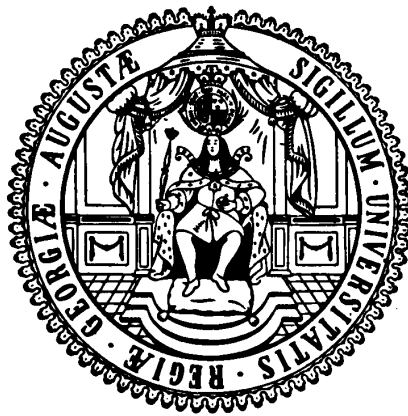# Courant Research Centre
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Female empowerment, cultural effects and savings:
Empirical evidence from India

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Female empowerment, cultural effects and savings: Empirical evidence from India

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Abstract

This paper looks at household consumption and financial decisions made in a matrilineal society where women are by culture the financial household managers. This culture was strongly altered by the British in the mid-19th century in particular through christian missionaries who proclaimed that the role of the household manager is ascribed to men and not to women. Using two different datasets, our results show that female empowerment is stronger and individuals keep following the traditional matrilineal Khasi rules the further they live away from the former British base. Instrumental variable estimates exploiting differences in distance to the former British base in Cherrapunji, suggest that households where women are empowered, spend more on welfare enhancing goods such as education and nutrition, but are less likely to have savings left at the end of the month, and that these effects are causal.

JEL-Codes:I3, O1, R20, Z1

Keywords: Female empowerment, savings, India

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1 Introduction

The empowerment of women has become an important goal in the field of development policies over the recent years in many countries. Behind such policies lies the belief that the empowerment of women is not just desirable in its own rights, but that the empowerment of women will benefit children and society at large (Doepke and Tertilt, 2014; Bobonis, 2009; Ashraf et al., 2010). However, the authors find mixed results when targeting money to women and do also provide evidence that such policies fail to make children better off.

The positive belief is to a large extend, based on studies that have shown that females make expenditures towards female oriented goods when they have some decision-making power in the household (Ashraf et al., 2010; Duflo, 2003; Lundberg et al., 1997). Duflo (2003) for instance shows that when economic resources are controlled by women within the household, education and nutrition of children are improved and that spending on long term durable goods are increased. Other studies argue that when females have strong bargaining power within the households if women are empowered expenditures for alcohol and drugs are reduced, as these products tend to be more in line with men's consumption patterns. Although the effect of female empowerment seems to be positively related to welfare increasing household expenditures, these studies do not show exact causal relationships.

This study is uniquely able to offer insights by looking at decisions made by households in which women are empowered for cultural reasons rather than through a shift in resources. We test the hypothesis that female empowerment causes welfare enhancing intra-household financial decisions (Doepke and Tertilt, 2014; Lundberg et al., 1997), using unique data from India, Meghalaya where the matrilineal society lives. A historical event, namely the arrival of the British missionaries provides us with variation in intra-household gender power structures within this society. Gender roles and gender related power structures are often determined by informal institutions and

are therefore deeply-seated, durable and often couched as central elements of the cultural or religious identity of society (Klasen, 2016). As the matrilineal society has persisted over centuries where females are responsible for household financial and economic decisions, the Christian missions might have affected the strong role of women in society significantly towards reducing their empowerment over time and new norms may have been established. Furthermore, historical events that weaken female empowerment in a matrilineal society may be measurable today.

The setting of this paper is Meghalaya, India which serves as an attractive natural testing ground for two major reasons. First, we can exploit the fact that Christian missionaries expanded slowly in the 18th century from the main base *Cherrapunji*, introducing local variation in intra-household gender roles and thus, female empowerment (Nakane, 1967). Second, Meghalaya and it's traditional Khasi culture has nonetheless persisted in many parts of this state and was mostly unaffected by other exogenous influences (Nakane, 1967; Nongbri, 1993). The Khasis live in the north-eastern state of Meghalaya, and form one of the few matrilineal cultures in the world. In the Khasi culture, women are considered to be the household head and inheritance follows the mother's lineage. Females in the matrilineal society are the financial managers and responsible for the economic and financial decisions of the household. Girls learn their role specific behavior already from young age on by observing their mothers and grandmothers. They are thus the textbook example of empowered females. Men in this society are ascribed to religious, political or farm activities outside the household (Nongbri, 1993).

Using two different datasets which contain rich information on *i) financial expenditures and ii) financial responsibilities within the household* , we test the aforementioned hypothesis. We use the arrival of the British as a natural experiment. Their influence on Khasi culture was strongest in areas closest to their base in Cherapunji. We are hence able to tackle potential endogeneity issues that may arise when examining the role of women empowerment by using the distance between the respondents place of

residence and Cherapunji as an instrument for the role for women empowerment within the household, similar to other studies that have used distance as an instrument see for instance (Christiansen et al., 2008; Becker and Woessmann, 2009).

Our instrument is highly correlated with four different indicators of female empowerment within the household. Furthermore, the land titles are more likely to be in the name of the women in the household. At the same time, we are able to show that the distance from Cherapunji does not influence other observable household characteristics. The main results of this paper therefore support the literature on female empowerment showing that increase in female empowerment has welfare increasing effects. Taken together, ours findings show that female empowerment is historically determined and can be influenced by exogenously induced norms.

We are able to contribute to the literature in two important ways. First, we are able to show that the unitary model of the household is not an accurate representation of how households make decisions. We do this, using a setting and identification strategy that is completely different from those that are normally used to study intra-household decision making. Second, we find evidence that shows that women have different preferences to men. This paper can therefore contribute to our understanding on what lies behind the effects of women empowerment. Households in which women are empowered, and have been for many generations, show consumption patterns that are in line with studies that examine the effect of short term empowerment of women. This evidence gives support to the arguments made by many policy makers that empowerment of women is not just a goal within itself, but would also have beneficial long term effects for children and society at large.

The remainder of this article proceeds as follows. The next section presents the relevant literature on female empowerment and intra-household decision making. Section 3 describes the data source and empirical strategy. The econometric results are presented

in Section 4. Section 5 provides a discussion and concludes.

