Traditional Institutions in Modern Times: Dowries as Pensions When Sons Migrate*

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This paper examines whether an important cultural institution in India – dowry – can enable migration by increasing the liquidity available to young men to share the gains of migration with their parents. We hypothesize that one cost of migration is the disruption of traditional elderly support structures, where sons live near their parents and care for them in their old age. Dowry can attenuate this cost by providing sons and parents with a moveable transfer that eases constraints on income sharing. To test this hypothesis, we collect two new datasets on property rights over dowry across family members. Net transfers of dowry to a man's parents are common but far from universal. 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 greater migration response to reduced migration costs. Despite its well-documented adverse consequences, dowry may persist because it facilitates old-age support, promoting migration.

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1 Introduction

The migration of workers from areas where labor has lower marginal returns to areas with 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., 2023; 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; Fetter et al., 2022). In economies where children provide most old-age support, households may forgo even high-return migration opportunities if migration prevents the optimal allocation of resources across generations.[1] Consequently, providing young people with increased liquidity during potential migration periods may play a significant role in facilitating their mobility.

This paper introduces and tests the new hypothesis that dowry, a transfer from the bride's family upon marriage that is prevalent, though spatially variable in size, throughout India, can play a role in encouraging migration.[2] Specifically, dowry provides young men with timely resources that can be transferred to their parents to compensate for the old-age support that would otherwise be lost when sons migrate.[3] Transferring some or all of the dowry to the groom's parents has been widely documented by the media (The Times of India, 2022), but the ownership of dowry, and variation in this ownership, has not been formally measured. We collect the first quantitative information on property rights over dowry in India and use these novel data together with ethnographic variation in dowry traditions across India and a natural experiment that varied migration costs to test the hypothesis that dowry traditions play a role in enabling migration.

To illustrate our mechanism, we develop a model in which parents and sons act collectively but experience frictions in resource sharing when the son migrates. If

[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.

[2] Based on calculations from the 2011 census, a substantial fraction of men in the average district leave their natal villages (24%). We explore the role of dowry in shaping this spatial variation in out-migration.

[3] In survey data we collected in Delhi, 77% of male migrants said that their parents would be justified in taking from the marriage gifts from the bride's family.

parental income is high enough relative to the son's income, this friction will not affect migration decisions. If, however, parents rely on income pooling or services provided by the son or his wife, sons may be less likely to migrate unless the returns are sufficiently high to offset household utility losses from parents' lost consumption. Dowry mitigates this friction by providing a transferable pool of resources that the son can share with his parents before migration, bringing consumption closer to the first-best allocation and lowering the net returns needed for a son to migrate.

Our model produces several testable predictions. First, depending on parents' and sons' (weighted) marginal utilities of consumption, some parents will make net transfers to sons, while others will receive transfers from the dowry. Second, parents will be more likely to take from the dowry when sons migrate, since migration produces frictions in the sharing of future income. Third, accounting for parental wealth, parents are more likely to take from the dowry when migrant sons expect a higher income, consistent with the fact that parents will have a higher relative marginal return to consumption. Fourth, in aggregate, sons raised in areas where dowry traditions are practiced are more likely to leave the village. Fifth, as long as migration rates are relatively low, a decline in the cost of migration will lead to a greater male migration response in areas where dowry is practiced. Finally, an extension of our model with remittances predicts that parents who receive remittances from migrant sons are also more likely to have taken a portion of the dowry.

The first three predictions, as well as the remittance prediction, 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% of 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 wanting to marry without the parents' consent, a proxy for parental bargaining power. In addition, we find that parents whose migrant son sends them financial remittances are 17 percentage points more likely to have taken from the dowry than parents of a migrant son who does not transfer remittances.

We then turn to the final two predictions, which aim to assess the role of dowry in enabling migration. To test these predictions, we use nationally representative

data from a detailed migration module collected in Round 64 of the National Sample Survey (NSS), conducted in 2007-08. 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. While dowry in India is nearly universal, the size of payments varies. We confirm that the variation in historical tradition strongly predicts the size of dowry payments in the Rural Economic and Demographic Survey (REDS) and the India Human Development Survey (IHDS).

In line with the fourth prediction of the model, we find that male migration rates are indeed higher in districts where more of the population belongs to groups with dowry traditions, controlling for a range of other factors. To test our fifth prediction about heterogeneity in responsiveness to a decline in the cost of migration, we exploit a time- and geographically-varying shock to this cost, the construction of the Golden Quadrilateral and North-South/East-West highway expansions. While the Golden Quadrilateral 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 among young men who were likely below marriage age at the time of the construction. These results are driven by migration for employment, and migration that is out of the district, aligning with the channel in our model where dowry helps to resolve frictions for economically beneficial migration that weakens ties to parents.

Our findings suggest that the roles played by cultural traditions may evolve as economic development changes the environment. While dowry is thought to have traditionally served as a bequest to the bride (Goody and Tambiah, 1973; Botticini and Siow, 2003), today, transfers often flow from the bride's to the groom's side (Anderson and Bidner, 2015). Our findings suggest that this realignment of resources may help sons reduce intra-household distortions to efficient migration decisions.

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, 2023), since economic development has been associated with a decline in patrilocality and thus filial old-age support of parents. Based on our findings, policymakers may wish to seek alternative means of ensuring parents without co-located sons receive adequate old-age support. Doing so may both curb demand for dowry and help ensure that intra-household frictions do not hamper efficient migration as modernization increases the returns to urbanization.

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). Much of this work stresses how facilitating the movement of individuals from areas where they earn low wages to where they earn higher wages can greatly improve both individual well-being and aggregate productivity. Thus, understanding barriers to migration is crucial for economic development. We contribute to this literature by identifying a new friction that reduces migration – parents' need for old-age support in settings with a limited formal social safety net – and showing how a cultural tradition like dowry can relax this friction. To the extent that rural to urban migration – a key driver of economic development – remains low in India (see Foster and Rosenzweig (2008)), we shed light on an important obstacle to migration and highlight a new set of policies, such as pension plans, that could enable it.

Second, we contribute to a growing literature that recognizes the importance of culture for economic outcomes (Fernández and Fogli, 2009; Fernández, 2011; Bau and Fernández, 2023) and shows that taking into account the cultural environment is critical for understanding the effects of both economic shocks and policies (La Ferrara and Milazzo, 2017; Ashraf et al., 2020; Corno et al., 2020; Dahl et al., 2022; Bau, 2021). Here, we show that the effects of policies that reduce migration costs in India, such as road construction programs, depend critically on underlying cultural traditions whose role has been shifting in modern times.

Finally, we also 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 whether dowry may play a role in facilitating migration by resolving household frictions that result from the disruption of traditional old-age support systems.

The remainder of the paper proceeds as follows: Section 2 provides background on marriage traditions and old-age support in India. Section 3 outlines a theoretical framework in which migration disrupts consumption sharing between parents and sons, and dowry provides liquidity to ease this constraint. Section 4 describes our original dataset measuring ownership of dowry and tests the intra-household predictions of the model. Section 5 tests the aggregate predictions of the model for the relationship between dowry and migration and the effects of declines in migration costs. Section 6 concludes.

2 Background

2.1 Marriage Traditions in India

While dowry dominates today, 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 (Manu and Olivelle, 2004). Consistent with this, Chiplunkar and Weaver (2023) 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 in India was a bequest to the bride, as in Europe (Goody and Tambiah, 1973). 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 their parents, work the family farm, and care for parents in their old age. This is because be-

quests via dowry mitigate agency problems that would otherwise occur if a daughter inherited part of the returns to her brother's effort after their parents' deaths.

In modern India, the practice of dowry appears to have changed greatly relative to the traditional practice in two ways.[4] First, both quantitative and qualitative sources suggest that the prevalence of the practice has dramatically increased. Chiplunkar and Weaver (2023) show that between 1935 and 1975, the share of marriages with dowry increased from about 40% to close to 90%, and dowry has remained nearly universal thereafter.[5] 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). Anderson (2003) notes this increase is despite a decline of dowry with modernization in Europe and points to the caste system as a key explanation.

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 bridegroom 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.[6] The qualitative literature does not just note

[4] Arunachalam and Logan (2016) posit that in South Asia, dowry is used by some families as a bequest to daughters, and others as a groom price paid to in-laws (Arunachalam and Naidu, 2010).

[5] The extent to which dowry payments have increased in *real* terms in India in recent decades is subject to more debate (Anderson, 2007; Rao, 1993; Edlund, 2006; Chiplunkar and Weaver, 2023).

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

that the groom's side has meaningful property rights over dowry today but also that the groom's parents may be capturing some or all of the dowry. AIDWA (2003) observes that for the 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 dowry can sometimes become a form of financial old-age support for grooms' parents, especially as patrilocality declines and migration increases. In Section 3, we characterize this mechanism in a simple model.

2.2 Old-Age Support in India

Traditionally, the elderly in India, as in many low-income countries, have relied on family, and especially sons (Jayachandran, 2015), for old-age support.[7] Based on evidence from two rounds of the special National Sample Surveys of aged persons (1986-1987 and 1995-1996), Chakraborti (2004) notes that the majority of elderly are supported by their children. Indeed, in survey data, we collected in Delhi (the Destination Survey described in Section 4.1), 88% of migrants said taking care of elderly parents was one of the most important factors for their reputation. At the same time, Chakraborti (2004) writes, "*The family also has its limitations, which are becoming increasingly apparent, as social and economic development undermines traditional values*" (p. 26), and "*Ageing increasingly appears to be a rural issue. The problem becomes more intense when younger family members move to the cities leaving behind the elderly to look after themselves*" (p. 253). Thus, even in the late 90s/early 00s, it was evident that modernization was disrupting traditional modes of old-age support that were dependent on co-residence.

Disrupting traditions of co-residence may not deprive the elderly of old-age support if children who migrate more than compensate for the loss of in-person support by sending remittances to their parents. However, in line with Chakraborti's observations, qualitative evidence suggests that this is not the case. Focus groups and life histories in Rajan et al. (1999) suggest that the elderly are concerned about incentive problems in ensuring old-age support when children live elsewhere. One respondent commented that, "*The elderly can only expect old age care from their children provided they stay with them*" (p. 305), while respondents in focus groups said that property

[7] As late as 2018, 48% of elderly respondents to the Longitudinal Aging Study in India (LASI) reported residing with an adult son.

should not be distributed to children before death lest it remove the incentive to provide old-age support (p. 271). Even in the absence of incentive problems, sending remittances can be difficult and costly. While a national incentive scheme has led 80% of Indians to nominally have bank accounts, as of 2018, a large fraction of those accounts were inactive (Anand, 2018). Forty-eight percent had zero transactions in the last year (Abraham, 2023). Mobile money is even less common: less than 5% of Indians have used mobile phones or the internet to access a financial institution, and only 29% have made or received digital payments (Anand, 2018). Consistent with the fact that lower-income South Asians do not use electronic banking or mobile money to make transfers, in Bangladesh, a similar context, "*Remitting money is difficult and migrants carry money back in person*" (Bryan et al., 2014). For many migrants, such in-person visits are infrequent. In our Destination Survey, the modal male migrant visited his parents twice per year, and 10% of respondents had not visited parents at all in the past year.

Despite growing frictions in providing traditional old-age support, as in many lower-income contexts, the state also has a limited role in providing old-age support. Pension coverage is low and uneven across states (Chakraborti, 2004). In data from the 2018 Longitudinal Aging Study (LASI), only 9% of respondents over 60 received or expected to receive a pension.

3 Theoretical Framework

We develop a simple model to explain the relationship between dowry, intergenerational income sharing, and migration. This generates testable predictions, which we bring to the data. We note that the model produces predictions that are distinct from possible alternative stories (such as dowry providing liquidity to pay migration costs), which will allow us to determine whether the specific mechanism in our model has empirical support. Our model presents the groom and his parents as a collective household (Chiappori, 1988), and hence does not take a stance on the process of decision-making. In Appendix A.2.6 we show that a dynamic Nash bargaining model that microfounds the decision-making process delivers the same predictions.

3.1 Setup

We model parents and sons as making collective household choices over migration and resource sharing. At the time of the son's marriage, the household decides whether the son should migrate and chooses the flow of transfers between parents and children by optimizing the Pareto-weighted sum of their utilities. Importantly, migration introduces a friction that prevents optimal transfers within the collective household.

Households have parents – who act as a single unit – and a son.[8] Parents have Pareto weight $\theta(\mathbf{z})$ and earn income y_P. The vector $\mathbf{z}$ represents all distribution factors that influence the relative power of parents vs. the child in the decision-making process in a collective framework (Chiappori et al., 2002), making the model non-unitary (Browning et al., 2014). For brevity, we use $\theta(\mathbf{z})$ and θ interchangeably. The son has Pareto weight $(1 - \theta(\mathbf{z}))$, earns income y_K, and receives an additional return, net of cost, R in the case of migration, denoted as $m = 1$. This formulation of the migration decision reflects the fact that the vast majority of men migrate for employment.[9] Households can be heterogeneous in θ, y_P, y_K, and the return to migration R, with R distributed according to a continuous and unimodal distribution. Because parents are older, they have accumulated their full income at the time of their son's marriage, while sons either have not yet started working or have yet to earn most of their lifetime income. Thus, y_P is fully liquid, while y_K is illiquid before the potential migration. This constrains the types of transfers that can be made by the parents and the son.

Sons marry and receive a marriage transfer E, representing the bride's endowment. This should be thought of as the husband's equilibrium share of the endowment, or the market clearing marriage transfer. In a setting like India where women's outside options are low, the husband may be expected to capture most of the marital surplus.

We use a simple framework to characterize the matching process, as this is not primarily a model of marriage-market matching: utility is perfectly transferable between husband and wife, and there is positive assortative matching between the groom's earnings y_K and the bride's qualities, from which the groom receives equilibrium

[8] In Appendix A.2.5, we consider the case of households with sons and daughters and show that the predictions of the model are unchanged.

[9] According to the special migration module included in the National Sample Survey Round 64, 82% of males who outmigrated from their households outmigrated for work. Male outmigration for marriage is negligible and accounts for less than 1% of male outmigration in the data.

transfer E (Andrew and Adams, 2022). Brides' families are unable to discern parent-son family dynamics in terms of likely transfer flows (described below), and so only match based on grooms' earning potential. The bride's endowment may represent the woman's future inheritance or her parents' investments in her, and hence be illiquid at the time of marriage ($d = 0$), or if there is dowry, it can be transferable goods available at the time of marriage ($d = 1$).[10]

There are two types of transfers between sons and parents: a lump sum transfer τ, the net marriage payment, that occurs around the time of the son's marriage (i.e., when the son is young and has not yet earned his income) and a later transfer α, which occurs when the son earns his income and parents have aged. This transfer can be monetary, or can be in-kind and represents the son's support to the aging parents, potentially including time support by the daughter-in-law. We define both transfers so that positive values represent flows from sons to parents, and negative values represent flows from parents to sons. Negative τ can be used by parents to transfer resources to sons, while if sons wish to transfer to parents, τ is bounded above by the transferable portion of the bride's endowment ($\tau \leq d \cdot E$).[11]

Since parents can already fully flexibly make transfers to the son through τ, we assume that $\alpha \geq 0$. Because α is paid later in life, it is subject to frictions due to migration. If the son migrates, sharing resources later in life may become more costly or even impossible because of distance (especially for in-kind support and services), lack of information, limited commitment, and remittance costs. To simplify exposition, in our baseline model, we constrain α to be 0 when the son migrates ($m = 1$) due to these frictions. In Section 3.5, we show that extensions that allow remittances to occur with some probability or at a cost do not alter the model's predictions.

[10] Consistent with the theoretical literature on dowry, we think of a woman's parents as giving dowry to promote their daughter's well-being. Parents, for various reasons, may choose different means of achieving this end, and thus might, in different circumstances, invest in their daughter's education, give dowry, or give a later inheritance (Anderson and Bidner, 2015). When there is a dowry, parents of daughters give a transferable gift equal to E at the time of the wedding. See Roy (2015) for the substitutability between dowry and inheritance in India and Botticini and Siow (2003) for a historical perspective.

[11] A further constraint is that $-\tau$ is bounded by the parents' income ($-\tau \leq y_P$) and α is bounded by the son's income ($\alpha \leq y_K$) to rule out the possibility that the parents can donate more than their income and then receive it back as a transfer from their son. The presence or absence of this constraint does not influence the model's implications and hence we can omit it from the model formulation.

In sum, the household chooses marriage transfer τ, son's transfer α, and migration status m to solve the following problem:

$$\begin{aligned} \max_{\substack{\alpha \geq 0, \tau \leq d \cdot E, \\ m \in \{0,1\}}} \quad & \theta(\mathbf{z}) \ln(c_P) + (1 - \theta(\mathbf{z})) \ln(c_K) \\ \text{s.t. } & c_P \leq y_P + \tau + \alpha(1-m) \\ & c_K \leq y_K + R \cdot m + E - \tau - \alpha(1-m). \end{aligned} \tag{1}$$

In this static model, marriage is simultaneous with migration and the transfer decision. Empirically, marriage may occur either before or after a son leaves the household. However, our mechanism doesn't require that migration occurs after marriage. Sons can return home instead of permanently migrating and due to strong norms against marrying without parental consent, parents would be expected to have influence over sons' decisions (consistent with the collective framework) at least until they approve his marriage.

