Cultural Institutions and Structural Change: Dowries as Pensions When Sons Migrate*

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PRELIMINARY

This paper examines whether an important cultural institution in India – dowry – can enable male migration by increasing liquidity at the time of marriage. We hypothesize that one cost of migration is the disruption of traditional elderly support structures, where sons co-reside with parents and care for them in their old age. Dowry can attenuate this cost by providing sons and parents with a liquid transfer that eases constraints on income sharing. To test this, we collect two novel datasets on property rights over dowry among migrants and among families of migrants. Net transfers of dowry to a man's parents are common. Consistent with using dowry for income sharing, transfers occur more when sons migrate, especially when they work in higher-earning occupations. Nationally representative data confirms that migration rates are higher in areas with stronger historical dowry traditions. Finally, exploiting a large-scale highway construction program, we show that men from areas with stronger dowry traditions have a higher migration response to a reduction in migration costs. Despite its potential negative consequences, dowry may play a role in facilitating migration and therefore, structural change.

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1 Introduction

Reallocating workers across space, from rural areas where labor has lower marginal returns to urban areas where it has higher returns, is a key driver of economic development. Yet, there are many obstacles to migration for financially constrained, rural households in low-income settings. Migration comes with large up-front costs (Bazzi, 2017; Bryan and Morten, 2019), and migrants face both financial risks (Lagakos et al., 2018; Bryan et al., 2014) and the prospect of losing access to local insurance networks (Munshi and Rosenzweig, 2016). Migration also reduces the co-residence between generations and may hence limit parental access to a child's resources (Leibenstein, 1957; Caldwell, 1978; Bau, 2021). In economies where most old-age support is provided by children, households may forgo even high return migration opportunities if they prevent the optimal allocation of resources across generations.[1] Thus, greater liquidity in the hands of young people at the time of potential migration may play an important role in facilitating it.

This paper introduces and tests the new hypothesis that dowry, a transfer from the bride's family upon marriage prevalent throughout India, encourages migration by providing young men with timely resources that can be transferred to their parents to relax concerns over old-age support. Indeed, the transfer of some or all of the dowry to grooms' parents in some cases is consistent with anecdotal evidence (The Times of India, 2022). Exploiting newly-collected data, which includes the first quantitative information on property rights over dowry in India, ethnographic variation in dowry traditions across India, and a natural experiment that varied migration costs, we provide the first evidence that dowry traditions help enable migration.

To illustrate our mechanism, we develop a model in which parents and sons act collectively but experience frictions in income sharing when the son migrates. If parental income is high enough relative to the son's income, this consideration will not affect migration decisions. If, however, the parent relies on income pooling with the son for sufficient consumption, this may make sons less likely to migrate unless the returns are sufficiently high to offset utility losses to the household from parents' lost consumption. Dowry mitigates this friction by providing a liquid pool of resources that the son can transfer to the parents in case of migration, bringing consumption

[1]For example, Fernando (2022) argues that eldest sons, who are expected to care for parents in India, benefit less from their inheritance because they cannot pursue migration opportunities.

closer to the first best allocation and lowering the returns needed for a son to migrate.

Our model produces several testable predictions. First, depending on parents' and sons' marginal utilities of income, some parents will make net transfers to sons while others will receive transfers from the dowry. Second, parents will take more on average when sons migrate, consistent with substituting to taking from the dowry since frictions in income-sharing arise when sons migrate. Third, accounting for parental wealth, parents will take more when migrant sons are expected to have a higher income, consistent with the fact that parents will have a higher relative marginal return to consumption. Fourth, parents who receive remittances from migrants sons are also more likely to have taken a portion of the dowry. Fifth, more sons will migrate in areas where dowry traditions are practiced, and sixth, as long as migration rates are relatively low, a decline in the costs of migration will lead to a greater male migration response in areas where dowry is practiced.

The first four predictions are borne out in our newly-collected data from over 2,500 families across six Indian states (the "origin survey") and over 550 prime age male workers in Delhi (the "destination survey"). The survey data carefully explore the property rights and control over all items gifted at the time of marriage. We find that 29% and 45% parents have taken from the son's dowry across the two samples, respectively. Taking is more frequent when the son is a migrant and especially when he has a high occupational score, holding fixed the father's occupational score. It is also more frequent when the son reports not having wanted to marry without the parents' consent, a proxy for parental bargaining power. Finally, we find that parents whose son is a remitting migrant are 20 percentage points more likely to have taken from the dowry than parents of a non-migrant son who does not transfer to his parents.

We then turn to the final two predictions, which aim to assess the role of dowry in enabling structural change. To test these predictions, we use nationally representative data from a detailed migration module collected in Round 64 of the National Sample Survey (conducted in 2007-2008). We combine these data at the district-level with the Ancestral Characteristics data assembled by Giuliano and Nunn (2018), which uses anthropological data to estimate the share of the current population belonging to groups with dowry traditions. We confirm that, while dowry payments in India are nearly universal, this variation is strongly predictive of the size of payments in the Rural Economic and Demographic Survey (REDS) and the India Human Development

Survey (IHDS).

In line with the fifth prediction of the model, we verify that male migration rates are indeed higher in districts where more of the population belongs to groups with dowry traditions. To test our sixth prediction, we exploit a time- and geographically-varying shock to the cost of migration – the construction of the Golden Quadrilateral, a national highway network. While this program has been previously-studied in the context of trade and productivity (see for example, Ghani et al. (2016); Asturias et al. (2018)), we use a complete database on capital projects in India to assemble new, detailed data on the district-level timing of the construction of highway segments. We then use the latest techniques in staggered-entry event study analyses to estimate the effect of highway construction on out-migration (Borusyak et al., 2021; Callaway and Sant'Anna, 2020). Separately estimating the effects of highway construction in districts with and without strong dowry traditions, we find that dowry areas indeed had substantially greater migration responses to road construction but only among men below marriage age at the time of the construction.

Our findings suggest that the roles played by cultural traditions may evolve as economic development changes the environment. While dowry likely traditionally served as a bequest to the bride (Goody et al., 1973; Botticini and Siow, 2003), today transfers often flow from the bride's to the groom's side (Anderson and Bidner, 2015), with perhaps surprising consequences for migration that we identify in this paper. Thus, dowry can promote efficient labor market allocations, while facilitating income-sharing within households. More speculatively, our results may point to an additional explanation for why the prevalence of dowry has only grown, despite attempts to ban it (Chiplunkar and Weaver, 2021), as economic development has been associated with a decline in patrilocal traditions of old age support.

This paper brings together two largely distinct literatures. First, we contribute to the literature on migration costs and the drivers of the inefficient allocation of labor across space (Gollin et al., 2014; Bryan and Morten, 2019; Bryan et al., 2014; Meghir et al., 2022; De Janvry et al., 2015; Kone et al., 2018) and particularly the literature emphasizing how migration interacts with informal social insurance (Munshi and Rosenzweig, 2016). We contribute to this literature by identifying a new friction that reduces migration – parents' need for old age support in settings with limited formal social insurance – and showing how a cultural tradition can relax this friction.

Second, we contribute to a growing literature that recognizes the importance of

culture for economic outcomes (Fernández, 2011; Fernández and Fogli, 2009) and shows that taking into account the cultural environment is critical for understanding the effects of both economic shocks and policies (Ashraf et al., 2020; Corno et al., 2020; Bau, 2021; Dahl et al., 2020; La Ferrara and Milazzo, 2017). Here, we show that the effects of road construction programs on migration in India depend critically on underlying cultural traditions.

Finally, in addition, we contribute to a large literature on the economic effects of dowry. Dowry payments have been shown to affect a range of outcomes, including intimate partner violence (Bloch and Rao, 2002; Calvi et al., 2021), resource sharing within the household (Calvi and Keskar, 2021), female neonatal and infant mortality (Bhalotra et al., 2020), savings behavior (Anukriti et al., 2022), and sex selection (Borker et al., 2017). We expand this literature, building on past theoretical work on property rights over dowry (Anderson and Bidner, 2015), to evaluate how dowry can play a role as an intergenerational transfer that promotes migration.

2 Background on Marriage Traditions in India

Historically, a variety of marriage traditions have co-existed in India across different groups. The *Law Code of Manu*, an authoritative and well-known legal text from ancient India, describes eight different marriage rites, which include both dowry (a more acceptable form for the higher castes) and bride wealth (payments from the groom's side of the family), as well as free romantic union, abduction, and seduction. Consistent with this, Chiplunkar and Weaver (2021) find that in the period from 1915 (the earliest year for which they have data) to 1930, less than 40% of marriages included dowry payments. This also matches the 1911 Census of India report, which documents a wide variety of marriage practices in India, including both dowry and bride price (Gait et al., 1913).

Anthropologists suggest that traditionally dowry was a bequest to the bride. Thus, women received their inheritance from their parents at the time of marriage while men received it at the time of their parents' death. Botticini and Siow (2003) show that this arrangement has advantages in patrilocal societies like India, where sons remain with parents, work the family farm, and care for parents in their old age. This is because bequests via dowry mitigate free-riding that would otherwise occur if a daughter inherited part of the returns to her brother's effort at the time of their

parents' deaths.

In modern India, the practice of dowry appears to have changed greatly relative to the traditional practice in two ways. First, both quantitative and qualitative sources suggest that the prevalence of the practice has dramatically increased. Chiplunkar and Weaver (2021) show that from between 1935 and 1975, the share of marriages with dowry increased from about 40% to close to 90%. Since then, the popularity of the practice has plateaued, so that it is now nearly universal. Similarly, a detailed report by AIDWA (2003) on the *Expanding Dimensions of Dowry* observes that, "Dowry is a Brahmic custom which today has spread to all sections of society" (p. 69).

Second, while prior to this paper, we are not aware of any *quantitative* evidence on property rights over dowry in India, qualitative evidence suggests that even if dowry originated as a bequest to the bride, brides' have limited property rights today. Even as early as the 1970s, Goody and Tambiah (1973) observed, "It cannot be denied that the normative... notion of dowry may in the face of contemporary developments.. show a shift whereby it may amount to a 'sale' of a son in marriage... This is an instance where modernization... may distort a traditional arrangement rather than eradicate it" (p. 63). Similarly, AIDWA (2003) writes, "Nor is the identification of dowry with pre-mortem inheritance given to a daughter and her bride groom satisfactory today" (p. 12) and further asserts that in Bihar, for example, "The majority of women do not have control over even their own jewelry" (p. 91). These qualitative patterns match the theoretical insights of Anderson and Bidner (2015), who show that economic development can cause the bride's parents to reallocate property rights to the groom to attract higher quality grooms for their daughters.

Understanding the modern practice of dowry is further complicated by the fact that marriage transactions are more complex than simply payments from the bride's side to the groom's side or vice versa.[2] The qualitative literature does not just note that the groom's side has meaningful property rights over dowry today but also that groom's parents may be capturing some or all of the dowry. AIDWA (2003) observes that for groom's parents, dowry can be an "avenue for acquisition of consumer goodies and wealth and control over the future support of earning children" (p. 19). This observation captures the exact mechanism we study in this paper – that modern

[2]As Goody and Tambiah (1973) observe, "Transactions in the same direction may be destined for different social persons" (p. 6).

dowry can sometimes become a form of financial old-age support for grooms' parents.

3 Theoretical Framework

We begin by outlining a simple model to explain the relationship between dowry, intra-household income sharing and migration. The model will provide us with testable predictions that we will bring to the data.

3.1 Setup

We model parents and sons as making collective household choices (Chiappori, 1988) over migration and optimal resource sharing. The household, after a son's marriage, decides whether the son should migrate and chooses the flow of transfers between parents and children by optimizing the weighted sum of their utilities. Parents earn income y_P and sons earn income y_K. Sons are heterogeneous in their earnings and the return to migration, R, received when $m = 1$. Migration introduces a friction that make the implementation of optimal collective decisions insecure.

