region, where the challenges are most pronounced.

Poverty and vulnerability to poverty for precarious and non-precarious household

This section examines the incidence of poverty among household heads in precarious versus non-precarious employment (see Figure 23). The study reveals that 60.8% of household heads in precarious jobs are classified as poor. In contrast, only 35.4% of household heads in non-precarious employment are poor, highlighting a notable 25.4 percentage point difference

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in poverty rates between the two groups. The Chi-square test confirms a significant difference in vulnerability status between poor and non-poor households among both precarious and non-precarious household heads. This is significant at the 1% alpha level. This suggests that employment stability plays a critical role in determining poverty levels, emphasizing the need for policies that address job security to help alleviate poverty among vulnerable households.

In terms of vulnerability to poverty, the results indicate a strong connection between working conditions and poverty risk. Figure 6 illustrates that approximately 74% of households in precarious employment are vulnerable to poverty, compared to only 51.8% of households in non-precarious jobs. This represents a 22-percentage point difference in vulnerability rates between those in precarious employment and those who are non-poor. Notably, there is a significant difference in the status of non-vulnerable households as well. The implications of these findings are critical. They suggest that improving working conditions and job security could significantly reduce vulnerability to poverty. Furthermore, the Chi-square test confirms a significant difference in vulnerability status between poor and non-poor households among both precarious and non-precarious heads, with results being significant at a 1% alpha level. In terms of expected poverty over the next two years, the results indicate a concerning trend for households in precarious employment, as they are projected to become increasingly vulnerable. Specifically, 81.1% of these households are expected to be at risk of falling into poverty, which starkly contrasts with the lower vulnerability rates observed among those in non-precarious employment. This suggests that

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precarious work not only places immediate economic pressure on households but also significantly heightens their long-term risk of impoverishment.

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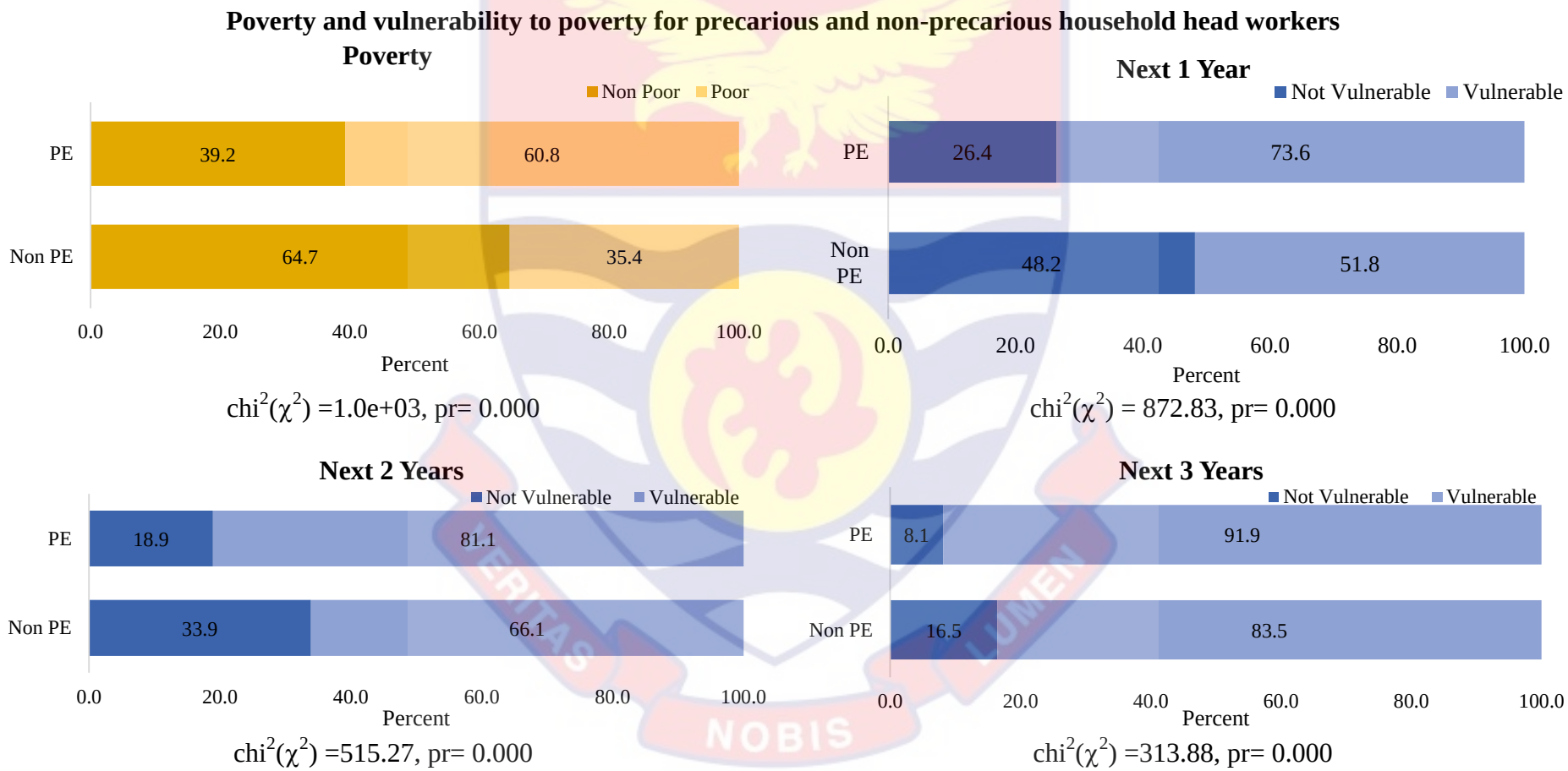


Figure 23: Precarious employment, Incidence of poverty and vulnerability to poverty over the next 1 to 3 years in Ghana

Source: Author's Construct, 2025

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In addition, the results reveal a 7.5 percentage point increase in vulnerability between the first and second years for households in precarious employment, underscoring a worsening trend. This increase indicates that the instability associated with precarious jobs leads to greater economic insecurity over time, making it more challenging for these households to maintain their financial well-being. The Chi-square test indicates that there is significant difference in vulnerability status between poor and non-poor households among both precarious and non-precarious heads and this is significant at the 1% alpha level.

By the third year, the situation for households in precarious employment and their vulnerability to poverty turns to be increasingly dire. The Chi-square test confirms a statistically significant difference between these households and those with more stable jobs. Figure 22 reveals that a staggering 91.9% of households led by heads in precarious employment are at risk of poverty, compared to their non-precarious counterparts. This marks an 11-percentage point increase in vulnerability from the second to the third year for those in precarious roles, highlighting the growing threat posed by job instability. This highlights the notion that the risk of poverty is not only higher among those in precarious employment but that the disparity in vulnerability between different employment types is substantial (Benach et al., 2014; Bühlmann, 2018).

Precarious employment and vulnerability to poverty in Ghana (Locational dimension)

The unequal distribution of employment opportunities in Ghana necessitates a closer examination of vulnerability to poverty among precarious and non-precarious household heads across different locations (see Figure 24).

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The results reveal that approximately 51% of households in precarious employment in urban areas are vulnerable to poverty, indicating a 17.2 percentage point difference between precarious and non-precarious household heads. In contrast, rural areas show an even more alarming picture, with about 93.6% of households in precarious employment at risk of falling into poverty. The Chi-square test confirms a significant difference in vulnerability status between precarious and non-precarious household workers in both rural and urban areas, which is significant at 1% alpha level.

Moreover, over the next two years, concerns about precarious employment and vulnerability to poverty are expected to intensify. The results indicate that approximately 63.7% of household heads in precarious employment in the urban centres are more vulnerable to poverty compared to those in non-precarious roles. This represents a 13.2% increase in vulnerability for precarious workers between the first and second years of assessment. In rural areas, the findings reveal that only 3.8% of household heads in precarious employment are not vulnerable to poverty. However, this alarming statistic implies that a about 96.2% are at significant risk of falling into poverty in the near future. This increase suggests that the instability associated with precarious jobs not only places immediate economic pressure on households but also threatens their long-term financial security, making it increasingly difficult for them to improve their circumstances. In addition, the Chi-square test confirms a significant difference in vulnerability status between precarious and non-precarious household workers in both rural and urban areas, with results being significant at the 1% alpha level.

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By the third year, the situation for households in precarious employment and their vulnerability to poverty has become increasingly alarming. Figure 6 shows that approximately 82.1% of household heads in precarious employment in urban areas are at risk of falling into poverty. In contrast, rural areas reveal an even graver reality, with nearly all household heads in precarious employment facing significant risks of impoverishment over the next three years. The Chi-square test confirms a significant difference in vulnerability status between precarious and non-precarious household workers in both rural and urban areas. This result is significant at a 1% alpha level. These findings emphasize the critical effect of precarious employment on household vulnerability, particularly among rural household. This heightened vulnerability in rural settings can be attributed to several factors, including limited access to stable job opportunities, lower wages, and fewer social safety nets. Rural workers often face additional challenges, such as inadequate infrastructure and limited access to education and healthcare, which compound their economic instability. The high vulnerability rates highlight the urgent need for interventions aimed at improving job security and providing support for those in precarious positions (Lazarte, 2017; Souza et al., 2018).

