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Keywords: Bank Account, Women's Status, Patriarchy, Multidimensional Poverty, India, Probit Model

JEL Code: D14, I32, C25

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1 Introduction

Several empirical studies have provided evidence supporting the instrumental role of women's access to and control over resources in driving a range of development outcomes. For instance, improvements in women's inheritance rights have been linked to multiple positive outcomes, such as their time spent in employment (Gupta, 2022), empowerment (Biswas et al., 2024), children's health (Ajefu et al., 2022), and other first- and second-generation outcomes (Deininger et al., 2019), while ownership and control over major household assets have been found to improve household food security (Sraboni et al., 2014). Their participation in salaried work has been linked to the adoption of clean cooking fuels (Choudhuri and Desai, 2020). In the specific context of access to formal financial resources, owning a bank account has been found to increase the utilisation of reproductive and maternal health services (Singh et al., 2019) and improve women's decision-making power within households (Jose and Younas, 2023). Direct wage payments into personal accounts, combined with training in account use, have been documented to incentivise women to work and lead to improvements in both financial activity and agency (Field et al., 2021).

Within the broad spectrum of women's access to resources, this study focuses specifically on access to a bank account. This focus is motivated by two key considerations. First, it aligns with India's policy efforts toward universal financial inclusion in recent decades. Launched in 2014, the Pradhan Mantri Jan Dhan Yojana (PMJDY) is the most recent initiative in this direction[1]. It has substantially expanded the reach of formal financial services to previously unbanked populations, with rural women emerging as key beneficiaries. According to NFHS data[2], the share of rural women who own a bank or savings account that they themselves use rose from 48.5% in 2015-16 to 77.4% in 2019-21. Second, this increase in account ownership coexists with deeply rooted patriarchal norms that continue to limit women's access to and control over resources in rural India[3]. Against this backdrop, this study examines the instrumental relevance of women's bank account ownership and investigates how this relevance is shaped by persistent patriarchal constraints.

While the positive effects of women's bank account ownership on various individual outcomes are well documented, as highlighted earlier, its relevance for addressing household-level multidimensional poverty remains relatively underexplored. This focus on multidimensional poverty is particularly important in light of growing evidence that traditional unidimensional measures, such as income or consumption, often fail to capture non-monetary deprivations like limited school-

[1]These efforts have been bolstered by direct benefit transfers, digital wage payments under MGNREGA, and the broader push toward digitisation following demonetisation (Cavoli et al., 2021).

[2]See NFHS-5 National Report: https://dhsprogram.com/pubs/pdf/FR375/FR375.pdf (accessed September 7, 2025).

[3]For instance, Gupta and Kumar (2024) find that such norms negatively impact women's educational attainment, thereby limiting their opportunities for empowerment. A second example concerns inheritance rights: although legal reforms, such as the amendments to the Hindu Succession Act, have aimed to strengthen women's inheritance rights, these norms continue to undermine their effective access to property (Jain et al., 2023).

ing[4], poor health, or inadequate sanitation (Tran et al., 2015; Suppa, 2016; Salecker et al., 2020). The absence of a one-to-one correspondence between monetary and non-monetary deprivations has prompted increased attention to multidimensional measures in recent years. This trend is reflected in global policy initiatives such as Target 1.2 of the 2030 Agenda for Sustainable Development, which aims to halve poverty "in all its dimensions" by 2030. In line with this trend, several countries have developed national Multidimensional Poverty Indices (MPIs), with India's MPI, led by NITI Aayog and first released in 2021, then updated in 2023, serving as a notable example.

To carry out the analysis, this study utilises data on rural households from Phase 1 states and union territories (UTs) of the 5th round of the National Family Health Survey (NFHS), focusing on those where currently married women aged 19-49 were interviewed. Examining the relationship between women's bank account ownership and household multidimensional poverty is challenging due to the potential endogeneity in this relationship. To address this concern, we employ a recursive bivariate probit model with an exclusion restriction. The results reveal a significant negative relationship between women's bank account ownership and household multidimensional poverty. The robustness of this finding is validated through the use of alternative estimation methods, two distinct measures of household multidimensional poverty, and a sample restriction. Additionally, we observe higher returns to having a bank account in states and UTs with lower levels of patriarchy. Lastly, an improvement in women's status, facilitated by access to a bank account, is proposed as a plausible explanation for the main finding.

The rest of the study is structured as follows. Section 2 reviews the literature and outlines our key contributions. Section 3 mentions the data source. Section 4 describes the variables and presents descriptive statistics. Section 5 details the empirical strategy. Section 6 presents the main result, followed by robustness checks in Section 7 and heterogeneity analysis in Section 8. Section 9 discusses a plausible channel that underlies our main finding. Section 10 concludes.

2 Literature & contributions

Several empirical studies using micro-level data have established a negative relationship between financial inclusion and poverty. In the context of Vietnam, Tran et al. (2022) find that households with access to financial services (including bank accounts, bank savings, and ATM cards), credit cards, or participation in financial markets are less likely to experience multidimensional poverty. In the Ghanaian setting, Bukari et al. (2024) focus on the conceptualisation of financial inclusion and argue that measures encompassing both formal and informal financial products are more effective in reducing the likelihood of household multidimensional poverty. In China's context, Wang et al. (2024) show that digital financial inclusion, captured through the breadth of coverage, depth of

[4]For instance, if household income is allocated unequally between boys and girls, income-based measures may mask educational disadvantages faced by girls (Sen, 1999).

usage, and level of digitalisation, significantly alleviates household multidimensional poverty. In the Indian context, Churchill and Marisetty (2020) and Cavoli et al. (2021) are most closely related to the present study. These studies draw on data from the 2016 and 2017 rounds of the Financial Inclusion Insights (FII) survey, respectively, and report similar findings. While our study complements these two contributions, it diverges in two key respects. First, these studies focus on household-level financial inclusion and do not explicitly consider women's access to financial resources. While aligned with their objectives, this approach overlooks the distinct role that women's financial access can play in shaping household well-being. Kumar and Jie (2023) underscore the pivotal role of gender in shaping the effectiveness of financial inclusion strategies for poverty reduction, showing that financial inclusion yields greater poverty-reducing effects in contexts where women have better access to formal financial services. Likewise, in the Kenyan context, Suri and Jack (2016) find that access to mobile money increased per capita consumption levels, with more pronounced impacts among female-headed households. Second, the multidimensional poverty measures used in these studies are not sufficiently comprehensive. For instance, Churchill and Marisetty (2020) define the standard of living solely in terms of asset ownership, thereby omitting other critical indicators, such as access to adequate housing, clean cooking fuels, sanitation, and safe drinking water, which are particularly relevant in rural India.

