Education, Employment, and Women's Say in Household Decision-Making in Pakistan

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First printing November 2014.

Preface

The Centre for Research in Economics and Business (CREB) was established in 2007 to conduct policy-oriented research with a rigorous academic perspective on key development issues facing Pakistan. In addition, CREB (i) facilitates and coordinates research by faculty at the Lahore School of Economics, (ii) hosts visiting international scholars undertaking research on Pakistan, and (iii) administers the Lahore School's postgraduate program leading to the MPhil and PhD degrees.

An important goal of CREB is to promote public debate on policy issues through conferences, seminars, and publications. In this connection, CREB organizes the Lahore School's Annual Conference on the Management of the Pakistan Economy, the proceedings of which are published in a special issue of the *Lahore Journal of Economics*.

The CREB Working Paper Series was initiated in 2008 to bring to a wider audience the research being carried out at the Centre. It is hoped that these papers will promote discussion on the subject and contribute to a better understanding of economic and business processes and development issues in Pakistan. Comments and feedback on these papers are welcome.

Acknowledgements

Abstract

This study uses data from the Pakistan Social and Living Standards Measurement Survey for 2007/08 to conduct an empirical analysis of the relationship between education, employment, and women's say in household decision-making in Pakistan. Using a linear probability model with fixed effects, we analyze decisions pertaining to family planning and to expenditure on food, clothing, medical costs, and recreation. In order to address the reverse causality between employment and empowerment, the study uses district cotton production as an instrument for employment. We find that education and employment have a significant effect on women's say in certain—though not all—household decisions. In most cases, employment in nonagriculture increases women's say as opposed to employment in agriculture. However, employment tends to empower women mainly in terms of expenditure-related decisions and not decisions pertaining to family planning.

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1. Introduction

Having a greater say in household decisions enables women to influence not only their own psychological and physical wellbeing, but also that of their children. Women who have a say in decisions pertaining to family planning and household expenditure are associated with better outcomes in terms of health and education (Mason, 2003; Acharya et al., 2010; Hou & Ma, 2011). This makes it important to identify the key factors that enable women to make these decisions. While a number of factors can determine women's say in household decision-making (HDM),[1] this study focuses on two factors: educational attainment and employment status. It is pertinent to note that, in Pakistan, women lag far behind in these areas—both the female literacy rate (46 percent) and female labor force participation (FLFP) rate (21.7 percent) are extremely low (Pakistan, Ministry of Finance, 2012).

Nonunitary household bargaining models predict that reservation utility will affect women's HDM. In this context, reservation utility is the utility gained if a woman's marriage ends (Manser & Brown, 1980; McElroy & Horney, 1981) or if she opts for noncooperation (Lundberg, Pollak, & Wales, 1994). Her earning power will, therefore, affect her reservation utility. This is in contrast to the classic unitary model in which changes in a woman's (individual) level of education and employment do not affect her role in decision-making.

This study employs the nonunitary model in the context of Pakistan. Given the limited empirical evidence available to test the relationship between education, employment, and empowerment, this paper attempts to shed some light on the issue by addressing the following questions:

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[1] Individual factors include a woman's age, level of education, and employment status. Household factors include household size, the household head's level of education and employment status, household structure (joint or nuclear), number of children, and household wealth/income, etc. Community factors normally include those that reflect the community's perception of women's empowerment.

1. Does educational attainment increase women's say in HDM?

2. Does employment status increase women's say in HDM?

   (i) Do both agricultural as well as non-agricultural employment increase women's say in household decision making?

   (ii) Do both paid and unpaid employment increase women's say in household decision making

The study has two main objectives therefore: (i) to empirically test whether education and employment affect women's say in HDM in Pakistan and (ii) to address the endogeneity that can arise in testing these relationships. This typically includes omitted variable bias (because community characteristics can affect women's level of education and employment status as well as the likelihood of being empowered) and reverse causality (because empowerment levels can affect employment status).

Accordingly, we adopt the following identification strategies: (i) a fixed effects (FE) approach to account for unobservable community or household characteristics that affect the variables of interest and HDM, and (ii) an instrumental variable (IV) approach to address the reverse causality between employment and women's say in HDM. Controlling for all observed and unobserved differences between households (as well as between communities, districts, and regions) and comparing only women within the same household helps rectify any omitted variable bias. Using a valid, informative IV addresses the reverse causality between employment and HDM.

Based on the data available, the decisions taken into consideration include women's say in the use of birth control and in household expenditure (on food, clothing, medical costs, and recreation). On addressing the endogeneity problems identified above and checking for the robustness of the results, the study finds that education increases women's say in family planning as well as expenditure-related decisions. However, employment has a more robust effect on decisions pertaining to expenditure rather than family planning. These findings, which are consistent with other empirical work on the economics of the family, reject the unitary household model and reflect the predictions of the intra-household bargaining models instead.

The study is organized as follows. Section 2 reviews the literature on women's say in HDM and examines the prevailing theories of intra-household bargaining. Section 3 presents a theoretical framework identifying the channels through which education and employment affect women's say in household decisions. Section 4 describes the data used and explains how the endogeneity bias that arises will be addressed, i.e., by using a linear probability model (LPM) with FE and different IVs. Section 5 presents the results of the regressions carried out and discusses the study's findings. Section 6 concludes the study, identifies its limitations, and recommends avenues for future research.

2. Literature Review

This section describes the intra-household bargaining theories put forward in the literature and explains how women's empowerment is measured. It also presents a critique of the methodologies used to empowerment and describes the literature pertaining to women's household empowerment in Pakistan. (See Appendix 1 for a summary of the studies cited in this section.)

2.1. Intra-Household Bargaining Theories

The literature on intra-household bargaining theories is classified into two broad strands: unitary models and nonunitary models. In unitary models, the members of a household pool their income either because they have common preferences or because the household head imposes his preferences on the rest of the household. Although Becker (1981) argues that household members are typically altruistic, the theoretical and empirical evidence suggests that this is not necessarily the case. Lundberg, Pollak, and Wales (1996) test the unitary model and find that individuals in a household each have their own preferences and do not pool their income as the model suggests. Nonunitary models, on the other hand, assume that it is the *source* of income that affects household welfare outcomes: an increase in a woman's income will affect the household's overall welfare differently from an increase in a man's income.

The cooperative bargaining models put forward by Manser and Brown (1980) and McElroy and Horney (1981) suggest that households may reach a "threat point," i.e., that of divorce. Lundberg et al. (1994), however, argue that divorce is too severe a threat point where daily

decision-making is concerned; their bargaining model uses noncooperation as a threat point instead.[2] Unlike in noncooperative bargaining models, households reach a Pareto-efficient outcome when in cooperative bargaining mode (Chiappori, 1988).

As opposed to the basic unitary model, the nonunitary model shows that distribution factors such as education and employment influence the reservation utility gained in cases of divorce or noncooperation. These distribution factors act as bargaining weights that make the threat point credible. This is because women who are better educated have a higher reservation wage and their employment status gives them better options outside marriage. Thus, education and employment enable women to have a say in how their household's resources should be allocated. Although the literature empirically tests this notion for various countries, very few studies have done so in the context of Pakistan and the present study, therefore, attempts to address this gap.

2.2.   Measuring Women's Say in HDM

It is important to note that studies define and/or measure women's say in HDM differently. For instance, Keller and Mbwewe (1991) define women's say as the ability to make their decisions independently; others such as Malhotra and Mather (1997) broaden this to include women's ability to make decisions not just independently but also *inter*dependently.

A key issue that arises when studying women's HDM is that of response bias. Respondents may understate or overstate their perceived level of empowerment depending on what they see as the study's objective. For instance, if the study seeks to intervene in places where women have low levels of empowerment, respondents may underestimate their perceived empowerment levels.

Additionally, people's perceptions of their own situation can vary. Two similarly empowered women may report different perceptions of their level of empowerment. Women may also compare their empowerment levels to those of other household members: for instance, a woman who exercises a slight degree of empowerment but lives in a household or

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[2] Noncooperation means that the household's husband and wife do not work together to produce anything; each performs their own activities separately and are collectively worse off as a result (Lundberg et al., 1994).

community where other women have extremely low levels of empowerment may report being more empowered than she is.

Varghese (2011) has created an index for measuring HDM, while others such as Acharya et al. (2010) and Mahmood (2002) focus on binary variable decisions, i.e., variables that are assigned a value of 1 if the woman has any say in decision making and 0 otherwise. The decisions that Acharya et al. (2010) and Mabsout and van Staveren (2010) incorporate pertain to major and daily household purchases, women's own healthcare, and factors that reflect freedom of movement, such as whether women have a say in meeting their friends and/or family.

Although the index approach gives an overall measure of empowerment, it does not identify the causal mechanisms at play. For instance, does education empower women by giving them a greater say in the use of contraceptives or does it empower them by allowing a greater say in the purchase of household items? If a study's aim is to test competing channels, using an index as the dependent variable may not be the most appropriate approach.

Constructing numerous regressions to cater to binary variable decisions, as Acharya et al. (2010) have done, poses a different problem—the likelihood of finding a significant relationship as the result of a random variation. Out of all the regressions the authors have run, at least one is likely to yield a significant relationship; robustness checks may, therefore, need to be applied to address this.

2.3. Determinants of Women's Say in HDM

This section discusses the prime determinants of women's say in HDM, the channels through which they function, and issues pertaining to the measurement of these variables.

2.3.1. Education

The literature puts forward different views with respect to measuring education and the channels through which it affects empowerment. Some authors incorporate education as a linear variable and include the number of schooling years (see Mabsout & van Staveren, 2010) as their independent variable. Malhotra and Mather (1997) also include a quadratic term, education squared, whereas others have used dummy

variables for each progressive level of education (see Acharya et al., 2010; Shahnaz & Kizilbash, 2002).

The advantage of measuring education in years is that one can then determine the effect of each additional year of schooling regardless of the level of education being considered. Moreover, by incorporating a quadratic term, one can determine whether the effect of education on empowerment increases at an increasing or decreasing rate. On the other hand, using dummy variables for different levels of education can help identify which level plays a greater role in empowering women. It is important to note that different levels of education completed may have different signaling values and expose women to very different scenarios: for instance, in order to gain a matriculate or intermediate level of education, a woman may have to leave her village. Therefore, for the purpose of this study, education is measured in years and years squared (see Section 4.1).

Different studies have also defined education differently. Some have referred to informal education: Murphy-Graham (2010), for instance, examines whether the informal tutorial learning system in Honduras has played a role in empowering women. Informal education may specifically address women's rights and help educate and empower them in this sense.

The bulk of the literature focuses on formal education, however, and empowers women by enabling them to read and write and make independent decisions (e.g., by no longer having to rely on others to read the news or medical prescriptions, etc.). Education also increases women's reservation wage, which also acts as an empowering factor.

Furthermore, a woman's educational attainment signals her social status and intellect. According to the marriage-matching model (Becker, 1973), educated women are more likely to marry educated men. The more educated a man, the more empowered his wife is likely to be. Through this channel, a more educated woman will be more empowered than a woman with less or no education. In this context, Acharya et al. (2010) and Shahnaz and Kizilbash (2002) find that women who are better educated have a greater say in decision-making.

Some studies argue that the results for education as an empowering factor are not robust. Acharya et al. (2010), for instance, conduct a

bivariate and multivariate analysis: the first reveals that women with primary schooling are less likely to make decisions pertaining to household expenditure; the second indicates that women with primary schooling do have a say in household expenditure. This suggests that different specification strategies may yield different results.

Various estimation specifications have been used to measure empowerment, including ordered probit and ordered logit models, logit and probit models, LPMs, conditional logit models (CLMs), and ordinary least squares (OLS). Different methodologies may, therefore, lead to different conclusions, also depending on whether the study determines the robustness of the results. Different geographical locations (for example, countries or regions within a country) may also render different results. Given that women's HDM power is sensitive to socioeconomic conditions and the cultural norms that prevail within a country or region, the results of one study cannot necessarily be generalized across the board. The study's external validity thus needs to be considered.