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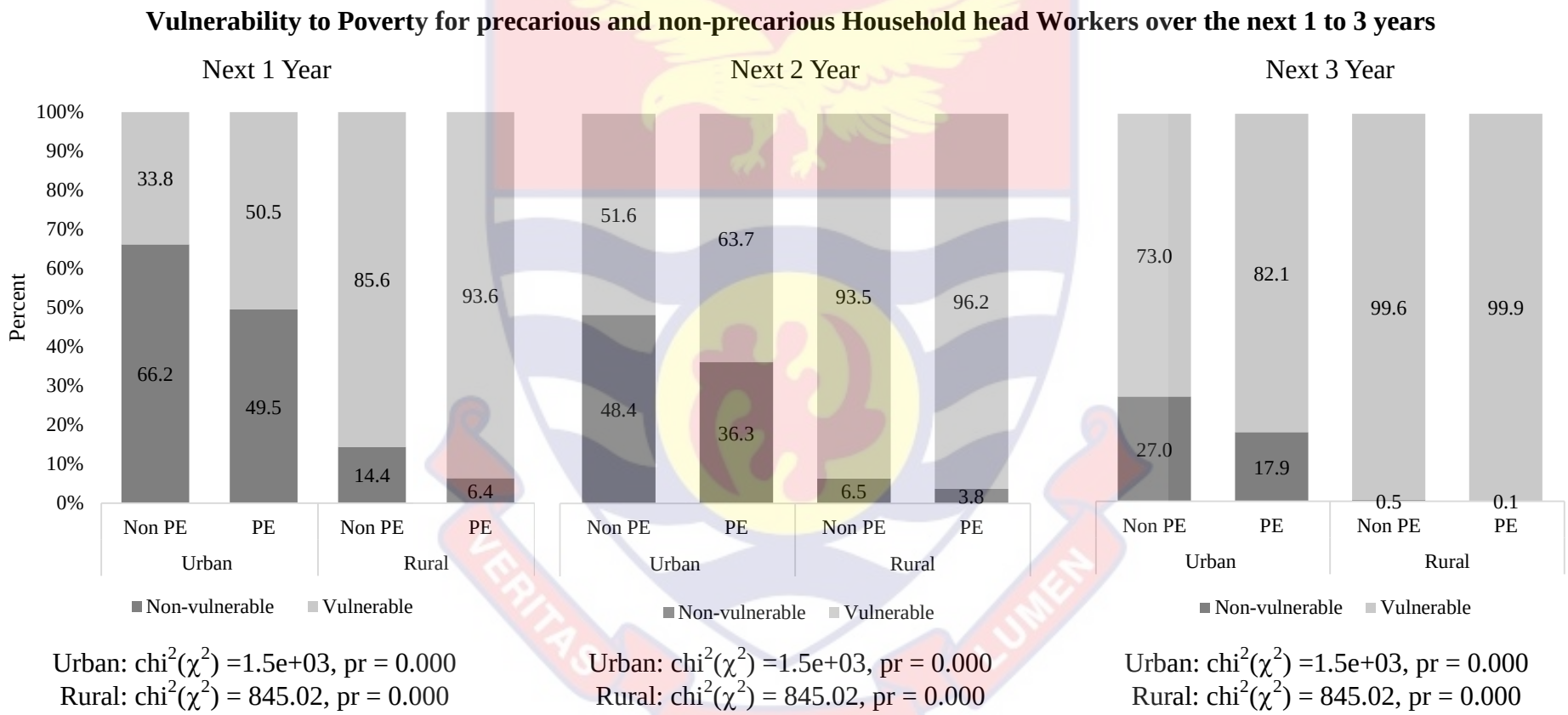


Figure 24: Precarious employment and vulnerability to poverty over the next 1 to 3 years in Ghana (Locational dimension)

Source: Author's Construct, 2025

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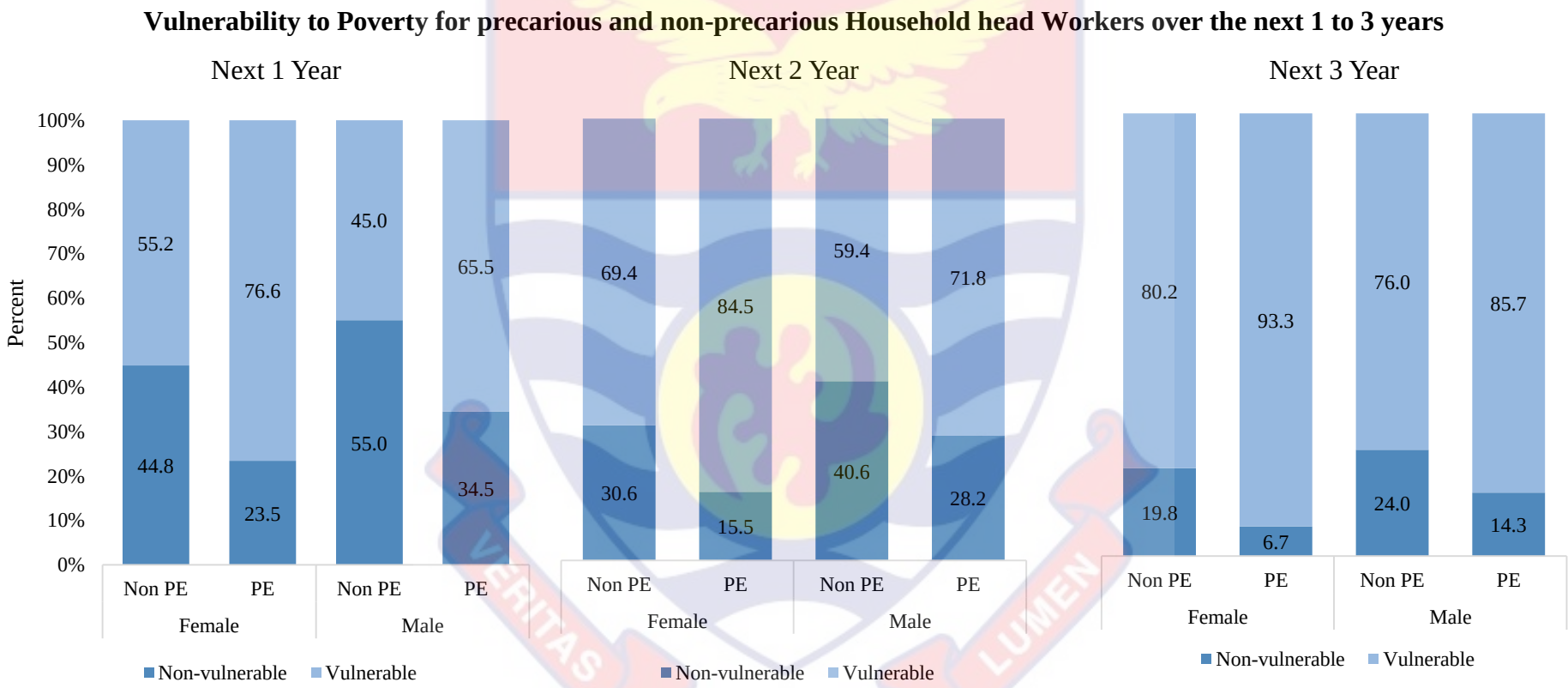
Precarious Employment and Vulnerability to Poverty in Ghana (Gender Dimension)

The unequal distribution of employment opportunities in Ghana necessitates a closer examination of vulnerability to poverty among precarious and non-precarious household heads through a gender lens (see Figure 25). In the first year, the results indicate that approximately 55.2% of female household heads in non-precarious employment are vulnerable to poverty, while this figure rises sharply to 76.6% for those in precarious employment. In contrast, male household heads demonstrate lower vulnerability rates, with 45.0% of those in non-precarious roles being vulnerable compared to 65.5% in precarious positions. This disparity highlights the heightened risk faced by female heads of households, who are more likely to experience economic instability.

Moving into the second year, the vulnerability situation worsens for both genders. For female household heads in non-precarious employment, the vulnerability rate increases to 69.4%, while for those in precarious employment, a staggering 84.5% are now classified as vulnerable. Male heads in non-precarious employment also see their vulnerability rise to 59.4%, while 71.8% of those in precarious jobs face significant poverty risks. The increasing vulnerability in the second year illustrates how the instability associated with precarious employment places immediate economic pressure on households, especially among women. By the third year, the situation becomes increasingly dire. Only 19.8% of female household heads in non-precarious employment remain non-vulnerable, whereas 80.2% are now considered vulnerable. Among those in precarious employment, a concerning 93.3% face significant risks of impoverishment.

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Female: chi^2(χ^2) = 612.65, pr = 0.000
Male: chi^2(χ^2) = 220.12, pr = 0.000

Female: chi^2(χ^2) = 408.10, pr = 0.000
Male: chi^2(χ^2) = 89.61, pr = 0.000

Female: chi^2(χ^2) = 227.56, pr = 0.000
Male: chi^2(χ^2) = 28.31, pr = 0.000

Figure 25: Precarious employment and vulnerability to poverty over the next 1 to 3 years in Ghana (Gender/Sex dimension)

Source: Author's Construct, 2025

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Similarly, for male household heads, vulnerability rates show that 24.0% in non-precarious roles are still non-vulnerable, while 85.7% of those in precarious employment are at risk. These findings underscore the critical impact of precarious employment on household vulnerability, particularly for female heads of households. The Chi-square test confirms significant differences in vulnerability status between precarious and non-precarious household heads for both genders, with results significant at the 1% alpha level. This increased vulnerability stems from several factors, such as limited access to stable job opportunities, lower wages, inadequate social safety nets, and deeply entrenched cultural norms, particularly affecting women. Traditional gender roles often restrict women's access to better-paying jobs and contribute to their disproportionate representation in low-wage, insecure positions. The alarming rates of vulnerability highlight the urgent need for targeted interventions to enhance job security and provide support for individuals in precarious employment, especially for female-headed households (Datta & Kotikula, 2017; Espino & Sauval 2016).

Effect of precarious employment on vulnerability to poverty in Ghana

Descriptive statistics

Table 29 presents the description and summary statistics of the variables used to analyse the relationship between precarious employment and household multidimensional vulnerability to poverty. Panel A covers multidimensional poverty and vulnerability, while Panel B focuses on precarious employment. The subsequent panels provide additional context, with Panel C detailing household control variables such as the age and gender of the household head, household size, education level, marital status, sector of employment, location, and religious affiliation of the household head.

