Banking and Marriage Markets:

Evidence from India's Branch Licensing Policy

Jagori Saha*

Version: October 2017

JOB MARKET PAPER

Abstract

This paper estimates the effect of access to credit on the probability of marriage of women and men in rural India. In societies where dowry payments are customary, an increase in access to credit can potentially increase the probability of marriage of girls either through an increase in income or consumption smoothing. Using a formal bank branch expansion in rural India and an instrumental variables approach, I find the following: First, the probability of marriage increases for girls but does not change for boys in response to an increase in formal banking; Second, the effect of formal bank branch expansion on the probability of marriage of daughters is concentrated during the years that households do not experience a positive agricultural income shock; Third, consistent with this result of a tighter "marriage squeeze", that is, there are more potential brides in the marriage market than potential grooms, an increase in per capita rural bank branches also leads to an increase in dowry payments and women's distance of marriage migration. The marriage market results are further supported by the following findings: (a) An increase in per capita rural bank branches only increases school enrollment of young girls, and therefore, fails to delay the marriage of girls who are at the highest risk of marriage; (b) An increase in per capita rural bank branches decreases labor participation of women, and therefore, fails to increase the value of labor of unmarried women in a household.

*Ph.D. Candidate, Department of Economics, University of Washington. Email: jagori@uw.edu. I sincerely thank my advisor, Rachel M. Heath, for her guidance and support. I am grateful for valuable suggestions and feedback from Chris Anderson, James D. Long and Xu Tan. I also thank the participants at the UW Labor and Development Brownbags for helpful comments and feedback. All errors are my own.

1 Introduction

In the past few decades, we have witnessed major efforts towards the provision and evaluation of access to credit in emerging economies, especially through microfinance (Crépon, Duflo, Devoto and Pariente, 2015; Angelucci, Karlan, and Zinman, 2015; Tarozzi, Desai, and Johnson, 2015; Banerjee, Duflo, Glennerster and Kinnan, 2015). However, very little is known about how an increase in access to credit can affect women during critical stages of their lives, such as, marriage. Such consequences are particularly relevant for countries where early marriage and financial transfers at the time of marriage (such as, bride price or dowry) are common practices. Recent work by Corno, Hildebrandt, and Voena (2017) shows that marriage timing of girls is used as a tool of consumption smoothing at the time of adverse income shocks. Specifically, they find that, when households face a negative agricultural productivity shock, a girl is more likely to marry in Sub-Saharan Africa where the practice of brideprice is common and less likely to marry in India where the practice of dowry is common. Therefore, either through consumption smoothing or income effects, an increase in access to credit can potentially increase the risk of marriage of girls in India. From a policy point of view, it is important to empirically test this hypothesis as early marriage can have long-run adverse effects on the health, education, and household bargaining power of women and also the health and education of their children (Field and Ambrus, 2008 ; Sekhri and Debnath, 2014; Chari, Heath, Maertens and Fatima, 2017).

In this paper, I examine the effect of access to rural banking on the marriage timing and other marriage outcomes of women and men in rural India. Additionally, I try to shed light on the other channels, such as, school enrollment and labor demand, that can be affected by access to credit and can consequently affect marriage timing decisions.

Empirical investigation of the above question poses a few challenges. First, it requires information on the exposure to financial access experienced by households of potential brides and grooms for at least the first few decades of their lives. For this purpose, I use the rural bank branches data from 1951 to 1999, which is available from India's central bank. Second, the analysis also requires detailed information on the birthplace and eventual marriage outcomes of the women and men in the sample. The Rural Economic and Demographic Survey of 1999 contains retrospective marriage information of the interviewed households' children. This enables me to accurately match the financial access information to the location of birth of these children and evaluate its impact on the decisions made before and at the time of their marriage. Third, opening bank branches are investment intensive and therefore, in the absence of policy interventions, banks are more inclined to open branches in more remunerative and developed locations. However, in case of rural India, most bank branch expansions were policy driven. In either case, the ordinary least squares estimate of the impact of formal bank branches on the outcome of interest is likely to be biased due to the endogenous placement of bank branches. To deal with this selection, following Kochar (2011), I use a rural bank expansion program, the *Branch Licensing Policy*, to instrument for per capita rural bank branches in a district. From 1979 to 1993, the Indian central bank implemented the *Branch Licensing Policy* to expand the country's formal banking network into its rural areas. The *Branch Licensing Policy* followed district-level rules, such that, during the policy years, only districts that were above a pre-determined rural population-to-bank ratio received rural bank branches as an increasing function of their initial rural population-to-bank ratio. I exploit these rules to instrument for per capita rural banks in a district.

Using the instrumental variables approach, I confirm that an increase in per capita bank rural bank branches increases the probability that a rural household borrows. Specifically, an additional rural bank branch for every million persons in a district increases the probability of that a household borrows by about 3%. Consequently, I find that an additional rural bank branch for every million persons in a district increases the probability of marriage of a daughter between by about 5.5% but does not statistically significantly affect the probability of marriage of boys. The marriage timing results suggest that households are more willing to have their daughters married in response to an increase in per capita rural bank branches but not their sons. This indicates that an increase in access to credit tightens the "marriage squeeze", that is, there are more potential brides in the marriage market than potential grooms.

A possible way for the market to adjust in response to the tighter "marriage squeeze" can be an increase in groom price (or dowry). As a result, I find that dowry payments increase by approximately 8% in response to a unit increase in per capita rural bank branches per million persons in a district. This is consistent with the intuition that sons' households who are now less willing to enter a marriage match have to be compensated more for agreeing to it. I further find that a unit increase in per capita rural bank branches for every million persons in a district leads to women migrating approximately 11% more distance after marriage. I interpret this as another result of the tighter "marriage squeeze" caused by the increase in access to finance. As the pool of potential grooms shrinks, daughters' households increase their search radius for a groom, which eventually culminates into a greater distance of marriage migration of women in a patrilocal society.

Additionally, I explore whether access to credit increases school enrollment/or and labor supply as either of these changes can potentially delay the marriage of girls. I find that an increase in per capita rural bank branches only increases school enrollment of young girls for whom the risk of marriage is anyways very low. Also, labor supply of women decreases as they are less likely to work for wages in response to an increase in per capita rural bank branches. These results provides further support to the marriage timing result for girls.

This study primarily contributes to two strands of existing literature. First, this work fits into the research on how marriage markets work in developing countries (Banerjee, Duflo, Ghatak, and Lafortune, 2013; Sautmann, 2014) and how they are affected by changing economic conditions. Recent studies in Bangladesh and India show that wealth shocks (Mobarak, Kuhn and Peters, 2013), income shocks (Corno and Voena, 2016; Corno, Hilderbrandt and Voena, 2016), and female labor demand shocks (Mbiti, 2008; Jensen, 2012; Heath and Mobarak, 2015) can affect the probability of marriage of women. Here, I show that access to finance is another economic factor that marriage decisions respond to in rural India.

Second, the study is also very closely related to the growing literature on the effects of access to finance on development outcomes. Since the advent of microcredit in the 1970's, providing access to finance to the poor has become a frontrunner as a tool of economic development. Though initially received with optimism, empirical evidence on the long run impact of access to finance is mixed (Banerjee, Duflo, Glennerster and Kinnan, 2015). Recent studies show that access to credit either through formal banks (Fulford, 2013) or microfinance (Kaboski and Townsend, 2011, 2012) can increase consumption in the short-term but can have detrimental effects on consumption in the long run. Burgess and Pande (2005) in their seminal work show large decreases in poverty levels as a result of the rural bank branch expansion in India. However, more recent studies (Panagariya, 2006; Kochar, 2011; Fulford, 2013) have shown reasons to question the causal inference of the work. This study shows that even though access to formal banks in rural India has been documented to increase consumption (Kochar, 2011; Fulford, 2013) and manufacturing growth (Young, 2017), it has adverse consequences for women's marriage outcomes. The observed increase early marriage of women can eventually lead to unwanted long-run effects on their health, status within household and decisions about investment in children. Therefore, from the standpoint of women's lives, there are reasons to be wary of access to finance policies, especially in societies that practice dowry.

The Indian central bank launched its most recent bank branch expansion program, the *Branch Authorization Policy* in September, 2005. In more recent years, the *Pradhan Mantri Jan Dhan Yojana* was launch in August

2014 to provide every household with a bank account and basic insurance cover. The Micro Unit Development and Refinance Agency was launched in April 2015 to fund and promote microfinance institutions, which will, in turn provide loans to small businesses. These policies show India's persistent commitment towards financial inclusion. However, this paper finds that access to finance policies can have adverse effects on women's welfare by increasing their risk of early marriage, dowry payments, and marriage migration. Therefore, the results in this paper indicate that there is a need to accompany these programs with supplemental policies that increase the value of unmarried women (such as, labor policies that promote educational investment in women and their eventual employment) and can potentially counter the marriage market effects of access to finance policies.

The results in this study also has implications for public policy in societies where brideprice is customary, such as, Sub-Saharan Africa and parts of Asia. Even though the practice of brideprice has its drawbacks, the findings here indicate that access to credit can reduce the need for households in these societies to marry their daughters to smooth consumption during a given year. This potential delay in marriage of girls can also eventually improve their long run outcomes.

The rest of this paper proceeds as follows. Section 2 provides a brief historical background on the expansion of formal bank branches and marriage markets in rural India. Section 3 models the dynamic optimization problem of a credit constrained household who choose the marriage timing of their daughter or son in a society where dowry payments are customary. Sections 4 and 5 describe the data and empirical methodology used in the study, respectively. Section 6 gives results. Section 6 discusses the results and section 7 concludes.

2 Background

In this section, first, I describe the major policies that extended India's formal banking network into the rural areas. Second, I briefly discuss some distinct features of the marriage market in India.

2.1 Bank Expansion in Rural India

Prior to 1969, the Indian central bank's role in rural credit was very limited. The All India Rural Credit Survey Committee of 1954 reported that less than 9% of rural credit was provided by formal financial institutions, and more than 75% of rural credit was provided by moneylenders, traders, and rich landlords (Shah, Rao and Shankar, 2007). During the 1950's and 1960's most of the efforts towards the provision of rural credit was focussed at developing cooperative credit societies. However, elite and state capture of these institutions constrained their ability to serve the rural borrowers. At this time, the only significant step towards social banking was the nationalization of the Imperial Bank of India (now called the State Bank of India) in 1955. Yet, even after the State Bank of India was directed to open 400 new branches in semi-urban areas and prioritize agricultural credit, only 2.4% of rural credit was provided by formal institutions in 1971.

Although, India's villages were home to the agricultural industry, which contributed to 60% of the Gross Domestic Product, the 1961 Census reports that almost none of the villages had any formal bank branches. The first major push towards social banking in India commenced with the nationalization of the 14 largest commercial banks in 1969. This was done with a clear message of the central bank playing a more active role in aligning the growth of the financial sector with the overall developmental goals of the country.

In line with these objectives, an *entitlement formula* was implemented in July 1962. This required commercial banks in India to follow a 2:1 ratio between their new branches in banked and unbanked centers[1]. To intensify the rural bank branch expansion, this ratio was later modified to 1:3 in February 1970, and 1:4 in 1977 (Panagariya, 2006). However, even the *entitlement formula* failed to accelerate growth in the rural banking network as needed. Therefore, a new *Branch Licensing Policy* was initiated in its place.