The use of different indicators of empowerment can also give rise to different results for the significance of education. Malhotra and Mather (1997) examine women's household empowerment in Sri Lanka and find that education has a significant effect on women's say in financial decision-making but *not* in social networking or household organization. This also shows why an index is not always the most appropriate method for determining which aspects of empowerment are affected by factors such as education and employment.

2.3.2. Employment Status

Different studies have defined employment variously as including both paid and unpaid workers (Acharya et al., 2010) or those working or looking for a job (Ejaz, 2011). Others have incorporated the type of occupation into their models (West, 2006) and then deduced the results. For our purposes, a woman is considered "employed" if she is a paid worker (see Section 4.1).

There are various views of the mechanism through which employment empowers women. Some studies argue that employment is empowering only if it allows a woman to exercise control over how her wage is spent. Employment may not necessarily be empowering if women have no control over their income (Malhotra & Mather, 1997). Acharya et al.

(2010) also find that paid employment is more empowering than unpaid employment. This relates to the earlier theories presented by McElroy and Horney (1981) and Manser and Brown (1980), which argue that employment acts as a resource that empowers women in the intra-household bargaining process.

Employment may also enable a woman to interact with the outside world and allow her to exercise autonomy directly or indirectly. Kabeer (1997) also argues that the mere possibility of controlling her money is likely to empower a woman.

2.3.3.   Other Determinants

Numerous other variables have been studied or used as controls when identifying the determinants of women's empowerment. Some of these include a woman's age, number of children, the husband's level of education and occupation, family structure (whether joint or nuclear), household wealth, and region (see, for example, Acharya et al., 2010; West, 2006; Hou & Ma, 2011; Mabsout & van Staveren, 2010; Shahnaz & Kizilbash, 2002; Mahmood, 2002; Moehling, 2004).

2.4.   Pakistan-Specific Studies

Based on a sample of women (aged 15–49) in Punjab, Pakistan, Shahnaz and Kizilbash (2002) attempt to identify which factors determine women's say in their employment status. They find that, although primary education has a negative effect on women's say in paid employment, higher levels of education are positively correlated with the likelihood of women having the sole say in this context. Given that their sample includes married and unmarried women, the authors argue that the primary education variable is negative because girls with primary schooling are younger and, therefore, less able to exercise empowerment.

Mahmood (2002) looks at how a woman's say in HDM affects her reproductive behavior in terms of the desire for more children and the use of contraceptives. Such decisions also pertain to children's health, the purchase of food and clothing, and women's own mobility. The author finds that the older a woman and the longer she has been married, the higher her chances will be of having a say in household decisions. Education and paid employment, however, empower only urban women with respect to decisions regarding household

expenditure. In the case of rural women, education has an insignificant impact and paid employment a negative impact on women's say in household decisions. The study argues that social norms explain why women in these areas are engaged primarily in unpaid work while those who are paid tend to underreport their incomes.

Hou and Ma (2011) study the effect of the Benazir Income Support Program on women's uptake of reproductive healthcare services. The results of their OLS model show that women who are older, more educated, or employed have greater decision-making power. There is also a positive and significant relationship between women's empowerment and employment status.

This overview of Pakistan-specific studies indicates that, even when considering the same country, different studies will yield different results for the relationship between employment status and education and women's empowerment at the household level.

2.5.   Treatment of Endogeneity

Although various studies have focused on a number of correlates of empowerment, they do not necessarily take into account the fact that most of these correlates are endogenous (see Acharya et al., 2010). For instance, education, employment, the number of children, and family structure are all endogenous variables—when incorporated as variables of interest, they may generate biased estimates unless the problem of endogeneity is addressed. Variables such as education and employment become endogenous when other unobserved variables affect empowerment in tandem. For instance, unobserved individual characteristics such as innate intelligence and interpersonal skills may affect empowerment at the same time as education and employment.

Unobservable community and household characteristics, such as how liberal a particular community or household is, can also affect empowerment and the variables of interest. Liberal communities and households are more likely to empower women per se, but they are also more likely to encourage women to pursue education and employment. Endogeneity can also arise due to reverse causality. For instance, although employment increases women's empowerment, women who are more empowered—and thus better able to assert themselves—are also more likely to be employed.

Some studies have attempted to address this endogeneity by using district FE (see Francavilla & Giannelli, 2011). However, while this might capture the socioeconomic status of the district concerned (which can affect empowerment), it does not take into account community or household characteristics, which play a vital role in determining empowerment. For instance, belonging to a household whose members encourage women to work would affect the latter's empowerment directly, in which case household fixed effects (HFE) would be a more appropriate means of addressing the endogeneity. Luke and Munshi (2005) and Moehling (2004), for example, use HFE to study the determinants of women's say in HDM. If, however, the endogeneity were a result of reverse causality, using an IV approach would be the most appropriate method.

It is imperative that the IV be informative as well as valid. Anderson and Eswaran (2009) use the incidence of illness among household members—other than the woman or her husband—as an IV for employment (assuming that the woman then acts as caregiver). Although the variable is explanatory and valid, it is a short-term shock and does not capture the woman's long-term employment status, i.e., once the household member recovers, the woman is likely to return to work.

González-Brenes (2004) uses historical rainfall data as an instrument for household assets. If we expect rainfall to affect the assets of rural (and not urban) households, then the results will capture the local average treatment effect (LATE), which we might not necessarily be able to generalize across the entire sample.

In studying the effect of the incidence of domestic violence on women's autonomy, Eswaran and Malhotra (2009) use women's height as an IV for domestic violence. Height is assumed to reflect health, i.e., a taller woman is more likely to be healthier and stronger and, therefore, less likely to experience domestic violence. Arguably, there is no reason to believe that a woman's height should affect her empowerment, but it is possible that taller women have access to better nutrition and thus are healthier and more likely to exercise autonomy in relation to their physical wellbeing.

In some cases (normally when measuring the impact of a microfinance intervention on women's empowerment), the issue of self-selection is addressed by using the distance to the site of the intervention as an IV

for participation. Such an instrument would be valid only if the location of that intervention was randomized across the sample area. If the intervention was offered only in particular areas for certain reasons, then those areas would be systematically different from others and distance would no longer be a valid IV.

3. Theoretical Framework

The more educated a woman, the more likely she is to exercise empowerment in the decision-making process. **Education** increases women's awareness of their surroundings and enables them to make informed decisions. Similarly, the more educated a woman, the more likely she is to have a better job, which also acts as a means of empowerment. Better-educated women are likely to be more articulate and, therefore, to have more autonomy in decision-making than less educated or uneducated women. In a country such as Pakistan, where more than half the women are illiterate, educated women are deemed superior to uneducated women and will, therefore, exercise significantly more influence over household decisions than the latter.

Employment can empower women by giving them control over what they earn and how it should be spent. Employed woman, by virtue of greater interaction outside their homes, may also be more exposed to the idea of women's rights and empowerment (e.g., access to birth control). Within the employment variable, women may be employed either in agriculture or nonagriculture. Nonagricultural employment is more likely to empower women than agricultural employment, which generally calls for less educated or skilled labor.

Age tends to have a positive effect on women's HDM in that older women are likely to have more life experience, specifically with regard to marriage. They are also more likely to have been married longer. Moreover, women married to the head of the household will exercise more decision-making power (and be accorded a higher status) than if they were not his spouse.

The **spouse's own characteristics**, such as his level of education, also play a vital role in women's say in decision-making. The more educated a woman's husband—and, therefore, the more aware he is of the importance of women's empowerment—the greater autonomy she is likely to have.

Finally, other controls such as **geography** also play a role in empowering women. For instance, urban women are likely to have higher levels of empowerment than rural women because urban areas are more developed and offer better living conditions and opportunities for education and employment. In terms of region, women in Punjab, as the most developed province, are more likely to exercise greater autonomy than women living in other provinces. District-level variables, too (see Section 4.3 for a list of district controls), reflect specific cultural and socioeconomic conditions, which may have an effect on women's say in HDM.

4.   Data and Methodology

This section presents the hypotheses to be tested, briefly describes the dataset used, and explains the estimation strategies employed to address endogeneity.

4.1.   Hypotheses

The study's primary hypothesis is that individual resources such as education and employment increase women's HDM power (see Manser & Brown, 1980; McElroy & Horney, 1981; Lundberg et al., 1994). To test whether education increases a woman's HDM, we use the number of schooling years and schooling years squared, which helps us determine the marginal effects of education on empowerment.

We also test whether employment increases a woman's HDM by including her employment status as a variable that takes the value of 1 if she is a paid worker and 0 otherwise. This determines if her contribution to household income gives her a greater say in the decision-making process. We do not use monetary income in this case because the amount a person contributes to household income will also affect their decision-making power, i.e., the more they contribute, the greater decision-making power they are likely to have. Moreover, the higher a person's wage or salary, the higher their standing in the household is likely to be, which in itself is an empowering factor.

Finally, the study also tests the different marginal effects of employment type by analyzing whether both agriculture and nonagriculture employment are empowering or if only one of the two is empowering.

4.2. Data Description

The study uses secondary micro-level data from the Pakistan Social and Living Standards Measurement Survey (PSLMS) for 2007/08, which provides cross-sectional data on a large sample of households in Pakistan. Specifically, our sample focuses on married women between the ages of 15 and 49. The sample includes 15,923 women and 12,953 households (see Table 1 for a description of the sample).

Approximately 30 percent of married women in the PSLMS sample are literate. With assortative matching against observable characteristics, the data show that there is a high correlation (0.434) between a woman's level of education and that of her spouse.

Table 1: Sample distribution

Women's residence	Distribution (percent)
Urban Pakistan	38.2
Rural Pakistan	61.7
Balochistan	16.1
KP	20.8
Punjab	39.5
Sindh	23.5
Employment status	
Married women who are paid workers*	10.1
Of which, proportion resident in:	
Balochistan	3.6
KP	7.5
Punjab	63.1
Sindh	25.8

* The proportion of rural women with paid work is greater than that of urban women.
Source: Pakistan Social and Living Standards Measurement Survey for 2007/08.

The two main dependent variables, which are dichotomous, represent women's say in HDM in the form of (i) their say in birth control and (ii) their say in expenditure on food, clothing and footwear, medical treatment, and recreation (see Figure 1). We assume that decisions regarding birth control are made by (i) the husband alone, (ii) the wife herself, (iii) both husband and wife (jointly), (iv) the husband or wife's mother, (v) nobody, or (vi) other persons, or that (vii) the woman is either menopausal or infertile. The variable generated, however, does not include women who are infertile or menopausal because their lack

of a say in the use of contraception has nothing to do with their decision-making autonomy.

All women between the ages of 15 and 49 (regardless of their marital status) were asked questions pertaining to household expenditure. We assume that these decisions are made by (i) the woman herself, (ii) the household head/father alone, (iii) both the household head/father and his/her spouse, (iv) both the household head/father and the woman concerned, (v) the household head/father and his/her spouse in consultation with the woman concerned, (vi) the household head/father and other male members, or (vii) some other combination of persons. For all these variables, we assign a value of 1 if the woman has any say at all and 0 otherwise. In order to compare the disaggregated and aggregated approach, we also construct an expenditure index using principal component analysis in Stata-11.