3.2 Solution

In this section, we describe the solution to the model. For all mathematical detail and proofs, see Appendix A.2.1. To solve the household's problem, we first solve for consumption and transfers conditional on migration and then compare the utilities when $m = 1$ and $m = 0$ to determine whether migration is utility-maximizing.

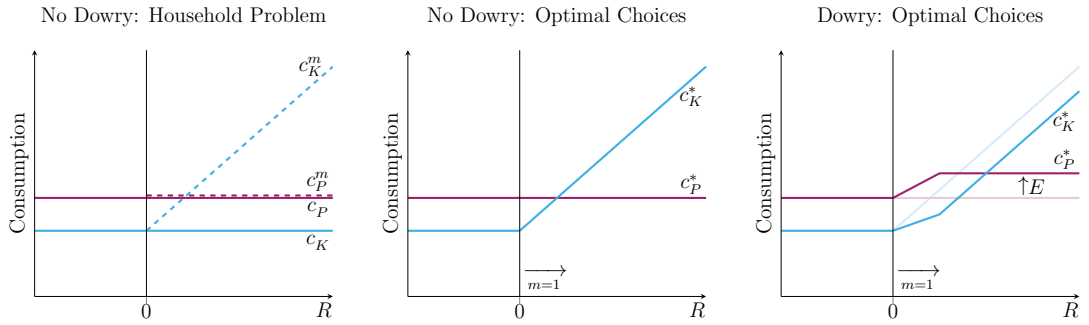
Without frictions, the household would choose consumption to equalize the parents' and the son's Pareto-weighted marginal utilities of consumption. With logarithmic utility, the parents' share of household resources ($y_K + y_P + E + R \cdot m$) would be θ, and the son's would be $1 - \theta$. Note that, as there is no friction if migration doesn't occur, the household always implements this solution when $m = 0$.

When $m = 1$, α is constrained to be zero. If the τ that equalizes the weighted marginal utilities is still feasible, it is implemented. This occurs when the optimal $\tau^* \leq d \cdot E$. If the τ that equalizes marginal consumption is greater than $d \cdot E$, the household sets τ at the upper bound, $d \cdot E$.

When the sum of parents' income and the upper-bound τ is weakly greater than their consumption allocation without migration, migrating when $R > 0$ will be a Pareto improvement for the household – making the son better off without making the parents worse off. We call these parents "Satisfied," since they are able to satisfy

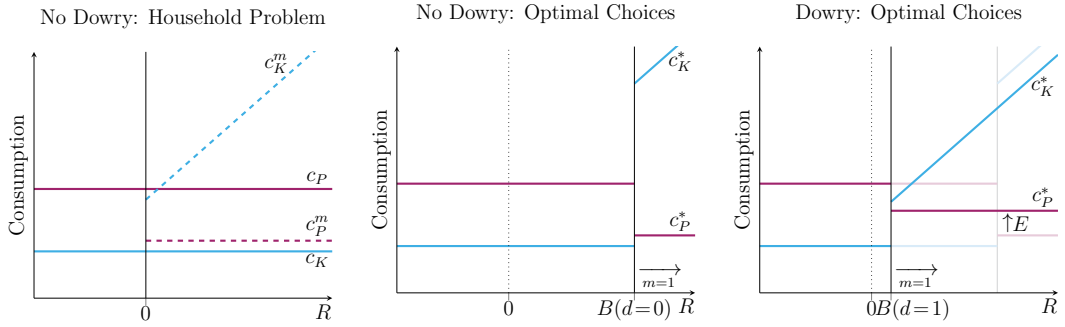
their consumption needs without requiring an income transfer from the son. The first panel of Figure 1 illustrates the hypothetical consumption with and without migration, over the possible returns R, for the no dowry, Satisfied case.

Figure 1: Household Migration Problem: Satisfied Parents



Notes: The first figure depicts the possible consumption for parents and sons with and without migration for Satisfied Parents with no dowry, $d = 0$, over the range of migration returns R. c_P and c_K depict the parents' and son's consumption without migration, respectively, and c_P^m and c_K^m their consumption with migration, where the parents are left to consume their income. The second panel depicts the optimal migration choice and consumption allocation when $d = 0$, and the third panel for when $d = 1$. In both cases, migration $m = 1$ occurs when net returns are above 0, and dowry simply allows consumption sharing that is closer to the first best.

Figure 2: Household Migration Problem: Seeking Parents



Notes: The first figure depicts the possible consumption for parents and sons with and without migration for Seeking Parents with no dowry, $d = 0$, over the range of migration returns R. c_P and c_K depict the parents' and son's consumption without migration, respectively, and c_P^m and c_K^m their consumption with migration, where the parents are left to consume their income. The second panel depicts the optimal migration choice and consumption allocation when $d = 0$, and the third panel for when $d = 1$. Migration $m = 1$ occurs without dowry when net returns are above $B(d = 0)$ and with dowry when net returns are above $B(d = 1)$.

When the sum of parents' income and the upper-bound τ is lower than their non-migration consumption allocation, migration will reduce parents' consumption. We call these parents "Seeking," since they are seeking an income transfer from sons, and this is illustrated in the no dowry case in the first panel of Figure 2.

Definition *Parents with $y_P + d \cdot E \geq \tilde{c_P}$ are "Satisfied", and parents with $y_P + d \cdot E < \tilde{c_P}$ are "Seeking," where $\tilde{c_P}$ represents the parents' consumption without migration.*

Now consider the migration decision. If parents are Satisfied, there is no distortion, and the household chooses m to maximize total resources. Then, $m = 1$ as long as $R \geq 0$, as illustrated for the no dowry case in the second panel of Figure 1. If the parents are Seeking, the returns on migration to the son must be high enough to compensate the household for the loss in the parents' consumption. Thus, migration only occurs if $R \geq B(d) > 0$, as illustrated for the no dowry case in the second panel of Figure 2.[12] As the figure shows, even when parents can be compensated through dowry, Seeking parents may experience a fall in consumption due to migration.

3.3 Predictions for the Distribution of Dowry

Our first set of predictions concern the direction of the net marriage transfer τ. We refer to cases where $\tau > 0$ as parents being "Net Takers" from the son's dowry. For proofs of these predictions, see Appendix A.2.1.

Prediction 1 *τ^* can be positive or negative.*

The equilibrium marriage transfer τ^* can be negative or positive depending on the relative size of the son's and parents' weighted marginal returns to consumption in the absence of transfers.

Prediction 2 *For any set of parameters y_P, y_K, and θ, the probability that parents are Net Takers of dowry will be higher if the son migrates ($m = 1$) than if he does not ($m = 0$).*

This occurs for two reasons. First, if migration is optimal, $R \geq 0$. Then, the son's resources increase as a result of migration, increasing τ^*. Second, if $m = 1$, transfers that could otherwise occur through α must occur through τ. Note that if migrant sons used dowry to pay for the upfront cost of migration and not to support their parents, we would be *less* likely to see them giving dowry to their parents upon migration, providing an empirical test that can help distinguish our mechanism from other channels.

[12] $B(d)$ is given by $(1-\theta)Y\left(\frac{\theta Y}{y_P + d \cdot E}\right)^{\frac{\theta}{1-\theta}} - y_K - (1-d)E$.

Prediction 3 *If $m = 1$, holding y_P fixed, the probability that parents are Net Takers of dowry is increasing in son's income y_K and parental Pareto weight θ.*

The prediction indicates that the optimal total transfer from a son increases in his income y_K (because his marginal return to consumption in the absence of a transfer is decreasing in y_K) and in the parental Pareto weight θ (because the household places a greater weight on parents' consumption). But τ^* is only defined (as opposed to $\tau^* + \alpha^*$) upon migration (when $m = 1$) since otherwise the son is indifferent between transferring with τ (up to the constraint) or α, and thus, τ may or may not vary with these factors in the absence of migration.

Distribution factors $\mathbf{z}$ (for example, the parents' veto power over the son's marriage) can influence the sharing of the dowry by shifting the Pareto weight θ, making the model non-unitary (Browning et al., 2014). In Appendix A.2.6, we provide a microfoundation of how the parents' veto power over their son's marriage can shift the sharing of dowry in a dynamic Nash bargaining framework, delivering the same predictions as a collective model.

3.4 Predictions for the Relationship Between Dowry Traditions and Migration

In this section, we consider the aggregate effect of dowry traditions on migration.

Prediction 4 *Households with a dowry tradition ($d = 1$) are more likely to have a migrant son.*

See Appendix A.2.2 for proof.

This occurs for two reasons. First, recall that in Satisfied households, a son migrates if $R \geq 0$. Because dowry strictly increases the set of feasible τ, a larger set of households will be Satisfied if $d = 1$. Second, even if households are Seeking, because the upper-bound transfer is greater in dowry societies, the distortion to parents' consumption is smaller, and the threshold for the return to migration such that migration is optimal $B(d)$ is lower. For a given set of parameters y_K, y_P, and θ, therefore, $B(d = 1) \leq B(d = 0)$ and the probability that $R \geq B(d = 1)$ is greater than the probability $R \geq B(d = 0)$. The effect of dowry on migration decisions is illustrated

for Satisfied households in the third panel of Figure 1 and for Seeking households in the third panel of Figure 2.

Because migration rates depend on dowry *ceteris paribus*, the migration response to reducing the cost of migration also depends on dowry. When migration rates are low, i.e. when sons with the modal return to migration do not migrate, a decline in the cost of migration will have a larger effect on migration rates where there is a higher baseline level of migration (dowry is present). This is because the density of men on the margin of migrating is greater.[13]

Prediction 5 *If migration rates are low, a decline in the cost of migration (or equivalently, an increase in the net returns to migration) will increase the probability of migration more when dowry is present.*

See Appendix A.2.3 for proof.

3.5 Extensions: Remittances, and Household with Sons and Daughters

We consider two sets of extensions to our baseline model.

Allowing for Remittances The baseline model assumes that sons cannot send parents remittances if they migrate. We consider two extensions with remittances. One extension allows remittances to fail with a non-zero probability, capturing the possibility, for instance, that the parent-son bond becomes weaker after migration. The other extension introduces costly remittances, capturing transaction costs. Both extensions are detailed in Appendix Subsection A.2.4, which shows that allowing for remittances does not qualitatively change the model's predictions.

In both extensions, remittances occur in the households in which sons would make transfers to parents in the absence of migration. Because remittances are costlier or less reliable than transferring through the dowry, households will first exhaust transferring through τ before making any transfers through remittances. Thus, the extensions deliver an additional, perhaps counter-intuitive prediction.

[13]This result relies on the single-peak assumption on the distribution of R. A similar argument is used in Ashraf et al. (2020) for examining heterogeneity in the response of education to school construction. The assumption that individuals with the modal returns to migration rates do not migrate in India is consistent with recent observations (Munshi and Rosenzweig, 2016).

Auxiliary Prediction 1 *Parents who receive remittances from their migrant sons are more likely to be Net Takers of dowry than those that do not receive remittances.*

Sons and Daughters For simplicity, in our baseline model, households only have one son. In Appendix A.2.5, we show that accommodating daughters does not change the model's qualitative predictions. We begin by proposing an extension in which households have one daughter and one son. The impact of dowry traditions on male migration in this case is weakly positive. This is because, in the model, while the benefit to the parent of the son's transfer is canceled out by paying the daughter's dowry, the difference between the parents' and son's consumption is still lower under dowry, as the son does not consume all of E himself. Thus, dowry reduces the distortion from migration (and the return needed to migrate) since sons' consumption is lower than in the non-dowry case where sons consume all of E.[14] In addition to this extension, we note that even if paying a daughter's dowry exactly canceled out the incentive effect of dowry traditions on a male sibling's migration in household with one son and one daughter, this would not lead dowry to have zero effect in aggregate. This is because households vary in sex composition of the children, and there is a positive effect on male migration in son-only households and households with more sons than daughters. Even if sex ratios are balanced, there are mechanically more sons in households with a greater number of sons. Since total male migration is not affected by households with only daughters, this leads to a positive effect on migration in aggregate. In fact, India's sex ratio is significantly male-skewed, amplifying the aggregate dowry effect.

4 New Data Collection & Testing Predictions on the Distribution of Dowry

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

[14] Proof is provided in Appendix A.2.5.

gration 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. More details for all the datasets in this paper, including details on data collection and measurement for the Origin and Destination Surveys, are provided in the Data Appendix A.3. The first dataset allowed us to obtain detailed information through in-person interviews with young or middle-aged men. The latter dataset, 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 the 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.[15] The sample was stratified to consist of roughly 20% Delhi natives and 80% individuals who had moved to Delhi, although this included those who moved as children. 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 between the ages of 21 and 41. 84% were born in 185 districts outside Delhi across 21 states. For our analysis, we define migrants as those who moved to Delhi alone or as an adult (age 15 or greater) with their families and pool those who moved to Delhi with their families before age 15 with non-migrants (our analysis is robust to other age thresholds, including using only those born in Delhi).[16] This definition of migrant is motivated by our model, where migration introduces a friction for income-sharing by physically separating sons and parents.

After collecting basic demographic information and details about respondents' (and their parents') income and education, we asked for a detailed account of gifts

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

[16] While age 15 may seem young for independent migration, employment is restricted for those 14 and under (child labor) in India, and education is no longer compulsory at 15. So, this is a natural cut-off for when migration for employment may begin to occur.

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	24035.03	557
Share Muslim	0.10	0.29	557
Total Dowry	202,866	269,894	557
Share of Net Takers	0.45	0.50	557
Share of Migrants	0.62	0.49	557

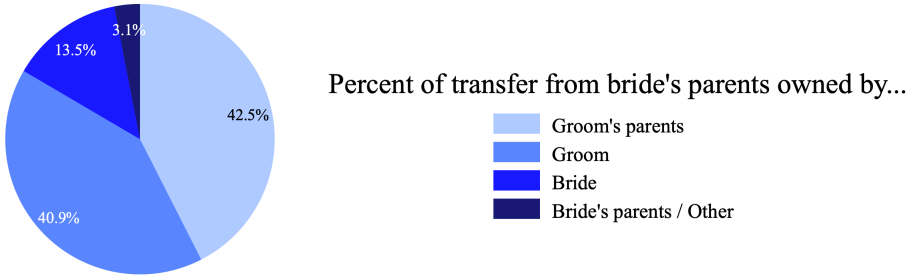
Notes: This table reports summary statistics for variables of interest in the Destination Survey conducted in 2018. Income and dowry are in Rupees. The occupation scores are the median monthly earnings of a certain occupation created by mapping our occupational categories to data from the NSS. 'Net Takers' are defined as grooms' parents who benefited financially from the marriage. Individuals who weren't born in Delhi are coded as migrants unless they migrated with parents as children (less than 15) or currently co-reside with parents.

transferred between the groom's and bride's sides 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 calculated the value of the gifts that were given and owned by the groom's parents (as well as those given and owned by the 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 net the groom's parents' transfers to other parties (excluding gifts they "gave" but ultimately own). We consider a groom's parents to be "Net Takers" ($\tau > 0$ in the model) if this net transfer is positive and "Net Givers" if it is negative ($\tau \leq 0$). In other words, the groom's parents are "Net Takers" if, once all the transfers are taken into account, they were made financially better off by the marriage. Finally, we also asked about financial assistance given to and received from parents, as well as co-residence patterns with parents. Table 1 reports summary statistics from these data. Consistent with the literature (Anderson, 2007), dowry is high, roughly 10 times the son's monthly earnings.

This survey provides the first quantitative evidence on property rights over dowry that we are aware of. Using these data, we are able to present an illustration of the ownership of gifts from the bride's side, which is what is often colloquially referred to as dowry, in Figure 3. We find that brides only retain property rights over 13.5% of their dowry on average. Grooms, on average, have ownership rights over 40.9% of

these marriage gifts, and grooms' parents have ownership over 42.5%.[17] This finding supports our model's approach of examining the previously unstudied allocation of dowry between the groom and his parents. In the next section, we explore what factors determine how much of the property rights accrue to the older generation and how much is maintained by the young couple?

Figure 3: Ownership of Transfers from Bride's Parents



Notes: This figure shows the ownership of the gross transfers made by the bride's parents to other parties at the time of the marriage, often referred to as dowry, across different parties, from the 2018 Destination Survey. We use the survey questions that ask which gifts were given by the bride's parents, and who has ownership (rights to sell) over those gifts.

4.2 Origin Survey

The 'Origin Survey' complements the destination survey by gathering information from parents, and from a broader range of geographies, allowing us to compare migrants and non-migrants from the same origin locations. The surveys were conducted over the phone by necessity (as it was collected in 2020, during the COVID crisis), and so have slightly less detailed information and more attrition. We conducted phone surveys in 34 districts in 6 North Indian states (Rajasthan, Uttar Pradesh, Bihar, Jharkhand, Madhya Pradesh, and Maharashtra) in partnership with IDinsight (IDI), a global advisory and data analytics research organization. The households contacted were 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.[18] We surveyed a total of 2,541 households. Due

[17] Note this does not mean that the benefit the bride gets from the dowry is equally limited, as her parents may have improved her welfare through a higher earning husband (Anderson and Bidner, 2015), or she may receive a commensurate marital surplus share in exchange for the nominal goods she disclaims.

[18] The voter rolls are representative of the population and compare well with averages from census and survey data (Joshi et al., 2020).