2.1.1 Branch Licensing Policy

The government of India implemented a major poverty alleviation program in 1978, the *Integrated Rural Development Program* (IRDP). IRDP promoted self-employment by providing income-generating assets through credit and subsidy. The program provided financial assistance to below-poverty-line families and was intended to help them rise above the poverty line. In 1978, the central bank also implemented a flat-rate of interest of 9% per annum for all priority sector lending (agriculture and allied activities, and small-scale and cottage industries) and directed that down payments were not mandatory for small rural borrowers.

The government implemented the IRDP in all blocks of the country by October 1980. The IRDP was India's primary poverty alleviation program at the time and the government needed India's formal banking network to expand into the rural areas to assist in the implementation of the program.

According to the 1949 Banking Companies Act, banks can only open a new branch in India after procuring

[1] A centre is defined as a revenue unit and is classified by the respective state government, i.e., it can be a village or city or municipality, or other geographical areas. A banked center is a revenue division with at least one bank branch and an unbanked center is a revenue division without any bank branches.

a license from the central bank. Therefore, during this policy, the central bank was able to restrict the growth of formal banks to only rural areas of financially underdeveloped districts. The policy spanned three periods: January 1979 to March 1982, April 1982 to March 1985, and April 1985 to March 1993. During each period of the *Branch Licensing Policy*, the central bank classified each district as *deficit* or *non-deficit* based on the district's initial rural population-to-bank ratio[2]. The central bank classified the districts that exceeded a rural population-to-bank ratio of 20,000 as *deficit* in the first period of the *Branch Licensing Policy*. The central bank reduced this threshold to 17,000 in the following two periods of the policy. During each policy phase, the central bank granted new branch licenses to only rural areas in *deficit districts*. Each *deficit district* received these new rural bank branch licenses such that they reached the target rural population-to-bank ratio by the end of the policy phase (20,000 for the first phase, and 17,000 for the second and third phase). Therefore, the number of new rural bank branches that a *deficit district* was assigned was positively related to how far this *deficit district* was from the policy's initial rural-population-to-bank ratio cutoff. During each of the three phases of the *Branch Licensing Policy*, the central bank issued a total of 5475, 6121, and 5360 rural bank branch licenses. Together these new licenses accounted for approximately a 60% increase in the total number of bank branches in the country.

Even though the IRDP and the *Branch Licensing Policy* ran together, they had separate implementation criteria. IRDP expenditures were the same across all blocks in the country. However, the implementation of the *Branch Licensing Policy* was based on how far a *deficit district*'s initial rural population-to-bank ratio was from the policy cut-off. Therefore, these unique district-level rules enable me to identify the effect of rural bank branch expansion on the outcomes of interest without picking up the the effects of other programs, running alongside the *Branch Licensing Policy*, like the IRDP.

Eventually, the government ceased the *Branch Licensing Policy* owing to the bad financial health of the banks. Since then the central bank redirected its attention to "improving efficiency, quality of assets and financial strength of banks" and further bank expansion was considered on the basis of "need, business potential, and financial viability"[3].

[2] This corresponded to the number of rural bank branches at the end of September 1978, March 1982, and March 1985, respectively. The district-level rural population data was used from the 1971 Census for the first period of the *Branch Licensing Policy* and the 1981 Census for the last two periods

[3] Though the *Branch Licensing Policy* was concluded, the Service Area Approach (SAA) that was implement in April 1989 was continued. The SAA's objective was to reduce spatial gaps in the rural banking network. Specifically, the SAA required each block, consisting of 15-25 villages, to be assigned a rural bank branch. The SAA was concluded at the start of the central bank's most recent branch expansion policy (the *Branch Authorization Policy*) that was implemented in September 2005.

2.2 Marriage Market in India

In India, women's labor participation, especially outside their household enterprise, is limited. Banerjee, Duflo, Ghatak, and Lafortune (2013) show that, even in more recent times and in an urban setting, less than 25% of the women in their sample worked after marriage. This makes marriage almost the single most important decision made during the life of a girl in India. However, potential brides and grooms play very little role in their marriage decisions. Literature documents that a marriage match in India is like a strategic contract between two households (Rao and Rao, 1982). Rosenzweig and Stark (1989) show that, in rural India, marriage matches are used as social insurance against income shocks.

India is one of the twelve countries that is part of UNFPA(United Nations Population Fund) and UNICEF's (United Nations Children's Fund) Global Programme to Accelerate Action to End Child Marriage. According to the Prohibition of Child Marriage Act of 2006[4], the legal age of marriage in India is 18 years for girls and 21 years for boys. Yet, even today, 48% of girls in rural areas and 29% of girls in urban areas are married before they are 18 years of age (UNICEF India, 2017). Though, there has been a decline in early marriage, it is slow, especially between the ages of 15 and 18. Qualitative evidence suggests that, there are several reasons why parents dislike delaying a daughter's marriage like higher dowry, declining number of potential matches, protection from sexual assault and pregnancy. However, early marriage of girls is associated with lower educational attainment, lower household bargaining power and higher risk of abuse, violence, mortality and morbidity of these girls and their children. Therefore, marriage timing has been a major focus of research on women's welfare in developing countries.

A marriage agreement in India is almost always accompanied by a dowry. A dowry is a financial transfer from the bride's household to the groom's household at the time of marriage. Traditionally, these marriage payments were only practiced among the upper caste[5] households in North India. However, over time, the tradition has spread to the rest of the country (Caldwell, Reddy, and Caldwell, 1983). These payments are generally much larger than the average household income (Anukriti, Kwon, and Prakash, 2016). Despite, state-level bans implemented as early as 1939 and the national Dowry Prohibition Act in 1961, there has been a surge in dowry payments and dowry-related deaths over time. In 2012, more than 18,000 dowry death cases were reported in India (National Crime Record Bureau). Some researchers propose "marriage squeeze", that

[4]This replaced the earlier legislation, Child Marriage Restraint Act 1929.

[5]Caste system is a social stratification practiced by Hindus in India, which is inherited at birth. It is a hierarchical system that was originally based on occupation and lifestyle practices.

is, fewer potential grooms than potential brides in the marriage market, as the cause of the rising groom prices (Rao, 1993; Sautmann, 2014). Other competing theories propose "marrying up", that is, lower caste women marrying upper caste men (Anderson, 2003; Rajaraman, 2006) and increased ability to replicate customs of the upper caste (Srinivas, 1952) as the causes of dowry inflation.

Another distinct feature of the marriage market in India is the practice of patrilocal exogamy. It refers to the custom in which a girl travels, often long distances, from her parent's house to her husband's house after marriage. In the National Sample Survey of 2007-08, 74% of rural women reported to have migrated for marriage (Fulford, 2015). Rosenzweig and Stark (1989) argue that these migration patterns of married women can be explained as risk-mitigating strategies adopted by agricultural households with high income variability. To smooth consumption, they create a marriage match with a household with low income variability in a distant village. Contrary to these results, recent work by Fulford (2015) shows that the documented marriage migration of women in India is largely associated with the status of women in society. Societies that place a lower value on their unmarried daughters (for example, the North Indian states) also exhibit greater distances of marriage migration of women.

3 Conceptual Framework

In this section, I develop a simple theoretical model to demonstrate how an increase in the availability of credit can affect the probability of marriage of daughters and sons in a society where dowry is customary. I also detail two other channels outside this simplistic framework that can affect marriage timing decisions in response to a relaxation of the credit constraint.

3.1 The Model

I use a framework developed in Corno and Voena (2016) and Corno, Hilderbrandt and Voena (2017), where households solve a consumption optimization problem and decide on the marriage timing of their daughters and sons. I introduce borrowing to the model, which enables households to move resources to future periods.

In the model, a household lives for two periods during which they maximize their utility, ($U(c_1, c_2)$), subject to the inter-temporal budget constraint and credit constraint. Every period, a unit mass of households with a daughter and a unit mass of households with a son are born. The two periods correspond to the young and old life stages of the daughter or the son. If they are not married by the first period, then they re-enter the marriage market in the second period. Once a marriage occurs, there is no more search. Brides and grooms are matched and can only marry within their own cohort. The instantaneous utility, $u(c_t)$, is increasing and concave in consumption. The household chooses consumption, c_t, in each period. The household also chooses how much to borrow in the first period, b, which is constrained by a constant, α. The household pays an interest rate, r, on the borrowings. The household is saving instead of borrowing when $b < 0$, in which case they earn an interest on it that is equal to r.

The household chooses the period in which their daughter or son marries. m_t is an indicator that is equal to 1 if a son or daughter marries in period t and zero otherwise and M_2 is an indicator that is equal to one if a son or daughter is married by the second period. A daughter's household has to pay dowry, d_t, for her marriage in period t. Similarly, a son's household receives a dowry, d_t, for his marriage in period t. d_t is endogenously determined from the marriage market equilibrium.

The household income, y_t, is subject to idiosyncratic shocks and is an i.i.d. stochastic process. A household has to invest i in their daughter or daughter-in-law (assuming patrilocal exogamy). The daughter or daughter-in-law contributes positively to household consumption when $i < 0$. If married by the second period, then $\varepsilon^f \geq 0$ and $\varepsilon^m \geq 0$ are a utilities derived by the daughter's and son's households, respectively. ε^f can be interpreted as the value received by the daughter's household from avoiding the stigma of an unmarried daughter and ε^m can be thought of the value from an offspring.

The optimization problem of a household with a daughter can be written as

$$\begin{aligned} \underset{c_1,c_2,m_1,m_2,b}{\text{maximize}} \quad & U(c_1, c_2) = u(c_1) + \beta\{E_1[u(c_2)] + M_2\varepsilon^f\} \\ \text{subject to} \quad & c_1 + m_1 d_1 + (1 - m_1)i = y_1 + b \\ & c_2 + m_2 d_2 + (1 - M_2)i + (1 + r)b = y_2 \\ & b \leq \alpha. \end{aligned} \tag{3.1}$$

Suppose μ^f is the Lagrange multiplier associated with the credit constraint, $b \leq \alpha$, then the first order condition of the above problem with respect to b is

$$u'(y_1 + b^* - m_1 d_1 - (1 - m_1)i) = \beta(1 + r)E_1[u'(y_2 - m_2 d_2 - (1 - M_2)i - (1 + r)b^*)] + \mu^f \tag{3.2}$$

The household prefers to have their daughter married in the first period if the utility derived from it is greater than the utility derived from waiting. If the credit constraint binds, that is, $\mu^f > 0$ and $b^* = \alpha$, then the household prefers to have their daughter married in the first period if

$$u(y_1 + \alpha - d_1) + \beta E_1[u(y_2 - (1+r)\alpha)] \geq u(y_1 + \alpha - i) + \beta E_1[u(y_2 - d_2^* - (1+r)\alpha)] + \varepsilon^f\}. \quad (3.3)$$

d_2^* in equation (3.3) is the equilibrium dowry payments in the market for older brides and grooms[6]. Using this framework, the optimization problem for the son's household is also derived in the Theoretical Appendix.

