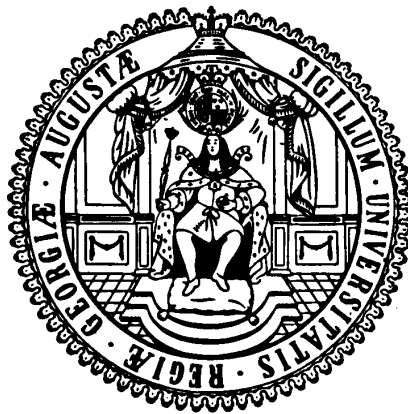# Courant Research Centre
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A Question of Nature or Nurture?**

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# The Financial Literacy Gender Gap:

# A Question of Nature or Nurture?

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## Abstract

This paper empirically investigates the role of nurture for the frequently reported differences in financial knowledge between women and men and uses a quasi-experimental framework comparing individuals who live in a matrilineal with those in a patriarchal environment in India. The results of our empirical analyses show that women, on average, are less likely to know about different financial instruments and practices than men. In contrast, no differences in financial knowledge between women and men exist in the matrilineal cultural environment. Matrilineal women are also more financially literate than women who live in patriarchal regions. Education, English language skills and the use of different information sources like TV and radio explain a large part of these differences in financial knowledge among women. Although considering a number of important variables, the results of a Blinder-Oaxaca decomposition show that a sizable portion of the differences in financial knowledge remains unexplained, what could be explained by nurture.

**JEL-Codes**: O1, I3, Z1

**Keywords**: Gender and financial literacy, matrilineal and patriarchal societies, Blinder-Oaxaca

decomposition

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# 1   Introduction

A growing body of empirical research documents the existence of a gender gap in financial literacy in many developed and developing countries (Lusardi and Mitchell, 2014). Studies show that men outperform women in very basic as well as sophisticated financial literacy questions (Lusardi et al., 2010). Strikingly, even single men have higher financial literacy than single women who are in charge of their own finances (Hsu, 2011). These significant gaps do also exist among the young and educated (Lührmann et al., 2014; Lusardi et al., 2010).

While this financial literacy gender gap has attracted growing interest among researchers and policy makers in developed as well as developing countries, the reasons for the gap are not yet fully understood. For instance, empirical evidence points to gender differences in financial knowledge arising from specialization within the household where men mostly decide about financial matters (Hsu, 2011; Lusardi and Mitchell, 2014). In line with this argument, studies show that women increase their financial knowledge mostly when it becomes relevant to them, for instance, prior to the death of their husbands (Hsu, 2011) or when social securities in their country are low (Japelli and Padula, 2013). However, empirical evidence also shows that sole female decision makers have equally low or even lower levels of financial literacy compared to those in partnerships, suggesting a limited role of intra-household specialization in explaining the financial literacy gender gap (Bucher-Koenen et al., 2012). Even more interestingly, studies provide empirical evidence for Germany for instance, that high school girls show lower interest in financial matters as well as lower self-assessed financial knowledge compared to boys (Lührmann et al., 2014).

Further, differences in certain personal characteristics like self-confidence or risk behavior of women and men may also affect their financial knowledge (Bucher-Koenen and Lusardi, 2011; Lusardi and Mitchell, 2014; Charness and Gneezy, 2010). Thus, an important question that remains unanswered so far is whether the financial literacy gender gap can be attributed to factors arising from *nurture* –evolving from the socio-cultral environment where women and men grow up – or whether this is caused by the

*nature* of the respective gender.

Given the fact that intra - household roles of women and men are often learned from early childhood (Lusardi and Mitchel, 2008; Bucher-Koenen et al., 2012) disentangling determinants leading to a financial literacy gender gap arising from *nurture* are challenging. This paper contributes to the existing literature in several important aspects. Firstly, this paper uses a unique cultural setting that allows to identify relevant factors for explaining gender differences in financial knowledge arising from *nurture*. In India the three north-eastern states of Nagaland, Mizoram and Meghalaya are characterized by a matrilineal culture while all other states in India are rather patriarchal. Women in these matrilineal states, in sharp contrast to patriarchal societies, grow up knowing that, later in life, they will be household heads who decide on the economic and financial matters of the family (Gneezy et al., 2009; Nakane, 1967). Hence, examining patriarchal and matrilineal societies allows us to make use of a quasi- experimental framework comparing financial knowledge of women and men who live in two cultures that greatly differ in terms of a women's role in household and financial decision making. Secondly, this paper uses information on general financial knowledge of the respondent as well as on knowledge about financial instruments like a credit card as well as on Indian specific financial items. Moreover, this paper investigates relevant determinants that may explain differences in financial knowledge among women who grew up and live in a matrilineal culture and women who grew up and live in a patriarchal environments like the use of information sources. Thus this paper provides new insights, for explaining the frequently reported gap between women and men in financial knowledge, what may not only be relevant for India but also for other countries.

On the one hand, nurture may explain why single women have lower levels of financial knowledge than single men despite both groups having similar levels of financial responsibility. Lusardi et al. (2010) conjuncture that women who grow up knowing that someone else will take care of the household finances in the future may be less interested in acquiring financial knowledge. On the other hand, women may be less interested in economic and financial issues in general already from early child hood (Lührmann et al.,

2014).

For our empirical analyses, we employ the National Data Survey of Savings Patterns of Indians (NDSSP), which was conducted under the administration of the ministry of finance in India in 2004-2005 in all Indian states. It is a large and unique data set that also covers the three matrilineal states in north eastern India. The data provides detailed information on the respondents' knowledge about financial matters and allows to further control for a large number of variables that may be particularly important for acquiring financial knowledge.

Our empirical results show that women in India, are on average less likely to know about different financial practices than men. In contrast, our results do not show any significant differences in financial knowledge between women and men who live in the three matrilineal states in India. Moreover, our empirical results provide evidence that women who grow up and live in the matrilineal culture in India are more knowledgeable about financial matters than women who live in other Indian states. Using the Blinder-Oaxaca decomposition technique, we find that the observed financial knowledge differences among women in matrilineal and patriarchal states can partly be explained by the use of information sources, English language skills and the educational level of the respondents. However, a sizable part of the residual remains unexplained pointing to differences that may be rooted in nurture.

The remainder of this paper is organized as follows. The next section discusses the relevant literature and derives hypotheses. Section 3 describes the data source and the measurement of variables. Descriptive statistics and the empirical results are presented in Section 4. Section 5 provides a discussion and Section 6 concludes.

# 2 Conceptual framework

## 2.1 Gender differences in financial knowledge

A burgeoning literature has examined potential factors behind gender differences in financial literacy (Lusardi and Mitchell, 2014; Lusardi et al., 2012). One of the proposed

factors that may explain why women are on average less financially literate than men is a women's lower involvement in financial decision making within the household. Hsu (2011), for instance, shows that within couples men tend to specialize in handling household financial matters, making women less likely to develop their financial knowledge. When women are less involved in financial decision making within the household, a smaller amount of financial knowledge may be acquired and a women's motivation to learn about financial matters may be lower since she may not see the use in acquiring this specific knowledge (Lusardi and Mitchell, 2014).

Interestingly, Fonseca et al. (2012) find that greater financial decision making, and hence, financial responsibility within the household, is positively correlated with higher financial literacy for men, but not for women. They show empirically that men are more likely to increase their financial knowledge when they are in charge of the financial and economic decisions. However, they do not find similar empirical evidence for female decision makers. Bucher-Koenen et al. (2012) similarly show that a remarkable gender gap in financial knowledge exists even among the divorced and widowed, and that sole female decision makers, those who were never married, have equally low or even lower levels of financial literacy compared to women living in a partnership. Hence, it remains unclear whether specialization of financial matters within households explains the financial literacy gender gap. Fonseca et al. (2012), argue that disparities in the level of financial knowledge among women and men is better explained by differences in how the knowledge is acquired, what they call the production process, than by differences in the personal characteristics of men and women. Regarding women's preferences, Lusardi and Mitchel (2008) argue that women may be in general less interested in financial matters than men, and therefore imply that the intra-household division of labor is somehow given by *nature*. Lührmann et al. (2014), for instance, provide empirical evidence that teaching high school children in finance in Germany, enhances interest in financial topics significantly for boys but not for girls.

On the other hand Field et al. (2010), show that differences in knowledge among women and men may be rooted in social norms. The authors conducted a field experiment

in India where business training was given to both upper caste individuals, where social restrictions are very strict, and lower caste individuals, where social restrictions are assumed to be somewhat less stringent. Their results show that participating in the business training was more beneficial to women who had stricter traditional restrictions. Their results thus show, to some extent, differences in financial knowledge arising from *nurture*.

