Economic Empowerment and Mental Health: Evidence from India*

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Abstract

This paper examines the scope of women's empowerment in improving mental health. Exploiting variation from a legal reform intended to increase women's inheritance rights in India, we find that women exposed to the reform exhibit significantly better markers of mental health in adulthood. Overall, their mental health index improved by 0.093σ. Specifically, they are 3.8 percentage points less likely to be depressed, 3.9 percentage points less likely to have trouble concentrating, and 3.3 percentage points less likely to feel afraid. We uncover spillover effects of similar magnitudes on the husbands of treated women. No such effects are observed for individuals from the same state-cohort groups belonging to religious communities to which the reform did not apply. Treated households report significantly higher rates of land ownership and treated women have a 0.08σ higher autonomy index. These findings underscore the effectiveness of policies that empower women in enhancing mental well-being.

Keywords: Mental health; Depression; Women's empowerment

JEL codes: I31, I38, J16 and O15

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1 Introduction

The World Health Organization estimates that over 300 million people worldwide suffer from depression, and 75% of individuals experiencing mental health disorders in low and middle-income countries do not receive any treatment. In India alone, the economic loss due to mental health conditions between 2012 and 2030 is estimated to be 1.03 trillion USD (WHO, 2017).[1] Prior medical and economics research has linked depression and stress with declines in productivity, cognition, and effective decision-making (Beck et al., 2011; Angelucci and Córdova, 2014; Abramson et al., 2024). While substantial evidence indicates that depression is more common among individuals living in poverty (Ridley et al., 2020; Haushofer and Fehr, 2014), the effect of poverty alleviation interventions on mental health remains inconclusive (see Lund et al. (2011) for an insightful review). Further, depression is known to be almost twice as common among women (Baranov et al., 2020), with an exceptionally high prevalence among the older age cohorts in low-and middle-income countries (Banerjee et al., 2022).

There is a large body of literature demonstrating that policies aimed at empowering women socially or economically (e.g., through changes in divorce laws, equalizing inheritance rights or targeted cash transfer schemes) also impact various dimensions of their well-being, such as labor supply (Voena, 2015; Heath and Tan, 2020), reduction in excess female mortality (Calvi, 2020), and improvement in intrahousehold bargaining power (Roy, 2008; Mookerjee, 2019). Such policies are also known to positively impact their children (Qian, 2008) and grandchildren (Duflo, 2000). However, their effectiveness in improving women's mental health remains an open question.[2]

This paper provides a comprehensive examination of this question by exploiting variation from a national level legal reform to inheritance rights in India. The Hindu Succession Act, which governed the inheritance rights of Hindus, Sikhs, Jains, and Buddhists (henceforth referred to as the 'Hindu' religious group), initially provided a birthright to ancestral property to sons only. Between 1977 and 1994, five states reformed the law to extend such a birthright to daughters, making it gender-neutral. We use the spatial and temporal variation in implementing the Hindu

[1] According to the National Mental Health Survey of India (2016), around 150 million individuals suffer from some form of mental morbidity in India (Gautham et al., 2020).

[2] A crucial issue in assessing the impact of policies aimed at empowering women on their mental health is the two-way relationship between empowerment and psychological well-being. It has been observed that programs designed to enhance women's mental well-being can also lead to improvements in their financial empowerment (Baranov et al., 2020).

Succession Act Amendment (henceforth 'HSAA') as a natural experiment to study its impact on mental well-being in a difference-in-difference setting. Our data comes from the Longitudinal Ageing Study in India (LASI), a nationally representative survey of older adults above 45.

Our setting constitutes an ideal context for examining this relationship for several reasons. First, the HSAA primarily improves the economic standing of women, who are especially vulnerable to depression and anxiety (WHO, 2017). Second, treatment eligibility is determined by a combination of the state of residence, the year of marriage, and religious affiliation and is, therefore, unlikely to have any direct influence on mental health. Third, while there are often concerns regarding the actual implementation of policies in developing country contexts, previous work has established that the HSAA did, in fact, increase women's likelihood of inheritance, overall resources, and dowry payments received from their natal families, and improved their educational, health, and labor market outcomes (Deininger et al., 2013, 2019; Roy, 2015; Heath and Tan, 2020; Calvi, 2020). Such economic empowerment has further increased social autonomy for *both* the treated women and their husbands (Mookerjee, 2019). This raises the compelling and crucial question of whether these socioeconomic advancements have improved the mental well-being of those affected by the reform.

We find that, among women belonging to the Hindu religious denominations that were under the purview of the reform, those who were eligible exhibited significantly better markers of mental health relative to their control group counterparts. Specifically, they are 3.8 percentage points (9.3%) (henceforth p.p.) less likely to be depressed, 3.9 p.p. (10.2%) less likely to have trouble concentrating, and 3.3 p.p. (12.3%) less likely to feel afraid in general. Overall, the treated women's mental health index improved by 0.08σ to 0.093σ. Furthermore, we find an improvement in the life satisfaction index of 0.086σ.[3] To put this result in context, Haushofer and Shapiro (2016) found through a randomized controlled trial that unconditional cash transfers improved life satisfaction by 0.17σ and increased happiness by 0.16σ. Therefore, the HSAA's effects on improving women's psychological well-being in India are approximately half of the effects of unconditional cash transfers given to poor households in rural Kenya. Consistent with parallel trends in the absence of the reform, an identical comparison among non-Hindu individuals excluded from its scope yields no such differences.

[3] Appendix Section B details the construction of the indices. The Cronbach's alpha for the mental health index and life satisfaction index is 0.76 and 0.85, respectively

Importantly, we also find similar improvements in psychological well-being among men, for whom the outcome is theoretically ambiguous a priori. On the one hand, men in the reform states who are married after the reform are likely to be economically advantaged through their wives' additional inheritance. On the other hand, they could face a reduction in their own shares of inherited land if they have sisters who are also treated by the reform. While men married just before and just after the reform may be equally likely to have sisters married pre- and post-reform, to the extent that siblings' ages and years of marriages are correlated, men who are 'treated positively' through their wives are, if anything, more likely to be 'treated negatively' through their sisters.[4] Our results show substantial spillover effects of similar magnitudes to those of the HSAA's treated women on the mental well-being of treated husbands. These effects could result directly from their overall socio-economic betterment through their wives' endowments or indirectly from their wives' improved mental state, in line with previous research showing that the mental states of co-resident partners are likely to be correlated (Das et al., 2007). Overall, our intent-to-treat estimate indicates that the HSAA improved the combined psychological well-being of treated women and men by $0.087\sigma - 0.1\sigma$.

Consistent with existing literature (Calvi, 2020), we find improvements in the physical health of treated women, as evidenced by a 1.4 percentage point (26%) decrease in the prevalence of anemia and an improvement in the physical health index of 0.14σ. The LASI dataset also allows us to perform heterogeneity analysis by self-reported childhood wealth and childhood health, uncovering several novel findings about the impact of the HSAA on women's later-life health outcomes. First, we find that the effects on mental health are larger for individuals who were raised in self-reported wealthier families, who would stand to benefit more from increased inheritance rights. Second, the reduction in anemia is driven by the subsample of women who report having good childhood health. These results highlight the critical importance of childhood health for the effectiveness of policies to improve women's later life outcomes. By demonstrating that the benefits of the HSAA are more pronounced among women with better childhood conditions, our findings underscore the necessity of early-life health interventions to enhance the long-term impact of such reforms.

In order to test the assumption of parallel trends further, we conducted a series of robustness

[4] Our data does not include information on individuals not part of the household, so we cannot check whether 'treated' husbands are more likely to have 'treated' sisters.

checks comparing individuals married before and after 'placebo' cutoff dates preceding the reform, and we showed that such placebo effects are negligibly small and statistically insignificant. A second crucial robustness check that our data allows us to perform is to compare results using an alternative definition of treatment based on the women's state of residence instead of the state of birth. This is an important factor to consider for married women, for whom the state of birth need not be the same as the state of residence. All our results are robust to using state of birth instead of state of residence.

Lastly, we verify in our data that treated individuals report a 3.3 p.p. (7%) to 4.4 p.p. (9.3%) higher likelihood of owning land, and treated women have a 0.08σ higher autonomy index. These results align with the existing literature and demonstrate that the HSAA policy achieved its primary objective of empowering women.

Our findings have meaningful implications for mortality, since depression symptoms are known to be strong correlates of future mortality conditional on age and gender (Banerjee et al., 2022), and significantly contribute to the global Disability-Adjusted Life Years (DALYs) (Charlson et al., 2016). It is therefore crucial to evaluate the extent to which policies can be effective at improving the mental health of individuals, particularly the elderly in low and middle-income countries (LMICs). To the best of our knowledge, this paper is one of the first to show the impact of a nationwide women's empowerment policy on their and their spouses' psychological well-being.

The rest of this paper is organized as follows: Section 2 provides an overview of the literature on mental health in developing countries and policy impacts of women's inheritance rights. Section 3 describes the data. Section 4 details the identification and estimation strategy. Section 5 describes the results, and Section 6 concludes.

2 Literature Review and Contribution

This paper intersects two key strands of literature: the impact of policies on mental health outcomes in developing countries and the research on the implications of inheritance rights.