Proposition 1: If (i) $u'(.) > 0$ and $u''(.) < 0$; (ii) $b^* = \alpha$; (iii) $d_1 > i$[7] and $d_2 >= 0$, then an exogenous increase in the credit limit, α:

1. Increases the value of having a daughter marry in the first period compared to the second period, as

$$\frac{\partial[u(y_1 + \alpha - d_1) - u(y_1 + \alpha - i) + \beta[E_1[u(y_2 - (1+r)\alpha)] - E_1[u(y_2 - d_2 - (1+r)\alpha)]]]}{\partial\alpha} > 0,$$

and therefore, increases the supply of young brides.

2. Decreases the value of having a son marry in the first period compared to the second period, as

$$\frac{\partial[u(y_1 + \alpha + d_1 - i) - u(y_1 + \alpha) + \beta[E_1[u(y_2 - (1+r)\alpha) - i] - E_1[u(y_2 + d_2 - i - (1+r)\alpha)]]]}{\partial\alpha} < 0,$$

and therefore, decreases the demand for young brides.

Corollary 1: If (i) $u'(.) > 0$, $u''(.) < 0$, and $u'''(.) > 0$[8]; (ii) $b^* = \alpha$; (iii) $d_1 > i$, then an exogenous increase in y_1:

1. Decreases $\partial V^f/\partial\alpha$, where

$$V^f = [u(y_1 + \alpha - d_1) - u(y_1 + \alpha - i) + \beta[E_1[u(y_2 - (1+r)\alpha)] - E_1[u(y_2 - d_2 - (1+r)\alpha)]]].$$

[6]The marriage market for older brides and grooms is described in the Theoretical Appendix.

[7]Throughout the model I assume that $d_1 > i$ as it is common for households to spend more than annual income (and therefore, child expenses) on daughter's dowry.

[8]Here, I assume prudence in addition to risk aversion. This implies precautionary saving, that is, households save more in response to an increase in risk.

2. Increases $\partial V^m/\partial\alpha$, where

$$V^m = [u(y_1+\alpha+d_1-i) - u(y_1+\alpha) + \beta[E_1[u(y_2-(1+r)\alpha)-i] - E_1[u(y_2+d_2-i-(1+r)\alpha)]]].$$

Corollary 1 shows that an increase in income during the first period will attenuate the effect of an increase in the credit limit on a household's willingness to marry their daughter or son.

In case of households with daughters, there must be some value of $\alpha = \alpha^f$ for which equation (3.3) holds with equality. For any $\alpha < \alpha^f$, a household will prefer to marry their daughter in the second period than the first period. Given that a unit mass of young daughters are born each period, the supply of young brides in the marriage market is equal to $1-\alpha^f$.

Proposition 2: The quantity supplied of young brides is decreasing in d_1 and the quantity demanded of young brides is increasing in d_1.

Proof: See Theoretical Appendix.

Corollary 2: An exogenous increase in the credit limit, α, increases equilibrium dowry payments for young brides, d_1^*.

Proof: As shown in Proposition 1, an exogenous increase in the credit limit, α, increases the supply of young brides and decreases the demand for young brides. Therefore, in the market for young brides, an increase in α shifts the downward sloping supply curve outwards and the upward sloping demand curve inwards (Proposition 2). As a result, equilibrium dowry payments for young brides increases in response to an exogenous increase in α.

3.2 Alternate Channels

One can think of more channels through which access to credit can change the marriage timing of girls and boys. Here, I elaborate two such channels that I think are most likely to be present:

Schooling For both girls and boys, credit can increase school enrollment through income and risk management effects. Berhman and Knowles (1999) show that to the extent to which microfinance influences the growth in income, it can also positively affect the demand for schooling. Jacoby and Skoufias (1997) find that, in India, a decline in agricultural income across seasons caused a drop in school attendance. These findings suggest that through an increase in income and risk-coping mechanisms, access to finance can increase educational attainment and thereby can potentially delay marriage, especially for girls.

Labor Participation An increase in credit opportunities may also lead to additional productive activities. This can increase a household's demand for labor either directly for these additional activities or indirectly for childcare or livestock duties (Jensen and Nielsen, 1997). In either case, this increases the value of an unmarried daughter in the household and can lead to the postponement of her marriage. Given the tradition of patrilocal exogamy, for boys, this is likely to increase their probability of marriage to bring in more labor into the household.

4 Data and Variable Construction

In this section, I describe the sources and suitability of the data that I use to test the effect of access to rural bank branches on marriage markets in India. I also detail the construction of the variables used in the study.

4.1 Bank Data

In this paper, I estimate the effect of rural bank branch expansion on marriage outcomes. For this purpose, I use per capita rural bank branches per million persons at the district-level[9] from 1951 to 1999 as the measure of rural bank branch network. The bank data is sourced from India's central bank (Reserve Bank of India's Directory of Commercial Banks). It records the state, district, revenue division[10], and date of open of all operating[11] bank branches in India.

[9]This was computed for each of 96 districts in the ARIS/REDS survey according to 1981 Census district boundaries. Also, using the 1981 Census Final Population Totals, I classified each revenue division within these districts as rural if the revenue division has a population of less than 10,000 persons (as per the available literature on the *Branch Licensing Policy*).

[10]Revenue divisions, also previously referred to as a centers, are classified by the respective state governments. They can be a village or city or municipality, or other geographical areas.

[11]I downloaded the data used in this paper on June 26, 2016. The central bank updates this list every month to include only currently operating branches. Therefore, the data for bank branches that were originally opened before June 2016 and were either closed or merged with other branches are either unavailable (for the closed branches) or only the merger dates (for the merged branches) are available.

4.2 Household Data

The household data on the outcomes of interest are from the Additional Rural Incomes Survey/Rural Economic and Demographic Surveys (ARIS/REDS). The ARIS/REDS is a nationally representative panel survey of rural India. It consists of detailed economic and demographic information at the household and village levels. The National Council of Applied Economic Research collected the first wave of ARIS/REDS in 1969. In this study, I use the 1982 and 1999 waves of the ARIS/REDS.

4.2.1 Marriage Timing

To explore the effects of per capita rural bank branches on marriage timing, I use the 1999 ARIS/REDS wave which covers 7,474 rural households across 100 districts and 17 states[12]. The 1999 ARIS/REDS data is uniquely suited for this study as it records retrospective marriage data on all sons and daughters of the surveyed households. This is particularly important in the case of married women because of the tradition of patrilocal exogamy in India. For example, in the ARIS/REDS data, over 85% of married daughters were reported to have moved outside of their natal village. However, most household surveys, only record a married woman's current area of residence and not her location of birth. Over 97% of all household heads in the ARIS/REDS data report that they were born in the village of their current residence. The low level of migration of household heads enables me to match the rural bank data to their daughters' natal district during the time that they were in the marriage market.

To examine the effect of an increase in rural access to credit on the timing of marriage of women and men, I use a discrete-time hazard model of marriage. I create a retrospective panel for each daughter and son in a household from 1951 to 1999. A daughter enters the panel at the age of 12 and exits the panel either at marriage or at the age of 24, whichever occurs first. The outcome variable of interest is an indicator that is equal to zero during the years that the daughter is unmarried and is equal to one during the year she gets married. I examine the risk of marriage for daughters between 12 and 24 years of age because the age of marriage for 90 percent of married daughters in the sample is between these ages. A similar retrospective panel is created for sons between 14 and 30 years old[13].

[12] In this paper, I can only include 96 of these districts in the analysis as there is no 1981 Census data for Assam due to the separatist movements at the time. Therefore, the 4 ARIS/REDS districts in Assam are dropped.

[13] In the 1999 REDS data, age of marriage of 90 percent of the married sons is between the ages of 14 and 30.

As the theoretical model shows, dowry is one of the primary channels through which access to finance can affect marriage outcomes. Previous literature largely documents that the practice of dowry originated and is still deep-rooted in Hinduism (Goody and Tambiah, 1973, Borooah and Iyer, 2004; Bloch, Rao, and Desai, 2004; Srinivasan, 2005; Chowdhury, 2010). It is said that *kanyadana*, the act of giving your daughter along with financial or other transfers, is one of the paths to attain enlightenment in Hinduism. In contrast, it has been documented that the practice of dowry is less prevalent and less approved of in Muslim households in India (Srinivasan and Lee, 2004). Several recent studies have used this cultural heterogeneity to show, for example, that adverse income shocks delay the marriage of daughters more among Hindu households (Corno, Hilderbrandt, and Voena, 2017) and also leads to a lower increase in dowry-related deaths in districts with higher proportion of Muslim population (Sekhri and Storeygard, 2014). For these reasons and the importance of dowry as a channel of change in this study, I restrict all analysis to only Hindu households who constitute 89 percent of the surveyed households in the 1999 ARIS/REDS.

4.2.2 Other Marriage Outcomes

I also employ the 1999 ARIS/REDS to explore the change in the characteristics of marriage matches formed when the brides' households experience an increase in access to rural bank branches. For this purpose, I use the dowry paid[14], distance of marriage migration data, spouse's years of schooling, and spouse's household landholding from all marriages of household heads' daughters between 1951 and 1999. To understand what happens to the quality of matches as grooms' households experience an increase in access to rural bank branches, I use the dowry received, spouse's distance of marriage migration, and spouse's years of schooling of male household heads. I also use the sample of male household heads to test the effect of an increase in per capita bank branches on spousal age gap[15].

4.2.3 Borrowing

A unique feature of the ARIS/REDS data is that, starting from the 1982 wave, it records information on household borrowing during the year of the survey. The 1982 ARIS/REDS interviewed 4,979 households[16]. As I

[14]All dowry variables are converted to 1999 Rupees value using the Consumer Price Index.

[15]This information is unavailable for the sample of daughters and sons in the 1999 ARIS/REDS.

[16]The 4,979 households who were interviewed in 1982 are re-interviewed in 1999. Moreover, household divisions and an addition of a new random sample leads to a final sample of 7,474 households in the 1999 ARIS/REDS survey.

described previously, the *Branch Licensing Policy* was in its second phase since April 1982. Therefore, I use the cross-sectional data from the 1982 wave of the ARIS/REDS to test the effect of an increase in per capita rural bank branches on the probability that a rural household borrows. For this purpose, I use an indicator variable that is equal to one if a household took out a loan in 1982 and equal to zero otherwise as the dependent variable.

4.2.4 School Enrollment

I also explore if schooling is a channel through which marriage timing is affected. The 1999 ARIS/REDS records years of schooling of all daughters and sons in the interviewed households. Using this, I create two retrospective panels from 1951 to 1999 for daughters and sons, respectively. A child enters the panel at the age of 5 and exits the panel either at dropout or at the age of 18[17], whichever occurs first. I investigate the effect of per capita rural bank branches on school enrollment using a binary variable that is equal to one during the years that the child is enrolled in school and is equal to zero during the year the child drops out.

4.2.5 Labor Supply

I also use the 1982 ARIS/REDS to study labor supply changes of women and men in response to an increase in per capita rural bank branches. For, this purpose, I create an indicator variable $Work$ that is equal to one if a household member is self-employed or working for salary/wage and zero otherwise. Also, I use the reported activity status for each member of the interviewed households and code it into five indicator variables to capture different types of work status: (i) Self-employed (Farm); (ii) Self-employed (Non-farm); (iii) Salaried Work; (iv) Wage Work and; (v) Domestic Work.