In order to analyze the question of whether the financial literacy gender gap can be ascribed to *nature* or *nurture*, it is important to explain how an individuals specific knowledge about financial matters can be affected. According to existing theories on the acquisition of specific human capital, there are at least two ways through which household financial responsibilities could affect financial literacy. First, being financially responsible provides the opportunity to acquire financial knowledge through the learning-by-doing technique. For instance, individuals who manage household finances inform themselves about different savings and investment mechanisms, as well as inquire about possible benefits and risks associated with their financial investments (Campbell, 2006). Such activities demand repeated interactions with workers from the financial institution, other customers of financial services like friends or neighbors who have similar interests (Hong et al., 2004). This may raise the financial knowledge level of the financially responsible individual and increase the knowledge gap with the less financially responsible partner. This is the view echoed by recent studies such as Hsu (2011). These studies assign the specializations within the household activities as the main reasons for the observed gender gap in financial literacy because decision making on financial matters is often allocated to men rather than to women. The learning-by-doing argument, however, falls short of explaining the financial literacy differences between unmarried women and men as reported by Hsu (2011) or the lower levels of financial interest among girls compared to boys that already exist at younger ages (Lührmann et al., 2014).

The second channel through which financial knowledge may be affected, is by increasing the expected benefit from investments in this specific form of human capital. Investment in human capital usually involves costs, as does acquiring financial knowledge.

Since financial knowledge is a specific form of human capital, it is not fully associated with the general level of schooling (Lusardi and Mitchell, 2014; Lührmann et al., 2014). Investment in human capital as described by Becker (1962) allows for approaching this issue theoretically. Taking into account the future flow of returns in terms of income, individuals invest in acquiring human capital in several ways, including formal education, on the job training, or by acquiring information about a specific topic or area that may be valuable in the future. Specific human capital is often of little help outside of one's own main area, although it is meant to be useful (Becker, 1962). The opportunity cost of investing in its acquisition is thus relatively higher than investing in a comparable amount of general human capital. Hence, individuals who are more responsible for household finances, and expect to remain in this role, are more likely to anticipate a larger net return from investment in financial knowledge than their partners. Conversely, individuals who expect others (their partners or the state) to manage their own finances in the future are less likely to invest in acquiring financial knowledge. Correspondingly, previous research by Japelli and Padula (2013) document that people are less likely to invest in financial literacy when the social security system in their country is strong. This argument has the potential to explain why even unmarried women are less financially knowledgeable than unmarried men. Namely, when women live in a society that often assigns men to manage household financial issues, they are not as likely to invest in acquiring financial knowledge as men. Consequently, even unmarried women could have lower levels of financial literacy than unmarried men. Moreover, this could also explain why already girls are less interested in financial matters than boys.

## 2.2 The matrilineal society in India

In India, men generally make the decisions regarding household financial issues. The few exceptions to the strongly patriarchal Indian society are the Khasi and Garo tribes who form the majority of the population of the north eastern Indian states Nagaland, Mizoram and Meghalaya.[1]

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[1]Nagaland, Mizoram and Meghalaya account for, respectively, 0.25%, 0.09% and 0.16% of the Indian population (www.censusindia.gov.in.)

The Khasi and Garo are matrilineal and matrilocal societies where women are the head of the household (Nakane, 1967). In the matrilineal culture, inheritance is through the mothers' lineage. Within the matrilocal culture married couples reside with or near the wife's parents. The Khasi and Garo men leave their mother's house after marriage and move into their wife's house. In the matrilineal culture, the youngest daughter usually stays with her mother and becomes the household head in the future. Thus, a man who is married to the youngest daughter in the family lives together with his wife and his mother-in-law, who is the head of the household (Nakane, 1967; War, 1995). Men who are unmarried, divorced, or widowed stay with their parents until they get married or re-married. Moreover, Khasi and Garo men are not allowed to hold properties of high value such as land or any other forms of valuable assets that could allow them to live independently and be self-reliant. Income earned by a man is used to contribute to the wealth of the wife's or mother's family. Hence, economic decisions and household responsibilities are not in the husband's but in the wife's hands (Nakane, 1967). The matrilineal culture is nevertheless considered to be gender symmetric – meaning that men are not totally excluded from the economic and financial decisions of the household, but rather contribute to their wife's household decision. Often the older brother of the youngest daughter, or the oldest man, is also seen as the household head, holding a consultative rather than an executive position within the family (Roy, 1986). This implies that Khasi and Garo women grow up knowing that they will hold the household responsibilities of their family in the future. Women learn from their mother how to manage economic situations, for example, how to distribute the households incomes, deal with other valuable assets, or manage the family properties. Women who grow up and live in this culture also differ from women growing up in patriarchal societies in their personality traits. Studies, for instance, show that Khasi women are not only more competitive than Khasi men but also more competitive than men in patriarchal societies (Gneezy et al., 2009). Moreover, Gneezy et al. (2009) argue that in matrilineal societies investments in the human capital of girls are prioritized compared to boys, which points to the relevance of nurture for women's superior financial literacy outcomes compared

to boys. Thus, Khasi and Garo women learn from early childhood that they may need specific knowledge to take care of the household financial and economic responsibilities in the future. Women in a matrilineal culture may, therefore, be more keen in acquiring financial knowledge than women who live in a patriarchal environment. Moreover, women who live in a matrilineal environment also gain practical experience within the household when observing their mothers dealing with financial matters.

Although opportunities for women in India have increased over the past few years through better education and increased labor market participation, the economic and financial responsibilities of women within a patriarchal household are still very low. Studies, for instance, show that women continue to follow traditional norms of society and household financial decisions are ascribed to the men who are typically the head of the household (Garikipati, 2008; Munshi and Rosenzweig, 2006). Thus, women's incentives to acquire financial knowledge may, therefore, be relatively low in a patriarchal environment whereas this may be the opposite in the matrilineal culture.

The foregoing discussion leads to the following hypotheses of this paper. Firstly, we expect that women in India know, on average, less about financial matters than men and secondly, that these gender differences in financial knowledge do not exist in Indian states where the matrilineal culture is prevalent. Thirdly, we expect that women living in a matrilineal culture are more financially knowledgeable than women in other Indian states. Finally, we suggest that a higher financial knowledge among women in matrilineal states compared to women in patriarchal states is driven by different determinants that influence financial knowledge, e.g. the use of different information sources, as well as by the simple fact of nurture (growing up in a matrilineal culture). In particular, women who know that they will be the household head in the future may be more perceptive to financially relevant information than women who live in a cultural environment where this role is typically appointed to men.

# 3   Data and methodology

## 3.1   Source

For the empirical analyses, the National Data Survey on Savings Patterns of Indians (NDSSP) is employed, which is a nationwide Indian survey conducted by AC Nielsen/Org-Marg on behalf of the Indian Ministry of Finance in 2004/2005. The NDSSP comprises relevant information about Indian households' savings and investments in financial instruments, as well as information about the respondents financial knowledge. The dataset further provides information on the respondents' income, age, marital status, level of education, use of information sources and place of residence. The NDSSP covers 40,862 households, and 211,000 individuals. Although all family members were asked to provide baseline information (e.g. age, education, occupation), only one member of the family was chosen to continue with the full questionnaire. We restrict our sample to respondents who are the head of the household since they can be expected to be responsible for savings and investment decisions. Our final sample therefore consists of 28,392 observations. Among the 28,392 observations, 3,006 are women and 25,400 are men. Although our final sample is restricted to household heads, in the matrilineal states our sample contains more male than female respondents. One explanation for this is that the oldest man in the matrilineal family as well as the brother of the oldest women is often nominally considered as the household head. This may explain why the majority of respondents from Nagaland, Mizoram and Meghalaya are men. From the 923 respondents from the northeastern states, Nagaland Mizoram and Meghalaya, 195 are women and 728 are men. However, men in these states are not traditionally in charge of the family's economic and financial decisions. It is, however, a unique characteristic of this data that it comprises respondents from matrilineal states, as most surveys do not cover them.

## 3.2 Measurement of variables

### 3.2.1 Dependent variables

In the past few decades, financial markets and institutions have become increasingly accessible to small investors and individuals. At the same time, the financial products available to individual consumers – such as alternative ways of saving, borrowing and investing, or different retirement plans – have shown tremendous growth, both in variety and complexity. In developing countries, financial products have become more accessible. Some financial products are particularly targeted to low income individuals, who often have relatively limited access to financial services. In India, for instance, a bank account can be opened free of charge and without a minimum deposit requirement. The Indian government also offers deposit guarantees for investments with national banks. Furthermore, bank customers are using financial instruments like credit or Kisan cards. Kisan cards are a common financial instrument used by farmers and people living in rural areas and provide affordable short-term credit. Kisan cards were launched in 1998 to help farmers with their agricultural activities and have become a widely applied financial instrument in many rural areas of India.