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Table 29: Descriptive statistics

	1 Mean	2 SD	3 Min.	4 Max.
Panel A: Dependent Variables				
Multidimensional poverty dummy	0.57	0.50	0	1
Vulnerability to Multidimensional poverty in the Next 1 year	0.60	0.46	0	1
Vulnerability to Multidimensional poverty in the Next 2 year	0.69	0.41	0	1
Vulnerability to Multidimensional poverty in the Next 3 year	0.81	0.29	0	1
Panel B: Main Independent Variables				
Precarious employment score	0.71	0.19	0	1
Precarious employment (Add)	10.04	2.74	0	14
Panel C: Household control Variables				
Age of household head	42.97	10.66	18	65
Age of household head squared	1959.96	934.02	324	4225
Female headed household	0.28	0.45	0	1
Household size	2.66	1.44	1	14
Household size square	9.14	11.77	1	196
No formal education	0.23	0.42	0	1
Primary	0.17	0.38	0	1
JHS/Middle	0.34	0.47	0	1
secondary	0.17	0.37	0	1
Tertiary	0.10	0.30	0	1
Not married	0.23	0.42	0	1
Married household head	0.77	0.42	0	1
Private sector employee	0.92	0.27	0	1
Christian household head	0.66	0.47	0	1
Rural household	0.51	0.50	0	1
Panel D: District Control Variables				
District development score	64.98	7.81	38.66	81.775
Basic schools	411.59	440.48	2	2266
District population share	4.30E+10	2.40E+10	8.72E+09	1.37E+11
District share of informal workers	4298.15	2127.52	1069	13130
Panel E: Locational Dummies				
Regional effects	NA	NA	NA	NA
Panel F: Instrumental				

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Variables				
District labour force rate	5232.28	3313.42	1128	18882
District casual employment share	180.86	111.98	24	540
Panel H: Control Function Variables				
Residual	0.71	0.08	0.51	1.01
Residual_raw	10.043	1.085	7.279	14.373
Observations	30,464			

Source: Computed from AHIES and Administrative and constructed data.

Panel D presents district control variables, including the district development score, number of basic schools, district population share, and the proportion of informal workers. Panel E includes regional dummy variables. Panel F discusses instrumental variables, specifically the district labour force rate and district causal employment share, while Panel H outlines a control function variable known as the residual.

Table 29 shows that 57 percent of households are multidimensionally poor. The descriptive results on vulnerability to multidimensional poverty indicate that 60% of households are at risk of falling into multidimensional poverty within the next year, with a standard deviation of 0.46. This risk increases to 69% over the next two years (standard deviation of 0.41) and rises further to 81% within three years (standard deviation of 0.29). These results highlight a growing concern, as a significant proportion of households face increasing vulnerability to poverty over time, emphasizing the need for timely interventions to support these families.

Panel B shows that the average precarious employment score is 0.71, with a standard deviation of 0.19, indicating that many households experience high levels of job insecurity. Additionally, a binary variable reveals that 75% of households are classified as experiencing precarious employment, with a

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standard deviation of 0.36, highlighting a significant portion of the population facing non-standard work conditions. Furthermore, the precarious employment, using additive measure, has an average score of 10.04 and a standard deviation of 2.74, reflecting the accumulation of precarity across different factors.

Panel C presents information on key household control variables. The results shoes that average age of the household head is 42.97 years. Especially, 28% of households are headed by females. The average household size is 3 people, with significant variability. Educational attainment varies, as 23% of household heads have no formal education, 17% completed primary education, 34% attended junior high school, 17% have secondary education, and only 10% attained tertiary education. Regarding marital status, 77% of household heads are married, while 23% are not. Employment data shows that 92% work in the private sector, and 66% identify as Christians. Additionally, 51% of households are located in rural areas, reflecting a balanced distribution between urban and rural settings. These variables are crucial for understanding household dynamics and potential vulnerabilities.

In addition, Panel D presents important district control variables. The average district development score is 64.93, with a standard deviation of 5.614, indicating a generally favourable level of development across districts, although some variability exists. There are, on average, 166 basic schools per district, with a standard deviation of 102, reflecting significant differences in educational infrastructure among districts. Additionally, there are an average of 5 secondary schools per district, with a standard deviation of 5.398, suggesting that while some districts have adequate secondary education facilities, others may be lacking. Moreover, Panel D presents key district

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control variables. The average district development score is 64.98, with a standard deviation of 7.81, indicating a generally favourable level of development, though there is some variability among districts. On average, there are 411.59 basic schools per district, with a standard deviation of 440.48, suggesting considerable differences in educational infrastructure across districts. The district population share averages 43 billion, with a standard deviation of 24 billion, highlighting significant variations in population distribution.

Effect of precarious employment on vulnerability to poverty in Ghana (Baseline result)

Table 30 presents baseline estimates using probit analysis to examine the relationship between precarious employment, multidimensional poverty, and vulnerability to poverty. The marginal effect results indicate a significant positive correlation between precarious employment (PE) and both forms of poverty. Specifically, household heads in precarious jobs are 10.2 times more likely to be multidimensionally poor compared to those in stable employment. Additionally, households in precarious jobs face an 8.3%, 0.7%, and 0.18% increased risk of experiencing poverty over the next 1, 2, and 3 years, respectively. These findings are significant at a 1% alpha level. This highlights the detrimental effect of precarious employment on household well-being, as unstable and insecure job conditions can worsen both income and non-income deprivations, making it harder for families to meet basic needs and maintain a decent standard of living.

These findings are well-explained through the Dual Labour Market Theory (Doeringer & Piore, 1971; Wilson, 1972), which posits that the labour

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market is divided into a primary sector, characterized by stable, well-paid jobs with benefits, and a secondary sector, where jobs are insecure, poorly paid, and lack advancement opportunities. Precarious employment typifies the secondary sector, where workers face systemic exclusion from social mobility and are structurally disadvantaged. This theoretical framework helps to explain the persistent association between PE and multidimensional poverty, as workers trapped in the secondary labour market lack access to the protections and resources needed to avoid or escape poverty. The findings align well with existing literature on precarious employment and poverty. For instance, Van Arsdale (2013) highlights how the shift to temporary work has led to increased insecurity and poverty, echoing these results on heightened vulnerability. Similarly, Horemans (2017) discusses how part-time and temporary workers are often at greater risk of in-work poverty, reinforcing the notion that precarious employment exacerbates financial instability. Furthermore, Dunga and Sekatane (2014) found that job quality is critical for escaping poverty, supporting the assertion that unstable jobs hinder households' ability to meet basic needs.

The findings indicate that female-headed households are poorer and more at risk of falling into poverty compared to male-headed households. Specifically, female-headed households have a 2.4% higher likelihood of being poor, which is statistically significant at 1% alpha level. Furthermore, the results show that these households face an increased probability of future poverty, with risks of 1.2%, 2.2%, and 0.4% over the next 1, 2, and 3 years, respectively. This disparity can be attributed to the compounded vulnerabilities faced by female-headed households, including lower average

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incomes, limited access to resources, and persistent sociocultural norms that may hinder their economic empowerment. The disproportionate burden of unpaid care work and household responsibilities often borne by women can also limit their ability to engage in stable, well-paying employment opportunities, further straining their household's financial security and increasing their vulnerability to poverty.

The findings regarding the increased vulnerability of female-headed households to poverty are supported by a substantial body of literature highlighting gender disparities. Chant (2010) emphasizes that these households face significant economic challenges due to systemic inequalities, including limited access to resources and employment. Graham et al. (2014) found that the disproportionate burden of unpaid care work restricts women's labour market participation, while Kabeer (2015) notes that social norms exacerbate their financial instability.

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Table 30: Precarious employment on poverty and VtP (Baseline Probit Estimates)

	Poverty		Vulnerability to Poverty [VtP 1 yr)		Vulnerability to Poverty [VtP 2 yr)		Vulnerability to Poverty [VtP 3 yr)	
VARIABLES	Model 1 Coefficient	Model 2 ME	Model 3 Coefficient	Model 4 ME	Model 5 Coefficient	Model 6 ME	Model 7 Coefficient	Model 8 ME
PE	0.325***	0.102***	0.349***	0.083***	0.033***	0.007***	0.133***	0.018***
	(0.002)	(0.001)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)
Female	0.077***	0.024***	0.081***	0.019***	0.082***	0.018***	0.249***	0.034***
	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
Age of household head	0.059***	0.018***	0.051***	0.012***	0.102***	0.022***	0.032***	0.004***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age of household head square	-0.001***	-0.000***	-0.001***	-0.000***	-0.002***	-0.000***	-0.001***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Household size	0.034***	0.011***	0.394***	0.094***	0.652***	0.143***	0.921***	0.128***
	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
Household size square	0.002***	0.001***	-0.005***	-0.001***	-0.041***	-0.009***	-0.066***	-0.009***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Educational attainment of head of household (Base: No schooling)								
Primary	-0.191***	-0.060***	-1.109***	-0.265***	-1.084***	-0.237***	-0.865***	-0.120***
	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)
JHS/Middle	-0.653***	-0.204***	-1.220***	-0.291***	-1.169***	-0.256***	-1.118***	-0.155***
	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)
	-0.897***	-0.281***	-1.273***	-0.304***	-1.243***	-0.272***	-1.013***	-0.140***
	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)
Secondary/MSE	-1.255***	-0.393***	-1.289***	-0.308***	-1.213***	-0.265***	-1.015***	-0.141***
	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)

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Tertiary	0.191***	0.060***	0.251***	0.060***	0.550***	0.120***	0.767***	0.106***
	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
Employment status of household head (Base: Public sector employee)								
Private sector	0.206***	0.065***	0.031***	0.007***	0.042***	0.009***	0.111***	0.015***
	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
Rural household	0.525***	0.164***	1.643***	0.393***	1.640***	0.359***	2.186***	0.303***
	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)
District development score	-0.009***	-0.003***	-0.002***	-0.001***	-0.003***	-0.001***	-0.003***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Basic schools	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
District population share	0.000***	0.000***	-0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Share of informal workers	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Region (Base: Western)								
Central	0.119***	0.037***	0.046***	0.011***	0.036***	0.008***	0.032***	0.004***
	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)
Greater Accra	-0.118***	-0.037***	-0.057***	-0.014***	-0.133***	-0.029***	-0.098***	-0.014***
	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)
Volta	-0.017***	-0.005***	0.015***	0.004***	0.051***	0.011***	-0.070***	-0.010***
	(0.002)	(0.001)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)
Eastern	-0.127***	-0.040***	0.104***	0.025***	0.160***	0.035***	0.228***	0.032***
	(0.001)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)	(0.000)
Ashanti	-0.122***	-0.038***	0.167***	0.040***	0.299***	0.065***	0.345***	0.048***