As this is not primarily a model of marriage market matching, we use a simple framework to characterize the matching process. Utility is transferable between husband and wife, and we assume non-consumption utility (e.g., production of children) creates positive assortative matching between the son's expected earnings and bride's endowment, E (Andrew and Adams-Prassl, 2021). The bride's endowment is liquid at the time of marriage if there is dowry ($d = 1$) and illiquid otherwise. Brides' families are unable to discern family dynamics in terms of likely transfer flows, and so can only match based on the groom's earning potential.

There are two types of transfers that can be made between sons and parents. The first transfer, τ, is made at the time of marriage and can be either negative—up to the parents' income—or positive—up to the liquid portion of the son's bride's endowment (the dowry, if in a dowry environment). Because this decision occurs before the son starts working, he cannot transfer from his income.

The second transfer, α, is from the son's income to the parents and is always weakly positive, since parents' income is fully liquid, and thus they make optimal transfers through τ. If the son migrates, such a transfer becomes impossible (baseline model) or may only occur with some probability (extension).

3.2 Household Choices of Migration and Intergenerational Transfers

The household chooses marriage transfer τ, son's transfer α, and migration status m to solve:

$$\begin{aligned} V = \max_{\substack{\alpha \geq 0, \tau \leq dE, \\ m \in \{0,1\}}} \quad & \theta \ln(c_P) + (1-\theta)\ln(c_K) \\ \text{s.t. } & c_P \leq y_P + \tau + \alpha(1-m) \\ & c_K \leq y_K + Rm + E - \tau - \alpha(1-m) \ , \end{aligned}$$

where y_P and y_K are the incomes of P(arent) and K(id) respectively, θ is the Pareto weight of the parent, α is the transfer from the son to the parent, m is a migration dummy, and R is the (net) return to migration. Households can be heterogeneous in parents' income y_P, son's income y_K, return to migration R, and wife's endowment amount E. The return to migration R is distributed according to a continuous and unimodal distribution, with c.d.f. F and p.d.f. f.

For simplicity, define $Y = y_K + y_P + E$ as total household resources without migration.

If $m = 1$, α is restricted to be 0. In subsection 3.3, we consider an extension in which remittances in case of migration are possible, but there is a positive probability that they may not occur.

3.2.1 Solution: Transfer Choices and Allocations

At the optimum, the household seeks to equalize the Pareto-weighted marginal utility of consumption of each party. Thus, the first order condition with respect to τ will set the optimal value of τ as a function of α and m:

$$\tau^* = \theta(y_K + Rm + E) - (1-\theta)y_P - (1-m)\alpha. \tag{1}$$

We first consider the case of no migration ($m = 0$). In this case, transfers happen through the combined $\tau + \alpha$ with

$$\tau^* + \alpha^* = \theta(y_K + E) - (1-\theta)y_P.$$

Hence, the sharing of the dowry is undetermined in this case. We will assume that parents will not take from the child's dowry if they are certain to be able to receive remittances.

Consumption is then equal to $c_P^* = \theta(Y)$ and $c_K^* = (1-\theta)(Y)$. Utility takes the value

$$V(m=0) = \theta ln(\theta(Y)) + (1-\theta) ln((1-\theta)(Y)) = \Theta + ln(Y) \ ,$$

where $\Theta \equiv \theta ln(\theta) + (1-\theta) ln(1-\theta)$.

In case of migration ($m=1$), remittances are no longer possible. Hence, $\alpha^* = 0$ and, from the first order conditions on τ we have that

$$\tau^* = min\{\theta(y_K + R + E) - (1-\theta)y_P, dE\}. \tag{2}$$

Given the above equation, the first three predictions follow directly:

Prediction 1 *Some parents will give on net while others will take (τ can be positive or negative).*

Prediction 2 *The amount taken by parents (τ) will be on average higher when sons migrate.*

Prediction 3 *When sons migrate, holding parental wealth constant, τ is weakly increasing in son's income and increasing in parental Pareto weight, θ.*

Allocations depend on whether the constraint on τ binds or not. It binds when $y_p + dE \leq \theta(y_p + y_k + E)$, hence when the parent's own income plus the share of dowry they can receive is less than their first-best consumption allocation, which is equal to a fraction θ of aggregate resources.

If the constraint does not bind,

$$\tau^* = \theta(y_K + R + E) - (1-\theta)y_P.$$

Consumption is then equal to $c_P^* = \theta(Y+R)$ and $c_K^* = (1-\theta)(Y+R)$. Utility takes the value

$$V(m=1) = \theta ln(\theta(Y+R)) + (1-\theta) ln((1-\theta)(Y+R)) = \Theta + ln(Y+R)$$

If the constraint binds, $\tau^* = dE$. Consumption is then equal to $c_P^* = y_P + dE$ and $c_K^* = y_K + R + (1-d)E$. Utility takes the value

$$V(m=1) = \theta ln(y_P + dE) + (1-\theta) ln(y_K + R + (1-d)E).$$

3.2.2 Solution: Migration Decision

In terms of the migration decision, there are two key types of households: those for whom the constraint on τ is not binding when $R = 0$, and those for whom the constraint on τ binds. If the constraint on τ does not bind, parents would not require a transfer from earnings when the return from migration is minimal. We will call these parents "satisfied." When the constraint binds, parents require a transfer out of sons' earnings to support their consumption allocation, and thus their consumption falls when sons migrate. We will call these parents "seeking."

Note, the reason parents may be "seeking" or "satisfied" can vary: it can be due to the intergenerational trajectory of earnings, parental altruism and thus the Pareto weight placed on sons, or the sufficiency of the liquid portion of dowry to meet parents' needs.

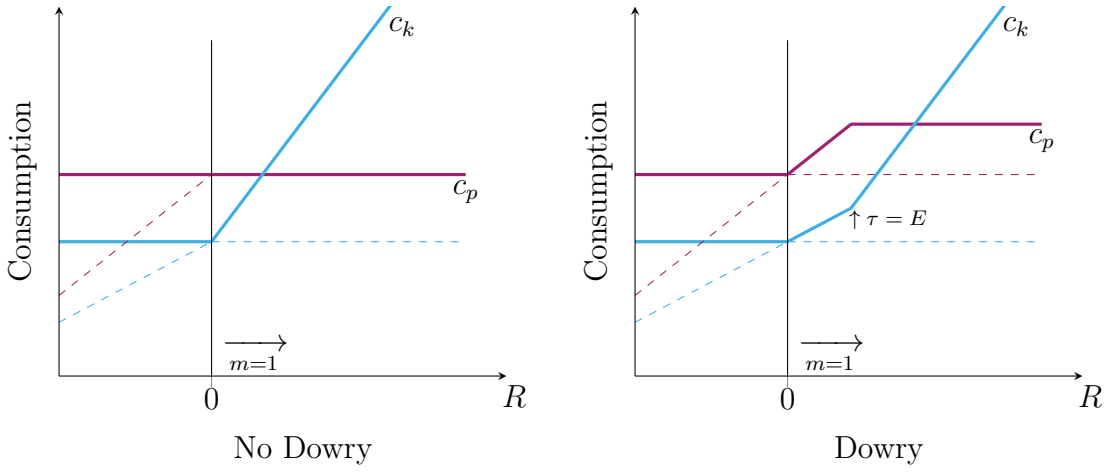
We examine the migration decision in those two cases with and without dowry.

Satisfied Parents Satisfied parents are able to meet their consumption target without income sharing from the son. This means the son is the initial claimant on the returns to migration. Thus, the family's utility will strictly increase with migration whenever $R > 0$, as illustrated in Figure 1 (this case is illustrated where the parent transfers exactly zero, and thus migration is Pareto improving by increasing the son's consumption without reducing the parents').

With dowry, the son is simply better able to share the returns to migration. As the son's return increases, first the portion of dowry taken will increase, up to dE, and then the son will be constrained from transferring more, and thus be the full claimant on additional returns. Migration will occur at $R = 0$ for households with satisfied parents.

Seeking Parents By definition, these parents expect to receive a positive α without migration. Because migration restricts α to 0, these households will require a higher return to choose migration because migration carries the additional cost of skewing

Figure 1: Consumption Allocations for Satisfied Parents



Note: Figure depicts the consumption of "satisfied" parents and their sons over the range of migration returns R. The left panel shows the allocations for households in non-dowry regions, and the right panel for dowry regions. c_P is parents' consumption and c_K is son's. Migration, $m = 1$ occurs in either case for returns above $R = 0$. Dotted lines to the left of this threshold indicate consumption levels if migration were to occur, and to the right if migration were foregone.

the intra-household allocation away from what is optimal. The migration decision will depend on when the Pareto-weighted returns to the son outweigh the cost of skewing the intra-household allocation.

Migration will require R is sufficiently high to satisfy:

$$\theta ln\left(y_P + dE\right) + (1-\theta) ln\left(y_K + R + (1-d)E\right) > \Theta + ln(Y). \tag{3}$$

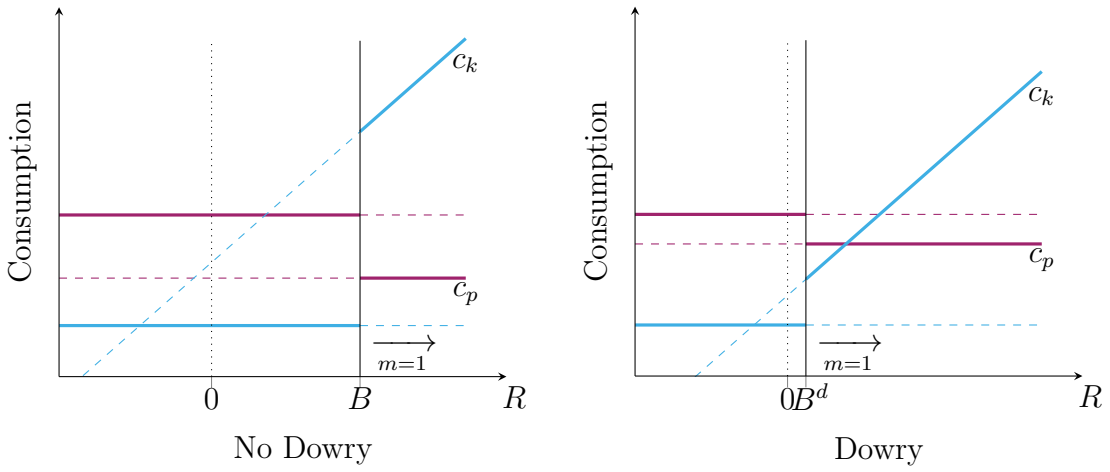
We define as B the smallest level of return to migration that satisfies the above inequality and, hence, justifies migration. This means that sons of seeking parents migrate if and only if $R > B$, where

$$B = (1-\theta)Y\left(\frac{\theta Y}{y_P + dE}\right)^{\frac{\theta}{1-\theta}} - y_K - (1-d)E.$$

This solution is illustrated in Figure 2. B^d is strictly smaller than B whenever households are seeking.

The intuition is that having dowry slackens the constraint on migration for seeking parents by allowing τ to increase parental consumption in the case of migration closer to the efficient allocation, thus creating a lower bar for the return required for the household to choose migration. The existence of dowry can also move households

Figure 2: Consumption Allocations for Seeking Parents



Note: Figure depicts the consumption of "seeking" parents and their sons over the range of migration return R. The left panel shows the allocations for households in non-dowry regions, and the right panel for dowry regions. c_P is parents' consumption and c_K is son's. Migration, $m = 1$ occurs without dowry when net returns are above B, and with dowry when net returns are above B^d. Dotted lines to the left of these thresholds indicate consumption levels if migration were to occur, and to the right if migration were foregone.

from the seeking to satisfied case.