4.3 Other Data Sources

4.3.1 Census

I use the 1971 and 1981 Comparative Primary Census Abstract to impute district-year level data on rural population, population density, percentage of scheduled caste, percentage of scheduled tribe, percentage of

[17]Children typically enroll in school when they are 5 years of age and graduate from high school when they are 18 years of age.

literates, percentage of cultivators and agricultural laborers, and percentage of other workers. These variables control for time-varying district characteristics in the specifications described below.

4.3.2 Rainfall

Lastly, I use district-level deviation of annual rainfall from the mean of annual rainfall (using 15 year lags), scaled by the standard deviation, to measure rainfall shocks. I use these z-scores as an additional district-level covariate in the specifications below and also to investigate heterogeneous effects of per capita rural bank branches on marriage timing by rainfall shocks. The precipitation data is from the University of Delaware. It is a monthly series of 0.5 degree by 0.5 degree grids with global coverage. I create a district-level series by matching the center coordinates of each district to the closest grid available in this data (within the national boundaries of India).

5 Empirical Strategy

This section describes the empirical specification that I use to examine the effect of an increase in per capita rural bank branches on marriage timing, other marriage marriage characteristics, school enrollment, borrowing and labor supply.

5.1 Main Specification

A simple ordinary least squares (OLS) specification to estimate the effect of per capita rural bank branches on the outcomes of interest is as follows:

$$\begin{aligned} Outcome_{ihdt} =& \theta PerCapitaRuralBanks_{dt} + Age_t + DistrictCharacteristics_{dt} \\ & + Household_h + Year_t + District_d \times (t - 1951) + u_{ihdt} \end{aligned} \tag{5.1}$$

In equation (5.1), $Outcome_{ihdt}$, is the dependent variable of interest of daughter/son i in household h, districtd d and year t[18]. $PerCapitaRuralBanks_{dt}$ is the number of rural banks in district d at the end of year t per million persons and measures rural financial access. Age_t is a vector of age dummies. $DistrictCharacteristics_{dt}$

[18] t refers to the year of marriage for marriage outcomes, such as, dowry paid, distance of marriage migration, spouse's years of schooling, and spouse's household landholdings for the sample of married daughters.

includes time varying district characteristics such as rural population, z-score of rainfall, percentage of literates, percentage of scheduled caste, percentage of scheduled tribe, population density, percentage of cultivators and agricultural laborers, and percentage of other workers. $Household_h$ captures household fixed effects to control for unobserved time-invariant characteristics of a household. $Year_t$ are year dummies that capture aggregate shocks. $District_d$ are district dummies and $District_d \times (t - 1951)$ are district-specific linear time trends that capture the differential growth rates in districts. u_{ihdt} is an idiosyncratic error term.

In the above specification, θ is identified within a household, however, for studying the marriage outcomes of the sample of male households heads, I am unable to take household fixed effects. Therefore, instead, I include district fixed effects and controls for the characteristics of their parents, as follows:

$$\begin{aligned} Outcome_{ihdt} =& \theta PerCapitaRuralBanks_{dt} + Age_t \\ &+ ParentCharacteristics_h + DistrictCharacteristics_{dt} \\ &+ District_d + District_d \times (t - 1951) + \mu_{ihdt} \end{aligned} \tag{5.2}$$

In equation (5.2), $ParentCharateristics_i$ includes land owned by male head of households' parents and its square, and an indicator for whether household belongs to a high-caste.

In the above OLS models, θ is the primary coefficient of interest and measures the effect of an increase in per capita rural banks on the outcome of interest. However, changes in the rural banking network is unlikely to be exogenous. Therefore, the estimate of θ is likely to be biased. In the absence of government intervention, banks are more likely to open branches in more developed districts. Conversely, government intervention may allow banks to open branches only in less developed districts. If the the outcome variable of interest takes larger values in more developed districts then: (a) θ will be overestimated, in the absence of policy intervention. (b) θ will be underestimated, in the presence of policy intervention. The opposite is true for an outcome variable that takes smaller values in more developed districts.

To overcome the limitations of the OLS model, I draw on the instrumental variables approach used by Kochar (2012) and exploit the district-level rules implemented during the Branch Licensing Policy. During the policy, if targeted rural branch expansion was successful, we will observe higher per capita rural bank branches in *deficit districts* with higher initial rural population-to-bank ratio compared to *deficit districts* just above the cutoff value of the initial rural population-to-bank ratio. I test the effectiveness of the Branch Licensing Policy in increasing rural access to formal banking as follows:

$$
\begin{aligned}
PerCapitaRuralBanks_{dt} = & \sum_{N=1}^{3} \alpha_N [PhaseN_t * I(DeficitN_d > 0) * DeficitN_d] \\
& + \sum_{N=1}^{3} \psi_N [PhaseN_t * I(DeficitN_d > 0)] \\
& + \sum_{N=1}^{3} \gamma_N [PhaseN_t * DeficitN_d] + \sum_{N=1}^{3} \psi_N PhaseN_t \\
& + DistrictCharacteristics_{dt} + District_d \\
& + Year_t + District_d \times (t - 1951) + \epsilon_{dt}
\end{aligned}
\tag{5.3}
$$

In equation (5.3), N denotes the three *Branch Licensing Policy* periods[19]. $PhaseN_t$ is an indicator variable that is equal to one during the years of policy period N and zero otherwise. $DeficitN_d$[20] is the difference between district d's initial rural population-per-bank ratio and the cut-off during policy period N. A higher $DeficitN_d$ indicates a higher initial rural population-to-bank ratio for district d. $I(DeficitN_d > 0)$ is an indicator variable that is equal to one if district d has an initial rural population-per-bank ratio above the cut-off and qualifies as a *deficit district*.

α_N is the coefficient of interest in equation (5.3). It estimates how per capita rural bank branches in a *deficit district* changes during period N if, at the start of period N, a rural bank branch in that *deficit district* served 1,000 more rural residents compared to *deficit districts* just above the cutoff. A successful *Branch Licensing Policy* means that, during each of the policy periods, *deficit districts* with an initial rural population-to-bank ratio farther away from the policy cutoff received more rural bank branches, and therefore, implies positive α_N for all three policy periods.

The estimation result of equation (5.3) using bank data from 1951 to 1999 is reported in Table 1. Consistent with the aims of the *Branch Licensing Policy*, coefficient estimates of α_N are positive and statistically significant. Table 1 shows that a 1000 unit increase in the initial rural population-to-bank ratio increases the number of rural bank branches per million persons in a *deficit district* by approximately 2 branches during each of of the three policy phases. This confirms that *deficit districts* did receive more rural bank branches during the policy as a positive function of the their initial rural population-to-bank ratio. A F-test on these three-way

[19] $Phase1$, $Phase2$ and $Phase3$ correspond to 1979 to 1981, 1982 to 1984 and 1985 to 1992, respectively.
[20] In the analysis, it is scaled down by a 1,000 persons.

interactions rejects that they are jointly insignificant. Therefore, based on equation (5.3), I use the three-way interactions between the policy phase indicators, the *deficit district* indicators and the degree of the deficits to instrument for the per capita rural bank branches in equations (5.1) and (5.2). This two-stage least squares (2SLS) instrumental variables approach is my main empirical strategy to estimate the effect of an increase in rural banking network on marriage markets.

5.2 Cross-sectional Specification

The main specification implicitly assumes that an increase in the rural banking network leads to an increases in the use of credit by rural households. Using the the nationally representative 1982 cross-sectional data on household borrowing and the following estimation model, I explore if an increase in per capita rural bank branches increases rural household borrowing:

$$\begin{aligned} Borrow_{hds} =& \theta PerCapitaRuralBanks_{ds} + HouseholdCharacteristics_{h} \\ &+ DistrictCharacteristics_{d} + State_{s} + \pi_{hds} \end{aligned} \tag{5.4}$$

The dependent variable, $Borrow_{hds}$, is an indicator variable that is equal to one if a household h in districtd d and state s took out a loan in 1982 and equal to zero otherwise. $PerCapitaRuralBanks_{d}$ is the number of rural banks in district d in 1982 per million persons. $HouseholdCharacteristics_{h}$ is a vector of household characteristics that includes dummies for age of household head, farmland owned by household and its square, dummies for household size, dummies for educational attainment of household head, an indicator for the household's caste. $State_{s}$ captures state fixed effects.

In equation (5.4), θ is the primary coefficient of interest. However, as described previously, the OLS estimate of θ is likely to be biased. To address this, I use a modification of equation (5.3) to instrument $PerCapitaRuralBanks_{ds}$ in 1982, as follows:

$$\begin{aligned} PerCapitaRuralBanks_{ds} =& \kappa_1 [I(Deficit2_d > 0) \times Deficit2_d] + \kappa_2 I(Deficit2_d > 0) \\ &+ \kappa_3 Deficit2_d + DistrictCharacteristics_d + State_s + \chi_{ds} \end{aligned} \tag{5.5}$$

I also use the estimation strategy described in (5.4) and (5.5) to study the effect of an increase in per capita rural bank branches on the labor supply variables in 1982.

6 Results

6.1 First Stage

Based on equation (5.3), Panels A and B in Table 2 report the 2SLS first-stage results of the marriage timing and school enrollment regressions, respectively. The instruments exploit the fact that, during each phase of the *Branch Licensing Policy*, qualifying *deficit districts* received more rural bank branches as an increasing function of their deficit. Consistent with the policy compliance result in Table 1, in both Panels A and B of Table 2, the coefficients on all three instruments are positive and confirm that, during each phase of the *Branch Licensing Policy*, more bank branches were opened in *deficit districts* with higher initial rural population-to-bank ratios. Also, the first-stage F-statistics are large enough to alleviate concerns about weak instruments.

Based on equation (5.5), Panels A, B, and C in Table 3 show the 2SLS first-stage results of the household borrowing and labor supply regressions. These first-stage results show that *deficit districts* that were farther away from the *Branch Licensing Policy*'s initial rural population-to-bank ratio cutoff in 1982 received statistically significantly more rural bank branches per capita compared to the *deficit districts* that were just above the cutoff. Specifically, the coefficient on the instrument shows that, within a state, *deficit districts* that were serving on average 1000 more persons per rural bank branch at the end of March 1982, compared to the *deficit districts* just above the 1982 initial rural population-to-bank ratio cutoff, received approximately 5 new rural bank branches per million persons in the district.

6.2 Marriage Timing

Column (1) in Table 4 reports the OLS estimate of the effect of an increase in per capita rural bank branches on the probability of marriage of daughters in rural India. I find that the OLS estimate of the effect of per capita rural bank branches on daughters' probability of marriage is small, positive and statistically indistinguishable from zero.

Column (2) in Table 4 shows the reduced form results of the discrete hazard model of marriage for the sample of daughters. The estimates show that the first phase of the policy intervention had no statistically significant effect on the probability of marriage of daughters. However, during the second and third phase of the *Branch Licensing Policy*, the policy intervention had a positive effect on the probability of marriage of daughters. Specifically, compared to the daughters in *deficit districts* that lie just above the policy cutoff, the probability of marriage of daughters increased by 0.0109 percentage points during the second phase of the policy and by 0.0067 percentage points during the third phase of the policy in *deficit districts* that served on average 1000 more persons per rural bank branch at the start of the policy phase. Since, there is a large overlap in the districts that qualified as *deficit* during each of the policy periods, the reduced form evidence suggests that, over time, the *Branch Licensing Policy* increased the risk of early marriage of girls.

