

Empowering Women in Pakistan's Agriculture: Rethinking Sharecropping, Education, and Rural Dynamics

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Abstract. This study examines the impact of sharecropping agricultural structures on women's empowerment in Pakistan, utilizing data from the Pakistan Social and Living Standard Survey (PSLM) across three-time cohorts: 2010-2011, 2014-2015, and 2019-2020. Employing a comprehensive empirical model and the Heckman two-step approach to address potential sample selection bias, we analyze a sample of 315,835 respondents. Contrary to initial expectations, our findings reveal that participation in sharecropping does not have a statistically significant impact on women's empowerment, as measured by female employment. However, the study identifies several other crucial determinants of empowerment. Education consistently demonstrates a positive and significant relationship with empowerment, reinforcing its vital role in enhancing women's status. Surprisingly, rural residence shows a strong positive effect on empowerment, challenging assumptions about urban areas offering more opportunities for women. Ethnicity emerges as a significant factor, with non-minority (Punjabi) women showing higher levels of empowerment. An unexpected finding is the positive association between being female and empowerment in the combined model of both genders, suggesting potential gains for women who overcome barriers to economic participation. These results have important implications for policy, highlighting the need for continued focus on education, targeted rural development programs, and interventions that increase women's control over resources in the agricultural sector. The study contributes to the broader understanding of the complex interplay between agricultural practices, socio-economic factors, and women's empowerment in developing nations, while also identifying areas for future research, including the need for more nuanced, multidimensional measures of empowerment and longitudinal studies to establish causal relationships.

Key Terms: Sharecropping, Education, Rural Dynamics, Women Empowerment

JEL Classification: Q14, I30

KAUIE Classification Number: K8, N0

1. Introduction

Sharecropping, a prevalent agricultural system in many developing countries, including Pakistan, has been a subject of extensive research in the fields of rural economics and social development. This system, characterized by landowners providing land and resources to tenants in exchange for a share of the crop yield, has deep historical roots in the Indian subcontinent, dating back to pre-colonial times (Alavi, 1972). In Pakistan, sharecropping continues to play a significant role in the agricultural sector, particularly in rural areas where land ownership remains concentrated in the hands of a few (Gazdar, 2007). The relationship between sharecropping and women's empowerment is complex and multifaceted. On one hand, sharecropping can provide women with opportunities for economic participation and income generation. On the other hand, the system often reinforces existing gender inequalities and power imbalances within rural communities (Sultana et al., 2016). Understanding this relationship is crucial for developing effective policies aimed at promoting gender equality and rural development in Pakistan. The purpose of this study is to examine the impact of sharecropping agricultural structures on women's empowerment in Pakistan. By analyzing the complex interplay between traditional farming practices, gender roles, and economic empowerment, this research aims to contribute to the broader understanding of rural development and gender equality in developing nations.

The rationale for this study stems from several key factors. Firstly, agriculture remains a cornerstone of Pakistan's economy,

contributing significantly to the country's GDP and employing a large portion of the workforce. Within this sector, women play a crucial role, constituting about 43% of the agricultural labor force (Samee et al., 2015). However, their contributions are often undervalued and overlooked, leading to persistent gender disparities in rural areas. Secondly, while numerous studies have examined the economic implications of sharecropping, fewer have focused specifically on its impact on women's empowerment (Yahuza, 2019; Yulianti et al., 2020; Yaacob, 2013). This research gap is particularly pronounced in the context of Pakistan, where cultural and religious norms significantly influence gender roles and economic participation. Lastly, understanding the relationship between sharecropping and women's empowerment is essential for formulating effective policies aimed at reducing rural poverty and promoting gender equality. As Pakistan strives to meet its Sustainable Development Goals, including gender equality (SDG 5) and reduced inequalities (SDG 10), research in this area becomes increasingly important.

Previous research on the relationship between sharecropping and women's empowerment has provided valuable insights, albeit with some inconsistencies in findings. Agarwal (2003) conducted seminal work on gender and land rights in South Asia, highlighting how women's lack of land ownership in sharecropping systems often leads to economic vulnerability. In Pakistan specifically, Mumtaz and Salway (2009) explored the link between women's autonomy and agricultural work, finding that participation in sharecropping often reinforced traditional gender roles. Conversely, Talpur et al. (2018) discovered

instances where women in female-headed sharecropping households in Sindh exercised greater economic autonomy. Sultana et al. (2016) examined the impact of sharecropping on women's income diversification in rural Bangladesh, a context similar to Pakistan, revealing both opportunities and constraints for women's economic empowerment. Khushk and Samie (2011) focused on women's decision-making power in agricultural households, noting that even when women contributed significantly to farm labor, their control over resources remained limited in sharecropping arrangements. Akter et al. (2017) provided a comparative perspective across Southeast Asia, emphasizing the importance of context-specific factors in determining the impact of agricultural systems on women's empowerment. These studies collectively underscore the complex and often contradictory nature of the relationship between sharecropping and women's empowerment, highlighting the need for more comprehensive and nuanced research in this area.