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	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.002)	(0.000)
Western North	0.168***	0.053***	0.186***	0.045***	0.367***	0.080***	0.283***	0.039***
	(0.002)	(0.001)	(0.002)	(0.001)	(0.003)	(0.001)	(0.004)	(0.000)
Ahafo	0.026***	0.008***	0.145***	0.035***	0.219***	0.048***	0.208***	0.029***
	(0.002)	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)	(0.004)	(0.001)
Bono	-0.115***	-0.036***	0.251***	0.060***	0.514***	0.112***	0.479***	0.066***
	(0.002)	(0.001)	(0.002)	(0.000)	(0.002)	(0.000)	(0.003)	(0.000)
Bono East	0.008***	0.002***	0.254***	0.061***	0.460***	0.101***	0.248***	0.034***
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.003)	(0.000)
Oti	0.254***	0.079***	0.434***	0.104***	0.647***	0.142***	0.466***	0.065***
	(0.002)	(0.001)	(0.003)	(0.001)	(0.004)	(0.001)	(0.005)	(0.001)
Northern	0.520***	0.163***	0.490***	0.117***	0.607***	0.133***	0.406***	0.056***
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.003)	(0.000)
Savannah	0.103***	0.032***	0.327***	0.078***	0.529***	0.116***	0.317***	0.044***
	(0.003)	(0.001)	(0.004)	(0.001)	(0.005)	(0.001)	(0.007)	(0.001)
Northeast	0.463***	0.145***	0.704***	0.168***	0.682***	0.149***	0.544***	0.075***
	(0.003)	(0.001)	(0.005)	(0.001)	(0.005)	(0.001)	(0.008)	(0.001)
Upper East	0.001	0.000	0.596***	0.142***	0.784***	0.171***	0.763***	0.106***
	(0.002)	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)	(0.005)	(0.001)
Upper West	0.270***	0.084***	0.607***	0.145***	0.824***	0.180***	0.598***	0.083***
	(0.002)	(0.001)	(0.003)	(0.001)	(0.004)	(0.001)	(0.005)	(0.001)
Constant	-0.499***		-0.892***		-1.961***		-0.162***	
	(0.006)		(0.007)		(0.007)		(0.009)	
Observations	30,464	30,464	30,464	30,464	30,464	30,464	30,464	30,464

Robust standard errors in parentheses * p < 0.1, ** p < 0.05, *** p < .01. VtP denote Vulnerability to Poverty.
Source: Author's Construct, 2025

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The age of the household head and household size demonstrate a non-linear relationship with multidimensional poverty and vulnerability to poverty. The marginal effect results indicate that as the age of the household head increases, the probability of being multidimensionally poor initially rises by 1.8%. However, in older age groups, household heads are less likely to be multidimensionally poor. This shift can be attributed to older individuals having more time to accumulate assets, such as savings, property, and social capital, which provide a safety net against poverty. Additionally, many older adults benefit from fixed income sources like pensions, contributing to financial stability that younger households may lack. Regarding vulnerability to poverty, the analysis shows that as household heads age, their likelihood of experiencing future poverty increases by 1.2%, 2.2%, and 0.04% over the next 1, 2, and 3 years, respectively; however, this risk diminishes at even older ages. These findings are significant at a 1% alpha level.

Similarly, larger household sizes are associated with a higher likelihood of being multidimensionally poor. However, as household size increases beyond a certain point, the likelihood of experiencing poverty decreases, suggesting that larger households may have more economically active members who contribute to financial support. This includes instances where child labourers play a significant role, as economically active children in Ghana have been shown to contribute meaningfully to household income (Koomson & Churchill, 2022).

Moreover, the results reveal that household heads with tertiary education and those from Christian households' experience significantly lower levels of multidimensional poverty and vulnerability compared to illiterate

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heads and non-Christians. Additionally, rural households exhibit higher levels of multidimensional poverty and vulnerability to poverty than their urban counterparts. Furthermore, household heads employed in the private sector are more likely to be poor or at risk of poverty compared to those in the public sector. At the district level, households located in districts with higher development scores tend to experience lower poverty and vulnerability. Conversely, districts with a greater share of informal workers are more likely to have households that are poor or at risk of poverty. The regional analysis shows that households in Bono East, Oti, Ahafo, Northern, Savannah, Northeast, Western North, Upper East, and Central regions are more likely to face poverty and vulnerability compared to those in the Western region. In contrast, households in Greater Accra, Ashanti, Eastern, and Volta regions show reduced levels of poverty and vulnerability to poverty in the next 1,2 and 3 years. These findings highlight the significant impact of education, geographic location, and employment status on poverty and vulnerability.

Effect of precarious employment on vulnerability to poverty in Ghana (Control function result)

In this section, the study examines the effect of precarious employment on multidimensional poverty and vulnerability to poverty in Ghana, while addressing potential endogeneity issues that could arise from unobserved factors or reverse causality. To explore this, we first discuss the endogeneity and weak instruments tests. A control function (CF) approach is employed to address endogeneity concerns, using instrumental variables to achieve consistent estimates. Given that the probit model can yield biased estimates in the presence of endogeneity, the CF method is necessary. The CF regressions utilize the casual district employment rate share and the labour force

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participation rate in a district as instrumental variables for precarious employment. The first-stage results indicate that these instruments are relevant, as they show a positive and significant correlation with precarious employment (*see Panel B*). The full results for the first stage results are presented in Table A4 in the Appendix. We also assess weak instruments using the F-statistic from the first-stage regression, where all values exceed 10, allowing us to reject the null hypothesis of weak instruments (Staiger and Stock, 1994). Furthermore, the validity of the chosen instruments is reinforced by the Sargan test of overidentifying restrictions, which fails to reject the null hypothesis of valid instruments, thus providing evidence for their exogeneity.

Given the significant effect of precarious employment (PE) on poverty, our descriptive analysis reveals a notably high risk of vulnerability to poverty. As a result, our main model will focus specifically on vulnerability to poverty (VtP) rather than overall poverty, employing the control function (CF) approach. This emphasis is justified because households headed in precarious employment are at a heightened risk of experiencing poverty in the near future, as indicated by the descriptive statistics. Therefore, our results will specifically examine the effect of precarious employment on vulnerability to poverty in the next 1 to 3 years.

In Panel A of Table 30, the CF estimates are presented. The significance of the residuals from the first stage, both in terms of the linear and squared terms, validates the need to account for the endogeneity of precarious employment and the potential heterogeneity in its effects. The interaction term between precarious employment and the first-stage residuals is included to control for the heterogeneity of the coefficient on precarious employment. The

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interaction term in both columns 2, 4 and 6 suggests that the effect of precarious employment on vulnerability to poverty in the future is heterogeneous and varies based on unobserved factors captured by the residuals.

Column 2 presents the estimates of the full model for vulnerability to poverty after adjusting for all relevant control variables at the household head, household, and district levels, as well as regional fixed effects. The results indicate that precarious employment (PE) has a positive and statistically significant impact on a household's risk of returning to poverty over the next 1 to 3 years. Specifically, the results reveal that households headed by individuals in precarious employment are 6.3%, 1.1%, and 2.1% more likely to be at risk of returning to poverty in the next 1, 2, and 3 years, respectively. The magnitude of 0.063 units indicates an increase in vulnerability to poverty in the next year, equivalent to [0.063 + 0.029(0.71)] units. Similarly, the magnitude of 0.011 units represents a rise in vulnerability for the second year, calculated as [0.011 + 0.002(0.71)]. For the third year, the magnitude of 0.021 units translates to an increase of [0.021 + 0.001(0.71)] units. Additionally, the positive and statistically significant coefficient on the squared residual term (residual square) across models 1 to 6 highlights the existence of heterogeneity in the effects of precarious employment on vulnerability to poverty.

This result indicates that higher levels of precarious work, characterized by job insecurity, low wages, and limited social protections, are directly linked to increased household vulnerability to poverty. These findings suggest that irregularity and unpredictability of incomes associated with these work conditions make it tremendously challenging for families to plan for the

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future and build the necessary financial resilience to withstand economic shocks or downturns. This indicates that without the cushion of predictable earnings and social protection, households reliant on precarious work face a heightened risk of falling back into poverty or remaining trapped in the vicious cycle of deprivation. The inability to accumulate savings, invest in productive assets, or weather unexpected expenses heightens the probability of these households returning to a state of poverty.

The key finding of this study—that precarious work increases household vulnerability to poverty—aligns with existing literature demonstrating how job instability and low wages significantly hinder financial resilience. For instance, Koomson et al. (2020) reveal that financial inclusion can mitigate poverty, particularly for female-headed households, underscoring the need for stable income sources. Similarly, Cao et al. (2023) highlight how multidimensional poverty is influenced by factors like education and health, which are often compromised in precarious employment situations. Moreover, Thabane (2015) emphasizes the vulnerability of female-headed households facing food insecurity, further illustrating that the challenges posed by precarious work disproportionately affect those already at risk. In addition, household characteristics play a critical role in determining vulnerability to poverty. Female-headed households are significantly more vulnerable across all timeframes, with marginal effects of 1.6%, 1.7%, and 3.3% in the next 1, 2, and 3 years, respectively. These results reflect systemic gender disparities, such as lower earnings, reduced access to opportunities, and higher caregiving burdens, which limit the ability of female-headed households to build financial

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resilience. Similar findings by Feeny and McDonald (2016) and Gallardo (2020) highlight the disproportionate impact of poverty risks on women.