3.3 Allowing for the Possibility of Remittances

We consider a case in which remittances are possible, but only with a fixed probability π. This extension is meant to capture the possibility of remittances with the risk that the a son may become estranged from the parents or experience costs in sending remittances that make remittances impossible.

$$V = \max_{\substack{\alpha \geq 0, \tau \leq dE, \\ m \in \{0,1\}}} \quad \theta E[\ln(c_P)] + (1-\theta)E[\ln(c_K)]$$

s.t. with probability π

$$c_P \leq y_P + \tau + \alpha(1-m)$$

$$c_K \leq y_K + Rm + E - \tau - \alpha(1-m)$$

with probability $1-\pi$

$$c_P \leq y_P + \tau + \alpha$$

$$c_K \leq y_K + Rm + E - \tau - \alpha$$

The value of migration when the constraint on τ is binding is now

$$V(m=1) = \Theta + \pi ln(Y+R) + (1-\pi)\left[\theta ln\left(\frac{y_P + dE}{\theta}\right) + (1-\theta) ln\left(\frac{y_K + R + (1-d)E}{1-\theta}\right)\right]$$

while the value of not migrating continues to be

$$V(m=0) = \Theta + ln(Y).$$

In this modified version of the model, the frictions are attenuated by the possibility of remittances. Nevertheless, as long as $\pi < 1$, dowry will continue to play the same qualitative role as in the absence of remittances.

This extension to the model also delivers a simple prediction about the relationship between net taking of parents and remittances. Because remittances are sent by sons when the consumption of their parents is too low relative to the first-best, they occur among households in which the groom's parents are net takers. In contrast, households in which parents are not net takers are those in which parents do not expect transfers from sons.

Prediction 4 *Parents who receive remittances from their migrant sons are more likely to be net takers of dowry than net givers.*

3.4 Effect of Dowry on Migration and Effect of GQ on Migration by Dowry

Prediction 5 *Families that practice dowry have a higher probability of having a migrant son.*

See Appendix A.1 for proof. The intuition for the proof is that dowry will move some households into the "satisfied" case where the required return to choose migration is zero, and will reduce the excess return required for households who remain in the "seeking" case by ameliorating the distortion in optimal consumption allocation induced by migration.

Because migration rates are different *ceteris paribus* in the presence or in the absence of dowry, we expect that reducing the cost of migration may also lead to a different response of migration depending on the presence of dowry. In particular, the density of the distribution of returns to migration may be different around different thresholds, and hence give rise to different elasticities. When migration rates are relatively low, i.e. when the man with the modal return to migration does not migrate, a decline in the cost of migration, like the one that can be generated by road construction, leads relatively more sons to migrate in cases where the baseline levels of migration are higher (dowry societies) than where they are lower (other societies).[3] This result relies on the single-peak assumption on the distribution of R.

Prediction 6 *As long as migration rates are relatively low, a decline in the cost of migration will raise the probability of migration more in the presence of dowry than without dowry.*

See Appendix A.2 for proof.

4 New Data Collection & Tests of Predictions 1–4

To test the first four predictions of the model, we collected two original, distinct survey data sets on what gifts were given at the time of the wedding and who benefited from those gifts. While other data sets have collected information on the size of

[3] A similar argument is used in Ashraf et al. (2020) for examining heterogeneity in the response of education to school construction.

dowry payments, these are the first data to our knowledge to measure how the dowry is eventually allocated across individuals. Motivated by the connection between migration and property rights over dowry in the model, we collected survey data from both a major migration destination and from origin villages distributed throughout Northern India. We describe each below. Collecting the former data allowed us to obtain detailed data through in-person interviews with young or middle-aged men. The latter data set, which was collected over the phone from parents of adult sons, sacrificed some of this detail, but has the key advantage of allowing us to compare migrants to non-migrants from the same origin locations.

4.1 Destination Survey

The 'Destination Survey' data was collected through in-person surveys of migrants and locals in Gurugram (a city just outside of Delhi, which is known as a technical and financial hub) in 2018. We chose Gurugram because Delhi is one of largest migration destinations in India (and has the highest fraction of migrants to native-born of any Indian city) and Gurugram in particular has many employment opportunities that may attract migrants.[4] The sample was stratified to consist of roughly 80% migrants and 20% locals. This allows for a comparison between migrants and non-migrants, with the caveat that migrants and non-migrants are likely to differ in other respects.

We surveyed 557 men (out of which 84% were migrants from 185 districts across 21 states) between the ages of 21 and 41. After collecting basic demographic information and details about their (and their parents') income and education, we asked for a detailed account of gifts that were transferred between the groom's side and the bride's side at the time of their wedding. For each category of gifts (e.g. jewelry, utensils, clothing, etc.), we asked who gave and who received the gift as well as who had 'ownership rights' over it. Using this ownership breakdown, we were able to calculate the value of the gifts that were given and owned by the groom's parents (as well as those given and owned by bride's parents, bride, and groom). Thus, we can calculate one of our key measures, net transfers to the groom's parents from the marriage, as the sum of the gross transfers from the bride's parents to the groom's parents and the gross transfer from the groom's parents to themselves (wedding gifts they eventually kept) net the groom's parents' transfer to the other parties. We

[4]According to the 2011 Census of India, Delhi had the second largest number of migrants after Mumbai but had the highest immigrant population share.

consider groom's parents "net-takers" if this net transfer is positive, and "net givers" if it is negative. Finally, we also asked about financial assistance given to/received from parents, as well as co-residence patterns with parents. Table 1 reports summary statistics from these data.

Table 1: Summary Statistics: Destination Survey

	Mean	SD	Obs
Son's Age	30.08	5.17	557
Son's Years of Education	12.26	3.66	557
Son's Monthly Income	21,197	24,035	557
Ln(Son's Occupation Score)	8.96	0.69	506
Ln(Father's Occupation Score)	8.57	0.42	498
Total Dowry	202,866	269,894	557
Share of Net Takers	0.45	0.50	557
Share of Migrants	0.65	0.48	557

Notes: This table shows summary statistics for variables of interest in the Destination Survey conducted in 2018. Income and dowry are in Rupees. The occupation scores are the median monthly earnings of a certain occupation created by mapping our occupational categories to data from the NSS. 'Net Takers' are defined as parents who had a positive net transfer with the bride's parents. Migrants here are defined to be non-coresidents.

4.2 Origin Survey

The 'Origin Survey' data were collected through phone surveys in 34 districts located across 6 North Indian states (Rajasthan, Uttar Pradesh, Bihar, Jharkhand, Madhya Pradesh, and Maharashtra) in 2020 in partnership with IDinsight (IDI), a global advisory and data analytics research organization. The set of households contacted was drawn from a pre-existing roster of household members who IDI had surveyed in-person for previous projects. These households were identified via voter rolls and community health worker registers. The voter rolls are representative of the population and compare well with averages from census and survey data (Joshi et al., 2020).

We surveyed a total of 2,541 households. Due to our interest in migration and dowry, we restricted our survey sample to households where the household head had a married son. Since households resist taking part in surveys with a duration greater than 20 minutes over the phone, we randomly sampled one married son and asked the head about that son's dowry and migration behavior.[5] After completing this module,

[5]Providing incentives for survey participation in India is challenging because mobile money is not

Table 2: Summary Statistics: Origin Survey

	Mean	SD	Obs
Son's Age	29.28	6.81	3,050
Son's Years of Education	8.61	4.51	2,832
Son's Monthly Income	7,097	10,760	2,354
Parents Monthly Income	6,387	12,611	3,068
Ln(Son's Occupation Score)	8.49	0.34	2,216
Ln(Father's Occupation Score)	8.39	0.35	2,160
Total Dowry	77,993	650,390	2,138
Share of Net Takers	0.29	0.45	1,704
Share of Migrant Sons	0.20	0.40	3,066

Notes: This table shows summary statistics for variables of interest in the Origin Survey. Income and dowry are in Rupees. The occupation scores are the median monthly earnings of a certain occupation created by mapping our occupational categories to data from the NSS. 'Net Takers' are defined as parents who had a positive net transfer with the bride's parents.

we then asked the respondent if they would be willing to complete the module for a second son. This allowed us to collect data on 3,069 sons, 20% of whom were migrants. For the selected son, we asked the parents about the gifts transferred at the time of their son's marriage. By asking them how much of each category they owned, we were able to get an estimate of the groom's parents ownership of gifts as reported by the parents themselves, complementing the 'Destination Survey.' Due to the limited time to conduct the survey, we also directly asked respondents to estimate the size of gifts they gave to the couple and the gifts they had kept. The net transfer to the groom's family is then calculated as the difference between these two values. Alongside asking about gifts, we also collected demographic details of the head, information about their son's income and education, and financial assistance given to/received from their son. Table 2 reports summary statistics for these data.

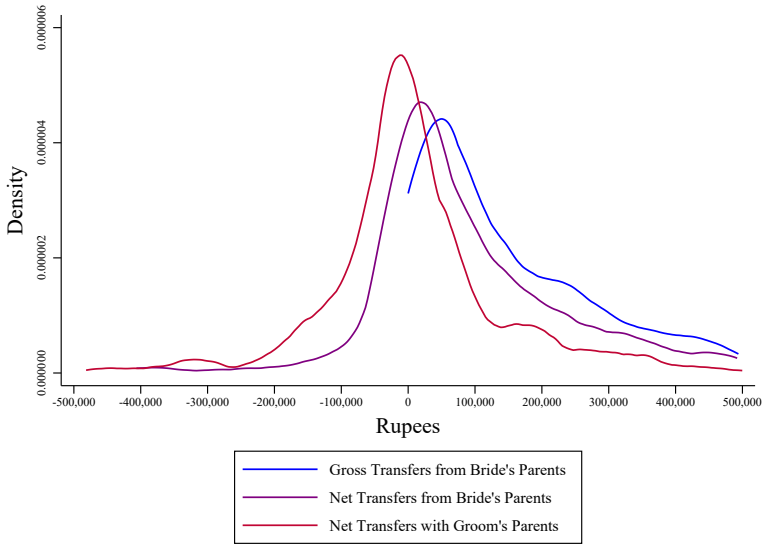
Notably, these two surveys collect data on dowry and transfers of the marriage gifts in different ways and from different family members. Thus, it will be reassuring if we see similar patterns across data sets that the results are not driven by measurement issues or systematic biases from specific types of survey respondents.

widespread and most households have monthly, unlimited cell phone bundles, reducing the value of offering households extra data or cell phone minutes.

4.3 Empirical Tests of Predictions 1 – 4

We see evidence in favor of Prediction 1 in both datasets. In the Destination Data, 45% of parents take from the dowry on net (Table 1). In the Origin Data, 29% of the groom's parents take on net (Table 2). Furthermore, Figure 3 uses the Destination Survey data to plot the inverse hyperbolic sines of the gross transfer from bride's parents and the net transfer from bride's parents (two commonly-collected dowry measures) against the net transfer to the groom's parents. Gross dowry is highest and universally positive, while net dowry is lower, with some negative mass, and centered above zero. The net amount taken by groom's parents, however, is approximately centered at zero, with mass on both sides, indicating that some groom's parents on net endow their sons with resources, rather than benefiting from the dowry.

Figure 3: Distribution of Gross and Net Transfers in the Destination Survey



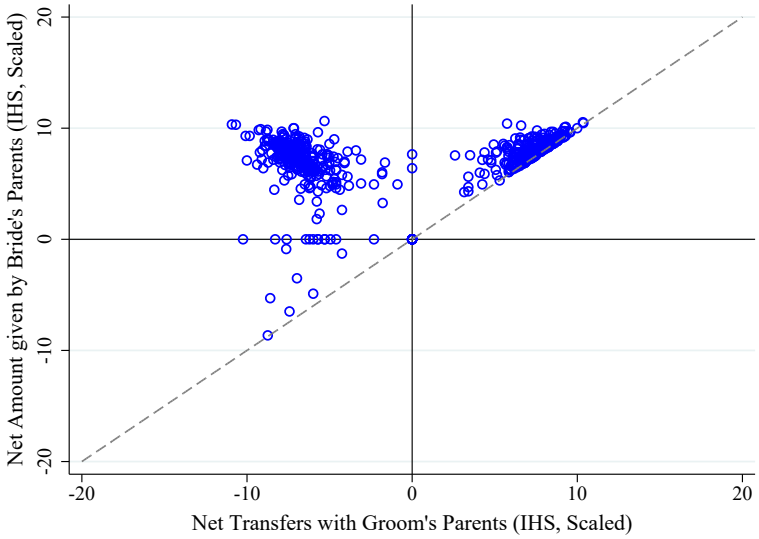
This figure shows the distribution of three different measures of dowry payments (gross transfer from bride's parents, net transfer from bride's parents, and net transfer to the groom's parents) in the 2018 destination survey. All values are coded so that transfers in the direction of the groom's parents are positive and away from the groom's parents are negative.

