

Marriage, Commitment and Unbundling Gendered Norms*

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Abstract

We explore the interplay between culture and institutions within the context of marriage. Marital institutions affect economic and social well-being, especially for women and the poor, by placing constraints on separation. We show how the optimal strength of such constraints depends on the cultural environment—in particular, the state of male dominance norms. We distinguish between male dominance in the private sphere, *inside* the household, and the public sphere, *outside* the household, and show how these have opposing predicted effects on the optimal strength of marital institutions. We test these, and related, predictions by exploiting a feature of Islamic marriage contracts using household data from Egypt.

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Since married women have been specialized to childbearing and other domestic activities, they have demanded long-term “contracts” from their husbands to protect them against abandonment and other adversities.

- Becker (1991), Ch.2

1 Introduction

Marital institutions—the rules of the marriage game, such as the conditions under which a marriage is established and terminated—have widespread economic consequences. Such rules exert influence over fertility rates, social mobility, the distribution of political power, the economic and social freedoms of women, labour productivity, savings rates, and the utilization of informal solutions to missing markets for insurance and credit. Understanding the forces that shape marital institutions is of first-order importance.

In this paper we focus in on a single, but fundamental,¹ role of marital institutions; the regulation of the husband’s commitment problem as described above by Becker. Rules that make divorce settlements more unfavourable to husbands, which we refer to as *stronger* marital institutions, provide husbands with a greater commitment to the relationship. To gain insight into the forces that shape the strength of marital institutions, we analyze the optimal strength from the perspective of households. The essential issue is the possibility of inefficient divorce, and the trade-off is that stronger marital institutions make inefficient divorce less attractive for the husband but more attractive for the wife.

We are particularly interested in understanding the *cultural* forces that shape marital institutions. Here we focus on *male dominance norms* since this dimension of culture has a clear potential to influence the functioning of marriage. For instance, Hill (2012) notes:

Although defining marriage and enforcing marriage rules was often difficult, there was substantial agreement across cultures on one point: Men were to be the dominant partner in the marriage or the heads of their families, and wives were to be subservient and obedient to their husbands.

We unbundle male dominance into two dimensions. First is male dominance in the private sphere *inside* the household, as reflected in the allocation of decision-making power.²

¹Becker goes on to state that “virtually all societies have developed long-term protection for married women” and that “one can even say that “marriage” is defined by a long term commitment between a man and a woman.” This aspect of marital institutions is central in much of the literature, including for instance Allen (2005), Lafortune and Low (2019), and Ambrus et al. (2010).

²The literature in Economics tends to overlook the cultural component of decision-making power,

Second is male dominance in the public sphere *outside* the household, as reflected in differential treatment of women in the workplace, the legal system, and the political system.³ We argue that this unbundling of male dominance norms is important and show that *inside* and *outside* norms have opposing predicted effects on the optimal strength of marital institutions. These predictions, and the subsequent empirical validation, are perhaps surprising in light of a common wisdom that bundles these dimensions of gendered norms, treating them as related manifestations of women’s empowerment in general.

To explore the role of culture in shaping marital institutions, we first provide a simple model in order to clarify the marital commitment problem and to establish the role of marital institutions in ameliorating it. The model establishes the role of inside and outside norms, allowing us to make tight predictions. In short, we consider a setting in which a couple marry, then learn their match quality, then face an opportunity to separate. Male dominance norms shape payoffs in a straightforward manner: inside norms primarily affect the payoffs to continued marriage, whereas outside norms primarily affect the separation payoffs. We parameterize the strength of marital institutions by the magnitude of a required divorce-contingent transfer from husband to wife.⁴

The marital commitment problem arises from the fact that the couple cannot commit ex ante to a state-contingent separation rule.⁵ This produces an ex ante welfare loss because there will be states in which one side (typically the husband) finds it privately optimal to separate even though total household welfare is larger under continued marriage. We show that the ex ante welfare loss arises because of a mismatch in spousal commitment to marriage, and how the optimal marital institution eliminates this mismatch. Culture affects optimal marital institutions because gendered norms affect this

instead focusing on the economic determinants (Anderson and Eswaran (2009), Majlesi (2016)) and the communication environment (Ashraf (2009)). Despite this, there is a growing appreciation that culture is an important contributor (Jayachandran (2015)). Among the very sparse extant work in this area, Lowes (2018) studies the impact of culture (matrilineal vs. patrilineal kinship systems) on the related issue of spousal conflict, and Bertrand et al. (2015) study how culture (gender identity and ‘breadwinner’ norms) affects marriage, labour force participation, and divorce.

³See Hiller and Touré (2021) for a theoretical model of the coevolution of these two dimensions.

⁴In practice, constraints on husbands’ desire to exit the marriage are embedded in a variety of related rules (e.g. those concerning alimony, the allocation of marital property on divorce, and even the conditions under which divorce is permitted). A large literature is concerned with evaluating the consequences of such rules; e.g. property division laws (Voena (2015), Lafortune and Low (2019)), alimony (Chiappori et al. (2017)), prenuptial agreements (Bayot and Voena (2015), Rainer (2007)), and divorce laws (Stevenson and Wolfers (2006), Fernández and Wong (2017)).

⁵Ligon (2002) and Mazzocco (2007) also present models of the household in which limited commitment induces ex ante inefficiency. The focus in these papers is a limited ability to commitment to future allocations within marriage and the consequences for risk-sharing. We assume risk neutrality to allow us a cleaner focus on the limited commitment to separation decisions and marital institutions. See Chiappori and Mazzocco (2017) for a review of related models and issues.

mismatch in spousal commitment and thus the extent to which additional institutional constraints are required.⁶ The key observation is that stronger inside norms raises the relative commitment of husbands whereas the opposite is true of outside norms.

The key methodological challenge in empirically exploring the model’s predictions is that a household’s optimal strength of marital institutions is unobserved. We overcome this by exploiting a feature of Islamic marriage contracts. In Islam, *mahr* (dower) is a mandatory payment, in the form of money or possessions, paid or promised to pay by the groom, or by the groom’s father, to the bride at the time of marriage, that legally becomes her property. The marriage payment is separated into two parts: at marriage (prompt dower, or *muqaddam*) or at the time of divorce (deferred dower, or *mu’akhar*). The aim of the payment is to provide the bride with some financial independence within marriage and the deferred component in particular acts as a barrier to divorce (Ambrus et al. (2010), Chowdhury et al. (2019)). The *mahr* in any Islamic marriage contract is a legal right of the wife, and the husband may not reduce the promised amounts (Fluehr-Lobban and Bardsley-Sirois (1990)). We show how a household’s chosen deferred dower reveals their optimal marital institution.

Our empirical setting is Egypt, which offers two advantages. First, it is a predominantly Muslim country for which we have detailed data on marriage payments. Second, we also find significant within-country variation in measures of inside and outside gendered norms. These significant differences seem to stem from a deep historical persistence of cultural differences with regards to the subordination of women which are driven by the early patterns of Islamization and tribal norms. The Islamic context is also well-suited here as there is a cultural distinction between the “public” and “private” rights for women, whereby practicing seclusion does not necessarily imply low female bargaining power within the household. We show that our main theoretical predictions find robust support in the data.

Our work contributes to a literature that jointly analyses culture and institutions (for a survey, see Alesina and Giuliano (2015)), and in particular to work exploring the impact of culture on institutions.⁷ The distinguishing feature of our work is the specific focus on the ‘gendered norms’ dimension of culture and on the ‘marriage’ dimension of institutions.⁸

⁶The argument is similar to Greif (1994), whereby strong formal legal institutions arise in societies with cultures that fail to foster alternative means of contract enforcement.

⁷There is also a literature that studies the reverse channel whereby institutions impact culture (e.g. Lowes et al. (2017)), and a theoretical literature concerned with the co-evolution of culture and institutions (Tabellini (2008), Bidner and Francois (2011), Bisin and Verdier (2017), Acemoglu and Jackson (2017)).

⁸As detailed in Alesina and Giuliano (2015), work in this literature typically examines the ‘social capital/generalized trust’, ‘individualist/collectivist’, ‘family ties’ or ‘attitudes to work/poverty’ dimension of culture, and the ‘financial’, ‘legal’ or ‘political’ dimension of institutions.

Our work also relates to the literature concerned with the effects of gendered norms more broadly.⁹ Work in this literature examines the role of gendered norms in affecting outcomes such as female labour force participation, fertility, and entrepreneurship; e.g. see Jayachandran (2019), Fernández and Fogli (2009), and Ashraf et al. (2019). Apart from our focus on a novel outcome (optimal marital institutions), we also contribute to this literature by demonstrating the importance of ‘unbundling’ such norms into those concerned with the private and public spheres.¹⁰

We also contribute to a literature that attempts to understand the nature of marital institutions. A body of work, set in a developing country context, studies various dimensions of marital institutions and practices, such as marriage payments, endogamy, consanguinity, *watta satta*, polygyny and so on.¹¹ Our work differs from this literature in our focus on marital institutions that aim to resolve the husband’s commitment problem. We know of no other work that analyzes the drivers of this fundamental dimension of marital institutions. The closest work on this dimension is a handful of papers which explain institutional changes that establish the property and political rights of women as a result of economic transformations (Geddes and Lueck (2002), Doepke and Tertilt (2009), and Fernández (2014)).

A few papers focus on the deferred dower in Islamic marriage. Ambrus et al. (2010) look at the effect of legal changes. Chowdhury et al. (2019) look at the effect of income shocks. Our work differs from these papers in three ways. First is our focus on cultural drivers. Second is the empirical context, outside of South Asia. Finally, we are not interested in the payments per se. Rather, we are interested in what the payments reveal about optimal marital institutions, and as such, we see our analysis extending beyond Islamic marriage.

The structure of the paper is as follows. Our model is set up and the consequent empirical predictions are established in Section 2. Section 3 describes our empirical strategy and the main empirical findings. Section 4 concludes.

⁹For surveys of the impact of culture on economic outcomes more broadly, see Guiso et al. (2006) and Fernández (2011).

¹⁰Rainer (2008) presents a model in which ‘outside’ norms influence decision-making power inside the household. Stronger outside norms lower the return to the wife’s investment in earning capacity, and the consequent lower earnings puts her in a weaker position inside the household. For these sorts of reasons, we would naturally expect male dominance outside and inside the household to move in the same direction.

¹¹See Anderson (2007), Botticini and Siow (2003), Anderson and Bidner (2015), Bidner and Eswaran (2015), Jacoby (1995), Jacoby and Mansuri (2010), Ashraf et al. (2020), Tertilt (2005).

2 Theory

2.1 Fundamentals

We model marriage as a contract that establishes a relationship with costly exit, and we identify the *strength* of marital institutions with the extent to which exit is costly. We begin by modelling such institutions in a reduced-form manner by supposing that separation involves a transfer $\tau \in \mathbb{R}$ from the husband to wife. The value of τ is exogenous, e.g. determined by the state or religious authority, and parametrizes the strength of marital institutions.¹² The model focuses in on a particular male and female, and unfolds in three stages.

2.1.1 Stage 1: Marriage Market

Potential spouses encounter each other in the marriage market. Consider two such agents, m (a male) and f (a female), that are to form a married household $h = (m, f)$. Agent $i \in \{m, f\}$ is endowed with private wealth $w_{i0} \in \mathbb{R}_+$. The pair (or their families) negotiate an ex ante transfer, denoted $T_h \in \mathbb{R}$, from husband to wife. This adjusts private wealth to $w_m = w_{m0} - T_h$ and $w_f = w_{f0} + T_h$.

The value of the ex ante transfer is determined by Nash bargaining. That is, if agent i gets an expected payoff from marriage of $V_i(T_h)$ and has an outside option of U_i , then the negotiated value of T_h satisfies $V_m(T_h^*) - U_m = V_f(T_h^*) - U_f$.

2.1.2 Stage 2: Marriage

Once married, the couple learn their match quality. This is given, inversely, by $\eta \in \mathbb{R}$. This is the realization of a mean-zero random variable drawn from a distribution, F . In section B.2 of the Appendix we generalize by allowing multidimensional match quality (so that husband and wife may experience a different match quality) and show that the qualitative conclusions remain, albeit at the cost of additional complexity.

Agents then have the opportunity to enter into a continuation agreement in which agent i transfers T_i^c in exchange for continued marriage.¹³ Negotiating and enforcing such an agreement is costly. Negotiation is costly since it invites animosity that detracts from

¹²More precisely, the value of τ parameterizes the extent to which marital institutions constrain *husbands* from exit. That is, negative values imply that marital institutions constrain wives from exit, and more so for more negative values. As will become clear, constraining wives is never optimal in the model.

¹³Spouses are unable to contract over the future division of household wealth—such contracts are prohibitively costly to write and enforce—but the transfers, T_i^c , achieve the same goal of adjusting the continuation value of marriage.

the value of continued marriage.¹⁴ Enforcement is costly since “marital duties are to be performed in a certain spirit, and no court can succeed in forcing an unwilling spouse to perform marital duties in a spirit of love and devotion” (Cohen (2002), p.31).¹⁵ For simplicity we assume that each side incurs a disutility of $\kappa > 0$ whenever such an agreement is negotiated.