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	6,955	10,751.5	2,375
Parents Monthly Income	6,387	12610.79	3,068
Share Muslim	0.22	0.41	3,061
Total Dowry	75,643	640,713	2,204
Share of Net Takers	0.27	0.44	1,878
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. Sons are coded as migrants if they have permanently moved away from the parents' village.

to our interest in dowry, we restricted our survey sample to households where the head had a married son. Since households resist taking part in phone surveys with a duration greater than 20 minutes, we randomly sampled one married son and asked the head about that son's dowry and migration behavior.[19] To ensure our sample included enough migrants to be informative, if there was at least one migrant married son, we randomly drew one of the migrant married sons with a 70% probability and a non-migrant married son with a 30% probability. After completing this module, we asked the respondents if they would be willing to complete it for a second son. This allowed us to collect data on 3,069 sons, 20% of whom were migrants. For selected sons, we asked the parents about the gifts transferred at the time of their son's marriage. By asking parents how much of each category of gifts they owned, we calculated their self-reported ownership, complementing the data collected from grooms in 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 at the time of the wedding and the gifts they had received from other parties. The net transfer to the groom's parents is then calculated as the difference between these two values. Alongside asking about gifts, we also collected demographic details on the household head, information about their son's income and education, and financial assistance

[19]Providing incentives for survey participation in India is challenging because mobile money is not widespread, and most households have monthly, unlimited cell phone bundles, reducing the value of offering households extra data or cell phone minutes.

given to/received from their son. Table 2 reports summary statistics for these data.[20] Again, dowry is roughly ten times the son's monthly earnings, although these rural families are, on average poorer, and both dowry and income are lower.

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

4.3 Empirical Tests of Predictions 1 – 3 and Auxiliary Prediction 1

In this subsection, we test the model's first set of predictions, as well as the auxiliary prediction, exploiting the newly-collected data's unique information on marriage payment transfers.

Prediction 1 Prediction 1 states that we should observe both net negative and net positive marriage payments to parents due to underlying heterogeneity in relative incomes, returns to migration, and Pareto weights. There is evidence in favor of this prediction in both datasets. In the Destination Data (where there is a higher share of migrant sons), 45% of grooms' parents take from the dowry on net (Table 1). In the Origin Data, 27% take on net (Table 2).

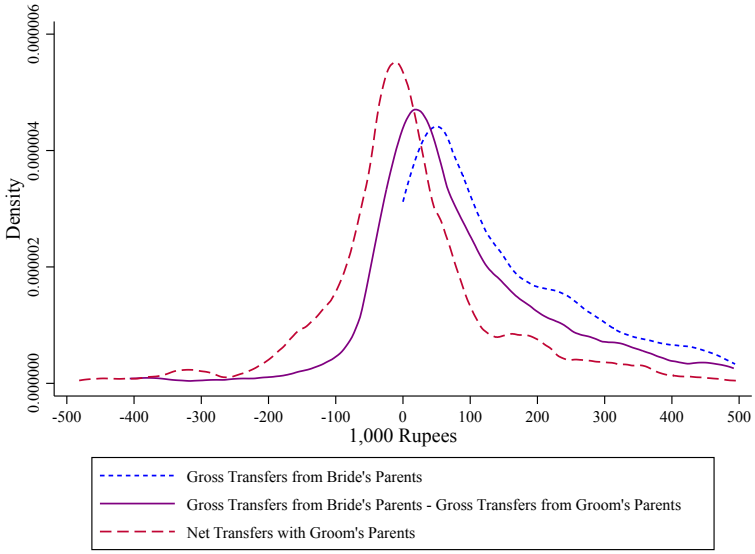
Figure 4 uses the Destination Data to plot the gross transfer from brides' parents (the value of all gifts given by the bride's side to the groom's side) and the net transfer from brides' parents (the value of all gifts given by the bride's side net the gifts received by the bride's side from the groom's side), two commonly collected dowry measures, alongside the net transfer taken by the grooms' parents.[21] Gross dowry is highest

[20] As shown in Table 2, due to recall issues and attrition during the phone survey, there is variation in the sample size by question. The Net Taker variable has a relatively higher missing rate because this value could only be calculated when parents provided numeric answers for the amount of gifts given and taken. In many cases, parents could report the existence of a gift and whether it was given or taken but could not estimate the value. Thus, this attrition appears to be related to recall rather than discomfort discussing taking from dowry. To ensure our results are robust to systematic recall error, we will also show a robustness test where we proxy for Net Taker in the Origin Survey with a measure that does not require reporting the quantitative values of gifts.

[21] We use the Destination Data because parents in the Origin Survey were not asked about what the bride's family gave to all other parties. This is both because of time constraints in the phone survey and because they are less likely to know the transfers on the bride's side.

and universally positive, while net dowry is lower, with some negative mass, and still centered above zero. The net amount taken by the groom's parents, however, is approximately centered at zero, with mass on both sides. This reflects the fact that – consistent with Prediction 1 – a substantial share of grooms' parents do, on net, benefit from their son's dowry. Many grooms' parents, on the other hand, endow their sons with resources on net at the time of marriage.

Figure 4: Distribution of Gross and Net Transfers in the Destination Survey



Notes: This figure shows the distribution of three different measures of dowry payments in the 2018 Destination Survey. The Destination Survey is used because we measure the allocation of gifts to the wife's parents as well. 'Gross Transfers from Bride's Parents' measures the total amount given by the bride's parents, to any recipient, sometimes called "gross dowry" in the literature. Positive numbers indicate outflows from the bride's parents. 'Gross Transfers from Bride's Parents - Gross Transfers from Groom's Parents,' often referred to in the literature as "net dowry," subtracts the contributions made by the groom's parents to the bride's side from the contributions by the bride's parents to the groom's side. Positive numbers indicate that the bride's parents gave more than the groom's parents, and negative numbers indicate that the groom's parents gave more. Finally, 'Net Transfers with Groom's Parents' is a new measure that is only possible to report with data on dowry ownership, which we collect for the first time. It measures the transfers from the bride's parents owned by the groom's parents minus any transfers from the groom's parents given to others. Positive values indicate the groom's parents are net takers, whereas negative values indicate they are net givers.

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 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. Data on property rights over dowry are needed

to understand dowry's implications for consumption across generations.

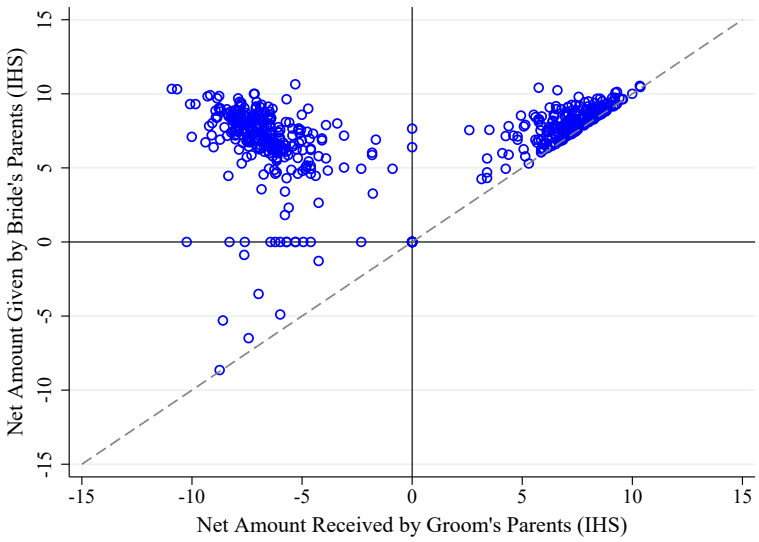
Finally, in Figure 5, using the Destination Data, we plot the inverse hyperbolic sines of the net amount given by the bride's side against the net transfer taken by the groom's parents. This allows us to look at what grooms' parents' giving and taking looks like across different dowry amounts. The fact that almost all data points are positive shows that dowry *giving* is essentially universal—there are only a handful of families practicing bride price, where the bride's family benefits on net (the dots below the x-axis). By contrast, dowry *taking* is far from universal, and the strong heterogeneity in grooms' parents behavior emerges even more clearly in this graph. In about half of the cases where the brides' parents give positive dowry, the grooms' parents also give net transfers to the young couple (dots to the left of the y-axis), and the amount given increases in the amount given by the bride's side. In the other half of cases, to the right of the y-axis, grooms' parents benefit from the transfers from the bride's side. Here, the amount taken is positively related to the amount given.

We next investigate the drivers of this substantial heterogeneity in dowry's allocation by testing the model's other predictions.

Prediction 2 We test whether parents are more likely to be Net Takers from the dowry if the son is a migrant in columns 1 (Origin Survey) and 3 (Destination Survey) of Table 3.[22] In these columns, we regress an indicator variable for whether the groom's parents took, on net, from the dowry (an indicator for $\tau > 0$) on an indicator variable for whether the son is a migrant. We additionally control for whether the son currently co-resides with his parents to account for the fact that property rights may be hard to measure in cases where sons and parents co-reside. The omitted category is, therefore, sons that remain in the same village as their parents (Origin Survey), or were born in Delhi or came to Delhi as children with their parents (Destination Survey), but do not currently co-reside. Consistent with the model's prediction, parents of migrants are 8 percentage points more likely to take in the Origin Survey

[22]In Appendix Table A1, for the Origin Survey, we perform the same analysis with an alternative measure of taking with fewer missing observations – the average fraction of gifts owned by the groom's parents. We recover the same patterns as in Table 3 columns 1 and 2 with this alternate measure (the Destination Survey does not have missing quantitative data). We do not use the fraction of gifts owned as our main measure because it is less closely aligned with our model, which predicts that parents take *on net*. Nonetheless, the fraction of gifts owned is highly correlated with Net Taking in cases where we can construct both, and it provides interesting evidence that our results hold on the intensive margin: parents of sons who migrate take more dowry, and the amount taken is increasing in sons' occupation score for migrants only.

Figure 5: Distribution of Net Transfers



Notes: This figure shows the relationship between the inverse hyperbolic sine of the net amount (in 100s of Rupees) given by the bride's parents and net amount received by the groom's parents in the 2018 Destination Survey. 'Net amount given by bride's parents' is defined as their total gifts to other parties minus their receipt of gifts from other parties. 'Net amount received by groom's parents' is the total gifts received by the groom's parents minus gifts given to other parties. Because the gifts given by the bride's side are what can be possibly taken by the groom's side, dots cannot be below the 45-degree line. Dots in the bottom-left quadrant reflect the rare practice of bride price: the bride's parents benefit on net, and the groom's parents give. Dots in the top-left quadrant reflect *both* sets of parents making transfers to their children: the bride's parents are making positive transfers, yet the groom's parents are also experiencing outflows, because they, too, are giving gifts. Dots in the top-right quadrant reflect the practice of dowry that is reflected in anecdotal evidence: the bride's parents giving, on net, while the groom's parents receive, on net, benefiting from some or all (those dots exactly on the 45-degree line) of these transfers.

and 27 percentage points more likely to take in the Destination Survey.[23]

To understand the types of transfers that drive net-taking, in Figure 6, we show the average value of each type of good taken by grooms' parents for migrants vs. non-migrants who are not co-resident in the Destination Survey.[24] Consistent with the results in Table 3, migrants' parents take more of almost every category. Reassuringly, the effect on net-taking is not an artifact of migrants leaving difficult to move goods like land or furniture with their parents. Rather, consistent with the model, where dowry provides more liquid resources that can be transferred, migrants' parents take substantially more of the most liquid goods (cash and jewelry).

[23]The difference in the point estimates between the Origin and Destination Surveys could reflect the differences in the samples' characteristics. For example, the grooms in Delhi are much richer, and in our model, parents are more likely to take from relatively wealthier sons.

[24]This is only possible with the Destination Survey, since it requires that individuals reported the values taken for each category separately.

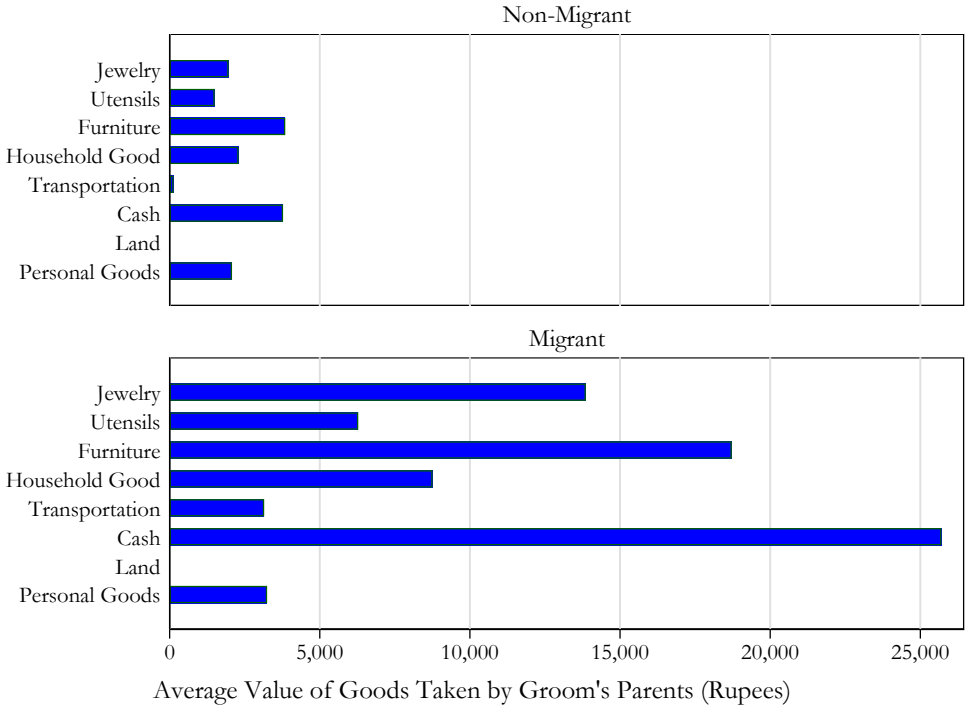
Table 3: Predictions 2 & 3: Migration, SES, Pareto Weights, & Net Taking

	Dep. Var.: Parents are Net Takers			
	Origin Survey:		Destination Survey:	
	(1)	(2)	(3)	(4)
Migrant Son	0.076**	0.008	0.271***	0.245**
	(0.037)	(0.056)	(0.087)	(0.116)
Migrant Son × Ln(Son Occ Score)		0.192**		
		(0.085)		
Non-Migrant Son × Ln(Son Occ Score)		0.027		
		(0.050)		
Ln(Father Occ Score)		-0.034		
		(0.039)		
Migrant Son × Parents have veto power				0.278***
				(0.075)
Non-Migrant Son × Parents have veto power				0.289***
				(0.086)
Coresidence & Mar. Year & Age FEs	Yes	Yes	Yes	Yes
Education dummies	Yes	No	Yes	Yes
Mean of dependent variable	0.273	0.270	0.447	0.449
R-squared	0.042	0.051	0.115	0.151
Observations	1869	1300	557	552

Notes: This table reports the relationship between migration, socioeconomic status, and net-taking behavior in both the Origin Survey (columns (1) & (2)) and the Destination Survey (columns (3) & (4)). The outcome is an indicator variable for whether the grooms' parents are Net Takers (i.e., those for whom the value of the gifts they control is greater than the value of the gifts they gave). In the Destination Survey, we define migrants as those who moved to Delhi alone or as an adult and do not currently live with their parents. In the Origin Survey, we define migrants as individuals who have permanently left their parents' village. The occupation scores are the median monthly earnings of a certain occupation created by mapping our occupational categories to data from the NSS. Parents are coded as having veto power if their son reports that he would not 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.

Alternative Explanations While consistent with the predictions of the model, the results in Table 3 are less consistent with an alternative model in which dowry facilitates migration because it can be used to pay other migration costs such as transportation, or setting up a new household or business. In columns 1 and 3, we observe that parents are more likely to take when a son migrates. If dowry enabled migration by paying upfront costs, we would expect there to be less dowry left for parents to benefit from when sons migrate. Furthermore, Figure 6 shows that migrant grooms' parents take substantially more cash. We would not expect to see this if the dowry mainly enables migration because it is used to pay upfront costs, as we would exactly expect cash to be used to pay those costs.

Figure 6: Amount Taken by Item and Son's Migration Status



Notes: This figure shows the average value of goods (in Rupees) taken by the groom's parents, by each dowry item. The data are from the Destination Survey in Delhi. It compares the taking behavior when the son is a migrant to when the son is not a migrant and excludes co-resident sons. Migrants are defined as those who moved to Delhi alone or as an adult, and do not reside with their parents.

Another potential alternative explanation for this result is that the dowry remains with the migrant's wife, who may stay with the groom's parents when the groom migrates. Migrants' wives remain with the groom's parents in 60% of cases in the Origin Survey and 51% of cases in the Destination Survey. Appendix Table A2 verifies that this is not the case. Parents of male migrants are more likely to be Net Takers regardless of the wife's location in both surveys.[25]

Finally, one could think that brides' parents are willing to offer more dowry for a migrant son. This explanation is entirely consistent with our theoretical analysis,

[25]While we do not model the wife's location explicitly, intuitively, there is no clear prediction about the differential effect of being a migrant whose wife accompanies the migrant (rather than staying with his parents). On the one hand, a wife who stays may help provide old-age support, substituting for taking the dowry. On the other hand, the wife staying is not exogenous, and may be more likely to occur in cases where there is a stronger tie between the son and his parents or where more old-age support is needed.

but does not explain the relationship between the grooms' parents' taking of dowry and migration. To explain this, it must be that brides' parents wish to facilitate migration for their daughters' welfare, and doing so requires resolving the grooms' parents need for age-old support, but this channel is exactly aligned with our model's key mechanism.