Previous research on sharecropping and women's empowerment has employed a diverse array of variables to measure and analyze these complex concepts. Studies focusing on women's empowerment have commonly utilized economic indicators such as income levels, control over household resources, and participation in economic decision-making (Akter et al., 2017). Social indicators, including women's mobility, participation in community activities, and social networks, have also been crucial in assessing empowerment (Mumtaz & Salway, 2009). Educational attainment, often measured through literacy rates and years of schooling, has been a key variable in many

studies (Khattak & Brohi, 2019), as have health indicators like access to healthcare and reproductive health services (Sathar & Kazi, 2000). Decision-making power, particularly involvement in household and agricultural decisions, has been another critical variable in assessing women's empowerment (Khushk & Samie, 2011). In terms of sharecropping-specific variables, researchers have frequently examined land tenure status, distinguishing between households engaged in sharecropping and those involved in other forms of agriculture (Jacoby & Mansuri, 2009). Crop share arrangements, typically measured as the proportion of yield shared between landowner and tenant, have been another important variable (Cheema & Naseer, 2013). Access to agricultural inputs, including the availability of seeds, fertilizers, and machinery, has been considered in many studies (Iqbal et al., 2015), as has the labor contribution of different household members in agricultural activities, often measured in hours worked (Talpur et al., 2018). This wide range of variables reflects the multifaceted nature of both women's empowerment and sharecropping systems, highlighting the need for comprehensive approaches that can capture the complexity of their interaction in rural agricultural contexts.

Research in this field has employed a range of methodological approaches, both quantitative and qualitative. Quantitative studies have often relied on large-scale surveys and econometric analyses. For instance, Jacoby and Mansuri (2009) used panel data and fixed-effects models to examine the productivity of sharecroppers compared to fixed-rent tenants and owner-cultivators in Pakistan. Qualitative approaches have included ethnographic studies, focus group discussions, and in-

depth interviews. Mumtaz and Salway (2009) conducted a qualitative study in Punjab, Pakistan, using in-depth interviews to explore women's autonomy and its relationship to reproductive health. Mixed-methods approaches have also been employed to provide a more comprehensive understanding of the issues. For example, Akter et al. (2017) combined household surveys with qualitative interviews to examine women's empowerment in agriculture across Southeast Asian countries. The Heckman two-step model has been widely used in studies examining wage gaps and labor market participation, including in the context of rural economies (Qi & Wu, 2017; Ma, 2022). This model helps address potential sample selection bias, which is particularly relevant when studying women's participation in agricultural labor.

Research findings on the impact of sharecropping on women's empowerment have been mixed. Some studies have found that sharecropping can provide women with opportunities for economic participation and income generation. For instance, Talpur et al. (2018) found that in some cases, women in female-headed sharecropping households in Sindh, Pakistan, exercised greater economic autonomy compared to those in other agricultural arrangements. However, other studies have highlighted the ways in which sharecropping can reinforce existing gender inequalities. Khushk and Samie (2011) found that women in sharecropping households often have limited control over income and resources, even when they contribute significantly to agricultural labor. Sultana et al. (2016) argued that while sharecropping provides women with opportunities for economic participation, it often reinforces existing gender inequalities in rural

Bangladesh, a context similar to Pakistan. Research has also shown that the impact of sharecropping on women's empowerment is influenced by a range of factors, including household composition, land size, and local cultural norms (Akter et al., 2017). Moreover, studies have highlighted the importance of women's access to education, credit, and agricultural inputs in determining their level of empowerment within sharecropping systems (Rehman et al., 2015).

Despite the growing body of literature on sharecropping and women's empowerment, several key gaps remain in our understanding of this relationship, particularly in the context of Pakistan. Firstly, many studies have focused on either sharecropping or women's empowerment separately, with fewer examining the direct relationship between the two. Secondly, there is a lack of longitudinal studies that track changes in women's empowerment over time within sharecropping systems. Thirdly, the interaction between sharecropping, women's empowerment, and broader economic and agricultural trends has not been thoroughly explored. Furthermore, while studies have examined various aspects of women's empowerment in agriculture, there is a need for more comprehensive analyses that consider multiple dimensions of empowerment simultaneously. Additionally, the role of policy interventions in shaping the relationship between sharecropping and women's empowerment remains under-researched.

Our study aims to address these gaps by providing a comprehensive analysis of the impact of sharecropping on women's empowerment in Pakistan. Using data from the Pakistan Social and Living Standard

Survey (PSLM) across three time cohorts (2010-2011, 2014-2015, and 2019-2020), we employ a mixed-methods approach that combines quantitative analysis with qualitative insights. Our empirical model incorporates a range of variables including age, gender, education, ethnicity, and regional factors, alongside our key variable of interest: participation in sharecropping. We also include an interaction term to examine how national agricultural growth moderates the relationship between sharecropping and women's empowerment. To address potential sample selection bias, we employ the Heckman two-step model, a methodological approach that has been widely used in similar studies. This allows us to provide more accurate estimates of the impact of sharecropping on women's empowerment while controlling for other relevant factors.

While our study aims to provide a comprehensive analysis of the relationship between sharecropping and women's empowerment in Pakistan, several limitations should be noted. Firstly, while the PSLM survey provides extensive data, it may not capture all relevant aspects of women's empowerment or the nuances of sharecropping arrangements. Future research could benefit from more specialized surveys designed specifically to examine these issues. Secondly, while our study spans multiple time cohorts, a longer-term longitudinal study could provide more insights into how the relationship between sharecropping and women's empowerment evolves over time. Future research could also explore how this relationship varies across different regions of Pakistan and how it is influenced by local cultural and economic factors. Additionally, qualitative research, including in-depth

interviews and ethnographic studies, could provide valuable insights into the lived experiences of women in sharecropping households. This could help to uncover nuances that may not be captured in quantitative data. Finally, future research could explore the effectiveness of various policy interventions aimed at promoting women's empowerment within sharecropping systems. This could include examining the impact of microfinance initiatives, agricultural extension services, and land reform policies on women's economic and social empowerment.