First, to motivate why economic empowerment through the HSAA might be expected to have implications for mental wellbeing, we discuss a set of papers investigating evidence from cash transfer and other targeted programs. Haushofer and Shapiro (2016) conducted a randomized controlled trial (RCT) in rural Kenya and found that unconditional cash transfers improve psycho-

logical well-being by 0.26σ, supporting the hypothesis that poverty alleviation has psychological benefits. Notably, the study revealed a 0.14σ higher psychological well-being index for female recipients compared to male recipients, driven by lower levels of the stress hormone cortisol and higher self-esteem. The authors suggest that this may be due to increased female empowerment reducing stress. Our results further illuminate this mechanism by demonstrating that the HSAA policy, known to enhance women's empowerment, also significantly improves their mental health outcomes. Additionally, the study found that the improvement in psychological well-being, as measured by cortisol levels, is primarily driven by males even in the treatment arm with female recipients, highlighting the spillover effects of the cash transfer scheme. We observe similar spillover effects of the HSAA on the husbands of treated women, with certain outcomes indicating a larger intent-to-treat (ITT) effect on husbands compared to their wives. Haushofer et al. (2020) shows that economic improvements seem to be more effective at improving psychological wellbeing than psychotherapy programs; through an RCT in Kenya, they find that a USD 1076 PPP unconditional cash transfer scheme improved mental wellbeing, but there were no such improvements for individuals in the treatment arm who received five weeks of psychotherapy. In India, McKelway et al. (2023) through a RCT in Tamil Nadu, India, assessed the impact of a 6-week phone-based cognitive behavioral therapy (CBT) and a one-time cash transfer of 1000 rupees on older individuals living alone. The results indicate that the cash transfer slightly decreased depression scores at the 3-week follow-up, but these effects did not persist at 3 months. Neither CBT alone nor the combination of interventions had significant short-term or long-term effects on depression. In a related paper, Ozer et al. (2011) find that the popular conditional cash transfer program in Mexico, *Oportunidades*, where transfers were explicitly targeted to women, lowered depressive symptoms among women in the treatment group.[5] The program is well-known for improving women's intra-household bargaining power, consequently altering the allocation of resources within the household (Attanasio and Lechene, 2014). Our results on the impact of the HSAA on a wide array of psychological well-being and life satisfaction measures further support the argument that policies enhancing women's bargaining power can improve their mental health. Lastly, Baird et al. (2013) also find that cash transfers reduced psychological distress among adolescent girls in Malawi.

A range of welfare programs have also been shown to improve the psychological well-being

[5] Leight et al. (2022) find a siginificant negative correlation between women's empowerment and maternal stress and depression using data from Burkina Faso.

of low-income individuals without explicitly targeting it. Bandiera et al. (2013) used an RCT that provided assets and training to the poorest women in rural Bangladesh and found an improvement in self-reported life satisfaction of 6.4 percentage points, four years after the program. Jana et al. (2013), through an RCT, found that a training program designed to improve self-esteem and agency among marginalized sex workers in Kolkata, India, improved self-reported measures of happiness and self-esteem. Banerjee et al. (2015), using six RCTs across six countries, showed that a multifaceted program that includes livelihood assistance, productive asset transfer, saving encouragement, and health education services successfully improved the mental health of treated individuals, as measured by a mental health index, perception of status in life, and lack of stress index. Lastly, Lindqvist et al. (2020) find that lottery players who won large prizes in Sweden, experienced an improvement in overall life satisfaction that lasted over a decade driven by improvement in financial life satisfaction.

The contribution of our paper to the above literature is two-fold. First, we illustrate the efficacy of a large-scale nationally implemented economic empowerment policy in improving the psychological wellbeing of the beneficiaries in a developing country context. Second, we document the existence of robust spillover effects on the spouses of the beneficiaries, which further broadens the scope of such policies in enhancing overall welfare.

On the other hand the effectiveness of psychotherapy and pharmacotherapy programs on psychological outcomes in developing countries is mixed. Haushofer et al. (2020) find that, compared to an unconditional cash transfer, a five-week psychotherapy program had no effect on treated individuals' psychological outcomes. In contrast, Blattman et al. (2017), through an RCT, find that cognitive behavioral therapy was successful in reducing depression and stress among criminally engaged men in Liberia in the short term, but the effects dissipate over time. However, the combined treatment of a cash transfer and cognitive behavioral therapy has a persistent effect after one year. Bryant et al. (2017), through an RCT, find that a five-session behavioral treatment called Problem Management Plus was successful in improving the psychological outcomes of women who were victims of gender-based violence. Baranov et al. (2020) via an RCT found that psychotherapy provided to prenatally depressed mothers in rural Pakistan reduced depression by 17% and improved women's financial empowerment. Lastly, Angelucci and Bennett (2024) provide one of the few pieces of evidence on the effectiveness of pharmacotherapy in developing countries. Using an

RCT that cross-randomized pharmacotherapy and livelihoods assistance among depressed adults in Karnataka, India, the authors find a persistent reduction in depression severity in the combined treatment arm. However, pharmacotherapy alone has weaker effects that do not persist.

Women's inheritance rights: There is a substantial body of literature studying the impact of improving women's inheritance rights on their well-being. In India, Deininger et al. (2019) finds evidence that the HSAA significantly increased the likelihood of daughters inheriting their natal land. We corroborate this finding using the LASI data. Heath and Tan (2020) find that the HSAA improved women's labor supply by 3.8 to 6.1 percentage points and increased autonomy by 0.17σ. Roy (2008) also finds that the HSAA improved women's autonomy and their intrahousehold bargaining power. Mookerjee (2019) shows that the increase in women's bargaining power is at the expense of the older generation in the household, not the husband. Our results on women's autonomy validate this by showing a statistically significant increase in the autonomy index for women and a positive but insignificant increase for husbands. Similar improvements in autonomy through inheritance rights have also been documented in the context of Kenya by Harari (2019).

Using a structural collective model (Chiappori, 1992; Dunbar et al., 2013) of the household, Calvi (2020) finds that the HSAA increased women's resource share and reduced the individual-level female poverty rate. The author uses the structural model to provide suggestive evidence that the HSAA potentially alleviated the missing women crisis in India (Sen, 1992; Coale, 1991; Anderson and Ray, 2010) by reducing excess female deaths at older ages. Further, Calvi (2020) and Calvi et al. (2022) show that the HSAA improved anemia among treated women. We extend this result along an important and policy-relevant dimension. First, we corroborate the result by finding a statistically significant reduction in anemia for women and no effect for men. Second, our heterogeneity analysis indicates that the reduction in anemia is driven by the subsample of women who self-report having good childhood health up to age sixteen. This finding highlights the importance of addressing anemia at younger and adolescent ages through policies such as providing salt fortified with iron and iodine, known as double-fortified salt, through school lunch programs (Krämer et al., 2021).

3 Data and Measurement

Our data comes from Wave 1 of the Longitudinal Ageing Study in India (LASI), which is a nationally representative survey of older adults aged 45 and above, conducted in 2017-18 across all states in India. The LASI is set apart from other popularly used surveys,[6] which generally restrict their interviewee sample to household members aged below 50, by its specific focus on the elderly. Furthermore, it is extremely rare for mental health information to be available in household surveys, which makes this dataset unique and ideal for our context.

The survey spans 73,396 eligible individuals across 66,613 households, who were interviewed on their socio-economic standing, social relationships, and various aspects of ageing such as mental health, physical health, social support, and life satisfaction. Key for our identification strategy, we observe the religion, year of marriage, and state of residence for each individual. A key feature in this respect is that the LASI data not only provides us with the current state of residence, but also identifies the state of birth for those who have migrated. This allows us to define treatment eligibility more precisely, based on the state of birth, for our preferred specifications.

Our key outcome variables are based on a series of questions asking the respondents how often they experienced the following negative emotions in the last week: (i) feeling depressed, (ii) feeling alone, (iii) having trouble concentrating, (iv) feeling low in energy, and (v) feeling afraid. Respondents could report that they had felt these emotions rarely or never, sometimes, often, or most of the time. Based on their answers, we generate binary indicators denoting whether they ever experienced each of these emotions in the preceding week. Finally, we also construct a index of mental health, using a principal component analysis, normalized with respect to the sample of Hindu women who were not treated.

Additionally, we also construct a life satisfaction index, capturing different facets of the respondents' subjective evaluation of their lives. Respondents were asked how strongly they agreed to the following statements: (i) their lives are close to ideal, (ii) the conditions of their lives are excellent, (iii) they are satisfied with their life, (iv) they have got the important things they wanted in life so far, and (v) they would change almost nothing if they could relive their lives. Based on their responses, we create dummy variables denoting whether they agree with each of these statements, and generate a life satisfaction index using a principal component analysis, normalized

[6] Examples are the Demographic and Health Surveys (DHS) and the Indian Human Development Survey (IHDS).

with respect to the sample of Hindu women who were not treated. Note that while the mental health index is constructed based on indicator variables denoting that the respondent experienced a certain negative emotion, such that a lower value of the index corresponds to a more desirable outcome, the life satisfaction index is instead constructed based on indicators of positive life assessments and so a higher value corresponds to a more desirable outcome.

Finally, we also consider two outcome variables reflecting the respondents' physical health. The first is a binary indicator of whether they were diagnosed with anemia in the last two years. The second is a principal component index based on their self-assessed likelihood of having diabetes, hypertension, anemia, or heart disease in the next two years, normalized with respect to the sample of Hindu women who were not treated.[7]

Table 1 reports summary statistics, separately for males (Column 1) and females (Columns 2). The average age of the male sample is 60, significantly higher by about 4 years than the average age of the female sample. Around 55% of the men and 33% of the women have finished primary schooling. A significantly higher proportion of the men are also currently married, at 87%, relative to the female sample who are more likely to have been widowed. Around 77% of men and women belong to the Hindu religious groups, 34% belong to a scheduled caste or scheduled tribe, and around 65% reside in rural areas.

In terms of the outcome variables reflecting mental health, 40% of the female respondents and 37% of the male respondents report having felt depressed recently, 35% of the women and 30% of the men have experienced loneliness, while as many as 59% of the women and 55% of the men reported feeling low in energy. There are two important points regarding these statistics: first, these numbers are in line with Banerjee et al. (2022), who find 30% of men and 38% of women in the age group 61-70 in India to test positive for symptoms of depression compared to 11% of men and 14% of women in the same age group in the United States. Second, since these are self-reported measures, they have a higher likelihood of measurement error than clinical diagnosis. Therefore, they are more likely to capture information about depression symptoms and individual well-being rather than actually classify individuals as clinically depressed or not. Consistent with the literature, we also find these proportions to be uniformly higher for the female respondents, with the overall life satisfaction index significantly lower for them. Lastly, 5% of the women have recently been diagnosed with anemia relative to 2.6% of the men, but there is no statistically

[7] All indices are described it in detail in Appendix B.

significant difference in the overall physical health index.