Prediction 3 This prediction states that the groom's parents' likelihood of taking is increasing in both the migrant son's income and the parents' Pareto weight, holding parents' income fixed. To test the first part of this prediction, we exploit the fact that our Origin Survey (but not the Destination Survey) collected information on both fathers' and sons' occupations. This provides a more accurate proxy of y_P and y_K than current earnings because it is less subject to age at the time of the survey, seasonality, the endogenous migration decision, and recall noise than current income measures. We convert this information into occupational scores by matching it to the nationally representative National Sample Survey's (round 68, conducted in 2011-12) occupational codes. 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 indeed the case. There is a large and statistically significant interaction between the son's occupational score and migrating. For migrant men, a 100% increase in the son's occupational score increases the likelihood of parents taking by 19 percentage points. In contrast, for non-migrant sons, the son's occupational score is not meaningfully associated with taking, which, although not a prediction of the model, is consistent with the availability of the income transfer α to share extra income with parents without resorting to dowry.

Column 4 of Table 3 tests the second part of Prediction 3. To proxy for the parents' Pareto weight θ, we exploit the following question from the Destination Survey: *"If your parents had not approved of the marriage, how much would that have affected your decision?"* We interpret parents as having a higher θ when sons report that they would not have married without parental approval. Thus, we expect parents to 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 of migrant sons are 28 percentage points more likely to be Net Takers. Interestingly, this is true for migrant and non-migrant sons, suggesting that dowry is used to redistribute consumption

according to Pareto weights, regardless of migration status.[26]

Auxiliary Prediction 1 The Origin Survey contains information about transfers received by the parents from sons and vice versa. To test auxiliary Prediction 1, which states that parents who receive remittances from migrant sons are more likely to have taken from the dowry than parents that do not receive remittances, we construct an indicator variable for whether a son made net financial transfers to the parents in the year prior to the survey (before the COVID-19 pandemic). Overall, around 30% of sons transfer, on net, to their parents (45% for migrant sons). We relate this variable to net taking and find a strong positive relationship between net taking of the dowry by parents and receiving remittances from migrant sons (Table 4). Consistent with the model's somewhat counterintuitive prediction, sons sending remittances appears to be a marker of being in a Seeking household where parents are also likely to take from the dowry.

Table 4: Auxiliary Prediction 1: Remittances & Net Taking

	(1)	(2)
	Net Taker	Net Taker
Son Transfers	0.052*	0.008
	(0.031)	(0.035)
Migrant Son		-0.008
		(0.051)
Son Transfers × Migrant Son		0.168**
		(0.074)
Coresidence & Mar. Year & Age FEs	Yes	Yes
Education Dummies	Yes	Yes
Mean of Dependent Variable	0.271	0.271
R-squared	0.062	0.068
Observations	1128	1128

Notes: Data are from the Origin Survey. 'Net Takers' are defined as grooms' parents who had a positive net transfer with the bride's parents. That is, they were made financially better off by the total gifts transferred at the time of the marriage. Son transfers is an indicator variable equal to 1 if the son made positive net financial transfers to his parents in the year prior to the survey. Standard errors are clustered at the household level. *,**, and *** denote 10, 5, and 1% significance respectively.

[26]We speculate that the difference between son's income, which only correlates with net-taking for migrants, versus Pareto weights, could stem from the fact that variation in income necessarily provides the liquidity to use the income transfer, α, to redistribute it for non-migrants, whereas for migrants this tool would not be available. By contrast, Pareto weights could vary such that even non-migrant sons do not have sufficient transferable income for the required redistribution, such as if sons' earning is through work on the family farm.

5 Migration Predictions

In this section, we test the predictions of the model about dowry's role in enabling migration. These predictions are important for understanding the dowry tradition's aggregate effects and whether dowry can help facilitate structural change. In the first subsection, we test Prediction 4, and in the second subsection, we test Prediction 5.

5.1 Prediction 4: Association Between Dowry Traditions and Migration

In this section, to test whether households with a dowry tradition have a higher probability of having a migrant son, we regress male migration on a measure of the strength of dowry traditions. To do so, we must introduce two new data sources. We first discuss the geographic variation in historical dowry traditions (our right-hand-side variable). We then introduce the main dataset used to test the predictions, the National Sample Survey's migration module (the source of our left-hand-side variable). Finally, we combine these datasets to test the prediction.

5.1.1 Variation in Historical Dowry Traditions

Testing the prediction requires a source of variation in the strength of dowry traditions. For this, 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 a weaker history of dowry traditions. 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.

Measure of Dowry Traditions 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*

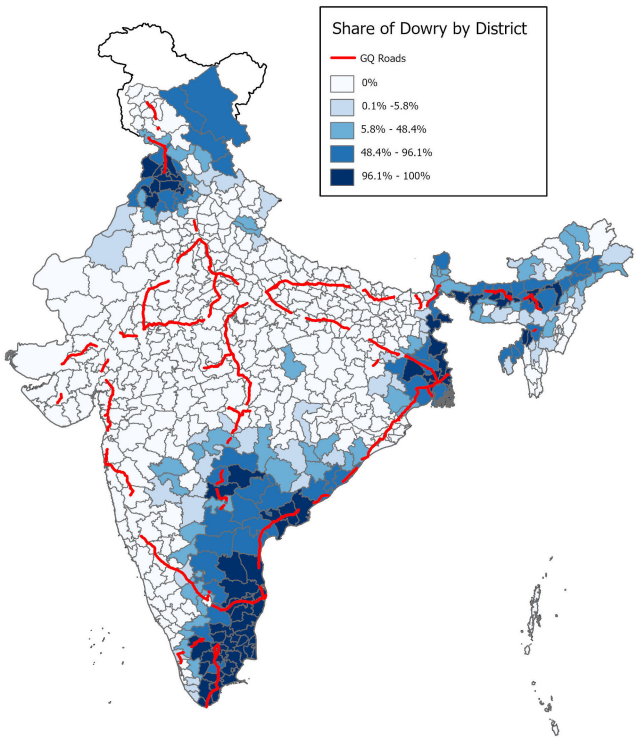
(Gordon Jr, 2009). After mapping the language groups in the *Ethnologue* to the *Ethnographic Atlas* (and other anthropological sources), Giuliano and Nunn (2018) calculate the weighted average of each traditional cultural trait among the population in an area by averaging over the population-weighted 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 7 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 the measure is frequently 0, implying there is no linguistic group connected to an ancestral group that practiced dowry. But the measure can also take very high values. Given the non-negligible mass of districts with values just above 0 (likely due to either minor linguistic groups reporting dowry or group boundaries extending just over district boundaries), 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 (368 districts out of 582). We then show robustness to other cutoffs.

Geographic Variation & Consistency With Qualitative Data Sources The variation in the dowry measure shown in Figure 7 may seem 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 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, which may raise questions about the measure. We validated the ancestral measure by comparing

Figure 7: Share of Population From Groups That Traditionally Practice Dowry by District, and Map of GQ and NS-EW corridors



Notes: The figure shows the district-level share of the population with a dowry tradition. The data are generated following methods in the *Ancestral Characteristics* data by Giuliano and Nunn (2018). The map of highways that make up the Golden Quadrilateral (GQ) and NS-EW corridors is overlaid over the dowry variation in red.

it to qualitative evidence from (1) two summary publications on dowry practices, Goody and Tambiah (1973) and AIDWA (2003), and (2) Yale's *Human Relations Area Files* (HRAF) database of ethnographic studies. 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 map. 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,'*" where the groom's family provides bridewealth, "*is more common in North India than in the South, where dowry proper... prevails*" (p. 20).

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 in their present population.[27] The central Northern states that are coded as having little ancestral dowry are home to ethnic groups that traditionally practiced bride price.[28]

Quantitative Validation We next check if the ancestral data are 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. We validate our measure using contemporary measures of dowry sizes from the large-scale 1999 round of the Rural Economic and Demographic Survey (REDS) (National Council of Applied Economic Research (India), 1999). An 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 5 in Section 5.2. In Table A3, we regress log gross and net dowry measures on the historical tradition measure.[29] All specifications control for marriage year fixed effects to account for inflation over time. Columns 1 and 2 show that the historical dowry measure is associated with an 81% (gross) to 109% (net) greater dowry payment. Columns 3 and 4 show that a positive relationship remains (though it shrinks) even after controlling for regional geographic variation via fixed effects for six geographic regions. We conclude that the ethnographic data is predictive of modern dowry payments.

We next turn to a more geographically widespread dataset, the India Human Development Survey (IHDS) (2011), which allows us to also include state fixed effects. In Table A4, we test if the traditional dowry measure is associated with whether dowry is frequently or ever paid in gold (a proxy for dowry size, which is not measured directly in the IHDS). The IHDS data confirm that the district-level traditional dowry

[27] 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 Schuetze, 1948; Rockhill, 1895).

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

[29] We focus on log dowry measures because dowry values are extremely skewed, and intensive margin variation in dowry payments is likely to be more relevant since practicing any dowry is nearly universal (Chiplunkar and Weaver, 2023).

measure is associated with a greater likelihood of having dowries paid in gold, even after controlling for state fixed effects.

5.1.2 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) (Indian Ministry of Statistics and Programme Implementation, 2008). This survey covered almost every district in India (588 of 610 districts).[30] All rounds of the Schedule 10 Survey 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. By appending the list of out-migrants to the list of current household members in the household roster, we assemble a superset of the roster containing all individuals who ever lived in the household (see Section A.3 for more details). For our main analysis, we define individuals as migrants if they are reported as having left the household. The listing of out-migrants seems to align with permanent migration (95% of out-migrants left more than a year ago). Nonetheless, as our model focuses on permanent migration, to more precisely capture the model's mechanism, we also report analyses where we define a migrant as someone who left the household more than a year ago and drop recent out-migrants from the data.

Table A5 reports the means of key socioeconomic characteristics and evaluates whether these characteristics are systematically different in dowry and non-dowry districts. We report results from regressions where our explanatory variable of interest is the population-weighted share of the district that practiced dowry traditionally, and the outcome is a particular district characteristic. After controlling for state fixed effects, out of the 14 characteristics we test, only distance to the closest city is statistically significantly different between dowry and non-dowry districts. Notably, both the share belonging to a scheduled tribe or caste and the share practicing Islam are uncorrelated with traditional dowry after including state fixed effects. Indeed, in

[30]India now has substantially more districts than it did in 2007-2008. The survey was not universal because areas were exempted due to security concerns, remoteness, or because some areas are inhabited by tribal people who do not wish to be contacted. The excluded areas were the Leh and Kargil districts of Jammu and Kashmir, interior villages of Nagaland that were more than 5 km to a bus route, and inaccessible villages in the Andaman and Nicobar Islands.

subsequent analyses, we control for state fixed effects (in cross-sectional regressions) and state-by-year fixed effects (in panel regressions). In robustness checks, we also control for distance to the closest city (along with various demographic and economic characteristics of households), since this is the only non-balanced characteristic conditional on the state fixed effects. Additionally, as there is evidence that regions with dowry may differ on the caste composition of the population (see e.g., Agarwal (1994)), even though, conditional on state fixed effects, caste does not seem to be related to the traditional dowry variable, we also show that all the results are robust to caste controls.

5.1.3 Test of Prediction 4

We combine the NSS data with the historical measure of dowry traditions to test Prediction 4, which states that stronger dowry traditions increase the probability of male migration. Here, and elsewhere, we only consider permanent rather than seasonal migrants. In Table 5, using a sample of males aged 15–45, we regress an indicator variable equal to 1 if an individual had migrated by 2007 (the year the data were collected) on three different versions of the district-level dowry tradition measure. The first, continuous measure is the share of the population belonging to groups with dowry traditions (columns 1–3). While this measure uses the most information, we also consider two discrete measures, since we will need to categorize districts as high and low traditional dowry districts to test Prediction 5. The second measure is an indicator variable equal to 1 if the continuous value is greater than 0.1% (columns 4–6). For our other discrete measure, we use a more stringent cut-off of 10% to capture districts with a high share of traditional dowry (columns 7–9). We focus on males aged 15–45 since younger men are unlikely to have had the opportunity to migrate without their parents, and the older sample may be affected by selection due to mortality and poor recall regarding early migrants. Additionally, migration rates for those with earlier birth years are negligible. For each measure, we report the estimates with no controls (first column) and add state and year of birth fixed effects (second column), as well as caste fixed effects, household head education controls, and additional geographic controls for the district centroid's latitude and longitude, the distance to the coast, and the distance to the closest big city (third column).

Columns 1-3 show that the continuous dowry measure is positively and significantly related to male migration. Despite controlling for a substantial fraction of

the geographic variation in dowry practices with state fixed effects and geographic controls, the positive relationship remains and continues to be significant (the point estimate actually becomes larger with controls). For the discrete measures, which leverage less information, the association between traditional dowry and male migration is still positive, though no longer statistically significant when including the most stringent additional controls. Reassuringly, as we would expect, the point estimate is larger for the higher cut-off of 10% relative to 0.1%.

Table A6 shows that the results are robust to defining a migrant as an individual who left the household at least a year ago and dropping those who migrated in the last year from the data. In Table A7, we also use the two waves of IHDS data to test this prediction. Across different combinations of fixed effects and age groups, our results are again consistent with the prediction.

Altogether, our results confirm that historical dowry traditions are associated with higher rates of male out-migration, supporting the hypothesis that dowry can ease migration frictions. One alternative explanation for this finding is that the dowry is used to pay migration costs. However, combining this result with the results of our survey data indicates that intra-household frictions are likely to play an important role. This is because, as mentioned earlier, if dowry were instead used to pay the pecuniary costs of migration, we would expect parents of migrant sons to receive *less* dowry rather than more.

Table 5: Prediction 4: Association Between Dowry Traditions and Male Migration

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Dep Var.: Individual Migrated								
Dowry (Continuous)	0.0257**	0.0451**	0.0380**						
	(0.0101)	(0.0199)	(0.0185)						
Dowry (0.1% Threshold)				0.0184**	0.0127	0.0068			
				(0.0086)	(0.0115)	(0.0112)			
Dowry (10% Threshold)							0.0213**	0.0296*	0.0257
							(0.0087)	(0.0174)	(0.0169)
Mean of Dependent Variable	0.244	0.244	0.229	0.244	0.244	0.229	0.244	0.244	0.229
Observations	188,192	188,192	184,322	188,192	188,192	184,322	188,192	188,192	184,322
R-squared	0.001	0.042	0.047	0.000	0.042	0.046	0.001	0.042	0.047
State FEs	N	Y	Y	N	Y	Y	N	Y	Y
Year of Birth FEs	N	Y	Y	N	Y	Y	N	Y	Y
Distance Controls	N	N	Y	N	N	Y	N	N	Y
Caste FEs	N	N	Y	N	N	Y	N	N	Y
Education Controls	N	N	Y	N	N	Y	N	N	Y

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 0.1% threshold discrete measure is an indicator variable equal to 1 if more than 0.1% of the district population belongs to groups with dowry traditions. The 10% threshold discrete measure is an indicator equal to 1 if more than 10% of the district population belongs to groups with dowry traditions. The distance control includes the district centroid's latitude and longitude, the distance to the coastline, and the distance to one of the closest large cities (Mumbai, Kolkata, Delhi, Chennai). Standard errors are clustered at the district-level. *,**, and *** denote 10, 5, and 1% significance respectively.

5.2 Prediction 5: Do Males From Dowry Districts Migrate More in Response to Highway Construction?

Finally, we investigate how the effect of a reduction in migration costs varies with traditional dowry prevalence. Prediction 5 states that, as long as migration rates are relatively low, communities in which dowry traditions are stronger should experience a greater increase in male migration in response to a decline in the cost of migration. In this section, we first introduce the cost shock we will use – two highway expansion programs – and then empirically test the prediction.

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

To test Prediction 5, we exploit a reduction in the cost of migration due 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) corridor, which connected the corners of the GQ through the interior.[31] 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 that 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) (2023), 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 7 plots the location of the full set of projects we identify.

[31] 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 before 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.

5.2.2 Test of Prediction 5

Empirical Strategy We leverage the staggered timing of highway construction across districts as a source of variation in migration costs over time and space under the assumption that access to roads reduces the cost of migration (Morten and Oliveira, 2023). The staggered timing of the construction of highway segments combined with information on the timing of migration from the NSS allows us 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 dataset into a panel at the individual i-year t level for the years between 1996 and 2007. The transformed data would allow for the estimation of the following, "naive" event study regression separately for individuals from dowry and non-dowry districts:

$$y_{iajdt} = \alpha_i + \theta_{jt} + \delta_a + \sum_s \beta_s GQ_{dts} + \mathbf{X}_{iajdt}\boldsymbol{\gamma} + \epsilon_{iajdt}, \tag{2}$$

where y_{iajdt} is an indicator variable equal to 1 if an individual i of age a, state j, and district d has migrated before year t. We first examine migration for all purposes and then for employment purposes only.[32] The fixed effects α_i, δ_a, and θ_{jt} are at the individual, age, and state-by-year level. 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, therefore, controls for any time-varying shocks at the state level, as well as any individual-level and age-specific time-invariant differences. Depending on the specification, the controls $\mathbf{X}_{iajdt}$ also include trends for geographic characteristics and cultural features (e.g., patrilineal inheritance and historical plow adoption), caste-by-year fixed effects, and trends by household consumption.