Consistent with the prediction in Proposition 1 and the reduced form results, the 2SLS estimate in Column (3) of Table 4 shows that an additional rural bank branch for every million persons in a district increases the probability of marriage of daughters in that district by approximately 0.0049 percentage points. Given that the mean of the dependent variable is 0.09, this effect corresponds to an increase of approximately 5.5% in the hazard of daughters getting married during a given year.

Column (4) in Table 4 shows that the OLS estimate of the effect of per capita rural bank branches on the probability of marriage of sons is small, negative, and statistically insignificant. Column (5) in Table 4 shows the reduced form results of the discrete hazard model of marriage for the sample of sons. The estimates show that the first and second phase of the policy intervention have no statistically significant effect on the probability of marriage of sons. This is similar to the result for daughters and may suggest a delayed response of the marriage market to an increase in access to formal banking. The coefficient on the instrument for the third phase of the policy is negative and statistically significantly different from zero. Specifically, compared to the sons in *deficit districts* that lie just above the policy cutoff, the probability of marriage of sons decreased by 0.0060 percentage points during the last phase of the policy in *deficit districts* that served on average 1000 more persons per rural bank branch at the start of the policy phase. Consistent with the prediction of the theoretical model, the 2SLS estimate in Column (6) of Table 4 is negative, however, it is statistically indistinguishable from zero.

By Agricultural Productivity Shocks Households often use the marriage timing of their daughters as an instrument of consumption smoothing. Corollary 1, shows that, the effect of banking on the marriage timing of girls should be concentrated during the years that households do not experience a positive agricultural productivity shock. Rural household incomes are primarily governed by agricultural production, which is heavily dependent on good rainfall. Therefore, I use deviation of annual rainfall from the long-run average, scaled by the long-run standard deviation as a measure of agricultural productivity shock. To test the difference in the effect of per capita banks on the probability of marriage by income shocks, I interact per capita rural bank branches with the z-score of rainfall.

Column (2) in Table 5 shows that, consistent with the prediction in Corollary 1, the coefficient on the interaction is negative and statistically significant. This indicates that the positive effect of access to credit on the probability of marriage of daughters is concentrated during the years of adverse income shocks. Also consistent with Corollary 1, Column (4) in Table 5 shows that the coefficient on the interaction is positive for the sample of boys. However, the coefficient is not statistically significant.

6.3 Other Marriage Outcomes

It is likely that the change in the marriage probabilities of women in response to an increase in the formal banking network can lead to changes in the characteristics of marriage matches formed. I investigate this using specifications (5.1) and (5.2) for the sample of daughters and male heads of households, respectively. However, the following coefficient estimates cannot be treated as causal because the characteristics of individuals who marry in response to an increase in per capita rural bank branches may be different from those who do not. Therefore, the estimates are a combination of the differential characteristics of those who choose to marry (the selection bias) and the different kind of marriage matches formed (the coefficient of interest) in response to an increase in access to finance.

Dowry The theoretical model in Section 3.1 shows that when the credit constraint is relaxed, a household's willingness to have a daughter married increases and the willingness to have a son married decreases. As a result, the equilibrium groom price (or dowry) increases to compensate the less willing groom's household to agree to a marriage. To test this, I estimate the OLS and 2SLS models with the amount of dowry paid for a daughter's marriage and the amount of dowry received for a male head of household's marriage as the dependent variables.

Columns (1) and (2) in Panel A of Table 6 report the OLS and 2SLS estimates of this regression for the sample of daughters. Consistent with the theoretical model, I find that an additional rural bank branch per million persons in a daughter's natal district increases dowries paid for the daughter by approximately Rs. 2200. Evaluated at the sample average, this effect translates into an 8% increase in dowries paid.

I repeat the analysis using dowries received by male heads of households. Columns (1) and (2) in Panel B of Table 6 report the OLS and 2SLS estimates of this regression. The 2SLS estimate shows that an additional rural bank branch per million persons in the groom's district increases dowries received by approximately Rs.1300. Evaluated at the sample average, this translates into a 5% increase in the amount of dowries received.

Marriage Migration Patrilocal exogamy is almost universal in India. It is common for women to leave their natal household after marriage and reside in the groom's household. Therefore, one consequence of the marriage timing results can be that girls from more financially developed districts marry grooms in less financially developed districts. I do not observe the district that the daughters marry into but I do observe the distance that they migrate after marriage. Therefore, I test the effect of per capita rural bank branches on the distance of migration of married daughters.

Columns (3) and (4) in Panel A of Table 6 display the OLS and 2SLS regression results for the sample of daughters. Using the 2SLS specification, I find that an additional rural bank branch for every million persons increases a daughter's marriage migration distance by approximately 3 kilometers. Evaluated at the sample average, this translates into an 11 percentage increase in women's distance of marriage migration.

I repeat the analysis using the distance migrated by male head of households' spouses to explore the search efforts of grooms' households. Columns (3) and (4) in Panel B of Table 6 report the OLS and 2SLS estimates for this sample. The 2SLS estimate is relatively small, negative and statistically insignificant. Therefore, I do not find any changes in the search efforts of grooms' households in response to an increase in formal banking.

Characteristics of Spouse Columns (5) to (8) in Panel A and Columns (5) to (10) in Panel B of Table 6 report the estimates for the effect of per capita rural bank branches during the year of marriage on spouse characteristics, such as, spouse's years of schooling, spouse's household landownership, and whether spouse was a relative before marriage. I do not find any statistically significant changes in these characteristics in response to an increase in per capita rural bank branches.

Spousal Age Gap The marriage timing results results show that the expansion of rural banks leads to an increase in the number of potential brides in the marriage market. A possible way for the marriage market to adjust in the aftermath of this change is for younger girls to marry older boys, thereby increasing spousal age gap. I test this by looking at the effect of an increase in per capita rural banks on the age difference between male household heads and their spouses.

Columns (11) and (12) in Panel B of Table 6 report the OLS and 2SLS estimates of the effect of an increase in per capita rural banks on the age difference between male household heads and their spouses. However, I do not find any effect of per capita rural bank branches on this spousal age gap.

6.4 Household Borrowing

Column (1) in Table 7 shows that the OLS estimate of per capita rural bank branches on the probability that a household borrows in 1982 is negative, small and statistically insignificant. Column (2) in Table 7 reports the reduced form result from the regression of the indicator for loan uptake on the instrument (the interaction between whether a district qualified as *deficit* in 1982 and the degree of the deficit). Here, the coefficient on the instrument shows that, within the same state, for every additional 1,000 persons served by a rural bank branch in a *deficit district* at the end of March 1982, the probability that a rural household in this *deficit district* borrows during 1982 increases by approximately 0.0198 percentage points, compared to the households in *deficit districts* that lie just above the policy cutoff.

Column (3) in Table 7 shows that the the 2SLS estimate of the effect of per capita rural bank branches on the probability of borrowing is positive and statistically significant. Specifically, the 2SLS estimate shows that an additional rural bank branch for every million persons in a district increases the probability that a rural household in that district borrows during 1982 by 0.0038 percentage points. Evaluated at the sample average, the effect translates into approximately 3% increase in the probability that a rural household borrows. A policy intervention interpretation can explain the difference between the OLS and 2SLS estimates. During 1982, financially underdeveloped districts were targeted to receive more rural bank branches. These are also the districts that have a lower incidence of household borrowing. Thus, the OLS estimate of the effect of per capita rural bank branches on the probability of rural household borrowing is underestimated.

By Landownership It is possible that despite the increase in the banking network there exists unequal access to or use of credit by economic status (Kochar, 2012). This can be because of various reasons, such as, the more well off can take more advantage of the newly available banking network, or have more productive use for these loans, or have a higher availability of collateral. Therefore, I investigate if the effect of per capita rural bank branches on the probability of rural household borrowing varies by landownership. To test this, I re-estimate the OLS and 2SLS models by including interactions between per capita rural bank branches and indicators for the last four quintiles of owned farmland.

The OLS (Column (1)) and 2SLS (Column (2)) results of this model are reported in Table 8. The 2SLS estimates of the effect of per capita rural bank branches on the probability of borrowing for the five quintiles of landowners is graphed in Figure 1. Specifically, I find that an additional rural bank branch per million persons increases the probability that a household borrows during 1982 by 0.0075, 0.0042, and 0.036 percentage points for the first, second, and fifth quintile of landowners, respectively. However, the estimates for the third and fourth quintile of landowners is statistically indistinguishable from zero. Also, the top quintile of landowners are significantly more likely to obtain a loan in response to an increase in the formal bank network compared to the bottom quintile of landowners.

6.5 School Enrollment

As described in Section 3.2 of the Conceptual Framework, an increase in access to credit can potentially increase schooling which in-turn can delay marriage, especially for girls. Therefore, in this section, I explore if the schooling channel is at work.

Column (1) in Table 9 shows the OLS result of the discrete hazard model of school enrollment for the sample of daughters. The OLS coefficient is small, positive, and statistically insignificant. The reduced form result in Column (2) of Table 9 shows that, during the first phase of the policy intervention, a girl in a *deficit district* farther away from the policy's rural population-to-bank ratio cutoff was less likely to be enrolled in school compared to a girl in a *deficit district* just above the cutoff. However, during the second and third phase of the *Branch Licensing Policy*, *deficit districts* that were farther away from the initial rural population-to-bank ratio policy cutoff display a positive and statistically significant effect of the policy intervention on the probability of school enrollment of girls. Specifically, for every additional 1,000 persons that a rural bank branch in a *deficit district* served at the start of the policy phase, the probability of school enrollment of daughters in the *deficit district* increases by approximately 0.023 percentage points during the second phase of the policy and by 0.0070 percentage points during the third phase of the policy, compared to the daughters in *deficit districts* just above the policy cutoff. This is consistent with delayed results found in the reduced form specification of the marriage timing models. Column (3) in Table 9 shows that, consistent with the reduced form results, the 2SLS estimate of per capita rural bank branches on the probability of school enrollment of girls is positive and larger compared to the OLS estimate, however, it is statistically insignificant.

Column (4) in Table 9 shows that the OLS estimate of per capita rural bank branches on the probability of school enrollment of sons is positive, small, and statistically insignificant. Column (5) in Table 9 shows the reduced form results of the discrete hazard model of school enrollment for the sample of sons. Column (5) shows that, contrary to the results for girls, during the first phase of the policy intervention, a son in a *deficit district* farther away from the rural population-to-bank ratio cutoff was more likely to be enrolled in school compared to a boy in a *deficit district* just above the cutoff. However, this effect does not continue into the later policy periods, which may indicate that access to finance led to an initial increase in school enrollment of boys but this did not hold over time. Column (6) in Table 9 shows that the 2SLS estimate is positive but much smaller than the 2SLS estimate for girls and statistically insignificant.