Finally, an opportunity to separate arises. If a continuation agreement has been reached then the couple remain married. Otherwise, each agent decides whether to separate or to remain married. Separation occurs if and only if at least one agent prefers it to continued marriage.

2.1.3 Stage 3: Payoffs

If the couple remain married, then they can jointly produce a household wealth of $W > 0$, of which agent i is allocated $W_i \geq 0$ (such that $W_m + W_f \leq W$). In this event, agent i gets a payoff from continued marriage of $C_i - \tilde{\eta}$, where $C_i \equiv W_i + w_i - (T_i^c - T_{-i}^c)$ is consumption and $\tilde{\eta} \equiv \eta + \mathbb{I} \cdot \kappa$ is the total psychological cost (where \mathbb{I} is an indicator for whether a continuation agreement exists).

Household wealth is allocated via generalized Nash bargaining where $z \in [0, 1]$ is the husband’s bargaining power. The outside option is an ‘unproductive’ marriage in which household wealth is reduced.¹⁶ For simplicity we suppose that an unproductive marriage produces no household wealth so that $W_m = W_f = 0$. The outside option payoff is therefore the same as outlined above except that $W_i = 0$. As such it is straightforward to show that bargaining leads to $W_m = z \cdot W$ and $W_f = (1 - z) \cdot W$.

If instead the couple separate, then the husband and wife respectively get payoffs of $\hat{u}_m + w_m - \tau$ and $\hat{u}_f + w_f + \tau$, where \hat{u}_i is a reduced-form exogenous payoff. This

¹⁴In the words of Cohen (2002), “Marital duties performed in exchange for financial compensation would have only shadows of their former values. The transactions costs of renegotiating the contract will often be prohibitive, because the very act of renegotiation destroys the value of the services performed” (p.26). Negotiating over transfers prior to marriage likely involves a far lower cost since the couple has no history and because such negotiations are typically undertaken by parents. Note too that no such cost arises for agreements in which one side pays the other in exchange for separation (e.g. in the case where divorce requires mutual agreement or is effectively the sole right of the husband).

¹⁵This argument is related to ‘shading’ on performance in commercial contracts by parties that feel aggrieved (Hart and Moore (2008)). In any case, the non-viability of external enforcement appears empirically clear: while most societies utilize transfers at the time of marriage (Anderson (2007)), none to our knowledge utilize such continuation contracts.

¹⁶That is, our model is one of ‘bargaining in marriage’ (Pollak (2018)) whereby an unproductive marriage is preferred to separation and is therefore the relevant outside option. We have in mind a situation in which the separation decision at the end of stage 2 is temporary in the sense that the costs of separation in stage 3 are sufficiently costly (due perhaps to older age or diminished prospects for remarriage) that an unproductive marriage dominates.

payoff incorporates any psychological costs, social stigma, prospects for employment and remarriage, consequences of dividing household goods such as children and housing, and so on.¹⁷

Along the lines of Becker's quote, we have in mind a situation where household specialization leaves the wife with weak earnings opportunities relative to the husband yet marriage facilitates greater equality in consumption. In short, the husband-wife difference in outcomes is less pronounced within marriage. Specifically:

Assumption 1 *Separation payoffs are sufficiently in favour of males, relative to their bargaining power in marriage, that $W_m - W_f < \hat{u}_m - \hat{u}_f$.*

This ensures that, absent marital institutions (i.e. $\tau = 0$), it is the husband that has stronger incentives to separate.

2.2 Analysis: Separation Decisions

It is useful to define each agent's (ex ante) *commitment* to marriage as follows.

$$\bar{\eta}_m(\tau) \equiv W_m - \hat{u}_m + \tau \tag{1}$$

$$\bar{\eta}_f(\tau) \equiv W_f - \hat{u}_f - \tau. \tag{2}$$

These represent commitment in the sense that, in the absence of a continuation agreement, agent i will prefer to remain married if $\eta \leq \bar{\eta}_i(\tau)$. Naturally, stronger marital institutions raise the marital commitment of husbands. Let the average marital commitment be denoted $\eta^* \equiv (1/2) \cdot [\bar{\eta}_m(\tau) + \bar{\eta}_f(\tau)] = (1/2) \cdot [(W_m - \hat{u}_m) + (W_f - \hat{u}_f)]$, noting that this is independent of the strength of marital institutions.

There are three possible outcomes to consider. In case I, the couple remained married without a continuation contract. This arises when both agents prefer continued marriage to separation even when $T_m^c = T_f^c = 0$. That is, when

$$\eta \leq \bar{\eta}(\tau) \equiv \min\{\bar{\eta}_m(\tau), \bar{\eta}_f(\tau)\}. \tag{3}$$

In this case the total surplus is $v(\eta) \equiv W + w_{0m} + w_{0f} - 2 \cdot \eta$.

¹⁷At the cost of extra notation, we could explicitly incorporate the raising of children (or the production of any household good) into the analysis. The household good is produced once the couple are married but before the match quality shock is realized. Continued marriage involves the joint consumption of the household good whereas separation leads to some costly division of the household good. The separation decision would then also depend on how this division occurs, but this possibility is completely accommodated by exogenous separation payoffs.

In case II, the couple remained married but with a continuation contract. This arises when the above condition fails, yet the total surplus under marriage-with-continuation-contract is at least as large as total surplus under separation. That is, when

$$\eta \in (\bar{\eta}(\tau), \eta^* - \kappa]. \quad (4)$$

Naturally, this possibility does not arise when the continuation contract is sufficiently costly. In this case the total surplus is $v(\eta) - 2 \cdot \kappa$.

In case III the couple separates. This arises when both of the above conditions fail to hold. That is, when

$$\max\{\bar{\eta}(\tau), \eta^* - \kappa\} < \eta. \quad (5)$$

In this case the total surplus is $v^s \equiv \hat{u}_m + \hat{u}_f + w_{0m} + w_{0f}$.

The three cases are illustrated in Figure 1. The shaded sections are regions where inefficiencies arise: the costs involved in the continuation contract arise in case II, and there is inefficient separation in case III⁻.

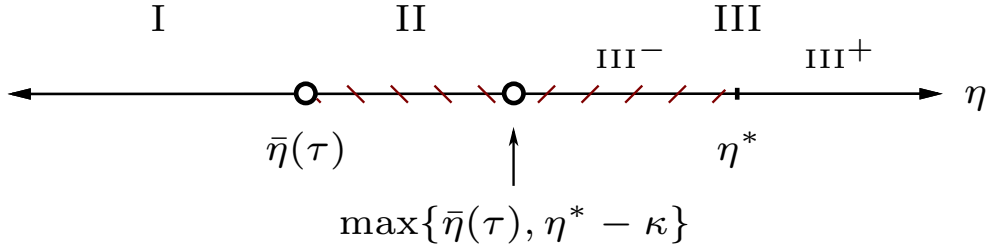


Figure 1: Equilibrium Outcomes

2.3 Analysis: Optimal Strength of Marital Institution

Consider a planner that does not observe match quality, η , but can choose the strength of marital institutions τ and the ex ante transfer, T_h . Notice that the ex ante transfer does not affect separation decisions, nor the total surplus in any given state. It merely allocates utility ex ante. Thus, regardless of the relative weight a planner places on husband and wife utilities, the optimal strength of marital institutions is the one that maximizes expected

surplus. That is, such a planner chooses τ to maximize

$$\int_{-\infty}^{\bar{\eta}(\tau)} v(\eta) dF(\eta) + \int_{\bar{\eta}(\tau)}^{\max\{\bar{\eta}(\tau), \eta^* - \kappa\}} \{v(\eta) - 2 \cdot \kappa\} dF(\eta) + \int_{\max\{\bar{\eta}(\tau), \eta^* - \kappa\}}^{\infty} v^s dF(\eta). \quad (6)$$

Proposition 1 *The optimal strength of marital institutions is that which satisfies $\bar{\eta}(\tau^*) = \eta^*$. That is, it equates the husband and wife commitment to marriage: $\bar{\eta}_m(\tau^*) = \bar{\eta}_f(\tau^*)$.*

All proofs are in section B.1 of the Appendix. In terms of Figure 1, the shaded ‘inefficiency’ region disappears at $\tau \rightarrow \tau^*$. The key trade-off is as follows. If marital institutions are weaker than optimal, $\tau < \tau^*$, then there exist states in which husbands seek inefficient divorces. This reduces the couple’s available ex ante expected surplus, and because of the ex ante transfer, implies a Pareto inefficiency. Similarly, if marital institutions are stronger than optimal, $\tau > \tau^*$, the same argument applies except that there are now states in which it is wives that seek inefficient divorces.¹⁸

To summarize, the key issue facing potential spouses is the prospect of inefficient separation. This arises from (i) their inability to commit to a state-contingent separation rule, and (ii) the transactions costs associated with writing and enforcing a continuation contract. It is such transactions costs that prevent Coaseian bargains following the realization of match quality. Uncertainty over match quality is indispensable for our mechanism, although this has nothing to do with risk (agents are risk neutral). Rather, the issue of optimal strength of marital institutions is non-trivial only because there exists some states in which separation is efficient and some states in which it is not.¹⁹

2.4 Introducing Male Dominance Norms

We consider two dimensions of male dominance norms. Inside male dominance norms describe the extent to which males are expected to dominate in the private sphere of the household. Outside male dominance norms describe the extent to which males dominate

¹⁸Of course, this trade-off is well-known. For instance, Dnes (1998) describes the incentives in former case as the “greener-grass” effect and the latter case as the “Black-Widow” effect. He outlines some practical considerations for various approaches to the division of assets at divorce (e.g. based on need, expectation damages, retribution, rehabilitation, etc.) in light of these effects, and thus is concerned with the details of how to best endow marital institutions with a particular strength. We, in contrast, are concerned with the bigger-picture issue of the determinants of the *optimal* strength.

¹⁹For instance, if the issue was merely that husbands predictably seek to separate once their wives have finished making investments in children, then it would be optimal to make separation impossible. Predictable future exploitation, e.g. of post-children wives, could be accounted for in ex ante transfers prior to the establishment of the marriage. Impossible separation clearly becomes sub-optimal only when there are states in which separation is efficient.

in the public sphere, including in the workforce, in political life, and under the law. All households in a community are subject to the same norms.

We parameterize inside norms with $\phi \in \mathbb{R}$ and take the primary effect to be in bargaining over household wealth. In particular, we assume that husband's bargaining power, z , is strictly increasing in ϕ . The main effect of inside norms then is to increase this husband-wife difference in consumption of household wealth. We allow for the possibility that such norms also raise the husband-wife difference in separation payoffs (e.g. if separated agents re-marry and are once again subject to such norms), but assume that the former effect dominates (e.g. if there is a positive probability of not remarrying). In particular, we assume

$$\frac{d}{d\phi}\{W_m - W_f\} > \frac{d}{d\phi}\{\hat{u}_m - \hat{u}_f\}. \quad (7)$$

We parameterize outside norms with $\psi \in \mathbb{R}$ and take the primary effect to be on the experience of separated agents. In particular, we assume that husband-wife difference in separation utility is strictly increasing in ψ . We allow for the possibility that such norms also affect household bargaining (e.g. if such norms were to contribute to outside options), but again assume that the former effect dominates (e.g. if, as in the model and models of bargaining-in-marriage more generally, the separation option is dominated by an unproductive marriage). In particular, we assume

$$\frac{d}{d\psi}\{\hat{u}_m - \hat{u}_f\} > \frac{d}{d\psi}\{W_m - W_f\}. \quad (8)$$

Proposition 2 *The optimal strength of marital institutions is decreasing in inside male dominance norms, ϕ , and increasing in outside male dominance norms, ψ .*

The intuition here is that a husband's commitment to marriage is increasing in the strength of inside male dominance norms but decreasing in the strength of outside male dominance norms. The optimal strength of marital institutions ensures that husbands possess a particular level of commitment to marriage, marital institutions will optimally be called upon to provide greater commitment as norms provide less commitment.

For a fixed ex ante transfer, each agent's expected payoff from entering into marriage will naturally depend on the state of male dominance norms. Given this, the negotiated ex ante transfer will also depend on the state of male dominance norms. The effect is unambiguous in the case of inside male dominance norms. The husband-wife difference in expected payoff from marriage is increasing in the strength of male dominance norms,

whereas outside options to marriage are unaffected.²⁰ Thus we have the following.

Proposition 3 *If the strength of marital institutions is set optimally, then the ex ante marriage payment, T_g , is increasing in inside male dominance norms, ϕ .*

The effect of outside male dominance norms is ambiguous: there is potentially a positive effect on the husband-wife difference in expected marriage payoffs (via z), but there is also potentially a direct positive effect on the husband-wife difference in outside options to marriage, $U_m - U_f$.

2.5 Empirical Implications

The main qualitative implication of the model is that gendered norms will shape the optimal strength of marital institutions (in a specific direction depending on the nature of the norm). There are some obvious challenges in exploring this empirically. First, the optimal strength of marital institutions is not observed. Even if we had some proxy measure based on prevailing family law, it is not clear that institutional designers (e.g. the state, religious authorities, etc.) have the objective of maximizing household welfare as we have defined it, nor that de jure laws accurately represent de facto constraints. Indeed, we have derived the optimal marital institution *from the perspective of a particular household* – in practice, marital institutions must be applied to a society of heterogeneous households as a whole. This is the second main challenge: there is typically no variation in de jure marital institutions within a society at a point in time since everyone is subject to the same law.