This naive approach and its related difference-in-differences regression, which assumes a constant treatment effect across treated units over time, may be problematic. A growing literature suggests that researchers must be cautious when estimating the effect of staggered treatments with two-way fixed effects (Goodman-Bacon, 2021; Callaway and Sant'Anna, 2020; Sun and Abraham, 2021; 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

[32] Employment-related migration includes the following NSS categories under reason for migration: in search of employment, in search of better employment, business, to take up employment/better employment, transfer of service/contract, and proximity to the place of work.

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 unsatisfactory control group for later treated units.[33] 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. We also show robustness to using the method proposed by Callaway and Sant'Anna (2020), which produces very similar results.[34] 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, while others will be observed longer post treatment. We include the controls from the 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, and the omitted period is the earliest pre-treatment period.

We focus on individuals' migration decisions between 1996 and 2007 (the last year detailed migration data are available), though we exploit information on projects implemented as late as 2016 to estimate the pre-treatment effects of highway construction. For those in GQ districts, we restrict our sample to those between 13 and 45 at the time they received the project, so as to not pick up how GQ affected dependent (child or old-age) migration.[35] But in all specifications, we also include age fixed

[33]See Goodman-Bacon (2021) 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.

[34]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.

[35]We choose an initial age slightly younger than 15 to capture individuals who may be too young to initially migrate but could respond to the expansion after a few years.

effects that account for differential migration rates by age and perform a robustness check where we match the non-GQ sample to the realized age distribution in the GQ districts.

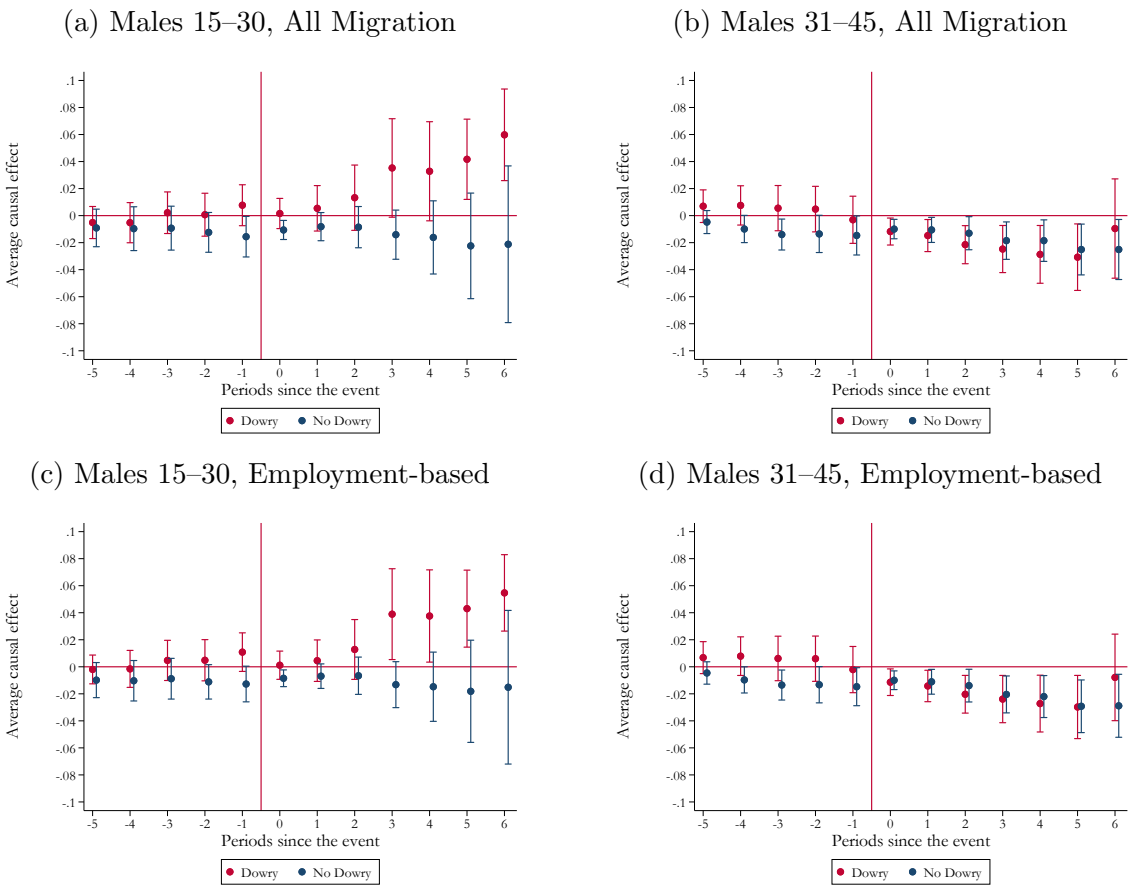
We expect the strongest impacts to be on individuals who were between 15 and 30 at the time of the survey (2007). We view this as the group that is most intensively treated because those younger than 15 are more likely to be too young to respond, and the average male marriage age in our sample is 23.[36] Thus, those as old as 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. So, it is reassuring if we estimate smaller (or null) effects for the 31-45-year-old sample.

Results Figure 8 reports the results using the methodology of Borusyak et al. (2021). The top panels report results for migration for any reason, while the bottom panels restrict the outcome to be migration for employment-related reasons only. 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 group). Panels (c) and (d) do the same but for employment-based migration only. In all cases, zero is normalized to be the year of the first highway construction project in the district. None of the panels exhibit pre-trends in migration rates prior to GQ construction.

After the receipt of the first highway construction project, Panel (a) shows that there is a large and significant increase in out-migration for prime-age men 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 allocation of dowry at the time of marriage (which is likely to have already occurred for the older group) is important for allowing young men to take advantage of increased migration opportunities. If anything, there is a decline for older groups, which could be a reaction to the increase among younger men (e.g., if there are more young migrants, fewer older men now migrate for risk mitigation purposes). Restricting the outcome to be defined as employment-based migration (as opposed to any migration) in Panel (c) confirms that the results are driven by migration for employment, consistent with the

[36]The average male age of marriage was 22 in our Origin Survey and 23 in our Destination Survey.

Figure 8: Effects of GQ on Male Migration by Dowry Status



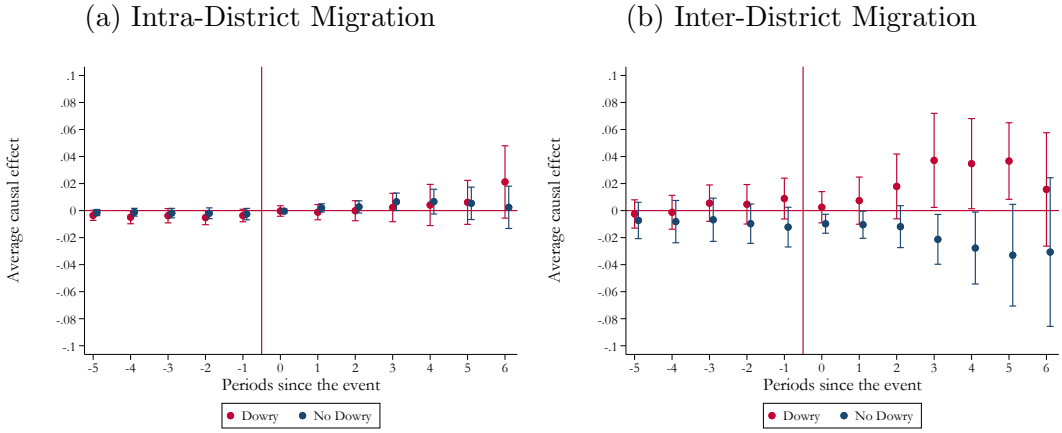
Notes: This figure shows the event study estimates of the effect of the GQ on migration. Panels (a) and (b) show the event study estimates of the effect of the GQ on all migration, while Panels (c) and (d) are restricted to employment-based migration specifically undertaken either: in search of employment, in search of better employment, for business, to take up employment/better employment, due to the transfer of service/contract, or for proximity to the place of work. In Panels (a) and (c), the sample is of males in the 2007 NSS who were aged 15-30. In Panels (b) and (d), the sample is of males in the 2007 NSS who were aged 31-45. For those in GQ districts, we restrict our sample to those between 13 and 45 at the time they received the project. All estimates use the methodology of Borusyak et al. (2021) and include individual, age, and state-by-year fixed effects. Standard errors are clustered at the district level.

idea that men are migrating to capture higher returns to migration.

Next, in Figure 9, we estimate the effects of the GQ by dowry tradition on *intra*-district and *inter*-district migration separately. That is, the dependent variables are indicator variables for migrating within or out of the district. 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 that 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 labor allocation and larger wage gains.

Figure 9: Effects of GQ on Young (Age 15-30) Male Intra/Inter-District Migration by Dowry Status Using Borusyak et al. (2021)



Notes: This figure shows the event study estimates of the effect of the GQ on migration based on the out-migrant's destination for males in the 2007 NSS who were aged 15-30. In Panel (a), the out-migrant's current location is located within the same district as their previous household. In Panel (b), the out-migrant's current location is not located within the same district as their previous household, although it is possible their current location is in the same state. All estimates use the methodology of Borusyak et al. (2021) and include individual, age, and state-by-year fixed effects.

Robustness We also conduct a number of robustness checks in Figures A1 and A2. First, in Figure A1 we include additional geographic controls (Panel (a)), and control for differential time trends by distance to the closest city and distance to coastlines. Even though all our specifications already include state-by-year fixed effects, the controls help ensure that the results are not driven by differential time trends across areas (within states), as neither the locations of the GQ nor dowry traditions are randomly assigned. The results remain similar.

Next, we control for caste-by-year fixed effects and the time-varying effects of the NSS's measure of household expenditures (Panel (b)). 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 heterogeneous effects of the GQ due to differences in socioeconomic status rather than

cultural traditions. Even though the household expenditure measure is observed after migration decisions have taken place and is therefore endogenous, we do not find that including these controls substantially affects our results.

In Panel (c), we control for other characteristics from the *Ethnographic Atlas* that may be related to dowry traditions or otherwise affect household behavior (such as the district-level prevalence of the plow and patrilineal inheritance) and allow the effects of these controls to vary over time.[37] This robustness check helps ensure that our results are not driven by other cultural traits that may be correlated with dowry and migration.

In Panel (d), we use a different estimation procedure proposed by Callaway and Sant'Anna (2020).[38] Our qualitative results are similar: we see an increase in emigration from rural areas for younger cohorts that receive a GQ segment in dowry areas. In Panels (e) and (f) we investigate whether our results could be biased by age-specific trends. Due to our sample restriction in the GQ districts that individuals are 13–45 at the time of the road construction, the age distribution between GQ and non-GQ districts differs. In Panel (e), we show that failing to include the age fixed effects does not affect our estimates, suggesting that our results are not sensitive to age-specific trends. In Panel (f), we adjust the age distribution in the non-GQ districts to ensure that the age distributions are the same between GQ and non-GQ regions.[39] Our results again remain the same.

In Figure A2 we vary the cutoff for what constitutes a dowry prevalent district. In our baseline specification, we classify a district as dowry prevalent if it has greater than 0.1% historical dowry practice. In Figure A2, we vary this cutoff to be 1%, 10%, and 25% in the different panels. Each of these cutoffs produces very similar patterns

[37] We focus on these two controls because the plow has been shown to be related to female labor force participation (Alesina et al., 2013), and male inheritance is thought to coincide with the practice of dowry (Botticini and Siow, 2003).

[38] 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' $ATT(g,t)$, 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.

[39] We first compute the fraction of in-sample individuals in each age group in GQ districts after implementing the age restrictions (individuals need to be 13–45 at the time of the road construction). A new control group is then drawn via stratified random sampling from non-GQ districts to match the distribution of ages in the GQ districts.

in male prime-age out-migration. Finally, in Figure A3, we report the results using the alternative definition for permanent migration (migrated more than 1 year ago) and confirm that they are robust.

In sum, our analysis indicates that the main predictions of our model are satisfied by the data, both in terms of how dowry is distributed across generations and in terms of how dowry may enable long-term migration.

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. In low-income countries like India, there are wide disparities in economic opportunities across regions, and enabling migration can facilitate aggregate growth and development (Munshi and Rosenzweig, 2009). We consider the possibility that dowry – a payment from the bride's family accompanying marriage – 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 six novel predictions, which we test with two newly-collected survey datasets 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 some, but not all, grooms' parents retain a substantial fraction of the dowry. Parents are more likely to retain dowry when sons migrate and especially when sons' earnings are higher and parents' bargaining power is greater. Somewhat counterintuitively, but consistent with the predictions of the model, parents are also more likely to take dowry 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 migrate more in response 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-sixth of the world's population. This alone makes understanding the effects of this practice – and how it affects the allocation of labor – important. However, more broadly, our results also speak to the role of family social insurance and the lack of formal sources of old-age support as constraints on migration in low-income settings (Fetter et al., 2022). Indeed, our results suggest that to ensure individuals can migrate to take advantage of high-paying jobs, policymakers may wish to provide access to sufficient old-age support.

More speculatively, our results may also speak to why the practice of dowry has remained widespread and even become more popular despite attempts by the Indian government to ban it. The decline of patrilocality and increased uncertainty in intergenerational old-age support may contribute to dowry's popularity. 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 living with or near 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

A.1 Appendix Tables

Table A1: Robustness of Origin Survey Results to Recovering Missing Data by Using Fraction Owned by Parents

	Origin Survey:	
	(1)	(2)
	Average Fraction Owned	Average Fraction Owned
Migrant Son	0.058***	0.042**
	(0.012)	(0.017)
Migrant Son × Ln(Son Occ Score)		0.079***
		(0.027)
Non-Migrant Son × Ln(Son Occ Score)		0.023
		(0.017)
Ln(Father Occ Score)		-0.026*
		(0.013)
Coresidence & Mar. Year & Age FEs	Yes	Yes
Education dummies	Yes	No
Mean of dependent variable	0.136	0.140
R-squared	0.068	0.067
Observations	2598	1819

Notes: This table reports the relationship between migration, socioeconomic status, and the average fraction of dowry gifts owned by the parents in the Origin Survey. For each category of gifts, grooms' parents were asked what approximate share they owned (the options were the categories 0%, 25%, 50%, 75%, and 100%). The outcome variable is the average over the percent parents reported owning of each category. Migrant sons are individuals who are reported to have permanently left their parents' village. The occupation scores are the median monthly earnings of a certain occupation created by mapping our occupational categories to data from the NSS. Standard errors are clustered at the household level. *,**, and *** denote 10, 5, and 1% significance respectively.

Table A2: Robustness for Prediction 2: The Wife's Location

	Origin Survey:	Destination Survey:
	(1)	(2)
	Net taker	Net taker
Migrant Son	0.074*	0.295***
	(0.041)	(0.092)
Migrant Son × Wife Accompanied	0.005	-0.053
	(0.055)	(0.057)
Coresidence & Mar. Year & Age FEs	Yes	Yes
Education dummies	Yes	Yes
Mean of dependent variable	0.273	0.447
R-squared	0.042	0.117
Observations	1869	557

Notes: This table reports the relationship between migration and net-taking behavior in both the Origin Survey (column (1)) and the Destination Survey (column (2)). The outcome is an indicator variable for whether the grooms' parents are Net Takers. That is, they were made financially better off by the total gifts transferred at the time of the marriage. In the Destination Survey, we define migrants as those who moved to Delhi alone or as an adult and do not currently live with their parents. In the Origin Survey, we define migrants as individuals who have permanently left their parents' village. $Wife\ Accompanied$ is an indicator variable equal to 1 if a wife lives with a migrant in his current location. Standard errors are clustered at the household level for the Origin Survey. *,**, and *** denote 10, 5, and 1% significance respectively.

Table A3: Validation of the Traditional Dowry Measure in the REDS

	(1)	(2)	(3)	(4)
	Ln(Gross Dowry)	Ln(Net Dowry)	Ln(Gross Dowry)	Ln(Net Dowry)
Historical Dowry (Continuous)	0.810***	1.094***	0.297	0.790**
	(0.207)	(0.249)	(0.223)	(0.298)
Marriage Year FEs	Yes	Yes	Yes	Yes
Region FEs	No	No	Yes	Yes
Mean of Dependent Variable	7.916	7.462	7.916	7.462
R-squared	0.349	0.388	0.443	0.435
Observations	50831	32444	50831	32444

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 A4: Validation of the Traditional Dowry Measure in the IHDS

	(1)	(2)	(3)	(4)
	Often gold	Often gold	Any gold	Any gold
Historical Dowry (Continuous)	0.152***	0.185**	0.054***	0.111**
	(0.035)	(0.088)	(0.013)	(0.048)
State Fixed Effect	No	Yes	No	Yes
Mean of Dependent Variable	0.749	0.749	0.931	0.931
R-squared	0.019	0.261	0.007	0.164
Observations	40550	40550	40550	40550

Notes: This table shows the results from regressing whether gold gifts are common upon marriage in the respondent'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 A5: Summary Statistics and the Association Between Dowry Prevalence and District Characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Without State FE			With State FE		
Dependent Variable	Mean	Coef.	Std. Err.	P-value	Coef.	Std. Err.	P-value
District Population Density	716.96	570.86	376.94	0.13	-202.12	716.35	0.78
Social Group: Share Scheduled Tribe or Caste	0.32	-0.04	0.02	0.04	0.02	0.08	0.77
Share Urban Sector	0.32	0.05	0.02	0.01	-0.07	0.04	0.11
Share Agricultural Sector	0.43	-0.10	0.02	0.00	-0.00	0.05	0.99
Religion: Share Hinduism	0.76	-0.04	0.03	0.11	-0.03	0.05	0.54
Religion: Share Islam	0.12	0.00	0.02	0.88	0.00	0.05	1.00
Share complete Primary School	0.55	0.05	0.01	0.00	-0.02	0.03	0.53
Share complete Secondary School	0.24	0.04	0.01	0.00	-0.02	0.02	0.32
Monthly HH Consumer Expenditure	4,563.45	-12.09	180.41	0.95	-406.92	442.14	0.36
Share that owns at least 0.005 ha of Land	0.83	-0.04	0.02	0.03	0.01	0.04	0.73
Share that owns at least 0.21 ha of Land	0.45	-0.16	0.02	0.00	-0.01	0.04	0.90
Share that owns at least 1.01 ha of Land	0.19	-0.09	0.01	0.00	0.00	0.03	0.88
Log Distance to Coastline (km)	5.74	-0.71	0.14	0.00	-0.15	0.17	0.38
Log Distance to closest big City (km)	5.92	-0.32	0.10	0.00	-0.45	0.16	0.01

Notes: This table shows summary statistics for the NSS Round 64 and the relationship between district characteristics and district-level dowry traditions from the *Ancestral Characteristics* data. The continuous dowry measure is the share of a district's current population belonging to groups with dowry traditions. The reported standard errors are robust.