2   Theoretical Framework

2.1   Intra-household resource allocation

Early economic theory traditionally treated the household as a single unit (Samuelson, 1956; Becker, 1965). In these unitary model of the household all members have the same utility function and so have the same preferences. There is no bargaining process and hence there is no correlation between household expenditures, financial outcomes and who makes the household decisions. Pareto efficiency is reached in these models. More recently, this model of unitary decision making has been rejected by a number of studies and replaced by non-unitary models (McElroy and Horney, 1981; Manser and Brown, 1980). In the non-unitary models of the household, it is assumed that each household member has a different utility function and therefore has different preferences. A bargaining process takes place within the household and decisions are made according to each member's bargaining power. In these non-unitary models of the household, two factors determine household consumption and expenditures: i) each household members bargaining power and ii) their preferences. The outcome of these bargaining process therefore varies depending on who makes the decision.

2.2   Bargaining power

Papers that study intra-household decision making processes often argue that bargaining power depends on the relative income that each partner or household member contributes to the household income. If one partner earns a higher income or receives a positive income shock, this increases their bargaining power and hence the bargaining process within the household will change in their favor (Manser and Brown, 1980). There is considerable evidence, based on observational data, that shows that control over resources leads to control over decisions (Lundberg et al., 1997). The consequence of

these models is that if women become empowered within the household, expenditures will shift to align with their preferences.

However, there is also evidence that shows that control over resources and relative income is not the only determinant of bargaining power. Smith et al. (2010) study representative data from the United States and find that there is a strong tendency for men to be the financial decision makers, this is only slightly lessened if the women is considerably older and has higher cognitive abilities than her husband. Ashraf (2009) shows that increased income has an effect on the outcome of the decision process, but also emphasis that information and communication are important for the outcomes of intra-household decision making. She also takes this as evidence of the role of culture in household decision making. She attributes the finding that only men respond to the information and communication treatment to the cultural background in the Philippines, where women are mostly in charge of household finances.

2.3   Preferences

At the same time, these non-unitary models of the household and the wider development literature often argue that women have different preferences to men. It is here often assumed that women's preferences are more beneficial to the next generation and to the development process in general. A number of studies have hence looked at exogenous changes to women's bargaining power and looked at the changes in household expenditures that results from this. Duflo and Udry (2004) show using a data from Cote d'Ivoir that increases in rainfall that benefits traditionally female crops, shifts household expenditure towards food consumption and so improve nutrition of children. Similarly, (Duflo, 2003) finds that an exogenous increase in pensions that is given to grandmothers raised nutrition of girls, but interestingly not that of boys. A considerable amount of evidence on the effect of increased bargaining power comes from conditional cash transfer programs that in many countries specifically target women. (Attanasio and

Lechene, 2010) look at the effect of PROGRESA, a conditional cash transfer program given to women in Mexico. They argue that a substantial increase in household resources (which should reduce the share spent on food) is counteracted by the effect of a shift in bargaining power towards women. In their study this leads to a large increase in household resources having no effect on the share spend on food. Also looking at the effect of PROGRESA, Rubalcava et al. (2009) find that the transfer programs increases investment in children, while Bobonis (2009) also controls for variation in rainfall but comes to the same conclusion. Similar results have been found in studies looking at cash transfer programs in Brazil (de Brauw et al., 2014). These show that cash in the hands of women leads to increased expenditure on long term durable goods. Using a program in Macedonia where the recipient of the transfer was randomized on a municipality level, Armand et al. (2016) find that cash transfers given to mothers rather than fathers increases the share of food consumption by 4 to 5%. Similarly, Ashraf et al. (2010) randomly give commitment savings accounts to some women and find that their self-reported bargaining power within the household increases. They also find a shift towards female orientated durable consumption goods. All these papers take their findings to reject the unitary-model of the household and as evidence that women have different preferences to men. Further they show that women's preferences are more in line with the welfare of children.

There is further evidence that women and men essentially have different preferences and that these preferences are innate. A large number of experimental studies have shown that women have different preferences to men (see (Andersen et al., 2013) for summary). Women have, further been found to be more risk averse (Dohmen et al., 2011; Eckel and Grossman, 2008) and more patient (Dittrich and Leipold, 2014), more pro-social (Eckel and Grossman, 1998) and less trusting (Buchan et al., 2008), although the evidence on trust is mixed. If men and women have different preferences that are innate and women's preferences are more conducive to the welfare of families, and so, in the long run, more conducive to growth, this has clear consequences for policy. Indeed,

if this is the case great policy effort should be undertaken to empower women within the household.

However, there are other economic theories that could also explain change in household expenditures caused by an increase in resources controlled by women. (Doepke and Tertilt, 2014) argue that it is not a difference in preferences between men and women that cause expenditure on children to increase as women get empowered. Rather they argue that it is the specific role that each spouse plays within the household that causes this shift. Using a theoretical model, they argue that men and women are involved to different extend in the production of public goods. In countries where labor market wages for women are low compared to men, women focus on the production of time intensive public goods such as the welfare of children. As a consequence of this, when resources are transferred to women rather than men, spending on nutrition and education will increase. At the same time, spending on labor intensive goods and investment decrease, as these are goods that men specialize on. In this case a shift in resources towards women will lead to a decrease in physical investment and so decrease growth in businesses. There is also empirical evidence for this model; de Mel et al. (2009) find that a transfer to male small business owners leads to an increase in profits, the same does not apply to female business owners.

2.4 Female Empowerment

The matrilineal society of Meghalaya has been used as a natural experiment in a number of other papers. Interestingly, women in this society behave very differently to women observed in other studies. Filipiak and Walle (2015) show, that unlike in most countries studied so far, women in this part of India are just as financially literate as men. This also applies to their self-reported financial knowledge (Filipiak, 2016). Gneezy et al. (2003) show that women that live here are more competitive than the men living in this society. Similarly, Asiedu and Ibanez (2014) show that women in Meghalya are

more likely to punish in a public goods game with third party punishment. As women in Meghalya have been shown to behave more similarly to men in other, patrilineal, societies, it would be reasonable to expect that households, in which women and men show similar expenditure patters to those run by men alone. This would indicate that it is the specific role played with in the household that causes a shift towards children as women's resources increase. However, if women have different innate preferences we would expect to find household expenditure patterns that are more focused towards female orientated goods and welfare of children.