We overcome these challenges by first making a very simple extension to the model and then exploiting a feature of Islamic marriage. The extension considers a richer ex ante contracting environment. Specifically, we maintain the impossibility of contracting on the state of match quality, η , but allow agents to contract over a separation-contingent transfer, denoted t_h , from husband to wife. Analysis here is straightforward: the total transfer payable by the husband in event of divorce is the sum of that imposed by marital institutions and that stipulated in the ex ante contract. Thus, if τ_h^* is the household's optimal strength of marital institutions in the restricted contracting environment (as analyzed in detail above) and τ is the actual strength of marital institutions, then the optimal separation-contingent transfer, t_h^* , is simply $t_h^* = \tau_h^* - \tau$. Again, note that both husband

²⁰We could allow outside options to marriage to also depend on the strength of inside norms, but what matters is that the effect on the husband-wife difference in marriage payoffs be larger than the effect on the husband-wife difference in outside options. This holds, for instance, if outside options incorporate the prospect of future marriage but such prospects are time discounted.

and wife agree that this amount is optimal (it maximizes the available surplus which can then be allocated via the ex ante transfer, T_h^*).

This simple extension is motivated by Islamic marriage. In Islam, *mahr* (dower) is a mandatory payment, contracted upon at the time of marriage. The marriage payment is separated into two parts: a prompt component (*muqaddam*) to be paid at the time of marriage, and a deferred component (*mu'akhar*) that is payable upon divorce. The aim of *mahr* is to provide the bride with some financial independence within marriage, and the deferred component in particular acts as a barrier to divorce (Ambrus et al. (2010), Chowdhury et al. (2019)). The *mahr* in any Islamic marriage contract is a legal right of the wife, and the husband may not reduce the promised amounts (Fluehr-Lobban and Bardsley-Sirois (1990)). The setting for our empirical analysis is Egypt. Early Islamic marriage contracts dating from the 9th century reveal the use of marriage payments (both the prompt and deferred portions) in Egypt beginning at this time (Rapoport (2000)). In present-day virtually all legal marriages stipulate a dower.

Connecting to the model, the prompt component is the ex ante transfer, T_h , and the deferred component is the divorce-contingent payment, t_h . In setting these payments optimally, the couple's preferences over the deferred dower are perfectly aligned. Since the prompt dower, T_h , serves to allocate a given household welfare, both husband and wife want to set the deferred dower, t_h , so as to maximize total surplus as in the model.²¹

Given this background, we are now ready to summarize our main empirical predictions.

2.6 Empirical Predictions

Our first set of predictions concern the determinants of the deferred dower, t_h . Since the optimal deferred dower is t_h^* , Proposition 2 leads to the following predictions:

Prediction 1 *The deferred dower, t_h , is decreasing in the strength of inside norms.*

Prediction 2 *The deferred dower, t_h , is increasing in the strength of outside norms.*

The model also makes predictions about the prompt dower. Since the deferred dower is optimally set, Proposition 3 applies. Thus we also have:

Prediction 3 *The prompt dower, T_h , is increasing in the strength of inside norms.*

²¹Unlike the general treatment above, the deferred dower must be non-negative and equals zero in a non-trivial minority of cases. The non-negativity is not a binding constraint when husbands have lower commitment to marriage relative to wives, which seems plausible. Setting the deferred dower to zero is approximately optimal when changes in the deferred dower have little impact on household welfare – e.g. when there is little probability mass attached to the inefficient cases III and IV, for instance because the couple expects marriage to deliver payoffs far in excess of separation payoffs.

Notice that these predictions are very tight: finding support for them requires a very specific and nuanced empirical relationship between gendered norms and marriage payments. That is, the two types of gendered norms have opposite predicted effects on the deferred dower (Predictions 1 and 2), and inside norms have an opposite predicted effect on each type of marriage payment (Predictions 1 and 3).

3 Empirical Analysis

3.1 Empirical Strategy

We test the model’s predictions using household-level data. Each household i resides in a geographic area $g(i)$. Our main outcomes of interest are marriage payments, both the deferred dower t_h and prompt dower T_h . We estimate the following equation:

$$Y_i = \alpha \cdot Z_{g(i)} + X_i\beta + \varepsilon_i, \tag{9}$$

where $Y_i \in \{\ln(1 + t_i), \ln(1 + T_i)\}$, $Z_{g(i)}$ is a measure of gendered norms defined at the geographic unit (the governorate, *Muhafazah*)²², X_i is a set of control variables and ε_i is the error term. Standard errors are clustered at the geographic unit throughout.

Our baseline set of control variables, X_i , include regional fixed effects²³, a rural-urban dummy variable, and the year of marriage.²⁴ A set of household controls which are pre-determined before marriage, and known to affect marriage payments, such as the education of husband and wives and their parents, the age of marriage of the wife, and the age difference between spouses.²⁵ We also include a measure of household wealth, which is not clearly exogenous to marriage negotiations but is a crucial determinant. All key estimation results follow through if we omit this wealth variable from the estimations.

We also include a set of geographic and environmental controls (which come from GIS data) to capture exogenous measures of the economic environment such as land and soil characteristics, light density, and distance to amenities such as hospitals, health care centres, and schools.

²²Egypt is divided into 27 governorates which are administered by a governor who is appointed by the President of Egypt. The country is further divided into 351 municipalities (*kisms*). We can run our estimations aggregating our data up to this level instead, but we are often left with too few observations in each kism to compute reliable estimates. Present-day governorates often directly correspond to past administrative units throughout history, some even to the *nomes* of Ancient Egypt.

²³These are the seven economic regions used for planning purposes, defined by the General Organization for Physical Planning (GOPP) of Egypt.

²⁴We also include a survey year fixed effect.

²⁵Refer to Table A3 in Appendix A, which demonstrates which of these control variables significantly determine marriage payments.

Though not reported here, the estimation results are also robust to including a host of other controls which are not necessarily exogenous. These include measures at the household level such as employment outcomes of spouses, whether the marriage is between kin, and the number of children. At the geographic level, these include variables to capture the local economic environment such as overall employment patterns by gender and their respective industry shares.

In such an estimation, as described in (9), we are left with some concerns of omitted variable bias and reverse causality with regards to our key explanatory variables of interest, gendered norms as represented by $Z_{g(i)}$. These identification concerns are somewhat alleviated by our theoretical predictions: that the two types of norms, inside and outside male dominance norms, have opposing effects on deferred dowers. The core concern with the OLS estimations of (9) is that locations with male biased beliefs are possibly also characteristic of some key unobservable direct determinant of marriage payments. The most obvious one being systematic differences in levels of economic development. However, one would expect that any unobservable that is positively correlated with economic development would in turn be negatively correlated with both male biased inside and outside norms and should thus not predict the opposing effects on marriage payments that we test for. Additionally, it would be difficult to conceive of an unobservable directly correlated with both types of norms and marriage payments that would have opposing predictions for the deferred and prompt components of the dower payments (i.e., consistent with Predictions 1 and 3). Nevertheless, we will provide a set of robustness checks, in Section 3.5, which will use measures of arguably exogenous variation which shift these norms and also employ an instrumental variable approach.

3.2 Data

Marriage Payments.

Our main data source is the Egypt Labor Market Panel Survey (ELMPS), which is a nationally representative household survey administered by the Economic Research Forum²⁶ in cooperation with Egypt's Central Agency for Public Mobilization and Statistics. Our study pools the two rounds from 2006 and 2012 and our final sample comprises roughly 12,600 married women.²⁷ Of key relevance for our purposes, the survey contains detailed

²⁶OAMDI, 2013. Labour Market Panel Surveys (LMPS), <http://www.erf.org.eg/cms.php?id=erfdataportal>. Version 2.1 of Licensed Data Files; ELMPS 2012. Egypt: Economic Research Forum (ERF). Even though the survey excludes Frontier governorates (Matruh, New Valley, Red Sea, North and South Sinai), data administrators employed appropriate sampling weights to ensure the representativeness of each round.

²⁷We exclude the 56 women in polygamous households, as marriage payments and household decision-making may be specific to such unions.

information on payments at the time of marriage. All married women (between the ages 16 and 49) are surveyed with regards to all costs associated with their marriage. These include the prompt and deferred dowers which were stipulated in the marriage contracts, as well as additional gifts of jewellery or household goods, and also monetary contributions to housing costs and wedding preparations, from both the groom and bride sides of the families. Our analysis focuses only on the first two contractual payments (the prompt and deferred dowers) without which the marriage is not legal. Though not reported here, all of our estimation results are robust to including these other monetary contributions at the time of marriage as additional control variables.

Summary statistics on the value of deferred dower and prompt dower are listed in Table A1 in Appendix A. Reported amounts are deflated using the CPI index corresponding to the reported year of marriage, 2000 being the baseline year.²⁸ The amount of the deferred dower is almost three times greater than that of the prompt dower, and is equal to roughly three times the average household expenditures per capita in 2012. Across the governorates of Egypt (the principal administrative unit), roughly 95% of the marriages in our sample transacted marriage payments. Marriage payments are equally prominent across rural and urban areas. In both greater Cairo and Alexandria, approximately 93% of marriages entailed a dower. There is one governorate, Damietta, a port city located on the Mediterranean Sea for which only 60% of marriages transacted dowers. In our estimations we use a logarithm transformation of the two dower payments to address the zeros in our data and our results are also robust to excluding this low incidence governorate, Damietta, from the analysis. Figures A2a and A2b in Appendix A.2 depict the geographic variation in the two dower payments across Egypt.

Control Variables.

The ELMPS survey is also our source for our baseline set of control variables defined at the household level. These include the educational attainment of wives and husbands and their parents, age at marriage, spousal age difference and household wealth. Table A1 in Appendix A includes summary statistics on these variables. In our sample, women received on average 8 years of schooling and their husband 9 years. Only 22% of women have a literate mother and 47% a literate father - very similar statistics follow for the parents of their husbands. Household wealth is captured by an index based on asset ownership and housing characteristics using Principal Components Analysis. On average women marry at 20 years old and have a 6 year age gap with respect to their spouse. Indicators of education, wealth, and age at marriage are also somewhat higher in urban

²⁸The CPI index is obtained from the International Monetary Fund, World Economic Outlook Database, October 2013. To reduce concern about outliers, we remove the top percentile of each payment.

areas compared to rural.

Local economic controls on soil quality, light density, and distance to several amenities come from various sources of geo-spatial data. These are described in detail in Appendix A. Table A2 in Appendix A provides summary statistics on these control variables. All these geographic variables are averaged up to the *kism* level, the second administrative unit of Egypt (of which there are 351 across the country). We do this to match our GIS data to our household level data. The *kism* is the smallest unit that we can geo-locate in the household level data. There are on average 90 households residing in each *kism* in our sample.

Gendered Norms.

To define measures of gendered norms, we use measures of perceptions and opinions from individuals and aggregate these to the local level (governorate). Based on the responses to several related questions, we construct a set of indices. For the perceptions/opinions variables we rely on three different data sources, the ELMPS (2006, 2012), the Demographic Health Survey (DHS) of Egypt (2014, 2015), and the Afrobarometer Survey of Egypt (2015, 2016). In the ELMPS survey, all ever-married women were asked detailed information on participation in household decision-making and views on whether women should work outside of the home. The DHS survey asks directly related questions regarding household decision making power and acceptance of intimate partner violence (IPV). The Afrobarometer survey contains information on how women are treated in society.

Inside Male Dominance Norms

Our main measure of *inside* male dominance norms comes from the responses regarding household decision making power in the ELMPS survey. Ever-married women (above 15 years old) are asked about who usually has the final say on several decisions including: making large purchases, purchases for daily needs, visiting family and friends, cooking, their own health and buying clothes for themselves. For each of these propositions, we define a variable that takes on the value one if the husband has the final say alone and zero otherwise. We assume that these variables serve as observed proxies of a latent variable, male dominance inside the household. We derive a summary measure of inside male dominance norms from a data-driven weighting scheme based on principal component analysis, with relative weights based on the correlation system of proxies with respect to male dominance.²⁹ We next compute weighted averages of these individual measures of

²⁹Alternatively, we can reproduce the results using equal-weighting between indicators of husbands' dominance.

inside male dominance norms at the local (governorate) level.³⁰ Table A2 in Appendix A reports summary statistics on this key index of interest, called “Husband Decides”. There is substantial geographic variation in this measure of inside male dominance, ranging from a low of 10.39 (Cairo) to a high of 42.0 (Qena). Figure A1a in Appendix A.2 displays (and interprets) this variation, and Figure A3a illustrates the geographic variation.