This study builds on the two concerns outlined above. First, it focuses specifically on the relationship between women's financial access, measured through bank account ownership, and household multidimensional poverty. Second, it adopts a more comprehensive measure of multidimensional poverty by drawing on the global MPI, with modifications to the education dimension. In addition, we explore heterogeneity in this relationship, informed by a body of literature that questions the straightforward link between women's access to resources and improvements in well-being within patriarchal contexts such as rural India (Kabeer, 1999; Kantor, 2003). Finally, this study also examines the broader determinants of household multidimensional poverty. Prior studies have highlighted that factors such as human capital, household composition, social group identity, and employment type play significant roles in shaping poverty outcomes (Coulombe and McKay, 1996; Grootaert, 1997; Mukherjee and Benson, 2003; Chen and Wang, 2015; Thorat et al., 2017; Imai et al., 2015).

3 Data

We utilise data on rural households from Phase 1 states and UTs of NFHS-5. This phase of the survey was conducted from June 17, 2019, to January 30, 2020, covering a total of 22 states and UTs. These include: Andaman & Nicobar Islands, Andhra Pradesh, Assam, Bihar, Dadra & Nagar Haveli and Daman & Diu, Goa, Gujarat, Himachal Pradesh, Jammu & Kashmir, Karnataka, Kerala, Ladakh, Lakshadweep, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Telangana, Tripura, and West Bengal. We restrict our analysis to Phase 1 states and UTs as Phase

2 was conducted after the COVID-19-induced lockdowns, which significantly impacted household well-being (Sanyal et al., 2023; Das and Biswas, 2023; Guariso and Nyqvist, 2023).

Conducted by the Ministry of Health and Family Welfare, Government of India, NFHS-5 employed a two-stage stratified sampling design and is representative at the state/UT and district levels. The information on the education and health of household members, as well as a host of socio-economic characteristics, collected in the survey, allows us to measure household multidimensional poverty and some of its important determinants that we control for in our regressions. The data collected through the Women's Questionnaire is used to construct our variable of interest: whether the interviewed woman has access to a bank account. In addition, the questionnaire provides information on several indicators of women's status, which we leverage to explore a plausible channel for our main finding. However, it is important to note that this information pertains only to ever-married women aged 15-49. It was collected through the state module of NFHS-5, which involved a randomly selected sub-sample comprising 15% of households from the district-level sample. Our analysis focuses on rural households included in this module, specifically those in which currently married women aged 19-49 were interviewed. We restrict the age range to 19-49 to avoid overlap with the 6-18 age group used to construct the school attendance indicator, which is a component of our dependent variable, the global MPI.

4 Variables & descriptive statistics

4.1 Variables

Our outcome variable is household multidimensional poverty. To identify whether a household is multidimensionally poor, we follow the methodology proposed by Alkire and Foster (2011) (see Appendix A). We adopt the dimensions and indicators of the global MPI, with modifications to the education dimension. The index is the result of a collaborative effort between the Oxford Poverty and Human Development Initiative (OPHI) and the United Nations Development Programme (UNDP). Since its introduction in 2010, it has been regularly updated to reflect improvements in data availability.

Motivated by Sen's notion of poverty as capability deprivation, the global MPI complements traditional unidimensional poverty measures by capturing deprivations across three equally weighted dimensions: education, health, and standard of living. Indicators within each dimension are also equally weighted. Table A.1 lists the indicators along with their definitions. As shown in the table, we modify the education dimension per the needs of our analysis and to better reflect the rural Indian context.

- The years of schooling indicator is excluded, as it is included separately as a control variable in the regressions.

- The school attendance indicator is disaggregated by gender, allowing for separate consideration of boys' and girls' attendance.
- The scope of school attendance is extended to include upper secondary education, motivated by high dropout rates at this level in India (Tilak, 2020). This enhances the index's ability to capture household deprivations related to children's education in rural areas. In India, the official age of entry into primary education is 6 years[5]. Accordingly, we define the school-age range as 6 to 18 years (i.e., 6 + 12).

In line with the global MPI approach, we exclude non-usual household residents from the calculation of deprivations to ensure that the index reflects shared resource constraints among permanent members (Alkire et al., 2021). In addition, and departing from global MPI practice, we remove individuals whose relationship to the household head is unknown, those unrelated to the head, and domestic helpers. These individuals are not part of the head's family unit and may experience distinct patterns of deprivation[6]. Including them may lead to a misrepresentation of the household's actual deprivation score; we, therefore, exclude them. Households with missing data on any MPI indicator are excluded from the analysis. Furthermore, if a household lacks eligible members for a given indicator within the education or health dimensions, it is classified as non-deprived in that indicator.

For the main analysis, we use a binary indicator of household multidimensional poverty based on the standard cutoff of $k = 33.33\%$. As part of the robustness checks, we then use the censored multidimensional poverty measure as the dependent variable, which retains the weighted deprivation scores for multidimensionally poor households while assigning a score of zero to all others. However, both the binary and censored measures involve information loss due to censoring, as noted by Mishra (2024), since they omit deprivations among non-poor households. To address this limitation, we also use the uncensored multidimensional poverty measure, which captures the intensity of deprivation irrespective of the household's k-based poverty status. This measure corresponds to the household's weighted deprivation score (see Appendix A).

Our variable of interest captures whether the interviewed woman has access to a bank account. In addition, we include several control variables in the regressions, such as the age, education, and gender of the household head, household size, dependency ratio, binary indicators for agricultural land and livestock ownership, caste, religion, and employment status of the woman and her spouse. The definitions of these variables are provided in Table 1.