In both samples of daughters and sons, the 2SLS estimates are much larger than the OLS estimates. Like the household borrowing results, this is consistent with the argument that the OLS estimates are underestimated because school enrollment in financially underdeveloped districts is lower and bank expansion during the sample period majorly occurred due to policy intervention in these underdeveloped locations.

By Age The effect of access to credit on school enrollment of children may vary by the age of a child. This is is most likely because, as a child grows older, there are more competing uses of her/his time. For example, an older child is more useful in helping with farm work than a younger child or it is a greater taboo to have an older unmarried daughter than a younger unmarried daughter. Therefore, I investigate if the effect of per capita rural bank branches on the probability of school enrollment varies by age by re-estimating the OLS and 2SLS model by including interactions of per capita rural bank branches with age and age squared.

The results of this specification are reported in Table 10. The 2SLS estimates of the effect of per capita bank branches on the probability of school enrollment by age are graphed in Figure 2(a) for the sample of daughters and in Figure 2(b) for the sample of sons. Specifically, I find that an increase in per capita rural bank branches only increases school enrollment of daughters between 6 and 13 years of age and the effect starts to decline from age 10 and becomes insignificant from age 14 onwards. For the sample of sons, I only find a small increase in school enrollment at the youngest school enrollment age of 5 in response to an increase in per capita rural bank branches.

6.6 Labor Supply

Section 3.2 briefly explains that an increase in access to credit can increase productive opportunities of a household. These additional activities can also potentially increase a household's labor demand either directly for these new activities or indirectly through reallocation of time among household members. If access to credit especially increases the value of female labor, then it could be a channel through which the marriage of daughters is delayed but boys might prefer to marry earlier. Therefore, in this section, I explore if an increase in access to credit through formal institutions increases labor participation of women and men.

Table 11 shows the effect of per capita rural bank branch expansion on the probability that a household member of works in1982. Column (2) in Panel A of Table 11 shows that the probability that a woman works decreases in response to an increase in per capita rural bank branches. Further analysis shows that this decline in women's probability of work in response to the increase in per capita rural bank branches primarily stems from a decline in women's wage employment (Column (10) Panel A of Table 11).

Column (2) in Panel B of Table 11 shows that, in contrast to the result for women, there is no statistically significant change in the probability of work for men in response to an increase in per capita rural bank branches. However, interestingly, in response to an increase in per capita rural bank branches, there is almost a one-to-one shift from self-employment in non-farm activities to self-employment in farm activities for men. Specifically, I find that an additional rural bank branch per million persons increases the probability that men are self-employed in farm work by 0.0034 percentage points and decreases the probability that men are self-employed in non-farm work by 0.0038 percentage points. This result can be either because agriculture is the more remunerative enterprise with credit assistance compared to other enterprises or because agriculture was a priority lending sector during this year and access to credit was largely restricted to this sector. I also find that the probability that men work in salaried jobs decreases in response to an increase in per capita rural bank branches.

By Landownership Since, self-employment in farm-work heavily depends on landownership and I find that the effect of per capita rural bank branches on the probability of borrowing varies by landownership. I test if the change in the probability of being self-employed in farm work in response to an increase in access to credit also varies by the ownership of farmland. To test this, I re-estimate the OLS and 2SLS model by including interactions between per capita rural bank branches and indicators for the last four quintiles of owned farmland.

The OLS (Columns (1) and (3)) and 2SLS (Columns (2) and (4)) results of this model are reported in Table 12. The 2SLS estimates of the effect of per capita rural bank branches on the probability of being self-employed in farm work for the five quintiles of landownership is graphed in Figure 3(a) for women and Figure 3(b) for men. I find that Figure 3(b) exhibits a similar u-shape as Figure 1. This suggests that the economic strata that borrow more in response to an increase in access to credit are also those who are more likely to engage in agricultural work. This can be either because most of the loans issued during this time were for the purpose of agriculture or because access to credit made agriculture a more remunerative source of income compared to other alternatives. However, I do not find similar effects for the sample of women.

7 Discussion and Conclusion

This paper evaluates the impact of access to formal banking in rural India on the risk of marriage of girls and boys. For the analysis, I match the bank branches data from the Indian central bank to the retrospective marriage information of daughters and sons of interviewed households in the 1999 ARIS/REDS. The empirical strategy uses district-level rules that governed rural bank branch expansion from late 1970's to early 1990's to instrument per capita rural bank branches in a district.

The results show that an increase in per capita rural bank branches increases the probability of marriage of girls. This result is consistent with the theory that, for a credit constrained household, an increase in the credit limit increases the utility of having a daughter marry earlier than later when dowry payments are customary. Unfortunately, this increase in the early marriage of girls can have long-run effects on the welfare of these women and their children (Field and Ambrus, 2008 ; Sekhri and Debnath, 2014; Chari, Heath, Maertens and Fatima, 2017).

In their recent work, Corno, Hildebrandt and Voena (2017) find that a negative income shock decreases the probability of marriage of girls in India. They argue that this is because a family is less likely to be able to procure the dowry required for a daughter's wedding during adverse times. Therefore, it is possible that the observed increase in the probability of marriage of girls in response to an increase in per capita rural bank branches is primarily driven by banks aiding the payment of dowries during the years that households do not experience a positive income shock. Consistent with this theory, I find that the increase in the probability of marriage of girls in response to an increase in per capita rural bank branches is more when households do not experience a positive agricultural productivity shock.

From a general equilibrium perspective, the probability of marriage of boys is expected to respond in the same manner as the change in the probability of marriage of girls in the same manner. However, from a partial equilibrium perspective, an increase in access to credit provides sons' households with a viable financing substitute, therefore, it may decrease the utility derived by a household from marrying their son earlier rather than later. Yet, I do not find any change in the probability of marriage of boys in response to an increase in per capita rural bank branches.

As girls are more likely to marry and there is no statistically significant change in the probability of marriage of boys, there is a tighter "marriage squeeze" in response to the increase in access to formal credit. This implies that the sons' household can now command more dowry payments as a result of this "marriage squeeze". Consistent with is argument, I find that an increase in per capita rural bank branches leads to an increase in dowries paid by girls' households and dowries received by boys' households.

The marriage timing results suggest that the competition between potential brides searching for a groom increases as access to formal banking increases. Therefore, another possible consequence of the tighter "marriage squeeze" can be an increase in the search efforts to find a groom. Consistent with this theory, I find that an increase in per capita rural bank branches increases married daughters' distance of migration. This result indicates that daughters' households increase the search distance for grooms and eventually the daughters get married farther away from their natal homes.

Using the 1982 ARIS/REDS data on household borrowing from 16 states, I also confirm that an increase in per capita rural bank branches does indeed increase the probability of loan uptake in 1982. This is in line with Kochar's (2012) work where, using this *Branch Licensing Policy*, she establishes that, in the Indian state of Uttar Pradesh, an increase in the number of rural bank branches increases loan uptake among rural households. Additionally, I find that the rural bank branch expansion was most successful in providing credit to the poorest and richest households defined in terms of farmland-ownership. I argue that this result is attributable to the central bank's directive during this time, that is, down payments were not mandatory for small rural borrowers, and therefore, poorer households could acces credit even without the availability of collateral. However, richer households, either because of more availability of collateral or more use for these agricultural loans, took advantage of this formal bank expansion as well. Therefore, consistent with Kochar's (2012) results, I find that the increase in the probability of loan uptake by the richest households is statistically significant more than the increase in the probability of loan uptake by the poorest households. This indicates that even though the expansion of the formal banking network made credit more readily available to the rural poor, the richest households benefitted the most from this larger network.

Apart from making it easier for households to pay a dowry, an increase in access to credit may affect the probabilities of marriage through other channels as well. I specifically explore whether an increase in per capita rural bank branches increases school enrollment and/or labor supply of women and men, which can potentially delay their marriage, especially for girls. I find that an increase in per capita rural bank branches increases the probability of school enrollment of only young girls for whom the risk of marriage is quite low. Lastly, I find that labor supply of women decreases in response to an increase in per capita rural bank branches. These results add further support to the marriage timing results.

The findings in this paper highlight the large impact of access to credit on marriage markets that practice marriage payments. The practice of brideprice is widespread in Sub-Saharan Africa and parts of Asia. Therefore, there is an urgent need to investigate the consequences of access to finance policies in these societies. Though outside the scope of this paper's analysis, the results here indicate that access to credit in conjunction with brideprice customs can potentially delay the marriage of girls and therefore can positively contribute towards the long-run welfare of women in these societies .

Overall, this paper establishes that an increase in access to formal banking plays only a limited role in increasing school enrollment but has large adverse effects on women's labor participation and marriage outcomes. The results emphasize the need to be cautious of access to finance policies, especially in societies that practice dowry. In face of India's continued investment in access to credit policies in recent years, the findings in this paper call for interventions that can be implemented alongside access to finance policies to minimize their effect on the marriage market, such as, an increase in labor opportunities for women, which can increases women's school enrollment and decrease their risk of marriage.

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Table 1: Branch Licensing Policy Compliance

	$PerCapitaRuralBanks$
Phase1 × Deficit1 × I(Deficit1>0)	2.03**
	(0.79)
Phase2 × Deficit2 × I(Deficit2>0)	1.69***
	(0.43)
Phase3 × Deficit3 × I(Deficit3>0)	1.74*
	(0.99)
Observations	4704
R^2	0.95
F-test on excluded instruments	25.08
	[0.00]

Table 2: First-stage Estimates - Panel Regressions

	DAUGHTERS	**SONS**
PANEL A: Second Stage Dependent Variable - $Married$	(1)	(2)
	First Stage	First Stage
	$PerCapitaRuralBanks$	$PerCapitaRuralBanks$
$Phase1_t * I(Deficit1_d > 0) * Deficit1_d$	1.36***	1.74***
	(0.24)	(0.36)
$Phase2_t * I(Deficit2_d > 0) * Deficit2_d$	1.48**	1.43**
	(0.75)	(0.66)
$Phase3_t * I(Deficit3_d > 0) * Deficit3_d$	1.08	1.19
	(0.84)	(0.83)
Observations	49,041	69,646
Level of Observation	Individual	Individual
First-stage F statistic	317.26	687.43
PANEL B: Second Stage Dependent Variable - $Enrolled$	(1)	(2)
	First Stage	First Stage
	$PerCapitaRuralBanks$	$PerCapitaRuralBanks$
$Phase1_t * I(Deficit1_d > 0) * Deficit1_d$	1.70***	1.65***
	(0.22)	(0.48)
$Phase2_t * I(Deficit2_d > 0) * Deficit2_d$	1.44**	1.83**
	(0.62)	(0.74)
$Phase3_t * I(Deficit3_d > 0) * Deficit3_d$	1.24	1.77**
	(0.83)	(0.88)
Observations	111,134	137,231
Level of Observation	Individual	Individual
First-stage F statistic	822.69	1835.52