In conclusion, this study aims to contribute to our understanding of the complex relationship between sharecropping and women's empowerment in Pakistan. By addressing key research gaps and employing rigorous methodological approaches, we hope to provide valuable insights that can inform policy and practice in promoting gender equality and rural development in Pakistan and similar contexts.

2. Literature Review

Sharecropping, a prevalent agricultural system in many developing countries, including Pakistan, has significant implications for rural economies and social structures. This literature review examines the impact of sharecropping on women's empowerment in Pakistan, a country where agriculture plays a crucial role in the economy and where gender disparities remain pronounced. The review synthesizes findings from various studies to provide a comprehensive understanding of how sharecropping affects women's economic,

social, and personal empowerment in rural Pakistan.

Sharecropping in Pakistan has deep historical roots, dating back to the pre-partition era. Alavi (1972) traces the evolution of this system from the colonial period, highlighting how it became entrenched in the agrarian structure of the region. The system persisted after independence, with Herring (1983) noting its resilience despite land reforms in the 1950s and 1970s. Gazdar (2007) argues that the continuation of sharecropping in Pakistan is closely tied to the uneven distribution of land ownership, a legacy of colonial policies and post-independence power structures. This historical context is crucial for understanding the current dynamics of sharecropping and its impact on rural women.

Sharecropping in Pakistan typically involves landowners providing land, inputs, and sometimes housing to tenants who contribute labor and a share of the harvest. Jacoby and Mansuri (2009) describe various arrangements, with the most common being a 50-50 split of the harvest between landowner and tenant. Cheema and Naseer (2013) highlight the power imbalances inherent in these relationships, often resulting in exploitation of tenants. They argue that these imbalances have particular implications for women, who are often in more vulnerable positions within the sharecropping hierarchy.

Women play a significant role in Pakistani agriculture, yet their contributions are often undervalued and overlooked. Samee et al. (2015) report that women constitute about 43% of the agricultural labor

force in Pakistan, engaging in various activities from sowing to harvesting. Mumtaz and Salway (2009) note that despite their substantial involvement, women's work in agriculture is often considered an extension of their domestic duties rather than economic activity. This perception has profound implications for women's status and empowerment within the sharecropping system.

The sharecropping system in Pakistan has complex effects on women's economic empowerment. Sultana et al. (2016) argue that while sharecropping provides women with opportunities for economic participation, it often reinforces existing gender inequalities. Khushk and Samie (2011) found that women in sharecropping households have limited control over income and resources. Their study revealed that even when women contribute significantly to agricultural labor, decision-making about crop selection, input use, and income allocation remains largely in the hands of male family members or landowners. However, Talpur et al. (2018) present a more nuanced view, suggesting that women's economic empowerment in sharecropping arrangements varies depending on factors such as household composition, land size, and local cultural norms. They found instances where women in female-headed sharecropping households exercised greater economic autonomy.

The social and cultural implications of sharecropping for women in Pakistan are multifaceted. Mumtaz and Salway (2009) argue that the system often reinforces

patriarchal norms, limiting women's mobility and decision-making power.

Sathar and Kazi (2000) observed that women in sharecropping households often face restrictions on their movement outside the home, which can limit their access to education, healthcare, and social networks. This isolation can hinder personal development and empowerment. Conversely, Akter et al. (2017) found that in some cases, women's involvement in sharecropping activities led to increased social interactions within the community, potentially enhancing their social capital. However, they note that these interactions are often limited to the agricultural sphere and do not necessarily translate to broader social empowerment.

The legal and policy framework surrounding sharecropping and women's rights in Pakistan plays a crucial role in shaping women's empowerment. Gazdar and Mallah (2012) analyze the impact of tenancy laws, noting that while these laws aim to protect tenants' rights, they often fail to address the specific vulnerabilities of women in sharecropping arrangements. The National Policy for Development and Empowerment of Women (2002) recognizes the need to improve women's status in agriculture. However, Zia et al. (2018) argue that implementation of such policies remains weak, particularly in rural areas where traditional practices often supersede formal legal structures. Mumtaz and Nosheen (2014) highlight the gap between policy formulation and implementation, noting that despite progressive legislation, women in sharecropping systems continue to face

discrimination and limited access to resources and decision-making processes.

The literature identifies several interrelated challenges and opportunities for enhancing women's empowerment within the sharecropping system in Pakistan. One of the primary challenges, as highlighted by Khattak and Brohi (2019), is the limited access to education and skills training for women in rural areas. This educational gap not only hinders women's personal development but also restricts their ability to engage effectively in agricultural decision-making and adopt new farming technologies. Closely related to this is the issue of land ownership and tenure security. Agarwal (2003) emphasizes that women's lack of land rights significantly undermines their bargaining power within the sharecropping system and limits their economic independence. This challenge is further compounded by women's limited access to agricultural inputs and technology, as noted by Iqbal et al. (2015). Such constraints often result in lower productivity and reduced income potential for women farmers.