Figure 1: Women's say in household decisions
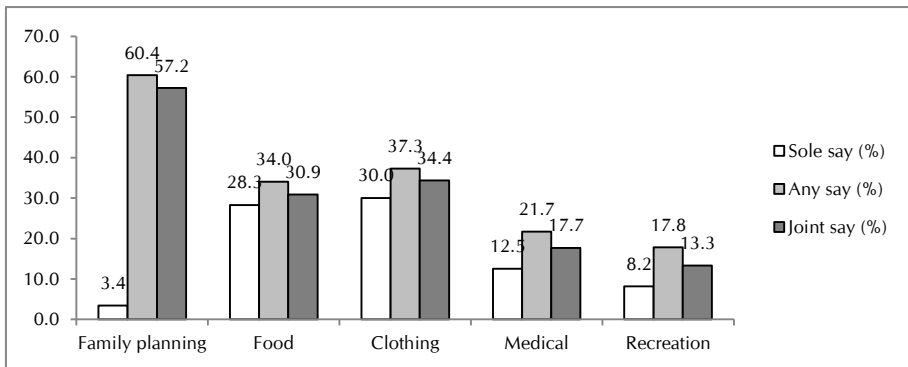
Source: Based on author's calculations

The variable of interest, i.e., the level of education, is measured by the number of years of education and years of education squared in order to account for the nonlinear relationship between education and HDM (see Section 2.3.1). Furthermore, women's employment status is assigned a value of 1 if they are paid workers and 0 otherwise. This is to account for the effect that cash in hand has on women's HDM (see Section 2.3.2).

The controls include (i) age (measured in years and years squared), (ii) the spouse's level of education (measured in years), (iii) the spouse's employment status (1 if a paid worker and 0 otherwise), (iv) a dummy

variable to show if the woman is the household head's spouse (1 if she is his spouse and 0 otherwise), (v) region (1 if urban and 0 if rural), (vi) province (dummy variables for each province: Punjab, Sindh, KP, and Balochistan), (vii) average district female educational attainment (measured in years), and (viii) average district household wealth (a household index for each household is generated and an average index level for each district is then calculated). For a list and description of the measurement of the controls, see Appendix 2.

4.3. Estimation Strategy

In order to address the endogeneity bias, we employ both an FE approach and IV approach. We construct two models: an LPM with community or primary sampling unit (PSU) FE and HFE to address the endogeneity with respect to education and a CLM to check the robustness of the results.

PSU FE and HFE are used to address the omitted variable bias and account for the unobservable characteristics common to women in a particular community and household. Such characteristics can include cultural and socioeconomic conditions that might affect the variables of interest (education and employment) as well as the outcome variables (women's HDM). For instance, women who live in a more liberal household may have a higher level of education and exercise greater HDM. HFE also address the endogeneity that arises from the assortative matching (see Becker, 1973) that takes place in marriages.

4.3.1. LPM With FE

The LPM with FE is constructed as follows:

$$\Pr(Empowerment_{fw} = 1 \mid x) = \beta_0 + \beta_1 Education + \beta_2 EmploymentStatus + \Sigma \beta_n X_n + \delta Wife_w + a_f + \upsilon_{fw}$$

The f indexes the level of FE (community/household), the w indexes married women (aged 15–49), and differencing takes place across wives (aged 15–49) within a community/household. X_n refers to the vector of control variables.

We use an LPM with an IV approach to address the reverse causality between employment and empowerment. The IV used is the average

household cotton production in a district.[3] Reverse causality is a concern because employment affects empowerment but the *level* of empowerment can also affect employment status.

As mentioned earlier, an IV must be both informative and valid. In this case, the IV is deemed informative because cotton-picking is a common form of employment among rural women. The instrument is valid because cotton production in a given district is considered a natural phenomenon that does not directly affect women's household empowerment. Moreover, cotton-picking is a labor-intensive activity that does not require a great deal of physical strength or any level of literacy—this further ensures the validity of the instrument.

Nonetheless, that cotton-producing areas are normally associated with poorer socioeconomic conditions and more conservative cultural norms may threaten the validity of the instrument. In order to address this, we employ a set of district-level controls that reflect the socioeconomic and cultural dimensions of the districts in question. Controls such as the percentage of women with at least secondary schooling, the percentage of women who use either prenatal or postnatal care, average household wealth, and average household income will have a positive effect on women's HDM. They reflect the district's social and economic development, and the more developed the district, the greater the level of empowerment women are likely to exercise in their households.

In the same manner, controls such as the distance to the nearest large city[4] and the percentage of women who do not use birth control for religious reasons will have a negative on women's HDM. We also use division FE to address any unobservable characteristics that may be associated with the administrative divisions in which these districts are located.

4.3.2.   LPM With IV Approach

The IV approach involves two stages. In the first stage,

$$\hat{EmploymentStatus}_i = \beta_0 + \beta_1 DistrictAverageCotton \Pr oduction + \Sigma\beta_n X_n + \upsilon$$

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[3] Cotton is grown in southern Punjab in the districts of Okara, Multan, Rahimyar Khan, Bahawalpur, Bahawalnagar, Vehari, Sahiwal, Khanewal, Layyah, Rajanpur, Lodhran, Muzaffargarh, and Dera Ghazi Khan.

[4] These include Lahore, Rawalpindi, Islamabad, Faisalabad, Multan, Karachi, Sukkur, Peshawar, and Quetta.

In the second stage,

$$Empowerment_i = \beta_0 + \beta_1 Employmen\hat{t}Status + \Sigma\beta_n X_n + \upsilon$$

We employ two additional sets of IVs to check the robustness of the estimates. The first set includes district FLFP rates, which are used as an instrument for employment. This IV is deemed informative because higher FLFP rates in a district imply that more employment opportunities will be available in that area and, therefore, that married women are more likely to be employed. It is valid because unless a woman is employed, the participation rate will not have a direct effect on her household empowerment.

The second set of IVs includes the district FLFP rates in agricultural and nonagricultural employment, which are used to assess which type of employment is more empowering. The regressions are run with and without the control variables to further check the robustness of the results.

5. Results and Analysis

Overall, the study's results show that education and employment increase women's say in HDM. Specifically, education has a significant effect on both family planning and expenditure-related decisions while employment has a significant effect only on expenditure-related decisions. The following sections discuss the findings from the FE estimates and the IV approach estimates.

5.1. OLS and Linear Probability Estimates

This section presents the study's OLS and linear probability estimates with and without PSU FE and HFE. It also empirically addresses the research questions posed earlier pertaining to the effect of education, employment status, and nature of employment on women's household empowerment.

5.1.1. Education

The first column of results in Tables 2 and 3 gives the naïve OLS regression results, which do not address any endogeneity concerns. This basic model includes the variables of interest—education and employment—along with a set of controls. Given that endogeneity exists

in this model, the coefficients of the variables of interest are biased. Education has a positive and significant effect on all household decisions (see also Tables A3.1 to A3.4 in Appendix 3).

Table 2: OLS results for expenditure index variable

Variable	OLS	PSU FE	HFE
Employment	0.1468	0.1582**	0.3922**
	(0.0907)	(0.0765)	(0.1937)
Education	0.0557***	0.0256*	0.0027
	(0.0165)	(0.0146)	(0.0261)
Education squared	-0.0011	-0.0004	-0.0002
	(0.0012)	(0.0011)	(0.0020)
Age	0.0552***	0.0338*	-0.0181
	(0.0199)	(0.0178)	(0.0249)
Age squared	-0.0003	-0.0000	0.0002
	(0.0003)	(0.0003)	(0.0004)
Spouse (of the head)	-0.4494***	-0.3585***	-0.0889
	(0.0701)	(0.0621)	(0.0660)
Spouse's education	0.0099	-0.0039	-0.0222
	(0.0125)	(0.0105)	(0.0165)
Spouse's education squared	-0.0005	0.0001	0.0010
	(0.0008)	(0.0007)	(0.0010)
Spouse's age	-0.0325***	-0.0298***	-0.0103
	(0.0054)	(0.0049)	(0.0064)
Spouse's age squared	0.0003***	0.0002***	0.0002*
	(0.0001)	(0.0001)	(0.0001)
Household size	-0.0327***	-0.0190***	
	(0.0070)	(0.0062)	
Household wealth	0.0060*	0.0063*	
	(0.0034)	(0.0033)	
Region	0.3606***		
	(0.0931)		
Sindh	-1.5747***		
	(0.1042)		
KP	-1.8693***		
	(0.1165)		
Balochistan	-2.5609***		
	(0.1117)		
Constant	2.1790***	1.4652***	2.0398***
	(0.3086)	(0.2729)	(0.3801)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$.

Standard errors in parentheses; clustered at PSU level.

Source: Author's calculations.

Table 3: OLS results for family planning variable

Variable	OLS	PSU FE	HFE
Employment	-0.0008	0.0274**	-0.0212
	(0.0157)	(0.0133)	(0.0352)
Education	0.0152***	0.0120***	-0.0004
	(0.0031)	(0.0025)	(0.0044)
Education squared	-0.0006***	-0.0005***	-0.0000
	(0.0002)	(0.0002)	(0.0003)
Age	0.0283***	0.0264***	0.0139***
	(0.0041)	(0.0034)	(0.0048)
Age squared	-0.0004***	-0.0004***	-0.0002***
	(0.0001)	(0.0001)	(0.0001)
Spouse (of the head)	0.0184	0.0178*	0.0126
	(0.0129)	(0.0103)	(0.0121)
Spouse's education	0.0082***	0.0023	0.0015
	(0.0022)	(0.0017)	(0.0032)
Spouse's education squared	-0.0002	-0.0000	-0.0001
	(0.0001)	(0.0001)	(0.0002)
Spouse's age	0.0022**	0.0022***	0.0019
	(0.0010)	(0.0008)	(0.0013)
Spouse's age squared	-0.0000**	-0.0000**	-0.0000
	(0.0000)	(0.0000)	(0.0000)
Household size	0.0015	-0.0002	
	(0.0019)	(0.0015)	
Household wealth	0.0000	0.0015***	
	(0.0006)	(0.0005)	
Region	0.0570***		
	(0.0175)		
Sindh	0.1050***		
	(0.0207)		
KP	0.1243***		
	(0.0223)		
Balochistan	-0.4715***		
	(0.0254)		
Constant	0.0543	0.1341**	0.3858***
	(0.0691)	(0.0557)	(0.0735)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$.
Standard errors in parentheses; clustered at PSU level.
Source: Author's calculations.

Since socioeconomic conditions and cultural factors are bound to affect the variables of interest as well as the outcome, the estimated coefficients generated by the OLS regressions are deemed biased (see Section 4.3). We address this endogeneity by incorporating PSU FE and HFE (see Tables A3.1 to A3.4 in Appendix 3).

In the community FE model, education has a significant and positive effect on women's say in family planning decisions: each additional year of schooling increases the chances of their having a say in family planning by 1.2 percentage points. With respect to expenditure-related decisions, the results show that education affects the expenditure index as a whole and expenditure on clothing in particular. Each additional year of schooling leads to a 0.15 standard deviation increase in the expenditure index.

These community FE results indicate that the simple OLS estimates do not model the effect of education on empowerment very well—in the OLS regressions, education has a positive and significant effect on *all* decisions. Moreover, the estimated coefficients of education in the community FE model are smaller in magnitude than the OLS estimates, implying that the latter are biased upward. This is consistent with Mabsout and van Staveren's (2010) study, which finds that the effect of education on women's HDM is mediated on controlling for community influences.

In the HFE estimations, education has an insignificant effect in the case of all decisions. This shows that, even at the community level, the estimates for women's education may be biased because unobservable household characteristics, such as the culture of the household, may affect the variable of interest as well as women's empowerment. In the case of some estimates, the standard errors have increased while the magnitude appears to be the same. In other cases, the standard errors have remained the same while the magnitude has declined sharply.

A possible reason for the lack of significance at the household level is that women within a household tend to have similar levels of schooling, i.e., education varies mostly *across* rather than *within* households. Another reason concerns the power or α term as the sample size becomes very limited in the HFE model. Here, power calculations could be used to determine which sample size is needed to obtain a significant result.

In the OLS estimates, the results for education are biased upward because unobservable socioeconomic conditions can have a positive impact on education as well as women's household empowerment. Interestingly, the magnitude of the coefficient of education declines as the level of FE falls, implying that a higher degree of endogeneity is addressed at a smaller level of FE.