Table 3: First-stage Estimates - Cross-sectional Regressions

PANEL A: Second Stage Dependent Variable - $Borrow$	
	First Stage
	$PerCapitaRuralBanks$
$(I(Deficit2_d > 0) * Deficit2_d$	5.28***
	(1.82)
Observations	4,075
Level of Observation	Household
First-stage F statistic	535.43
PANEL B: Second Stage Dependent Variable - $Work$**, Female Household Members**	
	First Stage
	$PerCapitaRuralBanks$
$(I(Deficit2_d > 0) * Deficit2_d$	5.37***
	(1.80)
Observations	10,717
Level of Observation	Individual
First-stage F statistic	1620.45
PANEL C: Second Stage Dependent Variable - $Work$**, Male Household Members**	
	First Stage
	$PerCapitaRuralBanks$
$(I(Deficit2_d > 0) * Deficit2_d$	5.22***
	(1.77)
Observations	12,825
Level of Observation	Individual
First-stage F statistic	1766.38

Table 4: Probability of Marriage

	DAUGHTERS			SONS		
	OLS	Reduced Form	2SLS	OLS	Reduced Form	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
	Married	*Married*	*Married*	*Married*	*Married*	*Married*
Per Capita Rural Banks	0.0003		0.0049**	-0.0001		-0.0038
	(0.0005)		(0.0024)	(0.0004)		(0.0024)
Phase1 × Deficit1 × I(Deficit1>0)		-0.0027			-0.0039	
		(0.0046)			(0.0053)	
Phase2 × Deficit2 × I(Deficit2>0)		0.0109*			0.0040	
		(0.0058)			(0.0082)	
Phase3 × Deficit3 × I(Deficit3>0)		0.0067**			-0.0060***	
		(0.0031)			(0.0019)	
Observations	49249	49249	49041	69801	69801	69649
Mean of Dependent Variable	0.09	0.09	0.09	0.07	0.07	0.07
Overidentification test			2.20			4.03
			[0.33]			[0.13]

Table 5: Probability of Marriage by Rainfall Shock

	DAUGHTERS		**SONS**	
	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)
	$Married$	$Married$	$Married$	$Married$
Per Capita Rural Banks	0.0003	0.0065*	-0.0001	-0.0023
	(0.0005)	(0.0033)	(0.0004)	(0.0022)
Per Capita Rural Banks $\times$ Rain z-score	0.0011	-0.0138*	-0.0004	0.0005
	(0.0009)	(0.0072)	(0.0008)	(0.0034)
Observations	49249	49041	69805	69653
First-stage F-statistic		60.92		170.29
Overidentification test		6.80		8.13
		[0.15]		[0.09]

Table 6: Characteristics of marriage matches formed

Panel A: Sample of Daughters	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dowry Paid	Dowry Paid	Distance Migrated	Distance Migrated	Spouse's School Years	Spouse's School Years	Spouse's HH Land	Spouse's HH Land
Per Capita Rural Banks	-116.46	2193.30**	-0.05	3.02*	0.01	0.12	1.92	-6.39
	(116.64)	(1062.26)	(0.23)	(1.62)	(0.02)	(0.08)	(1.51)	(4.63)
Observations	4512	3346	4512	3346	4512	3346	4512	3346
Mean of Dependent Variable	28103.29	28103.29	28.22	28.22	6.45	6.45	214.43	214.43
First-stage F-statistic		12.44		12.44		12.44		12.44
Overidentification test		2.05		3.68		3.80		1.31
		[0.36]		[0.16]		[0.15]		[0.52]

Panel A: Sample of Male Head of Households	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Dowry Paid	Dowry Paid	Distance Migrated	Distance Migrated	Spouse's School Years	Spouse's School Years	Spouse's HH Land	Spouse's HH Land	Related	Related	Age Gap	Age Gap
Per Capita Rural Banks	-75.53	1313.65*	0.08	-0.33	-0.01	0.03	3.88**	-2.29	0.00	-0.00	0.00	-0.03
	(172.27)	(756.43)	(0.07)	(0.65)	(0.01)	(0.04)	(1.86)	(4.36)	(0.00)	(0.00)	(0.01)	(0.05)
Observations	4615	4615	4615	4615	4615	4615	4615	4615	4543	4543	4615	4615
Mean of Dependent Variable	26965.09	26965.09	24.47	24.47	2.52	2.52	553.60	553.60	0.05	0.05	4.82	4.82
First-stage F-statistic		43.25		43.25		43.25		43.25		48.01		43.25
Overidentification test		3.10		1.75		3.21		1.42		1.39		0.69
		[0.21]		[0.42]		[0.20]		[0.49]		[0.50]		[0.71]

Table 7: Probability of Borrowing

	OLS	Reduced Form	2SLS
	(1)	(2)	(3)
	$Borrow$	$Borrow$	$Borrow$
Per Capita Rural Banks	-0.0003		0.0038*
	(0.0007)		(0.0022)
Deficit2 $\times$ I(Deficit2>0)		0.0198**	
		(0.0100)	
Observations	4075	4075	4075
Mean of Dependent Variable	0.14	0.14	0.14

Figure 1: Effect of Per Capita Banks on the Probability of Borrowing by Landownership

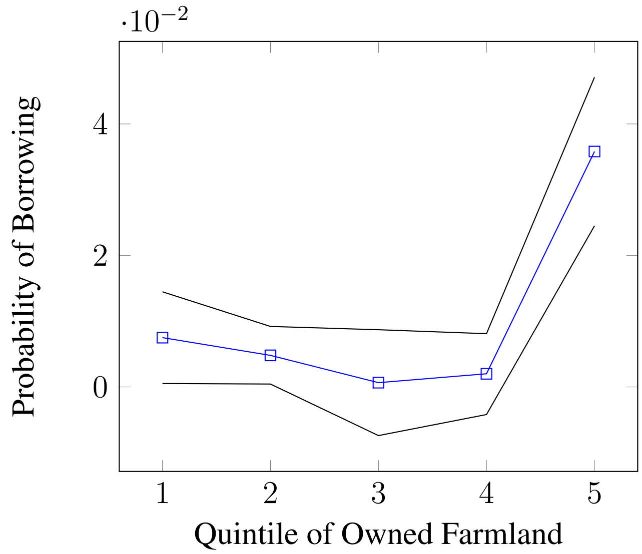


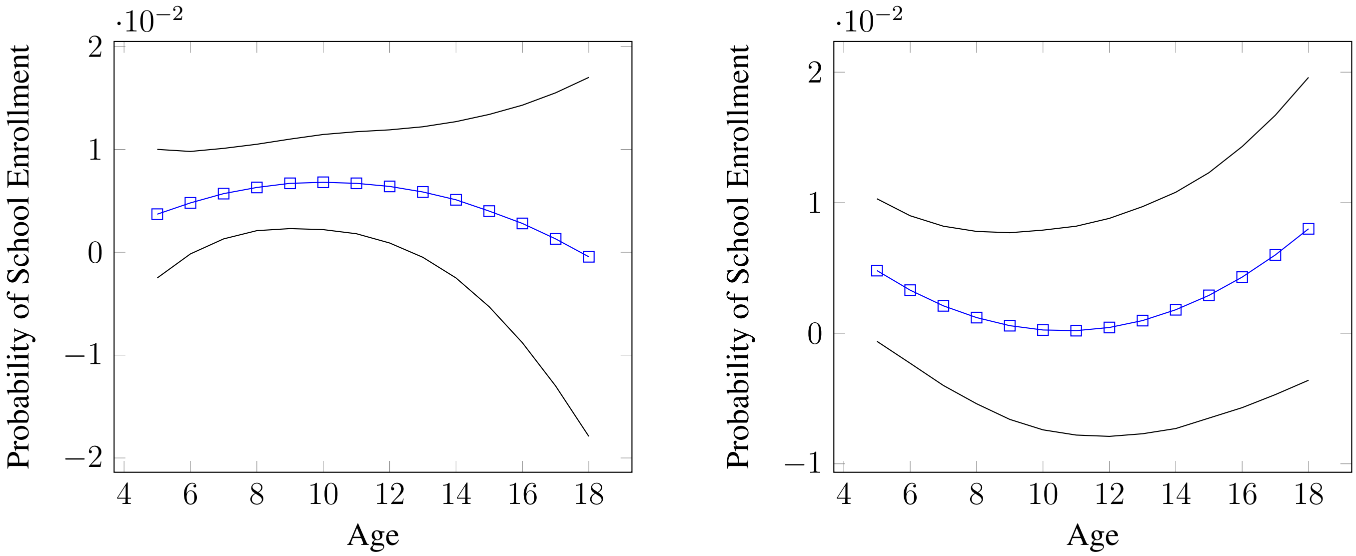
Table 8: Probability of Borrowing by Landownership

	OLS	2SLS
	(1)	(2)
	$Borrow$	$Borrow$
Per Capita Rural Banks	-0.0010	0.0075**
	(0.0011)	(0.0036)
Per Capita Rural Banks $\times 2^{nd}$ Quintile of Landowners	0.0004	-0.0027
	(0.0009)	(0.0045)
Per Capita Rural Banks $\times 3^{rd}$ Quintile of Landowners	0.0013	-0.0068
	(0.0011)	(0.0045)
Per Capita Rural Banks $\times 4^{th}$ Quintile of Landowners	0.0013	-0.0055**
	(0.0013)	(0.0025)
Per Capita Rural Banks $\times 5^{th}$ Quintile of Landowners	0.0013	0.0283***
	(0.0015)	(0.0030)
Observations	4075	4075

Table 9: Probability of School Enrollment

	DAUGHTERS			SONS		
	OLS	Reduced Form	2SLS	OLS	Reduced Form	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)
	Enrolled	*Enrolled*	*Enrolled*	*Enrolled*	*Enrolled*	*Enrolled*
Per Capita Rural Banks	0.0001		0.0043	0.0008		0.0021
	(0.0008)		(0.0031)	(0.0005)		(0.0033)
Phase1 × Deficit1 × I(Deficit1>0)		-0.0077**			0.0153*	
		(0.0038)			(0.0087)	
Phase2 × Deficit2 × I(Deficit2>0)		0.0225***			-0.0002	
		(0.0050)			(0.0097)	
Phase3 × Deficit3 × I(Deficit3>0)		0.0070*			0.0026	
		(0.0041)			(0.0059)	
Observations	111244	111244	111134	137361	137361	137231
Mean of Dependent Variable	0.40	0.40	0.40	0.57	0.57	0.57
Overidentification test			4.31			3.70
			[0.12]			[0.16]

Figure 2: Effect of Per Capita Banks on the Probability of School Enrollment by Age



(a) Daughters (b) Sons

Table 10: Probability of School Enrollment by Age

	DAUGHTERS		**SONS**	
	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)
	Enrolled	*Enrolled*	*Enrolled*	*Enrolled*
Per Capita Rural Banks	-0.0046***	-0.0052	-0.0031**	0.0167***
	(0.0015)	(0.0104)	(0.0016)	(0.0059)
Per Capita Rural Banks × Age	0.0012***	0.0024	0.0008***	-0.0031**
	(0.0003)	(0.0021)	(0.0003)	(0.0013)
Per Capita Rural Banks × Age^2	-0.0001***	-0.0001	-0.0000***	0.0001**
	(0.0000)	(0.0001)	(0.0000)	(0.0001)
Observations	111244	111134	137361	137231
First-stage F-statistic		53.53		221.06
Overidentification test		9.31		6.65
		[0.16]		[0.35]