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Table 31: Precarious employment on Vulnerability to Multidimensional Poverty (VtP) [Main results– Control Function Estimates]

	VtP (Next 1 yr))		VtP (Next 2 yr))		VtP (Next 3 yr)	
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Probit CF	Probit CF	Probit CF	Probit CF	Probit CF	Probit CF
PE	0.086***	0.063***	0.009***	0.011***	0.023***	0.021***
	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)
Residual (reduced form)	0.424***	8.178***	0.874***	0.475***	1.304***	1.007***
	(0.010)	(0.032)	(0.010)	(0.030)	(0.008)	(0.025)
Residual x PE		0.029***		0.002***		0.001***
		(0.000)		(0.000)		(0.000)
Residual square		6.595***		0.311***		0.233***
		(0.024)		(0.022)		(0.019)
female	0.016***	0.016***	0.018***	0.017***	0.034***	0.033***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age	-0.002***	-0.002***	-0.003***	-0.004***	-0.012***	-0.013***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age square	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Household size	0.063***	0.062***	0.041***	0.038***	0.083***	0.080***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Household size square	-0.004***	-0.004***	-0.001***	-0.001***	-0.008***	-0.008***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Primary	-0.166***	-0.165***	-0.131***	-0.130***	-0.018***	-0.020***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
JHS/Middle	-0.148***	-0.146***	-0.296***	-0.291***	-0.227***	-0.220***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Secondary	-0.332***	-0.331***	-0.540***	-0.542***	-0.398***	-0.401***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Tertiary	-0.538***	-0.539***	-0.851***	-0.871***	-0.580***	-0.607***

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	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Married	-0.044***	-0.043***	-0.053***	-0.056***	0.007***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Private sector employee	0.022	0.021	0.005	0.003	0.001	0.001
	(0.051)	(0.043)	(0.126)	(0.321)	(0.274)	(0.431)
Rural household	0.124***	0.122***	0.159***	0.158***	0.084***	0.083***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
District development score	-0.000***	-0.000***	0.000***	0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
District Basic schools share	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
District Population Share	-0.000***	-0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Panel B: First stage regression	**PE**					
Labour force participation in a district	0 .034***					
	(0.005)					
District casual employment share (ISCO)	0.012***					
	(0.002)					
Household head characteristics	Yes					
Household control variables	Yes					
District control variables	Yes					
Regional fixed effects	Yes					
F-statistic	534.50					
R-squared	0.162					
Sargan test chi2(1) [P-value]	1.404[0.236]					
Observations	30,464	30,464	30,464	30,464	30,464	30,464

Robust standard errors in parentheses * p < 0.1, ** p < 0.05, *** p < .01. VtP denote Vulnerability to Poverty. Marginal effect are reported.
Source: Author's Construct, 2025

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Age is another significant factor, with older household heads experiencing reduced vulnerability to poverty. The negative marginal effects indicate that with age comes greater stability, likely due to accumulated wealth or experience. However, the positive significance of the squared age term suggests a diminishing protective effect as age increases, potentially due to declining productivity or health challenges, consistent with insights from Azeem et al. (2018). Household size is also a critical determinant, as larger households are associated with higher vulnerability, with marginal effects of 6.2%, 3.8%, and 8.0% over the next 1, 2, and 3 years, respectively. However, the negative squared term suggests diminishing marginal effects, likely reflecting resource sharing or economies of scale in larger households.

Education emerges as a crucial mitigating factor in vulnerability to poverty. Households headed by individuals with tertiary education experience the greatest reductions in VtP, with marginal effects of -53.9%, -87.1%, and -60.7% over the next 1, 2, and 3 years, respectively. Secondary education also provides substantial protection, with reductions of 33.1%, 54.2%, and 40.1% over the same period. These results highlight the transformative role of education in enhancing employability, improving income stability, and building resilience, corroborating findings by Novignon et al. (2012) and Koomson et al. (2020). Marital status further influences poverty vulnerability, as married households consistently experience lower risks due to shared resources and social support systems.

The results show significant regional disparities, with rural households being more vulnerable to poverty than urban ones, as reflected in marginal effects of 12.2%, 15.8%, and 8.3% in the next 1, 2, and 3 years, respectively.

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This finding underscores the structural inequalities in access to services, infrastructure, and economic opportunities between rural and urban areas. Studies by Novignon et al. (2012) and Hernandez and Zuluaga (2022) similarly highlight the higher poverty risks in rural settings. At the district level, higher development scores are associated with lower vulnerability, indicating the importance of local-level investments in infrastructure and social services. However, the positive association between basic school shares and VtP suggests that increasing the number of schools alone may be insufficient; improving education quality and access must also be prioritized.

Robustness and Sensitivity Checks

In this section, multiple robustness and sensitivity checks were conducted to validate the results presented in Table 32 and 33. First, we assess the robustness of the PE and VtP association using alternative measures of PE, the additive approach. Table 5 shows that precarious employment (PE) has a positive and statistically significant impact on a household's risk of returning to poverty over the next 1 to 3 years. Specifically, the results reveal that households headed by individuals in precarious employment are 0.03%, 2.8%, and 0.02% more likely to be at risk of returning to poverty in the next 1, 2, and 3 years, respectively. Additionally, the positive and statistically significant coefficient on the squared residual term (Residual square) across models 1 to 6 highlights the existence of heterogeneity in the effects of precarious employment on vulnerability to poverty. The additive PE estimates are results complement the previous estimates and consistently show that precarious employment is positively correlated with vulnerability to poverty in the near future among households.

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Table 32: Precarious employment on Vulnerability to Multidimensional Poverty (VtP) [Alternative mmeasure PERaw score)– CF Estimates]

	VtP (Next 1 yr))		VtP (Next 2 yr))		VtP (Next 3 yr)	
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	ME	ME	ME	ME	ME	ME
PE (raw score)	0.006***	0.003***	0.003***	0.028***	0.001***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Residual_raw (reduced form)	0.218***	3.039***	1.250***	1.662***	1.015***	1.632***
	(0.009)	(0.031)	(0.010)	(0.035)	(0.009)	(0.028)
Residual_raw*PE		0.013***		0.049***		0.002***
		(0.000)		(0.001)		(0.000)
Residual_raw square		1.957***		0.622***		0.466***
		(0.022)		(0.026)		(0.021)
Panel B: First stage regression	**PE**					
Labour force participation in a district	0.023***					
	(0.002)					
District casual employment share (ISCO)	0.199***					
	(0.002)					
Household head characteristics	Yes					
Household control variables	Yes					
District control variables	Yes					
Regional fixed effects	Yes					
F-statistic	523.50					
R-squared	0.157					
Sargan test chi2(1) [1][P-value]	0.928 [0.335]					
Observations	30,464	30,464	30,464	30,464	30,464	30,464

Source: Author's Construct, 2025

Table 33 presents the robustness test using Lewbel's (2012) heteroscedastic-adjusted instrument method. This method allows for the generation of additional instruments based on the heteroskedasticity of the error terms, providing a way to evaluate the robustness of the model via both internal and external instrumentation. The results in Panel A of Table 4 show the estimates obtained using internal instruments. The Craig-Donald Wald F-

[1] Sargan test of overidentifying restrictions to check the validity of our instruments.

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statistic surpasses the threshold of 10, indicating a strong and significant relationship between the internal instruments and precarious employment (PE), ruling out the presence of a weak instrument problem (Stock & Yogo, 2005). The findings demonstrate that having a household head in precarious employment (PE) has a positive and significant effect on household risk of becoming poor in the next 1 to 3 years. Specifically, in Column 1, the results show that PE increases the likelihood of multidimensional poverty (measured by the Multidimensional Poverty Index, MPI) by 0.163, a substantial and significant effect. The Lewbel estimates are results complement the previous estimates and consistently show that precarious employment is positively correlated with vulnerability to poverty in the near future among households.

Table 33: Precarious employment on poverty and VtP (Internal and External Instruments Estimates)

	1	2	3
	VtP (Next 1 yr)	**VtP (Next 2 yr)**	**VtP (Next 3 yr)**
	ME	ME	ME
PE	0.171***	0.075**	0.056**
	(0.037)	(0.035)	(0.029)
Household head characteristics	Yes	Yes	Yes
Household control variables	Yes	Yes	Yes
District control variables	Yes	Yes	Yes
Regional fixed effects	Yes	Yes	Yes
Observations	30,464	30,464	30,464
R-squared	0.366	0.303	0.196

Robust standard errors in parentheses * p < 0.1, ** p < 0.05, *** p < .01. VtP denote Vulnerability to Poverty.
Source: Author's Construct, 2025

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Heterogeneous effects by Place of Residence and Gender of Household Head

This section examines the heterogeneous effects of precarious employment on vulnerability to poverty in the near future, considering rural-urban location and the gender of the household head. Table 6 presents control function (CF) estimates on column1 to 6 in Table 7. The first-stage results indicate that these instruments are relevant, as they show a positive and significant correlation with precarious employment (*see Panel B*). The results shows that precarious employment has a positive association with risk of becoming poor in male and female headed households. For female headed households, the results reveal that female headed in precarious employment are 7.2%, 2.9%, and 1.2% more likely to be at risk of returning to poverty in the next 1, 2, and 3 years, respectively. For male headed households, the results reveal that male heads in precarious employment are 8.7%, 1.3%, and 1.5% more likely to be at risk of returning to poverty in the next 1, 2, and 3 years, respectively.

The key finding of the study—that precarious employment heightens the risk of returning to poverty for both male and female-headed households, with a more pronounced effect on female-headed households—resonates strongly with the existing literature. For instance, Koomson et al. (2020) demonstrate that financial inclusion significantly reduces vulnerability to poverty, particularly among female-headed households, indicating that lack of access to financial resources exacerbates their precarious situation. Similarly, the findings of Cao et al. (2023) highlight the multifaceted nature of poverty, where educational and health dimensions play critical roles in household

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stability. Trani et al. (2016) further emphasise that individuals in marginalised groups, including women, are often deprived across multiple dimensions, which compounds their risk in precarious employment contexts. Collectively, this literature underscores the necessity of targeted interventions that not only improve employment conditions but also enhance access to resources and services, particularly for vulnerable households, to mitigate the risks of poverty effectively.