We employ a CLM to check the robustness of the results. As evident from the literature review, different specification strategies will yield different results. Our objective, therefore, is to test whether the results of the LPM with PSU FE and HFE still hold when a different specification is used. The estimates in Table A4.1 (Appendix 4) show that the results are robust. Education has a positive and significant effect on women's say in family planning when estimates are grouped at the community level but not in the case of the household level.

Similar to the LPM with community FE, the CLM indicates that education has a significant effect only on women's say in expenditure on clothing. Furthermore, the HFE results are also consistent with those of the CLM.

5.1.2. Employment

In the OLS model without FE, paid work does not increase women's say in household expenditure as a whole. On disaggregating the index, however, paid work has a positive and significant effect on women's say in food and clothing expenditure alone. The OLS estimates also show that employment has an insignificant effect on women's say in family planning.

In the community FE model, women who are employed have a greater say in all expenditure-related decisions except those pertaining to food and clothing. Employment has a significant effect on women's say in family planning and the use of birth control. This indicates that the OLS specification does not properly model the effect of employment on women's household empowerment and that the employment estimates in the OLS specification are biased.

The results of the HFE model imply that employment increases women's say in the expenditure index as a whole and in all expenditure-related decisions except those with respect to food. However, employment has an insignificant effect on women's say in family planning. These findings are consistent with the literature (see Acharya et al., 2010; West, 2006; Malhotra & Mather, 1997).

Importantly, as FE become smaller (from community FE to HFE), the magnitude of the coefficient of employment increases in most cases. For instance, the effect of employment on women's say in medical

expenditure rises from 2.6 to 5.15 percentage points from the community FE estimates to the HFE estimates. In the case of women's say in recreational expenditure, the effect of employment rises from 2.3 to 5.6 percentage points. Moreover, in the case of the overall expenditure index, the effect of employment status on women's say in expenditure rises from a standard deviation of 0.08 (community FE estimate) to 0.23 (HFE estimate).

Employment appears to have a significant effect on family planning in the community FE but not the HFE estimates. One reason for this is that the community FE estimates show the effect of employment for both nuclear and joint families while the HFE model specifically concerns joint families. As the literature suggests, women in joint families have less say in the decision-making process, especially where reproductive decisions are concerned.

The CLM estimates show that the results are robust. Employment has a significant effect on the reproductive aspect of women's empowerment in the community FE model, but not the household grouping. The results are also robust in the case of expenditure-related decisions. In both the LPM and CLM, the results show that, even when we address unobservable household characteristics that might influence women's employment status and say in expenditure-related decisions, employment nonetheless increases their chances of having a say in decisions pertaining to expenditure (see Tables A4.1 to A4.3 in Appendix 4).

5.1.3. Paid Versus Unpaid Work

In the LPM with community FE, both paid work and unpaid work increase women's say with respect to the expenditure index. On analyzing each expenditure decision individually, the results show that paid work increases women's say, but unpaid work does not. Moreover, paid work alone increases women's say in family planning. At the HFE level, the results show that only paid work increases women's say in expenditure-related decisions while neither paid nor unpaid work increases the likelihood of women having a say in family planning.

These findings are consistent with Acharya et al. (2010) who argue that paid work increases women's HDM while unpaid work does not. The results are also in line with Malhotra and Mather (1997) who find that

employment increases women's HDM only with regard to financial decisions. These results reinforce the idea that cash in hand—as opposed to being employed without cash remuneration—has a substantial effect on woman's bargaining power in financial decision-making (see Tables A5.1 to A5.4 in Appendix 5).

5.1.4. Agricultural and Nonagricultural Employment

As the literature shows, certain forms of employment are more empowering than others. For instance, West (2006) finds that agricultural employment does not play a significant role in empowering women while nonagricultural employment does. To test these heterogeneous effects in the case of Pakistan, we run FE regressions, dividing employment into two categories: agriculture and nonagriculture.

The results show that, in all expenditure-related decisions, nonagricultural employment empowers women while agricultural employment does not. These results are robust to community FE as well as HFE, and are consistent with West's (2006) study on the effect of employment on women's HDM in India. In the case of family planning decisions, neither agricultural nor nonagricultural employment affects women's say (see Tables A6.1 to A6.4 in Appendix 6).

5.1.5. Direct Versus Indirect Approach

The direct approach to measuring household empowerment involves analyzing women's say in HDM whereas the indirect approach involves analyzing the actual outcome (Mabsout & van Staveren, 2010). For instance, the direct approach would be to ask a woman if she has a say in the household's family planning; the indirect approach would involve asking her if she uses birth control.

Although this study focuses on the direct approach, this section provides a brief comparison of the two means of measuring empowerment. Figure 2 shows that approximately 60 percent of married women in the PSLMS sample report having a say in family planning decisions. However, only a little over 20 percent reports actually using birth control.

Figure 2: Women's say in family planning and use of birth control
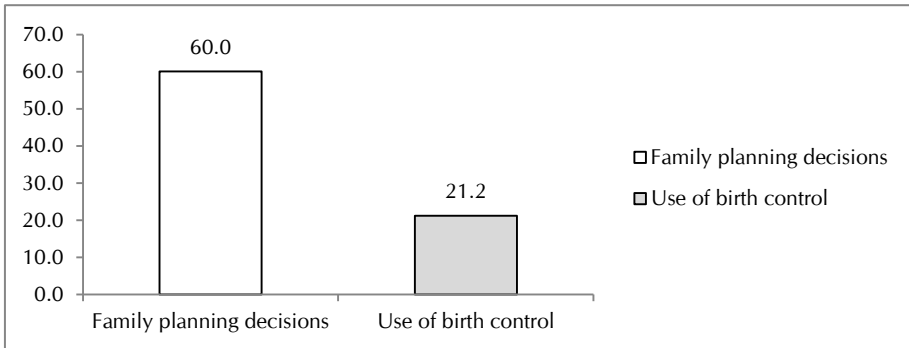
Source: Based on author's calculations

Almost three times as many women claim to have a say in decisions pertaining to family planning as opposed to actually using birth control methods. Moreover, even on accounting for women who oppose the use of birth control or are not using it because they are pregnant or want more children, a certain portion of this gap remains.

A major reason for this difference is that approximately two thirds of the women sampled did not respond to the questions pertaining to the use of birth control—perhaps because they were unwilling to discuss what they deemed a very personal matter. Excluding the women who did not respond, however, gives rise to a selection bias and yields regression results that are contrary to expectations.[5]

Comparing the direct and indirect approach also shows that there may be a response bias on the part of respondents, i.e., more women likely use birth control than those who are willing to say they do so. This would understate the percentage of married women using birth control. Alternatively, there may be a response bias in the answers pertaining to women's say in family planning decisions: perhaps more women claim to have a say than those who actually do. Empowerment is often a relative concept, as explained by Mason (2003), and women view their empowerment relative to those around them. Therefore, it is possible that, in this situation, the sampled women overstated their empowerment level.

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[5] An alternative method (for future research) would have been to use the Heckman selection model to address this selection bias.

5.1.6. Index Versus Disaggregated Approach

As anticipated, a comparison between the index and disaggregated approach shows that, if the results from the expenditure index imply that education and/or employment significantly increase the chances of women having a say in expenditure-related decisions, this does not mean that education and/or employment increase their say in *all* expenditure-related decisions.

This is evident from the results presented in this study. The disaggregated approach, therefore, provides greater insight into the various mechanisms at play. By analyzing each decision separately, as previously mentioned, the data show that far more women have a say in food-related expenditure than in recreational expenditure.

5.2. IV Approach

As explained earlier, we employ the IV approach to address the reverse causality between employment and empowerment. The IV for female paid work is the average cotton production in a district. Given that most cotton production in Pakistan takes place in relatively conservative areas, women from these districts may be less empowered than women from other areas. In order to increase the validity of the instrument, we use district-level controls and division FE (as discussed in Section 4.3).

The first-stage results show that the IV, district average cotton production (measured in kilograms), has a positive and significant effect on female paid work (Table 4). With every 10 kg rise in district average cotton production, the probability of being a female paid worker rises by nine percentage points. Other than the IV being significantly correlated with the endogenous variable, the diagnostic tests also reveal that the F-statistic for the first-stage regression is 31.79; this confirms that it is a good instrument (the F-statistic is greater than the rule-of-thumb value of 10).

Table 4: First-stage estimates (for IV district average cotton production)

Variable	Estimate
Average cotton production	0.009***
	(0.001)
Cotton production squared	-0.000***
	(0.000)
Education	-0.016***
	(0.003)
Education squared	0.002***
	(0.000)
Age	0.002***
	(0.000)
Spouse (of the head)	0.029***
	(0.008)
Spouse's education	-0.005***
	(0.002)
Spouse's education squared	0.000*
	(0.000)
Spouse's age	-0.000
	(0.000)
Household size	-0.002***
	(0.001)
Household wealth	-0.003***
	(0.001)
Average household size	0.003
	(0.005)
Average household wealth	0.006***
	(0.001)
Average household income	-0.000***
	(0.000)
Above-secondary education	-0.276**
	(0.115)
Distance (to the nearest large city)	0.002
	(0.004)
Average age at marriage for women	-0.029***
	(0.010)
Use of either prenatal or postnatal care	0.150
	(0.118)
Culture	0.055
	(0.102)
Constant	0.656***
	(0.202)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.
Source: Author's calculations.

In order to conduct an over-identification test, we use the squared value of average district cotton production; according to the Hansen test for

over-identification, the IVs are jointly exogenous. The first-stage results show that there is a negative and significant correlation between women's years of education, which implies that women with lower levels of education are more likely to be employed.

The second-stage regressions are initially run *without* FE and the results show that employment reduces women's say in recreational expenditure and family planning (see Tables A7.1 and A7.2 in Appendix 7). This may be due to the unobservable characteristics associated with cotton-growing areas. When we run the regressions *with* division FE, the IV estimates show that female paid work appears to have an insignificant effect on all decisions individually and on expenditure-related decisions as a whole (expenditure empowerment index) (see Table 5 and Table A8.1 in Appendix 8).

Although we have addressed the impact of unobservable characteristics at the division level, this effect may still be due to the LATE as cotton production takes place primarily in southern Punjab where women's empowerment levels are traditionally low. This means that there may be different marginal effects for different groups of people. Since this IV captures the impact mainly for women whose employment relies significantly on cotton production, it shows the effect on empowerment for women from those areas.

It is also important to note that the IV captures the effect of employment for women in agriculture and, as evident from the previous estimations, agricultural employment does not increase women's household empowerment. These results are, therefore, consistent with the previous estimates.

Table 5: Second-stage estimates for expenditure

Variable	Food	Clothing	Medical	Recreation
Employment	0.168	0.090	0.132	0.061
	(0.605)	(0.937)	(1.152)	(0.850)
Education	0.006	0.007	0.004	0.005
	(0.008)	(0.014)	(0.017)	(0.012)
Education squared	-0.000	-0.000	-0.000	-0.000
	(0.001)	(0.002)	(0.002)	(0.002)
Age	0.004**	0.005*	0.006**	0.005**
	(0.002)	(0.002)	(0.003)	(0.002)
Spouse (of the head)	-0.031	-0.046*	-0.063*	-0.064**
	(0.023)	(0.027)	(0.034)	(0.026)
Spouse's education	0.000	0.002	-0.002	0.001
	(0.003)	(0.004)	(0.005)	(0.004)
Spouse's education squared	0.000	-0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Spouse's age	-0.002***	-0.002***	-0.003***	-0.002***
	(0.001)	(0.000)	(0.001)	(0.001)
Household size	-0.003	-0.004*	-0.003	-0.003
	(0.002)	(0.002)	(0.003)	(0.003)
Household wealth	0.002	0.002	0.001	0.001
	(0.002)	(0.003)	(0.003)	(0.002)
Average household size	-0.020*	-0.015	-0.005	-0.001
	(0.011)	(0.013)	(0.007)	(0.006)
Average household wealth	0.005	0.002	-0.004	-0.005
	(0.003)	(0.004)	(0.005)	(0.004)
Average household income	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Above-secondary education	-0.221	-0.040	0.243	0.345
	(0.218)	(0.276)	(0.287)	(0.279)
Distance (to the nearest large city)	-0.006	-0.023	-0.013	-0.004
	(0.017)	(0.029)	(0.031)	(0.028)
Average age at marriage for women	-0.031	0.002	0.006	-0.021
	(0.020)	(0.030)	(0.019)	(0.019)
Use of either prenatal or postnatal care	-0.200	0.060	0.184	0.221
	(0.178)	(0.228)	(0.222)	(0.262)
Culture	-0.430**	-0.630*	-0.434	-0.312
	(0.177)	(0.328)	(0.305)	(0.280)
Hansen statistics	1.281	0.651	0.423	0.524
Chi-sq. (1) p-value	0.2578	0.4197	0.5156	0.4691

* p < 0.10, ** p < 0.05, *** p < 0.010; robust standard errors in parentheses.
Source: Author's calculations.