Distinguishing between these two explanations for observed effects is crucial for policy makers wishing to empower women, because they are hoping for beneficial effect for the next generation and maybe even for increased growth through higher human capital investment. If women have different preferences from men, empowering them will have beneficial effects even in the very long term. If, however, the effects observed are due to the role that women play within the household, the beneficial effect of women's empowerment may be reduced and even disappear in the long term and hence not have the same benefits.

Our study can not just give insights into whether the unitary and the non-unitary model give accurate descriptions of how household decisions are made, but can also provide insights into the mechanism found as a results of a shift in household resources. They are not able to observe the mechanism behind the effect of empowerment on household expenditure. Our study is uniquely able to give evidence on the long run effect of women's empowerment. We look at a natural experiment that means that we are able to observe women that have been empowered and have had increased control over household resources for of all of their lives. We compare these households to households whose women are less empowered within their household, due to the influence that British colonialism had on their culture.

2.5   The Khasis

The Khasis are besides the Garos and the Jaintias one of three main ethnic communities in Meghalaya, a mountainous state in North East India and it is assumed they are descendants from the very first wave of Mongolian immigrants. After independence, Meghalaya was separated from Assam in 1972 and borders Bangladesh to the South and East and Assam to the North and West. Although it is not known, when exactly the three tribes settled in the hills of Meghalaya, they had likely been there centuries before the Indian subcontinent was unified for the first time under British rule (Gait, 1906; India, 2002; Khasi, 2004).

"[...] who established themselves in their present habitat at a very remote period, and who, owing to their isolated position, maintained their independence, while their congers in the plains below were submerged in subsequent streams of immigration from the same direction. [...] The place and river names in the hills they inhabit all seem to be Khasi, and the people themselves have no traditions of any such [other tribes'] movement."

Until today, the Khasis reside predominantly in the Khasi Hills districts in the centre of Meghalaya (West Khasi Hills, East Khasi Hills, and Ri Bhoi). Thereby, the inaccessibility and remoteness of Meghalaya's hills have minimized external cultural influence besides confrontation with the British rule in the 19*th* century so that many Khasi traditions have been preserved and an exceptionally large share of Meghalaya's population have conserved their tribal identity (Gait, 1906; Herzog, 2001).

In the Khasis matrilineal culture, women are considered to be the household head and inheritance follows the mother's lineage. The youngest daughter, the *Khaddu* inherits the largest share of the families property, and becomes the household head of the entire family in the future. She is traditionally seen as a manager of assets and financial resources subject to the advice of an elder man, usually the mothers brother in oder to retain the maternal family line (Herzog, 2001). Men in this society are ascribed to religious, political or farm activities outside the household (Nongbri, 1983). Nonetheless, in her analysis of the Khasi matriarchy, Herzog (2001) explicitly analyses the power relations between women and men among the Khasis. She clearly stresses out that there is symmetry of

powers between sexes as they have split the rule over different spheres of society. Also today, the power balance is reflected in different indicators. For instance, Meghalaya is amongst the Indian states the one with the highest sex ratio with 989 females per 100 males (Census of India, 2013). Also the overall literacy rate in Meghalaya is with 76 percent very high in comparison to other Indian states, with a literacy rate of 73 percent for females and 76 percent for males (IIPS, 2014). Thus, the Khasi culture provides a natural testing ground for investigating household consumption and expenditure patters of empowered women who in learn this role from early childhood. In addition, we can assume that bargaining power within the household is equally distributed among couples.

3   Data and Descriptive Statistics

3.1   Source

The data was self-collected for the special purpose of this study in the three Khasi districts of Meghalaya (East Khasi Hills, West Khasi Hills, and RiBhoi). Interviews took place between May and June in 2015 in randomly selected villages where field teams randomly selected households on different days and at different times of the day. Of each household, they chose one adult member for an interview during which a rich set of socioeconomic individual and household characteristics were captured with a central focus on variables of household finance. Especially, the data does not only include comprehensive information on income, expenditures and on who assumes which financial responsibilities. It also contains rich information on individuals' economic preferences and financial literacy. Overall, the dataset is representative of the Khasi population in East Khasi Hills, West Khasi Hills, and Ri Bhoi with a population of about 1.5 million in total according to the 2011 Indian census (Government of India, 2013).

3.2   Measurement of Variables

3.2.1   Dependent Variables

In order to measure *financial decision making* different variables are employed. Firstly, *savings* are considered, where the respondent was asked: Do you have savings left at the

end of the month? The variable savings takes on the value of one if the respondent answers with "yes" and is zero otherwise. Secondly, the respondent is asked whether he or she has currently a credit. The variable *credit* takes on the value one if the respondent answers with yes and is zero otherwise. Thirdly, the monthly amount of household *expenditures* for food, education and temptation goods is considered.

3.2.2 Explanatory Variables

Female empowerment is measured as follows. The survey asks the respondent who in the family is responsible for short-term financial decisions, long-term financial decisions, and the gender of the household head. The variable *shorttermsavingsfemale* takes on the value one if the women in the household is responsible and is zero otherwise. Similarly, the variable *longtermsavingsfemale* takes on the value one if the women in the household is responsible for longterm savings and is zero if it is a man in the family. In addition we consider who is the household head, the variable *femalehh* takes on the value one if a women is household head and is zero if it is a man in the family. Whereas the latter rather reflect the position of the women with respect to empowerment in a more general sense, the former two variables indicate more directly female empowerment if they are one. Moreover, we consider whether the household owns a land title or not, and in whose name the land title is. The variable *femlandtitle* takes on the value one if the land title is on the name of a female household member.