Perhaps the most pervasive challenge is the persistence of gender norms and stereotypes. Farnworth et al. (2020) argue that these deeply ingrained societal attitudes continue to restrict women's roles in agriculture and hinder their empowerment. These norms often intersect with and exacerbate the other challenges, creating a complex web of barriers to women's advancement in the sharecropping system. Despite these significant challenges, the literature also points to several opportunities for enhancing women's empowerment.

Rehman et al. (2015) highlight the potential of microfinance and rural credit programs to provide women with access to capital, enabling them to invest in agricultural inputs or diversify their economic activities. These financial tools, when properly designed and implemented, can serve as stepping stones towards greater economic empowerment.

Another promising avenue is the formation of women's collective action groups and farmer organizations. Jamali (2009) demonstrates how these collectives can amplify women's voices, enhance their bargaining power, and facilitate knowledge sharing. Such groups can also serve as platforms for challenging restrictive gender norms and advocating for women's rights within the sharecropping system. Technological innovations in agriculture, as discussed by Taj et al. (2017), present another opportunity for women's empowerment. Mobile technologies, for instance, can provide women with access to market information, weather forecasts, and agricultural advice, potentially increasing their productivity and decision-making capacity. However, ensuring women's access to and control over these technologies remains a critical challenge.

Lastly, Lamontagne-Godwin et al. (2018) emphasize the potential of gender-sensitive agricultural extension services. By tailoring these services to women's specific needs and constraints, and by employing more female extension agents, these programs can significantly enhance women's agricultural knowledge and skills, thereby improving their status within the sharecropping system. These challenges and

opportunities are not mutually exclusive but are interconnected aspects of the complex landscape of women's empowerment in Pakistani sharecropping. Addressing the challenges while leveraging the opportunities requires a nuanced, context-specific approach that recognizes the diverse experiences of women in different regions and socio-economic contexts of Pakistan.

This literature review has explored the multifaceted impact of sharecropping on women's empowerment in Pakistan. The research indicates that while sharecropping provides women with opportunities for economic participation, it often reinforces existing gender inequalities and power imbalances. The system's impact on women's empowerment is influenced by a complex interplay of economic, social, cultural, and legal factors. The literature suggests that addressing women's empowerment in sharecropping systems requires a holistic approach. This includes improving women's access to education, resources, and decision-making processes, as well as challenging deeply ingrained social and cultural norms. Policy interventions need to be tailored to the specific contexts of rural Pakistan and should involve women in their design and implementation.

Future research could benefit from more longitudinal studies to track changes in women's empowerment over time, as well as intersectional analyses that consider how factors such as class, ethnicity, and age interact with gender in the context of sharecropping. Additionally, exploring innovative models of land tenure and agricultural production that promote gender

equality could provide valuable insights for policy and practice. Ultimately, empowering women within the sharecropping system in Pakistan is not only a matter of gender equality but also crucial for overall rural development and agricultural productivity. As such, it should remain a priority for researchers, policymakers, and development practitioners alike.

3. Research Methodology

This section outlines the data sources, estimation strategy, descriptive statistics, and empirical model employed in the study.

3.1 Data Estimation Strategy

This study utilizes a comprehensive dataset pooled from the Pakistan Social and Living Standard Survey (PSLM) conducted by the Pakistan Bureau of Statistics (PBS). The data spans three time cohorts: 2010-2011, 2014-2015, and 2019-2020, providing a longitudinal perspective on socioeconomic trends in Pakistan. The PSLM surveys for these periods included sample sizes of 76,546, 78,635, and 195,000 households, respectively, offering a robust foundation for analysis. The PSLM surveys employed advanced data collection methods to ensure reliability and accuracy. Specifically, the surveys were conducted using tablet-based android software integrated with Geographic Information System (GIS) for monitoring. This technology, developed by the data processing center, allowed for real-time data validation and quality control, significantly reducing the potential for data entry errors and enhancing the overall integrity of the dataset (PBS, 2020).

The surveys provided extensive information on a wide array of demographic characteristics, including gender, age, ethnicity, employment status, education level, income, and regional distribution. Of particular importance to this study is the data collected on employment status, which serves as a proxy for our key independent variable: Sharecropper Agricultural Structure. This information was gathered through the survey question Sec E Q6, "What was the employment status?" with response options including employer, self-employed, paid employee, owner cultivator, sharecropper, contract cultivator, and livestock.

The initial dataset comprised 772,518 research subjects from the entire census population included in the PSLM surveys. However, to align with legal and ethical considerations, as well as to ensure the relevance of the data to the research questions, several exclusion criteria were applied. Firstly, following the precedent set by Campos, Ren, and Petrick (2016) in their study in China, and in accordance with the Islamic Republic of Pakistan's constitutional prohibition on child labor, an age floor of 14 years was established. This restriction reduced the sample size to 523,211 respondents. Furthermore, To address potential sample selection bias, a common issue in studies of this nature, the Heckman two-step model was employed. This methodological approach, widely used in previous wage gap studies such as those by Qi & Wu (2017) and Ma (2022) in China, allowed for a more refined and relevant subsample of 315,835 respondents to be selected for analysis.

The Heckman two-step model is particularly valuable in this context as it helps to correct for potential bias that could arise from the exclusion of households not currently engaged in agriculture or lacking access to land. By estimating a selection equation that models the probability of

households being engaged in agriculture and having access to land, and then using the inverse Mills ratio (IMR) as a control variable in the outcome equation, this model provides a more accurate representation of the relationship between sharecropping agro structure and poverty alleviation.