We use the district FLFP rate to check for the robustness of the results. This IV is informative because the higher the district participation rate, the more likely it is that women from that district are employed. It is valid because, unless a woman is employed, the district participation rate will not affect her HDM. The first-stage results reveal that the IV is positive and

significant in determining empowerment, with an F-statistic of 208.41. Employment thus has a significant effect only on women's say in clothing-related expenditure (see Tables A9.1 to A9.3 in Appendix 9).

This IV, too, incorporates a LATE because it shows the marginal effect for women who live in areas that offer better employment opportunities. However, on average, women in Pakistan tend to be engaged in jobs that do not require a high level of education or skills.

A further robustness test is applied to analyze which type of employment is more empowering. Here, we use the district FLFP rates for agriculture and nonagriculture as IVs for married women engaged in agricultural and nonagricultural work, respectively. These IVs are informative because women living in districts where the availability of agricultural (nonagricultural) jobs is high are more likely to be employed in agriculture (nonagriculture). The instruments are valid because, unless a woman is employed in either one of these fields, the overall participation rate will not directly affect her level of household empowerment.

The results from the first stage(s) show that both IVs are informative as each has a significant effect on its respective endogenous variable. The second-stage results reveal that nonagricultural employment increases women's say in clothing-related expenditure. These results are consistent with the previous estimations, which showed that the IV estimates for the effect of employment on women's say in HDM were robust (see Tables A10.1 to A10.3 in Appendix 10).

6.   Conclusion

The low levels of empowerment among women are a serious concern, especially in developing countries. In the case of Pakistan, the statistics show that women lag behind men in most areas, including educational attainment and labor force participation. Moreover, social and cultural norms often restrict women's decision-making autonomy in various spheres. This study has looked at women's HDM power by assessing their say in five major decision areas: (i) family planning, and expenditure on (ii) food, (iii) clothing, (iv) medical treatment and (v) recreation.

Given that the theory suggests that resources in the form of education and employment act as a means of gaining intra-household bargaining power, the study's core aim was to determine the effect of education

and employment on women's household empowerment in Pakistan. In order to address the endogeneity in this relationship, we have used both FE and IV models.

The study provides a useful insight into the relationship between education, employment, and women's say in HDM and shows how endogeneity concerns can be addressed and the robustness of the results determined. We have found that education empowers women in the case of decisions pertaining to family planning as well as expenditure. With respect to employment status, nonagricultural and paid work increase women's household say in HDM as opposed to agricultural and unpaid work, respectively.

Although employment consistently increases women's say in the case of expenditure-related decisions, the results for the effect of employment on family planning are not robust. This implies that family planning is driven largely by cultural factors and that paid work does not necessarily increase women's say in this area. However, women who are employed and earn cash in hand have a greater say than unemployed women in how that cash is spent on meeting household needs.

The study has also shed light on the role of cultural and structural factors in determining women's say in household decisions. Given that cultural as well as structural factors (such as education and employment) drive these outcomes, both government and nongovernment organizations need to emphasize the importance of women's education and focus on forms of employment that will improve women's HDM outcomes.

Future research could focus on policy interventions to assess which particular mechanisms—for instance, awareness campaigns for women's right to education—determine the effect of education on women's household empowerment. Additionally, it is important to note that the intra-household bargaining process is a complex relationship and data constraints can make it difficult to control for certain determinants. Further research might, therefore, use a methodology that involves primary data collection with a questionnaire designed to study the bargaining process. Other research possibilities include conducting a natural experiment to assess how policy interventions might enhance women's household empowerment. A more interdisciplinary approach could also be employed by using tools from disciplines such as sociology and psychology to assess the dynamics of this issue.

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Appendix 1: Summary of literature review

Studies	Location	Measurement	Dependent variable	Estimation strategy	Findings
Education variable					
Acharya et al. (2010)	Nepal (direct method)	Dummy variables for education levels	Dichotomous variables for say in decisions regarding own health, major purchases, daily purchases, visits to family	Logistic regressions	Positive
Hou and Ma (2011)	Pakistan (direct and indirect methods)	Dummy variables for education levels	Index for uptake of reproductive healthcare services	OLS Logit	Positive
Murphy-Graham (2010)	Central America (direct method)	SAT intervention	Say in decision making	Qualitative analysis	Positive
Mabsout and van Staveren (2010)	Ethiopia (direct method)	Years	Empowerment index (health, purchases, visits to family)	Ordered logit	Mediated when community influences are controlled for
Malhotra and Mather (1997)	Sri Lanka (direct method)	Years and years squared	Say in financial decisions, social and organizational decisions	Multinomial logit Logit	Insignificant in social and organizational decisions
Employment status variable					
Acharya et al. (2010)	Nepal (direct method)	Dummy variables: not employed, employed for cash, employed not for cash	Dichotomous variables for say in decisions regarding own health, major purchases, daily purchases, visits to family	Logistic regressions	Paid employment is more empowering than unpaid employment
Hou and Ma (2011)	Pakistan (direct method)	1 = employed, 0 otherwise	Index for uptake of reproductive healthcare services	OLS Logit	Positive
West (2006)	India (direct method)	Dummy variables for types of occupation	Index for say in decision making, freedom of movement, husband's attitude toward domestic violence	Logit Ordered logit	Employment is empowering in some aspects and not in others
Malhotra and Mather (1997)	Sri Lanka (direct method)	Dummy variables: unpaid, employed and shares wages with family, wages for herself	Say in financial decisions, social and organizational decisions	Multinomial logit Logit model	Insignificant in social (e.g., networking) and organizational (e.g., household matters) decisions

Appendix 2: Measurement of control variables

Control variable	Measurement	Type
Age	Years and years squared	Continuous
Spouse (of the head)	1 = spouse of head, 0 otherwise	Dummy variable
Spouse's age	Years and years squared	Continuous
Husband's education	Years and years squared	Continuous
Household wealth	Index	Continuous
Household size	Number of family members living in the household	Continuous
Average household size in a district	Average number of family members in a district	Continuous
Average household wealth in a district	Index	Average of indices Continuous
Average household income in a district	Rupees	Continuous
Percentage of women with above-secondary education	Percentage	Continuous
Percentage of married women who have used postnatal or prenatal care	Percentage	Continuous
Average age at which women in a district get married	Years	Continuous
Culture	Percentage	Continuous
Distance (in 100 km) to the nearest large city	Kilometers	Continuous
Region	1 = urban, 0 = rural	Dummy variable
Province	Punjab, Sindh, KP, and Balochistan	Dummy variables Punjab base category

Appendix 3: OLS and FE results

Table A3.1: Food expenditure

Variable	OLS	PSU FE	HFE
Employment	0.0411**	0.0096	0.0380
	(0.0174)	(0.0116)	(0.0303)
Education	0.0049*	0.0025	-0.0025
	(0.0028)	(0.0023)	(0.0039)
Education squared	-0.0001	-0.0000	0.0002
	(0.0002)	(0.0002)	(0.0003)
Age	0.0078**	0.0055*	0.0002
	(0.0033)	(0.0029)	(0.0039)
Age squared	-0.0001	-0.0000	-0.0000
	(0.0001)	(0.0000)	(0.0001)
Spouse (of the head)	-0.0339***	-0.0339***	-0.0133
	(0.0113)	(0.0096)	(0.0106)
Spouse's education	-0.0002	-0.0010	-0.0014
	(0.0022)	(0.0016)	(0.0025)
Spouse's education squared	0.0000	0.0000	0.0001
	(0.0001)	(0.0001)	(0.0001)
Spouse's age	-0.0031***	-0.0031***	-0.0025**
	(0.0009)	(0.0008)	(0.0011)
Spouse's age squared	0.0000*	0.0000**	0.0001**
	(0.0000)	(0.0000)	(0.0000)
Household size	-0.0058***	-0.0027***	
	(0.0012)	(0.0009)	
Household wealth	0.0020***	0.0006	
	(0.0006)	(0.0005)	
Region	0.0285*		
	(0.0161)		
Sindh	-0.2935***		
	(0.0227)		
KP	-0.4677***		
	(0.0189)		
Balochistan	-0.5161***		
	(0.0174)		
Constant	0.5198***	0.3065***	0.3847***
	(0.0537)	(0.0462)	(0.0578)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

Table A3.2: Clothing expenditure

Variable	OLS	PSU FE	HFE
Employment	0.0526***	0.0190	0.0538*
	(0.0172)	(0.0129)	(0.0309)
Education	0.0089***	0.0046*	-0.0017
	(0.0031)	(0.0026)	(0.0040)
Education squared	-0.0001	0.0001	0.0002
	(0.0002)	(0.0002)	(0.0003)
Age	0.0049	0.0002	0.0031
	(0.0036)	(0.0032)	(0.0041)
Age squared	-0.0000	0.0001	-0.0001
	(0.0001)	(0.0000)	(0.0001)
Spouse (of the head)	-0.0583***	-0.0483***	-0.0147
	(0.0118)	(0.0100)	(0.0101)
Spouse's education	0.0025	-0.0018	-0.0042
	(0.0023)	(0.0018)	(0.0026)
Spouse's education squared	-0.0001	0.0001	0.0002
	(0.0001)	(0.0001)	(0.0001)
Spouse's age	-0.0027***	-0.0019**	-0.0007
	(0.0010)	(0.0008)	(0.0011)
Spouse's age squared	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)
Household size	-0.0066***	-0.0037***	
	(0.0013)	(0.0011)	
Household wealth	0.0018***	0.0011*	
	(0.0007)	(0.0005)	
Region	0.0799***		
	(0.0177)		
Sindh	-0.3240***		
	(0.0189)		
KP	-0.2237***		
	(0.0252)		
Balochistan	-0.4526***		
	(0.0203)		
Constant	0.5007***	0.4031***	0.3576***
	(0.0584)	(0.0498)	(0.0615)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

Table A3.3: Medical expenditure

Variable	OLS	PSU FE	HFE
Employment	-0.0077	0.0265**	0.0512*
	(0.0147)	(0.0120)	(0.0294)
Education	0.0070**	0.0035	0.0016
	(0.0028)	(0.0023)	(0.0037)
Education squared	-0.0000	-0.0001	-0.0002
	(0.0002)	(0.0002)	(0.0003)
Age	0.0108***	0.0088***	-0.0053
	(0.0034)	(0.0029)	(0.0038)
Age squared	-0.0001	-0.0001	0.0001
	(0.0001)	(0.0000)	(0.0001)
Spouse (of the head)	-0.0669***	-0.0499***	-0.0101
	(0.0109)	(0.0097)	(0.0106)
Spouse's education	0.0003	-0.0010	-0.0026
	(0.0020)	(0.0017)	(0.0025)
Spouse's education squared	0.0000	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)
Spouse's age	-0.0059***	-0.0056***	-0.0016*
	(0.0009)	(0.0008)	(0.0009)
Spouse's age squared	0.0001***	0.0001***	0.0000
	(0.0000)	(0.0000)	(0.0000)
Household size	-0.0039***	-0.0021**	
	(0.0011)	(0.0011)	
Household wealth	-0.0002	0.0006	
	(0.0006)	(0.0005)	
Region	0.0506***		
	(0.0157)		
Sindh	-0.1319***		
	(0.0181)		
KP	-0.1454***		
	(0.0196)		
Balochistan	-0.2342***		
	(0.0178)		
Constant	0.2120***	0.1608***	0.3306***
	(0.0523)	(0.0444)	(0.0582)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