Table A6: Association Between Dowry Traditions and Permanent Male Migration

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Dep Var.: Individual Migrated								
Dowry (Continuous)	0.0246**	0.0387**	0.0367**						
	(0.0095)	(0.0189)	(0.0169)						
Dowry (0.1% Threshold)				0.0174**	0.0108	0.0109			
				(0.0082)	(0.0109)	(0.0105)			
Dowry (10% Threshold)							0.0201**	0.0259	0.0254
							(0.0082)	(0.0168)	(0.0168)
Mean of Dependent Variable	0.233	0.233	0.218	0.233	0.233	0.218	0.233	0.233	0.218
Observations	185,463	185,463	181,774	185,463	185,463	181,774	185,463	185,463	181,774
R-squared	0.001	0.040	0.044	0.000	0.040	0.044	0.000	0.040	0.044
State FEs	N	Y	Y	N	Y	Y	N	Y	Y
Year of Birth FEs	N	Y	Y	N	Y	Y	N	Y	Y
Distance Controls	N	N	Y	N	N	Y	N	N	Y
Caste FEs	N	N	Y	N	N	Y	N	N	Y
Education Controls	N	N	Y	N	N	Y	N	N	Y

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 out-migrated more than a year ago. The sample is restricted to males born after 1945 and among migrants, is restricted to migrants who migrated at least one year ago. The continuous dowry measure is the share of a district's current population belonging to groups with dowry traditions. The 0.1% threshold discrete measure is an indicator variable equal to 1 if more than 0.1% of the district population belongs to groups with dowry traditions. The 10% threshold discrete measure is an indicator equal to 1 if more than 10% of the district population belongs to groups with dowry traditions. The distance control includes the district centroid's latitude and longitude, the distance to the coastline, and the distance to one of the closest large cities (Mumbai, Kolkata, Delhi, Chennai). Standard errors are clustered at the district-level. *,**, and *** denote 10, 5, and 1% significance respectively.

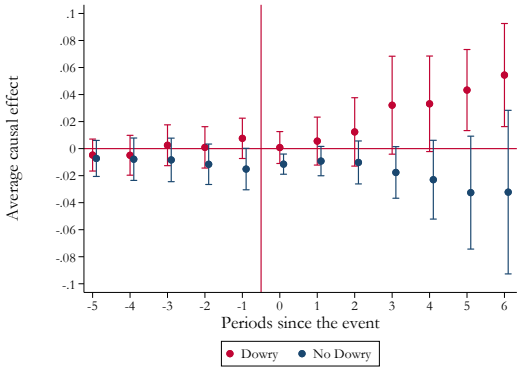
Table A7: Association Between Traditional Dowry and Migration: IHDS Data

	(1)	(2)	(3)	(4)
	Migrated	Migrated	Migrated	Migrated
Historical Dowry (Continuous)	0.0690*	0.0666*	0.0894**	0.0902**
	(0.0354)	(0.0357)	(0.0378)	(0.0381)
Observations	23,240	23,239	11,008	11,007
R-squared	0.044	0.053	0.051	0.057
Sample Ages (in 2005)	17 - 26	17 - 26	22 - 26	22 - 26
Age Fixed Effects	Yes	No	Yes	No
State Fixed Effects	Yes	No	Yes	No
Age-by-State FE	No	Yes	No	Yes

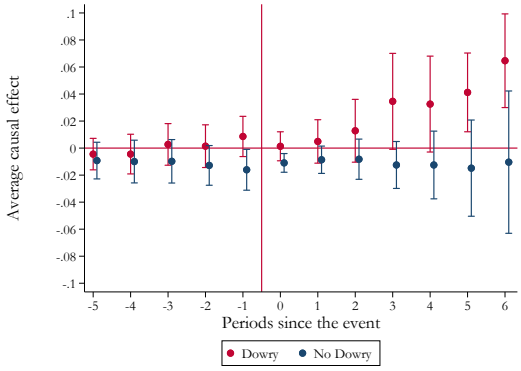
Notes: This table shows the results from regressing whether an individual (male) migrated between the 2005 and 2011 rounds of the IHDS on the historical prevalence of dowry in the district. We determine whether an individual migrated using the IHDS tracking data; therefore, we only observe migrations that took place between the two rounds, leading us to focus on a sample of young men who would be most likely to migrate during this 6 year period. The sample consists of only males aged 17-26 (Columns (1) and (2)) or 22-26 (Columns (3) and (4)) in 2005 (round I). 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), Males 15–30: Robustness Specifications

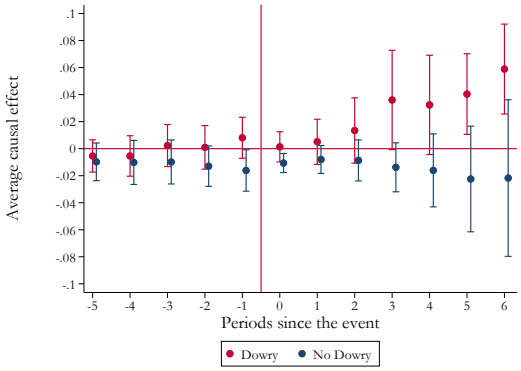
(a) +Time-Varying Geographic Controls



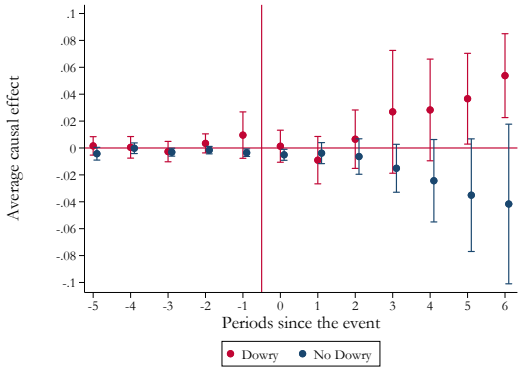
(b) +Caste-Year FEs and Time-Varying Household Consumption Controls



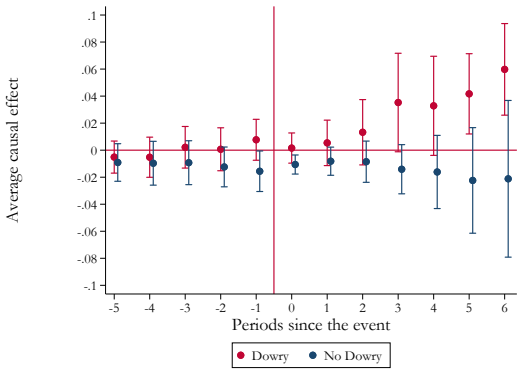
(c) +Time-Varying Cultural Controls



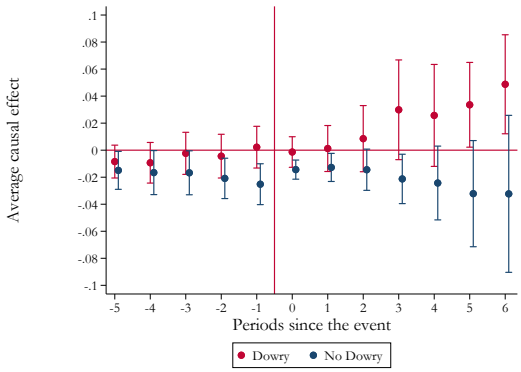
(d) Callaway and Sant'Anna (2020)



(e) No Age FEs (Person + State-Year FEs)

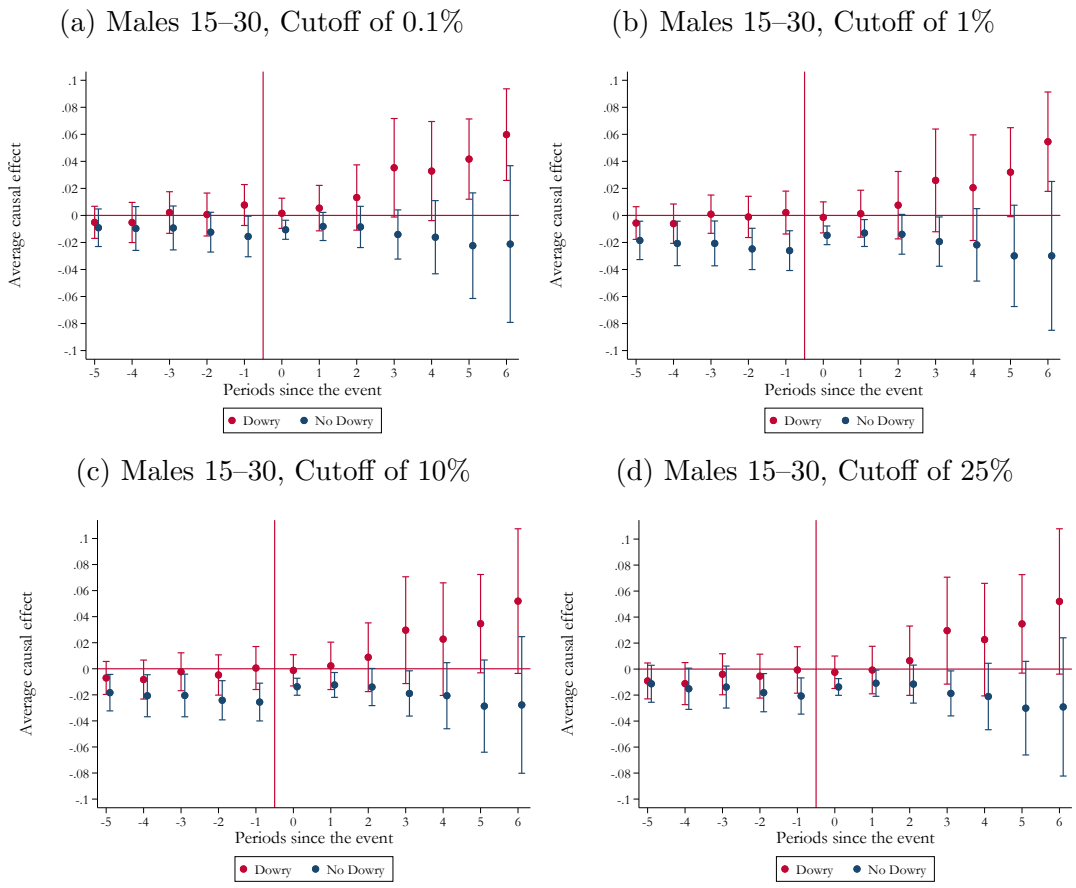


(f) Adjusted Age Distribution



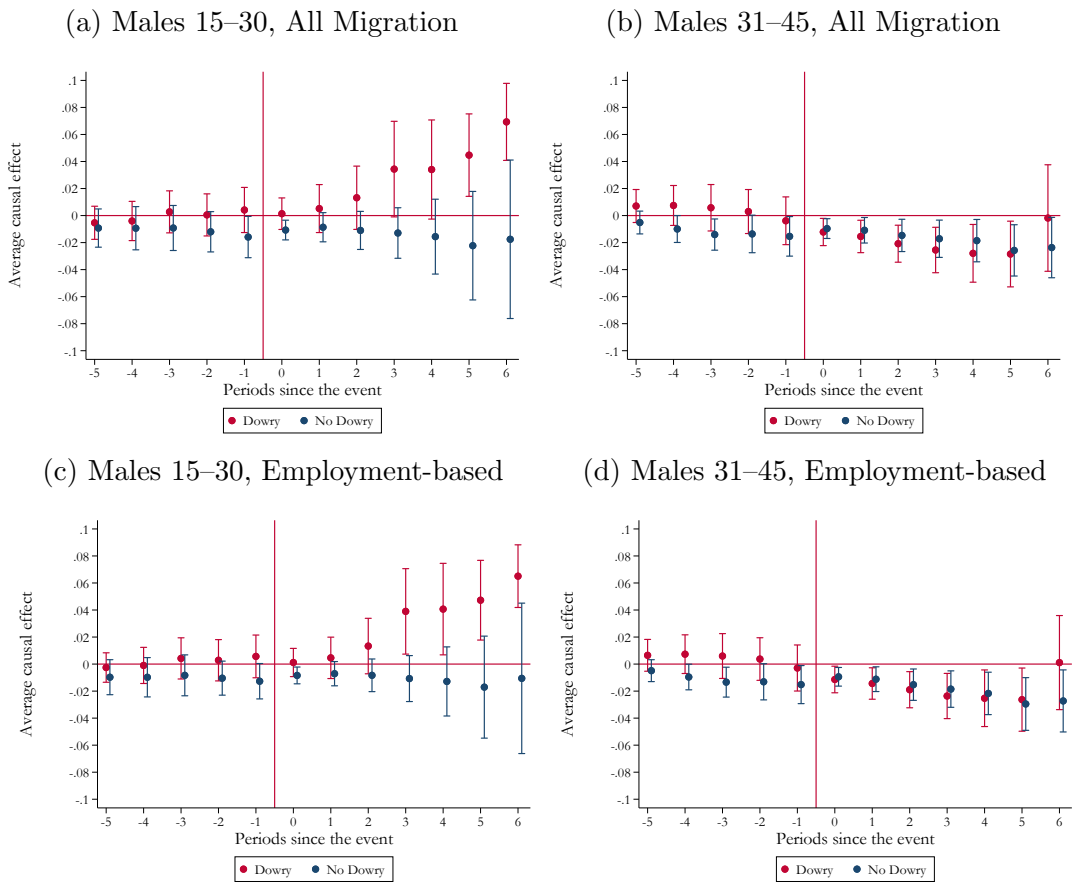
Notes: This figure reports event study estimates of the effect of the GQ on migration. Panel (a) includes time-varying distance controls (distance to closest big city and distance to nearest coastline). Panel (b) includes caste-by-year fixed effects and a time-varying control for household consumption expenditures. Panel (c) includes time-varying controls for the proportions of the district population that historically had plow technology and of the district population that practiced a patrilineal system of inheritance. Panel (d) estimates use the methodology of Callaway and Sant'Anna (2020), including state-by-year fixed effects. All other estimates use the methodology of Borusyak et al. (2021) and include individual, age, and state-by-year fixed effects. Panel (e) reproduces Figure 8 panel (a) without age fixed effects. Panel (f) adjusts the age distribution, whereby we randomly sample individuals from non-GQ districts to match the distribution of ages in GQ districts. All samples restrict to males in the 2007 NSS who were aged 15-30. In GQ districts, they further restrict to those who were 13-45 at the time of construction.

Figure A2: Effects of GQ on Male Migration by Dowry Status Using Borusyak et al. (2021), Varying Dowry Cutoffs



Notes: This figure shows the event study estimates of the effect of the GQ on migration. The panels vary the cutoff of the district-level measure of the strength of dowry traditions for determining dowry status. Panel (a) shows estimates using a 0.1% cutoff, replicating the preferred specification shown in Figure 7 Panel (a). Panel (b) uses a cutoff of 1%, Panel (c) a cutoff of 10%, and Panel (d) a cutoff of 25%. All samples are of males in the 2007 NSS who were aged 15-30. In GQ districts, they further restrict to those who were 13-45 at the time of construction. All estimates use the methodology of Borusyak et al. (2021) and include individual, age, and state-by-year fixed effects.

Figure A3: Effects of GQ on Male Migration by Dowry Status Using Borusyak et al. (2021), Permanent Migrants Specification



Notes: This figure shows the event study estimates of the effect of the GQ on permanent migration. Panels (a) and (b) show the event study estimates of the effect of the GQ on all migration, while Panels (c) and (d) are restricted to employment-based migration specifically 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 the place of work. In Panels (a) and (c), the sample is of males in the 2007 NSS who were aged 15-30. In Panels (b) and (d), the sample is of males in the 2007 NSS who were aged 31-45. The subgroup of migrants is restricted to individuals who left at least one year ago. For those in GQ districts, we further restrict our sample to those between 13 and 45 at the time they received the project. All estimates use the methodology of Borusyak et al. (2021) and include individual, age, and state-by-year fixed effects. Standard errors are clustered at the district level.