We consider furthermore, information on risk attitude, competitiveness, self-confidence with financial matters, and gambling behavior. Risk behavior was measured using a standard lottery question.[1] Since also other personal characteristics can influence investment as well as savings behavior we also take into account, *gambling behavior* which is often ascribed to men. This is captured by the number of tries the respondent needs to finish a simple but financially incentivized memory game played. We also take into account time preferences of the respondent using the question:"Suppose you have the option to receive RS 100 today or RS 150 three days later. It is sure that you will

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[1]Competitiveness is self-assessed by asking the respondent *"Suppose you are asked to toss a small ball into a small bin 10 feet away. You will have 10 opportunities to toss the ball. How many successful tosses do you think you will make?"*

get the money. What would be your choice?" The variable *shortpreferences* takes on the value one if the respondent opts for the first option. In addition we consider a substantial number of variables reflecting socio-economic characteristics as controls such as age, education, income, or occupation.

3.3 Female empowerment and financial decision making

From the above discussion, it becomes clear that the interrelation between female empowerment and the possible effect on preferences in financial decision making are not straight-forward and causality is far from certain. There are potential endogeneity issues. If we were just to compare empowered women with less empowered women in any society and to look at their preferences and financial decisions, we could be dealing with a potential endogeneity problem caused by unobserved variable bias. Similarly, reverse causality is an issue; it is possible that women that make better financial decisions, become more empowered in the process of making these decisions.

The dataset that we use in this paper provides a unique opportunity to circumvent these possible endogeneity problems. In the Khasi culture we do not only have a particular role setting with a gender symmetric bargaining structure within the household. In addition we have an historical event that allows us to induce some exogenous variation in the empowerment regressor of interest, namely when British missionaries tried to impose Christianity, and with it, more patrilineal societal norms.

This means that in some areas in Meghalaya, in particular those which are close to the place where the first Christian mission began females may be less empowered than elsewhere in Meghalaya. Since the British were most effective in their efforts to spread Christianity in the most accessible regions in the 19th century, we use the distance to Cherapunji, the regional capital as an *instrument* for the women's empowerment level. The exposure to Christianity and the British rule has had a considerable impact on the Khasi way of life. Most strikingly, the patriarchal structures of Christianity and British administration have questioned prevailing gender roles among the Khasis with property and inheritance laws challenging the matrilineal system of inheritance and their intra-

household role structure in a much broader sense (Chaube, 1973; The Imperial Gazetteer of India, 1909). We use this exogenous shock to study financial behavior of households because households who live geographically closer to Cherrapunji were stronger (and for a longer time) affected by this cultural shock than households who live further away. The instrument is very well suited for two reasons. First, Cherrapunji was selected by the British, and secondly, individuals are similar in their cultural, socio-economic and personal characteristics in our sample but differ in the strength of female empowerment Table 1. Christian missionary workers and British officers first settled in Cherrapunji and then moved to Shillong so that both towns can be considered to have historically been main hubs of Christian missionary work and British administration. Especially, the socioeconomic impact of Christianity and British rule has been considerable. We employ both the respondets distance to Cherrapunji as well as the distance to Shillong as an instrument for female empowerment and contribute to other studies where distance is used as an instrument in other settings (Christiansen et al., 2008; Becker and Woessmann, 2009).

3.4 Descriptive Statistics

As previously mentioned, with respect to financial decisions of a household we use different measures. Table 1 shows the average share of our sample respondents and the self-reported household expenditures for temptation goods, education, groceries and the amount of repaying current loans. The table reveals that households who live geographically far from Cherrapunji spend on average less on temptation goods, more on education, more on food, and more for repaying loans. We use the sample mean as threshold to determine who lives far and who lives close. For instance, spend household far away from Cherrapunji on average 4663 RS, approximately 70 USD, which is significantly more on groceries than other households who spend on average 4229 RS, around 62 USD. This however, does not seem to be related to the households income level, because our descriptive statistics show that the average household income is lower for those living far from Cherrapunji. Household's for instance who live near to Cherrapunji spend on average 690

RS per month on temptation goods which is around 10 USD, whereas households who live further away spend on average with 610 on average 9 USD slightly less.Group differences are statistically significant except for education expenditure. A similar household income distribution can be observed for households who live far away from Shillong, the second hub where Christian missionaries have affected the Khasi culture. For instance, ...

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insert Table 1 about here

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Figure 1 shows four indicators reflecting female empowerment in households who live near and far from Cherrapunji. Households who are located within a radius of 68 kilometers around Cherrapunji are classified as near. The figure shows that the share of empowered women is lower among households that are located near Cherrapunji in comparison to those who live further away. For instance, among those wo live near Cherrapunji only 38.5 percent of females are household head, 46 of females obtain a landtitle, 48 percent of females are responsible for short term savings and investments and 43 percent of females are responsible for long term savings and investments. The share is larger for those who live further than 68 km from Cherrapunji, indicating that females there are more empowered.

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insert Figure 1 about here

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In order to contrast the impact of the missionary activities and to shed light on the intra-household bargaining power of females who live in Shillong. One could argue that also in Shillong as in Cherrapunji the matrilineal Khasi traditions have weakened over time due to either Christianity or other influences from abroad, e.g. migration from bordering states and countries. Figure 2 reports the percentaged share of empowered females who live near and far away from the capital of Meghalaya, Shillong. The cutpoint is the sample mean. Those who live within 32 km around Shillong are categorized as being located near, all others as far away.

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insert Figure 2 about here

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The figure shows in contrast to Figure 1 that females are more empowered if they live near Shillong. Although the share of women who are household head is with 46 percent slightly lower, more often with 59.5 percent a land title is in a females name, are females responsible for short as well as for long-term savings and investment decisions.