[5] https://databrowser.uis.unesco.org/browser/EDUCATION/UIS-EducationOPRI (accessed on September 7, 2025).

[6] In DHS surveys, a household is not equivalent to a family. By removing unrelated members, unknown relations or domestic helps, we aim to restrict the analysis to the household head's family unit.

4.2 Descriptive statistics

In our sample, 20% of the households are identified as multidimensionally poor based on the k cutoff of 33.33%. Figure 1 illustrates the proportion of households experiencing deprivation across each indicator. The highest levels of deprivation are observed in housing, cooking fuel, and nutrition, followed by sanitation. These patterns align with the global MPI estimates for India.

Further, Table 2 presents average household differences based on whether the interviewed women hold a bank account, using a standard t-test. Households where women have a bank account are significantly less likely to be multidimensionally poor and experience lower weighted deprivation scores. These households also have more educated heads, are more likely to be headed by a female, have a smaller household size and lower dependency ratio, and are more likely to be Hindu. Women in these households are more likely to participate in the labour market, and their husbands are more likely to be employed in the non-agricultural sector.

5 Empirical strategy

To investigate the relationship between women's access to a bank account and household multidimensional poverty, we estimate the following univariate probit model:

$$P_h^* = \beta B_h + \gamma X_h + \mu_d + \epsilon_h, \quad \epsilon_h \sim \mathcal{N}(0,1) \tag{1}$$

Here, P_h^* denotes the latent multidimensional poverty status of household h, and P_h is the observed binary outcome such that:

$$P_h = \begin{cases} 1, & \text{if } P_h^* > 0 \\ 0, & \text{otherwise} \end{cases} \tag{2}$$

The main explanatory variable, B_h, is a binary indicator that equals 1 if the woman in household h has access to a bank account, and 0 otherwise. The vector X_h includes household- and woman-level controls as mentioned in Section 4.1. District fixed effects μ_d are included to account for unobserved time-invariant heterogeneity at the district level, and ϵ_h is the error term. Our parameter of interest is β, which captures the association between women's bank account ownership and household multidimensional poverty.

However, estimating the univariate probit model described above may give us biased estimates due to the potential endogeneity of our variable of interest. This endogeneity may stem from unobserved factors that influence both a woman's likelihood of owning a bank account and a household's multidimensional poverty status, thereby leading to omitted variable bias. For instance, households with higher levels of financial literacy, more progressive gender norms, or better access to local infrastructure may be more likely to promote women's financial inclusion while also investing in education, health, and living standards, thereby reducing multidimensional poverty. To address

these concerns, we employ a recursive bivariate probit model, which jointly estimates two binary outcomes while allowing for correlated error terms between the equations.

$$B_h^* = \beta_B X_{Bh} + \mu_d + \epsilon_{Bh} \tag{3}$$

$$P_h^* = \alpha B_h + \beta_P X_{Ph} + \mu_d + \epsilon_{Ph} \tag{4}$$

Equation (3) models B_h^*, the latent propensity of the woman in household h to own a bank account, while Equation (4) models P_h^*, the latent multidimensional poverty status as before. The binary variables B_h and P_h are observed such that $B_h = 1$ if $B_h^* > 0$ and $P_h = 1$ if $P_h^* > 0$. The vectors X_{Bh} and X_{Ph} include household- and woman-level controls as before. μ_d denotes district fixed effects as before. The error terms ϵ_{Bh} and ϵ_{Ph} are assumed to follow a standard bivariate normal distribution with mean zero, unit variances, and correlation coefficient ρ. A statistically significant ρ would indicate the presence of unobserved factors that jointly influence both a woman's bank account ownership and a household's multidimensional poverty status, thereby justifying the use of the recursive system. Conversely, an insignificant ρ would suggest that the two equations can be estimated separately as independent probit models.

To strengthen identification, we impose an exclusion restriction by including a variable in Equation (3) that is excluded from Equation (4). While Wilde (2000) argues that an exclusion restriction is not strictly necessary when there is sufficient variation in the regressors across equations, relying solely on functional form for identification is generally discouraged (Fairlie, 2005; Humphreys et al., 2014; Maitra and Rao, 2015). Therefore, we employ an external instrument: the proportion of other women within a woman's cluster (primary sampling unit, PSU) who report owning a bank account. Such leave-one-out instruments have been used in several empirical studies to identify causal relationships (Lenze and Klasen, 2017; Hossain et al., 2019; Sedai et al., 2021).

As noted by Drall and Mandal (2021), formal tests of instrument relevance are not available in non-linear models. To assess the strength of the instrument, we therefore report first-stage results from a robustness check using the two-stage least squares (2SLS) instrumental variables (IV) estimator (see Section 7.1). These results (Table A.4) show that the instrument is positively and significantly associated with women's bank account ownership, with an F-statistic exceeding the conventional threshold of 10, indicating it is not weak. Although a formal test of the exclusion restriction is not possible, we rely on theoretical justification: the instrument captures access to financial infrastructure and peer effects at the cluster level, factors that influence a woman's likelihood of owning a bank account within the cluster but are unlikely to affect household multidimensional poverty directly. Nonetheless, to address potential violations of the strict exogeneity assumption, we rely on the approach proposed by Conley et al. (2012) as part of our robustness checks.

6 Main results & discussion

Column (1) of Table 3 shows the baseline association between women's bank account ownership and household multidimensional poverty. The results reveal a statistically significant negative relationship, indicating that households are less likely to experience multidimensional poverty when women have access to a bank account.

However, as previously discussed, the baseline estimate is likely biased due to the potential endogeneity of women's bank account ownership. To address this concern, we employ a recursive bivariate probit model with an exclusion restriction, as outlined in Section 5, with the results presented in Column (2) of Table 3. The Wald test of exogeneity is significant at the 1% level, confirming that endogeneity is indeed a concern. The RBP estimate suggests that households are 14 percentage points less likely to be multidimensionally poor when women have access to a bank account. This marginal effect is notably larger than the OLS estimate, implying that the baseline model may have underestimated the true relationship between women's bank account ownership and household multidimensional poverty due to unaddressed endogeneity. Our finding aligns with existing micro-level evidence linking financial access to poverty reduction in the Indian context (Churchill and Marisetty, 2020; Cavoli et al., 2021).