A.2 Theoretical Appendix

A.2.1 Baseline Model Solution and Proof of Predictions 1, 2, and 3

Allocations and transfers The first order condition with respect to τ will set the optimal value of τ as a function of α and m:

$$\tau^* = \theta(y_K + R \cdot m + E) - (1-\theta)y_P - (1-m)\alpha \tag{3}$$

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

$$\tau^* + \alpha^* = \theta(y_K + E) - (1-\theta)y_P. \tag{4}$$

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 income share later through α.

Consumption is then equal to $c_P^* = \theta(Y)$ and $c_K^* = (1-\theta)(Y)$, where, for simplicity, we have defined $Y = y_K + y_P + E$ as total household resources without migration. Utility takes the value

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

where $\Theta \equiv \theta ln(\theta) + (1-\theta) ln(1-\theta)$ and $V(m)$ is the solution to equation 1 for a fixed migration decision m.

In the case of migration ($m = 1$), income transfers are no longer possible in the baseline model (this assumption is relaxed below). Hence, $\alpha^* = 0$ and, from the first order condition on τ, we have that

$$\tau^* = min\{\theta(y_K + R + E) - (1-\theta)y_P, d \cdot E\}. \tag{5}$$

Predictions 1, 2, and 3 follow directly from the above results.

Proof of Predictions 1–3. For Prediction 1, note that τ is positive when $\theta(y_K + R + E) > (1-\theta)y_P$, and negative otherwise.

For Prediction 2, consider that, in the case of migration, τ^* is given by equation 5, while in the case of no migration, τ^* is strictly less than the sum between τ^* and α^* in equation 4 since $\alpha^* \geq 0$ with $\tau^* \leq d \cdot E$. This implies that τ^* in the case of migration is weakly larger than τ^* without migration. Therefore, if parents are Net Takers when the son is not a migrant, they are also takers when he is a migrant. If they are Net Givers when the son is not a migrant, they may remain Net Givers or switch to being Net Takers. Therefore, migration weakly raises net taking.

Finally, for Prediction 3, we have that $\frac{\partial \tau^*}{\partial (y_K + R)} = \theta > 0$ and $\frac{\partial \tau^*}{\partial \theta} = (Y + R) > 0$ in an internal solution and 0 otherwise. Therefore, an increase in either $y_K + R$ or θ can turn a net-giving household into net-taking parents, but never the other way around.

■

Figure A4 illustrates how the optimal τ will move with migration and household characteristics. The x-axis is the parent's first-best consumption without migration compared to their income, and thus the desired transfer from son to parent absent migration. With no migration, when this quantity is negative, τ is used to "make up" the difference, and when it is positive, either τ or α is used, and thus τ is indeterminate (represented by the shaded region). Migration shifts the desired transfer up relative to the gap between parents' first-best no-migration consumption and their own earnings. With migration, because α cannot be used, there is a closed-form solution to τ as the minimum of the optimal transfer and the transferable dowry.

Consumption allocations depend on whether the constraint on τ binds or not. This constraint binds when $y_P + d\,E \leq \theta(y_P + y_K + E)$.

If the constraint does not bind, the optimal intergenerational transfer at marriage is

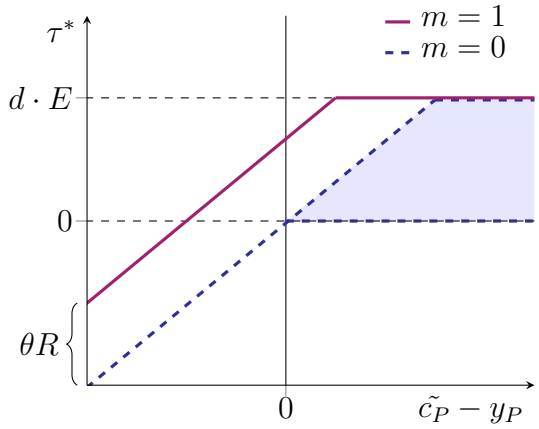
$$\tau^* = \theta(y_K + R + E) - (1 - \theta) y_P.$$

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, the optimal intergenerational transfer at marriage is, of course, $\tau^* = d \cdot E$. Consumption is then equal to $c_P^* = y_P + d \cdot E$ and $c_K^* =$

Figure A4: How τ^* Varies with Migration and Household Characteristics



Notes: This figure shows how the household's chosen τ will vary with the gap between the parents' no-migration optimal consumption, $\tilde{c_P}$, and their income, y_P. For parents of non-migrant sons, when this gap is negative–the parent earns more than they need to consume–they will transfer to sons. When this gap of positive, these parents can receive transfers through α or τ, and so the optimal τ will be indeterminant, up to its limit of $d \cdot E$. Migration shifts up the parents' ideal pareto-weighted consumption, and thus transfers will be positive for a broader range of households. Moreover, parents of migrant sons can only receive transfers through τ. Thus, we will observe more parents of migrant sons taking from dowry.

$y_K + R + (1-d)E$. Utility takes the value

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

Migration For Seeking Parents, migration requires that R is sufficiently high to satisfy:

$$\theta ln\left(y_P + d \cdot E\right) + (1-\theta) ln\left(y_K + R + (1-d)E\right) > \Theta + ln(Y). \tag{6}$$

A.2.2 Proof of Prediction 4

Recall, from equation (6):

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

We define two key quantities. Recall that whether parents are Satisfied or Seeking depends on whether $y_P + d \cdot E > \tilde{c_P}$. Filling in the first best consumption allocation, we have, $y_P + d \cdot E > \theta(y_P + y_K + E)$. Rearranging, define $A(d) = \frac{1-\theta}{\theta}(y_P + d\,E) - (y_K + (1-d)E)$ as the condition that defines whether parents are Satisfied ($A(d) \geq 0$)

or Seeking ($A(d) < 0$). Define $B(d)$ as the smallest level of return to migration that satisfies the migration decision inequality (as a function of dowry tradition d) and, hence, justifies migration. This means that sons of Seeking parents migrate if and only if $R > B(d)$.

The threshold $B(d)$, which takes the closed-form solution

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

satisfies two properties:

1. It is positive. This is because, at $R = 0$, the RHS of equation 6 is the optimization of the intergenerational 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 ($m = 1$), $\tau^* = d \cdot E$ 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. $0 < R < A$: $\tau^* < d \cdot E$, $\alpha^* = 0$
      ii. $R > A$: $\tau^* = d \cdot E$, $\alpha^* = 0$

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:

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

By the Implicit Function Theorem (IFT), $\frac{\partial B'}{\partial \pi} \leq 0$, 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.2.3 Proof of Prediction 5

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 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):

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

A.2.4 Remittances and Proof of Auxiliary Prediction 1

Risk of No Remittances We consider a case in which remittances are possible, but only with a fixed probability π, to capture the fact that remittances are subject to the risk that the son may become estranged from the parents or to prohibitively

high costs.

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

s.t. with probability π

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

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

with probability $1-\pi$

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

$$c_K \leq y_K + R\cdot m + E - \tau - \alpha$$

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

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

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.

Costly Remittances We now consider an alternative case in which remittances are always possible but at a cost γ. Again, the household chooses marriage transfer τ, son's transfer α, and migration status m to solve:

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

s.t. $c_P \leq y_P + \tau + \alpha$

$$c_K \leq y_K + R\cdot m + E - \tau - \alpha(1+\gamma m).$$

This version of the model will give rise to a new indirect utility function, associated with making a strictly positive α transfer in case of migration:

$$V(m=1,\alpha^*>0) = \Theta + ln(Y_i + R_i + \gamma(y_P + d \cdot E_i)) - \theta ln(1+\gamma)$$

with

$$\alpha^* = max\left\{\frac{\theta(y_K + R_i + (1-d)E_i) - (1-\theta)(1+\gamma)(y_P + d \cdot E_i)}{1+\gamma}, 0\right\}.$$

The value of migration when $\alpha^* = 0$ is now

$$V(m=1,\alpha^*=0) = \Theta + \left[\theta ln\left(\frac{y_P + d \cdot E}{\theta}\right) + (1-\theta) ln\left(\frac{y_K + R + (1-d)E}{1-\theta}\right)\right]$$

while the value of not migrating continues to be

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

Auxiliary Prediction 1 Auxiliary Prediction 1 follows directly from the above.
Proof. When remittances are uncertain, sons transfer to their parents up to the full value of dowry, and then choose a remittance payment that is sufficient to equate the weighted marginal utilities of consumption. When a unit of α costs γ, households first exhaust the costless transfers from son to parents with dowry, i.e. $\tau \in (0, E]$ with $d > 0$. ■

A.2.5 Daughters

Model Extension We now extend our model slightly to accommodate parents with daughters and sons. For simplicity, we assume that parents can have one son, one daughter, or one son and one daughter. Parents who only have daughters will not play a role in aggregate son migration, and so we focus on parents with either one son, or one son and one daughter.

To simply illustrate the impact of having a daughter versus having a son only, we assume parents in dowry culture have to pay their daughter's dowry, and that it is exactly equivalent to E, the dowry their sons receive, due to assortative matching. We further assume that in the absence of "dowry culture," the parents would leave their daughters a bequest at the end of life only, when it did not affect their own

consumption, and thus it is treated as costless, but such a bequest from his bride's parents will still increase (later) consumption for the son.[40]

If a son migrates and the transfer constraint binds, joint utility for parents with daughters will be:

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

Note that while the benefit to the parent of the son's transfer from dowry is canceled out by paying the daughter's dowry, the difference between parent and son consumption with dowry is still lower, as the son does not consume E himself.

Thus, although the migration decisions for sons of families with daughters will not be as greatly affected by dowry as for families without daughters, the presence of dowry will still lower the required return for migration. We can see this by examining $B_{dtr}(d)$, the lowest return required in order to choose migration:

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

When the household is Seeking, then $B_{dtr}(d=1) < B_{dtr}(d=0)$, for two reasons. First, the distortion in consumption is smaller, since the son does not keep the dowry amount. Second, the overall household resources are lower, creating a greater loss from forgoing migration.

Proposition $B_{dtr}(d=1) < B_{dtr}(d=0)$ when $A(d=0) < 0$.
Proof. By the IFT, $\frac{\partial B_{dtr}}{\partial d} \leq 0$ when parents are Seeking.
■

Implications of Household Composition Additionally, even if we adjusted the model such that having one son and one daughter exactly canceled out the impact of dowry on male migration and thus having more daughters than sons could make the impact of dowry on migration negative, there would still be an overall positive net effect on migration from the presence of dowry. This is due to household composition.

[40] Note that as discussed in Botticini and Siow (2003), if this bequest lessened sons' motivation to work on the family farm, this would lessen the comparative negative impacts of paying dowry for daughters on parental consumption.

Table A8: Household Composition and the Effect of Dowry on Male Migration

		Sons			
		0	1	2	3
Daughters	0	·	↑	↑	↑
	1	·	·	↑	↑
	2	·	↓	·	↑
	3	·	↓	↓	·

This table shows the aggregate impact of dowry on male migration by family type in a model where paying dowry for a daughter and receiving it for a son exactly cancel out in terms of the migration decision. Columns identify the number of sons in the household, rows identify the number of daughters, and each cell reports the direction of the effect on male migration for that household. Up arrows mean a positive impact, down arrows mean a negative impact, and dots mean no impact.

Families with no sons cannot have their sons' migration decisions impacted. Furthermore, with a balanced sex ratio, mechanically, there will be more sons in households where their migration will increase than in households where it would fall. This is illustrated in Table A8 for balanced sex ratios under the assumption that the impact of dowry is 0 when the number of sons equals the number of daughters. Moreover, given that sex ratios are actually skewed male, the aggregate dowry effect will be even stronger.

A.2.6 Dynamic Nash bargaining model

We propose here an alternative model, to show that a dynamic Nash bargaining framework can produce the same predictions as our baseline model. The model also provides a micro-foundation for the distribution factor in the collective model.

This model has two stages. In the first stage, the parents and the son bargain over the son's migration and the sharing of the dowry, if available. At that point, parents may be able to veto the son's marriage. In the second stage, after marriage and migration have occurred, the parents and the child bargain over the sharing of resources. Bargaining takes place without commitment, and the model is solved by backward induction.

The notation follows the baseline model.

Stage 2: Bargaining over income sharing After marriage and migration have occurred, parents and the child bargain, under symmetric Nash bargaining, over the sharing of resources:

$$\begin{aligned} & max_{c^P, c^K} \quad (c^P - v_2^P)(c^K - v_2^K) \\ s.t. \quad & c^P + c^K \leq y^P + y^K + E + R_i \cdot m. \end{aligned}$$

The outside options are:

$$\begin{aligned} v_2^P &= y^P + \tau \\ v_2^K &= y^K + E + R_i \cdot m - \tau - (\xi_0 - \xi_1 \cdot R_i \cdot m) \ , \end{aligned}$$

with $\xi_0 > 0$, $\xi_1 > 0$, and $\xi_0 - \xi_1 \cdot R_i \cdot m > 0$ for relevant values of R. This expression is meant to capture the utility cost for the child for not supporting his parent: it is easier for the son to defect from supporting his parents if he has migrated, especially if he is successful.

Under symmetric Nash bargaining with transferable utility, the optimal allocation is the one in which each party obtains their outside option plus half of the surplus. Allocations, as a function of τ and m, will hence be:

$$\begin{aligned} c^{P*} &= y^P + \tau + \frac{\xi_0 - \xi_1 \cdot R_i \cdot m}{2} \equiv u^P(\tau, m) \\ c^{K*} &= y^K + E + R_i \cdot m - \tau - \frac{\xi_0 - \xi_1 \cdot R_i \cdot m}{2} \equiv u^K(\tau, m). \end{aligned}$$

This result implies that, for a fixed τ, the parents' consumption declines upon the son's migration because he faces a lower cost of not supporting the parents, especially if he is earning high returns (e.g., he does not expect to ever come back home). In stage 1, τ can be endogenously set to compensate the parents for this future loss.

Stage 1: Bargaining over migration and marriage gifts In the first stage, the parents and son bargain over his migration m and the sharing of the marriage gifts τ. Since the son has yet to earn an income, his ability to transfer to his parents at this stage is bounded above by the transferable portion of the marriage gifts.

$$\begin{aligned} & max_{\tau, m} \quad (u^P(\tau, m) - v_1^P)(u^K(\tau, m) - v_1^K) \\ s.t. \quad & y^P \leq \tau \leq d \cdot E \\ & m \in \{0, 1\} \end{aligned}$$

The outside options are

$$v_1^P = y^P - l^P$$
$$v_1^K = y^K + (1-\phi)E + R_i \cdot m - l^K.$$

Here, l^P and l^K (for "love") represent the utility cost that each side faces when defecting from the parent-child arrangement. Also, $\phi \in [0,1]$ represents the strength of the parents' veto power over the marriage decision.

Again, the symmetric Nash bargaining solution applies. In an interior solution for τ^*, payoffs are:

$$u^{*P} = y^P + \frac{\phi E - l^P + l^K}{2}$$
$$u^{*K} = y^K + E + R_i \cdot m - \frac{\phi E - l^P + l^K}{2}.$$

Note that the parents' utility is independent of the son's migration decision because the son compensates them.

This gives rise to the following expression for τ^*

$$\tau^* = \frac{\phi E - l^P + l^K - (\xi_0 - \xi_1 \cdot R \cdot m)}{2}.$$

Therefore, the parents will take from dowry if and only if

$$\phi E - l^P + l^K - (\xi_0 - \xi_1 \cdot R_i \cdot m) > 0.$$

The above expression could be satisfied or not, depending on parameters, and is increasing in m, in ϕ, and in R when $m = 1$. This is in line with predictions 1, 2, and 3 of the collective model. Auxiliary prediction 1 is no longer necessarily satisfied, though: for such a prediction to carry through, the model requires that families in which the son has no obligation to the parents after migration (i.e., $\xi_0 - \xi_1 = 0$) are families in which the son has low cost of defecting even before migration l^K. Such a correlation appears tenable.

Migration decision If no constraint on τ is binding (i.e., $\tau^* \in [-y_P, d \cdot E]$), then migration occurs when the net return is positive ($R_i > 0$). This is the "Satisfied

parents" case.

If, instead, the constraint on τ binds ("Seeking parents"), it can influence the migration decision. In this case, the payoffs from cooperation are:

$$u^P(d \cdot E, m) = y^P + d \cdot E + \frac{\xi_0 - \xi_1 \cdot R_i \cdot m}{2}$$
$$u^K(d \cdot E, m) = y^K + (1-d)E + R_i \cdot m - \frac{\xi_0 - \xi_1 \cdot R_i \cdot m}{2}$$

while the payoffs from autarky are

$$v_1^P = y^P - l^P$$
$$v_1^K = y^K + (1-\phi)E + R_i \cdot m - l^K.$$

Parents' consumption declines upon the son's migration (like in the baseline model), so they can block the decision. The son will migrate in autarky if and only if $v_1^K(m=1) > u^K(d \cdot E, 0)$, hence, when

$$R_i > (\phi - d)E + l^K - \frac{\xi_0}{2} \equiv \tilde{B}^d.$$

In this case, the parents know they cannot block the migration decision for the son, and hence consent to it, since they prefer that outcome $y^P + d \cdot E + \frac{\xi_0 - \xi_1 \cdot R_i}{2}$ to their outside option $y^P - l^P$.