Table 1: Summary Statistics

	(1) Male		(2) Female		(1)-(2) Pairwise t-test	
Variable	N	Mean/(SE)	N	Mean/(SE)	N	Mean difference
Age	31135	60.046 (0.061)	42261	56.352 (0.059)	73396	3.694***
Primary Education	31134	0.554 (0.003)	42258	0.336 (0.002)	73392	0.219***
Married	31135	0.875 (0.002)	42259	0.687 (0.002)	73394	0.188***
Hindu	31135	0.776 (0.002)	42261	0.770 (0.002)	73396	0.007**
Scheduled Caste or Scheduled Tribe	31135	0.340 (0.003)	42261	0.342 (0.002)	73396	-0.002
Rural	31135	0.655 (0.003)	42261	0.640 (0.002)	73396	0.015***
Life Satisfaction Index	30193	0.038 (0.006)	41265	-0.010 (0.005)	71458	0.047***
Mental Health Index	30205	-0.108 (0.006)	41303	0.001 (0.005)	71508	-0.109***
Depressed	30205	0.370 (0.003)	41304	0.408 (0.002)	71509	-0.038***
Alone	30205	0.307 (0.003)	41304	0.350 (0.002)	71509	-0.043***
Trouble Concentrating	30205	0.356 (0.003)	41303	0.387 (0.002)	71508	-0.031***
Low Energy	30205	0.551 (0.003)	41305	0.594 (0.002)	71510	-0.042***
Afraid	30205	0.244 (0.002)	41304	0.274 (0.002)	71509	-0.030***
Anemia	31013	0.026 (0.001)	42148	0.051 (0.001)	73161	-0.025***
Physical Health Index	4823	0.023 (0.014)	6319	0.040 (0.013)	11142	-0.017

Notes: The sample consists of men and women drawn from the Longitudinal Ageing Study in India (LASI). Detailed information regarding the construction of the various indices can be found in Section B of the Appendix. The variable *Primary Education* is a dummy variable that equals 1 if the individual has completed grade five. The variable *Scheduled Caste or Scheduled Tribe* is a dummy variable that equals 1 if the household belongs to a Scheduled Caste or Scheduled Tribe. The *Anemia* variable is a dummy variable that equals 1 if the individual has been diagnosed with anemia by a health professional in the past two years.

4 Empirical Strategy

Our identification strategy exploits the following eligibility criteria for the HSAA: it applied only to women who (i) resided in the reform states, (ii) were unmarried at the time of the reform, and (iii) belonged to the Hindu religious groups. An additional feature of the reform helps assuage endogeneity concerns with respect to selection in the timing of marriage, namely that the states adopted it retrospectively relative to when it was announced.[8] This would mean that families who intended to disinherit their daughters could not selectively choose to marry them off before the

[8]For instance, the state of Andhra Pradesh formally passed the act in May 1986 but deemed it to have come into effect starting September 1985.

reform was implemented in their state.

We estimate a difference-in-difference model comparing respondents belonging to the reform and non-reform states and married before and after the reform, as follows:

$$y_{ist} = \beta_0 + \beta_1 Treated_{ist} + X_{ist}\gamma + \alpha_s + \alpha_t + \epsilon_{ist}, \tag{1}$$

where y_{ist} is the outcome for individual i born in state s and married in the year t, and $Treated_{ist}$ is a binary indicator for whether individual i was born in a state s which passed the reform and was married in a year t which succeeded the implementation of the reform. X_{ist} is a vector of controls that includes age, age squared, an indicator for belonging to the Scheduled Caste or Scheduled Tribe, and an indicator for rural/urban residence.[9] α_s and α_t are state of birth fixed effects and year of marriage fixed effects, respectively.

We estimate the specification separately for the Hindu and non-Hindu samples. Our coefficient of interest is β_1, which captures the additional difference in the average outcomes of individuals in the treatment states married post and pre-reform, relative to the difference between those in the control states married in the same years. Suppose any additional differences we see in the reform states are indeed attributable to the policy. In that case, we should expect to see a significant effect only for the Hindu sample but not for the non-Hindu sample to whom the HSAA did not apply.

In order to check for parallel trends, we also run a series of robustness tests defining 'placebo' treatments as follows. Suppose a reform state s passed the law in year l. We estimate a series of specifications as follows:

$$y_{ist} = \delta_0 + \delta_1 Placebo^k_{ist} + X_{ist}\gamma + \alpha_s + \alpha_t + \epsilon_{ist}, \tag{2}$$

where, $Placebo^k_{ist}$ is a dummy variable taking the value 1 if individual i was born in a reform state s and was married after the year $l-k$, i.e. i was still unmarried at least k years before the reform. We estimate this only for the subset of respondents who were not treated and were married before 1994, which is the last reform year. δ_1 in this model would capture the effect of this placebo treatment, i.e., the additional benefit of residing in a reform state and being married shortly before the reform. We run this for k from 1 to 10, corresponding to dummy cutoffs 1 to

[9] We also report our results, by including additional battery of control variables, which include the individual's education level, occupation, an indicator for labor force participation and an indicator for current marital status. However, it should be noted that some of these variables are endogenous to the policy. Therefore, these results should be interpreted with caution.

10 years preceding the reform. Suppose any differences in the outcomes in the treatment states are driven by the reform itself. In that case, δ_1 should be small and statistically insignificant for each placebo test since none of the respondents who received the placebo treatment were eligible for the reform. On the other hand, if δ_1 were similar to β_1, it would imply that our results may be explained by pre-existing differences prior to the implementation of the HSAA in the reform states accruing to younger cohorts of married women.

5 Results

In this section, we first describe our main results, followed by the robustness tests and potential mechanisms.

5.1 Main Results

We start with the results for women, who were the intended beneficiaries of the HSAA. Table 2 reports the β_1 coefficient from equation (1), for each of our mental health outcomes, for the sample of Hindu women to whom the reform applied. The top panel estimates a sparsely controlled model, controlling only for age, caste, and rural residence, while the bottom panel additionally controls non-parametrically for the level of education, occupation, and marital status. We find that women who were eligible for the policy are 3.8p.p. (p-value < 0.01) less likely to be depressed, which translates to a 9% reduction relative to the control group women. They are also 3.9 p.p. (10%) (p-value < 0.01) less likely to have trouble concentrating, as well as 3.3 p.p. (12.6%) (p-value < 0.01) less likely to feel afraid. The coefficients on the likelihood of feeling alone or low in energy are likewise negative, but statistically insignificant. Finally, in terms of the overall mental health index, treated women are less likely to experience negative emotions by 0.093σ (p-value < 0.01). The coefficients from the sparsely controlled and fully controlled specifications are very similar for all of these outcomes.

Next, we perform an analogous exercise for non-Hindu women who were excluded from the purview of the reform, in the spirit of a falsification test. Table 3 reports the results organized as before. We see no such improvements for them – the coefficients are, in fact, uniformly positive in magnitude, denoting a higher likelihood of experiencing depression and anxiety, and are all

statistically insignificant with the exception of the coefficient on feeling afraid. To the extent that non-Hindu women constitute a reasonable counterfactual for Hindu women, these results suggest that the actual reduction in the likelihood of emotional stress for Hindu women may be understated.

Table 2: Effect on Mental Health: Hindu Women

	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of birth)	-0.093***	-0.038***	-0.021	-0.039***	-0.022	-0.033***
	(0.030)	(0.015)	(0.014)	(0.015)	(0.015)	(0.013)
Observations	30,065	30,066	30,066	30,065	30,066	30,066
Mean of Dep. Variable (Control)	0.000	0.408	0.352	0.384	0.600	0.268
Additional Covariates	No	No	No	No	No	No
Romano-Wolf p-value	0.002	0.002	0.064	0.002	0.064	0.002
	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of birth)	-0.080***	-0.031**	-0.014	-0.037**	-0.019	-0.030**
	(0.030)	(0.015)	(0.014)	(0.015)	(0.015)	(0.013)
Observations	29,996	29,997	29,997	29,996	29,997	29,997
Mean of Dep. Variable (Control)	0.000	0.408	0.352	0.384	0.600	0.268
Additional Covariates	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of hindu women drawn from the Longitudinal Ageing Study in India (LASI). The construction of Mental Health Index is described in Section B in the Appendix. The index is negatively coded, higher value of the index indicates a more negative outcome. All regressions include individual's year of marriage and state of birth fixed effects. Individual controls include age, age squared, and indicators for belonging to a Scheduled Caste or Tribe and rural residence. Standard errors are clustered at the sampling unit level. * significant at 10%; ** significant at 5%; *** significant at 1%. Additional covariates include educational level, occupation, current marital status and an indicator for if the individual has ever worked in the labor market. The Romano-Wolf FWER adjusted p-values are based on 500 bootstrap replications (Romano and Wolf, 2005).

Table 3: Effect on Mental Health: Non-Hindu Women

	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of birth)	0.072	0.030	0.004	0.002	0.029	0.056**
	(0.060)	(0.030)	(0.026)	(0.027)	(0.029)	(0.026)
Observations	8,982	8,982	8,982	8,982	8,983	8,982
Mean of Dep. Variable (Control)	0.052	0.415	0.362	0.411	0.610	0.301
Additional Covariates	No	No	No	No	No	No
Romano-Wolf p-value	0.295	0.457	0.980	0.980	0.457	0.006
	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of birth)	0.081	0.035	0.006	0.006	0.032	0.056**
	(0.061)	(0.030)	(0.026)	(0.028)	(0.029)	(0.027)
Observations	8,968	8,968	8,968	8,968	8,969	8,968
Mean of Dep. Variable (Control)	0.052	0.415	0.362	0.411	0.610	0.301
Additional Covariates	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of non-hindu women drawn from the Longitudinal Ageing Study in India (LASI). The construction of Mental Health Index is described in Section B in the Appendix. The index is negatively coded, higher value of the index indicates a more negative outcome. All regressions include individual's year of marriage and state of birth fixed effects. Individual controls include age, age squared, and indicators for belonging to a Scheduled Caste or Tribe and rural residence. Standard errors are clustered at the sampling unit level. * significant at 10%; ** significant at 5%; *** significant at 1%. Additional covariates include educational level, occupation, current marital status and an indicator for if the individual has ever worked in the labor market. The Romano-Wolf FWER adjusted p-values are based on 500 bootstrap replications (Romano and Wolf, 2005).

We now consider the male respondents, on whom the impact of the HSAA is theoretically ambiguous a priori. While men from the reform states married post-reform stand to benefit through their wives' potential increase in inheritance economically, they also have the likelihood of facing a reduction in their shares of inherited family property to the extent that they may have HSAA-eligible sisters. To the extent that economic resources are drivers of mental health, men who are treated through their marriages may, therefore, either show a net gain if their combined marital resources offset any reduction in their own inheritances but not if their overall resources go down. On the other hand, insofar as husbands may experience a direct emotional benefit from their wives' improved mental well-being, one might expect an overall improvement in the mental health of the treated men.