Regarding the control variables, Column (2) of Table A.3 shows that the age and education of the household head are significantly and negatively associated with household multidimensional poverty. Female-headed households are also less likely to be multidimensionally poor. In contrast, a larger household size is positively and significantly associated with multidimensional poverty. Land ownership emerges as a significant protective factor, reducing the likelihood of households being multidimensionally poor. Similarly, households belonging to upper castes are less likely to experience such poverty. However, households in which women are employed are significantly more likely to face multidimensional poverty, suggesting that female labour force participation may be driven by economic distress rather than empowerment (Eswaran et al., 2013). Additionally, having a husband employed in the agriculture sector significantly increases the likelihood of household multidimensional poverty.

7 Robustness checks

7.1 Alternative estimation methods

The first robustness check employs alternative estimation methods. First, we apply the 2SLS IV estimator, with results presented in Table 4. The estimate remains qualitatively consistent with our main result, reinforcing the negative and significant relationship between women's bank account ownership and household multidimensional poverty.

Second, we use the Propensity Score Matching (PSM) approach, which is widely used in observational studies to address endogeneity and infer causal relationships (Liu et al., 2020; Churchill and Marisetty, 2020; Biswas and Das, 2022; Biswas, 2024). Here, the treatment variable is whether the interviewed woman in the household owns a bank account, and matching is conducted using a set of observed covariates. Following Rosenbaum and Rubin (1985), we implement nearest neighbour matching with a calliper of 0.001 to estimate the average treatment effect on the treated (ATT). The results, shown in Table 5, indicate that households where women own a bank account are significantly less likely to be multidimensionally poor compared to households where the interviewed women do not have one. While PSM addresses endogeneity arising from observed covariates, it does not account for unobserved factors that may simultaneously influence both women's bank account ownership and household multidimensional poverty. To evaluate the sensitivity of the estimated treatment effect to such hidden bias, we report the Rosenbaum bounds in the last column of Table 5. These bounds indicate the extent to which an unobserved confounder would need to influence treatment assignment to invalidate the observed treatment effect. Specifically, the results suggest that hidden bias up to 19-20% would still yield a significant difference in household multidimensional poverty between households where the interviewed women own a bank account and those where they do not. This implies that the PSM estimates are moderately robust to potential hidden bias.

Overall, these alternative estimation techniques confirm the robustness of our main finding.

7.2 Plausibly exogenous

In this section, we address the concern that our instrument may not be fully exogenous, potentially biasing our main result. For example, a high prevalence of women's bank account ownership at the cluster level might create spillover effects, such as stronger informal support networks or greater diffusion of financial knowledge, that could affect household multidimensional poverty independently of an individual woman's financial access. To account for these potentially confounding pathways, we employ the method developed by Conley et al. (2012), which permits causal inference even when the instrument violates the strict exogeneity assumption and is only plausibly exogenous. Consider the following equation:

$$P_h^* = \beta B_h + \gamma Z_h + \delta X_h + \mu_d + \epsilon_h \tag{5}$$

In our main analysis, we assumed that $\gamma = 0$, implying that the instrument has no direct effect on household multidimensional poverty. However, the method by Conley et al. (2012) allows for $\gamma \neq 0$. It has been applied in several empirical studies addressing different issues (Das, 2021; Biswas and Das, 2022; Ojha and Babbar, 2024).

Following Biswas and Das (2022), we begin by regressing household multidimensional poverty on the instrument and control variables to obtain the reduced form effect of the instrument (Table 6). We

then obtain bounds for the second-stage effect of women's bank account ownership on household multidimensional poverty, assuming that the direct effect of the instrument on the outcome lies between zero and the reduced form effect. Further, we report the maximum value of γ ($\gamma_{\max}$) for which the resulting bounds on the second-stage estimate exclude zero. This $\gamma_{\max}$ value, shown in Table 6, indicates that women's bank account ownership is negatively and significantly associated with household multidimensional poverty even when the direct effect of the instrument is 59% of the reduced form effect. We conclude that our main result is robust to a fairly large degree of instrument endogeneity.

7.3 Alternative poverty measures

The second robustness check replaces the binary measure of multidimensional poverty with the censored and uncensored multidimensional poverty measures, as discussed in Section 4.1. The results, presented in Table 7, further support the robustness of our main finding.

7.4 Restricting to one respondent per household

In households where multiple women were interviewed, the third robustness check restricts the sample to women who are either the household head or the spouse of the household head, as these individuals are more likely to serve as primary decision-makers (Deshmukh-Ranadive, 2005). The results, shown in Table 8, continue to support our main finding.

8 Heterogeneity

Kabeer (1999), in her conceptualisation of empowerment, defines resources as essential preconditions that enhance an individual's capacity to make choices. However, she and others (Kantor, 2003; Eswaran et al., 2013) emphasise that cultural contexts play a critical role in determining how effectively women can convert resources into improved well-being outcomes. In light of this, we explore the heterogeneity in the relationship between women's bank account ownership and household multidimensional poverty.

To achieve this, we categorise the states in our sample by their level of patriarchy, classified as low or high, based on the India Patriarchy Index (see Table A.5 for details). Developed by Singh et al. (2021), this index quantifies the construct of patriarchy using data from the NFHS. It has been applied by Bhattacharya (2023), who finds that in highly patriarchal states, the presence of a mother-in-law does not enhance the daughter-in-law's labour force participation, while the presence of a father-in-law decreases her work time and increases her involvement in household production.

In our context, we hypothesise that the benefits of women's bank account ownership would be diminished in highly patriarchal states, where women hold a more subordinate social status. Our

findings, presented in Table 9, support this hypothesis. In less patriarchal states, women's bank account ownership is associated with a 22 percentage point reduction in the likelihood that the household is multidimensionally poor. By contrast, in highly patriarchal states, the effect is only marginally significant and substantially smaller in magnitude.

9 Plausible channel

Here, we provide indicative evidence supporting a plausible channel that explains our main finding. Specifically, we investigate whether women's access to a bank account is associated with improvements in their status. We then assess whether this enhanced status helps explain the significant negative relationship between women's bank account ownership and household multidimensional poverty observed in our study.