In the NDSSP survey, respondents were asked different questions that capture their financial knowledge. For our empirical analyses we use the following: (1) Does the government guarantee full deposits in national banks? (2) Do you know the current value of all of your investments? (3) Do you have a credit card? (4) Do you have a Kisan card? While the first two questions reflect an individual's general financial knowledge on financial matters, the latter two point to the respondents financial knowledge with respect to financial instruments. The respondent has the following options to answer those questions: Yes, No, or Don't know what this is. We compute four dummy variables according to the aforementioned questions. Since we are interested in whether the respondent knows the respective financial item we categorize yes and no responses as one category of knowing about this financial item, because only very few respondents answer with "yes". Most of the respondents answer with "no" – indicating that they know what is meant by the financial item. Our dependent variables are thus four dummy

variables taking on the value one if the respondent's answer is either "yes" or "no", and is zero if the respondent's answer is "do not know what this is", respectively.

### 3.2.2 Explanatory variables

*Matrilineal States*: The NDSSP Dataset allows us to identify individuals who live in the north-eastern Indian states Nagaland, Mizoram and Meghalaya where matrilinealty is the prevalent form of society. The dummy variable *matristate* takes on the value one, if an interviewee reports that he or she lives in one of the three matrilineal states and is zero otherwise.

*Regional Characteristics:* Differences in financial knowledge may be related to regional characteristics of the state where the respondent lives. To take this issue into account, we consider whether the respondent lives in a rural or in an urban area and furthermore, we control for the GDP per capita at the Indian state level.[2]

*Personal Characteristics:* We account for the respondent's gender, marital status, age, caste affiliation, level of education, income from primary and secondary occupations, whether land is owned (other than homestead) and the respondent's risk attitude. Moreover, it is an advantage of the NDSSP data that it comprises information about the respondent's risk attitude, since empirical evidence shows that women who live in matrilineal states are on average more risk-seeking than women living elsewhere (Gneezy et al., 2009).[3]

*Education*: The respondent's level of education may be strongly related to their financial knowledge. Therefore we account for twelve possible education levels. We compute eleven dummy variables ranging from "illiterate" to "postgraduate and above", with "illiterate"

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[2]Official data is obtained from official statistics of the Reserve Bank of India: http://dbie.rbi.org.in/DBIE/dbie.rbi?site=home

[3]Risk attitude is measured using a lottery-type question where only one of the three choices guarantees a positive return. The interviewee has to make a hypothetical investment of 1000 rupees and can choose between three alternative investments. In the first choice Rs. 1000 may increase to 2000 Rs. after one year or the investor may only get Rs. 500 back. In the second choice money may increase to Rs. 1200 or the investor may lose some of the money and get Rs. 800 back. In the third choice money will grow to Rs. 1050 without any loss. The dummy variable risk attitude takes on the value one if an interviewee opts for the third choice, and is zero otherwise. Hence, this variable reflects the respondents risk aversion, which is an important issue when investigating financial knowledge because an individual's attitude towards risk may also influence financial behavior.

being the reference category. Moreover, we consider whether the respondent speaks, reads, or writes English.

*Information Sources:* Financial information may also be diffused via different information sources. Therefore, we consider whether the respondent watches TV, listens to the radio, reads the newspaper or uses the Internet. The corresponding dummy variable takes on the value one if the respondent uses the information source at least once a week and is zero if the source is used less frequently.

# 4 Empirical results

## 4.1 Descriptive statistics

Table 1 reports group differences between female and male respondents in their financial knowledge about the four considered financial items. The table reports, firstly, group differences in financial knowledge for all sample respondents *(Sample I)* and, secondly, for only those respondents who live in one of the three matrilineal states *(Sample II).* The table shows for Sample I that in India, the fraction of women who know what is meant by different financial items is lower in comparison to men. For instance, when looking at the more general financial knowledge of "what government guarantees to deposits means" or "what the current value of all the respondent's investments is" group differences are, although significant, not very large. By including the latter as a dependent variable we account for the fact that the individual knows that the accumulated value of investments may vary due to changes in value. However, on average women report that they know what is meant by deposit guarantees or the current value of all their investments less often than men. From the total sample, 78 percent of the female respondents state that they know what the current value of all their investments is, compared to 83 percent of the male respondents. Furthermore, 50 percent of the female respondents state that they know what a credit card is compared to 58 percent of the male respondents. These gender specific group differences also exist for the knowledge about Kisan cards. In contrast, if one focuses only on individuals who live in matrilineal states (Sample II), women and

men do not differ significantly in their financial knowledge on the four considered financial items. For instance, 94 percent of female respondents and 95 percent of male respondents know what deposit guarantees are. Moreover, 92 percent of female respondents and 93 percent of male respondents know what is meant by the current value of their investments. Furthermore, 85 percent of female respondents and 83 percent of male respondents know what is meant by a credit card, and 73 percent of the female respondents and 78 percent of the male respondents know what a Kisan card is. The table shows that women in matrilineal states are almost as financially knowledgeable as men in patriarchal states.

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insert Table 1 about here

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Hence, differences in financial knowledge among women living in patriarchal and women in matrilineal states are worth investigating in more detail. Figure 1 distinguishes between women who live in matrilineal states and women who live in other Indian states and reports the means on their knowledge about the four financial items considered. The figure also reports the average responses for the total sample among female and male respondents for comparison. Comparing women living in matrilineal states with those who live in other patriarchal states, the former respond more often that they know about the respective financial item. Furthermore, women in matrilineal cultures are even more knowledgeable than men in patriarchal states. For instance, 92 percent of the female respondents who live in a matrilineal state say that they know what is meant by the *current value of their investments*, compared to 83 percent of male respondents in a patriarchal state. Furthermore, 85 percent of the female respondents say that they know what a *credit card* is, while only 83 percent of the male respondent in a patriarchal environment do so, and similar results are obtained for the knowledge about a *Kisan card*.

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insert Figure 1 about here

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Summary statistics for all explanatory variables are reported in Table 2. The table shows that, among the Regional Characteristics only a very small fraction of our female sample respondents (6.4 percent of women and 9.8 percent of the male respondents) live in the matrilineal states Nagaland, Mizoram and Meghalaya. On average 43 percent of women and 46 percent of men are located in rural areas. With respect to the Personal Characteristics, 87 percent of the male sample respondents are married compared to 66 percent of the female respondents. Men have an average age of 39 years, two years older than women in our sample, are less often affiliated to backward castes, and are characterized by a higher annual income compared to women. Moreover, 40 percent of our male respondents report that they own land whereas only 27 percent of women report being landowners. Furthermore, female sample respondents more frequently report that they are risk averse compared to the male respondents. Among the education levels considered, 32 percent of the women and 13 percent of the men in our sample are illiterate. Gender differences in education are increasing up to the high school level and education levels are on average higher for men until higher secondary education. However, about 4 percent of our female and 3 percent of the male respondents state having a post graduate education. Women and men also differ in their use of information sources. About 48 percent of our female sample respondents read the newspaper at least once a week, compared to 64 percent of the men. About 5 percent of the women and 4 percent of the men state using the Internet at least once a week. A relatively larger share state listening to the radio or watching TV. On average 45 percent of the female and 53 percent of the male respondents say that they listen to the radio, and 73 percent of the females and 74 of the male respondents state that they watch TV at least once a week.

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insert Table 2 about here

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All in all, our descriptive results indicate that no significant financial literacy gender gap exists among respondents in the three matrilineal states. This could either imply

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that women in these states are more financially literate than men, or that men are less financially literate than the average women in these states. A third explanation could be that the matrilneal culture is rather more gender symmetric and therefore, women and men possess similar levels of financial knowledge because the husband is also involved in the financial decision making of the household. Table 1 provides evidence for the latter, showing that although group differences are not significant, men are slightly more financially literate than women in Sample II. The Table moreover provides evidence that men in matrilineal states often know even more about the respective financial items than men in other Indian states. Thus, it is not only the women but also the men in matrilineal states that are more financially literate than women and men in other Indian states. The role of nurture therefore seems to be a major factor when investigating the financial knowledge between men and women. However, if nurture is driving the financial literacy gender gap, it is important to identify the relevant nurture factors that could narrow this disparity. Therefore, we focus on explaining the financial literacy differences among *women* in *matrilineal* and *women* in *patriarchal* Indian states.