Table 3 reports summary statistics for all explanatory variables and reports group differences for household where women are empowered and households where women are less empowered. We use the sample mean as threshold to determine who lives far and who lives close. The table shows that individuals in both groups do not differ significantly in many characteristics. 54 percent of females in our sample live further away and 53 percent live close to Cherrapunji. 16 percent of those individuals who live close are the youngest daughter and 23 percent are among the sample respondents who live further away. The average age in both groups is around 29 years and small but significant differences appear in the education level which is on average the High School level for those who live further away from Cherrapunji and middle school in the other group. 58 percent of those sample respondents near to Cherrapunji are married, and 46 percent in the other group. Group differences are significant. Among the questions that capture the financial knowledge of the respondent, individuals in both groups do not differ significantly in terms of making correct mathematical computations, assessing pricing risks correctly or when computing interest rates. Our sample respondents are also not statistically different in terms of their occupation. Our descriptive statistics are in line with official statistics in India. This is reflected by our data with 15.9 percent in the far away from Cherrapunji group and 19.6 percent of the others which is in line with official statistics. Merely slightly more are self-employed. However, significant group differences exist for the variables reflecting the level of female empowerment. For instance, 79.3 percent report that in households further away from Cherrapunji the land title is in the name of a female while the share is with 61.2 percent lower in the other group. Group differences reflecting financial responsibility are

not significant. Among the Khasis many respondents state that economic and financial household decisions are made together with the spouse. Among the personality traits significant differences exist for the variables self-confidence and gambling. The share is higher for those who live further away from Cherrapunji.

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insert Table 3 about here

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Figure 1 shows whether households where female have a dominant role on economic and financial decisions have savings left at the end of the month or not. The blue bars reflect the share of respondents who say that they do not have savings left and the red bar shows the share of respondents who have savings left at the end of the month. The selected indicators of female empowerment are: a women is the household head, the land title is in the females name, a women is responsible for short-term savings and investments, and a women is responsible for long-term savings and investments. Among households with a women as household head merely 26.15 percent of the respondents say that they have savings left at the end of the month. Among households where the land title is in the females name 39.23 percent report that they have savings left at the end of the month and 60.77 percent report that they don't. 36.96 of the households where a women is responsible for short-term savings and investments say that they have savings left at the end of the month and 37.85 percent if a women is responsible for long-term savings and investments.

3.5 Econometric specification

In order to capture the average causal effect of female intra-household financial empowerment on the respective household financial decision we make use of an instrument which is the distance from the respondent house to Cherrapunji and his or her distance to Shillong. We make use of OLS as well as 2 stage least square estimations (2SLS) instrumenting for female empowerment.

The main assumption that underlies our IV estimator is that the closer the Khasis live

to Cherrapunji or Shillong, the more they have been exposed to (the legacies of) male-centered decision making structures of the British and the less likely they stick to their matrilineal Khasi tradition. Consequently, we expect that female are more empowered when they live far away from these two towns while it should be the other way round for respondents who live close to these two places. Using distance as an instrumental variable, this paper contributes to other studies where distance is used as an instrument in other settings (Christiansen et al., 2008; Becker and Woessmann, 2009). More precisely, it follows the well-known examples of Becker and Woessmann (2009) and Nunn (2008), who also use the degree of exposure (approximated by distance) to a cultural shock as an instrument cultural differences and how they shape economic outcomes.

We employ three measures for intra-household female empowerment. Firstly, the variable *shorttermsavings*, which takes on the value one if a female in the household is primarily responsible for short-term savings and investments. Secondly, *longtermsavings*, which takes on the value one if a female in the household is responsible for long-term savings and investments, and thirdly the variable *femaleHH* which is one if a female is the household head in the family. We exploit thus the variation in female empowerment among the Khasis when they live either near or far from the two main hubs of Christian missionary Cherrapunji and Sillong. The distance variable *Distancefar* is one if the respondent lives further away than 68 kilometers from Cherrapunji and 32 kilometers from Shillong.[2] Both numbers reflect the sample means in distance to these two places.[3] Thus, we first regress the three empowerment variables on the respondents distance (either near or far) to Cherrapunji, and also to Shillong. X denotes a vector of covariates, H reflects whether a household has a land-title or not, in order to account for the asset or living standard of the household.

$$Empowerment_h = \alpha_1 + \beta_1 Distancefar_h + \gamma_1 X_i + \delta_1 H_i + \mu_i h \qquad (1)$$

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[2]We computed the distance from each households to Cherrapunji and Sillong, according to his address stated in the survey with google maps.

[3]Table 3 show that indeed female empowerment measured by our three variables varies according to distance.

$$FinancialDecision_h = \epsilon_1 + \zeta_1 IV Empowerment_i + \eta_1 X_i + \theta_1 H_i + \iota_i h \qquad (2)$$

We estimate the reduced form equation that incorporates ϵ reflecting the constant, ζ which is the estimator of our instrument for female empowerment, which should be significantly different from zero. The exclusion restriction and states that a valid instrument may not have any effect on the dependent variable $FinancialDecision$ other than through the endogenous regressor $Empowerment$. Formally that requires that the instrument is uncorrelated with the error term of the structural equation (1): $Cov(FarfromCherrapunji) = 0$. While the first condition can be empirically tested by estimating the reduced form equation (2), the second condition requires institutional knowledge about the determinants of cultural change among the Khasis.[4] Whether a respondent lives near or far from the two places should not affect his or her intra-household financial decision making process.

4 Results

In our econometric specification we make use of the aforementioned determinants reflecting female empowerment to estimate the probability on having savings left at the end of the month.[5] The main argument that drives these regressions, is that females are assumed to make better economic and financial decisions than men, and thus female empowerment is considered as a major long-term goal among public policies.

Our results show that households where females are responsible for economic and financial decisions by culture and where this role is learned from early childhood are less likely to have savings left at the end of the month. We argue that our instrument the distance of the respondent to Cherrapunji where Christian mission began allows us to deal with the edogeneity problem arising from reversed causality. In addition cultural effects that are affecting intra-household gender roles are also often hard to capture and

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[4]As Cameron and Trivedi (2009:175) point out: "Instrument validity relies more on persuasive argument, economic theory, and norms established in prior related empirical studies."

[5]A women is the household head, the land title is in the females name, a women is responsible for short-term savings and investments, and a women is responsible for long-term savings and investments.

could lead to further endogeneity problems resulting from omitted variable bias.