The results, documented in Table 4, show precisely such an improvement for the sample of Hindu men treated by the policy. They are 4.7 p.p. (13%) (p-value < 0.01) less likely to have recently felt depressed, 3.3 p.p. (11%) (p-value < 0.05) less likely to have felt alone, 3 p.p. (8.5%) (p-value < 0.1) less likely to have trouble concentrating, and exhibit a 0.093σ (p-value < 0.01) improvement in overall mental health as captured by the index. A similar falsification analysis using the sample of non-Hindu men, reported in Table 5, shows no such effects – the coefficients are uniformly statistically insignificant. As before, the coefficients with and without additional controls are almost identical. Overall, these findings demonstrate spillover effects of wives' empowerment on husbands' mental well-being, either through a combined increase in net resources or directly because of the improvement in their partners' emotional state.

Table A5 and A6 in the Appendix show the ITT estimates for the women and men combined sample for Hindus and non-Hindus, respectively. Results indicate that the HSAA improved the mental health index for treated Hindus by $0.087\sigma - 0.1\sigma$ and did not affect non-Hindus. In the Appendix, ITT estimates in Table A7 and A8 indicate that the results are consistent with the region of residence fixed effects instead of the region of birth.

Table 4: Effect on Mental Health: Hindu Men

	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of birth)	-0.093***	-0.047***	-0.033**	-0.030*	-0.029*	-0.017
	(0.035)	(0.017)	(0.016)	(0.017)	(0.017)	(0.015)
Observations	22,157	22,157	22,157	22,157	22,157	22,157
Mean of Dep. Variable (Control)	-0.107	0.370	0.310	0.353	0.558	0.240
Additional Covariates	No	No	No	No	No	No
Romano-Wolf p-value	0.002	0.002	0.024	0.048	0.052	0.116

	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of birth)	-0.090**	-0.046***	-0.034**	-0.030*	-0.025	-0.015
	(0.035)	(0.017)	(0.016)	(0.017)	(0.017)	(0.015)
Observations	22,065	22,065	22,065	22,065	22,065	22,065
Mean of Dep. Variable (Control)	-0.116	0.366	0.305	0.350	0.556	0.239
Additional Covariates	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of hindu men drawn from the Longitudinal Ageing Study in India (LASI). The construction of Mental Health Index is described in Section B in the Appendix. The index is negatively coded, higher value of the index indicates a more negative outcome. All regressions include individual's year of marriage and state of birth fixed effects. Individual controls include age, age squared, and indicators for belonging to a Scheduled Caste or Tribe and rural residence. Standard errors are clustered at the sampling unit level. * significant at 10%; ** significant at 5%; *** significant at 1%. Additional covariates include educational level, occupation, current marital status and an indicator for if the individual has ever worked in the labor market. The Romano-Wolf FWER adjusted p-values are based on 500 bootstrap replications (Romano and Wolf, 2005).

Table 5: Effect on Mental Health: Non-Hindu Men

	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of birth)	0.019	0.017	-0.030	0.030	-0.015	0.023
	(0.074)	(0.034)	(0.033)	(0.034)	(0.037)	(0.032)
Observations	6,433	6,433	6,433	6,433	6,433	6,433
Mean of Dep. Variable (Control)	-0.060	0.382	0.314	0.374	0.578	0.264
Additional Covariates	No	No	No	No	No	No
Romano-Wolf p-value	0.764	0.758	0.607	0.607	0.764	0.629

	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of birth)	0.028	0.020	-0.028	0.029	-0.009	0.028
	(0.073)	(0.034)	(0.034)	(0.035)	(0.037)	(0.032)
Observations	6,383	6,383	6,383	6,383	6,383	6,383
Mean of Dep. Variable (Control)	-0.060	0.382	0.314	0.374	0.578	0.264
Additional Covariates	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of non-hindu men drawn from the Longitudinal Ageing Study in India (LASI). The construction of Mental Health Index is described in Section B in the Appendix. The index is negatively coded, higher value of the index indicates a more negative outcome. All regressions include individual's year of marriage and state of birth fixed effects. Individual controls include age, age squared, and indicators for belonging to a Scheduled Caste or Tribe and rural residence. Standard errors are clustered at the sampling unit level. * significant at 10%; ** significant at 5%; *** significant at 1%. Additional covariates include educational level, occupation, current marital status and an indicator for if the individual has ever worked in the labor market. The Romano-Wolf FWER adjusted p-values are based on 500 bootstrap replications (Romano and Wolf, 2005).

Table 6: Effect on Mental Health: Life Satisfaction

	(1) Life Satisfaction Index	(2) Life Satisfaction Index	(3) Life Satisfaction Index	(4) Life Satisfaction Index
Treated (state of birth)	0.086***	-0.038	0.125***	0.052
	(0.031)	(0.057)	(0.036)	(0.077)
Observations	30,053	8,966	22,157	6,423
Mean of Dep. Variable (Control)	-0.000	0.052	0.174	0.180
Women Sample	Yes	Yes	No	No
Hindu Sample	Yes	No	Yes	No

Notes: The sample consists of women and men drawn from the Longitudinal Ageing Study in India (LASI). The construction of Life Satisfaction Index is described in Section B in the Appendix. The index is positively coded, higher value of the index indicates a more positive outcome. All regressions include individual's year of marriage and state of birth fixed effects. Individual controls include age, age squared, and indicators for belonging to a Scheduled Caste or Tribe and rural residence. Standard errors are clustered at the sampling unit level. * significant at 10%; ** significant at 5%; *** significant at 1%.

Next, we turn to the normalized life satisfaction index, which encapsulates different aspects of the respondents' overall subjective assessment of their lives. The results are reported in Table 6. Column (1) corresponds to the subsample of Hindu women, for whom we see an improvement by 0.086σ (p-value < 0.01) among those who were treated by the reform. The coefficient for the non-Hindus, reported in column (2), is statistically insignificant. Consistent with the spillover results above, from columns (3) and (4), we see an increase in the life satisfaction index for HSAA-eligible Hindu men of 0.125σ (p-value < 0.01), but not their non-Hindu counterparts.

Table 7: Physical Health

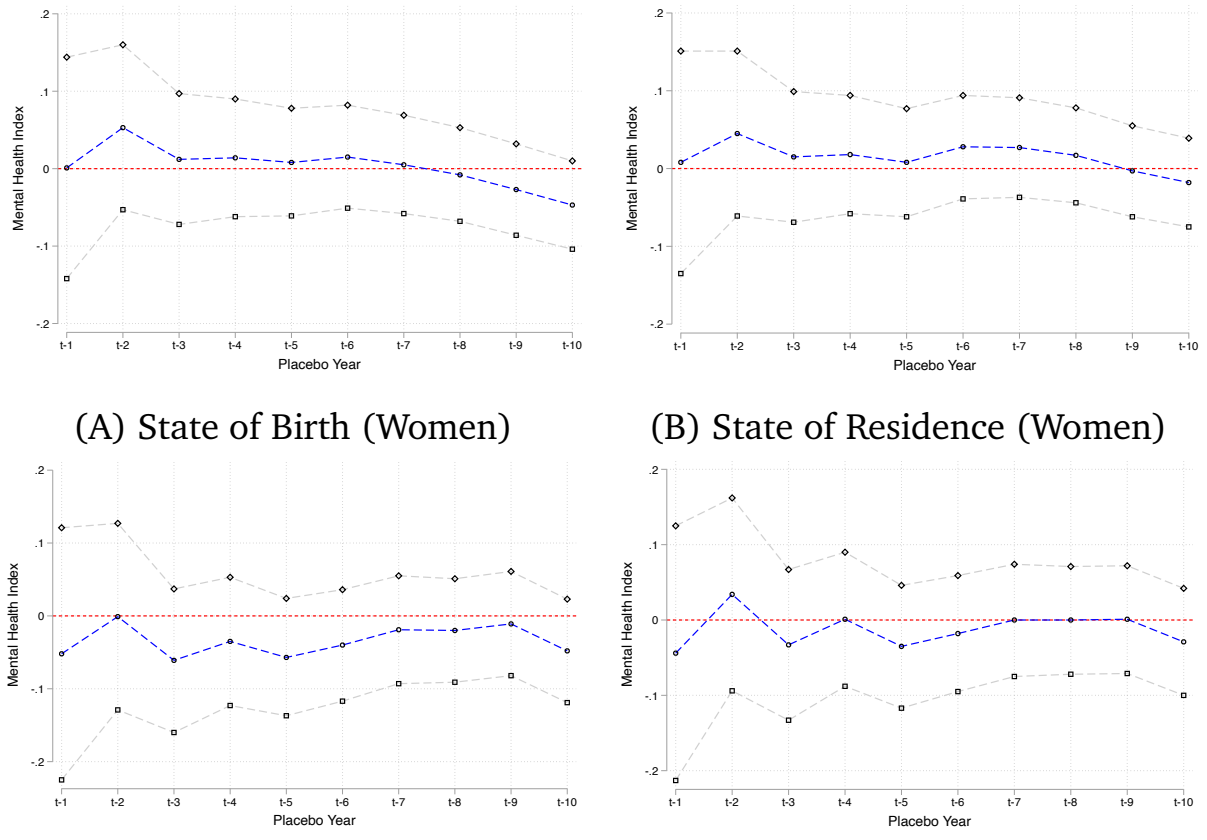
	(1) Anemia	(2) Physical Health Index	(3) Anemia	(4) Physical Health Index	(5) Anemia	(6) Physical Health Index	(7) Anemia	(8) Physical Health Index
Treated (state of birth)	-0.014**	-0.140*	-0.007	0.110	0.004	0.019	-0.014	0.172
	(0.006)	(0.077)	(0.011)	(0.168)	(0.004)	(0.087)	(0.010)	(0.271)
Observations	30,606	4,692	9,148	1,284	22,715	3,522	6,592	1,037
Mean of Dep. Variable (Control)	0.054	-0.000	0.044	0.104	0.028	-0.022	0.023	0.087
Women Sample	Yes	Yes	Yes	Yes	No	No	No	No
Hindu Sample	Yes	Yes	No	No	Yes	Yes	No	No

Notes: The sample consists of women and men drawn from the Longitudinal Ageing Study in India (LASI). The construction of Physical Satisfaction Index is described in Section B in the Appendix. The index is negatively coded, higher value of the index indicates a more negative outcome. All regressions include individual's year of marriage and state of birth fixed effects. Individual controls include age, age squared, and indicators for belonging to a Scheduled Caste or Tribe and rural residence. Standard errors are clustered at the sampling unit level. * significant at 10%; ** significant at 5%; *** significant at 1%.