## 4.2   Methodology

In order to analyze whether gender specific differences in financial literacy exist even after controlling for observable characteristics such as levels of education, income and marital status, we firstly estimate a baseline probit model on the probability of knowing about the four considered financial items with female as one explanatory variable. Firstly, the total sample is employed (Table 3). Secondly, the same regressions are made separately for those respondents from the three matrilineal states and all other states (Table 4). Comparing respondents who grew up and live in a matrilineal culture and those who grew up and live in a patriarchal environment, allows us to disentangle determinants affecting an individual's financial knowledge that can be attributed to *nurture* rather than *nature*.

Thirdly, in order to properly ascribe certain characteristics of women who live in a matrilneal culture to higher or lower financial knowledge relative to women living in a

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patriarchal environment, we employ the Blinder-Oaxaca decomposition technique. Since our dependent variables of financial knowledge are binary, the extended Blinder-Oaxaca decomposition to logit and probit models by Fairlie (2006) is employed (Table 5). This method allows us to decompose the financial literacy differences into the coefficient effect and the characteristics effect as presented in the following equation.

$$FL_{pf} - FL_{mf} = \underbrace{\left[\hat{P}(\beta_{ff}, X_{pf}) - \hat{P}(\beta_{ff}, X_{mf})\right]}_{\text{Characteristics effect}} + \underbrace{\left[\hat{P}(\beta_{pf}, X_{pf}) - \hat{P}(\beta_{ff}, X_{pf})\right] + \left[\hat{P}(\beta_{ff}, X_{mf}) - \hat{P}(\beta_{mf}, X_{mf})\right]}_{\text{Coefficient effect}}$$

$FL$ denotes the financial literacy variable, $\beta$ stacks the parameters attached to the regressors $X$ and the indices $ff$, $pf$ and $mf$ denote, estimations using the full female sample, the patriarchal female sub-sample and the matrilineal female sub-sample, respectively. Accordingly, the characteristics effect measures the portion of the financial literacy difference between women in patriarchal and matrilinial states that could be accounted for by differences in the distributions of the explanatory variables such as levels of education, income, use of information sources and other determinants. The remaining part, the coefficient effect, is the residual which might arise from different responses in ($\beta$s) of the two groups for a given change in the explanatory variable, or differences in omitted explanatory variables .

## 4.3 Determinants of financial knowledge

### 4.3.1 Baseline results

Table 3 documents estimation results from our baseline probit model. It reports the average marginal effects of the explanatory variables on the individual's probability of knowing about the four items that measure financial knowledge.

Table 3, for instance, shows that among the Regional characteristics, individuals who live in matrilineal states have a 1.8 lower probability of knowing what deposit guarantees are while having a 6.5 percentage points higher probability of knowing what is meant by the current value of their investments. Moreover, they also have a higher probability of

knowing what a credit card and a Kisan card is, though the coefficient for the latter is not statistically significant. The marginal effects for GDP per state are positive except for the knowledge on deposit guarantees. The table additionally shows that individuals who live in a rural area are less likely to know about the considered financial items.

*Personal characteristics* are also important determinants of an individual's financial knowledge. The table shows that female respondents have a lower probability of knowing about the four considered financial items. Females, for instance, have a 2.4 percentage points lower probability of knowing what deposit guarantees are and a 1.8 percentage points lower probability of knowing what is meant by the current value of their investments. They are also about 1.9 percentage points less likely to know what a credit card is and have a 5.1 lower probability of knowing what a Kisan card is. This indicates that the gender gap with respect to knowing these instruments, which is documented in Table 1, could be partly explained by differences in the explanatory variables included in the probit regression. However, the significant impact of gender on the three financial questions after controlling for a large set of explanatory variables might suggest that nature or some other deeper cultural determinants not controlled for in our model could be behind the financial literacy gender gap in India. Considering other personal characteristics, being married does not have a statistically significant impact, except for its positive relation with knowing about a Kisan card. An increase in age significantly increases financial knowledge of the four financial items considered, while being affiliated to a backward caste is negatively related to financial knowledge what has aslo been reported in prior research (Bönte and Filipiak, 2012).[4] Moreover, individuals with higher incomes are more likely to know about financial practices and financial instruments. Risk averse individuals are more likely to know what government guarantees to deposits means and what a current value of total investment is. However, individuals who are risk averse have a lower probability of knowing about the two financial

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[4]Some of the explanatory variables are employed in Bönte and Filipiak (2012). The NDSSP dataset is representative at the state level. We find when comparing descriptive statistics from the NDSSP dataset with official statistics, that the outcomes do not differ much. We make use of the official data obtained from the Reserve Bank of India in our empirical analyses, see: http://dbie.rbi.org.in/InfoViewApp/listing/main.do.

instruments credit card and Kisan card while they are more likely to know about the current value of all their investments, and what deposit guarantees are. Further, show our baseline results that financial knowledge is strongly related to *education*, which is also a reported result in the literature (Lusardi and Mitchell, 2014).

The marginal effects for all eleven education levels are all positive and highly significant, increasing in their size as the level of education increases. Individuals who are able to speak, read or write English have a 3.0 percentage points higher probability of knowing what deposit guarantees are and are also more likely to know what is meant by the current value of all their investments. Moreover, they have a 15.4 percentage points higher probability of knowing what a credit card is and a 12.4 higher probability of knowing about a Kisan card. Therefore, a certain knowledge of English seems to be very important for acquiring a certain amount of financial knowledge as well, either about specific financial instruments or general financial knowledge.

The *use of information sources* like the Internet, TV, radio or newspaper is also very relevant for financial knowledge. For instance, individuals who read the newspaper at least once per week have a 1.2, 3.8, 11.0 and 11.0 percentage points higher probability of knowing about deposit guarantees, the current value of investments, a Credit card and a Kisan card, respectively, relative to those who do not read newspapers at least once in a week. Qualitatively similar positive marginal effects are obtained for those individuals who are using the Internet, radio and TV at least once a week.

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insert Table 3 about here

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In order to compare female respondents who live in a matrilineal state with those who live in a patriarchal state in their financial knowledge, we conduct separate probit regressions for two samples. The results are reported in Table 3. The table shows firstly that female respondents who live in a state where the patriarchal culture is prevalent have a 2.4 percentage points lower probability of knowing about deposit guarantees, a

0.06 percentage points lower probability of knowing what is meant by the current value of their actual investments, a 2.2 lower probability of knowing what a credit card is and have further a 4.9 percentage points lower probability of knowing what a Kisan card is compared to men. In contrast the marginal effects of being female in a matrilineal state are not significantly related to a lower probability to know about the four financial items considered. The only exception is the knowledge about Kisan cards where for females the marginal effect is still negative. However, the latter result is not surprising as Kisan cards are specifically designed to provide short term credit to farmers and farming is primarily done by the men in matrilineal societies. Men may therefore be more knowledgeable about Kisan cards, since working- activity specific information may be provided via word-of mouth communication when talking to other men who work on farms. Financial activities as well as financial knowledge may therefore be also shaped through social interaction with others (Hong et al., 2004; Bönte and Filipiak, 2012).

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insert Table 4 about here

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These first result indicate, that lower levels of financial knowledge are unlikely to be rooted in the nature of the respective gender. It is thus, of interest to investigate what determines the differences in financial knowledge among females living in two different cultures. In order to identify relevant determinants that may contribute to and explain the differences in financial knowledge among women living in matrilineal and patriarchal states of India, we make use of the Blinder-Oaxaca decomposition.

### 4.3.2   Blinder-Oaxaca decomposition results

Table 5 reports the results of the Blinder-Oaxaca decomposition technique for binary dependent variables as suggested Fairlie (2006). The outcomes of our results allow for explaining knowledge specific differences between women in matrilineal and patriarchal states in more detail.