Table 34: Precarious employment on poverty and VtP by gender (Control Function Estimates)

	(1)	(2)	(3)	(4)	(5)	(6)
	VtP (Next 1 yr)		**VtP (Next 2 yr)**		**VtP (Next 3 yr)**	
Panel A: Gender dimension						
VARIABLES	Female ME	Male ME	Female ME	Male ME	Female ME	Male ME
PE	0.072***	0.087***	0.029***	0.013***	0.012***	0.015***
	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)
Residual (reduced form)	-0.572***	0.736***	0.772***	0.803***	2.662***	0.806***
	(0.020)	(0.012)	(0.019)	(0.011)	(0.017)	(0.008)
Household head characteristics	Yes	Yes	Yes	Yes	Yes	Yes
Household control variables	Yes	Yes	Yes	Yes	Yes	Yes
District control variables	Yes	Yes	Yes	Yes	Yes	Yes
Regional fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	8,524	21,940	8,524	21,940	8,524	21,940
Panel B: First stage regression	**PE**					
Labour force participation in a district	0 .034***					
	(0.005)					
District casual employment share (ISCO)	0.012***					
	(0.002)					
Household head characteristics	Yes					
Household control variables	Yes					

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District control variables	Yes
Regional fixed effects	Yes
F-statistic	534.50
R-squared	0.162
Sargan test [chi2(1) [P-value]	1.404[0.236]
Observations	30,464

Robust standard errors in parentheses * p < 0.1, ** p < 0.05, *** p < .01.

Source: Author's Construct, 2025

These results highlight important differences in how precarious employment affects households led by men versus those led by women. For female-headed households, the higher risk of poverty may stem from systemic factors such as lower wages, limited access to stable employment opportunities, and fewer social supports. Women often occupy more vulnerable positions in the labour market, making them particularly susceptible to the negative effects of unstable jobs. Women in Ghana often face systemic barriers in accessing decent employment opportunities due to gender norms, discrimination, and limited access to resources such as education, training, and credit facilities. As a result, women are more likely to engage in precarious forms of employment, such as informal sector activities or temporary and low-paying jobs.

Furthermore, female-headed households in Ghana may face additional challenges due to the disproportionate burden of unpaid care work and household responsibilities, limiting their ability to engage in stable and secure employment. In contrast, while male-headed households also face risks associated with precarious employment, the slightly lower percentages suggest that they may have better access to resources or safety nets that can mitigate these effects. Men are often more likely to hold jobs that, despite being

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precarious, might still offer higher wages or greater opportunities for advancement compared to those typically available to women.

Locational dimension

This section investigates how precarious employment affects the likelihood of poverty, emphasizing differences between rural and urban locations. Table 35 presents control function (CF) estimates on column 1 to 6. The first-stage results indicate that these instruments are relevant, as they show a positive and significant correlation with precarious employment (*see Panel B*). The results shows that precarious employment has a positive association with risk of becoming poor of households in precarious employment in rural and urban areas. The results indicate a significant association between precarious employment and an increased risk of falling back into poverty for households in both rural and urban areas. Specifically, households engaged in precarious employment in rural areas are 9.9%, 9.5%, and 4.2% more likely to face poverty in the next one, two and three years, respectively.

Table 35: Precarious employment on poverty and VtP by location (Control Function Estimates)

	(1)	(2)	(3)	(4)	(5)	(6)
	VtP (Next 1 yr)		**VtP (Next 2 yr)**		**VtP (Next 3 yr)**	
	Rural	Urban	Rural	Urban	Rural	Urban
VARIABLES	ME	ME	ME	ME	ME	ME
PE	0.081***	0.099***	0.001***	0.095***	0.004***	0.042***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)
Residual (reduced form)	0.451***	0.049***	0.329***	1.982***	0.350***	1.477***
	(0.016)	(0.012)	(0.006)	(0.017)	(0.008)	(0.014)
Household head characteristics						
Household control variables						
District control variables						
Regional fixed						

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effects						
Observations	15,436	15,028	15,436	15,028	15,436	15,028
Panel B: First stage regression	**PE**					
Labour force participation in a district	0 .034***					
	(0.005)					
District casual employment share (ISCO)	0.012***					
	(0.002)					
Household head characteristics	Yes					
Household control variables	Yes					
District control variables	Yes					
Regional fixed effects	Yes					
F-statistic	534.50					
R-squared	0.162					
Sargan test chi2(1) [P-value]	1.404[0.236]					
Observations	30,464					

Robust standard errors in parentheses * p < 0.1, ** p < 0.05, *** p < .01.

Source: Author's Construct, 2025

In urban areas, precarious employment raises household vulnerability to poverty by 8.1%, 0.01%, and 0.04% over the same time periods. The findings suggest that relatively rural household in precarious employment face the risk of been poor in rural areas than urban centre. This is because, in rural areas, the economic landscape is often marked by limited job opportunities, making any form of employment, especially precarious work, especially precarious. Households in these regions are likely to rely heavily on agriculture or seasonal work, which can fluctuate significantly with market conditions and environmental factors. This instability leads to income volatility, making it difficult for families to maintain a consistent standard of

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living. As a result, they face a sustained risk that can trap them in a cycle of poverty. In urban areas, while there may be more job opportunities, many of these jobs are still unstable and low paying. The increase in poverty risk of households, which suggests that even minor job instability can have serious consequences for families. In cities, higher living costs can make households particularly vulnerable to economic changes, such as job loss or wage cuts, make household be of high risk of been poor. Consequently, households in rural areas are more susceptible to the adverse effects of precarious employment, as it exacerbates deprivations across multiple dimensions of well-being, such as inadequate income, poor access to healthcare and education, and substandard living conditions.

This aligns with literature such as that of Goshu (2013), which illustrates how limited economic opportunities in rural settings often lead to greater vulnerability, as families are reliant on unstable agricultural or seasonal work. Additionally, Cao et al. (2023) note that rural poverty is exacerbated by factors like lower access to education and healthcare, which your findings also reflect, as precarious employment compounds these deprivations. In urban areas, while job opportunities may exist, the precarious nature of many jobs, combined with higher living costs, creates a fragile economic environment, similar to the insights from Oyebamiji and Khan (2023), who identify the vulnerability of urban households to economic fluctuations.

Chapter Summary

The third empirical chapter examines the effect of precarious employment on vulnerability to poverty in Ghana, addressing potential

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endogeneity issues through a control function (CF) approach using instrumental variables. The descriptive statistics show high levels of multidimensional poverty (57% of households) and vulnerability to poverty (60-81% at risk over 1-3 years), with many households (75%) experiencing precarious employment. The key findings indicate that households with heads in precarious jobs are significantly more likely to be multidimensionally poor and at risk of falling back into poverty, with female-headed and rural households being particularly vulnerable. Additionally, the results reveal that precarious employment has a positive and statistically significant impact on a household's risk of returning to poverty over the next 1 to 3 years, with households headed by individuals in precarious employment being 6.3%, 1.1%, and 2.1% more likely to be at risk, respectively.

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CHAPTER EIGHT

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

Inequality of opportunity poses a significant challenge in Ghana, profoundly affecting household welfare and economic stability. As the labour market increasingly shifts toward precarious employment, more individuals find themselves in unstable job situations that jeopardize their financial security. This instability not only perpetuates existing socio-economic disparities but also heightens the risks of food insecurity and future poverty, creating a cycle that is difficult to escape. Moreover, the absence of robust social safety nets exacerbates these vulnerabilities, leaving households ill-equipped to handle health shocks and other economic stresses. Addressing these interconnected issues is essential for fostering a more equitable and resilient economy.

Considering these challenges, this thesis investigates the interplay between inequality of opportunity, precarious employment, and household welfare in Ghana. The study aims to estimate the levels of inequality in precarious employment across different age cohorts. Utilizing both national survey and administrative data, the second empirical chapter examines the effect of precarious employment on household food insecurity while also exploring the moderating role of social safety nets in this relationship. Additionally, it investigates how health shocks and household asset accumulation serve as pathways through which precarious employment influences food insecurity. The third empirical chapter assesses the effects of precarious employment on multidimensional poverty and vulnerability to poverty in Ghana. The findings from this research carry significant

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implications for policymakers, underscoring the urgent need for targeted interventions and inclusive strategies to address inequality of opportunity, promote decent work, and enhance household well-being.

This chapter summarizes the entire thesis, highlighting the key conclusions of the study and offering policy recommendations based on these findings. It is organised into three main sections: the first section summarizes the research, followed by conclusions drawn from the study's results in the second section. The third section includes policy recommendations, discusses the study's limitations, and identifies potential areas for future research.

Summary of Findings

The primary purpose of this study is to investigate the interplay between inequality of opportunity, precarious employment, and household welfare in Ghana. This thesis investigates three interconnected themes: (1) estimating the inequality of opportunity in precarious employment in Ghana; (2) examining the effect of precarious employment on household food insecurity, potential channels, and the reducing role of social protection; and (3) investigating the impact of precarious employment on vulnerability to multidimensional poverty in Ghana. The study followed the positivist philosophy and quantitative approach. The analysis utilizes data from Ghana's Annual Household Income and Expenditure quarterly panel Survey for the objectives.

In the first empirical chapter, the study explores inequality of opportunity in precarious employment within the Ghanaian workforce, using data from the fourth round of the Ghana Household, Income and Expenditure panel Survey. With a sample size of 15823 individuals working population

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between the ages of 18 to 60, the inequality of opportunity approach, and shapely decomposition models were used to estimate inequality of opportunity in precarious employment across different age cohorts. The study section delves into the outcomes of this inequality, employing a heterogeneity analysis to scrutinise variations across different circumstances variables.