We construct three alternative measures of inside male dominance. The first measure is analogous to the “Husband Decides” index using instead data from the DHS survey (referred to as “Husband Decides (DHS)”). We see from Table A2, that these two measures (from the two different data sources) are very similar. The second measure, referred to as “Fear of Husband” and constructed from the ELMPS survey, is just a local average of a dummy indicator variable which is equal to one if a woman responded yes (as opposed to no) to the question “Are you often or generally afraid of disagreeing with your husband”. We see from Table A2, that the vast majority of women fear their husbands, more than 60%. The third measure, also from the ELMPS, is a weighted index constructed from survey questions which ask ever-married women whether a husband is justified in beating his wife in a set of circumstances: a wife burns the food, she neglects the children, she argues with her husband, talks to other men, wastes her husband’s money, or refuses sex with him. These different scenarios are meant to characterize a common set of role expectations for women inside the home. This index, referred to as “IPV Justified”, is increasing in women’s acceptance of IPV when they transgress these established domestic roles.

Outside Male Dominance Norms

Measures of outside male dominance norms are meant to capture the overall treatment of women in society outside of their home (or in public). For this purpose we focus on three types of norms. The first is to do with attitudes towards women working outside of the home. Despite relatively, high education levels in Egypt, formal female labour force participation is extremely low (less than 15%). This is likely in large part due to customs of seclusion and gender segregation. To construct an average measure of these attitudes, we use information from the ELMPS survey which asks women a series of questions regarding their attitudes towards women working outside of the home, like whether women should be allowed to work, whether having a job interferes with a woman’s duties to her husband and children, and whether women who work should be pitied. We again average this index up to the governorate level. This variable is increasing in women’s negative attitudes towards

³⁰We can alternatively construct these averages at a more disaggregated level, the lower level administrative unit (kism) and the results follow through. However, for a number of kims, the population numbers are low and we have too few individual-level observations (i.e., less than 10) to construct averages with sufficient accuracy.

work and is referred to as “No Women Work” in Table A2. Figure A1b in Appendix A.2 displays (and interprets) the variation in outside norms, and Figure A3b illustrates the geographic variation.

A second index comes from the Afrobarometer survey which asks a series of questions regarding whether women are treated unequally (relative to men) by employers, local political leaders, police and courts. We construct an index equal to one if respondents state either “always” or “often” compared to “rarely” or “never”. We compute an average index of these different measures at the governorate level. This variable termed, “Unequal Treatment” is increasing in the degree of unequal treatment towards women and is described in Table A2. The majority of women perceive unequal treatment in society, where the measure is higher for treatment from local political leaders and employers compared to the police and courts.

A third measure comes from the DHS survey and reflects attitudes towards female genital mutilation. Women are asked whether or not they think the custom of female genital mutilation should continue or be stopped. We construct a dummy variable equal to one if they believe the custom should continue and average up this variable to the governorate level. Despite being illegal since 2008, female genital mutilation is extremely widespread in Egypt. According to the 2017 Census, more than 90% of females between ages (15-47) have been circumcised. The custom is traditionally believed to constrain women’s sexuality by ensuring her virginity before marriage and her fidelity afterwards. The custom has been present in Egypt since ancient times, there is evidence dating back to as far as fifth century B.C. (Kouba and Muasher (1985)). As a consequence, researchers believe that the custom did not originate in Islam but was adopted by it around 640 AD - the time of the Arab conquest of Egypt (Hansen (1972/1973), Hayes (1975)). Research emphasizes that the custom gained strength under Islam because of the religion’s emphasis on virginity, chastity, seclusion and protecting the honour of women. We posit that beliefs in this custom makes the relative separation costs for women to be larger - in line with the other two outside male dominance norms. The variable “Support FGM” is described in Table A2, where we see that on average 72% of women support the tradition.

3.3 Stylized Facts

Before turning to the estimation results, we first document the relationship between inside and outside norms and show some supporting raw correlations in the data. We may expect that inside and outside dimensions of male dominance would be strongly positively correlated, each merely representing a different angle on male dominance in general. Figure

2 demonstrates that this presumption is premature and that there is no clear relationship between these dimensions (across governorates in Egypt). This non-relationship arises across each combination of inside and outside norms described above.

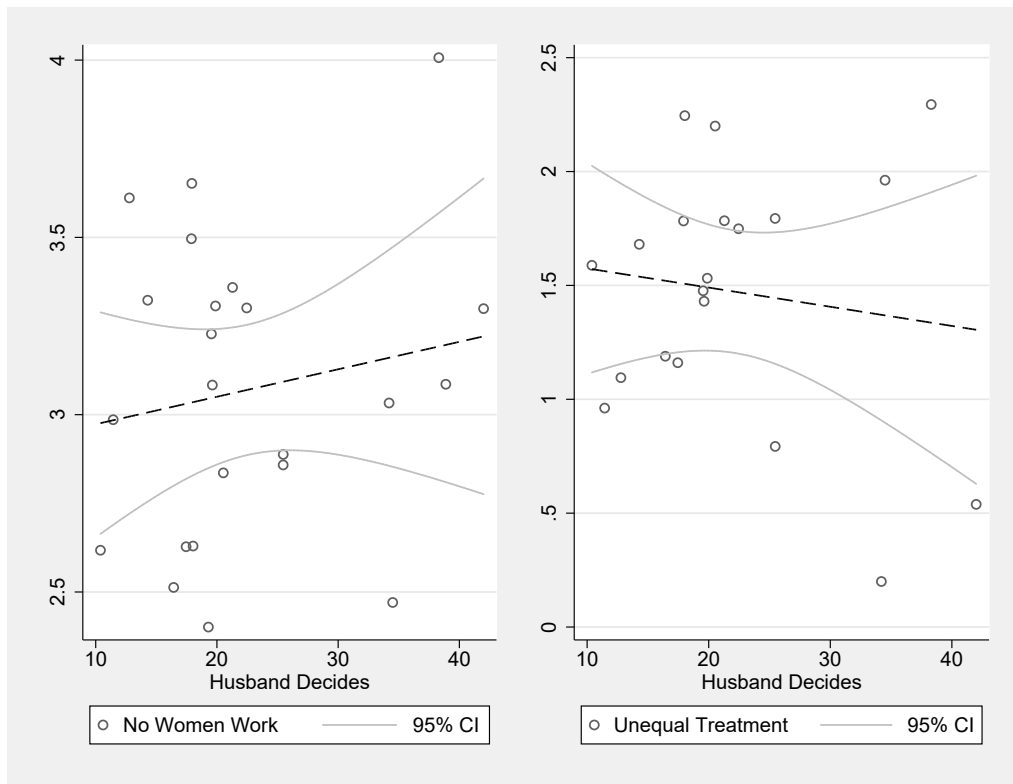


Figure 2: Inside and Outside Male Dominance Norms

Figure 3 offers a first glimpse at the empirical confirmation our predictions using simple raw correlations at the governorate level. The top left panel shows the negative relationship between inside norms and average deferred dower (Prediction 1), the top right panel shows the positive relationship between average deferred dower and outside norms (Prediction 2), and the bottom left shows the positive relationship between inside norms and average prompt dower.

3.4 Baseline Estimations

We begin with OLS estimations of (9) using direct measures of gender biased norms from self-reported beliefs. Table 1 present OLS estimation results from estimating equation (9) where $Z_{g(i)}$ reflects our measures of inside male dominance norms, as described in Section 3.2. We acknowledge the potential endogeneity issues associated with such an

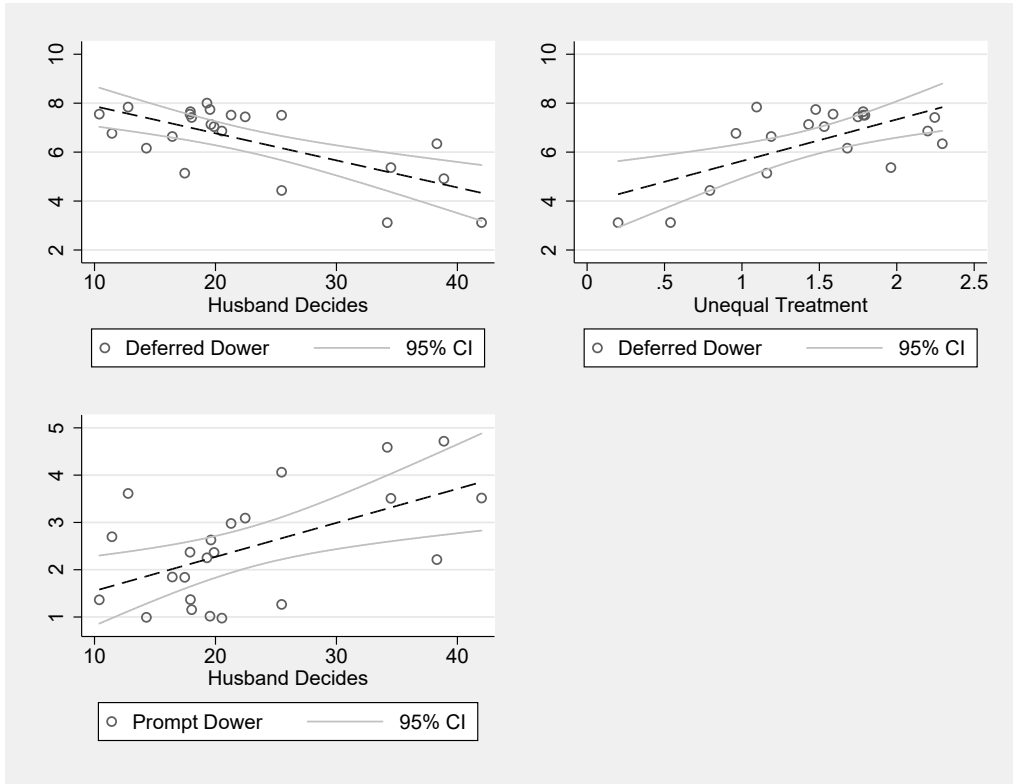


Figure 3: Raw Correlations

OLS estimation and will demonstrate robustness of these results using an IV strategy in Section 3.5.2.

The first three columns of Table 1 consider the impact of our first measure of inside male dominance norms, “Husband Decides”, adding our three sets of control variables sequentially. The first column estimations control for only our baseline set of “Fixed Effects” (regional fixed effects, a rural-urban dummy, and year of marriage). The second column adds our baseline set of “Household Controls” (education of husband and wife and their parents, wife’s age and age at marriage, age difference between spouses, and household wealth). The third column also includes our baseline set of “Local Controls” (soil characteristics, light density, distance to nearest hospital and health clinic, and travel times to nearest primary, preparatory and secondary schools). The table reports the estimated coefficients with standard errors clustered at the governorate level in parentheses. The results demonstrate that “Husband Decides” is significantly negatively related to the deferred dowry, consistent with Prediction 1. The final three columns of Table 1 demonstrate the robustness of this relationship using our three alternative measures of inside male dominance norms.

[Table 1 Here]

Table 2 presents analogous OLS estimation results from estimating equation (9) where $Z_{g(i)}$ is instead equal to our measures of outside male dominance norms, as described in Section 3.2. We see that outside male dominance norms are a significantly positive determinant of deferred dowers, as consistent with Prediction 2 from our model.

[Table 2 Here]

We now provide two sets of robustness checks on the OLS results. The first three columns of Table 3 show that the opposing effects on the deferred dower of the two types of gendered norms (presented in Tables 1 and 2), are robust to including the two types of norms together into the estimations.

[Table 3 Here]

The last three columns of Table 3 present a type of Placebo test, by demonstrating that other types of norms (not directly pertaining to gender) do not have any significant impact on deferred dower payments. For this purpose, we use information from the Afrobarometer survey to capture three different types of social norms. The first variable, that we term “Political Islam”, is constructed from a series of questions which ask respondents whether they agree to a system of governance ruled by Islamic Law without elections or political parties, whether they think that democracy contradicts the teachings of Islam, whether a state runs better if religious people hold the public positions, and whether non-Muslims should have fewer political rights than Muslims. The second variable, we term “Mistrust”, reflects the standard trust questions of whether most people can be trusted, and how much trust respondents have for different categories of people. A third variable, “Authoritarianism”, is an average index made up of a host of questions relating to freedom of the media, freedom to demonstrate and protest, voting rights, government accountability, and political competition. More details on the precise definition of these indices is found in Appendix A.

We now test Prediction 3 that the prompt dower, T_h , is increasing in the strength of male dominance inside household norms. Table 4 presents the OLS results in the first three columns, adding in our baseline sets of controls sequentially, where we see the predicted positive relationship.

[Table 4 Here]

3.5 Further Robustness

3.5.1 Beyond Subjective Assessments of Norms

Aside from relying on self-reported perceptions of societal gendered norms, as in the previous section, we also consider two other explanatory variables which we interpret as historical shifters of outside norms. One shifter affects the relative male economic advantage and another the relative separation costs, which from the model, both have similar predictive effects as outside male dominance norms on optimal marital institutions.