To explore this channel, we begin by estimating the relationship between women's bank account ownership and their status. We define women's status using two key dimensions: (1) their involvement in household decision-making and (2) their control over personal financial resources. For the first dimension, we use responses to questions on decision-making within the household, specifically regarding: (a) the woman's own health care, (b) major household purchases, (c) visits to family or relatives, and (d) how the husband's earnings are spent. Based on the responses, we assign a score of two if the woman makes the decision alone, one if the decision is made jointly with her husband, and zero if she is not involved. For the second dimension, we assess whether the woman has money that she alone can decide how to use. A score of one is assigned if she does, and zero otherwise. We then aggregate the scores across all indicators to construct a composite measure of women's status. Panel (a) of Table 10 shows the results. Consistent with prior research (Singh et al., 2019; Jose and Younas, 2023), we find a positive and statistically significant relationship between women's bank account ownership and their status.

Next, we adopt the methodology of Mookerjee et al. (2023) and Ojha and Babbar (2024) to generate predicted values of women's status, which we then use to examine their association with household multidimensional poverty. Panel (b) of Table 10 presents these results, based on a two-stage linear regression procedure with bootstrapped standard errors (1,000 replications, clustered at the PSU level). We find that a one-unit increase in predicted status is associated with a five percentage point reduction in the likelihood that the household is multidimensionally poor. This finding is consistent with our expectations and serves as a plausible explanation for our main finding.

However, due to the potential endogeneity of women's status, these findings should be considered indicative rather than causal. Establishing definitive causal links will require further investigation.

10 Conclusion

The instrumental relevance of women's access to resources is well-documented in the literature. This study contributes to that body of evidence by examining the relationship between women's access to a bank account and household multidimensional poverty in the context of rural India. Addressing potential endogeneity concerns, we find a significant negative relationship between women's bank account ownership and household multidimensional poverty. This finding remains robust across alternative estimation approaches, two distinct poverty measures, and the applied sample restriction. We also find that the benefits of owning a bank account are greater in states and UTs with low levels of patriarchy. Lastly, we provide indicative evidence that an improvement in women's status, facilitated by access to a bank account, drives our main finding.

This study, however, is not without limitations. First, due to data constraints, we are unable to explore other dimensions of financial inclusion beyond bank account ownership. Previous studies have used more comprehensive indices. For example, Koomson et al. (2020) construct a financial inclusion index that incorporates ownership and use of financial products, access to credit, and receipt of remittances. Similarly, Churchill and Marisetty (2020) include access to banking, loans/credit, and insurance, while Cavoli et al. (2021) distinguish between bank account ownership and active usage. Unfortunately, the NFHS-5 data do not allow for such detailed disaggregation. Second, the multidimensional poverty measure employed in our analysis may not fully capture the range of overlapping deprivations that households experience simultaneously.

Despite these limitations, our findings underscore the significance of SDG Target 5.a, which calls for reforms to ensure women's equal rights to different forms of resources. Beyond expanding access, our heterogeneity analysis stresses the importance of addressing entrenched patriarchal norms. As studies emphasise, without such changes, women's access to resources may not translate into improved well-being (Kabeer, 1999; Kantor, 2003).

Tables & figures

Table 1: Definitions of variables

Variables	Definitions
Interest variable	
Access to a bank account	Indicator variable = 1 if the interviewed woman aged 19-49 has a bank account that she uses, 0 otherwise.
Instrument	The proportion of women in the respondent's cluster who report having access to a bank account that they use, calculated excluding the respondent herself.
Controls	
Head's age	Age in years of the household head.
Head's education	Years of education completed by the household head.
Female-headed	Indicator variable = 1 if a female heads the household, 0 otherwise.
Household size	Number of household members.
Dependency ratio	The number of household members aged 0-14 and 60 or above divided by the number of household members aged 15-59.
Agricultural land	Indicator variable = 1 if the household has agricultural land, 0 otherwise.
Livestock	Indicator variable = 1 if the household has livestock, 0 otherwise.
Caste	Indicator variable = 1 if the household does not belong to SC, ST, or OBC, 0 otherwise.
Religion	Categorical variable indicating the household's religion as Hindu, Muslim, or Other.
Woman's employment status	Indicator variable = 1 if she participated in paid (cash/kind) work throughout the 12 months preceding the survey, 0 otherwise.
Husband's employment status	Categorical variable indicating his employment status in the seven days/12 months preceding the survey, categorised as not employed, employed in the agriculture sector, or employed in the non-agriculture sector.