3.1.1 Descriptive Statistics

Table 1: Summary Statistics

| Variable | Obs | Mean | Std. dev. | Min | Max |
|----------|---------|--------|-----------|-----|-----|
| AGE | 315,835 | 31.404 | 20.734 | 0 | 99 |
| GENDER | 315,835 | 0.431 | 0.495 | 0 | 1 |
| ETHNIC | 145,360 | 0.696 | 0.460 | 0 | 1 |
| EDU | 315,835 | 0.297 | 0.457 | 0 | 1 |
| RELEDU | 315,835 | 0.081 | 0.273 | 0 | 1 |
| EMPLOY | 108,536 | 0.855 | 0.352 | 0 | 1 |
| C1 | 315,835 | 1.000 | 0.000 | 1 | 1 |
| C2 | 315,835 | 0.000 | 0.000 | 0 | 0 |
| PDI | 315,835 | 0.360 | 0.480 | 0 | 1 |
| PDII | 315,835 | 0.640 | 0.480 | 0 | 1 |
| PDIII | 315,835 | 0.500 | 0.500 | 0 | 1 |
| AGROSHAR | 112,591 | 0.016 | 0.126 | 0 | 1 |

Source: Authors' Own

In this comprehensive dataset of 315,835 observations, the demographic and socioeconomic characteristics of the sample present a nuanced picture of the population under study. The mean age of 31.4 years (SD = 20.734) indicates a relatively young but diverse age distribution. Gender composition slightly favors males, with females constituting 43.1% of the sample. Ethnically, the Punjabi majority represents 69.6% of the 145,360 observations for this variable, underscoring the ethnic diversity within the sample. Educational attainment appears limited, with only 29.7% of individuals having received formal education, while

religious education affiliated with orthodox Islamic institutions is even less prevalent at 8.1%. Employment data, available for 108,536 individuals, reveals a high employment rate of 85.5%. The provincial distribution, represented by dummy variables PDI, PDII, and PDIII, exhibits variability across different regions of Pakistan. Notably, sharecropping, a key variable of interest, is practiced by merely 1.6% of the 112,591 individuals for whom this data is available. These descriptive statistics provide crucial context for the subsequent analysis of economic empowerment, as measured by the natural logarithm of monthly per capita

income, and its relationship with various demographic, socioeconomic, and regional factors in Pakistan.

3.2 Empirical Model

To investigate the impact of sharecropping agricultural structure on women's

empowerment in Pakistan, we employ an empirical model that incorporates a range of independent variables to analyze their influence on the dependent variable, which is represented by monthly per capita income. The model is expressed as:

$$\begin{aligned} EMPOWERMENT_i = & \alpha_0 + \alpha_1 LAGE_i + \alpha_2 GENDER_i + \alpha_3 REGION_i + \alpha_4 MINORITY_i + \\ & \alpha_5 MARITAL_i + \alpha_6 EDUCATION_i + \alpha_7 RELIGIOSITY_i + \alpha_8 TDI_i + \alpha_9 TDII_i + \alpha_{10} PDI_i + \alpha_{11} PDII_i \\ & + \alpha_{12} PDIII_i + \alpha_{13} SHARECROPPER_i + \varepsilon_i \end{aligned}$$

Baseline equation (i)

In this model, *EMPOWERMENT* represents the natural logarithm of monthly per capita income, serving as the primary measure of economic empowerment. *LAGE* is the natural logarithm of the age of research subjects, accounting for potential age-related effects on empowerment. *GENDER* is a binary variable where 1 represents female and 0 represents male, allowing for the examination of gender-specific impacts. *REGION* represents 1 for the residents of rural community and 0 for otherwise. *MINORITY* represents ethnic minority status, where 0 is assigned to ethnic minority research subjects and 1 to residents of the Punjabi ethnic group (the majority in Pakistan). *MARITAL* is a binary variable where 1 represents married while 0 represents otherwise. *EDUCATION* is a binary variable indicating educational status, where 1 represents individuals with formal education and 0 those without. *RELIGIOISTY* represents affiliation with orthodox Islamic institutions if 1 and 0 otherwise. *SHARECROPPER*, a key variable of interest, denotes individuals engaged in sharecropping (1) versus other rural professions (0). The model also includes time

dummy variables (TDI and TDII) to control for cohort effects and temporal trends, as well as regional dummy variables (PDI, PDII, and PDIII) to account for variations across different provinces of Pakistan. The random error term, ε , is assumed to be normally and independently distributed.

To ensure the robustness of our analysis, we have assessed the potential for multicollinearity among the predictor variables. Based on the correlation table, we can confirm that multicollinearity does not pose a significant concern in our dataset. Our analytical strategy involves several steps, beginning with a comprehensive examination of descriptive statistics for all variables, providing insights into the distribution and central tendencies of our data. We will then construct a correlation matrix to identify potential relationships between variables and to further confirm the absence of problematic multicollinearity.

The main analysis will employ Ordinary Least Squares (OLS) regression to estimate the coefficients in our empirical model. This will allow us to quantify the impact of each

independent variable on the empowerment measure while controlling for other factors. The Heckman two-step procedure will be applied to address potential sample selection bias, involving the estimation of a probit model for the selection equation, calculation of the Inverse Mills Ratio (IMR), and inclusion of the IMR as an additional explanatory variable in the main regression equation.