In addition to confirming prediction 1, this figure reveals an important fact about dowry from our new data. The "net dowry" measure often used in the literature does not correspond to the "net groom's parents' benefit." While much of the literature on measuring dowry has focused on the distinction between gross and net dowry measures (e.g., Edlund (2006)), our results indicate that both measures do not capture the

internal allocation of resources within the groom's family. This figure suggests that data on property rights over dowry are needed to understand dowry's implications for consumption across generations.

Finally, in Figure 4, using the Destination Data, we plot the inverse hyperbolic sines of the net amount given by the bride's side against the net transfers from the groom's parents. We again see that roughly half of parents give among groom's parents, while the other half take. For parents who take, the amount taken is increasing in the size of the transfer from the bride's household. For parents who give, the groom's parents actually give the couple more when the bride's parents give more. Reassuringly, there are very few "bride price" households: almost no respondents report that the bride's parents were made better off by the marriage.

Figure 4: Distribution of Net Transfers



This figure shows the relationship between the inverse hyperbolic sine of the net amount (in rupees) given by the bride's parents and transfers with the groom's parents in the 2018 destination survey.

Prediction 2 We evaluate this prediction in columns 1 (Origin Survey) and 3 (Destination Survey) of Table 3. In these columns, we regress an indicator variable for whether the groom's parents took on net from the dowry on an indicator variable for whether the son is a migrant. We additionally control for whether the son currently co-resides with parents. The omitted category is therefore sons that remain

Table 3: Migration, Socioeconomic Status, and Net Taking Behavior

	Dep. Var.: Parents are Net Takers			
	Origin Survey:		Destination Survey:	
	(1)	(2)	(3)	(4)
Migrant Son	0.071*	-0.010	0.413***	0.361***
	(0.039)	(0.059)	(0.062)	(0.058)
Coresident	0.097***	0.097**	0.414***	0.358***
	(0.032)	(0.038)	(0.070)	(0.067)
Ln(Son Occ Score)		0.017		
		(0.053)		
Migrant Son × Ln(Son Occ Score)		0.172*		
		(0.099)		
Ln(Father Occ Score)		-0.023		
		(0.041)		
Parents have veto power				0.295***
				(0.056)
Year of marriage fixed effects	Yes	Yes	Yes	Yes
Education dummies	Yes	No	Yes	Yes
Mean of dependent variable	0.293	0.293	0.447	0.449
Adjusted R-squared	0.004	0.000	0.007	0.047
Observations	1698	1174	557	552

Notes: This table reports the relationship between migration, socioeconomic status and net-taking behaviour in both the origin survey (columns (1) & (2)) and the destination survey (columns (3) & (4)). The outcome is an indicator variable for whether the parents are net takers (i.e. those who had a positive net transfer with the bride's parents). Migrant sons are defined to be non co-resident migrants. The occupation scores are the median monthly earnings of a certain occupation created by mapping our occupational categories to data from the NSS. Parents have veto power if their son wouldn't have married without their consent. Standard errors are clustered at the household level for the origin survey. *,**, and *** denote 10, 5, and 1% significance respectively.

in the same village/city as their parents but do not co-reside.[6] Consistent with the model's prediction, parents of migrants are 7 percentage points more likely to take in the Origin Survey and 41 percentage points more likely to take in the Destination Survey. We do note that the coefficient on co-resident is also positive, but this may arise because property rights over parts of the dowry (which includes household items such as furniture and kitchen utensils) may be hard to define in cases where sons and parents are co-resident.

[6]We note that, consistent with the small size of the Destination Survey, and the fact that migrants to Delhi were sampled at a 4 to 1 ratio to non-migrants, this omitted category in the Destination Survey is small, containing 12 respondents.

Prediction 3 To test the first part of this prediction, we exploit the fact that our Origin Survey collected information on both father's and son's occupations. To convert this information into occupational scores, we match occupational information to the nationally representative National Sample Survey (round 68, conducted in 2011-2012); the occupational score is then the median monthly earnings of the occupation. Column 2 of Table 3 tests whether, conditional on the father's occupational score, parents are more likely to take when migrant sons have higher occupational scores. This is exactly the case. There is a large and marginally statistically significant interaction between the son's occupational score and migrating. For migrants, a 100% increase in the son's occupational score increases the likelihood of parents taking by 17 percentage points. In contrast, for non-migrant sons, the son's occupational score has no predictive power for taking.

Column 4 of Table 3 tests the second part of Prediction 3. To proxy for the parents' θ, we exploit the following question from the Destination Survey: *"If your parents had not have approved of the marriage, how much would that have affected your decision?"* We interpret parents as having a higher Pareto weight θ when sons report that they would not marry. Thus, we expect that parents will be more likely to take when sons report that parents have veto power. This is indeed the case: when sons report parents have veto power, parents are 30 percentage points more likely to be net takers.

Prediction 4 The origin survey contains information about transfers received by the parents from sons and viceversa. To test prediction 4, we construct a dummy variable that captures whether a son made net financial transfers to the parents in the year prior to the survey (before the COVID-19 pandemic). Overall, 30% of sons transfer on net to their parents (45% for migrant sons). We relate this variable to net taking behavior and find a strong positive relationship between net taking of the dowry by parents and the fact that they receive remittances from their migrant sons (table 4).

5 Predictions 5–6: Evidence on Migration

In this section, we directly test the predictions of the model concerning dowry's role in enabling migration. These predictions are important for understanding the

Table 4: Parental dowry taking and net transfers to parents

	(1) Net taker	(2) Net taker	(3) Net taker	(4) Net taker
Son tranfers	0.047	0.006	0.032	-0.016
	(0.031)	(0.035)	(0.031)	(0.035)
Migrant Son		-0.086*		-0.086**
		(0.044)		(0.043)
Son tranfers × Migrant Son		0.196***		0.222***
		(0.075)		(0.073)
Year of marriage dummies	Yes	Yes	Yes	Yes
Education dummies	Yes	Yes	Yes	Yes
Dowry and assets controls	No	No	Yes	Yes
Mean of dependent variable	0.287	0.287	0.289	0.289
Adjusted R-squared	0.001	0.006	0.135	0.141
Observations	1054	1054	949	949

Notes: Data from origin survey. 'Net Takers' are defined as parents who had a positive net transfer with the bride's parents.

dowry tradition's aggregate effects and whether dowry can help facilitate structural change. To do so, we first introduce three new data sources.

5.1 Variation in Historical Dowry Traditions

Testing predictions 5–6 requires a source of variation in the strength of dowry traditions. For this variation, we draw on geographic variation in the extent that dowry was traditionally practiced in India. As long as places that traditionally practiced dowry still have higher dowries today (e.g., because cultural change is slow and dowry payments are somewhat path dependent), we should expect households in these places to behave more like the "dowry" households in the model relative to individuals from places with less of a strong history of dowry traditions. Furthermore, an advantage of using this variation is that it predates the large changes in India that have accompanied economic development and which may affect both migration and dowry payments.

We use the *Ancestral Characteristics* data developed by Giuliano and Nunn (2018) to create a district-level measure of the strength of dowry traditions. The *Ancestral Characteristics* data combine ethnicity-level anthropological data (predominantly

from the *Ethnographic Atlas* (Murdock, 1967)) with maps of the current distribution of 7,500 language groups from the *Ethnologue* (Gordon Jr, 2009). After mapping the language groups in the *Ethnologue* to the *Ethnographic Atlas* (and other anthropological sources), Giuliano and Nunn (2018) calculated the weighted average of each traditional cultural trait among the population in an area by averaging over the population-weighted current language polygons, using weights from the 2007 Landscan population data. As the public version of the data made available by Giuliano and Nunn (2018) calculates trait averages at the state-level for India, we follow Giuliano and Nunn's methodology but recalculate trait values at the district-level.

Figure 5 reports the district-level share of the population with traditional dowry according to this measure. The strength of dowry traditions varies within broad regions, and is frequently 0, meaning there is no linguistic group connected to an ancestral group that practiced dowry, but can also take very high values. Thus, for a district-level, discrete dowry measure, we code districts as having historical dowry if more than 0.1% of the population traditionally practiced dowry (214 districts out of 582).

This map may be surprising for two reasons. First, it suggests a relatively low prevalence of dowry, even though dowry is nearly universal today. This is because our measure is based on historical practices, in most cases prior to contact with the British. As Section 2 discusses, historically dowry *was* far from universal and a variety of marriage traditions were practiced in India. Thus, some areas that are coded as having no dowry traditionally may have experienced rapid increases in dowry's prevalence in recent decades. This appears to be the case, for example, in Kerala: "The dowry system is not general everywhere in Kerala. In Palghat and Trivandrum districts it has become common, Nayars having taken the cue from Christians and Tamil Brahmins, among whom the dowry system was well entrenched" (Puthenkalam, 1977); and in Madhya Pradesh: "until 15 years earlier, the demand for dowry was very limited" (AIDWA, 2003, p. 135).

Second, the geographic regions with higher rates of dowry may not align with contemporary impressions about the status of women in different states. To address this concern, we validated the ancestral measures using two tools: (1) Yale's *Human Relations Area Files* (HRAF) database of ethnographic studies, and (2) two summary publications on dowry practices, Goody and Tambiah (1973) and AIDWA (2003). Both AIDWA (2003) and Goody and Tambiah (1973) are consistent with the greater

prevalence of dowry in the South (relative to the North) seen in the figure. AIDWA writes, "Thus in North India, unlike South India, land, territory, and productive assets were not usually given in dowry" (p. 16). Goody and Tambiah (1973) observe, "What I call 'indirect dowry' is more common in North India than in the South, where dowry proper... prevails" (p. 20).[7]

The underlying ethnographies by cultural group in the HRAF database further confirm the Giuliano and Nunn (2018) coding based on specific language groups. The states and territories that have high ancestral dowry, Andhra Pradesh, Assam, Punjab, Tamil Nadu, Telangana, West Bengal, and Ladakh, have large cultural groups that historically practiced dowry making up their present population.[8] The central Northern states that are coded, perhaps surprisingly, as having little ancestral dowry practice are home to ethnic groups that traditionally practiced bride price.[9]

Our next validation is to check if the ancestral data is predictive of contemporary practices. Because this variation is historical, it may not explain all or even most of the modern variation in dowry. Indeed, since dowry is widespread today, we use this measure as a source of intensive margin variation in dowry size rather than extensive margin variation in dowry prevalence. To verify that these data are indeed predictive of traditions today, despite any noise in the underlying anthropological data and the significant cultural change that has occurred since they were assembled, we validate the data against contemporary measures of dowry sizes. We use information on dowry payments from the large-scale 1999 round of the Rural Economic and Demographic Survey (REDS). An additional advantage of validating the measure in the 1999 REDS is that these data were collected right before the highway construction program whose differential effects in dowry vs. non-dowry districts will be used to test prediction 6 in section 5.5. In Table A1, we regress log gross and net dowry measures on the tradition measure.[10] Columns 1 and 2 show that the historical dowry measure is associated

[7]Here, "indirect dowry" refers to large expenditures on the wedding and jewelry for the bride by the groom's family, which would often be classified is bride price or bride wealth.

[8]Telugu in Andhra Pradesh and Telangana (Dube, 1955; Tapper, 1987), Bengali in West Bengal and Assam (Fruzzetti, 1982; Rohner et al., 1988; Roy, 1975), Punjabis in Punjab (Eglar, 1960; Honigmann, 1957), Tamil in Tamil Nadu (Beck, 1972; Dhanasekaran, 1965), and Tibetan in Ladakh (Hermanns and Sch¨tze, 1948; Rockhill, 1895).