Table A3.4: Recreational expenditure

Variable	OLS	PSU FE	HFE
Employment	0.0011	0.0235**	0.0561**
	(0.0143)	(0.0116)	(0.0251)
Education	0.0076***	0.0026	0.0029
	(0.0025)	(0.0021)	(0.0036)
Education squared	-0.0003	-0.0001	-0.0002
	(0.0002)	(0.0002)	(0.0003)
Age	0.0045	0.0023	-0.0055
	(0.0031)	(0.0026)	(0.0036)
Age squared	0.0000	0.0000	0.0001
	(0.0000)	(0.0000)	(0.0001)
Spouse (of the head)	-0.0664***	-0.0496***	-0.0086
	(0.0102)	(0.0089)	(0.0091)
Spouse's education	0.0024	0.0014	-0.0032
	(0.0018)	(0.0015)	(0.0023)
Spouse's education squared	-0.0001	-0.0001	0.0002
	(0.0001)	(0.0001)	(0.0001)
Spouse's age	-0.0045***	-0.0041***	-0.0006
	(0.0008)	(0.0007)	(0.0009)
Spouse's age squared	0.0000**	0.0000***	0.0000
	(0.0000)	(0.0000)	(0.0000)
Household size	-0.0014	-0.0016	
	(0.0012)	(0.0010)	
Household wealth	-0.0001	0.0010*	
	(0.0005)	(0.0005)	
Region	0.0299*		
	(0.0157)		
Sindh	-0.1042***		
	(0.0177)		
KP	-0.1653***		
	(0.0174)		
Balochistan	-0.1774***		
	(0.0187)		
Constant	0.2398***	0.2087***	0.2779***
	(0.0493)	(0.0404)	(0.0547)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

Appendix 4: Robustness of FE estimates

Table A4.1: CLM for family planning

Variable	PSU	Household
Employment	0.2082**	-0.1986
	(0.0973)	(0.4299)
Education	0.0932***	0.0025
	(0.0200)	(0.0956)
Education squared	-0.0039**	-0.0014
	(0.0016)	(0.0075)
Age	0.2202***	0.3129***
	(0.0267)	(0.1078)
Age squared	-0.0031***	-0.0048***
	(0.0004)	(0.0017)
Spouse (of the head)	0.1440*	0.2253
	(0.0842)	(0.2916)
Spouse's education	0.0139	0.0120
	(0.0148)	(0.0690)
Spouse's education squared	0.0001	-0.0001
	(0.0010)	(0.0043)
Spouse's age	0.0161**	0.0285
	(0.0065)	(0.0216)
Spouse's age squared	-0.0002**	-0.0003
	(0.0001)	(0.0004)
Household size	-0.0026	
	(0.0114)	
Household wealth	0.0115***	
	(0.0041)	

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

Table A4.2: CLM (grouped at PSU level) for food, clothing, medical, and recreational expenditure

Variable	Food	Clothing	Medical	Recreation
Employment	0.0618	0.1129	0.1973**	0.2183**
	(0.0863)	(0.0832)	(0.0903)	(0.1001)
Education	0.0216	0.0315*	0.0336*	0.0240
	(0.0183)	(0.0173)	(0.0183)	(0.0198)
Education squared	-0.0002	0.0006	-0.0010	-0.0012
	(0.0014)	(0.0013)	(0.0014)	(0.0015)
Age	0.0483*	-0.0009	0.0643**	0.0044
	(0.0267)	(0.0249)	(0.0269)	(0.0276)
Age squared	-0.0004	0.0004	-0.0004	0.0005
	(0.0004)	(0.0004)	(0.0004)	(0.0004)
Spouse (of the head)	-0.2690***	-0.3534***	-0.4054***	-0.4522***
	(0.0858)	(0.0783)	(0.0888)	(0.0925)
Spouse's education	-0.0101	-0.0155	-0.0096	0.0173
	(0.0144)	(0.0141)	(0.0157)	(0.0173)
Spouse's education sq.	0.0003	0.0005	0.0008	-0.0011
	(0.0009)	(0.0009)	(0.0011)	(0.0011)
Spouse's age	-0.0243***	-0.0096	-0.0386***	-0.0327***
	(0.0070)	(0.0061)	(0.0065)	(0.0068)
Spouse's age squared	0.0003**	0.0000	0.0004***	0.0002**
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Household size	-0.0238**	-0.0271***	-0.0109	-0.0078
	(0.0095)	(0.0094)	(0.0106)	(0.0115)
Household wealth	0.0043	0.0063*	0.0026	0.0068
	(0.0040)	(0.0036)	(0.0039)	(0.0043)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

Table A4.3: CLM (grouped at household level) for food, clothing, medical, and recreation

Variable	Food	Clothing	Medical	Recreation
Employment	0.5006	0.7790*	0.8275*	1.2476**
	(0.4134)	(0.4515)	(0.4512)	(0.5523)
Education	-0.0405	-0.0338	0.0162	0.0774
	(0.0758)	(0.0786)	(0.0770)	(0.0808)
Education squared	0.0030	0.0030	-0.0026	-0.0067
	(0.0056)	(0.0060)	(0.0058)	(0.0059)
Age	-0.0040	0.0882	-0.1087	-0.1645
	(0.0944)	(0.0972)	(0.0967)	(0.1103)
Age squared	-0.0004	-0.0017	0.0015	0.0025
	(0.0015)	(0.0015)	(0.0015)	(0.0018)
Spouse (of the head)	-0.3521	-0.3840	-0.2291	-0.3331
	(0.3003)	(0.3094)	(0.2938)	(0.3448)
Spouse's education	-0.0645	-0.1090	-0.0381	-0.0969
	(0.0789)	(0.0744)	(0.0722)	(0.0860)
Spouse's education sq.	0.0050	0.0037	0.0003	0.0056
	(0.0064)	(0.0059)	(0.0053)	(0.0070)
Spouse's age	-0.0418**	-0.0065	-0.0373	-0.0126
	(0.0203)	(0.0205)	(0.0242)	(0.0275)
Spouse's age squared	0.0009**	0.0003	0.0007	0.0002
	(0.0004)	(0.0004)	(0.0005)	(0.0005)
Household size				
Household wealth				

$*$ $p < 0.10$, $**$ $p < 0.05$, $***$ $p < 0.010$; robust standard errors in parentheses.

Appendix 5: Paid versus unpaid work

Table A5.1: Food, clothing, medical, and recreational expenditure (PSU FE)

Variable	Food	Clothing	Medical	Recreation
Paid	0.0126	0.0236*	0.0300**	0.0278**
	(0.0119)	(0.0131)	(0.0123)	(0.0118)
Unpaid	0.0203	0.0299**	0.0235*	0.0283**
	(0.0148)	(0.0150)	(0.0137)	(0.0133)
Education	0.0027	0.0049*	0.0038	0.0029
	(0.0023)	(0.0025)	(0.0023)	(0.0021)
Education squared	-0.0000	0.0001	-0.0001	-0.0002
	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Age	0.0054*	0.0001	0.0088***	0.0022
	(0.0029)	(0.0032)	(0.0029)	(0.0026)
Age squared	-0.0000	0.0001	-0.0001	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Spouse (of the head)	-0.0341***	-0.0488***	-0.0503***	-0.0500***
	(0.0096)	(0.0100)	(0.0097)	(0.0089)
Spouse's education	-0.0009	-0.0017	-0.0009	0.0015
	(0.0016)	(0.0018)	(0.0017)	(0.0015)
Spouse's educ. sq.	0.0000	0.0001	0.0001	-0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Spouse's age	-0.0031***	-0.0019**	-0.0056***	-0.0042***
	(0.0008)	(0.0008)	(0.0008)	(0.0007)
Spouse's age sq.	0.0000**	0.0000	0.0001***	0.0000***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Household size	-0.0028***	-0.0037***	-0.0021**	-0.0017*
	(0.0009)	(0.0011)	(0.0011)	(0.0010)
Household wealth	0.0006	0.0011**	0.0006	0.0010*
	(0.0005)	(0.0005)	(0.0005)	(0.0005)
Constant	0.3061***	0.4024***	0.1602***	0.2081***
	(0.0462)	(0.0498)	(0.0443)	(0.0404)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

Table A5.2: Food, clothing, medical, and recreational expenditure (HFE)

Variable	Food	Clothing	Medical	Recreation
Paid	0.0454	0.0609*	0.0522*	0.0584**
	(0.0315)	(0.0319)	(0.031)	(0.0265)
Unpaid	0.0388	0.0372	0.0051	0.0121
	(0.0346)	(0.0354)	(0.0331)	(0.0304)
Education	-0.0023	-0.0015	0.0016	0.003
	(0.0039)	(0.0040)	(0.0037)	(0.0036)
Education squared	0.0002	0.0002	-0.0002	-0.0002
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
Age	0.0001	0.0030	-0.0054	-0.0056
	(0.0039)	(0.0041)	(0.0038)	(0.0036)
Age squared	-0.0000	-0.0001	0.0001	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Spouse (of the head)	-0.0140	-0.0154	-0.0102	-0.0088
	(0.0106)	(0.0102)	(0.0106)	(0.0091)
Spouse's education	-0.0014	-0.0042	-0.0026	-0.0032
	(0.0025)	(0.0026)	(-0.0025)	(0.0023)
Spouse's educ. sq.	0.0001	0.0002	0.0001	0.0002
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Spouse's age	-0.0026**	-0.0007	-0.0016*	-0.0006
	(0.0011)	(0.0011)	(0.0009)	(0.0009)
Spouse's age sq.	0.0001**	0.0000	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Household size	0.3837***	0.3566***	0.3304***	0.2776***
	(0.0578)	(0.0614)	(0.0581)	(0.0547)
Household wealth				
Constant				

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

Table A5.3: Expenditure index and family planning (PSU FE)

Variable	Expenditure index	Family planning
Paid	0.1883**	0.0272**
	(0.0779)	(0.0134)
Unpaid	0.1995**	-0.0011
	(0.0893)	(0.0154)
Education	0.0276*	0.0120***
	(0.0145)	(0.0025)
Education squared	-0.0006	-0.0005***
	(0.0011)	(0.0002)
Age	0.0332*	0.0264***
	(0.0178)	(0.0034)
Age squared	-0.0000	-0.0004***
	(0.0003)	(0.0001)
Spouse (of the head)	-0.3612***	0.0178*
	(0.0622)	(0.0103)
Spouse's education	-0.0031	0.0023
	(0.0105)	(0.0017)
Spouse's education squared	0.0001	-0.0000
	(0.0007)	(0.0001)
Spouse's age	-0.0300***	0.0022***
	(0.0049)	(0.0008)
Spouse's age squared	0.0003***	-0.0000**
	(0.0001)	(0.0000)
Household size	-0.0195***	-0.0002
	(0.0062)	(0.0015)
Household wealth	0.0064*	0.0015***
	(0.0033)	(0.0005)
Constant	1.4605***	0.1341**
	(0.2729)	(0.0557)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

Table A5.4: Expenditure index and family planning (HFE)