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insert Table 5 about here

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The results reveal that the level of regional GDP per capita and living in a rural area do not significantly explain the existing differences in financial knowledge except for the knowledge about deposit guarantees. This, however, implies that regional differences do not significantly contribute to a higher financial knowledge of matrilineal women compared to women living in a patriarchal environment. Among the *personal characteristics*, Table 5 shows that most of the explanatory variables are narrowing the effect on the observed difference in financial knowledge for the four considered financial items by 20%. This implies that the observed differences could have been even larger if there were no differences in personal characteristics. Differences in education levels explain about 38% of the differences in financial literacy between women of matrilineal and patriarchal states. This for instance, is in line with the observations by Gneezy et al. (2009) reporting that matrilineal societies prioritize investments in human capital of girls compared to boys. This clearly underscores the role that mitigating the gap in general level of education could play in reducing the gender gap in financial literacy. Mastering the English language, as a separate form of knowledge, also explains 21% - 40% of the financial literacy differences between women of the two cultures. One explanation could be that some information about financial matters are provided in English. Differences in frequency of use of mass media – newspaper, Internet, radio and TV – are the most relevant factors in explaining why women living in matrilineal states are more financially knowledgeable than women in patriarchal states: these variables explain 31% - 60% of the differences in financial knowledge. This points to our assumption that women in matrilineal states, as household heads, may be more perceptive for financial information when using different information sources. Finally, it is worth noting that while contributions from all explanatory variables employed in the model explain more than 100% of the observed knowledge gap between the two groups, in two financial

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literacy measures namely the knowledge about deposit guarantees and knowledge about Kisan cards, a sizable portion of the gap regarding knowing what current value of total investments is and what a credit card is remains unexplained. More than 100% explanatory power implies that the potential gaps due to these variables have been dampened by other explanatory variables which work in the opposite direction (e.g. personal and regional characteristics), making the actual difference smaller than it should otherwise be. Unexplained differences rather point to cultural factors. In particular, we argue that women living in a matrilineal society are more likely to invest more in acquiring financial knowledge from early childhood than their patriarchal peers. Women in patriarchal societies know by nurture that someone else will be responsible for the economic and financial matters of the family in the future, whereas matrilineal women grow up knowing that they will be in charge of the household's economic decisions. This tendency could have already been reflected by matrilineal women's larger investment in general human capital, English language skill and use of mass media. Nevertheless, although controlling for a large number of explanatory variables, the means of acquiring financial knowledge could also include other channels not observed by our data.

## 4.4 Robustness checks

In order to check the robustness of our results we conduct several additional regressions. In order to have a comparable sample size, we reduce the number of respondents from patriarchal states randomly by the statistical software to 4,000, while the number of respondents from matrilineal states remains unchanged. The regression results do not change significantly using the reduced sample size for respondents living in patriarchal states.

Moreover, our results indicate that the use of information sources may explain a large part of the gap in financial knowledge among female respondents in matrilineal and patriarchal states. Therefore, we run probit regressions with triple interactions of education, knowing the Eglish language and the use of information sources. The results indicate that the use of TV in contrast to the other information sources (e.g.

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Internet, radio or newspaper) increases the probability of knowing the four financial items considered significantly. In contrast this moderating effect is not always significant for the use of the remaining information sources e.g. Internet or radio on the probability of knowing the four financial items considered. This, however, supports the results of the Oaxaca decomposition technique as reported in Table 5, where watching TV at least once a week has the largest narrowing effect for the financial literacy gap among women in matrilineal and patriarchal states among all information sources considered.

Thirdly, our definition of the dependent variables may be of some concern as well. We take both "yes" and "no" responses as indicators of financial knowledge, and the "don't know what this is" response as showing lack of knowledge about the financial item considered. One potential concern here is if the respondents give a "no" response simply because they do not understand what the issue in question is. We expect that the presence of a "don't know what this is" answer clearly solves this confusion between not being able to positively reply the question and not understanding the item in question at all. In order to consider this potential issue, we performed multinomial logit regressions considering the three responses as separate alternatives. The results are documented in Table 6. Interestingly, most variables affect the probabilities of giving "yes" and "no" responses in the same direction. Most importantly, the significantly negative impact of being female on financial literacy documented in the baseline probit results (Table 3) is also observed when the dependent variables are disaggregated into "yes", "no", and "don't know what this is" responses. Finally, we employ a large number of explanatory variables in our empirical analyses, therefore multicollinearity might be an issue. Correlation coefficients that are available upon request indicate that knowing English and being a university graduate are moderately correlated with a correlation coefficient of 0.339. Furthermore, we also compute variance inflation factors (VIFs) that are moderate, ranging from 1.02 to 3.07.

# 5    Discussion

With the number of financial instruments growing at a rapid rate, individuals are forced to make increasingly complex financial decisions such as financial planning, wealth accumulation, debt, and pensions. Empirical evidence shows that financial knowledge is still very low among the general population, and much lower among women. Explaining why women are less financially literate than men is an important issue for policy makers as women may be disadvantaged in making the best use of existing financial products. Therefore, knowledge about the relevant determinants that may narrow or increase the gap between men and women in their financial knowledge is very important. While a growing body of empirical research documents that a gender gap in financial literacy exists, little is known about the determinants leading to this gap. So far, different reasons have been identified to explain differences in financial knowledge between women and men. This includes specialization within the household among women and men (Hsu, 2011), personality traits like lower self-confidence when dealing with financial matters (Gneezy et al., 2009), or differences in learning about financial matters (Lusardi and Mitchell, 2014). It remains, however, unclear whether the identified gap in financial knowledge between women and men may be a matter of *nature* or *nurture*. Moreover, disentangling gender specific determinants rooted in nature or evolving from nurture is indeed challenging. Intra - household roles between women and men are often learned from early childhood (Lusardi, 2008) and may therefore affect an individual's future behavior about financial matters during their life time. This may explain why single women, for instance, are characterized with similar or even lower financial knowledge than those living in a partnership. This paper tries to shed more light on the relevance of nurture – rather than nature – in explaining the financial literacy gender gap repeatedly documented in the literature. For this purpose, this paper uses a quasi-experimental framework that exists in India, which allows us to investigate whether the financial literacy gender gap can be attributed to some extent to factors resulting from nurture. In doing so we compare the matrilineal culture which is prevalent in three north-eastern Indian states, Nagaland, Mizoram and Meghalaya, and the patriarchal culture which is

the prevailing culture in all other Indian states. Firstly, descriptive statistics show that our empirical results do also support the common fact that women are less financially literate than men in India. Secondly, a financial literacy gender gap exists for individuals living in patriarchal states whereas it does not exist for those living in matrilineal states. Thirdly, women living in matrilineal states are characterized as having more financial knowledge, with respect to the four financial items considered, than women living elsewhere in India. Finally, when we focus only on women, our results of the Blinder-Oaxaca decomposition technique show that different determinants can explain the gap in financial knowledge among women in matrilineal and patriarchal societies, including education, risk aversion, education or being able to speak, read or write English. Among the factors considered, the use of mass media turns out to explain the largest portion of the knowledge differences between females of the two cultural systems. However, a small part of the financial literacy difference remains unexplained by the observed factors, hinting at the role of some cultural factors such as attitude implanted in early childhood. In sum, the results provide a general evidence that nurture – not nature – explains the financial literacy gender gap in India. Given the fact that women in matrilineal societies make financial decisions everyday it is likely that women grow up learning about financial matters differently than men. Women may also acquire financial knowledge differently compared to women living in a patriarchal culture. Therefore, matrilineal women may also be more perceptive for financial information because they know that this specific form of human capital will be useful either currently or in the future.

# 6 Conclusion

Why do men perform better in financial literacy questions than women, and why do they even outperform women who are dealing with their household finances independently? Based on our results in this paper, we conclude that the lower level of financial knowledge of women relative to men often documented in the literature is unlikely to be the result of nature. Rather, it is the result of their low investment in acquiring financial knowledge,

either in terms of lower formal education, a lower level of English language or lower use of mass media sources. One may assume that one of the deeper causes behind this financial literacy gender gap is the cultural environment, which leads women to expect that their male partners will take care of their finances in the future.