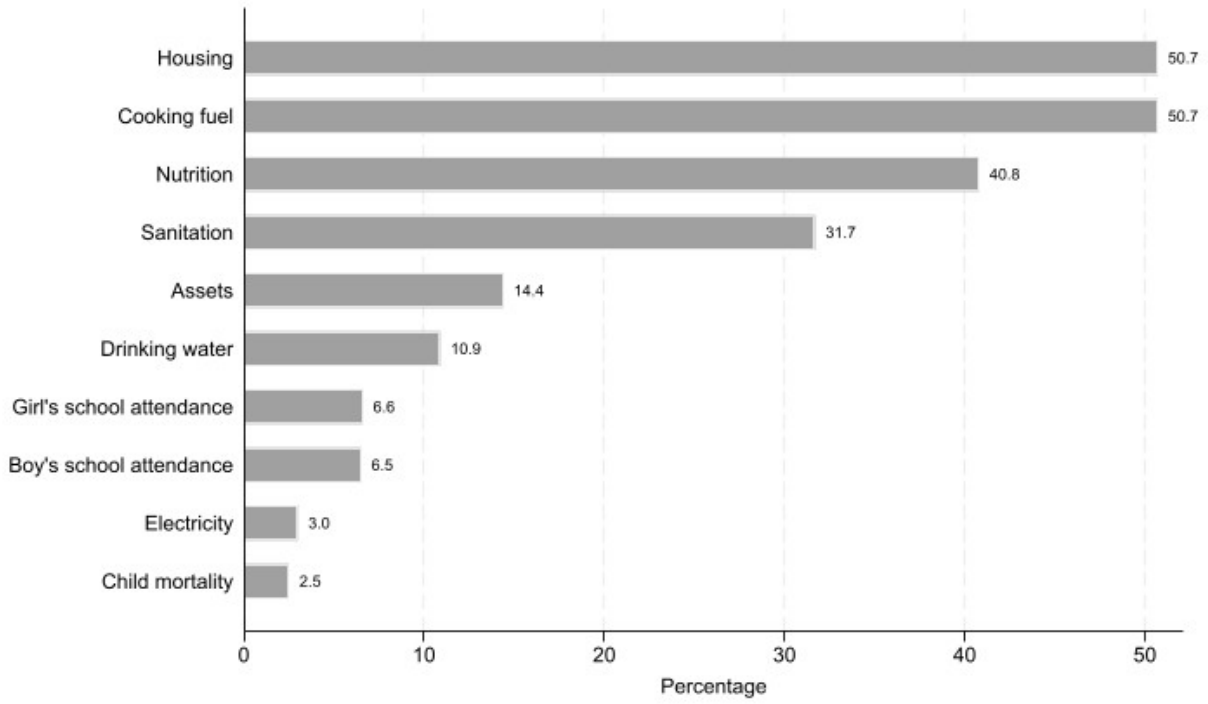

Figure 1: Uncensored headcounts

Note: Calculations are based on rural households from Phase 1 states and UTs of NFHS-5, where currently married women aged 19-49 were interviewed.

Table 2: Summary statistics

	Bank account		No bank account		Differences in means
	Mean	N	Mean	N	
Outcome variables					
Multi-dimensionally poor[1]	0.18	19007	0.26	5035	-0.08***
Censored MP	0.07	19007	0.11	5035	-0.04***
Uncensored MP	0.17	19007	0.21	5035	-0.04***
Controls					
Head's age	47.14	19007	47.00	5035	0.15
Head's education	5.91	19007	5.08	5035	0.82***
Female-headed	0.14	19007	0.11	5035	0.04***
Household size	5.03	19007	5.28	5035	-0.25***
Dependency ratio	0.79	19007	0.81	5035	-0.02*
Has agricultural land	0.54	19007	0.53	5035	0.01
Has livestock	0.63	19007	0.67	5035	-0.04***
Upper caste	0.19	19007	0.19	5035	0.01
Hindu	0.75	19007	0.70	5035	0.05***
Muslim	0.11	19007	0.12	5035	-0.01
Other religion	0.14	19007	0.18	5035	-0.04***
Woman employed					
Yes	0.22	19007	0.16	5035	0.06***
Husband employed					
No	0.15	19007	0.18	5035	-0.03***
Yes, in agriculture	0.39	19007	0.44	5035	-0.06***
Yes, in non-agriculture	0.46	19007	0.38	5035	0.08***

Notes: MP stands for multi-dimensional poverty. The sample comprises rural households from Phase 1 states and UTs of NFHS-5, where currently married women aged 19-49 were interviewed.
[1] The k cutoff is 33%. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 3: Women's access to a bank account and household multidimensional poverty

	Probit	RBP
	(1)	(2)
	Multidimensionally poor	
Access to a bank account	-0.034***	-0.137***
	(0.006)	(0.039)
Controls	Yes	Yes
District fixed effects	Yes	Yes
Observations	23170	24038
ρ		0.247
Wald statistic		8.308***

Notes: RBP stands for recursive bivariate probit. The sample comprises rural households from Phase 1 states and UTs of NFHS-5, where currently married women aged 19-49 were interviewed. The regression output is based on the k cutoff of 33%. The controls include the household head's age, education and gender, household size and dependency ratio, binary indicators for agricultural land and livestock ownership, caste, religion, and the woman's and her husband's employment status. For RBP estimation, the instrument used is the leave-one-out cluster-level proportion of women who own a bank account. Clustered standard errors at the PSU level are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4: Robustness check 1.1: Women's access to a bank account and household multidimensional poverty - 2SLS estimates

	Multidimensionally poor
Access to a bank account	-0.248***
	(0.054)
Controls	Yes
District fixed effects	Yes
Observations	24038
First-stage F-stat	303.659***

Notes: The sample comprises rural households from Phase 1 states and UTs of NFHS-5, where currently married women aged 19-49 were interviewed. The regression output is based on the k cutoff of 33%. The controls include the household head's age, education and gender, household size and dependency ratio, binary indicators for agricultural land and livestock ownership, caste, religion, and the woman's and her husband's employment status. The instrument used is the leave-one-out cluster-level proportion of women who own a bank account. Clustered standard errors at the PSU level are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Robustness check 1.2: Propensity score matching and sensitivity analysis (Rosenbaum bounds)

Outcome Variable	Treated	Control	Difference	T-statistic	Rosenbaum bounds
Multidimensionally poor	0.176	0.211	-0.0337	-3.18***	1.19-1.20

Notes: The sample comprises rural households from Phase 1 states and UTs of NFHS-5, where currently married women aged 19-49 were interviewed. The estimates reported under the columns 'Treated' and 'Control' correspond to the average outcomes for the matched samples. Matching is conducted after controlling for covariates such as the household head's age, education and gender, household size and dependency ratio, agricultural land and livestock ownership, caste, religion, and the woman's and her husband's employment status. The estimate in the column labelled 'Difference' represents the ATT (Average Treatment effect on the Treated), based on matched samples. Rosenbaum bounds show the level of hidden bias at which the treatment effect becomes statistically insignificant. *** $p < 0.01$.