The findings from the study suggested that that over 70% of the sample is engaged in precarious employment, indicating a significant portion of the workforce lacks job security and adequate social protections. The analysis of precarious employment across birth cohorts reveals that the oldest cohort (aged 51-60) and the youngest cohort (aged 18-30) experience the highest levels of employment deprivation. Regional and ethnic variations in employment opportunities are also observed. Individuals born in the Savannah zone consistently experience higher employment deprivation compared to those from Coastal or Forest zones. Certain ethnic groups, such as the Ga-Dangme, have lower employment deprivation scores, while others like the Ewe and "Others" category generally have higher scores. The study also highlights the influence of household characteristics on employment outcomes. Individuals from households where the head is engaged in public wage employment tend to have lower employment deprivation scores, while those with household heads in unpaid work have significantly higher scores. Education level of the household head and household wealth quintiles also play a significant role in determining employment outcomes.

The second empirical analysis investigated the effect of precarious employment on household food insecurity, potential mediating channels, and the mitigating role of social protection in Ghana. Four hypotheses were tested:

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(a) precarious employment has no significant impact on household food insecurity; (b) different dimensions of precarious employment do not affect household food insecurity; (c) social safety net programs do not reduce the effect of precarious employment on household food insecurity; and (d) health shocks and household durable asset accumulation do not mediate the relationship between precarious employment and household food insecurity. Utilizing data from the first and second waves of Ghana's Annual Household Income and Expenditure quarterly panel Survey, a sample of 15,596 households was analysed, focusing on the demographic characteristics of household heads. The measurement of food insecurity primarily relied on the Rasch model, complemented by the Multidimensional Poverty Index (MPI), principal component analysis, and an additive approach for the Food Insecurity Experience Scale (FIES). To address the potential endogeneity issue arising from reverse causality between precarious employment (PE) and the outcome variables, a two-stage least squares approach was employed, using the casual employment rate in one's sector of employment as an instrumental variable. Additionally, dominance analysis was utilized to establish the relationship between various dimensions of precariousness and household food insecurity.

The findings from this analysis revealed that higher levels of precarious employment are linked with increased food insecurity. The results indicate that precarious employment increases food insecurity more among female and rural workers compared to male and urban workers. Further, relative importance of various precariousness dimensions was found to have an increasing effect on food insecurity. The dominance analysis also showed

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that employment insecurity is the most important predictor of food insecurity, followed by lack of rights and protection, income inadequacy, and unsafe or unhealthy work environment. The results also show that the adverse effects of precarious employment on food security can be mitigated by social protection programs. The study identifies health shocks and household asset accumulation as critical channels through which precarious employment affects food insecurity.

The third empirical analysis investigated the effect of precarious employment on household vulnerability to multidimensional poverty, examining heterogeneity analysis across gender/sex and Locational dimension. Four hypotheses were tested: (a) precarious employment has no significant impact on household vulnerability to multidimensional poverty; (b) examines heterogeneity analysis of precarious employment impact on household vulnerability to multidimensional poverty. Using data from the first and fourth waves of Ghana's Annual Household Income and Expenditure quarterly panel survey, a sample of 30,464 households was analysed, focusing on the demographic characteristics of household heads. The study employs the conventional multidimensional poverty threshold of 33.3%, based on the global multidimensional index deprivation scores, utilize ten binary indicators grouped into three equally weighted dimensions: health (nutrition and child mortality), education (years of schooling and school attendance), and living standards (cooking fuel, sanitation, drinking water, electricity, housing, and assets). The standard poverty cutoff is set at 33.3%.

To measure vulnerability, we apply the vulnerability-as-expected-poverty (VEP) approach within a multidimensional poverty framework.

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Specifically, we employ a three-stage Feasible Generalized Least Squares (FGLS) estimator to evaluate vulnerability over time, establishing cut-off points of 0.5 for the first year, 0.29 for the second year, and 0.21 for the subsequent three years. To address endogeneity concerns, the study uses the control function (CF) approach, incorporating instrumental variables for consistent estimates. In particular, the CF regressions leverage the causal district employment rate share and the labour force participation rate in a district as instrumental variables for precarious employment.

The findings reveal a significant positive association between precarious employment (PE) and both multidimensional poverty and vulnerability to poverty over the subsequent one, two, and three-year periods. Notably, female-headed households are found to be poorer and more susceptible to poverty compared to their male-headed counterparts. Additionally, household heads with tertiary education, as well as those from Christian backgrounds, experience substantially lower levels of multidimensional poverty and vulnerability than their illiterate peers. The analysis further indicates that rural households face higher levels of multidimensional poverty and vulnerability relative to urban households. Furthermore, individuals employed in the private sector are at a greater risk of poverty compared to those in public sector employment. At the district level, households situated in areas with higher development indices tend to exhibit lower rates of poverty and vulnerability, while districts with a larger proportion of informal workers are more likely to harbour households at risk of poverty.

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Conclusions

The main purpose of the study was to study is to investigate the interplay between inequality of opportunity, precarious employment, and household welfare in Ghana. Based on the key findings, the study reached the following specific conclusions.

The conclusion drawn from the findings of the first empirical chapter highlights a significant problem of precarious employment, with over 70% of the sample lacking job security and essential protections. The highest levels of job insecurity are observed in the oldest (51-60) and youngest (18-30) age groups, while individuals in the Savannah region face greater inequality in employment. Notably, ethnic disparities exist, with the Ga-Dangme experiencing less job deprivation than the Ewe and others. Approximately one in seven instances of inequality in opportunities related to precarious employment stems from circumstances beyond individual control, emphasising the important role of household characteristics, particularly the education and wealth of the household head, alongside factors such as sex, region of birth, and ethnicity in understanding these disparities.

In the second empirical chapter, the study concludes that precarious employment is significantly linked to increased food insecurity, particularly for female and rural workers. Employment insecurity stands out as the primary predictor of food insecurity, further intensified by inadequate income and lack of rights. Additionally, health shocks and the accumulation of durable assets within households serve as important pathways through which precarious employment impacts food security. The findings affirm that the negative

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effects of precarious employment can be alleviated through effective social protection measures.

The third empirical chapter concludes that approximately two-thirds of households are at risk of falling into poverty within the next year, with this vulnerability increasing over time, particularly among non-poor households. The situation is especially severe in rural areas, among female-headed households, and in the Savannah region. Among heads of households in precarious employment, six in ten are classified as poor, and a staggering eight in ten are vulnerable to multidimensional poverty. This vulnerability is notably higher among rural and female heads of households compared to their urban and male counterparts. The third empirical chapter concludes that precarious employment is positively associated with household vulnerability to multidimensional poverty in the future, with this vulnerability increasing over the years. Females and rural dwellers are more vulnerable than their male and urban counterparts. At the district level, households located in areas with higher development indices tend to show lower rates of poverty and vulnerability. Conversely, districts with a larger proportion of informal workers are more likely to contain households at risk of poverty.

Recommendations

1. Based on the findings and conclusions drawn from the first empirical chapter, the following recommendation are proposed:
    i. To enhance the feasibility of the proposed recommendations, it is essential to carefully weigh the resource implications. For example, the Ministry of Employment and Labour Relations (MELR) can strengthen enforcement of existing employment standards by

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leveraging its current workforce for monitoring, while upskilling inspectors to focus on high-risk sectors like agriculture and construction. Job training programs can be rolled out regionally through partnerships with local NGOs and private training institutions, reducing costs. External funding from organizations such as the ILO and GIZ can be mobilized to support these initiatives, particularly in underserved areas.

ii. Similarly, for the Ministry of Education's strategy to enhance access to quality education in rural areas, repurposing underutilized schools and training centres can be a cost-effective solution. Collaborations with local businesses and NGOs for curriculum development, as well as partnerships with private companies for scholarship funding, will ensure that programs are tailored to community needs while managing fiscal pressures.

2. Based on the findings and conclusions drawn from the second empirical chapter, the following recommendations are proposed:

   i. The Ministry of Employment and Labour Relations should implement and strengthen social protection programs specifically designed to support individuals in precarious employment. This includes developing unemployment benefit schemes, food assistance packages, and subsidised access to healthcare services. These interventions are crucial for cushioning the effects of job insecurity on food security. To enhance feasibility, the ministry can reallocate resources from existing labour market initiatives, strengthen partnerships with

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the National Social Protection Strategy (NSPS), and mobilise external funding from development partners such as the World Bank and the International Labour Organisation (ILO).

ii. The Ministry of Gender, Children and Social Protection should focus on creating gender-sensitive policies that address the unique challenges female workers face in precarious employment. These should include targeted training programs to enhance employability and productivity, along with the provision of accessible and affordable childcare services to reduce the care burden on women. Resource implications can be addressed by leveraging the gender budgeting framework within the national budget, working in collaboration with local NGOs, and accessing international support from agencies like UN Women and GIZ. Third, the Ministry of Health should implement preventive healthcare initiatives targeting vulnerable groups. These could include mobile health outreach programs and community-based health education campaigns to mitigate health shocks that exacerbate food insecurity. These programs can be supported through existing primary health care funds, supplemented with contributions from the NHIS and global health initiatives such as the Global Fund and WHO programs.

iii. The Ministry of Employment and Labour Relations should implement and strengthen social protection programs aimed at supporting individuals in precarious employment. This includes developing unemployment benefits, food assistance programs,

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and access to healthcare specifically designed for those facing job insecurity. By ensuring that these vulnerable workers receive adequate support during challenging times, the ministry can help mitigate the adverse effects of precarious employment on food security.