The first shifter of outside male dominance norms borrows from the work of Alesina et al. (2013) who test the hypothesis that traditional agricultural practices influenced the historical gender division of labour and in turn the persistence of norms and beliefs regarding the appropriate role for women in society. Boserup (1970) originally put forth the hypothesis that certain cultivation practices (which accord with certain crops) are relatively more suited to female labour. In particular those that employ heavy machinery like the plough, which requires upper body strength, are more suited to male labour inputs. Whereas more labour intensive crops, which instead rely on handheld tools, are correspondingly more female labour intensive. To this end, Alesina et al. (2013) compute the average suitability of “female” and “male” crops within a land area and demonstrate how this variation is correlated with positive beliefs regarding women’s role in society. Following their methodology, we construct a measure of average suitability of “male crops” (rye, wheat, and barley) and a corresponding value for “female crops” (millet and sorghum). To the female crops we add cotton for our context, which is a primary crop in Egypt that employs female labour.³¹ The information on the suitability of a location for cultivating particular crops is taken from the FAOs GAEZ 2002 database.³² This database reports these measures for 5 arc-minute by 5 arc-minute grid-cells. The data are constructed using information on a location’s precipitation, temperature, weather conditions, soil slope and soil characteristics. These characteristics are combined with the specific growing requirements of crops to produce a measure of whether each crop can be grown in each location and if so, how productively. The FAO models for crop growth are based solely on requirements and constraints for crop specific growth, the measures of suitability are not affected by which crops are actually grown in a particular location. This feature of the data is important for concerns over causality. Summary statistics on our measure of relative male to female crop suitability are reported in Table A2 of Appendix A. We expect that this variable shifts beliefs that render a higher relative economic advantage for men - in line

³¹Our results do not qualitatively change if we instead exclude cotton.

³²Refer to: <http://www.fao.org/nr/gaez/en/>.

with the predictions regarding outside male dominance norms.

The second shifter we consider affects the relative separation costs and comes from historical geographical variation within Egypt with regards to the prevailing school of religious law. There are four major schools of thought with respect to Islamic jurisprudence within Sunni Islam: Hanafi, Maliki, Shafi'i and Hanbali. It was mandated that all rules of law, applied by judges (*qadis*) across the Muslim territories, should be based on the holy sources, the Quran and Hadith. The four schools (*madhhab*), attributed to four early jurists (of the 7th and 8th centuries), differ with respect to interpretations of these holy texts. The different schools of thought recognize each other's validity and have interacted in legal debate over the centuries. Unlike the three other nucleus of the Islamic Empire (Hijaz, Syria, and Iraq), Egypt did not produce a leader nor did it develop a judicial system of its own. Instead it became the first region outside al-Hijaz which opted for the Maliki school of law, formerly the ancient school of Medina (today's Saudi Arabia) and was then considered the spiritual centre of the Muslim Empire (Mansour (1981)). With the Arab conquest, the Maliki school of law soon spread to the rest of North Africa and Spain and later to West Africa beginning in the 10th century. Maliki remains the central school of religious law in most of North and West Africa today, but only persists in the southern part of Egypt. By the time of the third Islamic caliphate of Egypt, at the end of the 8th century, the country was a semi-autonomous province of the Abbasid Empire (who ruled from Baghdad) dominated by an exclusive class of Arab notables who followed the Maliki School of Law. However, Egyptian Malikism faced growing challenges from the Hanafi School of Law (of modern-day Iraqi origins) which predominated in the Abbasid Court in Baghdad. The officials dispatched to the provinces were Hanafis and Hanafism began to take a foothold in Egypt. The influence of the Abbasid Caliphate (from 750 to 969) however did not extend to the southwestern part of the country, which remains under the Maliki School of Law to this day. It is this geographic variation that we will exploit.

Secular law has prevailed in Egypt since the 19th century, with the arrival of the European colonists. However, personal and family law and thus regulations relevant to marriage still follow religious doctrine and marriage contracts are legally enforced in the Sharia courts (Fluehr-Lobban and Bardsley-Sirois (1990)). Relevant for our purposes here, is that the two schools of religious law, Hanafi and Maliki, differ with respect to the conditions for which a woman has rights to divorce.³³ Under the Hanafi school, a man is entitled to repudiate his wife unilaterally without justification and without legal proceedings, the

³³The Shafi School of Law was also present in the eastern part of the country, it was the official school for the Ayyubid dynasty which ruled from 1218 to 1250. During the Ottoman rule, Hanafi replaced Shafii in Egypt. Hanafi and Shafii do not differ with regards to conditions for divorce.

only way a woman could seek divorce was to convince her husband, she had no judicial means of her own. The Maliki school, on the other hand, introduced some grounds for dissolution of marriage where the wife did not require her husbands' approval. These include: defects and disease of the husband (after marriage), non-provision of maintenance by the husband (unless proved destitute), absence (without justification for more than one year) or imprisonment of the husband, and serious injury of the wife by the husband. We posit that these more lenient terms of divorce for women lower their relative social costs associated with separation (Mashhour (2005)). In this regard, the traditional presence of the Hanafi School of Law compared to Maliki should shift beliefs that render the relative separation costs for women to be larger - in line with the predictions regarding outside male dominance norms.

We define a variable "Hanafi" equal to one if an individual resides in an area where Hanafi religious law historically prevailed and zero if Maliki did. Table A2 in Appendix A reports the summary statistics on this variable, where 63% of our sample live in a region with Hanafi marriage laws.

The first three columns of Table 5 report the results from estimating equation (9), where $Z_{g(i)}$ is equal to a measure of male to female crop suitability. As we move along the columns, additional sets of baseline controls are included. We see a robust positive and significant relationship between deferred dower and male to female crop suitability, consistent with Prediction 2.

[Table 5 Here]

The last three columns of Table 5 report the results from estimating equation (9) where $Z_{g(i)}$ is the Hanafi variable. We see that, consistent with Prediction 2, Hanafi law is significantly positively related to the deferred dower.

3.5.2 Unbundling Gendered Norms

The baseline estimation results demonstrate how inside and outside male dominance norms have opposing effects on deferred dowers. That these two types of norms do not move in the same direction in our estimations helps to identify our empirical predictions. A potential concern with the OLS estimations of the effects of gendered norms (as measured by aggregated self-reported beliefs) on marriage payments is that locations with male biased beliefs are possibly also characteristic of some key unobservable direct determinant of marriage payments. The most obvious one being systematic differences in levels of economic development. To this end, we have included as controls a host of measures

directly related to the economic environment at the very local level. But more to the point, one would expect that any unobservable that is positively correlated with economic development would in turn be negatively correlated with both male biased inside and outside norms and should thus not predict the opposing effects on marriage payments that we observe in the data analysis. Additionally, it would be difficult to conceive of an unobservable directly correlated with both norms and marriage payments that would have opposing predictions for the deferred and prompt components of the dower payments (i.e., consistent with Predictions 1 and 3).

In this section we aim to make sense of this unbundling of gendered norms that we observe in the data. To this end, we turn to the Arab conquest of Egypt and the subsequent adoption of Islam across the country to explain the historical persistence in cultural differences with regards to the subordination of women inside and outside the household. We isolate relevant historical patterns that make sense of this unbundling of gendered norms, and can also be in an IV estimation strategy to further support the main empirical findings.

Roman Egypt (then part of the Byzantine Empire) was invaded by the Rashidun Caliphate in 639 CE. A force of roughly 4000 troops, where most soldiers belonged to two main tribes of Arabia, crossed over the Egyptian border, first taking siege of a town on the eastern extremes of Egypt's Nile Delta. From the time of this initial conquest, Arab tribal immigrants were continually dispatched to reinforce the army but also encouraged to settle. Estimates suggest the settlement of roughly 5000 Arab families in the eastern Nile Delta by about 727 CE (O'Sullivan (2006)). These settlement patterns were under the direct order of the reigning Caliph. Families were granted land (previously occupied by the Christian Copts³⁴), began to practice agriculture, animal breeding, and trade. Coinciding with the forced migration were systematic campaigns of Islamization among subject Christians, who were promised exemption from rising poll-taxes. Most of the women of the settled Muslim families were descended from the Christian Coptic population. This early group of assimilated Arabs in the Delta grew wealthy and came to represent the social and political elite of Egypt. Tribal loyalties were dissolved in favour of merit-based positions of leadership (Awad (1954)). Accompanying these large-scale authorized immigrations, were the unauthorized waves of nomadic tribes who immigrated into the country subsequently. By the middle ages almost all of Egypt was Islamized and these nomadic tribes had assimilated as well but typically had emigrated further into the heart of the Rif (the

³⁴Christianity was introduced into Egypt around 42 CE and by the third century, Christians constituted the majority of the population. The scriptures were translated into the local language, known as Coptic. Soon the Church of Alexandria was formally recognized as one of Christendom's four Apostolic Sees and its followers were known as Coptic Christians (or Copts).

southern part of the country). It is argued that because these nomadic tribes settled later and into somewhat more remote areas, tribalism is still central to the social organization (Baron (2006)). Of particular note, are the use of traditional arbitration councils and the “Law of the Arabs” to resolve disputes in lieu of codified laws (Nielsen (2006)). Areas where these nomadic tribes settled are known for their patriarchal clan system, autocratic elders and feuds. This cultural distinction between the “sophisticated” Islamic elite who arrived early in the forced immigration process, during the initial conquest, and the later nomadic tribes residing in the more remote areas has implications for the persistence of gendered norms.

The tribal institutions of pre-Islamic Arabia were highly unfavourable to women. Most economic tasks necessary for nomadic societies favoured men. Women were typically forced into marriage, by capture or purchase, and female infanticide as well as honour killings were common. The Quran introduced reforms to customary tribal law relevant to the status of women by mandating both marriage and inheritance laws. Marriage became a contractual agreement which required the consent of both parties and was legally enforced. Upon marriage, women were to receive a dower (as protection against divorce) and men were obligated to economically maintain their wife throughout the marriage, regardless of her own personal wealth. Women were also given the right to inherit from her parents and were allocated half of the amount given to sons (Esposito (1975)). At the time, these rights allotted to women were far superior to those in Western Europe, where women would be granted property rights centuries later. Customs of seclusion, originally practiced in Byzantium and Persia, gained common acceptance. They were originally meant to give honour and distinction to women, and were adopted by Islam as an additional precaution against the immoral conditions that prevailed in pre-Islamic Arabia (Saleh (1972)).

By the middle ages, Egyptian urban clusters had developed into major cultural centres. Political power was located in households rather than in more formal mechanisms and structures of centralized bureaucratic states (Fay (2012)). Despite following the strict rules of seclusion, the women within these elite families held significant decision making power (Hatem (1986)). In large part, due to Sharia law, which allowed them to inherit and own property (Russell (2004)). There was therefore a contrast between the public and private spheres of life for these women. On the one hand, they were prevented from engaging with the public realm (through veiling and seclusion) but were active in the private realm. In the context of our model, *outside* male dominance norms are strong amongst these elite women but *inside* male dominance norms are weak. This is in contrast to elements of the tribal culture that persisted to this day from the influence of the more remote nomadic tribes, where all gendered norms were strongly to the detriment of women (both strong

inside and outside male dominance norms).

Taking this history into account, we posit two instrumental variables which distinguish the more “sophisticated” cultural norms from the “tribal”. The first instrument is the distance to the North-West Africa historical trade route dating from the 6th century. These data come from the geo-referenced Old World Trade Routes (OWTRAD) database across the territories of North Africa (Ciolek 2006).³⁵ We posit that present-day locations closer to this historical trade route of the initial conquest are more likely to be exposed to the “sophisticated” cultural norms.³⁶ We therefore expect this instrument, distance to the historical trade route to be positively related to inside male dominance norms and negatively related to outside male dominance norms. As a second instrument, we use the relative suitability to nomadic pastoralism, which we expect to be positively related to more “tribal” norms. To construct this instrument, we follow a similar strategy to Becker (2019) and create a land suitability for nomadic pastoralism relative to sedentary animal husbandry using the geo-referenced grid cell level data from Beck and Sieber (2010).³⁷ We posit that relative suitability to nomadic pastoralism positively predicts both inside and outside male dominance norms, in accord with early nomadic tribal norms. The geographic variation in these two instruments are depicted in Figures A4a and A4b respectively in Appendix A.2.

By using these instruments, we are assuming that these two variables, which arguably determined settlement patterns before the middle ages, do not have their own direct effect on marriage payments, except via the posited channel here, that of persistent gendered cultural norms. As already emphasized, almost all of Egypt was Islamized by the 12th century and that Islam in turn does not prescribe the magnitude of marriage payments. Research focused on the persistence of the described tribal norms in some areas of the country, emphasize that these strong cultural distinctions are based on the fact that inhabitants of these regions see themselves as direct descendants of the original nomadic tribes from the Arabian peninsula (Watson (1907), Hopkins and Saad (2004), and Nielsen (2006)). It is particularly striking that this “tribal” identity can prevail today even in large urban centres such as Cairo (Hopkins and Saad (2004)).

³⁵Refer to <http://www.ciolek.com/owtrad.html>.

³⁶This IV strategy is related to that of Michalopoulos et al. (2018) who use the proximity to the pre-600 CE trade network to predict today's Muslim adherence.

³⁷Becker (2019) constructs the grid cell level average suitability for sedentary animal husbandry and nomadic pastoralism relative to agriculture suitability. Our strategy slightly differs for two reasons. First, for Egypt we have no variation in agricultural suitability using this data. Second, for our purposes we aim to capture the likely presence of nomadic tribes compared to sedentary ones. These data from Beck and Sieber (2010) use climate and soil conditions and ecological niche modelling (ENM) to derive spatial predictions of the suitability to four landuse traits (agriculture, sedentary animal husbandry, nomadic pastoralism, and hunting-and-gathering) for the Old World.