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## Table 1: Means and standard deviations in financial knowledge

| Knowledge (Sample I) | Female Respondents | | | Male Respondents | | | Differences | |
|---|---|---|---|---|---|---|---|---|
| | Mean | St. Dev. | Obs. | Mean | St. Dev. | Obs. | Difference | test statistic |
| Deposit Guarantee | 0.886 | 0.316 | 2811 | 0.935 | 0.246 | 24672 | 0.048 | 91.183 |
| Actual Investments | 0.778 | 0.415 | 2811 | 0.825 | 0.379 | 24672 | 0.047 | 38.605 |
| Credit Card | 0.496 | 0.500 | 2811 | 0.582 | 0.493 | 24672 | 0.079 | 66.44 |
| Kisan Card | 0.505 | 0.500 | 2811 | 0.632 | 0.482 | 24672 | 0.086 | 75.627 |
| **Knowledge (Sample II)** | | | | | | | | |
| Deposit Guarantee | 0.938 | 0.240 | 195 | 0.950 | 0.216 | 728 | 0.012 | 0.455 |
| Actual Investments | 0.923 | 0.267 | 195 | 0.931 | 0.253 | 728 | 0.008 | 0.159 |
| Credit Card | 0.851 | 0.356 | 195 | 0.832 | 0.373 | 728 | -0.0188 | 0.400 |
| Kisan Card | 0.728 | 0.446 | 195 | 0.784 | 0.411 | 728 | 0.056 | 2.757 |

Table 1 reports means and standard deviations for group differences between women and men with respect to the four dependent variables used as a measure of financial knowledge: (1) knowledge about government guarantees to bank deposits; (2) knowledge about the current value of the total investments; (3) knowledge about credit cards; and (4) knowledge about Kisan cards. The variables take on the value one if respondents declare that they know about these financial items and are zero when they state that they do not know what it is. A $\chi^2$ test is employed for categorical variables. Group differences are statistically significant for all four items and the means are notably lower for women than for men when the total sample (Sample I) is employed. In the second sample (Sample II), only those respondents are considered who live in the three matrilineal states. The second sample contains therefore only 913 observations, with 195 female and 728 male respondents. Group differences between female and male respondents are significant in Sample I and lose significance when only respondents who live in the three matrilineal states are considered.

Figure 1: Gender differences in financial knowledge

Figure 1 shows means in percentage shares in financial knowledge for the four dependent variables: (1) knowledge about government guarantees to bank deposits; (2) knowledge about the current value of the total investments; (3) knowledge about credit cards; and (4) knowledge about Kisan cards. First the figure shows differences for the total sample among female and male respondents. Second, the figure shows differences for only female respondents and distinguishes among those who live in a matrilineal state and those who live in a patriarchal state. The figure shows that on average men state more frequently than women that they know about the four considered financial items. Females in matrilineal not only have on average a better knowledge about the four financial items than females in patriarchal states but also better knowledge than men in patriarchal states.
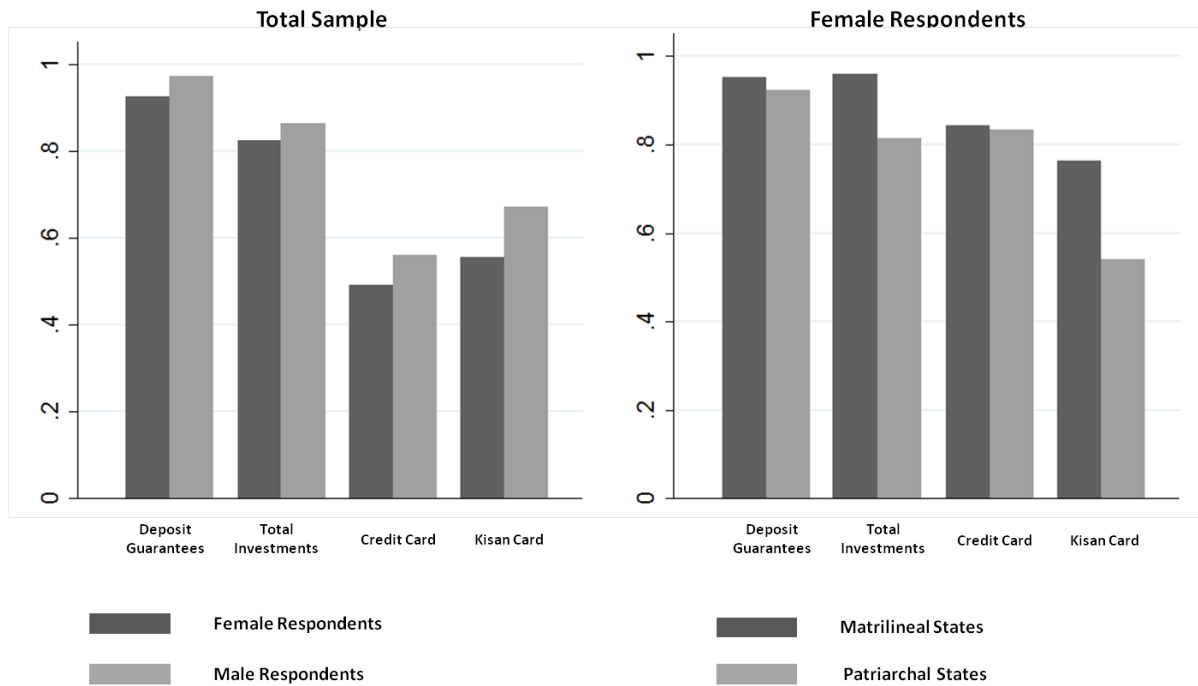
Table 2:

Summary statistics for explanatory variables

| | Women | | Men | | Differences | |
|---|---|---|---|---|---|---|
| | Mean | st. Dev. | Mean | st. Dev. | Difference | test statistic |
| **Regional Characteristics** | | | | | | |
| Matristate | 0.064 | 0.246 | 0.098 | 0.166 | -0.0362 | 112.097 |
| Rural | 0.433 | 0.495 | 0.463 | 0.498 | 0.030 | 9.992 |
| GDP p.c.* | 9.932 | 0.322 | 9.885 | 0.403 | -0.046 | -6.059 |
| **Personal Characteristics** | | | | | | |
| Married | 0.666 | 0.471 | 0.874 | 0.331 | 0.208 | 925.027 |
| Age* | 37.757 | 10.810 | 39.722 | 11.363 | 1.965 | 9.012 |
| Backward Caste | 0.335 | 0.472 | 0.253 | 0.434 | -0.0826 | 94.835 |
| Income* | 8.348 | 1.627 | 8.639 | 1.384 | 0.292 | 10.708 |
| Landowner | 0.276 | 0.447 | 0.407 | 0.491 | 0.131 | 194.45 |
| Risk Attitude | 0.777 | 0.416 | 0.750 | 0.432 | -0.026 | 10.404 |
| **Education** | | | | | | |
| Illiterate | 0.315 | 0.464 | 0.131 | 0.337 | -0.184 | 711.035 |
| Literate no schooling | 0.029 | 0.168 | 0.023 | 0.151 | -0.005 | 3.919 |
| Less than primary | 0.036 | 0.188 | 0.050 | 0.218 | 0.0134 | 10.414 |
| Primary school | 0.085 | 0.280 | 0.108 | 0.311 | 0.022 | 14.618 |
| Middle school | 0.101 | 0.302 | 0.179 | 0.384 | 0.078 | 115.47 |
| High school | 0.135 | 0.342 | 0.215 | 0.411 | 0.079 | 104.818 |
| Higher Secondary | 0.085 | 0.279 | 0.105 | 0.307 | 0.020 | 11.701 |
| Technical Diploma | 0.014 | 0.118 | 0.021 | 0.145 | 0.007 | 6.845 |
| Graduate | 0.131 | 0.337 | 0.115 | 0.319 | -0.0153 | 6.092 |
| Professional Degree | 0.025 | 0.158 | 0.020 | 0.141 | -0.005 | 3.339 |
| Post Graduate | 0.038 | 0.192 | 0.027 | 0.163 | -0.011 | 12.116 |
| Knowledge English | 0.440 | 0.496 | 0.489 | 0.499 | 0.048 | 25.547 |
| **Information Sources** | | | | | | |
| Newspaper | 0.476 | 0.499 | 0.637 | 0.003 | 0.161 | 298.528 |
| Internet | 0.047 | 0.212 | 0.037 | 0.190 | -0.010 | 7.006 |
| Radio | 0.446 | 0.497 | 0.528 | 0.499 | 0.082 | 72.030 |
| TV | 0.733 | 0.442 | 0.744 | 0.436 | 0.010 | 1.519 |

Table 2 reports summary statistics for explanatory variables separately for women and men. Our empirical analyses are based on 3006 observations for women and 25400 for men. The table reports the results of a $\chi^2$ test for the categorical variables testing for group differences between women and men, and for the continuous variables a t-test is employed. Continuous variables are assigned with one asterisk. The table reports significant group differences between women and men for all explanatory variables except for the education level "literate but no schooling" and "professional degree" as well as for watching "TV".