Variable	Expenditure index	Family planning
Paid	0.4243**	-0.0223
	(0.2028)	(0.0368)
Unpaid	0.1684	-0.0054
	(0.2352)	(0.0445)
Education	0.0036	-0.0004
	(0.0260)	(0.0044)
Education squared	-0.0003	-0.0000
	(0.0020)	(0.0003)
Age	-0.0185	0.0139***
	(0.0249)	(0.0049)
Age squared	0.0002	-0.0002***
	(0.0004)	(0.0001)
Spouse (of the head)	-0.0921	0.0127
	(0.0663)	(0.0120)
Spouse's education	-0.0224	0.0015
	(0.0166)	(0.0032)
Spouse's education squared	0.0010	-0.0001
	(0.0010)	(0.0002)
Spouse's age	-0.0104	0.0019
	(0.0064)	(0.0013)
Spouse's age squared	0.0002*	-0.0000
	(0.0001)	(0.0000)
Constant	2.0354***	0.3860***
	(0.3796)	(0.0736)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

Appendix 6: Agriculture and nonagriculture employment

Table A6.1: Expenditure index

Variable	Expenditure index	
	PSU FE	**HFE**
Agriculture	0.3160	-0.0382
	(0.4689)	(0.1379)
Nonagriculture	0.2040***	0.5510***
	(0.0783)	(0.1992)
Education	0.0260*	0.0032
	(0.0146)	(0.0262)
Education squared	-0.0005	-0.0004
	(0.0011)	(0.0020)
Age	0.0334*	-0.0197
	(0.0178)	(0.0248)
Age squared	-0.0000	0.0002
	(0.0003)	(0.0004)
Spouse (of the head)	-0.3590***	-0.0914
	(0.0622)	(0.0661)
Spouse's education	-0.0040	-0.0222
	(0.0105)	(0.0165)
Spouse's education squared	0.0001	0.0010
	(0.0007)	(0.0010)
Spouse's age	-0.0297***	-0.0104
	(0.0049)	(0.0064)
Spouse's age squared	0.0003***	0.0002*
	(0.0001)	(0.0001)
Household size	-0.0190***	
	(0.0062)	
Household wealth	0.0064*	
	(0.0033)	
Constant	1.4715***	2.0644***
	(0.2732)	(0.3787)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

Table A6.2: Food and clothing expenditure

Variable	Food		Clothing	
	PSU FE	HFE	PSU FE	HFE
Agriculture	0.0658	-0.0047	-0.0315	-0.0029
	(0.0835)	(0.0205)	(0.0775)	(0.0214)
Nonagriculture	0.0165	0.0587*	0.0256**	0.0756**
	(0.0117)	(0.0307)	(0.0130)	(0.0312)
Education	0.0026	-0.0024	0.0047*	-0.0016
	(0.0023)	(0.0039)	(0.0026)	(0.0040)
Education squared	-0.0000	0.0002	0.0001	0.0002
	(0.0002)	(0.0003)	(0.0002)	(0.0003)
Age	0.0054*	0.0000	0.0002	0.0029
	(0.0029)	(0.0039)	(0.0032)	(0.0041)
Age squared	-0.0000	-0.0000	0.0001	-0.0001
	(0.0000)	(0.0001)	(0.0000)	(0.0001)
Spouse (of the head)	-0.0339***	-0.0136	-0.0485***	-0.0151
	(0.0096)	(0.0106)	(0.0100)	(0.0101)
Spouse's education	-0.0010	-0.0014	-0.0018	-0.0042
	(0.0016)	(0.0025)	(0.0018)	(0.0026)
Spouse's educ. sq.	0.0000	0.0001	0.0001	0.0002
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Spouse's age	-0.0031***	-0.0025**	-0.0019**	-0.0007
	(0.0008)	(0.0011)	(0.0008)	(0.0011)
Spouse's age sq.	0.0000**	0.0001**	0.0000	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Household size	-0.0027***		-0.0037***	
	(0.0009)		(0.0011)	
Household wealth	0.0006		0.0011**	
	(0.0005)		(0.0005)	
Constant	0.3076***	0.3873***	0.4034***	0.3609***
	(0.0462)	(0.0576)	(0.0498)	(0.0613)

* p < 0.10, ** p < 0.05, *** p < 0.010; robust standard errors in parentheses.

Table A6.3: Medical and recreational expenditure

Variable	Medical		Recreation	
	PSU FE	HFE	PSU FE	HFE
Agriculture	0.0653	-0.0105	0.0523	-0.0013
	(0.0675)	(0.0204)	(0.0789)	(0.0195)
Nonagriculture	0.0314**	0.0675**	0.0289**	0.0789***
	(0.0128)	(0.0304)	(0.0122)	(0.0261)
Education	0.0036	0.0016	0.0027	0.0030
	(0.0023)	(0.0038)	(0.0021)	(0.0036)
Education squared	-0.0001	-0.0002	-0.0002	-0.0003
	(0.0002)	(0.0003)	(0.0002)	(0.0003)
Age	0.0088***	-0.0055	0.0022	-0.0058
	(0.0029)	(0.0038)	(0.0026)	(0.0036)
Age squared	-0.0001	0.0001	0.0000	0.0001
	(0.0000)	(0.0001)	(0.0000)	(0.0001)
Spouse (of the head)	-0.0500***	-0.0104	-0.0496***	-0.0089
	(0.0097)	(0.0106)	(0.0089)	(0.0091)
Spouse's education	-0.0010	-0.0026	0.0013	-0.0032
	(0.0017)	(0.0025)	(0.0015)	(0.0023)
Spouse's educ. sq.	0.0001	0.0001	-0.0001	0.0002
	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Spouse's age	-0.0056***	-0.0016*	-0.0041***	-0.0006
	(0.0008)	(0.0009)	(0.0007)	(0.0009)
Spouse's age sq.	0.0001***	0.0000	0.0000***	0.0000
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Household size	-0.0021**		-0.0016	
	(0.0011)		(0.0010)	
Household wealth	0.0006		0.0010*	
	(0.0005)		(0.0005)	
Constant	0.1617***	0.3336***	0.2096***	0.2814***
	(0.0444)	(0.0581)	(0.0404)	(0.0544)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

Table A6.4: Family planning

Variable	Family planning	
	PSU FE	HFE
Agriculture	0.1173	-0.0027
	(0.0796)	(0.0224)
Nonagriculture	0.0208	-0.0369
	(0.0140)	(0.0373)
Education	0.0119***	-0.0004
	(0.0025)	(0.0044)
Education squared	-0.0005***	0.0000
	(0.0002)	(0.0003)
Age	0.0264***	0.0140***
	(0.0034)	(0.0049)
Age squared	-0.0004***	-0.0002***
	(0.0001)	(0.0001)
Spouse (of the head)	0.0180*	0.0128
	(0.0103)	(0.0121)
Spouse's education	0.0023	0.0015
	(0.0017)	(0.0032)
Spouse's education squared	-0.0000	-0.0001
	(0.0001)	(0.0002)
Spouse's age	0.0022***	0.0019
	(0.0008)	(0.0012)
Spouse's age squared	-0.0000**	-0.0000
	(0.0000)	(0.0000)
Household size	-0.0002	
	(0.0015)	
Household wealth	0.0014***	
	(0.0005)	
Constant	0.1343**	0.3850***
	(0.0558)	(0.0736)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

Appendix 7: IV cotton estimates without division FE

Table A7.1: Expenditure index and family planning

Variable	Expenditure index	Family planning
Employment	-2.054	-1.191***
	(1.666)	(0.414)
Education	-0.008	-0.006
	(0.029)	(0.008)
Education squared	0.004	0.002**
	(0.003)	(0.001)
Age	0.045***	0.004***
	(0.006)	(0.001)
Spouse (of the head)	-0.357***	0.079***
	(0.115)	(0.021)
Spouse's education	-0.019	0.002
	(0.015)	(0.003)
Spouse's education squared	0.001	0.000
	(0.001)	(0.000)
Spouse's age	-0.018***	-0.000
	(0.003)	(0.001)
Household size	-0.030***	-0.001
	(0.008)	(0.002)
Household wealth	0.002	-0.003*
	(0.006)	(0.002)
Average household size	-0.099	0.008
	(0.072)	(0.017)
Average household wealth	-0.045**	0.000
	(0.019)	(0.006)
Average household income	0.000	0.000
	(0.000)	(0.000)
Above-secondary education	3.845**	-0.688
	(1.726)	(0.448)
Distance (to the nearest large city)	-0.007	0.015
	(0.072)	(0.022)
Average age at marriage for women	-0.186	0.010
	(0.162)	(0.036)
Use of either prenatal or postnatal care	2.912*	0.401
	(1.586)	(0.400)
Culture	-3.214***	-1.136***
	(1.193)	(0.354)
Region	-0.223	-0.111***
	(0.149)	(0.029)
Sindh	-1.759***	0.069
	(0.308)	(0.065)
KP	-1.767***	-0.029
	(0.506)	(0.105)
Balochistan	-1.776***	-0.545***
	(0.506)	(0.116)
Constant	6.208*	0.608
	(3.479)	(0.834)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

Table A7.2: Food, clothing, medical, and recreation

Variable	Food	Clothing	Medical	Recreation
Employment	0.574	0.223	-0.774**	-0.794**
	(0.440)	(0.364)	(0.367)	(0.372)
Education	0.011*	0.006	-0.010	-0.007
	(0.007)	(0.006)	(0.006)	(0.007)
Education squared	-0.001	-0.000	0.002**	0.001*
	(0.001)	(0.001)	(0.001)	(0.001)
Age	0.003**	0.004***	0.008***	0.007***
	(0.001)	(0.001)	(0.001)	(0.001)
Spouse (of the head)	-0.046***	-0.056***	-0.040*	-0.044**
	(0.016)	(0.016)	(0.022)	(0.022)
Spouse's education	0.002	0.002	-0.007**	-0.004
	(0.003)	(0.003)	(0.003)	(0.003)
Spouse's education squared	-0.000	-0.000	0.000**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Spouse's age	-0.002***	-0.001***	-0.003***	-0.003***
	(0.000)	(0.001)	(0.001)	(0.001)
Household size	-0.003*	-0.004***	-0.005***	-0.004***
	(0.002)	(0.001)	(0.002)	(0.001)
Household wealth	0.003**	0.002*	-0.002	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Average household size	-0.028**	-0.027*	-0.008	0.006
	(0.012)	(0.015)	(0.013)	(0.013)
Average household wealth	-0.004	-0.009**	-0.006	-0.005
	(0.004)	(0.004)	(0.004)	(0.004)
Average household income	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Above-secondary education	0.210	0.792**	0.593*	0.387
	(0.392)	(0.347)	(0.307)	(0.323)
Distance (to the nearest large city)	-0.007	-0.019	0.007	0.011
	(0.008)	(0.014)	(0.012)	(0.012)
Average age at marriage for women	0.058**	0.034	-0.063**	-0.094***
	(0.026)	(0.031)	(0.027)	(0.025)
Use of either prenatal or postnatal care	0.093	0.233	0.510*	0.566**
	(0.283)	(0.325)	(0.276)	(0.272)
Culture	-0.587**	-0.349*	-0.342	-0.392*
	(0.225)	(0.208)	(0.225)	(0.227)
Region	0.003	-0.036	-0.038	-0.038
	(0.023)	(0.025)	(0.028)	(0.029)
Sindh	-0.178***	-0.266***	-0.223***	-0.233***
	(0.051)	(0.054)	(0.054)	(0.054)
KP	-0.269***	-0.070	-0.229**	-0.311***
	(0.075)	(0.096)	(0.091)	(0.085)
Balochistan	-0.292***	-0.245***	-0.209**	-0.182*
	(0.082)	(0.086)	(0.102)	(0.098)
Constant	-0.491	-0.104	1.528**	2.029***
	(0.611)	(0.715)	(0.584)	(0.558)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