Table 6: Robustness check 2: Plausibly exogenous instrumental variable regression

	(1) Multidimensionally poor
$\hat{\gamma}$	-0.082*** (0.017)
Controls	Yes
District fixed effects	Yes
Observations	24038
β (lower bound)	-0.352
β (upper bound)	0.102
$\gamma_{\max}$	-0.048

Notes: The sample comprises rural households from Phase 1 states and UTs of NFHS-5, where currently married women aged 19-49 were interviewed. The regression output is based on the k cutoff of 33%. The controls include the household head's age, education and gender, household size and dependency ratio, binary indicators for agricultural land and livestock ownership, caste, religion, and the woman's and her husband's employment status. The instrument used is the leave-one-out cluster-level proportion of women who own a bank account. Clustered standard errors at the PSU level are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 7: Robustness check 3: Women's access to a bank account and household multidimensional poverty - alternative poverty measures

	(1) Censored MP	(2) Uncensored MP
Access to a bank account	-0.118*** (0.023)	-0.110*** (0.019)
Controls	Yes	Yes
District fixed effects	Yes	Yes
Observations	24038	24038
First-stage F-stat	303.659***	303.659***

Notes: MP stands for multi-dimensional poverty. The estimates are based on 2SLS estimation due to convergence issues with the fractional probit model. The sample comprises rural households from Phase 1 states and UTs of NFHS-5, where currently married women aged 19-49 were interviewed. The regression output in Column (1) is based on the k cutoff of 33%. The controls include the household head's age, education and gender, household size and dependency ratio, binary indicators for agricultural land and livestock ownership, caste, religion, and the woman's and her husband's employment status. The instrument used is the leave-one-out cluster-level proportion of women who own a bank account. Clustered standard errors at the PSU level are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Robustness check 4: Women's access to a bank account and household multidimensional poverty - restricting to one respondent per household

	Multidimensionally poor
Access to a bank account	-0.131*** (0.041)
Controls	Yes
District fixed effects	Yes
Observations	21382
ρ	0.231
Wald statistic	6.558**

Notes: The estimates are based on recursive bivariate probit estimation. The sample comprises rural households from Phase 1 states and UTs of NFHS-5, where currently married women aged 19-49 were interviewed. In households with multiple interviewed women, the respondent selected is the woman who is either the household head or the household head's spouse. The regression output is based on the k cutoff of 33%. The controls include the household head's age, education and gender, household size and dependency ratio, binary indicators for agricultural land and livestock ownership, caste, religion, and the woman's and her husband's employment status. The instrument used is the leave-one-out cluster-level proportion of women who own a bank account. Clustered standard errors at the PSU level are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 9: Heterogeneity in the relationship between women's access to a bank account and household multidimensional poverty

	Less patriarchal	Highly patriarchal
	(1)	(2)
	Multidimensionally poor	
Access to a bank account	-0.221***	-0.094*
	(0.050)	(0.053)
Controls	Yes	Yes
District fixed effects	Yes	Yes
Observations	6292	17746
ρ	0.486	0.142
Wald statistic	17.964***	1.546

Notes: The estimates are based on recursive bivariate probit estimation. The sample comprises rural households from Phase 1 states and UTs of NFHS-5, where currently married women aged 19-49 were interviewed. The regression output is based on the k cutoff of 33%. The controls include the household head's age, education and gender, household size and dependency ratio, binary indicators for agricultural land and livestock ownership, caste, religion, and the woman's and her husband's employment status. The instrument used is the leave-one-out cluster-level proportion of women who own a bank account. Clustered standard errors at the PSU level are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 10: Improvement in women's status as a plausible channel

Panel (a)	
	Status
Access to a bank account	0.585***
	(0.033)
Controls	Yes
District fixed effects	Yes
Observations	23954
Panel (b)	
	Multidimensionally poor
Predicted status	-0.053***
	(0.010)
Controls	Yes
District fixed effects	Yes
Observations	23954

Notes: This table reports estimates from a two-stage linear regression procedure with bootstrapped standard errors (1,000 replications, clustered at the PSU level). In the first stage (Panel a), women's status is regressed on an indicator for bank account ownership, controlling for relevant covariates. The fitted values from this regression are then used as a generated regressor in the second stage (Panel b), where the dependent variable is a binary indicator of multidimensional poverty, based on the k cutoff of 33%. OLS is employed in the second stage due to convergence issues with the probit model. The sample comprises rural households from Phase 1 states and UTs of NFHS-5, where currently married women aged 19-49 were interviewed. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix A

The Alkire-Foster (AF) method

Alkire and Foster (2011) proposed a dual-cutoff approach to identify the multidimensionally poor in the population.

The first step involves defining dimensional cutoffs to assess whether households are deprived in each dimension of poverty, formalised by them as follows:

Let n denote the number of households in the reference population, where $n \in \mathbb{Z}_+$. Suppose poverty is assessed across d dimensions, with $d \in \mathbb{Z}_+$. The value $p_{ij} \in \mathbb{R}_+$ represents the achievement of household i in dimension j. The achievements of all households in the population are compiled in the $n \times d$ achievement matrix P:

$$P = \begin{bmatrix} p_{11} & \cdots & p_{1d} \\ \vdots & \ddots & \vdots \\ p_{n1} & \cdots & p_{nd} \end{bmatrix}$$

In each dimension j, household i must achieve a minimum level of z_j to be classified as non-deprived. This threshold is referred to as the deprivation cutoff and is represented by the vector $z = \begin{pmatrix} z_1 & \cdots & z_d \end{pmatrix}$, where each z_j corresponds to one of the d dimensions being evaluated. Utilising the $n \times d$ achievement matrix P and the $1 \times d$ vector of deprivation cutoffs z, we obtain the typical element of deprivation matrix $g^0(p)$ as follows:

$$g^0_{ij} = \begin{cases} 1, & \text{for } P_{ij} < z_j \\ 0, & \text{otherwise} \end{cases}$$

for all $i = 1, ..., n$ and $j = 1, ..., d$.

The vector $w = \begin{pmatrix} w_1 & \cdots & w_d \end{pmatrix}^T$ represents the relative weights of the dimensions, where $w_j > 0$ for all $j = 1, ..., d$. In the case of normalised weights, we have $\sum_j w_j = 1$.

Based on the deprivation profile of household i, denoted by g^0_i from the matrix $g^0(P)$, and the vector of weights w, the weighted deprivation score for household i is calculated as:

$$c_i = \sum_{j=1}^{d} g^0_{ij} w_j$$

This score increases with the number of deprivations a household experiences: it takes a value of 0 if the household is not deprived in any dimension, and a value of 1 if it is deprived in all dimensions. The vector $c = \begin{pmatrix} c_1 & \cdots & c_n \end{pmatrix}$ represents the weighted deprivation scores for all households in the reference population.