The presence of dowry makes it less likely that the constraint on τ binds. Also, the threshold that justifies migration for the son $\tilde{B}^d$ is decreasing in d, just as in the collective model. Hence, migration rates will be higher with dowry, satisfying Prediction 4 of the baseline model. Prediction 5 follows.

A.3 Data Appendix

A.3.1 Destination Survey

The Destination Survey data was carried out by Outline India, an Indian research and social development consultancy. Data was collected through in-person surveys of migrants and locals in seven commercial spaces with a range of IT/corporate, government offices, and eateries in Delhi and Gurgaon in June 2018. The survey tool was finalized after three rounds of piloting, with an average of 20 respondents per round. Based on our observations from the pilot rounds, we decided to limit the respondent's age group to 21-40 years to improve recall. Respondents were also screened based on the age at which they got married – if they were married before the age of 16, they were not surveyed due to poor recall of wedding gifts and arrangements. Outline India aimed to interview 20% non-migrants and 80% migrants, equally divided among the following educational categories: (a) less than 10th grade passed, (b) 10th grade passed, (c) 12th grade passed, (d) graduation completed (B.A., B.Sc., B.Tech, etc.), (e) above graduation (MBA, vocational course after graduation, Ph.D., M.Sc., etc.). Here, migrants were defined as those individuals who were born outside Delhi-NCR but who migrated to Delhi to live or for work. The final survey contained 557 respondents, of which 84% were born outside Delhi in 185 districts across 21 states. Survey participants were approached by enumerators in the commercial areas and recruited to take part in the survey. Participants received 100 Indian Rupees and were entered into a lottery for a smartphone.

The survey asked for a detailed account of gifts transferred between the groom's and bride's sides at the time of their wedding. Participants were asked specifically about the following categories: personal goods (clothes, shoes, etc.), jewelry, utensils, furniture, cash, transport goods, land, household goods, or other gifts.[41] For example, for the jewelry category, the survey asked "*Were jewelry, gold, silver (plates, coins) given from your family to the bride's family?*", as well as "*Were jewelry, gold, silver (plates, coins) given from the bride's family to your family?,*" which could be answered with "*yes*" and "*no.*" If respondents answered yes in either case, they were asked about the total value ("*Value of the jewelry and gold/silver (Amount in Rupees)*"), whether the jewelry would all be kept at the same place and if yes, where it is kept and who

[41] The initial categories were based on the Survey of Status of Women and Fertility in India and were then piloted.

the final owner is (*"Who has the final ownership or the right to sell the jewelry?"*). If not all of the good was kept in the same place, participants were asked to describe what fraction was kept/owned by different parties. Using this ownership breakdown, we calculated the value of the gifts given and owned by the groom's parents (as well as those given and owned by the bride's parents, bride, and groom).

Measures of transfers are constructed as follows:

- *Gross Transfers Made by X*: The total value of personal goods, jewelry, furniture, cash, and other transfers that X made to other parties, not including transfers that X was reported to have made but that X now owns.
- *Gross Transfers Received by X*: The total value of personal goods, jewelry, furniture, cash, and other transfers that X now owns.
- *Net Transfers to X*: *Gross Transfers Received by X - Gross Transfers Made by X*.

The key dependent variable *Parents are Net Takers* takes the value 1 if the net transfers to the groom's parents are positive and 0 otherwise.

A.3.2 Origin Survey

The 'Origin Survey' data were collected through phone surveys in 34 districts in 6 North Indian states (Rajasthan, Uttar Pradesh, Bihar, Jharkhand, Madhya Pradesh, and Maharashtra) in partnership with IDinsight (IDI), a global advisory and data analytics research organization. Households were interviewed in two waves (in June and August 2020) to increase the sample size. The households contacted were drawn from a pre-existing roster of households with whom IDI had established a surveying relationship. IDI had previously obtained phone numbers through in-person visits for other projects. These households were identified via voter rolls and community health worker registers.

We surveyed a total of 2,541 households. Due to our interest in dowry, we restricted our survey sample to households where the head had at least one married son. This targeting was initially used for calling and recruiting households to take part in the survey. We further confirmed that the current head had a married son before the phone survey took place. Since households resist taking part in phone surveys with a duration greater than 20 minutes, we randomly sampled one married

son and asked the head about that son's dowry and migration behavior. To ensure our sample included enough migrants to be informative, if there was at least one migrant married son, we randomly drew one of the migrant married sons with a 70% probability and drew a non-migrant married son with a 30% probability. After completing this module, we asked the respondents if they would be willing to complete it for a second son. We gathered information on 529 additional sons, and in total, this allowed us to collect data on 3,069 sons, 20% of whom were migrants.

In the interest of time, because the survey took place over the phone, a simpler module was used to collect information on the gift exchange at marriage. For the selected sons, we asked the parents about the gifts transferred at the time of their son's marriage. For each of the same categories of gifts as in the Destination Survey and for both gifts given by the groom's family and gifts given by the bride's family, we asked *"Was this gift given?" (1 - yes, 0 - no)* and *"Your ownership?" (1 - none, 2 - less than half, 3 - half (50/50), 4 - more than half, 5 - full).* Due to the limited time to conduct the survey, instead of asking about the value of each type of gift separately, as in the Destination survey, we asked about aggregate transfers. To be able to construct the gross and net transfers for the groom's parents, we asked:

1. *Keeping all of those items in mind, what is the total amount of gifts your family provided, to your son, the bride, and the bride's family?*

2. *[Referring to the gifts given by the groom's side] You mentioned that you used or owned some of the [categories] given. Keeping that in mind, what amount of these total gifts would you say you and your spouse have used, used the proceeds from, or own (would use the proceeds from)?*

3. *Keeping all those items in mind, what is the total amount of gifts the bride's family provided to the bride, your son, and your family?*

4. *[Referring to the gifts given by the bride's side] You mentioned that you used or owned some of the [categories] given. Keeping that in mind, what amount of these total gifts would you say you and your spouse have used, used the proceeds from, or own (would use the proceeds from)?*

Then, gross transfers made by the groom's parents are given by #1-#2, and net transfers to the groom's parents are #4-(#1-#2). Net taker is defined in the same way as before.

A.3.3 India's National Sample Survey (NSS) 64th Round, Schedule 10

The paper uses data from a special module of the 64th round of the National Sample Survey (NSS) Schedule 10, which was collected by the Indian Ministry of Statistics and Programme Implementation between July 2007 and June 2008. This module was not included in other NSS surveys and consists of an extensive set of migration-related questions, including a roster of *individuals who have left the household*. The data were downloaded from the Ministry of Statistics' website.

The NSS data are organized into different blocks, each corresponding to a specific set of questionnaires administered to the respondents. The following blocks are used in the analysis: **block 3** (household characteristics records), **block 3.1** (out-migrant records of former households members), **block 4** (individual-level demographics and usual activity of household members), and **block 6** (migration records of household members).

Our key outcome variable *migration* is created using item 12 of block 3 ("*whether any former member of the household migrated out any time in the past (1 - yes, 2 - no)*"). If respondents answered yes, they were given the opportunity to list out-migrants from their households and provide information on their gender, age, year of migration, distance of migration (different district, state, or country), and reason for migration in block 3.1. While the survey does not explicitly specify that an individual must have permanently left the household, only 4.27% of migrants left less than a year ago, and the average out-migrant left 7.8 years ago. This suggests that most migration in the module is permanent.

To analyze the effects of the GQ and dowry customs on migration, we create a dataset of all individuals who ever lived in the household (including migrants) by appending information on migrants from block 3.1 to information on individuals who are still in the household from block 4. Additional information is drawn from block 6 (on characteristics of in-migrants) and block 3 (on household location and socioeconomic status). Appending out-migrants and non-migrants results in 672,901 observations (345,632 men). Restricting the dataset to only include men aged 15-45 results in 188,192 observations.

For the GQ analysis, we exploit the fact that we observe 'year of migration' for migrants and expand the dataset to create a panel of males with observations at the individual i-year t level for the years from 1996–2007. Therefore, each individual is observed 12 times, with one observation per year. Using the information on the year

of migration, we construct an 'out-migrant' variable that is equal to 1 after an individual has migrated out of his household and 0 otherwise.[42] We exclude individuals who migrated before the year 1996 and retain the non-migrants. Additionally, we dropped individuals in treated districts younger than 13 or older than 45 when the treatment occurred, as they were unlikely to migrate in response to highway construction. Finally, we further restrict the sample to those aged 15–45 at the time of the survey so that the control and treatment groups include similarly-aged individuals.

A.3.4 District-Level Dowry and Other Cultural Variables

The country-level version of the *Ancestral Characteristics* data is available from Nathan Nunn's website. However, for our analysis, we need to produce a district-level version of the data for India. Our construction of these data strictly follows the steps for the construction of the country-level *Ancestral Characteristics* data produced by Giuliano and Nunn (2018), except that we use a shapefile with Indian district-level boundaries to calculate the share of different practices at the district level.

To create the district-level data, we download the following data sets from Nathan Nunn's website:

- *EthnoAtlas_Ethnologue16_baseline_by_language.dta*: A dataset matching languages from the *Ethnologue* to societies in *Ethnographic Atlas*
- *langa_no_overlap_biggest_clean.shp*: A cleaned shape file of language polygons for the languages in the *Ethnologue*.

The dataset *EthnoAtlas_Ethnologue16_baseline_by_language.dta* contains language-level data on cultural traditions (dowry practices, inheritance rules and distribution for movable property, transfer of residence at marriage, and animals and plow cultivation) from the *Ethnographic Atlas*. The key dowry measure comes from the variable *v6* in the *Ethnographic Atlas*, defined as "mode of marriage (primary)." We code a language group as having dowry if this variable takes the value 8 ("dowry").

[42] The fraction of males in our sample that had migrated at the time of our survey is 24.4%. With the help of a special data request from the Indian Census Bureau, we calculate that the number of male migrants per origin district male population in the 2011 Census was a very similar 24.1%. These numbers reflect individual-level flows to anywhere outside of an individual's natal household (including other rural areas), and is a different object than estimates obtained from net changes in population (Foster and Rosenzweig, 2008; Munshi and Rosenzweig, 2016), or household-level migration (Munshi and Rosenzweig, 2016).

The above data are combined with a shape file of district-level boundaries for India accessed here (Meena, 2018) and data on grid-level population density from the Landscan 2007 Global Population Database (Oak Ridge National Laboratory, 2007) in ArcGIS. The Landscan data are produced by Oakridge Laboratories in conjunction with the US government and NASA and report estimates of the world's population in 2007 for 30 arc-second by 30 arc-second (roughly 1 km by 1 km) grid-cells globally.

ArcGIS is then used to calculate the share of each district with a tradition X (e.g., dowry) under the assumption that individuals currently living in a language polygon have the cultural tradition from the *Ethnographic Atlas* that has been matched to that language. In practice, since data on each tradition is missing for a small number of groups in the *Ethnographic Atlas* (19 out of 1,265 groups for dowry), we calculate the measure as the share of the population with non-missing data.

A.3.5 District-Level Highway Construction Measure

Information on whether a district received a GQ or North-South/East-West highway segment and the timing of construction was created by matching information from the CapEx database assembled by CMIE to information from the National Highway Development Plan. The CapEx database aims to include data on all capital expenditure projects, including those by the Indian Government, greater than 10,000,000 Rupees ($\approx$ 135,000 USD) and has information on the year of completion of projects, the project owner (e.g., if it is a government project), the type of project (e.g., road construction), and the location (GIS coordinates and districts) of projects. By hand-matching government road projects in CapEx with information provided by the National Highway Development Plan on the location and timing of highway construction (Fifteenth Lok Sabha, 2011), we were able to identify which projects were likely to be components of the Golden Quadrilateral (GQ) or North-South and East-West highway projects. We further verify that the projects are correctly identified by mapping their locations and observing whether they are on the routes for these highway projects. We note that, since the GQ and North-South/East-West projects mainly connected and upgraded existing road networks, the projects form a patchwork on the routes rather than one continuous new highway construction. These project-level data were aggregated to form a district-level dataset with information on the year the first segment in a district was completed for districts with completed projects.

To merge these data with the NSS data, we harmonize the state and district names with those in the 2007 NSS Schedule 10. This results in a final dataset with treatment information for 136 districts where a highway segment was completed.

A.3.6 India Human Development Survey (IHDS)

The paper uses IHDS data from 2005 (IHDSI) and 2011 (IHDSII). The raw data can be downloaded from this website. We use modules DS1 and DS2 from the first wave and module DS11 from the second wave. The website also provides supplemental syntax do-files, which we run for every module to process the data.

For the validation of the traditional dowry measure in the IHDS, we utilize the household-level module DS2. The outcome variable in Appendix Table A4 is from the response to the question, "*Generally in your community, for a family like yours, is gold given as a gift at the time of the daughter's marriage?*" The possible responses are: 0–"Rarely/Never," 1 – "Sometimes," and 2 – "Usually." The indicator variable "*Any gold*" is coded as 1 if respondents reported receiving gold "*1 - sometimes*" or "*2 - usually*" during their daughter's marriage. The dependent variable "*Often gold*" indicates that gold is usually (2) gifted upon marriage. After harmonizing the state and district names, we merge the district-level traditional dowry measure into the data for the validation analysis.

The IHDS conducted a second wave in 2011, during which most households from the first wave were re-interviewed. The tracking module DS11 enables the identification of household members who migrated out of their households after the first wave in 2005. The information collected in 2011 for these individuals is merged with the main individual-level dataset (module DS1) from the first wave. In total, we identify 39,673 migrants (between 2005 and 2011) and 176,081 non-migrants from 2005. Similar to the household-level dataset, we harmonize the state and district names for consistency. Additionally, we merge the district-level historical dowry measure. We restrict the sample to males aged 11–20 in the IHDSI (17-26 in the IHDSII). This is to focus on the group that is most likely to permanently migrate, due to our mechanism, over the next 5 years. This restriction reduces the sample size to 24,426 observations. This dataset generates Appendix Table A7, which examines the association between traditional dowry and migration in the IHDS data.

A.3.7 Rural Economic and Demographic Survey (REDS)

The paper utilizes data on dowry payments from the public-access 1999 round of the Rural Economic and Demographic Survey (REDS). The raw data for this survey can be downloaded from this website, which includes different "decks" of data. Below we describe the decks used in our analysis.

Deck 1 contains interview and household identification details. We extract unique household identifiers and households' state and district codes. To obtain the state and district names, we merge the information from the Excel sheet *districts.xls* on the website. Deck 2 is a household roster, which lists all household members along with their relationship to the head of the household and their demographics, such as age, sex, education, and marital status. Decks 3, 4, 5, and 6 ask specific questions about different categories of individuals related to respondents in the household: brothers and non-coresident fathers (deck 3), sisters (deck 4), sons (deck 5), and daughters (deck 6) of the head of the household and their spouse. Each respondent in these decks is identified by the variable *q6*. The main variables of interest from decks 3 to 6 are *q11* and *q12*, which ask about "*Dowry paid out*" and "*Dowry received*," respectively for the marriages of the individuals that the deck asks about. Respondents were asked to report the size of these transfers. Note that because these questions are asked about both brides and grooms, dowry received (and dowry paid out) could refer to transfers to and from the brides' or the grooms' families. In addition, deck 8 contains the marriage details (including the dowry questions) of the household head. Deck 215 is administered to female respondents and gathers detailed information about non-resident children, again including the dowry questions *q11* and *q12*.

We recode the dowry questions based on the gender of the individual being married as transfers from the bride's to the groom's side and vice versa so that the direction of transfers is standard across marriages. We then append all the dowry information from the different decks to create our full dataset of dowry payments. The final dowry measures in Appendix Table A3 are "*Net Dowry*" and "*Gross Dowry*", which are the transfer to the groom's side net the transfer to the bride's side and the transfer to the groom's side, respectively. Log gross dowry is available in more cases than log net dowry for two reasons. First, calculating net dowry requires that transfers in both directions are non-missing, while gross dowry only requires that transfers in one direction are non-missing. Second, in a small number of cases, net transfers to the groom's side are negative (while gross transfers are positive) and become missing after

taking the log transformation.

In the final step, we merge the state and district name information from deck 1 with the dowry information, harmonize the district codes to match the data on traditional dowries, and merge the two datasets.

A.3.8 Additional Control & Balance Variables

Population Density (Census 2011). An Excel file named *A-1_NO_OF_VILLAGES_TOWNS_HOUSEHOLDS_POPULATION_AND_AREA.xlsx* can be downloaded from the following website. We specifically focus on district-level information, which consists of 640 unique districts, each categorized into total, rural, and urban divisions. The dataset provides population density information per square kilometer, and we use the information for the "Total" division. We harmonize the district variables to merge with the NSS data.

Distance to 4 Major Cities. To obtain distances from district centroids to the four major cities (Delhi, Kolkata, Mumbai, and Chennai), we load the Indian shape file of district-level boundaries for India (accessed here (Meena, 2018)) into ArcGIS. We use the built-in functions of ArcGIS to identify the centroids of the districts and calculate the distance from the centroids to the four major cities.

Distance to Coastline. For coastline distance, we combine the a shapefile obtained from marineregions.org, which includes not only the coastline but also the rivers that connect to the Indian Ocean, with the shapefile of Indian districts in ArcGIS. Then, we use ArcGIS to calculate the shortest distance from the district centroids to the nearest coastline or river that connects to the Indian Ocean.