[9]For example Bhil in Madyha Pradesh, Gujarat, Maharashta, and Rajasthan (Naik, 1956; Singha, 1987; Mann, 1985) and Gond in Madyha Pradesh and Maharashtra (Fuchs, 1960; Grigson and Elwin, 1949).

[10]We focus on log dowry measures because dowry values are extremely skewed, and intensive margin variation in dowry payments is likely to be most important as practicing any dowry is nearly

with a 112% (gross) to 116% (net) greater dowry payment. Columns 3 and 4 show that these relationships remain even after controlling for regional geographic variation via fixed effects for six geographic regions. Thus, the ethnographic data is predictive of modern dowry payments.

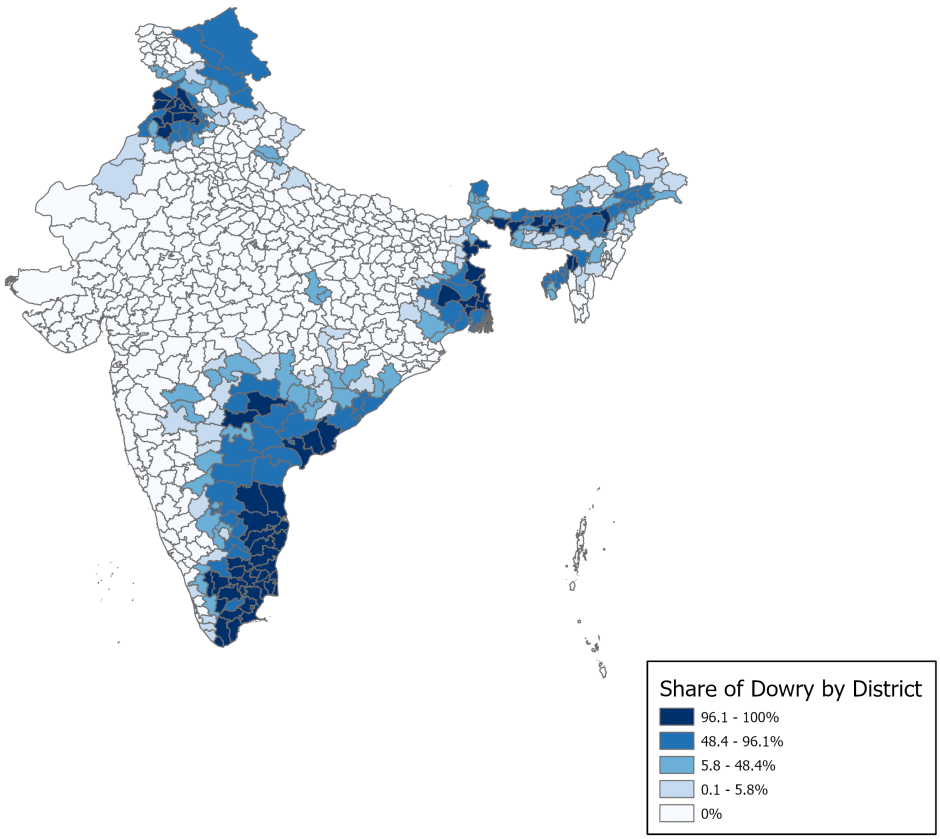
We now turn to a more geographically widespread dataset, the India Human Development Survey (IHDS), which allows us to also include state fixed effects. Here, we test if the traditional dowry measure is associated with whether dowry is frequently or ever paid in gold (a proxy for dowry size). The IHDS data confirm that the district-level traditional dowry measure is associated with a greater likelihood of having dowries paid in gold, even when controlling for state fixed effects.

5.2 National Sample Survey: Migration Module

We obtain nationally representative data on out-migration from a special module included in the 64th round (collected July 2007-June 2008) of India's National Sample Survey (NSS). All rounds of the Schedule 10 Survey of the NSS ask detailed questions about employment and education for current household members. However, the 64th round also asks an extensive set of migration related questions. A respondent lists all family members who have migrated and provides demographic details about the migrant, as well as the reason for migration, and the year of migration. Table 5 reports summary statistics for dowry vs. non-dowry districts for males from these data. There is some suggestive evidence in line with prediction 4: the male out-migration rate is 1 percentage point (or 5%) higher in dowry districts than non-dowry districts. Otherwise, households are mostly comparable in terms of socioeconomic status across dowry and non-dowry districts. The rate of household head primary completion is identical (57%), and household monthly per capita expenditures are very similar (4,630 Rupees in dowry districts vs. 4,797 Rupees in now-dowry districts). The one exception is the share of households working in agriculture, which is higher in non-dowry districts, potentially consistent with the lower uptake of migration opportunities.

universal (Chiplunkar and Weaver, 2021).

Figure 5: Share of Population From Groups That Traditionally Practice Dowry by District



This figure shows the district-level share of the population with traditional dowry, created from the Ancestral Characteristics data developed by Giuliano and Nunn (2018).

5.3 The Golden Quadrilateral & North-South/East-West Highway Expansions

To test prediction 6, we exploit a reduction in the cost of migration due to the to the expansion of India's highway system. We study the construction of the Golden Quadrilateral (GQ) highway system, which connects the four nodal cities, as well as the North South-East West (NS-EW) system, which connected the corners of the GQ

Table 5: Summary Statistics for Males 25–55 in the 2007 National Sample Survey

	Mean	SD	Obs
Dowry Districts			
Ever Migrated	0.24	0.43	60,701
Head Completed Primary	0.57	0.50	60,685
Share of HH in Agriculture	0.36	0.48	60,701
Avg HH Monthly Per Capita Expen.	4,630	3,867	60,701
Non-Dowry Districts			
Ever Migrated	0.23	0.42	85,366
Head Completed Primary	0.57	0.50	85,340
Share of HH in Agriculture	0.41	0.49	85,366
Avg HH Monthly Per Capita Expen.	4,797	4,018	85,366

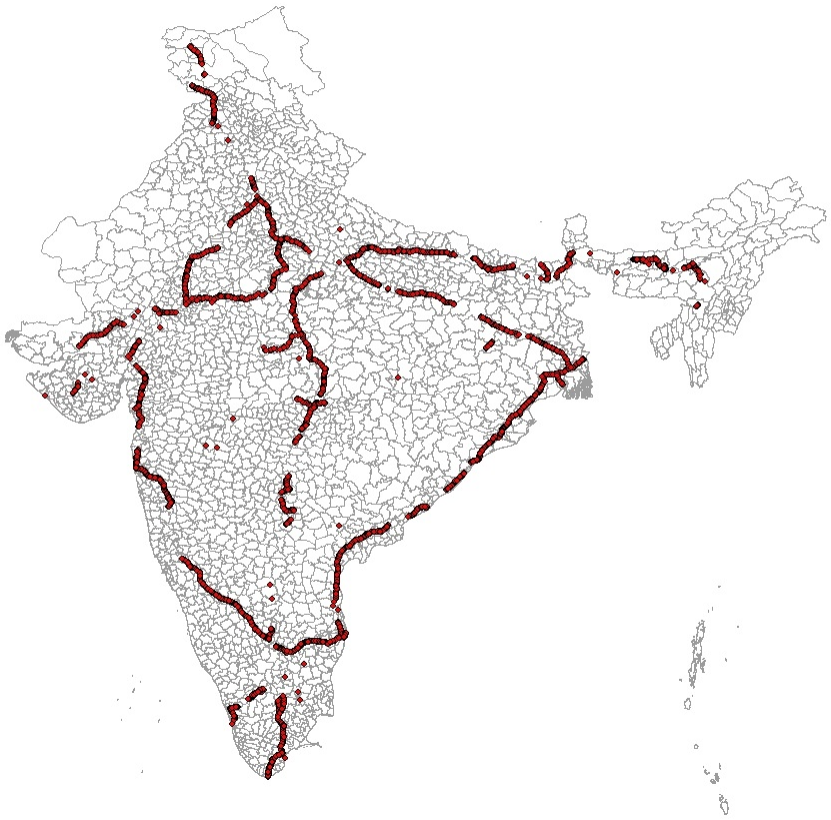
This table shows summary statistics for the NSS 2007, split into dowry and non-dowry districts. The sample is restricted to males aged 25–55 at the time of the survey. The out-migration variable is at the individual-level. The remaining variables are at the household-level (the NSS doesn't record education information for migrants).

through the interior.[11] Starting in 1999, these projects upgraded more than 5,846 km of already existing highways in India. The National Highway Development Project (NHDP) invested about US $71 billion to build roads, widen the national highways, and strengthen them for heavy traffic and truck transportation. Previous work shows how the expansion of the GQ affected firm distribution (Ghani et al., 2016), and better connections to large cities improved economic development (Alder, 2016) and welfare (Asturias et al., 2018).

The NHDP has publicly released a list of projects that were part of the construction of the GQ and the NS-EW corridor highways. We matched these projects to the CapEx data maintained by the Centre for Monitoring Indian Economy (CMIE), which includes detailed information on all infrastructure projects in India with a cost greater than 10 million Rupees (roughly 135,000 USD). By cross-referencing the NHDP list with CapEx, we can identify the completion year and district of each of these projects. Figure 6 plots the location of the full set of projects we identify.

[11] Three of the four cities (Mumbai, Kolkata and Chennai) were chosen to be capitals of the British Presidencies as they were natural harbors and could be used as ports for trade. There was little economic activity in these three regions prior to the British and not much of a pre-existing road network. The fourth (Delhi) was a major historical capital of various pre-Colonial empires and was a British cantonment during the Raj.

Figure 6: Map of GQ and NS-EW corridors



This figure shows the map of highways that make up the Golden Quadrilateral (GQ) and NS-EW corridors.

5.4 Prediction 5: Is Male Migration Higher from Dowry Districts?

We use the NSS data to test Prediction 5. In Table 6, using a sample of males born after 1945, we regress an indicator variable equal to 1 to if an individual had migrated by 2007 (the year the data were collected) on a continuous district-level traditional dowry measure (the share of the population belonging to groups with dowry traditions) and the discrete measure (an indicator variable equal to 1 if the continuous value is greater than 0.1%). We focus on males born after 1945 to limit selection due to mortality and poor recall regarding early migrants and because migration rates for those with earlier birth years are negligible. Columns (1) and (4) report the results without any controls. For both measures, there is a strong positive association be-

tween the dowry measure and male migration. Columns (2) and (5) further include state and year of birth fixed effects. Despite controlling for a substantial fraction of the geographic variation in dowry practices, the positive relationship remains (albeit no longer statistically significant for the discrete measure). Finally, in columns (3) and (6), we include additional geographic controls for the district centroid's latitude and longitude, as well as the distance to the coast. Including these additional controls also does not substantially reduce the point estimates. In Appendix Table A3, we also use the IHDS data to test this prediction. We show across different combinations of fixed effects and age groups, our results are again consistent with the prediction.

Table 6: Association Between Dowry Traditions and Male Migration

	Dep. Var.: Individual Migrated					
	(1)	(2)	(3)	(4)	(5)	(6)
Dowry (Continuous)	0.022***	0.029**	0.027*			
	(0.007)	(0.014)	(0.015)			
Dowry (Indicator)				0.018***	0.013	0.009
				(0.006)	(0.008)	(0.008)
State FE	N	Y	Y	N	Y	Y
Year of Birth FE	N	Y	Y	N	Y	Y
Distance Controls	N	N	Y	N	N	Y
Number of observations	329,424	329,422	329,422	329,424	329,422	329,422
Clusters	582	582	582	582	582	582
Adjusted R^2	0.001	0.098	0.098	0.001	0.098	0.098

Notes: This table reports the relationship between district-level dowry traditions from the Ancestral Characteristics data and male migration using data from the NSS Round 64 migration module. The outcome is an indicator variable for whether an individual migrated. The sample is restricted to males born after 1945. The continuous dowry measure is the share of a district's current population belonging to groups with dowry traditions. The discrete measure is an indicator variable equal to 1 if more than .1% of the district population belongs to groups with dowry traditions. Standard errors are clustered at the household level for the origin survey. *,**, and *** denote 10, 5, and 1% significance respectively.