Aside from cultural identity, these two instruments would have also predicted degrees of geographic remoteness and other consequent economic outcomes for the early settlers. However, since this early era, which dates to before the 12th century, Egypt has experienced a series of occupations, massive economic and technological changes, as well as extensive social reforms, that would have minimized these initial differences with regards to economic outcomes. Including our host of economic and geographic controls at the very local level should control for what systematic differences remain. Our exclusion restriction is threatened if we posit that there is some unobservable variable that is significantly correlated by say distance to the historical trade route that in turn has a positive relationship with inside male dominance norms and a negative relationship with outside male dominance norms. Conceiving of such an unobservable factor seems somewhat difficult. Moreover, Table A4 in Appendix A demonstrates that our two instrumental variables are not significantly correlated with household or community level measures of economic well-being today.

Tables 6 and 7 present the results from a two-stage least-squares estimation procedure. Table 6 demonstrates that the two instruments above discussed are indeed significant determinants of our gendered norms variables and that the signs are as expected - distance to the historical trade route positively predicts inside male dominance norms and negatively predicts outside male dominance norms. Nomadic suitability positively predicts both types of male dominance norms.

[Table 6 Here]

Table 7 shows the second stage estimation results, which demonstrate that Predictions 1 and 2 are confirmed - inside male dominance norms are negatively related to deferred dowers and outside male dominance are positive determinants.³⁸

[Table 7 Here]

4 Conclusions

Marital institutions—the rules of the marriage game—have broad consequences for a range of economic outcomes, yet there is little work attempting to understand the drivers of such rules. We have attempted to make this general inquiry manageable by focusing on one

³⁸The IV estimated coefficients on outside male dominance norms are substantially higher than the corresponding OLS coefficients (reported in Table 3). This may be due to heterogenous or non-linear impacts of our two instrumental variables across different samples of the population, which cause the estimated LATE to be larger than the ATE.

central role of marital institutions—making husband exist costly—and one class of cultural drivers—male dominance norms. In doing so, our analysis draws a new connection between cultural change and changes in marital institutions. This connection is nuanced and requires an ‘unbundling’ of gendered norms; we demonstrate that male dominance inside the household and male dominance outside the household have opposing predictions. We exploit a feature of Islamic marriage contracts—the deferred dower—to overcome the central empirical challenge of the non-observability of a household’s optimal strength of marital institutions. The model generates a very particular set of predictions that are borne out in the data. In particular, strong inside male dominance norms substitute for strong marital institutions, whereas the opposite is true of strong outside male dominance norms.

Our analysis and results can be extended in a variety of directions. First, it would be interesting to probe other situations in which ‘unbundling’ of gendered norms is illuminating. Second, the analysis could be extended to shed light on the origins of gendered norms surrounding marriage. Whilst the origins of outside norms have received attention,³⁹ less has been devoted to understanding the drivers of inside norms. Indeed, the most interesting observation from Hill’s quote is the reliability with which cultures allocate power to husbands over wives. This systematic pattern might be partially explained by our finding that inside norms ‘substitute’ for marital institutions, suggesting that inside norms flourish when it is costly to constrain husbands via marital institutions.

Finally, whilst we have exploited a convenient feature of Islamic marriage in our empirical implementation, we emphasize that the lessons to be drawn are broader. Thus, it would be interesting to explore the empirical validity of our predictions in other settings. Our empirical framework extends readily to other Muslim populations, but it would be particularly valuable to find ways to extend the empirical framework to non-Muslim populations.

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³⁹For example, Alesina et al. (2013), Grosjean and Khattar (2019)), and Becker (2019).

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Table 1: Deferred Dower and Inside Dominance Norms

	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + t_i)$
Husband Decides	-0.11*** (0.037)	-0.10*** (0.032)	-0.11*** (0.032)			
Husband Decides (DHS)				-0.11** (0.044)		
Fear of Husband					-0.036* (0.021)	
IPV Justified						-0.0059* (0.0031)
Observations	12262	9147	8905	8493	8905	8905
R^2	0.086	0.094	0.100	0.098	0.071	0.072
Fixed Effects	✓	✓	✓	✓	✓	✓
Household Controls		✓	✓	✓	✓	✓
Local Controls			✓	✓	✓	✓

NOTES. Clustered standard errors at the governorate level are in parentheses. *** reflects statistical significance at the 1% level, ** at the 5%, and * at 10%. Refer to Appendix A for details on the variable definitions and data sources.

Table 2: Deferred Dower and Outside Dominance Norms

	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + t_i)$
No Women Work	0.84** (0.36)	0.80** (0.37)	0.84** (0.35)		
Unequal Treatment				1.62*** (0.52)	
Support FGM					0.036* (0.018)
Observations	12262	9147	8905	8112	8493
R^2	0.045	0.057	0.066	0.109	0.068
Fixed Effects	✓	✓	✓	✓	✓
Household Controls		✓	✓	✓	✓
Local Controls			✓	✓	✓

NOTES. Clustered standard errors at the governorate level are in parentheses. *** reflects statistical significance at the 1% level, ** at the 5%, and * at 10%. Refer to Appendix A for details on the variable definitions and data sources.

Table 3: Deferred Dower and Male Dominance Norms–Robustness

	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + t_i)$
Husband Decides	-0.11*** (0.031)	-0.11*** (0.023)	-0.11*** (0.035)	-0.10** (0.048)	-0.10** (0.049)	-0.12*** (0.034)
No Women Work	0.90*** (0.34)			0.79* (0.39)	0.80* (0.43)	0.96** (0.38)
Unequal Treatment		1.53*** (0.26)				
Support FGM			0.042*** (0.013)			
Political Islam				-0.0050 (0.0044)		
Mistrust					0.0048 (0.0051)	
Authoritarianism						0.0034 (0.0031)
Observations	8905	8112	8493	8112	8112	8112
R^2	0.113	0.146	0.114	0.120	0.117	0.118
Fixed Effects	✓	✓	✓	✓	✓	✓
Household Controls	✓	✓	✓	✓	✓	✓
Local Controls	✓	✓	✓	✓	✓	✓

NOTES. Clustered standard errors at the governorate level are in parentheses. *** reflects statistical significance at the 1% level, ** at the 5%, and * at 10%. Refer to Appendix A for details on the variable definitions and data sources.

Table 4: Prompt Dower and Inside Male Dominance Norms

	$\ln(1 + T_i)$	$\ln(1 + T_i)$	$\ln(1 + T_i)$
Husband Decides	0.054 (0.034)	0.065** (0.030)	0.060* (0.034)
Observations	10865	8086	7855
R^2	0.099	0.138	0.155
Fixed Effects	✓	✓	✓
Household Controls		✓	✓
Local Controls			✓

NOTES. Clustered standard errors at the governorate level are in parentheses. *** reflects statistical significance at the 1% level, ** at the 5%, and * at 10%. Refer to Appendix A for details on the variable definitions and data sources.

Table 5: Deferred Dower and Outside Norms Shifters

	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + t_i)$
Male/Female Crop Suitability	0.71* (0.38)	1.03*** (0.42)	0.95* (0.51)			
Hanafi				1.08* (0.53)	0.86* (0.50)	0.92 (0.71)
Observations	11667	8677	8665	11910	8870	8845
R^2	0.197	0.194	0.195	0.039	0.052	0.057
Fixed Effects	✓	✓	✓	✓	✓	✓
Household Controls		✓	✓		✓	✓
Local Controls			✓			✓

NOTES. Clustered standard errors at the governorate level are in parentheses. *** reflects statistical significance at the 1% level, ** at the 5%, and * at 10%. Refer to Appendix A for details on the variable definitions and data sources.

Table 6: Male Dominance Norms First Stage

	Husband Decides	Husband Decides	No Women Work	No Women Work	Unequal Treatment	Unequal Treatment	Support FGM	Support FGM
Distance to Trade Route	0.095*** (0.0018)	0.090*** (0.0024)	-0.0047*** (0.00011)	-0.0039*** (0.00016)	-0.0057*** (0.00022)	-0.0059*** (0.00024)	-0.10*** (0.0034)	-0.13*** (0.0049)
Nomadic Suitability	4.99*** (0.075)	4.59*** (0.078)	0.0086*** (0.0027)	0.0082*** (0.0029)	0.012 (0.0090)	0.040*** (0.0095)	5.34*** (0.097)	4.77*** (0.12)
Observations	12262	8905	12262	8905	11059	8112	11719	8493
R^2	0.721	0.725	0.279	0.321	0.182	0.277	0.573	0.601
Fixed Effects	✓	✓	✓	✓	✓	✓	✓	✓
Household Controls		✓		✓		✓		✓
Local Controls		✓		✓		✓		✓

NOTES. Clustered standard errors at the governorate level are in parentheses. *** reflects statistical significance at the 1% level, ** at the 5%, and * at 10%. Refer to Appendix A for details on the variable definitions and data sources.

Table 7: Male Dominance Norms Second Stage

	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + T_i)$	$\ln(1 + T_i)$
Husband Decides	-0.097* (0.054)	-0.098** (0.048)	-0.11** (0.050)	-0.11** (0.055)	-0.16*** (0.053)	-0.14*** (0.043)	0.082** (0.042)	0.100** (0.042)
No Women Work	3.50** (1.53)	4.43* (2.54)						
Unequal Treatment			2.90*** (1.13)	2.81*** (0.81)				
Support FGM					0.085 (0.053)	0.083** (0.037)		
Observations	12262	8905	11059	8112	11719	8493	10865	7855
Fixed Effects	✓	✓	✓	✓	✓	✓	✓	✓
Household Controls		✓		✓		✓		✓
Local Controls		✓		✓		✓		✓

NOTES. Clustered standard errors at the governorate level are in parentheses. *** reflects statistical significance at the 1% level, ** at the 5%, and * at 10%. Refer to Appendix A for details on the variable definitions and data sources.

APPENDIX
FOR ONLINE PUBLICATION

A Data Appendix

A.1 Tables

Table A1 below describes summary statistics of the mean and standard deviation (in parentheses) for the variables from the household-level data used in our empirical analysis. The first column is for the whole sample, the next two columns describe the urban and rural samples separately.

Table A1: Summary Statistics - Household Data

	All		Urban		Rural	
	mean	sd	mean	sd	mean	sd
$\ln(1 + t_i)$	6.65	2.89	6.98	2.70	6.36	3.01
$\ln(1 + T_i)$	2.39	3.61	2.06	3.45	2.67	3.71
Wife Education	8.21	5.42	9.76	4.95	6.89	5.45
Husband Education	9.23	4.99	10.4	4.60	8.24	5.10
Wife Age	30.1	7.48	31.3	7.61	29.1	7.21
Wife Age Married	20.7	3.93	21.8	4.10	19.8	3.52
Husb.-Wife Age Difference	6.60	5.17	6.46	5.07	6.72	5.26
Wealth Index	3.98	0.85	4.34	0.84	3.68	0.74
Wife's Mother Literate	0.22	0.41	0.32	0.47	0.14	0.34
Wife's Father Literate	0.47	0.50	0.59	0.49	0.37	0.48
Husband's Mother Literate	0.20	0.40	0.29	0.45	0.098	0.30
Husband's Father Literate	0.45	0.50	0.57	0.50	0.33	0.47
Urban	0.46	0.50	1	0	0	0
Observations	12639		5818		6821	

NOTES. Data Sources: Egypt Labor Market Panel Survey (ELMPS) (2006, 2012).

Table A2 below describes summary statistics on the mean and standard deviation (in parentheses) for the variables defined at the local level used in our empirical analysis. The geographic variables such as soil quality measures, light density, and distance to amenities are all averaged to the kism level.⁴⁰ The norms variables are aggregated up to the governorate level. The first column presents the averages for the whole sample, the next two columns describe the urban and rural samples separately.

The “Husband Decides” index, from the ELMPS is based on women’s reported exclusion from the following types of household decisions: large purchases, daily purchases,

⁴⁰We do this to match our GIS data to our household level data. The kism is the smallest unit that we can geo-locate in the household level data.

visits to friends and family, own health, purchasing own clothing, and daily cooking. The index “Husband Decides (DHS)” is similarity defined but comes from the DHS survey. “Fear of Husband”, from the ELMPS survey, is a local average of a dummy indicator variable which is equal to one if a woman responded yes (as opposed to no) to the question “Are you often or generally afraid of disagreeing with your husband”. “IPV Justified”, also from the ELMPS, is a weighted index constructed from survey questions which ask ever-married women whether a husband is justified in beating his wife in a set of circumstances: a wife burns the food, she neglects the children, she argues with her husband, talks to other men, wastes her husband’s money, or refuses sex with him.

The “No Women Work” index is based on an individuals agreement to the following statements: “A thirty year old woman who has a good job but is not married is to be pitied”, “A woman who has a full-time job cannot be a good mother”, “Having a full-time job always interferes with a woman’s ability to keep a good life with her husband”; and disagreement with: “Women should continue to occupy leadership positions in society” and “A woman’s place is not only in the household but she should be allowed to work”.