Appendix 8: IV cotton estimates with division FE

Table A8.1: Expenditure index and family planning: Second stage

Variable	Expenditure index	Family planning
Employment	0.861	-0.366
	(5.569)	(1.428)
Education	0.042	0.010
	(0.081)	(0.019)
Education squared	-0.002	0.000
	(0.011)	(0.002)
Age	0.039***	0.003
	(0.014)	(0.003)
Spouse (of the head)	-0.409**	0.054
	(0.175)	(0.047)
Spouse's education	0.001	0.005
	(0.025)	(0.006)
Spouse's education squared	0.000	-0.000
	(0.001)	(0.000)
Spouse's age	-0.017***	-0.000
	(0.003)	(0.001)
Household size	-0.025	-0.001
	(0.017)	(0.003)
Household wealth	0.012	0.001
	(0.015)	(0.004)
Average household size	-0.073	0.006
	(0.050)	(0.015)
Average household wealth	-0.008	-0.006
	(0.024)	(0.006)
Average household income	0.000	0.000***
	(0.000)	(0.000)
Above-secondary education	0.838	0.139
	(1.408)	(0.375)
Distance (to the nearest large city)	-0.085	-0.025
	(0.168)	(0.019)
Average age at marriage for women	-0.083	0.061
	(0.132)	(0.038)
Use of either prenatal or postnatal care	0.645	0.259
	(1.286)	(0.304)
Culture	-3.444**	-1.016***
	(1.719)	(0.348)
Hansen statistic	0.147	1.863
Chi sq.	0.7014	0.1722

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

Appendix 9: Robustness check for IV estimates: District FLFP with division FE

Table A9.1: First-stage results

Variable	First stage
Employment	0.968***
	(0.034)
Education	-0.015***
	(0.003)
Education squared	0.002***
	(0.000)
Age	0.002***
	(0.000)
Spouse (of the head)	0.026***
	(0.008)
Spouse's education	-0.004**
	(0.002)
Spouse's education squared	0.000
	(0.000)
Spouse's age	-0.000
	(0.000)
Household size	-0.002***
	(0.001)
Household wealth	-0.003***
	(0.001)
Average household size	0.003*
	(0.001)
Average household wealth	0.002***
	(0.001)
Average household income	0.000
	(0.000)
Above-secondary education	-0.183***
	(0.044)
Distance (to the nearest large city)	0.001
	(0.001)
Average age at marriage for women	-0.001
	(0.003)
Use of either prenatal or postnatal care	-0.005
	(0.034)
Culture	-0.059***
	(0.018)
Region	-0.014
	(0.010)
Sindh	0.012*
	(0.006)
KP	-0.012*
	(0.006)
Balochistan	-0.011
	(0.007)
Constant	-0.012
	(0.058)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

Table A9.2: Expenditure index and family planning: Second stage

Variable	Expenditure index	Family planning
Employment	1.111	-0.265
	(1.193)	(0.304)
Education	0.046*	0.011**
	(0.025)	(0.005)
Education squared	-0.002	-0.000
	(0.003)	(0.001)
Age	0.038***	0.003**
	(0.006)	(0.001)
Spouse (of the head)	-0.416***	0.051**
	(0.134)	(0.020)
Spouse's education	0.002	0.005**
	(0.014)	(0.002)
Spouse's education squared	0.000	-0.000
	(0.001)	(0.000)
Spouse's age	-0.017***	-0.000
	(0.003)	(0.001)
Household size	-0.025**	-0.000
	(0.011)	(0.002)
Household wealth	0.012**	0.001
	(0.005)	(0.001)
Average household size	-0.073	0.006
	(0.052)	(0.015)
Average household wealth	-0.009	-0.007
	(0.016)	(0.005)
Average household income	0.000	0.000***
	(0.000)	(0.000)
Above-secondary education	0.850	0.145
	(1.305)	(0.346)
Distance (to the nearest large city)	-0.086	-0.026
	(0.161)	(0.017)
Average age at marriage for women	-0.082	0.061
	(0.134)	(0.039)
Use of either prenatal or postnatal care	0.616	0.246
	(1.331)	(0.184)
Culture	-3.404**	-1.000***
	(1.340)	(0.372)

$* p < 0.10, ** p < 0.05, *** p < 0.010$; robust standard errors in parentheses.

Table A9.3: Food, clothing, medical, and recreation

Variable	Food	Clothing	Medical	Recreation
Employment	0.295	0.717***	-0.143	-0.142
	(0.243)	(0.129)	(0.330)	(0.294)
Education	0.008*	0.017***	0.000	0.002
	(0.004)	(0.004)	(0.006)	(0.005)
Education squared	-0.001	-0.001***	0.000	0.000
	(0.000)	(0.000)	(0.001)	(0.001)
Age	0.003***	0.003***	0.007***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)
Spouse (of the head)	-0.035*	-0.064***	-0.055***	-0.058***
	(0.019)	(0.020)	(0.019)	(0.018)
Spouse's education	0.001	0.005	-0.003	-0.000
	(0.003)	(0.003)	(0.002)	(0.002)
Spouse's education sq.	-0.000	-0.000	0.000**	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Spouse's age	-0.002***	-0.001***	-0.003***	-0.003***
	(0.000)	(0.000)	(0.001)	(0.001)
Household size	-0.003**	-0.003*	-0.004*	-0.003*
	(0.001)	(0.002)	(0.002)	(0.002)
Household wealth	0.002***	0.004***	0.000	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Average household size	-0.020*	-0.016	-0.005	-0.000
	(0.011)	(0.014)	(0.008)	(0.007)
Average household wealth	0.004	0.001	-0.004	-0.004
	(0.003)	(0.003)	(0.004)	(0.004)
Average household income	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Above-secondary educ.	-0.215	-0.009	0.229	0.335
	(0.223)	(0.257)	(0.265)	(0.272)
Distance (to the nearest large city)	-0.007	-0.026	-0.011	-0.003
	(0.016)	(0.027)	(0.029)	(0.026)
Average age at marriage for women	-0.031	0.005	0.005	-0.022
	(0.019)	(0.028)	(0.022)	(0.021)
Use of either prenatal or postnatal care	-0.214	-0.012	0.216	0.244
	(0.172)	(0.236)	(0.229)	(0.277)
Culture	-0.410***	-0.531**	-0.477*	-0.344
	(0.130)	(0.266)	(0.250)	(0.231)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

Appendix 10: IV district FLFP in agriculture and nonagriculture with division FE

Table A10.1: First-stage(s) results

Variable	Agriculture	Nonagriculture
Agriculture	1.179***	
	(0.208)	
Education	0.000	-0.013***
	(0.000)	(0.002)
Education squared	-0.000	0.002***
	(0.000)	(0.000)
Age	0.000***	0.003***
	(0.000)	(0.000)
Spouse (of the head)	-0.000	0.024***
	(0.000)	(0.008)
Spouse's education	0.000	-0.002
	(0.000)	(0.001)
Spouse's education squared	-0.000	0.000
	(0.000)	(0.000)
Spouse's age	-0.000*	-0.001**
	(0.000)	(0.000)
Household size	-0.000**	-0.001***
	(0.000)	(0.000)
Household wealth	-0.000	-0.003***
	(0.000)	(0.000)
Average household size	0.000	0.003*
	(0.000)	(0.001)
Average household wealth	0.000**	0.002***
	(0.000)	(0.000)
Average household income	0.000	(0.000)
	(0.000)	(0.000)
Above-secondary education	0.000	-0.218***
	(0.004)	-0.032
Distance (to the nearest large city)	0.000	(0.000)
	(0.000)	-0.001
Average age at marriage for women	-0.000	-0.001
	(0.000)	(0.002)
Use of either prenatal or postnatal care	-0.001	-0.005
	(0.004)	(0.032)
Culture	0.005*	-0.064***
	(0.003)	(0.016)
Region	0.001	-0.023***
	(0.001)	(0.006)
Sindh	0.000	0.015**
	(0.000)	(0.006)
KP	-0.000	-0.008
	(0.001)	(0.006)
Balochistan	-0.000	-0.008
	(0.001)	(0.007)
Nonagriculture		0.943***
		(0.030)
Constant	-0.003	-0.010
	(0.009)	(0.057)

* p < 0.10, ** p < 0.05, *** p < 0.010; robust standard errors in parentheses.

Table A10.2: Expenditure index and family planning: Second stage

Variable	Expenditure index	Family planning
Agriculture	-2.533	-3.934
	(10.784)	(3.849)
Nonagriculture	1.193	-0.042
	(1.769)	(0.608)
Education	0.045*	0.015**
	(0.027)	(0.007)
Education squared	-0.002	-0.001
	(0.004)	(0.001)
Age	0.038***	0.004*
	(0.006)	(0.002)
Spouse (of the head)	-0.418***	0.042
	(0.119)	(0.027)
Spouse's education	-0.000	0.006***
	(0.011)	(0.002)
Spouse's education squared	0.000	-0.000
	(0.001)	(0.000)
Spouse's age	-0.017***	-0.000
	(0.003)	(0.001)
Household size	-0.025**	-0.001
	(0.011)	(0.002)
Household wealth	0.012**	0.001
	(0.005)	(0.001)
Average household size	-0.073	0.005
	(0.052)	(0.015)
Average household wealth	-0.008	-0.007
	(0.016)	(0.005)
Average household income	0.000	0.000***
	(0.000)	(0.000)
Above-secondary education	0.841	0.097
	(1.304)	(0.342)
Distance (to the nearest large city)	-0.069	-0.022
	(0.160)	(0.019)
Average age at marriage for women	-0.085	0.062*
	(0.133)	(0.037)
Use of either prenatal or postnatal care	0.705	0.263
	(1.311)	(0.204)
Culture	-3.363**	-0.934**
	(1.376)	(0.368)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

Table A10.3: Food, clothing, medical, and recreation: Second stage

Variable	Food	Clothing	Medical	Recreation
Agriculture	3.474	0.979	-2.555	-2.124
	(2.995)	(2.084)	(1.901)	(2.009)
Nonagriculture	0.097	0.884***	-0.124	-0.098
	(0.418)	(0.213)	(0.483)	(0.493)
Education	0.004	0.017***	0.001	0.003
	(0.006)	(0.003)	(0.007)	(0.007)
Education squared	-0.000	-0.002***	0.000	-0.000
	(0.001)	(0.000)	(0.001)	(0.001)
Age	0.003*	0.002**	0.007***	0.006***
	(0.002)	(0.001)	(0.002)	(0.002)
Spouse (of the head)	-0.027	-0.066***	-0.057***	-0.061***
	(0.020)	(0.019)	(0.018)	(0.018)
Spouse's education	-0.000	0.003	-0.003*	0.000
	(0.002)	(0.002)	(0.002)	(0.002)
Spouse's education squared	0.000	-0.000	0.000*	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Spouse's age	-0.001*	-0.001***	-0.003***	-0.003***
	(0.001)	(0.000)	(0.001)	(0.001)
Household size	-0.003*	-0.003	-0.004*	-0.003*
	(0.002)	(0.002)	(0.002)	(0.002)
Household wealth	0.002**	0.004***	0.000	0.001
	(0.001)	(0.001)	(0.001)	(0.001)
Average household size	-0.019*	-0.016	-0.005	-0.001
	(0.011)	(0.014)	(0.008)	(0.007)
Average household wealth	0.004	0.001	-0.004	-0.004
	(0.003)	(0.003)	(0.004)	(0.004)
Average household income	0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Above-secondary education	-0.176	0.028	0.193	0.307
	(0.224)	(0.261)	(0.258)	(0.268)
Distance (to the nearest large city)	-0.010	-0.017	-0.009	-0.002
	(0.018)	(0.028)	(0.028)	(0.025)
Average age at marriage for women	-0.032*	0.003	0.006	-0.021
	(0.018)	(0.028)	(0.021)	(0.020)
Use of either prenatal or postnatal care	-0.223	0.010	0.234	0.256
	(0.176)	(0.239)	(0.231)	(0.275)
Culture	-0.469***	-0.507*	-0.455*	-0.321
	(0.142)	(0.260)	(0.261)	(0.242)

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$; robust standard errors in parentheses.

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