5.5 Prediction 6: Do Males From Dowry Districts Migrate More in Response to Highway Construction?

Empirical Strategy Our empirical strategy exploits variation in the locations and staggered timing of the construction of highway segments combined with information on the timing of migration from the NSS to estimate the effect of highway construction on male out-migration in dowry vs. non-dowry districts. For our analysis, we transform our cross-sectional data set into a panel at the individual i, year t level for

the years between 1996 and 2007.[12] The transformed data allow for the estimation of the following, "naive" event study regression separately for individuals from dowry and non-dowry districts:

$$y_{ijdt} = \alpha_i + \theta_{jt} + \sum_s \beta_s GQ_{dts} + \epsilon_{ijdt}, \tag{4}$$

where y_{ijdt} is an indicator variable for whether individual i has migrated before year t, j denotes a state, α_i and θ_{jt} are individual and state-by-year fixed effects, and GQ_{dts} is an indicator variable equal to 1 if in year t a highway segment had been constructed s years ago in district d. This framework is therefore set up to control for any time-varying shocks at the state-level as well as any individual-level, time-invariant differences across groups.

However, this naive approach and its related difference-in-difference regression, which assumes a constant treatment effect across treated units over time, are problematic. A growing literature suggests that researchers must be cautious when estimating the effect of staggered treatments with two-way fixed effects (Goodman-Bacon, 2018; Callaway and Sant'Anna, 2020; Sun and Abraham, 2020; de Chaisemartin and D'Haultfuille, 2020). This literature shows that, in many instances, a traditional two-way fixed effects model does not recover easily interpretable estimates of the Average Treatment Effect (ATE) or the Treatment on the Treated (ATT). This is for at least two reasons. First, if effects evolve over time or are heterogeneous, previously treated units will form a bad control group for later treated units.[13] Second, the weighting of different treatment effects from different units will depend on the number of periods that a unit is observed as treated, so that the estimated treatment effect in the naive difference-in-differences regression depends on the timing of treatment.

To account for these issues, our empirical strategy utilizes the proposed solution of Borusyak et al. (2021), as their framework adheres most closely to our context.[14]

[12] Corno et al. (2020) use a similar approach to analyze the effects of rainfall shocks on child marriage in India and Sub-Saharan Africa.

[13] See Goodman-Bacon (2018) for a decomposition of how the traditional two-way fixed effects ATT is a weighted average of each of the 2x2 ATTs, which may lead to issues when previously treated groups are control groups for certain 2x2 comparisons. The paper also suggests diagnostic tests for when it is appropriate to use the traditional two-way fixed effects model.

[14] Another set of solutions suggested by Cengiz et al. (2019) in their Online Appendix D uses "stacked-events" when studying changes to the minimum wage. In our context (unlike the minimum wage), a unit is treated only once, and the units are treated in relatively short spans of time.

We estimate event studies with carefully chosen comparison units (for instance, previously treated units are never used as controls). Given the differential timing of our treatments, this implies that certain units will have more pre-treatment periods, where others will have more post-treatment outcome measures. Furthermore, we include the controls from the "naive" event study regression described above

Borusyak et al. (2021) employ an imputation-based approach, where they model the non-treated potential outcome using only the control group (in our application, the not-yet treated districts and the never treated districts) and extrapolate the non-treated outcome to impute the unobserved potential outcomes of treated units. They compute individual-level treatment effects for each observation using the imputed values, which are then aggregated to give the average effect for each event-time. Standard errors are clustered at the district level.

We focus on individuals' migration decisions between the years 1996 and 2007 (the last year data is available), though we exploit information on projects implemented as late as 2016 to estimate the pre-treatment effects of highway construction. For our main treatment effects, we focus on individuals who were between 15 and 30 at the time of the survey (2007). We view this as the group that is mostly intensively treated because those younger than 15 are more likely to be too young to respond, and the average male marriage age in India is 23. Thus, those up to 30 in 2007 would have still been around marriage age when the first GQ projects were built. Older men are likely to have already married, and allocation decisions over the dowry may be difficult to change ex-post due to the highway construction. Thus, we expect smaller effects (if any) among the older group.

Results Figure 7 reports the results using the methodology of Borusyak et al. (2021). Panel (a) reports the results for males who were 15–30 at the time of the survey (our intensively treated group), while Panel (b) reports the results for males who were 31–45 (the less intensively treated or placebo group). In both cases, zero is normalized to be the year of the first highway construction project in the district. Among the most intensively treated cohorts, there is little scope for pre-trends for dowry or non-dowry groups (Panel (a)). After the receipt of the first highway construction project, Panel (a) shows that there is a large and significant increase in out-migration for the youth in dowry regions, while the estimated effect on migration for non-dowry males is indistinguishable from zero. In contrast, there is no increase

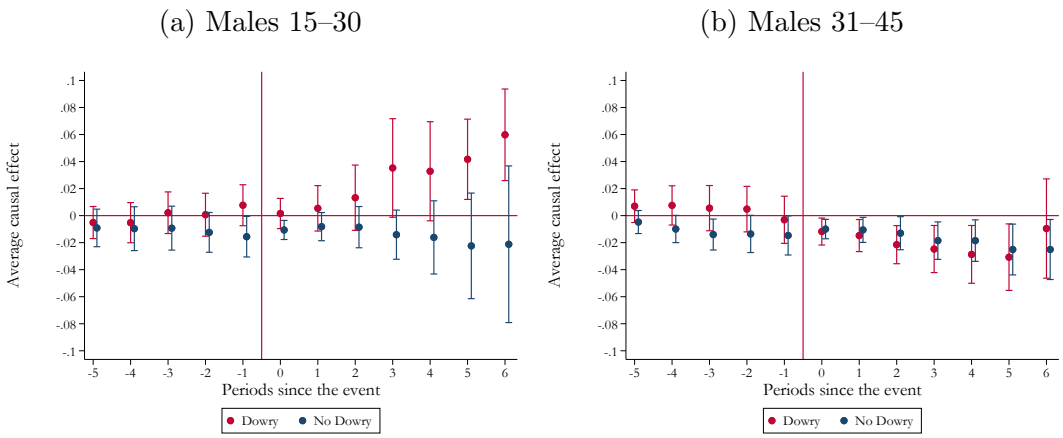
in migration for older males (Panel (b)). This lack of an increase is consistent with the idea that the timing of marriage and the allocation of dowry (which have likely already occurred for the older group) are important for allowing young men to take advantage of increased migration opportunities. If anything, there is a decline for both groups. This decline could could be reaction to the increase among younger men (e.g., if there are more young migrants, fewer older men now migrate for risk mitigation purposes).

In addition, we use the same strategy to evaluate the differential effects of the GQ on outcomes that more directly speak to the question of whether dowry helps enable structural change. First, in Figure 8, we run the same analysis with an indicator variable for migration *for employment* as our outcome. Our results confirm that the migration effects in Figure 7 are driven by migration for employment as opposed to other types of migration such as migration for marriage. Second, in Figures 9 and 10, we estimate the effects of the GQ by dowry tradition on *intra*-district and *inter*-district migration. We find no evidence of a strong effect on intra-district migration for either group. This is consistent with the fact that GQ segments would have mainly connected locations to other districts *and* with the fact that nearby migrations may not create the same frictions for optimal income sharing as farther afield migrations. In contrast, our migration effects for the dowry sample are concentrated in inter-district migrations, where we would expect the income-sharing frictions created by migration would be greater. Altogether, these results suggest that dowry enables longer-distance migrations for employment purposes in response to a reduction in the cost of migration, consistent with improvements in the labor allocation.

Robustness We also conduct a number of robustness checks. In Figure A1, we include age fixed effects as additional controls, and in Figure A2, we additionally control for differential time-trends by latitude, longitude, distance to the closest big city and distance to coast lines. The latter test helps ensure that the results are not driven by differential time trends across areas, as neither the locations of the GQ or dowry traditions are randomly assigned. In both cases, the results remain similar.

In Figure A3, we control for caste-by-year fixed effects and the time-varying effects of the NSS's measure of household expenditures. This test is intended to control for any socioeconomic characteristics that may be related to belonging to a dowry group and would otherwise lead to bias from differential time trends or heteogeneous effects

Figure 7: Effects of GQ on Male Migration by Dowry Status



This figure shows the event-study estimates of the effect of the GQ on migration. In Panel (a), the sample is of males in the 2007 NSS who were aged 15-30. In Panel (b), the sample is of males in the 2007 NSS who were aged 31-45. All estimates use the methodology of Borusyak et al. (2021) and include individual and state-by-year fixed effects.

of the GQ due to differences in socioeconomic status rather than cultural traditions. Even though the household expenditure measure is endogenous (as it is measured after migration decisions have taken place), we do not find that including these controls substantially affects our results.

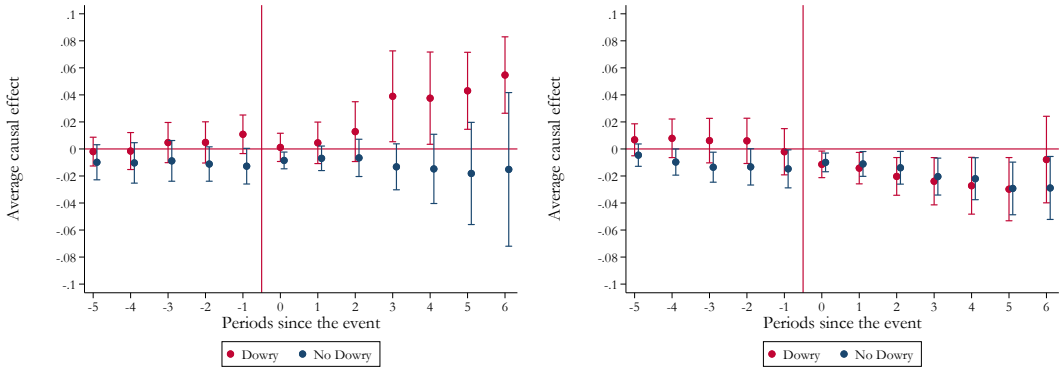
In Figure A4, we control for other characteristics from the *Ethnographic Atlas* that may be related to dowry (such as, the district level prevalence of plow animals, and for patrimonial inheritance) and allow the effects of these controls to vary over time. This robustness check helps ensure that our results are not driven by other cultural traits that may arise with dowry.

Finally, in Figure A5, we use a different estimation procedure proposed by Callaway and Sant'Anna (2020).[15] Across these alternative specifications, our qualitative results are similar. We see an increase in emigration from rural areas for youth that receive a GQ segment in dowry areas but less so in non-dowry areas and for older age cohorts.

[15]Callaway and Sant'Anna (2020) recognize that the effects may be dynamic (so vary over time-since-treatment t), and that early treated groups may have different effects from later treated groups (and so vary over treated groups g). As such, the event study estimates an $ATT(g,t)$ that varies over time and by treated group, estimating every possible combination of 'group-time' $ATT(g,t)$s, which are then aggregated in different ways (by time-period, by group or by event-time) to get overall ATTs. We use the doubly robust estimator, as recommended by Callaway and Sant'Anna (2020). Standard errors are calculated using the wild bootstrap, and clustered at the district level.