The “Unequal Treatment” index comes from questions in the Afrobarometer survey which asks whether women are treated unequally (relative to men) by employers, local political leaders, police and courts. We construct an index equal to one if respondents state either “always” or “often” compared to “rarely” or “never”. We compute an average index of these different measures at the governorate level.

“Support FGM” comes from the DHS survey and reflects attitudes towards female genital mutilation. Women are asked whether or not they think the custom of female genital mutilation should continue or be stopped.

The “Mistrust” index reflects the degree of defiance of individuals towards people they know. It is based on three variables: answering not at all or just a little to “How much do you trust each of the following types of people: Your relatives?”, “Your neighbors?”, and “Other people you know?”. The support of “Political Islam” index includes any proposition involving Islam in political matters. It is based on four variables: approving or strongly approving of the following statement “A system governed by Islamic law without elections or political parties?”, agreeing or strongly agreeing with “Democracy is a system that contradicts the teachings of Islam”, with “In a Muslim country, non-Muslims should enjoy less political rights than Muslims”, and with “The country is better off if religious people hold public positions in the state”. The “Authoritarianism” index reflects support for authoritarian political regimes. It is based on eight variables: agreeing or strongly agreeing with “The government should have the right to prevent the media from publishing things that it considers harmful to society”, approving or strongly approving on “Elections and Parliament are abolished so that the President can decide everything”, agreeing or strongly agreeing with “Since elections sometimes produce bad results, we should adopt other methods for choosing this country’s leaders”, with “The President should be able to devote his full attention to developing the country rather than wasting time justifying his actions”, with “Once election is over, opposition parties and politicians should accept defeat and cooperate with government to help it develop the country”, with “Too much reporting on negative events, like government mistakes and corruption, only harms the country”, “Since the President represents all of us, he should pass laws without worrying

about what Parliament thinks”, and with “There should be no constitutional limit on how long the President can serve”.

Indicators of soil quality are derived from the FAO’s Global Agro-Ecological Zones (GAEZ).⁴¹ “Soil rooting conditions” correspond to the soil depth/volume limitations of a soil unit, constraining yield formation. It is measured by seven class values. “Soil terrain slope” corresponds to the terrain slope gradient (from 0 to 100%). “Soil workability” refers to the soil workability constraints to cultivation. It is measured by seven class values. “Light density” has been repeatedly shown as a good proxy for human economic activity (see Henderson et al., 2012). Our measure is based on satellite data from the National Geophysical Data Center. Digital archives begin in 1992, which is the year we retain for our variable. The intensity of nighttime lighting is reported as a digital number varying from 0 (no light) to 63. Distance and time to health and educational facilities come from the ELMPS Surveys.

Table A3 below presents OLS estimation results on the deferred dower (first two columns) and the prompt dower (last two column) as a function of the baseline household-level controls. We see that husband’s education and household wealth, as well as wife’s father’s education, all positively determine deferred dower payments. For the prompt dower payments, wife’s education is a negative determinant and husband-wife age difference is a positive determinant.

Table A4 below presents results for OLS estimations on a set of economic outcome variables (defined at the household level) as a function of our two instrumental variables, used in the analysis of Section 3.5.2. The list of dependent variables is found in the first column of Table A4. The estimated coefficients (with standard errors clustered at the governorate level in parentheses) for each separate regression on the respective instruments, distance to the historical trade route and nomadic suitability, for each dependent variable are separate entries of the table. All estimations include the baseline set of fixed effects (regional, urban/rural, and year of marriage). We see that our two instrumental variables are not significant determinants of any of the dependent variables reflecting economic outcomes at the household level.

⁴¹FAO/IIASA, 2010. Global Agro-ecological Zones (GAEZ v3.0). FAO, Rome, Italy and IIASA, Laxenburg, Austria.

Table A2: Summary Statistics - Local Area Data

	All		Urban		Rural	
	mean	sd	mean	sd	mean	sd
Male/Female Crop Suitability	6.03	0.27	6.06	0.36	6.01	0.17
Hanafi	0.63	0.48	0.71	0.46	0.56	0.50
Husband Decides	21.7	9.19	19.4	9.17	23.6	8.77
Husband Decides (DHS)	21.7	7.94	20.6	7.27	22.7	8.36
Fear of Husband	61.5	14.2	57.6	14.3	64.8	13.3
IPV Justified	137.1	72.7	123.3	68.8	148.8	73.8
No Women Work	3.11	0.42	3.03	0.41	3.18	0.42
Unequal Treatment	1.53	0.47	1.51	0.45	1.54	0.50
Support FGM	71.7	13.6	67.1	14.9	75.6	11.1
Political Islam	6.89	60.4	-1.05	60.1	13.5	59.8
Mistrust	7.82	60.2	29.8	65.4	-10.6	48.1
Authoritarianism	-5.43	60.4	-6.18	56.9	-4.81	63.1
Distance to Trade Route	71.5	55.2	71.8	62.2	71.1	48.4
Nomadic Suitability	2.63	1.41	2.52	1.39	2.71	1.43
Soil- Terrain Slope	95.9	4.99	94.4	5.67	97.2	3.91
Soil- Workability	1.98	1.22	2.39	1.42	1.64	0.88
Soil- Rooting Conditions	1.70	1.22	2.07	1.47	1.39	0.84
Average Luminosity	29.7	17.9	38.3	20.9	22.4	10.3
Distance to Hospital	23.7	5.07	22.1	5.11	25.1	4.61
Distance to Health Centre	14.7	1.82	14.5	1.89	14.9	1.73
Time to Primary School	11.0	6.86	10.5	6.33	11.3	7.26
Time to Preparatory School	13.0	8.33	12.6	7.41	13.3	9.02
Time to Secondary School	19.0	12.7	16.4	12.4	21.2	12.6
Observations	12639		5818		6821	

NOTES. Data Sources: Egypt Labor Market Panel Survey (ELMPS) (2006, 2012); Egypt Demographic Health Survey (DHS) (2014, 2015); Egypt Afrobarometer Survey (2015, 2016); GULF/2000 Map Project; FAO GAEZ 2002 database; PRIO-GRID; Global Land Use Database; Beck and Sieber (2010); OWTRAD.

Table A3: Dower and Household Controls

	$\ln(1 + t_i)$	$\ln(1 + t_i)$	$\ln(1 + T_i)$	$\ln(1 + T_i)$
Wife Education	-0.0047 (0.019)	-0.0032 (0.020)	-0.035** (0.016)	-0.031** (0.014)
Husband Education	0.036** (0.017)	0.037** (0.017)	-0.0051 (0.013)	-0.012 (0.013)
Wife Age	-0.10** (0.045)	-0.11** (0.045)	-0.010 (0.031)	-0.0081 (0.036)
Wife Age Married	0.088* (0.046)	0.091* (0.047)	0.033 (0.040)	0.029 (0.044)
Husb.-Wife Age Difference	-0.0046 (0.0084)	-0.0055 (0.0084)	0.032** (0.014)	0.029** (0.013)
Wealth Index	0.17** (0.080)	0.15* (0.079)	-0.019 (0.13)	0.020 (0.13)
Wife's Mother Literate	0.040 (0.11)	0.038 (0.11)	-0.068 (0.15)	-0.077 (0.16)
Wife's Father Literate	0.36*** (0.11)	0.34*** (0.10)	0.023 (0.097)	0.059 (0.096)
Husband's Mother Literate	-0.043 (0.13)	-0.037 (0.12)	0.085 (0.12)	0.073 (0.10)
Husband's Father Literate	0.087 (0.11)	0.093 (0.11)	0.021 (0.11)	0.077 (0.12)
Observations	9147	8905	8086	7855
R^2	0.045	0.055	0.148	0.172
Fixed Effects	✓	✓	✓	✓
Local Controls		✓		✓

NOTES. Clustered standard errors at the governorate level are in parentheses.
 *** reflects statistical significance at the 1% level, ** at the 5%, and * at 10%.
 Refer to Appendix A for details on the variable definitions and data sources.

Table A4: Exclusion Restriction

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Distance to Trade Route	0.00049 (0.0093)	-0.0045 (0.0071)	-0.0027 (0.0075)	-0.0020 (0.0024)	-0.0090 (0.027)	0.0098 (0.0067)	-0.0055 (0.0077)	-0.0027 (0.0075)	-0.0022 (0.019)
Nomadic Suitability	-0.14 (0.49)	-0.082 (0.39)	-0.28 (0.31)	-0.096 (0.10)	0.78 (0.81)	0.58 (0.38)	0.22 (0.30)	0.24 (0.29)	1.14 (1.04)
Observations	12619	11305	12638	12639	12639	12639	12639	12639	12639
R^2	0.150	0.069	0.122	0.059	0.377	0.146	0.010	0.012	0.027

NOTES. Clustered standard errors at the governorate level are in parentheses. The dependent variable associated with each column is as follows: (1) Wife Education (2) Husband Education (3) Wife Age Married (4) Household wealth (5) Distance to Hospital (6) Distance to Health Centre (7) Time to Primary School (8) Time to Preparatory School (9) Time to Secondary School

A.2 Figures

Figures A1a and A1b illustrate the variation in male dominance norms. Figure A1a shows how inside norms vary across governorates; the vertical axis is our index measure and to put this in context the horizontal axis is one input into the index—the average extent to which husbands decide on large purchases. We see very large variation here; husbands decide large purchases in less than 30% of households in some governorates, but in more than 60% of households in other governorates.

Figure A1b performs the same exercise, but with outside norms. Again, there is large variation across governorates, whereby less than 5% of women in some governorates believe that a woman with a job outside the home cannot be a good mother, whereas this is true for more than 20% in other governorates.

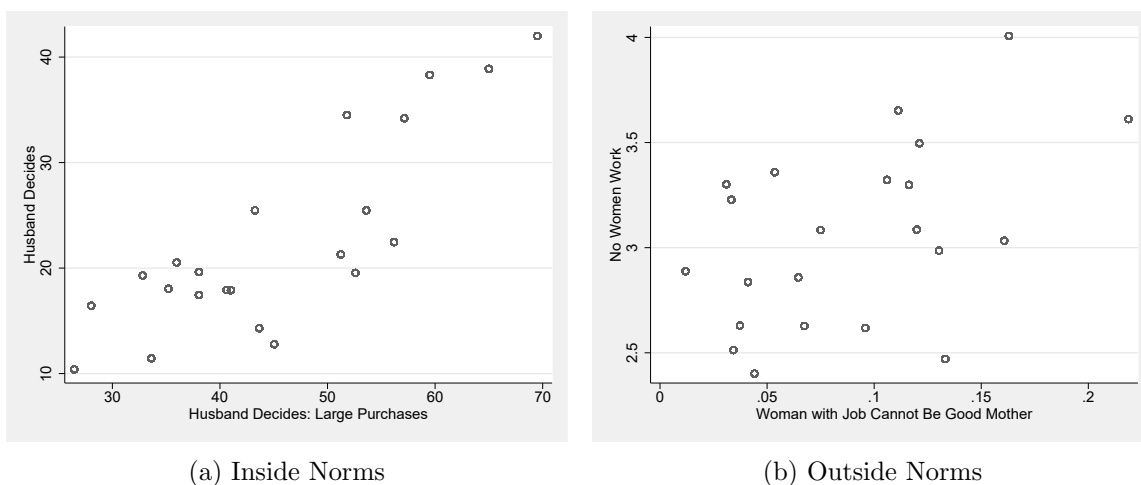
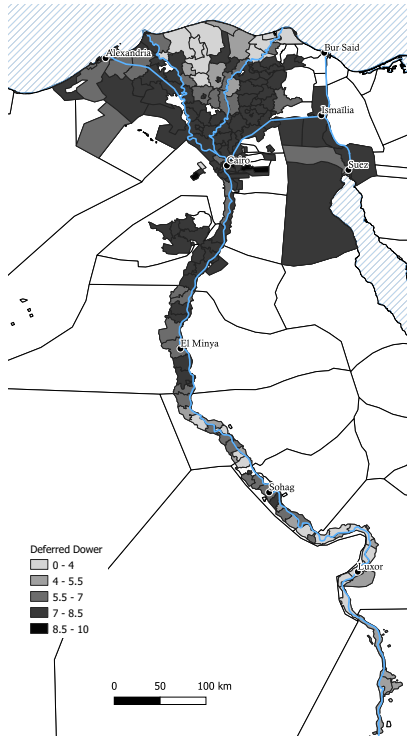
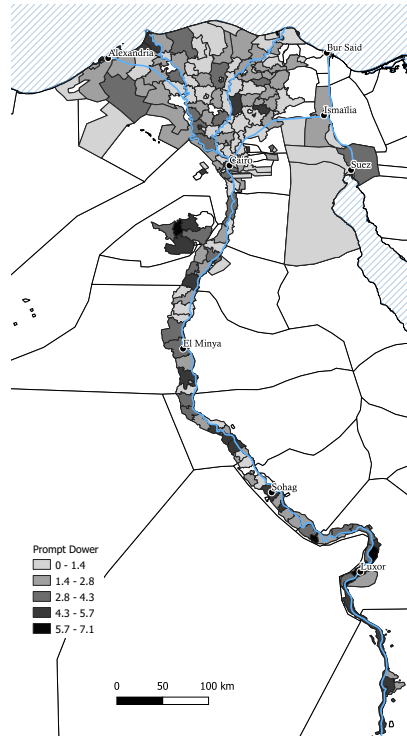