For all four regressions, we can reject the null-hypothesis that the four selected determinants of female empowerment are exogeneous which implies that simple Probit estimates would be biased. Moreover, the hypothesis of weak instruments can be rejected with an F-test on the coefficient of the variable *Farfromcherrapunji*. Results from the F-test, show that the selected instrument is stronger for the variables reflecting female empowerment in Table 3. When female are responsible for *long-term* or *short-term savings and investments*, the household has a lower probability to have savings left at the end of the month. More precisely, households where a women is responsible for long-term savings and investments (e.g. buying land or saving for a wedding) have a 36 percentage points lower probability to have savings left at the end of the month, compared to households where someone else is responsible. Those households where a women is responsible for short-term savings and investments (e.g. buying durables or investment in education) have a 44.2 lower probability to have savings left at the end of the month.

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insert Table 3 about here

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Table 4 shows that instrumenting for female empowerment is necessary, but also that the chosen instrument is weaker for *female land-title* and *female household head* as indicators for female empowerment. Households where the land-title is in a womens' name have a 82 percentage points lower probability to have savings left at the end of the month and households where a women is the household head have a 52.4 percentage points lower probability. The marginal effects of female empowerment are significant implying that female empowerment is negatively related to savings. Among the explanatory variables, a basic level of financial knowledge is positively related to savings.

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insert Table 4 about here

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insert Table 5 about here

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5   Discussion and Conclusion

This paper provides new empirical evidence for the outcomes of female empowerment on savings and financial behavior in a much broader sense. We use a unique setting the matrilineal culture that allows us to separate the potential counter-factual of empowered women, from women who are less empowered in one and the same state in India. The Indian state Meghalaya, was one of the first places in India where Christian missionaires have started their work in Cherrapunji. Thus, individuals who live near to this place have been influenced by the Christian culture substantially in their norms and traditions away from the traditional matrilineal Khasi way of life.

While most of the current literature argues that female empowerment is positively related to savings and expenditures, our results show that this assumption has to be considered with caution. Our data allows us to instrument for female empowerment and its effect on household savings. The distance to Cherrapunji serves as a valid instrument for female empowerment. It can be assumed that intra-household gender roles differ in households that are located near to Cherrapunji from those who are located further away. Our descriptive statistics support this assumption, showing that the indicators employed to assess the level of female empowerment such as female financial responsibilities for long- and- short term investment and savings decisions, or when the land-title is in the females name, differ significantly between those respondents who live near Cherrapunji and those who live far away. The empirical results show that households where females are empowered have a lower probability to have savings left at the end of the month than other households where women are less empowered. We take into account that individuals in particular women, may also differ in their personal characteristics what might influence financial behavior. Our data allows us to control for a substantial number of variables that could affect savings behavior such as financial literacy or personality traits like competitiveness or risk behavior. Since all respondents are from the same state in India,

they are moreover similar in many other characteristics e.g. education or culture in a much broader sense and mainly differ in their intra-household gender roles.

However, an in-depth analysis of the underlying reasons why savings-behavior is negatively affected is beyond the scope of this study. Women may for instance behave more opportunistically as shown for instance by (Ashraf, 2009), or are less specialized when dealing with many other household responsibilities. Thus, future research might use these first results as a starting point to investigate female empowerment and financial behavior in more detail.

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Figure 1:

Determinants of Female Empowerment: Cherrapunji

The Figure shows four variables reflecting female empowerment: a female is household head, the land-title is in a womens' name, a female is responsible for short-term savings and investments and a female in the household is responsible for long-term savings and investments. Dark blue bars reflect the fraction for respondents living near to Cherrapunji and the light-blue bar reflects the fraction that lives far away. The figure shows the percentages of female empowerment in both places (near and far from Cherrapunji).
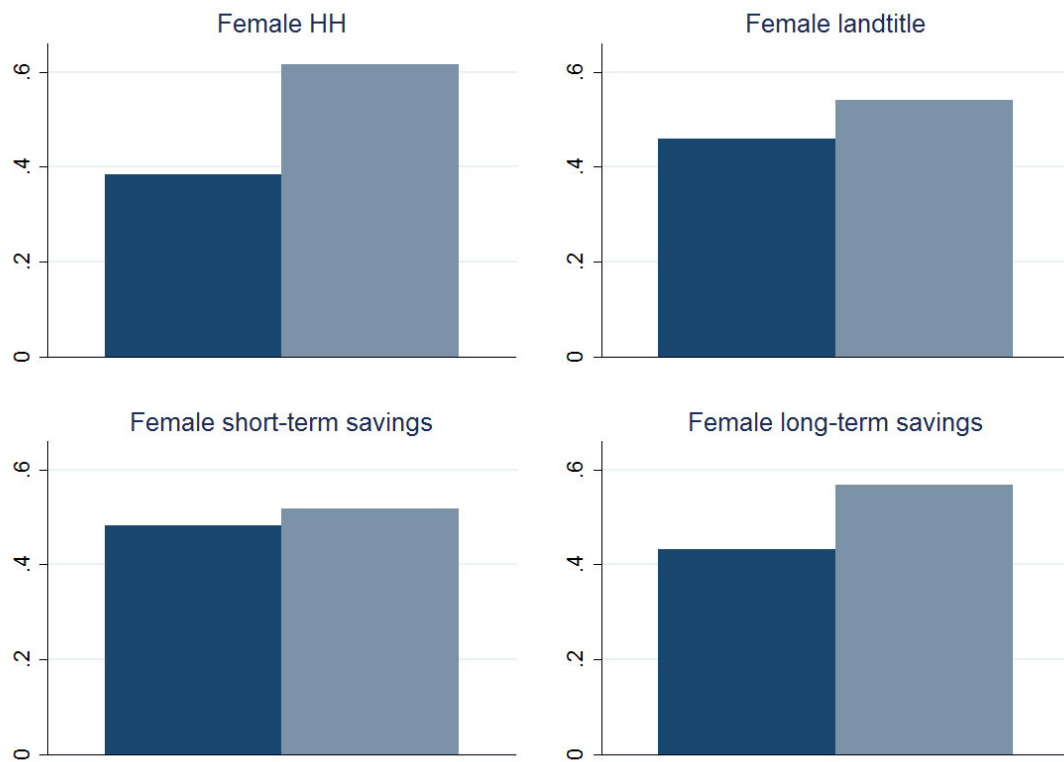
Figure 2:

Determinants of Female Empowerment: Shillong

The Figure shows four variables reflecting female empowerment: a female is household head, the land-title is in a womens' name, a female is responsible for short-term savings and investments and a female in the household is responsible for long-term savings and investments. Dark blue bars reflect the fraction for respondents living near to Shillong and the light-blue bar reflects the fraction that lives far away.
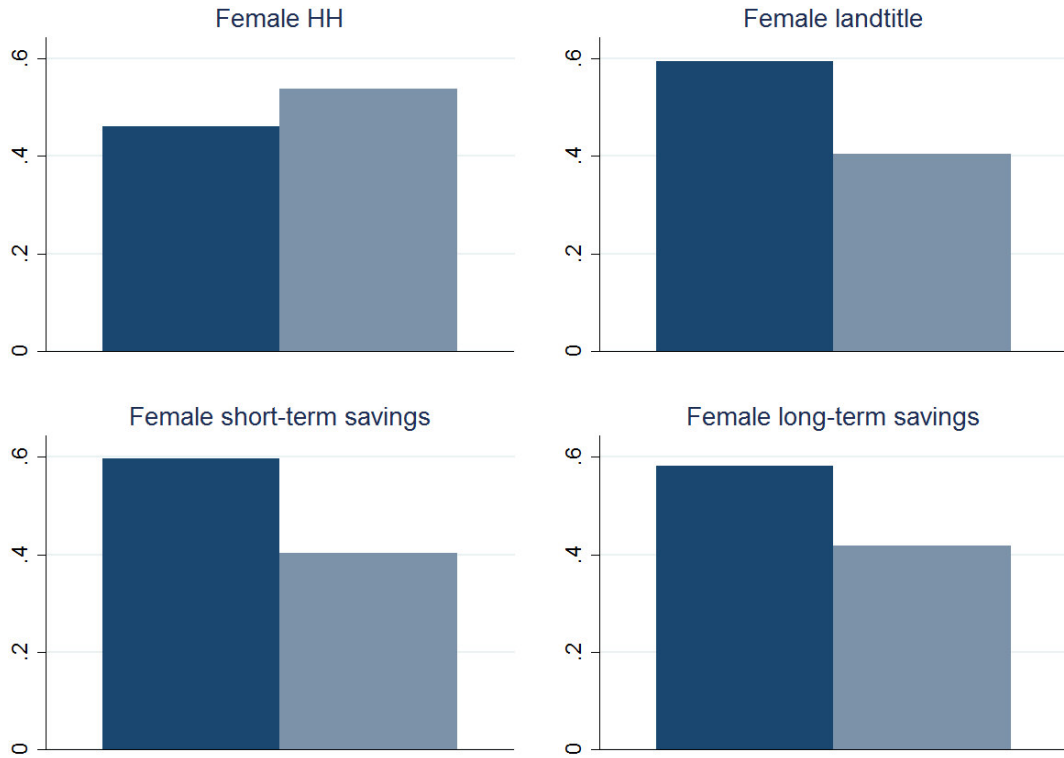

Table 1:

Female Empowerment and Distance

	km > mean			km < mean			differences	
	mean	st. dev.	obs.	mean	st. dev.	obs.	difference	test statistic
Distance I (Cherrapunji)								
Credit	12.76	28.69	52	24.26	19.48	11.5	1.839	0.081
Savings	0.362	0.481	320	0.427	0.495	351	0.064	1.7165
Food Expenditures	46.63	23.58	320	42.29	24.71	351	-4.341	-2.322
Education Expenditures	26.788	63.75	320	22.24	26.20	351	-4.539	-1.050
Temptationgoods Expenditures	6.183	7.521	320	6.659	7.39	351	0.4761	0.776
Distance II (Shillong)								
Credit	28.8	41.88	20	12.39	16.98	58	-16.40	-2.471
Savings	0.231	0.422	242	0.489	0.500	429	0.258	6.774
Food Expenditures	45.082	23.43	242	43.958	24.733	429	-1.124	-0.576
Education Expenditures	31.711	67.602	199	19.975	30.982	313	-11.735	-2.663
Temptationgoods Expenditures	6.832	7.609	212	6.182	7.371	381	-0.650	-1.0174

Table 1 reports means and standard deviations for group differences between households living close to Cherrapunji and far. The variables takes on the value one if the individual lives 68 km or closer (which is the mean). Variables denoted with an Astrix are metric and t-test for group differences were employed. All other variables are binary and we employ a chi^2 test for group differences. The number of observations for those living far from Cherrapunji is 320 and for those who live close to Cherrapunji is 351.

Table 2:

Summary Statistics for Explanatory Variables

	Mean	SD	Min	Max
Financial Expenditures				
Food	44.363	24.261	0.5	150
Education	24.536	48.884	0.5	500
Temptation goods	6.414	7.457	0.5	60
Creditrepayment	16.602	26.428	1	200
Regional Characteristics				
Shillong	0.360	0.480	0	1
Cherrapunji	0.476	0.499	0	1
GDP p.c. (state level)*				
('000 of RS)				
Numbers of banks per city*				
Personal Characteristics				
Age*	29	10.24	15	60
Married	0.52	0.49	0	1
Income*	10.171	7.970.5	1.300	65.000
('000 of RS)				
Female	0.538	0.498	0	1
Khaddu	0.201	0.401	0	1
Education	5.48	2.18	1	11
Preferences				

Table 3 reports summary statistics for explanatory variables used. Those respondents are considered who do not possess a savings account at present and within the past twelve months. Official data for Indian states are used to control for regional characteristics such as the number of financial institutions, the Gross Domestic Product (GDP) per capita at the state level and the number of banks per state are given in Rupees (RS). Income is computed by earnings minus expenditures and can therefore be negative.