The second is a poverty cutoff, denoted by k. If the breadth of a household's weighted deprivations is greater than or equal to k, it is considered multidimensionally poor.

Table A.1: Dimensions and indicators of global MPI

Dimensions	Indicators and their deprivation cutoffs
Education	*Years of schooling*: No household member aged 12 years or older has completed at least six years of schooling. *School attendance*: Any school-aged child is not attending school up to the age at which they would complete class eight. **Modifications:** *Girls' school attendance*: Any school-aged girl aged 6-18 is not attending school. *Boys' school attendance*: Any school-aged boy aged 6-18 is not attending school.
Health	*Nutrition*: Any adult under 70 years of age or any child for whom there is nutritional information[1] is undernourished[2]. *Child mortality*: Any child under the age of 18 years has died in the family in the five years preceding the survey.
Living Standards	*Cooking fuel*: It cooks with dung, wood, charcoal, or coal. *Sanitation*: Its sanitation facility is not improved, or it is improved[2] but shared with other households. *Drinking water*: It does not have access to improved drinking water, or improved[2] drinking water is at least a 30-minute walk from home, round trip. *Electricity*: It has no electricity. *Housing*: At least one of the three housing materials for the roof, walls, and floor is inadequate[2]: the floor is of natural materials, and/or the roof and/or walls are of natural or rudimentary materials. *Assets*: It does not own more than one of these assets: radio, television, telephone, computer, animal cart, bicycle, motorbike, or refrigerator, and does not own a car or truck.

Source: The global MPI. [1] NFHS-5 collected anthropometric data for all children under five years of age, all women aged 15-49 years, and men aged 15-54 years in households selected for the state module.
[2] See Table A.2 for more details.

Table A.2: Undernourishment criteria, and constituents of improved sanitation, drinking water sources, and inadequate housing materials

Undernourishment criteria	Improved sanitation	Improved drinking water sources
Children under 5 years: Z-score for height-for-age or weight-for-age falls below minus two standard deviations from the median of the reference population, as defined by the WHO Child Growth Standards, 2006. *Adolescents aged 15–19 and adults*: BMI-for-age is below 18.5 kg/m^2 and BMI is below 18.5 kg/m^2, respectively.	Flush/pour flush to piped sewer system, septic tank, pit latrine, or unknown destination, ventilated improved pit (VIP) latrine, biogas latrine, pit latrine with slab, and twin pit/composting toilet	Piped water, public taps, standpipes, tube wells, boreholes, protected dug wells and springs, rainwater, tanker trucks, cart with a small tank, bottled water, and a community reverse osmosis (RO) plant
	Inadequate housing materials	
Floor	Walls	Roof
	Natural materials	
Mud/clay/earth, sand, and dung	No walls, cane/palm/trunks/bamboo, mud, and grass/reeds/thatch	No roof, thatch/palm leaf/reed/grass, mud, sod/mud and grass mixture, and plastic/polythene sheeting
	Rudimentary materials	
	Bamboo with mud, stone with mud, plywood, cardboard, unburnt brick, and raw/reused wood	Rustic mat, palm/bamboo, raw wood planks/timber, unburnt brick, and loosely packed stone

Note: The constituents of improved sanitation and drinking water sources, and inadequate housing materials are taken from NFHS-5.

Table A.3: Average marginal effects of control variables

	Probit	RBP
	(1)	(2)
	Multidimensionally poor	
Head's age	-0.004***	-0.003***
	(0.000)	(0.000)
Head's education	-0.016***	-0.010***
	(0.001)	(0.000)
Female-headed	-0.032***	-0.013**
	(0.008)	(0.006)
Household size	0.024***	0.017***
	(0.002)	(0.001)
Dependency ratio	0.005	0.004
	(0.004)	(0.003)
Household has agricultural land	-0.037***	-0.026***
	(0.006)	(0.005)
Household has livestock	0.008	0.006
	(0.006)	(0.005)
Upper caste	-0.048***	-0.035***
	(0.008)	(0.006)
Muslim	0.029**	0.015*
	(0.011)	(0.008)
Other religion	0.001	-0.000
	(0.015)	(0.011)
Woman employed		
Yes	0.011*	0.021***
	(0.007)	(0.005)
Husband employed		
Yes, in agriculture	0.034***	0.028***
	(0.008)	(0.006)
Yes, in non-agriculture	-0.017**	-0.002
	(0.008)	(0.006)
District fixed effects	Yes	Yes
Observations	23170	24038
ρ		0.247
Wald statistic		8.308***

Notes: RBP stands for recursive bivariate probit. The sample comprises rural households from Phase 1 states and UTs of NFHS-5, where currently married women aged 19-49 were interviewed. The regression output is based on the k cutoff of 33%. For RBP estimation, the instrument used is the leave-one-out cluster-level proportion of women who own a bank account. Clustered standard errors at the PSU level are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.4: 2SLS first-stage results from robustness check 1.1

	Access to a bank account
Leave-one-out cluster average	0.332***
	(0.019)
Controls	Yes
District fixed effects	Yes
Observations	24038
First-stage F-stat	303.659***

Notes: This table reports the first-stage results from Robustness Check 1.1. The sample comprises rural households from Phase 1 states and UTs of NFHS-5, where currently married women aged 19-49 were interviewed. The controls include the household head's age, education and gender, household size and dependency ratio, binary indicators for agricultural land and livestock ownership, caste, religion, and the woman's and her husband's employment status. Clustered standard errors at the PSU level are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.5: Classification of Phase 1 states and UTs according to patriarchy level

Low	High
Andaman & Nicobar Islands, Andhra Pradesh, Dadra & Nagar Haveli and Daman & Diu, Goa, Kerala, Lakshadweep, Meghalaya, Mizoram, Nagaland, Sikkim, and Telangana	Assam, Bihar, Gujarat, Himachal Pradesh, Jammu & Kashmir, Karnataka, Ladakh, Maharashtra, Manipur, Tripura, and West Bengal

Notes: The patriarchy scores were provided by Dr. Abhishek Singh, IIPS, Mumbai. The states that fall below the median score were considered to have low levels of patriarchy, and those above the median were treated as having high levels of patriarchy.

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