Finally, we also examine the impact of the reform on respondents' physical health, namely whether they have been diagnosed with anemia, and a normalized index summarizing their self-reported likelihood of contracting several ailments in the next two years. We find a significant reduction in the rates of anemia of 1.4 p.p. (26%) (p-value < 0.01) and the self-assessed likelihood of future health issues of 0.14σ (p-value < 0.1) only among the treated women (columns (1) and (2)), but not the treated men (columns (5) and (6)). As before, falsification tests based on the non-Hindu sub-sample show no differences for either the female (columns (3) and (4)) or the male (columns (7) and (8)) respondents.

5.2 Robustness Checks

Figure 1: Placebo Test: Mental Health Index



(A) State of Birth (Women)

(B) State of Residence (Women)

(C) State of Birth (Men)

(D) State of Residence (Men)

Note: The sample consists of Hindu women and men not treated by the HSAA who married prior to 1994, drawn from the Longitudinal Ageing Study in India (LASI). The figure illustrates the intent-to-treat (ITT) parameter estimated using Equation 2, plotted for 10 placebo treatment years, ranging from one year prior to the true treatment year to ten years prior. Here, t represents the true policy implementation year. Figure 1(A) shows the plot for Hindu women with state of birth fixed effects. Figure 1(B) shows the plot for Hindu women with state of residence fixed effects. Figure 1(C) presents the plot for Hindu men with state of birth fixed effects, and Figure 1(D) shows the plot for Hindu men with state of residence fixed effects.

We now turn to our robustness checks. First, in order to test for parallel trends, we estimate equation (2) for ten different cutoffs, defining placebo treatments according to whether the respondents were still unmarried 1 through 10 years before the reform. The sample for this analysis is restricted to Hindu respondents who were not, in fact, actually eligible for the HSAA. This exercise aims to examine whether there were any pre-existing differences prior to the reform between the treatment and control states in terms of the outcomes of recently married individuals relative to cohorts married earlier.

Figures 1(A) and 1(C) plot the coefficients for each of these placebo treatments for the female and male Hindu respondents, respectively. Almost all of them are close to zero in magnitude and uniformly statistically insignificant. Any differences in the outcomes of respondents married earlier and later between the treatment and control states, therefore, seem to emerge at the time of the treatment and do not seem to have predated the policy or played a role in its implementation.

Next, we replicate our analysis by constructing an alternative measure of treatment, defined based on the state of residence rather than the state of birth.[10] The purpose of this exercise is twofold. First, if one were concerned that girls from reform states who stood to inherit property were likely to be married within the state while those who were likely to be disinherited by their families had a higher likelihood of being married out of state, treatment definitions according to the state of residence and state of birth would selectively differ for the women who were actually treated – robustness of our results to both definitions of treatment would assuage this concern. Second, to the extent that prior research exploiting the HSAA has mostly assigned treatment status based on the state of residence because of data limitations (Roy (2015), Heath and Tan (2020), Mookerjee (2019), demonstrating that the results are robust across both definitions of treatment also helps assuage similar measurement error concerns when interpreting the findings of these studies.

Tables A1 and A2 reproduce results analogous to Tables 2 and 3 respectively, defining treatment status based on the state of residence. The coefficients are qualitatively identical and very similar in magnitude – we see a reduction in the likelihood of mental distress among Hindu women who were exposed to the reform, with no such differences for their non-Hindu counterparts. Similarly, Tables A3 and A4 replicate the findings for the Hindu and non-Hindu male subsamples, respectively; as before, we see spillover improvements for the Hindu men, and not for the non-Hindu subsample. Finally, Figures 1(B) and 1(D) plot the coefficients from the placebo tests for women and men, respectively. The coefficients for all ten placebo treatments are extremely close to zero and statistically insignificant.

Our findings are robust to multiple hypothesis testing as indicated by the Romano-Wolf adjusted p-values (Romano and Wolf, 2005). Finally, we also combine the Hindu and non-Hindu subsamples and estimate a triple difference specification, further interacting treatment status with an indicator for belonging to the Hindu religious groups. The coefficients, reported in A9, bear out our earlier result – for both definitions of treatment, based on state of birth and state of residence, we see a marked reduction in the likelihood of experiencing negative emotions for the Hindu sample in the reform states married post-reform, relative to the non-Hindu sample.

[10] In our sample, 10% of the respondents have migrated away from their state of birth, while 90% of the sample continues to reside in their birth states.

5.3 Mechanisms

Table 8: Effect on Land Ownership

	(1) Own Land	(2) Own Land	(3) Own Land	(4) Own Land	(5) Own Land	(6) Own Land
Treated (state of birth)	0.033**	-0.029	0.044***	-0.018	0.043***	-0.009
	(0.014)	(0.021)	(0.013)	(0.021)	(0.012)	(0.021)
Observations	53,495	15,789	53,495	15,789	53,325	15,725
Mean of Dep. Variable	0.475	0.422	0.475	0.422	0.475	0.423
Baseline Covariates	No	No	Yes	Yes	Yes	Yes
Additional Covariates	No	No	No	No	Yes	Yes
Hindu	Yes	No	Yes	No	Yes	No

Notes: The sample consists of women and men drawn from the Longitudinal Ageing Study in India (LASI). All regressions include individual's year of marriage and state of birth fixed effects. Individual controls include age, age squared, and indicators for belonging to a Scheduled Caste or Tribe and rural residence. Standard errors are clustered at the sampling unit level. * significant at 10%; ** significant at 5%; *** significant at 1%. Additional covariates include educational level, occupation, current marital status and an indicator for if the individual has ever worked in the labor market.

Table 9: Effect on Autonomy

	(1) Autonomy Index	(2) Autonomy Index	(3) Autonomy Index	(4) Autonomy Index
Treated (state of birth)	0.080***	-0.014	0.021	-0.018
	(0.029)	(0.053)	(0.021)	(0.040)
Observations	22,499	7,002	17,826	5,359
Mean of Dep. Variable (Control)	-0.000	0.052	0.174	0.180
Women Sample	Yes	Yes	No	No
Hindu Sample	Yes	No	Yes	No

Notes: The sample consists of women and men drawn from the Longitudinal Ageing Study in India (LASI). The construction of Autonomy Index is described in Section B in the Appendix. The index is positively coded, higher value of the index indicates a more positive outcome. All regressions include individual's year of marriage and state of birth fixed effects. Individual controls include age, age squared, and indicators for belonging to a Scheduled Caste or Tribe and rural residence. Standard errors are clustered at the sampling unit level. * significant at 10%; ** significant at 5%; *** significant at 1%.

Having established through the intent-to-treat (ITT) estimates our main finding that the HSAA-eligible women, as well as their husbands, exhibit significant reductions in their likelihood of experiencing depression, loneliness, and lethargy, we now turn to investigating the potential channels that may be driving this improvement.

First, we examine the economic empowerment pathway by asking whether treated individuals are more likely to own land. A caveat for this measure is that we cannot distinguish between land that was acquired through the husbands' family and the wives' inheritance from their natal families, and so we cannot identify whether the treated couples indeed receive larger land bequests from the wives' inheritances.[11] Nevertheless, this measure is informative about the respondents' net resource ownership.

[11]The data does list the nominal 'owners' of the land among the household members, but the head is listed as the owner for almost all households, with co-owners listed in certain instances.

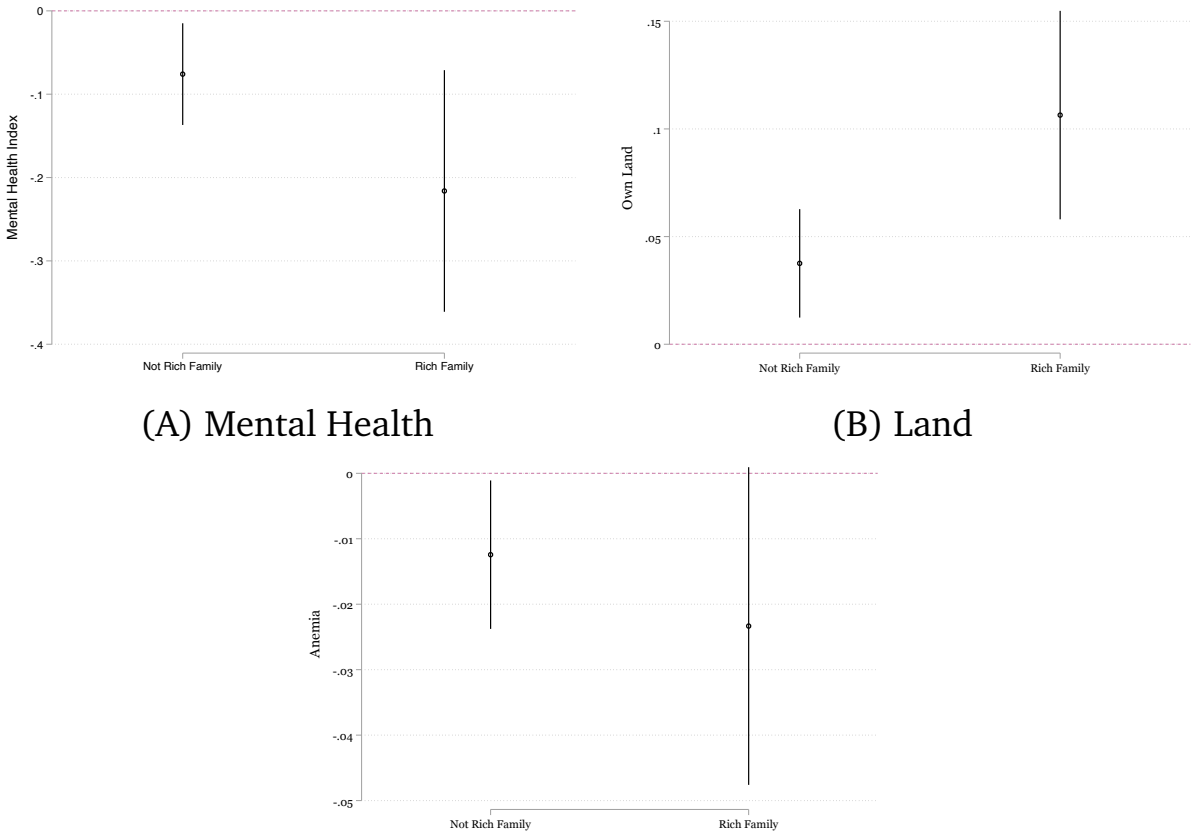
Table 8 shows the results. Hindu respondents who belonging to the reform states who were married post-reform are 4.4 p.p. (9%) (p-value < 0.01) more likely to belong to a land-owning household, while the corresponding coefficient for non-Hindu respondents is small and statistically indistinguishable from zero. The results hold for both the sparsely controlled and fully controlled specifications. While these findings are suggestive because land ownership is coarsely measured, they are consistent with the evidence from prior research on the HSAA's impact on land inheritance (Deininger et al. (2013)) and a net increase in transfer from women's natal household (Roy (2015)).