To ensure the stability and reliability of our findings, we will conduct various robustness checks, including subgroup analyses. We will examine the relationship between sharecropping and empowerment under broader economic conditions, conducting comparative analyses to identify any significant differences across regions and over time. Additionally, we will perform a robustness test by running the same analysis on the entire population, including both males and females, to verify that the results are consistent with those obtained from the female cohort.

This comprehensive methodological approach will allow us to rigorously examine the impact of sharecropping agricultural structure on women's empowerment in Pakistan, while accounting for various demographic, socioeconomic, and regional factors. By addressing potential biases and conducting thorough robustness checks, we aim to provide reliable and policy-relevant insights into this critical area of research.

4. Results and Discussion

The empirical analysis of the impact of sharecropping agricultural structure on women's empowerment in Pakistan reveals a complex interplay of socio-economic factors that influence economic empowerment, as measured by monthly per capita income. The results from both the baseline equation focusing solely on the female cohort (Table 2) and the robustness model including both male and female respondents (Table 3) provide valuable insights into the dynamics of empowerment in rural Pakistan.

Table 2: Baseline Equation – Sharecropping and Women Empowerment (Only Female Cohort)

| | EMPOWERMENT | |
|------------------|-------------|---------|
| | Coefficient | P Value |
| AGE | -0.044 | 0.32 |
| REGION | 0.430 | 0.00 |
| MINORITY | 0.124 | 0.00 |
| MARRIED | 0.915 | 0.04 |
| EDUCATION | 0.062 | 0.00 |
| RELIGIOSITY | -0.064 | 0.09 |
| SHARECROP | -0.017 | 0.73 |
| Cohort Effects | YES | |
| Province Effects | YES | |
| _cons | 0.847 | 0.00 |

Source: Authors' Own

Table 3: Robustness Check – Sharecropping and Women Empowerment (All Gender Cohort)

| | EMPOWERMENT | |
|------------------|-------------|---------|
| | Coefficient | P Value |
| AGE | -0.051 | 0.20 |
| GENDER | 0.152 | 0.00 |
| REGION | 1.319 | 0.00 |
| MINORITY | 0.127 | 0.00 |
| MARRIED | 0.723 | 0.06 |
| EDUCATION | 0.058 | 0.00 |
| RELIGIOSITY | -0.070 | 0.04 |
| SHARECROP | -0.025 | 0.59 |
| Cohort Effects | YES | |
| Province Effects | YES | |
| cons | 0.605 | 0.00 |

Source: Authors' Own

4.1 Sharecropping and Empowerment

Contrary to initial expectations, the study finds that participation in sharecropping does not have a statistically significant impact on empowerment for either women alone or the combined sample of men and women. In the female-only model (Table 2), the coefficient for SHARECROP is -0.017 ($p = 0.73$), while in the combined model (Table 3), it is -0.025 ($p = 0.59$). These results suggest a slight negative association between sharecropping and empowerment, but the high p-values indicate that we cannot conclude this relationship with confidence.

This finding challenges some previous studies that have suggested a more direct link between sharecropping and women's economic status. For instance, Sultana et al. (2016) found that sharecropping provided women with opportunities for economic participation in rural Bangladesh. However, our results align more closely with the nuanced view presented by Akter et al.

(2017), who emphasized that the impact of agricultural systems on women's empowerment varies depending on context-specific factors.

The lack of a significant relationship between sharecropping and empowerment in our study could be attributed to several factors. Firstly, as Mumtaz and Salway (2009) noted, women's work in agriculture is often considered an extension of their domestic duties rather than economic activity. This perception may limit the transformative potential of sharecropping on women's economic empowerment. Secondly, as Khushk and Samie (2011) found, women in sharecropping households often have limited control over income and resources, even when they contribute significantly to agricultural labor. This lack of control may negate potential empowerment gains from participation in sharecropping.

4.2 Socio-Economic Factors and Empowerment

While sharecropping does not show a significant impact, other socio-economic factors emerge as important determinants of empowerment in our study. Education consistently demonstrates a positive and significant relationship with empowerment across both models (coefficient = 0.062, $p = 0.00$ in Table 2; coefficient = 0.058, $p = 0.00$ in Table 3). This aligns with numerous studies highlighting the crucial role of education in women's empowerment. For instance, Khattak and Brohi (2019) emphasized the importance of educational attainment in enhancing women's status and decision-making power in rural Pakistan.

The strong positive effect of rural residence on empowerment (coefficient = 0.430, $p = 0.00$ in Table 2; coefficient = 1.319, $p = 0.00$ in Table 3) is an intriguing finding that warrants further investigation. This result challenges the common assumption that urban areas offer more opportunities for empowerment. It's possible that rural women, particularly those engaged in agriculture, have more opportunities for income generation compared to their urban counterparts who may face different labor market constraints. This finding resonates with Talpur et al.'s (2018) study, which found instances of greater economic autonomy among women in rural Sindh.

Ethnicity also emerges as a significant factor, with non-minority (Punjabi) women showing higher levels of empowerment (coefficient = 0.124, $p = 0.00$ in both models). This finding underscores the importance of considering ethnic disparities in empowerment studies and aligns with

research highlighting the intersection of gender and ethnicity in shaping economic outcomes (Gazdar, 2007). Marital status shows a positive association with empowerment, particularly in the female-only model (coefficient = 0.915, $p = 0.04$). This could reflect the combined economic resources of married couples or the social status accorded to married women in Pakistani society. However, it's important to note that this relationship becomes less significant in the combined model ($p = 0.06$), suggesting potential gender differences in the impact of marriage on empowerment.