Figure 8: Effects of GQ on Male Migration for Employment Reasons by Dowry Status Using Borusyak et al. (2021)

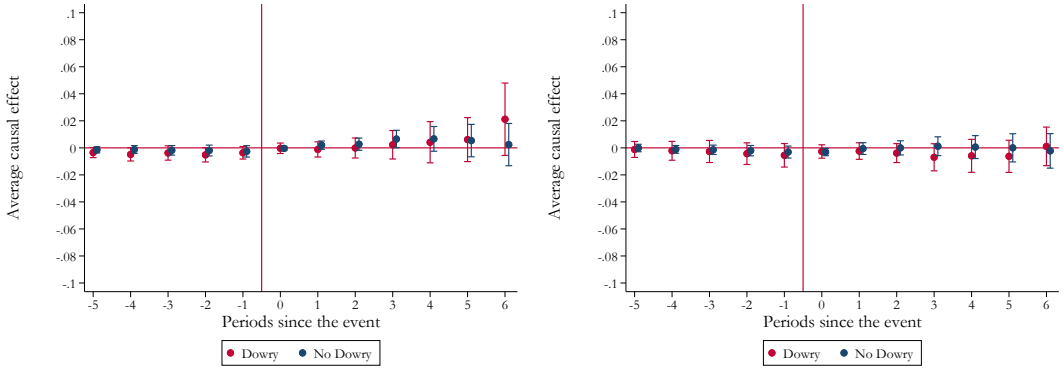
(a) Males 15–30 (b) Males 31–45



This figure shows the event-study estimates of the effect of the GQ on migration undertaken either: in search of employment, in search of better employment, for business, to take up employment/better employment, due to the transfer of service/contract, or for proximity to place of work . In Panel (a), the sample is of males in the 2007 NSS who were aged 15-30. In Panel (b), the sample is of males in the 2007 NSS who were aged 31-45. All estimates use the methodology of Borusyak et al. (2021), and state-by-year fixed effects.

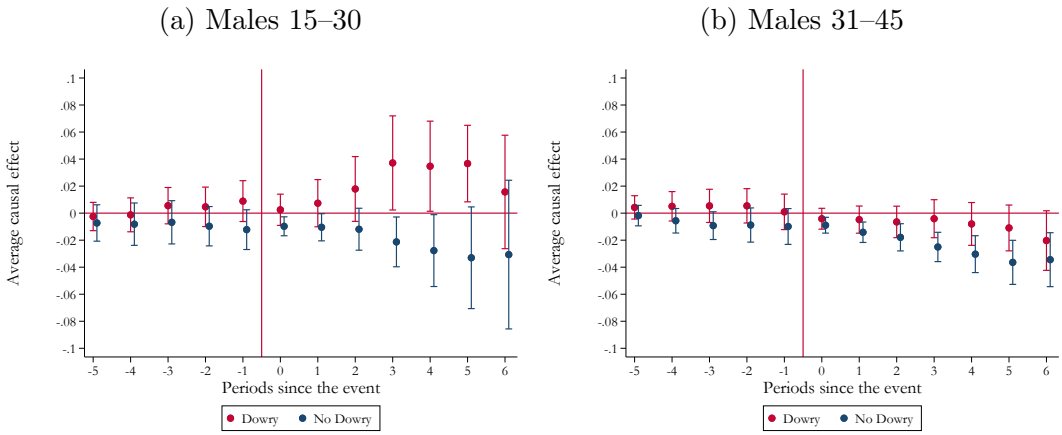
Figure 9: Effects of GQ on Male Intra-District Migration by Dowry Status Using Borusyak et al. (2021)

(a) Males 15–30 (b) Males 31–45



This figure shows the event-study estimates of the effect of the GQ on migration when the out-migrant's current location is located within the same district as their previous household. In Panel (a), the sample is of males in the 2007 NSS who were aged 15-30. In Panel (b), the sample is of males in the 2007 NSS who were aged 31-45. All estimates use the methodology of Borusyak et al. (2021), and includes state-by-year fixed effects.

Figure 10: Effects of GQ on Male Inter-District Migration by Dowry Status Using Borusyak et al. (2021)



This figure shows the event-study estimates of the effect of the GQ on migration. In Panel (a), the sample is of males in the 2007 NSS who were aged 15-30. In Panel (b), the sample is of males in the 2007 NSS who were aged 31-45. All estimates use the methodology of Callaway and Sant'Anna (2020), and includes state-by-year fixed effects.

6 Conclusion

This paper explores whether cultural traditions can relax migration constraints in a developing context, where improving the allocation of labor may have large returns. Specifically, we consider the possibility that dowry – a payment from the bride's family to the groom's family – can provide households with liquidity at the time of marriage, enabling migration. We focus on one important reason that increased liquidity may facilitate migration in low-income contexts. In India, like many low-income countries, sons are expected to care for parents in their old age. Migration may then disrupt traditional forms of old-age support. If this is the case, dowry may provide an alternative mechanism for liquidity-constrained sons to make transfers to their parents.

To explore this hypothesis, we build a model of a household's migration decision in the presence of dowry. This model produces five novel predictions, which we test with two newly-collected survey data sets on property rights over dowry, a large representative migration survey collected by the Indian government, ethnographic data on dowry traditions, and variation from a natural experiment. We confirm that parents frequently retain a substantial part of the dowry, they retain more when sons migrate, and among migrating sons, take more when their marginal returns to consumption are relatively high. Somewhat counterintuitively, but consistent with

the predictions of the model, parents also take more from migrating sons who remit. Furthermore, male migration rates are higher in places with a strong history of dowry traditions (where dowry payments are also higher today), and in these places, males respond more to a reduction in the cost of migration.

Dowry is a widespread practice throughout India, a country of 1.4 billion people, which contains roughly one-fifth of the world population. This alone makes understanding the effects of dowry – and how it affects the allocation of labor – important. However, more broadly, our results also speak to the role of co-residence traditions and the lack of formal sources of old age support as constraints on migration in low-income settings.

More speculatively, our results may also speak to why the practice of dowry has remained widespread (and its prevalence may have even increased) despite attempts by the Indian government to ban it. If there are large returns to migration, dowry traditions may allow families to take advantage of these returns while mitigating losses to old age support. Notably, the practice of patrilocality (married sons co-residing with elderly parents) has been declining in India over the past several decades. Thus, attempts to discourage the practice of dowry may be more successful if they are accompanied by expansions in pension programs or other formal means of old age support.

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Appendix Tables

Table A1: Validation of the Traditional Dowry Measure in the REDS

	(1) Ln(Gross Dowry)	(2) Ln(Net Dowry)	(3) Ln(Gross Dowry)	(4) Ln(Net Dowry)
Historical dowry	1.124***	1.157***	0.418*	0.740**
	(0.216)	(0.269)	(0.223)	(0.308)
Region FEs	No	No	Yes	Yes
Mean of dependent variable	7.917	7.462	7.917	7.462
Adjusted R-squared	0.072	0.061	0.194	0.110
Observations	50782	32418	50782	32418

Notes: This table shows the results from regressing log gross and net dowry measures from the 1999 round of REDS on the fraction of a district population traditionally practicing dowry. Columns (3) and (4) add region fixed effects. Standard errors are clustered at the district level. *,**, and *** denote 10, 5, and 1% significance respectively.

Table A2: Validation of the Traditional Dowry Measure in the IHDS

	(1) Often gold	(2) Often gold	(3) Any gold	(4) Any gold
Fraction historical dowry in district	0.152***	0.176**	0.054***	0.107**
	(0.035)	(0.085)	(0.013)	(0.046)
State fixed effect	No	Yes	No	Yes
Mean of dependent variable	0.749	0.749	0.931	0.931
Adjusted R-squared	0.019	0.260	0.007	0.163
Observations	40550	40550	40550	40550

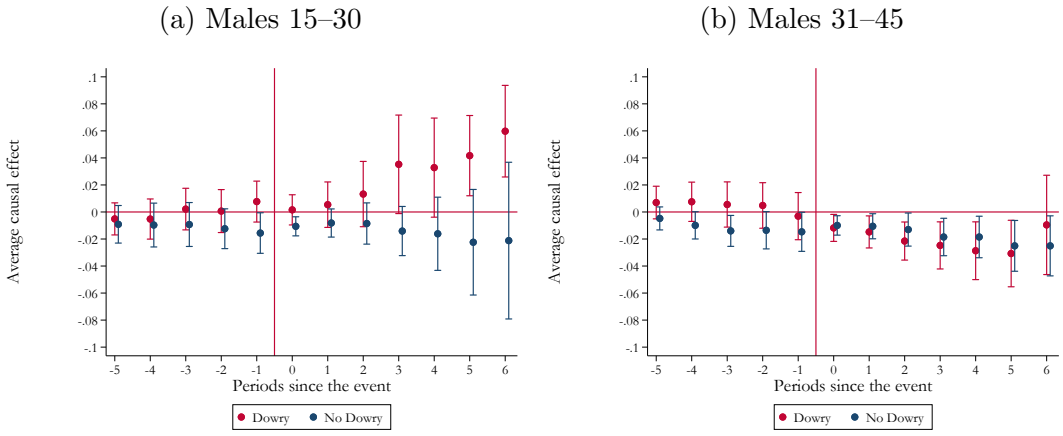
Notes: This table shows the results from regressing whether gold gifts are common upon marriage in the repondent's community from the 2005 round of IHDS on the fraction of a district population traditionally practicing dowry. Columns (2) and (4) add state fixed effects. Standard errors are clustered at the district level. *,**, and *** denote 10, 5, and 1% significance respectively.

Table A3: Effect of Dowry on Migration: IHDS Data

	(1) Migrated	(2) Migrated	(3) Migrated	(4) Migrated
Fraction Historical Dowry in District	0.0659*	0.0635*	0.0849**	0.0853**
	(0.0351)	(0.0354)	(0.0381)	(0.0385)
Observations	23,803	23,802	11,286	11,285
R-squared	0.044	0.051	0.049	0.055
Ages	17 - 26	17 - 26	22 - 26	17 - 26
Age Fixed Effects	Yes	No	Yes	No
State Fixed Effects	Yes	No	Yes	No
Age-by-State FE	No	Yes	No	Yes

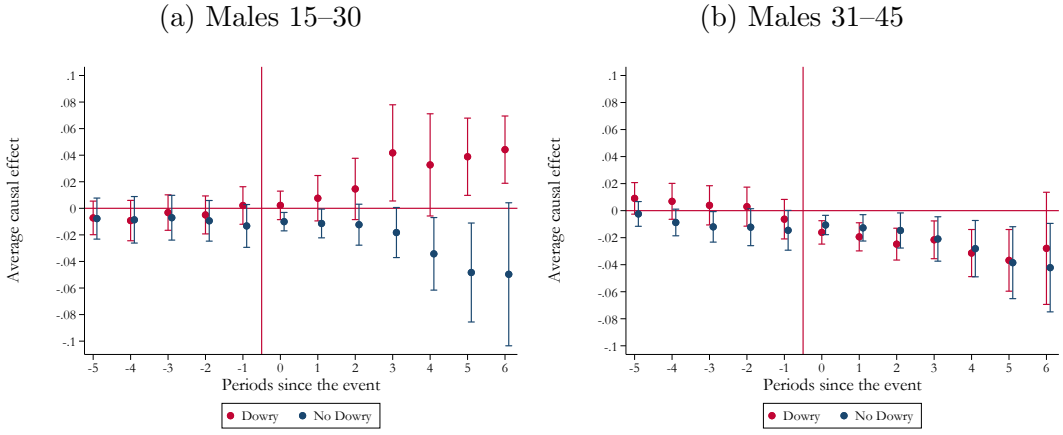
Notes: This table shows the results from regressing whether an individual (male) migrated between the 2005 and 2011 rounds of the IHDS on the historical prevalence of dowry in the district. The sample consists of only males who were ages 17-26 (Columns 1 and 2) or 22-26 (Columns 3 and 4). Columns (1) and (3) have state and age fixed effects. Columns (2) and (4) add state-by-age fixed effects. Standard errors are clustered at the district level. *,**, and *** denote 10, 5, and 1% significance respectively.