While economic empowerment could have directly led to improved mental wellness, an alternative channel could be the accompanying social empowerment resulting from strengthened inheritance rights, elevating women's social standing in their marital families (Roy (2008)). Indeed, mental health improvements for both men and women are consistent in this context with the finding in Mookerjee (2019) that bargaining power improves for *both* spouses and not just the wife. We attempt to test this channel of increased autonomy based on a series of questions in the LASI data regarding whether respondents play a role in making the following decisions: (i) their children's marriage, (ii) property transactions, (iii) gifts to family, (iv) education of family members, and (v) arrangement of social or religious events. We combine these into an autonomy index, and estimate equation (1) using this index as the outcome variable.[12] As we see from Table 9, the autonomy index improved by 0.08σ (p-value < 0.01) for treated Hindu women but not for the corresponding non-Hindu subsample. The coefficient for Hindu men is positive in magnitude but statistically insignificant. This might suggest a more vital role for the autonomy channel for the female respondents relative to the male respondents.

[12] see Appendix B for details.

5.4 Heterogeneity Analysis

Figure 2: Mental Health Index: Heterogeneity Analysis by Childhood Wealth



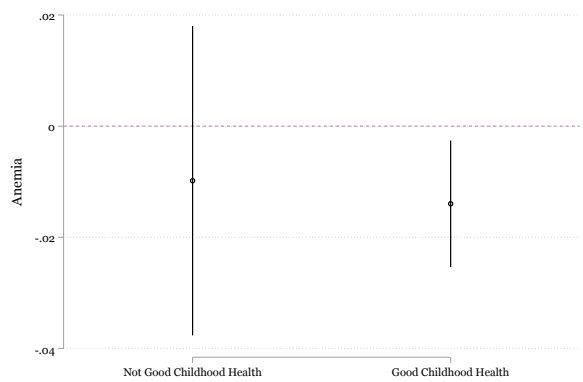
(A) Mental Health

(B) Land

(C) Anemia

Note: The sample consists of Hindu women drawn from the Longitudinal Ageing Study in India (LASI). All regressions include individual's year of marriage and state of birth fixed effects. Individual controls include age, age squared, and indicators for belonging to a Scheduled Caste or Tribe and rural residence. Standard errors are clustered at the sampling unit level. The childhood family wealth indicator is derived from a question asking respondents to reflect on their family's financial status during their childhood (from birth to age 16) compared to other families in their community. The response options were: 1. Pretty well off financially, 2. Average, 3. Poor, 4. Varied. A family is classified as rich if the respondent answered 1 to the above question; otherwise, the family is classified as not rich.

Figure 3: Anemia: Heterogeneity Analysis by Childhood Health



Note: The sample consists of Hindu women drawn from the Longitudinal Ageing Study in India (LASI). All regressions include individual's year of marriage and state of birth fixed effects. Individual controls include age, age squared, and indicators for belonging to a Scheduled Caste or Tribe and rural residence. Standard errors are clustered at the sampling unit level. The childhood health indicator is derived from a question asking respondents to assess their overall health up to age 16 based on their own memories, or what they heard or perceived from their parents. Response options were: 1. Very good, 2. Good, 3. Fair, 4. Poor, 5. Very poor. An individual is classified as having good childhood health if the respondent answered 1 or 2 to the above question; otherwise, the individual is classified as having not good childhood health.

Lastly, we perform heterogeneity analysis exercises to ascertain that the improvements we see are more pronounced for the sample of women who stand to benefit more from greater inheritance

rights, viz., women hailing from more affluent families. The LASI questionnaire asked respondents to subjectively rate their natal families' wealth relative to other households in their community, and we created an indicator for whether respondents assessed that they were well off (as opposed to average or poor). For the sample of Hindu women, we then plot the coefficients for those belonging to rich and poor natal families in Figure 2. First, we see that the improvement in mental health, as measured by a decline in the combined index, is greater for women from richer households. Second, the current household landholding is also higher for the treated women from wealthier backgrounds. This supports the idea that treated women from landowning households are more likely to inherit land themselves. Finally, we also see a larger drop in the likelihood of having anemia among treated women from richer families, though it is measured less precisely (significant at 10%).

We also consider a different aspect of heterogeneity, the respondents' assessment of their own physical health in childhood up to age 16. Based on this, we bin them into good and poor childhood health and reproduce similar plots for the subsample of Hindu women in each of these bins in Figure 3. The analysis uncovers a critical and policy-relevant finding that indicates that women with good self-reported childhood health primarily drive the reduction anemia.

Finally, our results are also consistent with social implications of the HSAA reform documented in previous studies. Amaral (2017) shows that violence against women declines because of better marriage market negotiations, which could contribute to the improvements we see in mental health outcomes. There is also evidence that girls who are treated were more likely to enter into marriage with their paternal cousins, arranged by her family in an attempt to keep her share of property within the male lineage (Bahrami-Rad (2021)). Continued ties with the natal families and proximate residence to them through such consanguineous marriages may also have served as an alternative pathway for lower rates of depression and loneliness among women.

6 Conclusion

In this paper, we study the effect of women's empowerment on their psychological well-being. We leverage amendments to inheritance rights in India, which equalized women's inheritance rights to men's in several Indian states, as a natural experiment, using a difference-in-differences framework to analyze the impact. We find that the policy improved women's psychological well-being

across several dimensions, with an improvement in the mental health index of 0.08σ to 0.093σ. Additionally, we observe substantial positive spillover effects on the husbands of treated women, with improvements in mental health of a similar magnitude. Depression symptoms are strong predictors of future mortality (Banerjee et al., 2022); further, mental health and its social, economic, and public health consequences have been of significant concern to policymakers in India (Ranade et al. (2022)) as well as globally (Galea and Ettman (2021)). According to Charlson et al. (2016), one-third of global Disability-Adjusted Life Years (DALYs) due to mental, neurological, and substance use disorders occur in China and India, highlighting the need for prevention, early identification, and effective treatment programs. Our findings demonstrate the effectiveness of policies enhancing women's agency and economic standing in addressing these challenges. Lastly, while previous work has highlighted the benefits of empowering women on their children's outcomes (Qian, 2008; Calvi et al., 2022), our results demonstrate these policies' effectiveness in improving their partners' mental well-being. These findings open the door to future research exploring the potential mechanisms driving the positive spillovers on the psychological well-being of partners.

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A Additional Tables and Figures

Table A1: Effect on Mental Health: Hindu Women (By Residence)

	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of res)	-0.100***	-0.038**	-0.022	-0.041***	-0.030*	-0.035***
	(0.031)	(0.015)	(0.014)	(0.015)	(0.015)	(0.013)
Observations	30,527	30,528	30,528	30,527	30,528	30,528
Mean of Dep. Variable (Control)	0.000	0.409	0.352	0.384	0.600	0.268
Additional Covariates	No	No	No	No	No	No
	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of res)	-0.090***	-0.032**	-0.016	-0.040***	-0.028*	-0.033**
	(0.030)	(0.015)	(0.014)	(0.015)	(0.015)	(0.013)
Observations	30,458	30,459	30,459	30,458	30,459	30,459
Mean of Dep. Variable (Control)	0.000	0.409	0.352	0.384	0.600	0.268
Additional Covariates	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of hindu women and men drawn from the Longitudinal Ageing Study in India (LASI). The construction of Mental Health Index is described in Section B in the Appendix. The index is negatively coded, higher value of the index indicates a more negative outcome. All regressions include individual's year of marriage and state of residence fixed effects. Individual controls include age, age squared, and indicators for belonging to a Scheduled Caste or Tribe and rural residence. Standard errors are clustered at the sampling unit level. * significant at 10%; ** significant at 5%; *** significant at 1%. Additional covariates include educational level, occupation, current marital status and an indicator for if the individual has ever worked in the labor market.

Table A2: Effect on Mental Health: Non-Hindu Women (By Residence)

	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of res)	0.081	0.030	-0.001	0.002	0.038	0.065**
	(0.062)	(0.031)	(0.027)	(0.028)	(0.030)	(0.027)
Observations	9,014	9,014	9,014	9,014	9,015	9,014
Mean of Dep. Variable (Control)	0.053	0.416	0.362	0.411	0.610	0.301
Additional Covariates	No	No	No	No	No	No
	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of res)	0.092	0.036	0.002	0.008	0.043	0.065**
	(0.063)	(0.031)	(0.027)	(0.029)	(0.031)	(0.028)
Observations	9,000	9,000	9,000	9,000	9,001	9,000
Mean of Dep. Variable (Control)	0.053	0.416	0.362	0.411	0.610	0.301
Additional Covariates	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of non-hindu women and men drawn from the Longitudinal Ageing Study in India (LASI). The construction of Mental Health Index is described in Section B in the Appendix. The index is negatively coded, higher value of the index indicates a more negative outcome. All regressions include individual's year of marriage and state of residence fixed effects. Individual controls include age, age squared, and indicators for belonging to a Scheduled Caste or Tribe and rural residence. Standard errors are clustered at the sampling unit level. * significant at 10%; ** significant at 5%; *** significant at 1%. Additional covariates include educational level, occupation, current marital status and an indicator for if the individual has ever worked in the labor market.