The role of religiosity, represented by affiliation with orthodox Islamic institutions, becomes significant in the combined model (coefficient = -0.070, $p = 0.04$), indicating a negative association with empowerment. This finding contributes to the ongoing discourse on the relationship between religious conservatism and women's empowerment in Muslim-majority countries. It aligns with some studies suggesting that adherence to more orthodox interpretations of Islam may be associated with more traditional gender roles, potentially limiting women's economic opportunities (Mumtaz & Salway, 2009).

4.3 Gender Dynamics

An unexpected finding emerges in the robustness model (Table 3), where being female is associated with higher empowerment when controlling for other factors (coefficient = 0.152, $p = 0.00$). This result challenges conventional wisdom about gender disparities in Pakistan and requires careful interpretation. It's possible that this finding reflects the effectiveness of targeted interventions and policies aimed at

promoting women's economic participation in recent years. Alternatively, it could indicate that women who do participate in the labor force (and thus are included in our sample) achieve relatively high levels of empowerment compared to the general population.

This finding, however, should not be interpreted as evidence that gender inequality is no longer a concern in Pakistan. Rather, it suggests that when women overcome barriers to economic participation, they can achieve significant gains in empowerment. This interpretation aligns with Akter et al.'s (2017) findings in Southeast Asia, where women's empowerment in agriculture sometimes exceeded expectations, particularly when supportive policies and programs were in place.

4.4 Implications for Policy and Practice

The results of this study have several important implications for policy and practice. Education remains a key driver of empowerment. Policies aimed at increasing access to education for girls and women, particularly in rural areas, should be prioritized. The strong positive association between rural residence and empowerment suggests that rural development programs have the potential to significantly impact women's economic status. Policymakers should focus on enhancing economic opportunities in rural areas, particularly in the agricultural sector. While sharecropping itself may not directly impact empowerment, interventions in the agricultural sector should focus on increasing women's control over resources and decision-making power, as suggested by Khushk and Samie (2011). The ethnic disparities in empowerment highlight

the need for targeted interventions that consider the specific challenges faced by minority women.

The negative association between religiosity and empowerment suggests a need for dialogue and interventions that promote women's economic participation within the context of religious and cultural norms. The positive association between being female and empowerment in the combined model suggests that removing barriers to women's economic participation can lead to significant gains. Policies should focus on eliminating these barriers across all sectors.

4.5 Limitations and Future Research Directions

While this study provides valuable insights, several limitations should be noted. Firstly, the use of monthly per capita income as a proxy for empowerment, while common in economic studies, may not capture all dimensions of empowerment. Future research could benefit from incorporating multidimensional measures of empowerment that include aspects such as decision-making power, mobility, and access to resources, as suggested by Akter et al. (2017).

Secondly, the cross-sectional nature of the data limits our ability to establish causal relationships. Longitudinal studies tracking changes in women's empowerment over time, particularly in relation to changes in agricultural practices and policies, could provide more robust evidence of causal links.

Thirdly, while our study controls for several important factors, there may be unobserved variables influencing the relationship between sharecropping and

empowerment. Qualitative research, including in-depth interviews and ethnographic studies, could provide valuable insights into the lived experiences of women in sharecropping households and help uncover nuances that may not be captured in quantitative data.

Future research could also explore the effectiveness of various policy interventions aimed at promoting women's empowerment within sharecropping systems. This could include examining the impact of microfinance initiatives, agricultural extension services, and land reform policies on women's economic and social empowerment.

Additionally, given the unexpected finding regarding the positive association between being female and empowerment in the combined model, further investigation into the factors driving this result is warranted. This could involve more detailed analysis of labor force participation rates, sector-specific studies, and examination of recent policy initiatives aimed at promoting women's economic empowerment in Pakistan.

In conclusion, this study contributes to our understanding of the complex relationship between agricultural practices, socio-economic factors, and women's empowerment in Pakistan. While sharecropping itself may not have a direct significant impact on empowerment, the study highlights the importance of education, rural development, and addressing ethnic disparities in promoting women's economic status. These findings provide valuable insights for policymakers and practitioners working towards gender equality and rural

development in Pakistan and similar contexts.

5. Conclusion and Recommendation

This study set out to examine the impact of sharecropping agricultural structure on women's empowerment in Pakistan, utilizing data from the Pakistan Social and Living Standard Survey (PSLM) across three-time cohorts. The research aimed to contribute to the broader understanding of rural development and gender equality in developing nations, particularly in the context of traditional farming practices and their intersection with gender roles and economic empowerment.

Our findings reveal a complex picture of women's empowerment in rural Pakistan, challenging some preconceived notions while reinforcing others. Contrary to initial expectations, the study found that participation in sharecropping does not have a statistically significant impact on empowerment, as measured by monthly per capita income, for either women alone or in a combined sample of men and women. This result underscores the complexity of the relationship between agricultural practices and economic empowerment, suggesting that the impact of sharecropping may be moderated by other socio-economic and cultural factors.

While sharecropping itself did not emerge as a significant predictor of empowerment, our study highlighted several other important determinants. Education consistently demonstrated a positive and significant relationship with empowerment, reinforcing its crucial role in enhancing women's status and decision-making power.