3. Based on the findings and conclusions drawn from the third empirical chapter, the following recommendation are proposed:
    i. The Ministry of Employment and Labour Relations should implement targeted programs aimed at improving job security for those in precarious employment. This includes developing formal employment opportunities and skill-enhancing training programs, particularly for individuals in rural areas and female-headed households. To manage resource constraints, the Ministry can partner with existing vocational training centers and NGOs, using their infrastructure to deliver cost-effective programs. Funding for these programs can be mobilized through public-private partnerships (PPPs) and international organizations such as the ILO. Additionally, reallocating existing resources from other labor initiatives can help ensure that the transition for vulnerable workers is well-supported without requiring significant new funding.
    ii. Second, the Ministry of Gender, Children and Social Protection should focus on creating specific initiatives for female-headed households, addressing challenges through financial literacy programs and access to microfinance. These initiatives can be

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rolled out by building on existing community-based support structures and collaborating with microfinance institutions that already operate in rural areas. The cost of these initiatives can be mitigated by leveraging grants from donor organizations and utilizing the government's existing infrastructure, such as local social protection programs, to minimise overhead costs. Furthermore, partnerships with NGOs that specialise in women's empowerment and financial inclusion could reduce costs while increasing the reach and impact of these programs.

iii. Local government authorities must prioritise rural development initiatives in the Savannah region, which includes investing in infrastructure such as transportation and communication. This would facilitate access to markets and employment opportunities. To fund these initiatives, local governments could explore low-cost financing options, such as the issuance of municipal bonds or tapping into development funds from international donors focused on rural development. The government should also incentivise private sector investment through tax breaks or subsidies, particularly for companies willing to invest in infrastructure projects in these underdeveloped areas.

iv. At the district level, the Ministry of Local Government and Rural Development should conduct assessments to identify areas with high concentrations of informal workers. These assessments would enable the ministry to tailor interventions,

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such as formalising informal businesses and providing access to social protection programs. This initiative can be financed through reallocating existing resources for informal sector development and securing funding from development partners focused on employment formalisation. By utilising data-driven decision-making and working closely with local businesses, the ministry can ensure that interventions are both cost-effective and impactful.

Suggestions for Further Research

Further studies should consider the following point to improve the literature on inequality of opportunity, precarious employment and household welfare.

First Empirical Chapter

Future studies can:

- Employ various inequality measurement techniques to better analyse inequality of opportunity in the labour market.
- Explore parental characteristics, specifically those of both fathers and mothers, instead of solely focusing on household head characteristics.
- Incorporating a wider range of circumstance variables, as data availability permits, to capture the complexities of inequality in employment opportunities.
- Investigate the channels through which these inequalities manifest, enhancing our understanding of their underlying causes.

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Second Empirical Chapter

Future studies can:

- Utilize panel estimation techniques, leveraging time-variant data to gain deeper insights into the dynamics of precarious employment and its impacts over time.
- Examine additional pathways through which precarious employment affects household food insecurity, exploring a broader spectrum of influencing factors.
- Assess the effects of various social protection programs beyond health insurance, analysing how different interventions may alleviate the negative consequences of precarious employment on food security.

Third Empirical Chapter

Future studies can:

- Adopt panel estimation techniques with time-variant data to provide a more nuanced analysis of the relationships among precarious employment, poverty, and household welfare.
- Expand the analysis of inequality of opportunity, precarious employment, and household welfare to other countries within Sub-Saharan Africa, facilitating cross-country comparisons and broader insights.
- Investigate household vulnerability to poverty across different time horizons, specifically focusing on one, two, and three-year intervals, to understand the temporal dimensions of poverty risk more comprehensively.

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APPENDICES

Table A2: Correlation matrix (food insecurity measures)

	FIES	FIES (MPI)	FIES (PCA)	FIES (RS)
FIES	1			
FIES (MPI)	0.982	1		
	0.000			
FIES (PCA)	0.794	0.7906	1	
	0.000	0.000		
FIES (RS)	0.982	1.000	0.7906	1
	0.000	0.000	0.000	

Table A4: Precarious employment and food insecurity (union cut-off and alternative measures for PE)

VARIABLES	FIES	FIES (MPI)	FIES (PCA)	FIES (RS)
Panel A: PE: union cut-off (0.33)				
PE	0.052***	0.021***	0.047***	0.171***
	(0.007)	(0.003)	(0.009)	(0.023)
	[0.114]	[0.116]	[0.091]	[0.116]
Household head x'tics	Yes	Yes	Yes	Yes
Household x'tics	Yes	Yes	Yes	Yes
Ecological zone FE	Yes	Yes	Yes	Yes
Month of survey FE	Yes	Yes	Yes	Yes
Observations	15,596	15,596	15,596	15,596
R-squared	0.132	0.140	0.091	0.140
Panel B: Equal weights for PE				
PE	0.052***	0.021***	0.047***	0.170***
	(0.007)	(0.003)	(0.008)	(0.023)
	[0.117]	[0.119]	[0.094]	[0.119]
Household head x'tics	Yes	Yes	Yes	Yes
Household x'tics	Yes	Yes	Yes	Yes
Ecological zone FE	Yes	Yes	Yes	Yes
Month of survey FE	Yes	Yes	Yes	Yes
Observations	15,596	15,596	15,596	15,596
R-squared	0.130	0.138	0.090	0.138
F-statistics	125.6	125.6	125.6	125.6
Anderson-Rubin Wald test	25.58	27.15	17.94	27.15
Panel C: PE score (Additive)				
PE	0.037***	0.015***	0.033***	0.120***
	(0.005)	(0.002)	(0.006)	(0.016)
	[0.116]	[0.117]	[0.093]	[0.117]
Household head x'tics	Yes	Yes	Yes	Yes
Household x'tics	Yes	Yes	Yes	Yes
Ecological zone FE	Yes	Yes	Yes	Yes
Month of survey FE	Yes	Yes	Yes	Yes
Observations	15,596	15,596	15,596	15,596
R-squared	0.130	0.138	0.090	0.138

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Robust standard errors in parentheses, clustered by household ID, *** p<0.01, ** p<0.05, * p<0.1. FE (fixed effect). Standardised coefficients in square bracket.

Table A5: Precarious employment and food insecurity (union cut-off and alternative measures for FIES)

	FIES All	FIES Rural	FIES Urban
Panel D: FIES cut off (0.33)			
PE	0.213***	0.181***	0.229***
	(0.029)	(0.052)	(0.032)
	0.116	0.086	0.138
Household head x'tics	Yes	Yes	Yes
Household x'tics	Yes	Yes	Yes
Location	Yes	No	No
Ecological zone FE	Yes	Yes	Yes
Month of survey FE	Yes	Yes	Yes
Observations	15,596	7,856	7,740
R-squared	0.140	0.089	0.127
Panel E: More weight on WFOOD_1DAY			
PE	0.202***	0.171***	0.217***
	(0.027)	(0.049)	(0.030)
	0.116	0.085	0.139
Household head x'tics	Yes	Yes	Yes
Household x'tics	Yes	Yes	Yes
Location	Yes	No	No
Ecological zone FE	Yes	Yes	Yes
Month of survey FE	Yes	Yes	Yes
F-statistics	28	28	28
Observations	15,596	7,856	7,740
R-squared	0.141	0.093	0.127

Robust Standard errors in parentheses and p-values less 0.05(*), 0.01(**), 0.001 (***). FE (fixed effect)

Supplementary documents

Table S1: Household food insecurity

	Standard label	Question wording
1	WORRIED	"…During the last 12 MONTHS, was there a time when You were worried you would not have enough food to eat because of a lack of money or other resources?"
2	HEALTHY	"…Still thinking about the last 12 MONTHS, was there a time when you were unable to eat healthy and nutritious food because of a lack of money or other resources?"
3	FEWFOODS	"…Was there a time when you ate only a few kinds of foods because of a lack of money or other resources?"
4	SKIPPED	"…Was there a time when you had to skip a meal because there was not enough money or other resources to get food?"

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5	ATELESS	"…Still thinking about the last 12 MONTHS, was there a time when you ate less than you thought you should because of a lack of money or other resources?"
6	RANOUT	"…Was there a time when your household ran out of food because of a lack of money or other resources?"
7	HUNGRY	"…Was there a time when you were hungry but did not eat because there was not enough money or other resources for food?"
8	WHOLEDAY	"…During the last 12 MONTHS, was there a time when you went without eating for a whole day because of a lack of money or other resources?"

Table S2: Precarious employment

Dimension	Indicator	Precarious cut-off/Description Weight	Weighting
	No written contract	1 if job does not have a written employment contract	0.0833
Employment insecurity/instability	Underemployment	1 if employee works less than 40 hours a reference week	0.0833
	Wish to change job	1 if an employee wishes to change job	0.0833
Income inadequacy/instability	Minimum wage	1 if job pays wage below minimum wage	0.0833
	Irregular wages or salary	1 if job salary is irregular	0.0833
	Bonuses and commission	1 if worker receives bonuses and commission	0.0833
Lack of rights and protection	Holidays/leave	1 if job does not offer paid holidays/leave	0.0833
	Social security	1 if job does not offer social security benefits	0.0833
	Health insurance	I if job does not provide health insurance coverage	0.0833
Unsafe or unhealthy work environment		1 if worker is exposed to dust, fumes	0.0625
exposed to any of the following at work?		1 if worker is exposed to loud	0.0625

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	noise or vibration	
	1 if worker is exposed to heights at work	0.0625
	1 if worker is exposed to chemicals	0.0625

Table S3: First stage regression for CF.

VARIABLES	(1) PE index	(2) PE_raw score
District labour force rate	0 .034***	0.023***
	(0.005)	(0.002)
District causal employment share	0.012***	0.199***
	(0.002)	(0.027)
District share of informal workers	0.034***	0.538***
	(0.005)	(0.068)
District development score	-0.001***	-0.019***
	(0.000)	(0.002)
District share of Basic schools	0.000***	0.000***
	(0.000)	(0.000)
District population share	0.000***	0.000***
	(0.000)	(0.000)
Head is female	-0.016***	-0.251***
	(0.003)	(0.039)
Age	-0.000***	-0.005***
	(0.000)	(0.001)
Household size	0.017***	0.248***
	(0.001)	(0.011)
Primary	-0.010***	-0.147***
	(0.003)	(0.047)
JHS/Middle	-0.030***	-0.439***
	(0.003)	(0.042)
Secondary	-0.069***	-0.974***
	(0.003)	(0.050)
Tertiary	-0.207***	-2.813***
	(0.004)	(0.059)
Rural	0.013***	0.168***
	(0.002)	(0.031)
Constant	1.025***	14.868***
	(0.033)	(0.486)
Observations	30,464	30,464
Sargan test chi2(1) [P-value]	1.404[0.236]	0.928 [0.335]
F-statistic	534.50	523.50
R-squared	0.162	0.157

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