Table A3: Effect on Mental Health: Hindu Men (By Residence)

	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of res)	-0.076**	-0.041**	-0.027	-0.029*	-0.014	-0.014
	(0.035)	(0.017)	(0.016)	(0.017)	(0.017)	(0.015)
Observations	22,508	22,508	22,508	22,508	22,508	22,508
Mean of Dep. Variable (Control)	-0.108	0.370	0.309	0.353	0.558	0.240
Additional Covariates	No	No	No	No	No	No

	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of res)	-0.075**	-0.041**	-0.028*	-0.030*	-0.012	-0.013
	(0.036)	(0.018)	(0.016)	(0.017)	(0.017)	(0.015)
Observations	22,415	22,415	22,415	22,415	22,415	22,415
Mean of Dep. Variable (Control)	-0.108	0.370	0.309	0.353	0.558	0.240
Additional Covariates	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of hindu men and men drawn from the Longitudinal Ageing Study in India (LASI). The construction of Mental Health Index is described in Section B in the Appendix. The index is negatively coded, higher value of the index indicates a more negative outcome. All regressions include individual's year of marriage and state of residence fixed effects. Individual controls include age, age squared, and indicators for belonging to a Scheduled Caste or Tribe and rural residence. Standard errors are clustered at the sampling unit level. * significant at 10%; ** significant at 5%; *** significant at 1%. Additional covariates include educational level, occupation, current marital status and an indicator for if the individual has ever worked in the labor market.

Table A4: Effect on Mental Health: Non-Hindu Men (By Residence)

	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of res)	0.022	0.023	-0.033	0.018	-0.000	0.025
	(0.074)	(0.035)	(0.033)	(0.034)	(0.038)	(0.031)
Observations	6,452	6,452	6,452	6,452	6,452	6,452
Mean of Dep. Variable (Control)	-0.059	0.382	0.314	0.375	0.577	0.264
Additional Covariates	No	No	No	No	No	No

	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of res)	0.027	0.024	-0.032	0.016	0.004	0.028
	(0.074)	(0.034)	(0.033)	(0.035)	(0.037)	(0.031)
Observations	6,402	6,402	6,402	6,402	6,402	6,402
Mean of Dep. Variable (Control)	-0.059	0.382	0.314	0.375	0.577	0.264
Additional Covariates	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of non-hindu men and men drawn from the Longitudinal Ageing Study in India (LASI). The construction of Mental Health Index is described in Section B in the Appendix. The index is negatively coded, higher value of the index indicates a more negative outcome. All regressions include individual's year of marriage and state of residence fixed effects. Individual controls include age, age squared, and indicators for belonging to a Scheduled Caste or Tribe and rural residence. Standard errors are clustered at the sampling unit level. * significant at 10%; ** significant at 5%; *** significant at 1%. Additional covariates include educational level, occupation, current marital status and an indicator for if the individual has ever worked in the labor market.

Table A5: Effect on Mental Health: Hindu

	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of birth)	-0.099***	-0.045***	-0.028**	-0.037***	-0.027**	-0.028**
	(0.027)	(0.013)	(0.012)	(0.013)	(0.013)	(0.011)
Observations	52,225	52,226	52,226	52,225	52,226	52,226
Mean of Dep. Variable (Control)	-0.046	0.392	0.334	0.371	0.583	0.256
Additional Covariates	No	No	No	No	No	No

	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of birth)	-0.087***	-0.040***	-0.022*	-0.034***	-0.024*	-0.024**
	(0.027)	(0.013)	(0.012)	(0.013)	(0.013)	(0.011)
Observations	52,064	52,065	52,065	52,064	52,065	52,065
Mean of Dep. Variable (Control)	-0.046	0.392	0.334	0.371	0.583	0.256
Additional Covariates	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of hindu women and men drawn from the Longitudinal Ageing Study in India (LASI). The construction of Mental Health Index is described in Section B in the Appendix. The index is negatively coded, higher value of the index indicates a more negative outcome. All regressions include individual's year of marriage and state of birth fixed effects. Individual controls include age, age squared, and indicators for belonging to a Scheduled Caste or Tribe and rural residence. Standard errors are clustered at the sampling unit level. * significant at 10%; ** significant at 5%; *** significant at 1%. Additional covariates include educational level, occupation, current marital status and an indicator for if the individual has ever worked in the labor market.

Table A6: Effect on Mental Health: Non-Hindu

	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of birth)	0.051	0.023	-0.007	0.016	0.006	0.044*
	(0.055)	(0.026)	(0.024)	(0.023)	(0.025)	(0.023)
Observations	15,422	15,422	15,422	15,422	15,423	15,422
Mean of Dep. Variable (Control)	0.006	0.401	0.342	0.396	0.597	0.285
Additional Covariates	No	No	No	No	No	No

	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of birth)	0.065	0.029	-0.002	0.018	0.014	0.046**
	(0.055)	(0.026)	(0.023)	(0.023)	(0.025)	(0.023)
Observations	15,358	15,358	15,358	15,358	15,359	15,358
Mean of Dep. Variable (Control)	0.006	0.401	0.342	0.396	0.597	0.285
Additional Covariates	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of non-hindu women and men drawn from the Longitudinal Ageing Study in India (LASI). The construction of Mental Health Index is described in Section B in the Appendix. The index is negatively coded, higher value of the index indicates a more negative outcome. All regressions include individual's year of marriage and state of birth fixed effects. Individual controls include age, age squared, and indicators for belonging to a Scheduled Caste or Tribe and rural residence. Standard errors are clustered at the sampling unit level. * significant at 10%; ** significant at 5%; *** significant at 1%. Additional covariates include educational level, occupation, current marital status and an indicator for if the individual has ever worked in the labor market.

Table A7: Effect on Mental Health: Hindu (By Residence)

	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of res)	-0.095***	-0.043***	-0.025**	-0.037***	-0.026**	-0.027**
	(0.027)	(0.013)	(0.012)	(0.013)	(0.013)	(0.011)
Observations	53,038	53,039	53,039	53,038	53,039	53,039
Mean of Dep. Variable (Control)	-0.046	0.392	0.334	0.371	0.582	0.256
Additional Covariates	No	No	No	No	No	No
	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of res)	-0.086***	-0.039***	-0.020*	-0.036***	-0.023*	-0.025**
	(0.027)	(0.013)	(0.012)	(0.013)	(0.013)	(0.011)
Observations	52,876	52,877	52,877	52,876	52,877	52,877
Mean of Dep. Variable (Control)	-0.046	0.392	0.334	0.371	0.582	0.256
Additional Covariates	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample consists of hindu women and men drawn from the Longitudinal Ageing Study in India (LASI). The construction of Mental Health Index is described in Section B in the Appendix. The index is negatively coded, higher value of the index indicates a more negative outcome. All regressions include individual's year of marriage and state of residence fixed effects. Individual controls include age, age squared, and indicators for belonging to a Scheduled Caste or Tribe and rural residence. Standard errors are clustered at the sampling unit level. * significant at 10%; ** significant at 5%; *** significant at 1%. Additional covariates include educational level, occupation, current marital status and an indicator for if the individual has ever worked in the labor market.

Table A8: Effect on Mental Health: Non-Hindu (By Residence)

	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of res)	0.056	0.026	-0.012	0.010	0.017	0.050**
	(0.056)	(0.027)	(0.025)	(0.023)	(0.026)	(0.023)
Observations	15,473	15,473	15,473	15,473	15,474	15,473
Mean of Dep. Variable (Control)	0.006	0.402	0.342	0.396	0.597	0.286
Additional Covariates	No	No	No	No	No	No
	(1) Mental Health Index	(2) Depressed	(3) Alone	(4) Concentrate	(5) Low Energy	(6) Afraid
Treated (state of res)	0.070	0.032	-0.007	0.014	0.024	0.052**
	(0.056)	(0.026)	(0.024)	(0.024)	(0.026)	(0.023)
Observations	15,409	15,409	15,409	15,409	15,410	15,409
Mean of Dep. Variable (Control)	0.006	0.402	0.342	0.396	0.597	0.286
Additional Covariates	Yes	Yes	Yes	Yes	Yes	Yes