## Table 3:

### General financial knowledge and financial instruments

| | General Knowledge | | Financial Instruments | |
|---|---|---|---|---|
| | Deposit Guarantee | Actual Investments | Credit Card | Kisan Card |
| **Regional Characteristics** | | | | |
| Matristate | -0.0182* | 0.0652*** | 0.102*** | 0.000453 |
| | (0.0105) | (0.0114) | (0.0199) | (0.0195) |
| GDP per state | -8.46e-07*** | 5.13e-06*** | 4.22e-06*** | 3.58e-07 |
| | (1.50e-07) | (3.20e-07) | (4.20e-07) | (3.91e-07) |
| Rural | -0.0131*** | -0.0110** | -0.0595*** | -0.000769 |
| | (0.00311) | (0.00508) | (0.00721) | (0.00694) |
| **Personal Characteristics** | | | | |
| Female | -0.0236*** | -0.0180** | -0.0196* | -0.0513*** |
| | (0.00513) | (0.00772) | (0.0110) | (0.0106) |
| Married | 0.00291 | 0.00166 | 0.00636 | 0.0243*** |
| | (0.00401) | (0.00654) | (0.00958) | (0.00914) |
| Age | 0.000297** | 0.000675*** | 0.00217*** | 0.00261*** |
| | (0.000123) | (0.000205) | (0.000303) | (0.000285) |
| Bwcast | -0.00847*** | -0.0213*** | -0.0246*** | -0.0418*** |
| | (0.00321) | (0.00528) | (0.00767) | (0.00730) |
| Annual Income | 0.00320*** | 0.00710*** | 0.0212*** | 0.0200*** |
| | (0.00104) | (0.00165) | (0.00249) | (0.00236) |
| Landowner | 0.0115*** | 0.0258*** | -0.0285*** | 0.0346*** |
| | (0.00296) | (0.00482) | (0.00720) | (0.00681) |
| Riskaverse | 0.0301*** | 0.0453*** | -0.0370*** | -0.0245*** |
| | (0.00358) | (0.00544) | (0.00732) | (0.00697) |
| **Education** | | | | |
| Literate but no schooling | 0.00366 | 0.0210* | 0.0356* | 0.0473** |
| | (0.00721) | (0.0123) | (0.0209) | (0.0187) |
| Less than primary | 0.0160*** | 0.0301*** | 0.0417*** | 0.0588*** |
| | (0.00487) | (0.00926) | (0.0158) | (0.0141) |
| Primary school | 0.0183*** | 0.0424*** | 0.102*** | 0.0998*** |
| | (0.00392) | (0.00719) | (0.0119) | (0.0108) |
| Middle school | 0.0199*** | 0.0501*** | 0.133*** | 0.129*** |
| | (0.00388) | (0.00688) | (0.0111) | (0.0101) |
| High school | 0.0215*** | 0.0349*** | 0.173*** | 0.162*** |
| | (0.00434) | (0.00805) | (0.0116) | (0.0106) |
| Higher Secondary | 0.0229*** | 0.0504*** | 0.231*** | 0.209*** |
| | (0.00498) | (0.00896) | (0.0117) | (0.0108) |
| Technical Diploma | 0.0334*** | 0.0758*** | 0.290*** | 0.249*** |
| | (0.00681) | (0.0130) | (0.0145) | (0.0140) |
| Graduate | 0.0386*** | 0.0764*** | 0.318*** | 0.276*** |
| | (0.00431) | (0.00852) | (0.0101) | (0.00954) |
| Post Graduate | 0.0396*** | 0.118*** | 0.338*** | 0.303*** |
| | (0.00624) | (0.00965) | (0.0119) | (0.0107) |
| Professional Degree | 0.0457*** | 0.0881*** | 0.336*** | 0.287*** |
| | (0.00459) | (0.0108) | (0.0107) | (0.0108) |
| English | 0.0303*** | 0.0478*** | 0.154*** | 0.124*** |
| | (0.00389) | (0.00624) | (0.00835) | (0.00817) |
| **Information Sources** | | | | |
| Newspaper | 0.0119*** | 0.0381*** | 0.110*** | 0.110*** |
| | (0.00386) | (0.00626) | (0.00848) | (0.00824) |
| Internet | 0.0197** | 0.0465*** | 0.117*** | 0.0913*** |
| | (0.00783) | (0.0124) | (0.0202) | (0.0183) |
| TV | 0.0127*** | 0.0386*** | 0.0420*** | 0.0398*** |
| | (0.00357) | (0.00591) | (0.00655) | (0.00623) |
| Radio | 0.00999*** | 0.00596 | 0.107*** | 0.0600*** |
| | (0.00279) | (0.00453) | (0.00836) | (0.00798) |
| Observations | 28,392 | 28,392 | 28,392 | 28,392 |
| Pseudo $R^2$ | 0.069 | 0.072 | 0.213 | 0.157 |
| Predicted Probabilities | 0.944 | 0.842 | 0.608 | 0.648 |
| Observed Probabilities | 0.931 | 0.824 | 0.582 | 0.624 |

Table 3 reports the average marginal effects of the explanatory variables on the probability of knowing about (1) government guarantees to bank deposits; (2) the current value of the total investments; (3) credit cards; and (4) Kisan cards. Robust standard errors are given in parentheses. ***, **, * denote significance at the 1, 5, 10 percent level.

Table 4:

Financial knowledge:
Comparing matrilineal and patriarchal states

| | Deposit Guarantees | | Actual Investments | |
|---|---|---|---|---|
| | Patriarchal States | Matrilineal States | Patriarchal States | Matrilineal States |
| Female | -0.024*** | -0.006 | -0.018** | 0.003 |
| | (0.005) | (0.016) | (0.008) | (0.019) |
| Observations | 27,469 | 923 | 27,469 | 923 |
| Pseudo $R^2$ | 0.210 | 0.098 | 0.159 | 0.049 |
| | Credit Card | | Kisan Card | |
| | Patriarchal States | Matrilineal States | Patriarchal States | Matrilineal States |
| Female | -0.022* | -0.002 | -0.049*** | -0.075* |
| | (0.011) | (0.031) | (0.011) | (0.038) |
| Observations | 27,469 | 923 | 27,469 | 923 |
| Pseudo $R^2$ | 0.210 | 0.098 | 0.159 | 0.049 |

Table 4 reports the average marginal effects of the explanatory variables on the probability of knowing about (1) government guarantees to bank deposits; (2) the current value of the total investments; (3) credit cards; and (4) Kisan cards. Two different samples for individuals living in patriarchal states and individuals in matrilineal states are employed. Although not reported, all aforementioned explanatory variables are included in the regressions except for GDP per state, which is left out because of perfect collinearity for the sample where only matrilineal states are considered. Robust standard errors are given in parentheses. ***, **, * denote significance at the 1, 5, 10 percent level.

The Blinder-Oaxaca decomposition: financial knowledge difference between women in matrilineal and patriarchal states of India

| | Deposits Guarantee (1) | Actual Investments (2) | Credit Card (3) | Kisan Card (4) |
|---|---|---|---|---|
| **Regional Characteristics** | -0.00224* | -0.001 | -0.000350 | 0.003 |
| | (-4.34) | (0.75) | (0.10) | ( -1.42) |
| GNP p.c. (state level) | -0.001 | -0.002 | 0.000 | 0.000 |
| Rural | -0.001 | 0.000 | -0.000419 | 0.003 |
| | | | | |
| **Personal Characteristics** | -0.001 | 0.0284** | 0.0108 | 0.0270* |
| | ( 1.14) | (-19.59 ) | ( -3.04) | (-12.11) |
| Married | 0.000 | 0.003 | 0.00289 | 0.00494* |
| Age | -0.001 | 0.000 | 0.00199** | 0.00269*** |
| Backward Caste | 0.008 | 0.0196** | -0.00138 | 0.016 |
| Annual income | -0.005 | 0.0124* | 0.00228 | -0.001 |
| Landowner | 0.000 | -0.001 | 0.00204 | 0.000 |
| Risk averse | -0.00220** | -0.00634*** | 0.00352** | 0.00477*** |
| | | | | |
| **Education** | -0.003 | 0.003 | -0.0864*** | -0.0857*** |
| | (6.61) | (-2.04) | (24.34) | (38.66) |
| | | | | |
| **English** | -0.0202** | -0.0313** | -0.0865*** | -0.0739*** |
| | (40.31) | (21.79) | (24.37) | (33.14) |
| | | | | |
| **Information sources** | -0.0313*** | -0.0677*** | -0.113*** | -0.108*** |
| | (60.66) | (46.69) | (31.83) | (48.43) |
| Newspaper | -0.008 | -0.0294** | -0.0331** | -0.0333** |
| Internet | -0.002 | -0.004 | -0.00847** | -0.00846* |
| Radio | -0.00987*** | -0.0228*** | -0.0300*** | -0.0304*** |
| TV | -0.0115*** | -0.0110** | -0.0409*** | -0.0344*** |
| Observations | 3005 | 3005 | 3005 | 3005 |
| Observations from Patriarchal states | 2810 | 2810 | 2810 | 2810 |
| Observations from Matrilineal states | 195 | 195 | 195 | 195 |
| Predicted probability for women from patriarchal states | 0.887 | 0.778 | 0.496 | 0.505 |
| Predicted probability for women from matrilineal states | 0.938 | 0.923 | 0.851 | 0.728 |
| Differences in predicted probabilities | -0.0516 | -0.145 | -0.355 | -0.223 |
| Characteristics effect (contribution from difference in all regressors) | -0.058 | -0.0694 | -0.279 | -0.237 |

Table 5 reports the financial knowledge difference for female living in patriarchal and matrilineal states of India along with the portion of the difference that is explained by all explanatory variables considered in the model (characteristics effect). In addition, the separate contributions from differences in each explanatory variables are presented. ***, ** and * denote significance at the 1, 5 and 10 percent level.