Table 3:

Female Empowerment and Savings
Instrumental Variable Probit Regressions

Variables	(1) HH Savings	(2) Female Short-term-investments	(1) HH Savings	(2) Female Long-term-investments
Female Financial Responsible (IV)	-1.060***		-1.415***	
	(0.344)		(0.388)	
Sociodemographic characteristics				
Age	-0.000153	0.00347*	-0.00125	0.00153
	(0.00566)	(0.00207)	(0.00542)	(0.00209)
Married	-0.252*	-0.281***	-0.400**	-0.311***
	(0.146)	(0.0421)	(0.162)	(0.0424)
Education	0.0231	0.0134	0.0389	0.0218**
	(0.0256)	(0.00972)	(0.0250)	(0.00980)
Ownland	0.130	-0.163***	0.0380	-0.164***
	(0.117)	(0.0431)	(0.127)	(0.0435)
Income	4.03e-06	-5.25e-06**	4.34e-06	-3.04e-06
	(7.68e-06)	(2.62e-06)	(7.50e-06)	(2.64e-06)
Financial Literacy				
Computation correct	0.112	-0.0934**	0.149	-0.0291
	(0.133)	(0.0438)	(0.126)	(0.0442)
Know interest rate	-0.0516	-0.0396	-0.177	-0.119**
	(0.146)	(0.0537)	(0.148)	(0.0541)
Know bank deposit	0.274**	0.155***	0.270**	0.122***
	(0.126)	(0.0420)	(0.117)	(0.0424)
Personality traits				
Risk behavior	0.223	0.0636	0.257	0.0833
	(0.182)	(0.0664)	(0.176)	(0.0670)
Gambling (no. of tries memory)	0.0351	-0.0233***	0.0255	-0.0198**
	(0.0262)	(0.00763)	(0.0282)	(0.00769)
Short-preferences	0.0238	-0.0340	0.0785	0.0179
	(0.104)	(0.0377)	(0.0984)	(0.0381)
Competitiveness	0.192*	0.0144	0.114	-0.0308
	(0.107)	(0.0396)	(0.108)	(0.0399)
Farfromcherrapunji		0.249***		0.166***
		(0.0418)		(0.0421)
Constant	-0.501	0.597***	-0.168	0.599***
	(0.504)	(0.122)	(0.580)	(0.123)
athrho	0.538**		0.735**	
	(0.212)		(0.305)	
lnsigma	-0.783***		-0.775***	
	(0.0276)		(0.0276)	
Observations	656	656	656	656
F-Test (First Stage)	15.176		34.825	

Table 3 reports the coefficients on the probability that a household has savings left at the end of the month. (1) denotes the first stage IV-Probit regressions and (2) the second stage, with the variable Farfromcherrapunji as an instrument for female empowerment. Wald-Test F-statistics are obtained from the 2SLS Regressions.***, **, * denote significant at the 1, 5, 10 percent level.

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Table 4:

Female Empowerment and Savings
Instrumental Variable Probit Regressions

Variables	(1) HH Savings	(2) Female Land-title	(1) HH Savings	(2) Female Household Head
Female Financial Responsible (IV)	-1.858***		-2.921***	
	(0.383)		(0.616)	
Sociodemographic characteristics				
Age	-0.00797	-0.00283	0.0284***	0.0108***
	(0.00517)	(0.00195)	(0.00855)	(0.00124)
Married	-0.147	-0.0967**	-0.357***	-0.135***
	(0.111)	(0.0396)	(0.136)	(0.0251)
Education	0.0231	0.00902	0.00685	6.18e-05
	(0.0236)	(0.00915)	(0.0245)	(0.00579)
Ownland	0.666***	0.242***	0.125	-0.0372
	(0.116)	(0.0405)	(0.114)	(0.0257)
Income	1.68e-06	-2.79e-06	-6.67e-07	-2.77e-06*
	(7.47e-06)	(2.47e-06)	(7.85e-06)	(1.56e-06)
Financial Literacy				
Computation correct	-0.0281	-0.0963**	0.0247	-0.0475*
	(0.142)	(0.0412)	(0.138)	(0.0261)
Know interest rate	0.0727	0.0431	0.0131	0.00724
	(0.133)	(0.0505)	(0.135)	(0.0320)
Know bank deposit	0.163	0.0456	0.257**	0.0595**
	(0.103)	(0.0395)	(0.107)	(0.0250)
Personality traits				
Risk behavior	0.282*	0.0914	0.192	0.0261
	(0.165)	(0.0625)	(0.167)	(0.0396)
Gambling (no. of tries memory)	0.0378	-0.00257	0.00843	-0.0128***
	(0.0258)	(0.00718)	(0.0306)	(0.00455)
Short-preferences	-0.0741	-0.0628*	0.142	0.0330
	(0.103)	(0.0355)	(0.0941)	(0.0225)
Competitiveness	0.000382	-0.0675*	0.128	-0.00333
	(0.114)	(0.0372)	(0.105)	(0.0236)
Farfromcherrapunji		0.101***		0.0699***
		(0.0393)		(0.0249)
Constant	0.336	0.616***	-1.219***	-0.121*
	(0.642)	(0.115)	(0.393)	(0.0729)
athrho	1.055**		0.960**	
	(0.437)		(0.408)	
lnsigma	-0.844***		-1.300***	
	(0.0276)		(0.0276)	
Observations	656	656	656	656
F-Test (First Stage)	6.514		7.715	

Table 4 reports the coefficients on the probability that a household has savings left at the end of the month. (1) denotes the first stage IV-Probit regressions and (2) the second stage, with the variable Farfromcher-rapunji as an instrument for female empowerment. Wald-Test F-statistics are obtained from the 2SLS Regressions. ***, **, * denote significant at the 1, 5, 10 percent level.

Table 5:

Female Empowerment and Savings
Marginal Effects

	(1)	(2)	(3)	(4)
Female Empowerment:	Long-term investments	Short-term investments	Land-title	Household Head
	-0.357***	-0.442***	-0.822***	-0.524***
	(0.093)	(0.085)	(0.283)	(0.082)

Table 5 reports the average marginal effects after IV-Probit using the distance to Cherrapunji as an instrument for the four variables reflecting female empowerment, on the probability that a household has savings left at the end of the month. We employ the Delta-method for computing marginal effects in non-linear. ***, **, * denote significant at the 1, 5, 10 percent level.