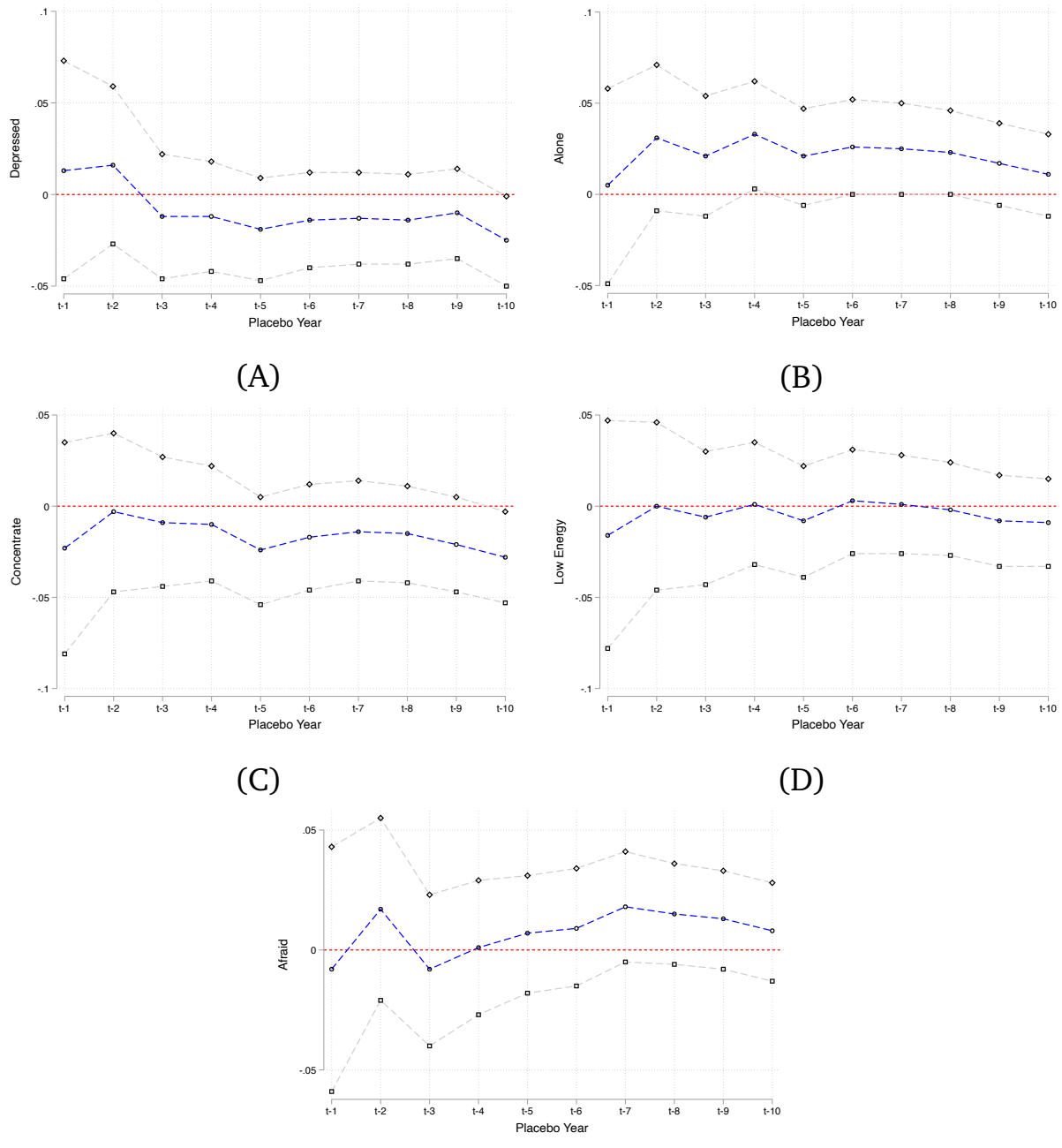
Notes: The sample consists of non-hindu women and men drawn from the Longitudinal Ageing Study in India (LASI). The construction of Mental Health Index is described in Section B in the Appendix. The index is negatively coded, higher value of the index indicates a more negative outcome. All regressions include individual's year of marriage and state of residence fixed effects. Individual controls include age, age squared, and indicators for belonging to a Scheduled Caste or Tribe and rural residence. Standard errors are clustered at the sampling unit level. * significant at 10%; ** significant at 5%; *** significant at 1%. Additional covariates include educational level, occupation, current marital status and an indicator for if the individual has ever worked in the labor market.

Table A9: Effect on Mental Health: Triple Difference-in-Differences (DDD)

	(1) Mental Health Index	(2) Mental Health Index	(3) Mental Health Index	(4) Mental Health Index
Treated (state of birth) × Hindu	-0.129**		-0.140*	
	(0.065)		(0.073)	
Treated (state of res) × Hindu		-0.114*		-0.136*
		(0.065)		(0.075)
Observations	67,388	68,255	38,731	39,229
Mean of Dep. Variable (Control)	-0.036	-0.036	0.010	0.010
Women Sample	No	No	Yes	Yes

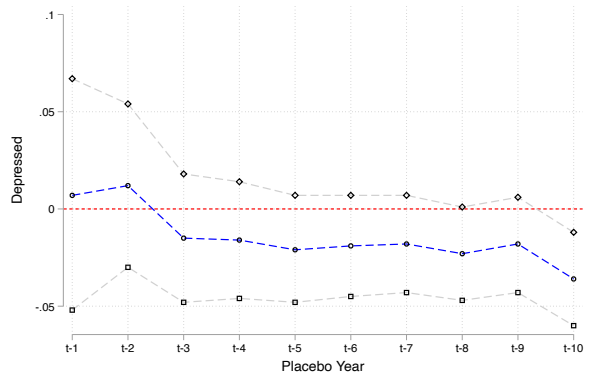
Notes: The sample consists of men and men drawn from the Longitudinal Ageing Study in India (LASI). The construction of Mental Health Index is described in Section B in the Appendix. The index is negatively coded, higher value of the index indicates a more negative outcome.

Figure A1: Placebo Test: Particular Outcomes (State of Residence)

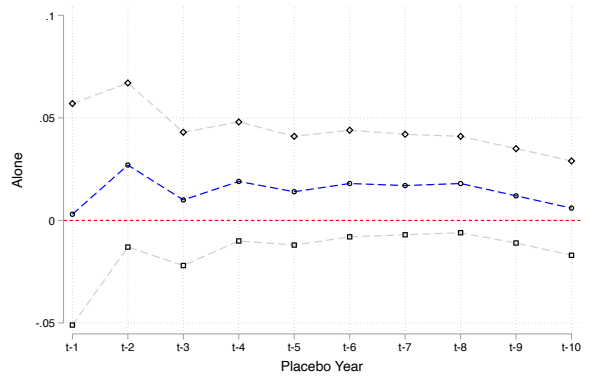


Note: The sample consists of Hindu women and men not treated by the HSAA who married prior to 1994, drawn from the Longitudinal Ageing Study in India (LASI). The figure illustrates the intent-to-treat (ITT) parameter estimated using Equation 2 with state of residence fixed effects, plotted for 10 placebo treatment years, ranging from one year prior to the true treatment year to ten years prior. Here, t represents the true policy implementation year.

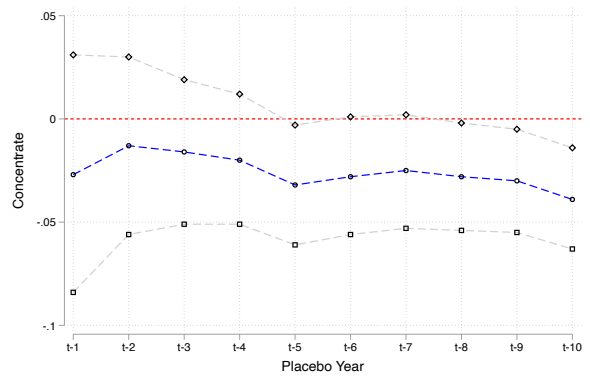
Figure A2: Placebo Test: Particular Outcomes (State of Birth)



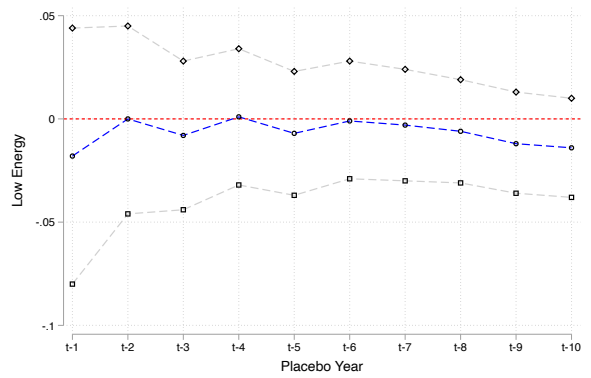
(A)



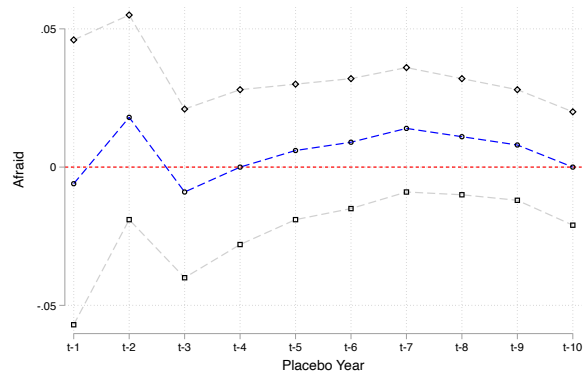
(B)



(C)



(D)



(E)

Note: The sample consists of Hindu women and men not treated by the HSAA who married prior to 1994, drawn from the Longitudinal Ageing Study in India (LASI). The figure illustrates the intent-to-treat (ITT) parameter estimated using Equation 2 with state of birth fixed effects, plotted for 10 placebo treatment years, ranging from one year prior to the true treatment year to ten years prior. Here, t represents the true policy implementation year.

B Construction of Indices

In this section, we describe the construction of the four indices used in this paper, namely, the mental health index, the life satisfaction index, the physical health index, and the autonomy index.

1. **Life Satisfaction Index:** Individuals answer the following questions on a scale of 1 to 7, where 1 stands for strongly disagree and 7 for strongly agree:

   (a) "In most ways my life is close to ideal."

   (b) "The conditions of my life are excellent."

   (c) "I am satisfied with my life."

(d) "So far, I have got the important things I want in life."

(e) "If I could live my life again, I would change almost nothing."

From each of these questions, we create a dummy variable, which is 1 if the individual reports agree, somewhat agree, or strongly agree, and 0 otherwise. The life satisfaction index is constructed as the first principal component using a principal component analysis of the five dummy variables. We normalize the index such that the mean of the index for Hindu women *not* treated by the HSAA is zero, and the standard deviation of the index for Hindu women *not* treated by the HSAA is one.

2. **Mental Health Index:** The mental health index is constructed as the first principal component using a principal component analysis of the following five variables: whether an individual reports being depressed, alone, having trouble concentrating, having low energy, or feeling afraid. We normalize the index such that the mean of the index for Hindu women *not* treated by the HSAA is zero, and the standard deviation of the index for Hindu women *not* treated by the HSAA is one.

3. **Physical Health Index:** The physical health index is constructed as the first principal component using a principal component analysis from five questions, which ask individuals to report on a scale of 1 to 10 how likely they think they will have the following ailments in the next two years: hypertension, heart disease, anemia, or diabetes. We normalize the index such that the mean of the index for Hindu women *not* treated by the HSAA is zero, and the standard deviation of the index for Hindu women *not* treated by the HSAA is one.

4. **Autonomy Index:** Individuals describe their role in household decision-making processes. The roles are categorized as having no role, deciding alone, contributing to decision-making, or not applicable. The decisions involve: marriage of son/daughter, buying and selling of property, gifts to children, grandchildren, other relatives, education of family members, and arrangement of social or religious events. From responses to these five questions, we create dummy variables, which take a value of 1 if the individual plays any role and 0 otherwise. The autonomy index is constructed as the first principal component using a principal component analysis of the five dummy variables. We normalize the index such that the mean of the index for Hindu women *not* treated by the HSAA is zero, and the standard deviation of the index for Hindu women *not* treated by the HSAA is one.