The strong positive effect of rural residence on empowerment was an intriguing finding that challenges common assumptions about urban areas offering more opportunities for empowerment. Ethnicity also emerged as a significant factor, with non-minority (Punjabi) women showing higher levels of empowerment, highlighting the importance of considering ethnic disparities in empowerment studies.

An unexpected finding was the positive association between being female and empowerment in the combined model, when controlling for other factors. This result suggests that when women overcome barriers to economic participation, they can achieve significant gains in empowerment. However, this should not be interpreted as evidence that gender inequality is no longer a concern in Pakistan, but rather as an indication of the potential for women's economic empowerment when supportive conditions are in place.

These findings have several important policy implications. Firstly, they underscore the continued importance of education as a key driver of empowerment, suggesting that policies aimed at increasing access to education for girls and women, particularly in rural areas, should remain a priority. Secondly, the positive association between rural residence and empowerment highlights the potential of rural development programs to significantly impact women's economic status. Thirdly, while sharecropping itself may not directly impact empowerment, interventions in the agricultural sector should focus on increasing women's control over resources and decision-making power.

The study also points to several directions for future research. There is a need

for more nuanced, multidimensional measures of empowerment that go beyond income to include aspects such as decision-making power, mobility, and access to resources. Longitudinal studies tracking changes in women's empowerment over time, particularly in relation to changes in agricultural practices and policies, could provide more robust evidence of causal links. Qualitative research, including in-depth interviews and ethnographic studies, could offer valuable insights into the lived experiences of women in sharecropping households and help uncover nuances that may not be captured in quantitative data.

Furthermore, the unexpected finding regarding the positive association between being female and empowerment in the combined model warrants further investigation. This could involve more detailed analysis of labor force participation rates, sector-specific studies, and examination of recent policy initiatives aimed at promoting women's economic empowerment in Pakistan.

In conclusion, this study contributes to our understanding of the complex relationship between agricultural practices, socio-economic factors, and women's empowerment in Pakistan. While challenging some assumptions about the role of sharecropping in women's empowerment, it reinforces the importance of education, rural development, and addressing ethnic disparities in promoting women's economic status. As Pakistan continues to strive for gender equality and rural development, these findings provide valuable insights for policymakers and practitioners. They highlight the need for holistic approaches that consider the multifaceted nature of women's

empowerment and the diverse contexts in which it occurs. By addressing these complexities, Pakistan can work towards

creating more inclusive and equitable rural economies that empower women and contribute to overall national development.

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تمكين المرأة في الزراعة في باكستان:
إعادة التفكير في نظام المزارعة، التعليم، والديناميكيات الريفية

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المستخلص. تتناول هذه الدراسة تأثير هياكل الزراعة بالمزارعة على تمكين المرأة في باكستان، باستخدام بيانات المسح الاجتماعي ومستوى المعيشة في باكستان (PSLM) عبر ثلاث فترات زمنية: 2010-2011، 2014-2015، و2019-2020. من خلال نموذج تجريبي شامل وفق طريقة هيكرمان ذات الخطوتين لمعالجة احتمالية تحيز العينة؛ وذلك بتحليل عينة مكونة من 315,835 مستجيبًا. خلافًا للتوقعات الأولية، وقد كشفت نتائج الدراسة أن المشاركة في نظام المزارعة لا يؤثر بشكل كبير على معالجة احتمالية تحيز العينة الإحصائية على تمكين المرأة كما تم قياسه من خلال توظيف الإناث، ومع ذلك تحدد الدراسة عدة عوامل حاسمة أخرى للتمكين. يُظهر التعليم علاقة إيجابية ودالة إحصائية مع التمكين، مما يعزز دوره الحيوي في تعزيز مكانة المرأة. من المدهش أن الإقامة في المناطق الريفية تظهر تأثيرًا إيجابيًا قويًا على التمكين، مما يتحدى الافتراضات المتعلقة بأن المناطق الحضرية تقدم فرصًا أكثر للنساء. كما تظهر العرقية كعامل مهم، حيث تُظهر النساء غير الأقليات (البنجابيات) مستويات أعلى من التمكين. أحد النتائج غير المتوقعة هو الارتباط الإيجابي بين كون المرأة أنثى والتمكين في النموذج المشترك لكلا الجنسين، مما يشير إلى مكاسب محتملة للنساء اللواتي يتغلبن على العقبات أمام المشاركة الاقتصادية. ولهذه النتائج آثار مهمة على السياسات، حيث تسلط الضوء على الحاجة إلى استمرار التركيز على التعليم، وبرامج التنمية الريفية المستهدفة، والتدخلات التي تزيد من استحواذ النساء على الموارد في القطاع الزراعي. تساهم الدراسة في الفهم الأوسع للعلاقة المعقدة بين الممارسات الزراعية والعوامل الاجتماعية والاقتصادية وتمكين المرأة في الدول النامية، بينما تحدد أيضًا مجالات للبحوث المستقبلية، بما في ذلك الحاجة إلى مقاييس أكثر دقة وشمولية للتمكين ودراسات طولية لإثبات العلاقات السببية.

الكلمات الدالة: المزارعة، التعليم، الديناميكيات الريفية، تمكين المرأة

تصنيف JEL: Q14, I30

تصنيف KAUIE: K8, N0