Figure A1: Variation in Norms

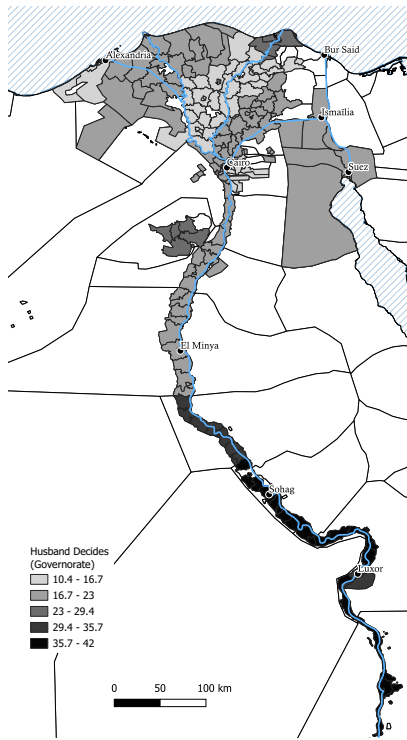


(a) Map of Log Deferred Dower

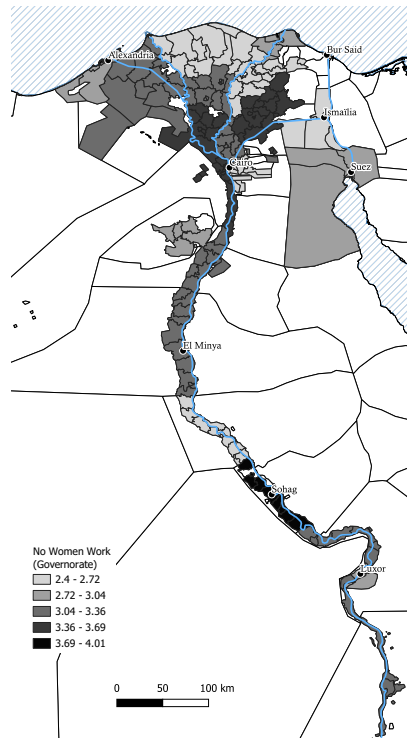


(b) Map of Log Prompt Dower

Figure A2: Maps: Marriage Payments

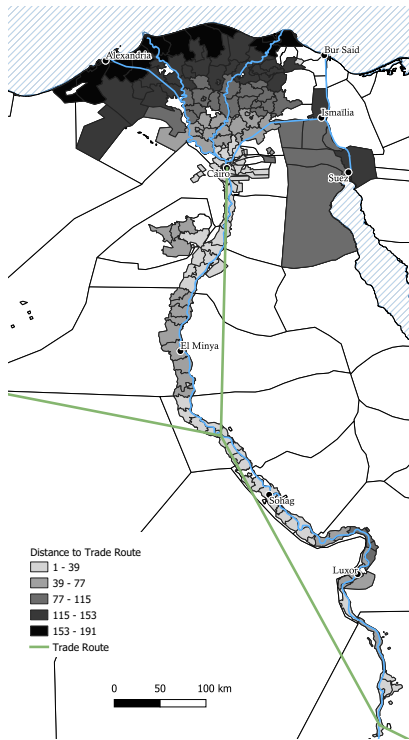


(a) Husband Decides (Inside)

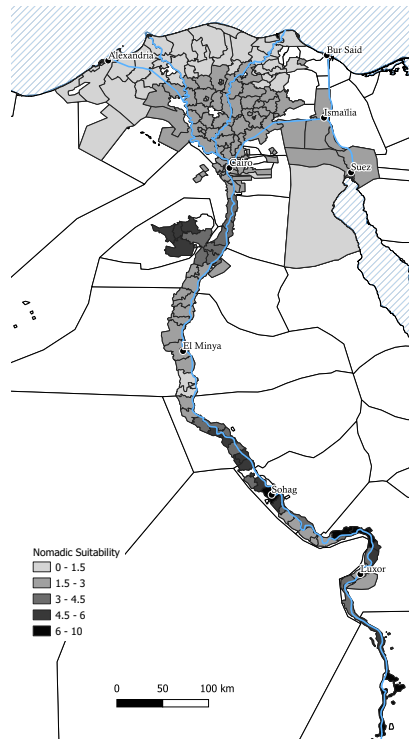


(b) No Women Work (Outside)

Figure A3: Maps: Male Dominance Norms



(a) Trade Routes



(b) Nomadic Pastoralism

Figure A4: Maps: Instruments

B Model Appendix

B.1 Proofs

Proof of Proposition 1. The objective function is bounded above by

$$\int_{-\infty}^{\infty} \max\{v(\eta), v^s\} dF(\eta). \quad (10)$$

Noting that $v(\eta) \geq v^s$ for all $\eta \leq \eta^*$, this upper bound can be written:

$$\int_{-\infty}^{\eta^*} v(\eta) dF(\eta) + \int_{\eta^*}^{\infty} v^s dF(\eta). \quad (11)$$

The objective function achieves this maximum when τ is such that $\bar{\eta}(\tau) = \eta^*$. This is feasible, whereby

$$\tau^* \equiv \frac{1}{2} \cdot \{[W_f - \hat{u}_f] - [W_m - \hat{u}_m]\}. \quad (12)$$

This is positive under assumption 1. \square

Proof of Proposition 2. This is a straightforward consequence of (12), (7) and (8). \square

Proof of Proposition 3. Under optimal marital institutions the couple either are married with no continuation contract or are separated. If the former, the husband-wife difference in payoffs is

$$\Delta V(T_h) \equiv (W_m + w_m) - (W_f + w_f) = (2 \cdot z - 1) \cdot W + (w_{0m} - w_{0f}) - 2 \cdot T_h. \quad (13)$$

If the latter, the husband-wife difference in payoffs is

$$\Delta V^s(T_h) \equiv (\hat{u}_m + w_m) - (\hat{u}_f + w_f) - 2 \cdot \tau^* = (2 \cdot z - 1) \cdot W + (w_{0m} - w_{0f}) - 2 \cdot T_h \quad (14)$$

Since the husband-wife difference in payoffs is independent of the state, this is also the difference in expected marital payoffs. This difference is increasing in the strength of inside norms and decreasing in the ex ante marriage payment. The Nash bargaining condition then tells us that T_h^* is increasing in ϕ . \square

B.2 Extension: Multidimensional Match Quality

This section generalizes the analysis by allowing the spouses to get different match quality shocks. In particular, suppose that $(\eta_m, \eta_f) \sim F$ on \mathbb{R}^2 with associated joint density f . To describe equilibrium outcomes it is convenient to define $\eta \equiv (1/2) \cdot [\eta_m + \eta_f]$ and $\varepsilon \equiv (1/2) \cdot [\eta_m - \eta_f]$. That is, η is the couple's average shock and ε measures the husband-wife difference in shocks. Let h be the implied density of η and let g_η be the implied density of ε conditional on η .⁴² We place no restriction on h but make the following assumption on g_η .

Assumption 2 For each $\eta \in \mathbb{R}$, the density g_η is (i) symmetric: $g_\eta(\varepsilon) = g_\eta(-\varepsilon)$ for all $\varepsilon \in \mathbb{R}$, and (ii) single-peaked: $g_\eta(\varepsilon)$ is decreasing at all $\varepsilon \in \mathbb{R}_+$.

⁴²That is, $h(\eta) = \int_{-\infty}^{\infty} f(\eta + \varepsilon, \eta - \varepsilon) d\varepsilon$ and $g_\eta(\varepsilon) = f(\eta + \varepsilon, \eta - \varepsilon)/h(\eta)$.

The symmetry assumption is helpful because it ensures that we do not introduce further gender asymmetries, and the single-peakedness assumption is a technical assumption assuring a well-defined optimization problem.

The equilibrium outcomes are very similar to those in the main model and are illustrated in Figure B5.

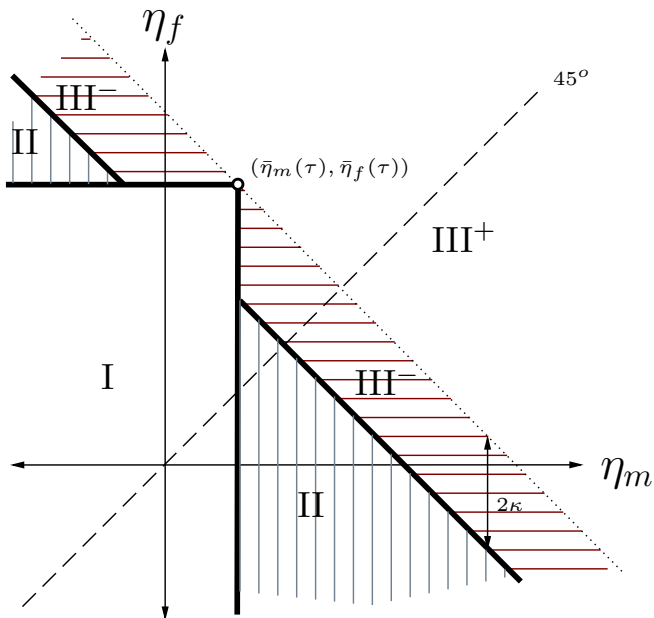


Figure B5: Equilibrium Outcomes

Case I is continued marriage without a continuation agreement. This arises when:

$$0 \leq \min\{\bar{\eta}_m(\tau) - \eta_m, \bar{\eta}_f(\tau) - \eta_f\} \quad (15)$$

This can be written in terms of the redefined variables as:

$$0 \leq \min\{\bar{\eta}_m(\tau) - \eta - \varepsilon, \bar{\eta}_f(\tau) - \eta + \varepsilon\}. \quad (16)$$

Therefore, this is equivalent to:

$$-(\bar{\eta}_f(\tau) - \eta) \leq \varepsilon \leq \bar{\eta}_m(\tau) - \eta. \quad (17)$$

Notice that this can hold only when $\eta \leq \eta^*$.

Case II is continued marriage with a continuation agreement. This arises when (17) does not hold and

$$\eta \leq \eta^* - \kappa. \quad (18)$$

Case III is separation. This arises when (17) does not hold and

$$\eta^* - \kappa \leq \eta.$$

These cases are illustrated in Figure B5, where case III is divided into two parts labelled III⁻ and III⁺. The shaded areas represent cases in which some surplus is lost: region II involves a costly continuation agreement and region III⁻ involves inefficient separation.

Welfare then is

$$\int_{-\infty}^{\eta^* - \kappa} \left\{ v(\eta) - 2\kappa + \int_{-(\bar{\eta}_f(\tau) - \eta)}^{\bar{\eta}_m(\tau) - \eta} \{2\kappa\} dG_\eta(\varepsilon) \right\} dH(\eta) \quad (19)$$

$$+ \int_{\eta^* - \kappa}^{\eta^*} \left\{ v^s + \int_{-(\bar{\eta}_f(\tau) - \eta)}^{\bar{\eta}_m(\tau) - \eta} \{v(\eta) - v^s\} dG_\eta(\varepsilon) \right\} dH(\eta) \quad (20)$$

$$+ \int_{\eta^*}^{\infty} v^s dH(\eta) \quad (21)$$

Simplifying, and ignoring terms that are independent of τ , maximizing welfare is equivalent to maximizing:

$$\int_{-\infty}^{\eta^*} \left\{ \xi(\eta) \int_{-(\bar{\eta}_f(\tau) - \eta)}^{\bar{\eta}_m(\tau) - \eta} dG_\eta(\varepsilon) \right\} dH(\eta) \quad (22)$$

where $\xi(\eta) \equiv \max\{v(\eta) - v^s, 2\kappa\}$. Define $\Delta(\tau) \equiv (1/2) \cdot [\bar{\eta}_m(\tau) - \bar{\eta}_f(\tau)]$ and $\tilde{\eta} \equiv \eta^* - \eta$ so that the objective function becomes:

$$\int_{-\infty}^{\eta^*} \xi(\eta) \left\{ \int_{\Delta(\tau) - \tilde{\eta}}^{\Delta(\tau) + \tilde{\eta}} g_\eta(\varepsilon) d\varepsilon \right\} dH(\eta) \quad (23)$$

There are two points to note here. First, the strength of marital institutions only affects welfare via its effect on $\Delta(\tau)$. Second, the single-peakedness property implies that the term in braces is maximized when $\Delta(\tau) = 0$. Since this is true for all η , it follows that the optimal τ is the same as that identified in the main model: i.e. the value that satisfies $\bar{\eta}_m(\tau^*) = \bar{\eta}_f(\tau^*)$. Indeed, the pure match quality shock in the main model is a limiting case of the family of joint distributions considered here. Unlike the main model, the optimal strength of marital institutions does not achieve the first best—i.e. there will be cases of inefficient separation and continued marriage with costly continuation agreements. Also, there will exist states in which the wife has a stronger desire to separate than the husband (and thus states where it is the husband that pays the wife in the continuation agreement).