Figure A1: Effects of GQ on Male Migration by Dowry Status Using Borusyak et al. (2021), Including Age Fixed Effects



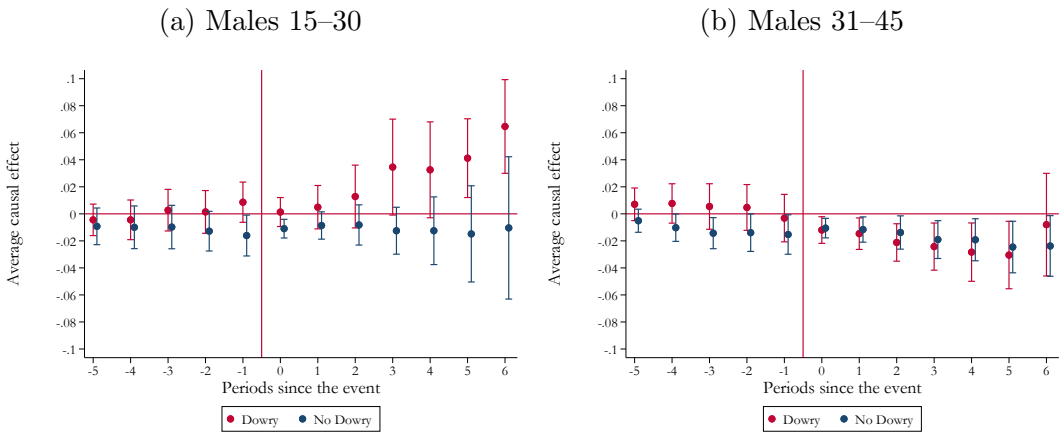
This figure shows the event-study estimates of the effect of the GQ on migration. In Panel (a), the sample is of males in the 2007 NSS who were aged 15-30. In Panel (b), the sample is of males in the 2007 NSS who were aged 31-45. All estimates use the methodology of Borusyak et al. (2021), and include individual, state-by-year, and age fixed effects.

Figure A2: Effects of GQ on Male Migration by Dowry Status Using Borusyak et al. (2021), Including Time-Varying Geographic Controls



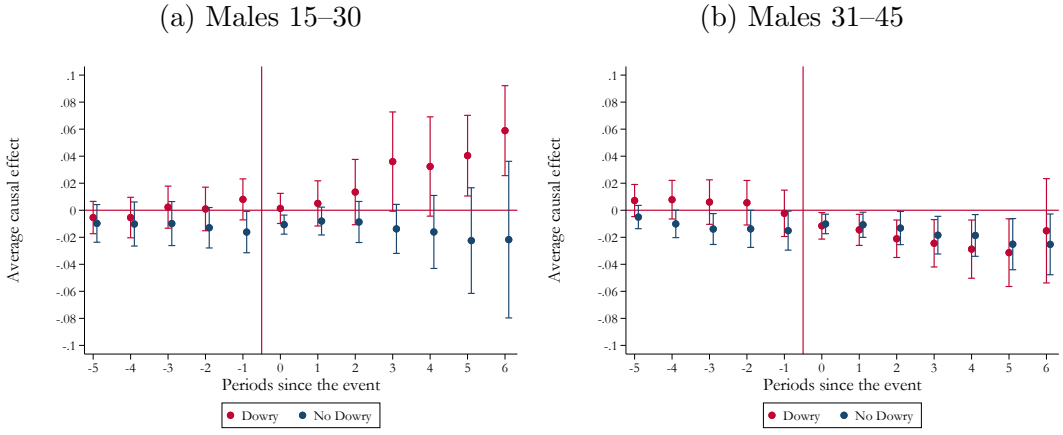
This figure shows the event-study estimates of the effect of the GQ on migration. In Panel (a), the sample is of males in the 2007 NSS who were aged 15-30. In Panel (b), the sample is of males in the 2007 NSS who were aged 31-45. All estimates use the methodology of Borusyak et al. (2021), and include time-varying distance controls (longitude and latitude of district, and distance to nearest coastline), as well as individual and state-by-year fixed effects.

Figure A3: Effects of GQ on Male Migration by Dowry Status Using Borusyak et al. (2021), Including Caste-Year Fixed Effects and Time-Varying Household Consumption Controls



This figure shows the event-study estimates of the effect of the GQ on migration. In Panel (a), the sample is of males in the 2007 NSS who were aged 15-30. In Panel (b), the sample is of males in the 2007 NSS who were aged 31-45. All estimates use the methodology of Borusyak et al. (2021), and includes state-by-year and caste-by-year fixed effects and a time-varying control for household consumption expenditure.

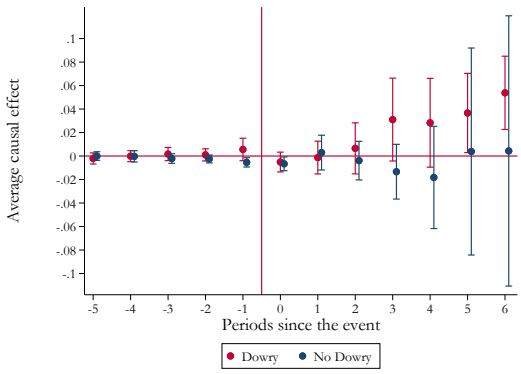
Figure A4: Effects of GQ on Male Migration by Dowry Status Using Borusyak et al. (2021), Including Time-Varying Cultural Controls



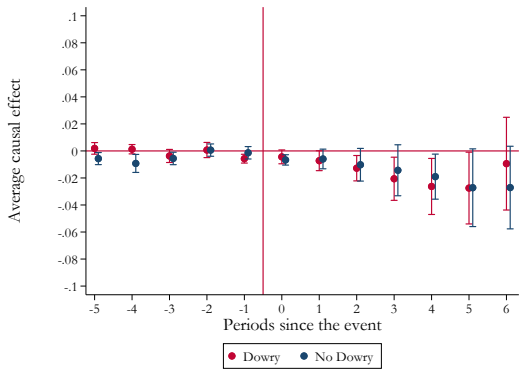
This figure shows the event-study estimates of the effect of the GQ on migration. In Panel (a), the sample is of males in the 2007 NSS who were aged 15-30. In Panel (b), the sample is of males in the 2007 NSS who were aged 31-45. All estimates use the methodology of Borusyak et al. (2021), and includes state-by-year fixed effects and time-varying controls for the proportion of the population (at the district level) that historically employed animals in plow cultivation and the proportion of the population that practiced a patrilineal system of inheritance.

Figure A5: Effects of GQ on Male Migration by Dowry Status Using Callaway and Sant'Anna (2020)

(a) Males 15–30



(b) Males 31–45



This figure shows the event-study estimates of the effect of the GQ on migration. In Panel (a), the sample is of males in the 2007 NSS who were aged 15-30. In Panel (b), the sample is of males in the 2007 NSS who were aged 31-45. All estimates use the methodology of Callaway and Sant'Anna (2020), and includes state-by-year fixed effects.

Theoretical Appendix

A.1 Proof of Prediction 5

Recall, from equation (3):

$$\theta ln\left(y_P + dE\right) + (1-\theta) ln\left(y_K + R + (1-d)E\right) > \Theta + ln(Y).$$

We define B as the smallest level of return to migration that satisfies the above inequality and, hence, justifies migration. This means that sons of seeking parents migrate if and only if $R > B$.

The threshold B, which takes the closed-form solution

$$(1-\theta)Y\left(\frac{\theta Y}{y_P + dE}\right)^{\frac{\theta}{1-\theta}} - y_K - (1-d)E,$$

satisfies two properties:

1. It is positive. This is because, at $R = 0$, the RHS of equation 3 is the optimization of the intra-household allocation that admits the LHS as a possible allocation.

2. It is lower when $d = 1$ than when $d = 0$ when $A(d = 0) < 0$. To see this, consider $sign(\frac{\partial B}{\partial d}) = sign(A(d = 1))$

Based on these two cases, we see that the migration decision depends on returns relative to resources available to transfer outside of earnings.

1. Seeking parent households, for whom $A < 0$:

   (a) $R < B$: no migration ($m = 0$), $\tau^* + \alpha^* = \theta(y_K + E) - (1-\theta)y_P$.

   (b) $R \geq B$: migration ($m = 1$), $\tau^* = dE$ and $\alpha^* = 0$

2. Satisfied parent households, for whom $A > 0$:

   (a) $R < 0$: no migration ($m = 0$), $\tau^* + \alpha^* = \theta(y_K + E) - (1-\theta)y_P$.

   (b) $R > 0$: migration ($m = 1$)

      i. $0 < R < A$: $\tau^* < dE$, $\alpha^* = 0$

ii. $R > A$: $\tau^* = dE$, $\alpha^* = 0$

Since $A(d=1) > A(d=0)$ we should expect higher migration in societies that have dowry.

In the remittances extension, the same patterns hold. The threshold for migration $B'(\pi, d)$ can be defined implicitly as:

$$\pi\left[\Theta + ln(Y + B')\right] + (1-\pi)\left[\theta ln(y_P + dE) + (1-\theta)ln(y_K + B' + (1-d)E\right]$$

$$\equiv \Theta + ln(Y).$$

By the Implicit Function Theorem, $\frac{\partial B'}{\partial \pi} \leq 0$, so increasing the probability that remittances can take place reduces the required return for migration. Similarly, also by the IFT, $\frac{\partial B'}{\partial d} \leq 0$.

A.2 Proof of Prediction 6

Define $\tilde{R}$ as the idiosyncratic economic returns of migration, and λ as the average cost of migration. Then $R = \tilde{R} + \lambda$ and $\tilde{R}$ is distributed with cdf F and pdf f. Consider the GQ as a reduction in λ.

Comparing dowry and no-dowry economies, there are three cases:

1. Both $A(d=1)$ and $A(d=0)$ are positive.
   In this case, migration will occur when returns are positive and it will be equally likely to occur with and without dowry:

   $$P(m=1|d=1, A(d=1)>0) = 1 - F(\lambda)$$

   $$P(m=1|d=0, A(d=0)>0) = 1 - F(\lambda)$$

   A decline in the cost of migration will have the same positive effect on migration in dowry and non-dowry economies:

   $$\frac{\partial P(m=1|d=1, A(d=1)>0)}{\partial \lambda} - \frac{\partial P(m=1|d=0, A(d=0)>0)}{\partial \lambda} = 0$$

2. $A(d=1)$ is positive and $A(d=0)$ is negative.
   In this case, migration will occur when returns are positive with dowry and

when when returns are greater than $B > 0$ without dowry, and hence will be more likely to occur with dowry than without:

$$P(m = 1|d = 1, A(d = 1) > 0) = 1 - F(\lambda)$$
$$P(m = 1|d = 0, A(d = 0) < 0) = 1 - F(\lambda + B(d = 0))$$

A decline in the cost of migration will have a larger effect on migration in dowry economies than non-dowry economies when the distribution of returns of migration is unimodal and the rates of migration are low (i.e. the person with modal return does not migrate):

$$\frac{\partial P(m = 1|d = 1, A(d = 1) > 0)}{\partial \lambda} - \frac{\partial P(m = 1|d = 0, A(d = 0) < 0)}{\partial \lambda} =$$
$$f(\lambda) - f(\lambda + B(d = 0))$$

3. Both $A(d = 1)$ and $A(d = 0)$ are negative.
   In this case, migration will occur when returns are greater than $B(d) > 0$, and hence will be more likely to occur with dowry than without since $B(d = 0) > B(d = 1)$:

$$P(m = 1|d = 1, A(d = 1) < 0) = 1 - F(\lambda + B(d = 1))$$

$$P(m = 1|d = 0, A(d = 0) < 0) = 1 - F(\lambda + B(d = 0))$$

   Again, a decline in the cost of migration will have a larger effect on migration in dowry economies than non-dowry economies when the distribution of returns to migration is unimodal, and the rates of migration are low (i.e. the person with modal return does not migrate):

$$\frac{\partial P(m = 1|d = 1, A(d = 1) < 0)}{\partial \lambda} - \frac{\partial P(m = 1|d = 0, A(d = 0) < 0)}{\partial \lambda} =$$
$$f(B(d = 1) + \lambda) - f(B(d = 0) + \lambda)$$