Table 6:

Multinomial logit results for full sample

| | Deposits Guarantee | | | Actual Investments | | | Credit Card | | | Kisan Card | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (1) | (2) | (3) | (1) | (2) | (3) | (1) | (2) | (3) |
| **Regional Characteristics** | | | | | | | | | | | | |
| Matristate | -0.0673*** | 0.0476*** | 0.0197* | 0.0560*** | 0.009 | -0.0648*** | -0.0114*** | 0.129*** | -0.118*** | -0.0129*** | 0.020 | -0.007 |
| GNP p.c. (state level) | -2.37e-06*** | 1.60e-06*** | 7.73e-07*** | 3.07e-06*** | 2.10e-06*** | -5.16e-06*** | 1.39e-07** | 4.16e-06*** | -4.30e-06*** | -7.62e-07*** | 1.17e-06*** | 0.000 |
| Rural | -0.0151*** | 0.002 | 0.0127*** | 0.0253*** | -0.0367*** | 0.0114** | -0.00745*** | -0.0532*** | 0.0607*** | 0.0172*** | -0.0192*** | 0.002 |
| **Personal Characteristics** | | | | | | | | | | | | |
| Female | -0.0130* | -0.008 | 0.0207*** | -0.011 | -0.004 | 0.0152** | -0.00304* | -0.0182 | 0.0213* | -0.00990*** | -0.0424*** | 0.0523*** |
| Married | 0.0143** | -0.0112** | -0.003 | 0.0342*** | -0.0320*** | -0.002 | 0.00521*** | 0.00103 | -0.00623 | 0.001 | 0.0247*** | -0.0257*** |
| Age | 0.000 | 0.000 | -0.000250** | 0.000679** | 0.000 | -0.000629*** | 0.000114** | 0.00217*** | -0.00229*** | 0.000292*** | 0.00231*** | -0.00260*** |
| Backward Caste | -0.0111** | 0.004 | 0.00701** | -0.0313*** | 0.0115* | 0.0198*** | -0.00385*** | -0.0214*** | 0.0253*** | -0.00664*** | -0.0333*** | 0.0400*** |
| Annual income | 0.000 | 0.00256** | -0.00276*** | 0.0158*** | -0.00897*** | -0.00680*** | 0.00442*** | 0.0173*** | -0.0217*** | 0.00371*** | 0.0159*** | -0.0196*** |
| Landowner | 0.004 | 0.00710* | -0.0112*** | 0.0367*** | -0.0111* | -0.0256*** | -0.00103 | -0.0295*** | 0.0305*** | 0.0245*** | 0.008 | -0.0328*** |
| Riskaverse | 0.0707*** | -0.0426*** | -0.0281*** | 0.104*** | -0.0586*** | -0.0456*** | -0.00402*** | -0.0335*** | 0.0375*** | -0.003 | -0.0211*** | 0.0237*** |
| **Education** | | | | | | | | | | | | |
| Literate but no schooling | 0.006 | -0.004 | -0.002 | -0.031 | 0.0499** | -0.0185* | -0.00613 | 0.0436** | -0.0375* | -0.003 | 0.0509*** | -0.0478*** |
| Less than primary | -0.012 | 0.0251** | -0.0132*** | -0.0466*** | 0.0737*** | -0.0271*** | -0.0118*** | 0.0552*** | -0.0434*** | -0.002 | 0.0609*** | -0.0590*** |
| Primary school | 0.005 | 0.011 | -0.0157*** | -0.016 | 0.0542*** | -0.0384*** | -0.00265 | 0.106*** | -0.104*** | 0.003 | 0.0943*** | -0.0978*** |
| Middle school | 0.0254*** | -0.009 | -0.0168*** | -0.0263** | 0.0718*** | -0.0455*** | -0.000795 | 0.135*** | -0.134*** | 0.001 | 0.125*** | -0.126*** |
| High school | 0.0178** | 0.000 | -0.0181*** | -0.0274** | 0.0583*** | -0.0310*** | 0.000912 | 0.172*** | -0.173*** | 0.00623* | 0.152*** | -0.158*** |
| Higher Secondary | 0.014 | 0.006 | -0.0194*** | -0.020 | 0.0663*** | -0.0460*** | 0.00165 | 0.226*** | -0.228*** | 0.007 | 0.196*** | -0.203*** |
| Technical Diploma | 0.0490*** | -0.019 | -0.0300*** | 0.0708*** | 0.000 | -0.0709*** | 0.0104 | 0.273*** | -0.284*** | 0.0199** | 0.222*** | -0.242*** |
| Graduate | 0.0532*** | -0.0177** | -0.0355*** | 0.0397** | 0.0312** | -0.0709*** | 0.0118* | 0.305*** | -0.316*** | 0.0101** | 0.263*** | -0.273*** |
| Post Graduate | 0.0504*** | -0.013 | -0.0373*** | 0.117*** | -0.004 | -0.113*** | 0.0192** | 0.314*** | -0.333*** | 0.007 | 0.291*** | -0.298*** |
| Professional Degree | 0.0791*** | -0.0356*** | -0.0435*** | 0.0954*** | -0.014 | -0.0818*** | 0.0159* | 0.314*** | -0.330*** | 0.002 | 0.280*** | -0.282*** |
| English | 0.0324*** | -0.002 | -0.0302*** | 0.0386*** | 0.008 | -0.0465*** | 0.00646*** | 0.148*** | -0.155*** | 0.000 | 0.126*** | -0.126*** |
| **Information Sources** | | | | | | | | | | | | |
| Newspaper | 0.006 | 0.005 | -0.0109*** | 0.0462*** | -0.009 | -0.0375*** | 0.00993*** | 0.101*** | -0.111*** | 0.00323* | 0.106*** | -0.109*** |
| Internet | 0.004 | 0.0178* | -0.0215*** | 0.0500*** | -0.001 | -0.0493*** | 0.0345*** | 0.0921*** | -0.127*** | 0.0163*** | 0.0883*** | -0.105*** |
| Radio | 0.0180*** | -0.00868** | -0.00928*** | 0.0223*** | -0.0152*** | -0.007 | 0.00119 | 0.0433*** | -0.0445*** | -0.001 | 0.0416*** | -0.0410*** |
| Tv | 0.0126** | -0.001 | -0.0116*** | 0.0472*** | -0.012 | -0.0355*** | 0.00422** | 0.106*** | -0.111*** | 0.00385** | 0.0561*** | -0.0600*** |
| Observations | 28392 | 28392 | 28392 | 28392 | 28392 | 28392 | 28392 | 28392 | 28392 | 28392 | 28392 | 28392 |
| Observed Probability | 0.839 | 0.092 | 0.069 | 0.555 | 0.269 | 0.176 | 0.028 | 0.554 | 0.418 | 0.275 | 0.597 | 0.376 |
| Predicted Probability | 0.856 | 0.090 | 0.054 | 0.569 | 0.276 | 0.155 | 0.014 | 0.597 | 0.388 | 0.018 | 0.633 | 0.349 |
| McFadden's $R^2$ | 0.041 | 0.041 | 0.041 | 0.042 | 0.042 | 0.042 | 0.198 | 0.198 | 0.198 | 0.150 | 0.150 | 0.150 |

Table 6 reports the marginal effects computed after multinomial logit regressions. The dependent variable has three outcome categories: *Yes*, *No*, or *Don't know what this is* which are denoted with (1), (2), and (3) respectively. The base category for alternatives (1) and (2) is alternative (3) whereas alternative (1) is used as a base category to compute the marginal effects for the alternative (3). ***, ** and * denote significances at the 1, 5 and 10 percent level.