Table 11: Probability of Work

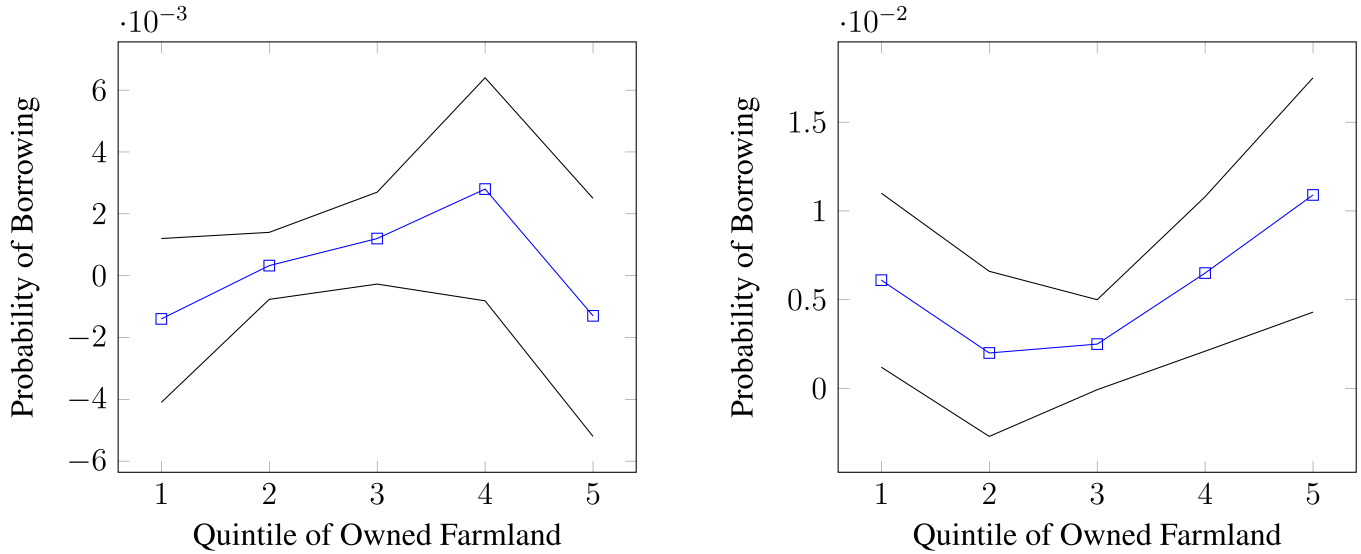
PANEL A: Women	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	$Work$	$Work$	Self-Employed (Farm)	Self-Employed (Farm)	Self-Employed (Non-farm)	Self-Employed (Non-farm)	Salaried Work	Salaried Work	Wage Work	Wage Work	Domestic Work	Domestic Work
Per Capita Rural Banks	-0.0006	-0.0021*	0.0003	-0.0001	-0.0001	0.0001	-0.0000	-0.0000	-0.0007**	-0.0021**	0.0009	0.0023
	(0.0004)	(0.0012)	(0.0002)	(0.0009)	(0.0001)	(0.0002)	(0.0001)	(0.0002)	(0.0003)	(0.0010)	(0.0006)	(0.0016)
Observations	10717	10717	10717	10717	10717	10717	10717	10717	10717	10717	10717	10717
Mean of Dependent Variable	0.16	0.16	0.05	0.05	0.01	0.01	0.01	0.01	0.10	0.10	0.62	0.62

PANEL B: Men	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	$Work$	$Work$	Self-Employed (Farm)	Self-Employed (Farm)	Self-Employed (Non-farm)	Self-Employed (Non-farm)	Salaried Work	Salaried Work	Wage Work	Wage Work	Domestic Work	Domestic Work
Per Capita Rural Banks	0.0015***	-0.0003	0.0015***	0.0034**	0.0001	-0.0038**	-0.0001	-0.0017**	0.0001	0.0018	-0.0008*	0.0012
	(0.0003)	(0.0012)	(0.0005)	(0.0017)	(0.0003)	(0.0018)	(0.0002)	(0.0007)	(0.0003)	(0.0015)	(0.0004)	(0.0012)
Observations	12825	12825	12825	12825	12825	12825	12825	12825	12825	12825	12825	12825
Mean of Dependent Variable	0.53	0.53	0.28	0.28	0.04	0.04	0.06	0.06	0.15	0.15	0.17	0.17

Table 12: Probability of Self-employment in farm-work by Landownership

	OLS (1) Self-employed (Farm)	2SLS (2) Self-employed (Farm)	OLS (3) Self-employed (Farm)	2SLS (4) Self-employed (Farm)
Per Capita Rural Banks	0.0001	-0.0014	0.0023***	0.0050**
	(0.0003)	(0.0013)	(0.0006)	(0.0022)
Per Capita Rural Banks $\times 2^{nd}$ Quintile of Landowners	-0.0003	0.0015	-0.0017**	-0.0028
	(0.0002)	(0.0015)	(0.0008)	(0.0037)
Per Capita Rural Banks $\times 3^{rd}$ Quintile of Landowners	0.0004	0.0025**	-0.0017**	-0.0051**
	(0.0004)	(0.0010)	(0.0007)	(0.0022)
Per Capita Rural Banks $\times 4^{th}$ Quintile of Landowners	0.0008	0.0042**	0.0007	0.0002
	(0.0006)	(0.0017)	(0.0007)	(0.0018)
Per Capita Rural Banks $\times 5^{th}$ Quintile of Landowners	0.0000	0.0003	0.0003	0.0026*
	(0.0005)	(0.0009)	(0.0009)	(0.0016)
Observations	10717	10717	12825	12825

Figure 3: Effect of Per Capita Banks on the Probability of Self-employment in Farm by Landownership



(a) Women

(b) Men

A Theoretical Appendix

The optimization problem of a household with a son can be written as

$$\begin{aligned}
\underset{c_1,c_2,m_1,m_2,b}{\text{maximize}} \quad & U(c_1,c_2) = u(c_1) + \beta\{E_1[u(c_2)] + M_2\varepsilon^m\} \\
\text{subject to} \quad & c_1 - m_1(d_1 - i) = y_1 + b \\
& c_2 - m_2 d_2 + M_2 i + (1+r)b = y_2 \\
& b \leq \alpha.
\end{aligned} \tag{A.1}$$

Suppose μ^m is the Lagrange multiplier associated with the credit constraint, $b \leq \alpha$, then the first order condition of the above problem with respect to b is

$$u'(y_1 + b^* + m_1(d_1 - i)) = \beta(1+r)E_1[u'(y_2 + m_2 d_2 - (1 - M_2)i - (1+r)b^*)] + \mu^m \tag{A.2}$$

The household prefers to have their son married in the first period if the utility derived from it is greater than the utility derived from waiting. If the credit constraint binds, that is, $\mu^m > 0$ and $b^* = \alpha$, then the household prefers to have their son married in the first period if

$$u(y_1 + \alpha + d_1 - i) + \beta E_1[u(y_2 - (1+r)\alpha) - i] + \varepsilon^m \geq u(y_1 + \alpha) + \beta E_1[u(y_2 + d_2^* - i - (1+r)\alpha)] + \varepsilon^m. \tag{A.3}$$

In case of households with sons, there must be some value of $\alpha = \alpha^m$ for which equation (A3) holds with equality. For any $\alpha < \alpha^m$, a household will prefer to marry their son in the first period than the second period. Given that a unit mass of young sons enter the marriage market each period, the supply of young grooms is equal to α^m.

Proof of Proposition 2: α^f and α^m satisfy equations (3) and (A3) with equality, therefore:

$$u(y_1 + \alpha^f - d_1) + \beta E_1[u(y_2 - (1+r)\alpha^f)] + \varepsilon^f = u(y_1 + \alpha^f - i) + \beta E_1[u(y_2 - d_2^* - (1+r)\alpha^f)] + \varepsilon^f \tag{A.4}$$

$$u(y_1+\alpha^m+d_1-i)+\beta E_1[u(y_2-(1+r)\alpha^m)-i]+\varepsilon^m = u(y_1+\alpha^m)+\beta E_1[u(y_2+d_2^*-i-(1+r)\alpha^m)]+\varepsilon^f. \tag{A.5}$$

The equations in (A4) and (A5) can be written as:

$$\frac{u(y_1+\alpha^f-i)-u(y_1+\alpha^f-i-(d_1-i))}{d_1-i} = \frac{\beta\{E_1[u(y_2-(1+r)\alpha^f)]-E_1[u(y_2-d_2^*-(1+r)\alpha^f)]\}}{d_1-i} > 0 \tag{A.6}$$

$$\frac{u(y_1+\alpha^m+d_1-i)-u(y_1+\alpha^m)}{d_1-i} = \frac{\beta\{E_1[u(y_2+d_2^*-i-(1+r)\alpha^m)]-E_1[u(y_2-(1+r)\alpha^m)-i]\}}{d_1-i} > 0. \tag{A.7}$$

Taking $\lim_{d_1-i\to 0}$ on both sides of equations (A.6) and (A.7) yields:

$$\frac{du(y_1+\alpha^f-i)}{d(d_1-i)} > 0 \tag{A.8}$$

$$\frac{du(y_1+\alpha^m)}{d(d_1-i)} > 0 \tag{A.9}$$

Equations (A.9) and A.10) can be rewritten as follows:

$$\frac{du(y_1+\alpha^f-i)}{d(d_1-i)} = \frac{d\alpha^f}{d(d-i)} \times \frac{du(y_1+\alpha^f-i)}{d\alpha^f} > 0 \tag{A.10}$$

$$\frac{du(y_1+\alpha^m)}{d(d_1-i)} = \frac{d\alpha^m}{d(d-i)} \times \frac{du(y_1+\alpha^m)}{d\alpha^m} > 0. \tag{A.11}$$

As u is increasing in α^f and α^m, equations (A.10) and (A.11) show that α^f and α^m are increasing in d_1. Therefore, quantity supplied of young brides $(1-\alpha^f)$ is decreasing in dowry paid for young brides (d_1) and quantity demand of young grooms (α^m) is increasing in dowry received for young grooms (d_1).

A.1 Second Period: Marriage Market Equilibrium

In the second period, household agrees to marry a daughter or son if the following conditions hold:

$$u(y_2-d_2-(1+r)\alpha)+\varepsilon^f \geq u(y_2-i-(1+r)\alpha) \tag{A.12}$$

$$u(y_2+d_2-i-(1+r)\alpha)+\varepsilon^m \geq u(y_2-(1+r)\alpha) \tag{A.13}$$

Assuming a log utility function, equations (A.13) and (A.14) yield an upper and a lower bound, respectively, for d_2^*, as follows:

$$d_2^* \leq [y_2 - (1+r)\alpha]\frac{[exp\{\varepsilon^f\} - 1]}{exp\{\varepsilon^f\}} + \frac{i}{exp\{\varepsilon\}} = \bar{d}_2 \tag{A.14}$$

$$d_2^* \geq -[y_2 - (1+r)\alpha]\frac{[exp\{\varepsilon^m\} - 1]}{exp\{\varepsilon^m\}} + i = \underline{d_2} \tag{A.15}$$

In the second period, a marriage occurs if $d_2^* \in [\bar{d}_2, \underline{d_2}]$.