Marriage, Commitment and Social Norms: Theory and Evidence from Egypt

Preliminary - please do not circulate

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Abstract

An important role of marriage institutions, especially in developing countries, is to counter a commitment problem in which a husband faces a socially excessive incentive to separate from their wife once she has made her early contributions to the household; most notably the raising of children. An analysis of the factors which influence the magnitude of this commitment problem is important, but has not been previously performed because this magnitude is not readily observed. We provide a simple model and use it to show that the magnitude of the commitment problem facing a household is revealed by an observable characteristic of Muslim marriages–the deferred dower (*mo'akhar*). Armed with this measure and household data from Egypt, we find considerable empirical support for a novel prediction of the model: the underlying commitment problem is less severe in places with social norms that give husbands greater authority over household decisions.

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1 Introduction

Marriage is a ubiquitous feature of human kinship and social organization developed very early in the course of human social history. For thousands of years, marriage has organized people's places in the economic and political hierarchy of society (Coontz 2005). Marriage was not primarily for individual benefit. It was a way of raising capital, constructing political alliances, organizing the division of labour by age and gender, and deciding what claim, if any children had on their parents, and what rights parents had on their children.

The exact origins of marriage are unclear. In early societies, that predated the discovery of agriculture, where scarcity was often the norm, as were reciprocity and sharing, most scholars believe that a relative degree of social equality existed. Because they lacked a surplus of resources, the concept of private property, or the knowledge of biological paternity, marriages or male-female partnering was likely informal, easily dissolved, and secondary to kinship ties (Shlain 2003). There was little emphasis on female virginity, paternity or life-long unions, so there was no real incentive for men to dominate women (Coltrane and Adams 2008).

The creation of agrarian economies marked the advent of settled societies based on farming and land ownership. With such economies came the concept of personal ownership and labour, inheritance rights, and the creation of political and economic laws to protect wealth (Rossides 1997). Families were gradually reshaped by the discovery of agriculture. The right to own land and pass it to heirs meant that women's childbearing abilities and male domination became more important. Rather than kinship, marriage became the center of the family and was increasingly based on a formal contractual relationship between men, women, and their kinship groups. The property and gender implications of marriage are evident in the exchange of gifts between spouses and families and clearly defined rules about the rights and responsibilities of each marital spouse. Ensuring paternity became important in the transfer of property to legitimate heirs, and the rights and sexuality of women were circumscribed. The property-like status of women has been evident throughout the history of marriage and the consequent male domination of the institution. On the other side, at the core of human pair-bonding is that it encourages more extensive male parental investment and a division of labour (Chapais 2008). Integral to the institution of marriage is solving the commitment problem on behalf of husbands. As society and the institution evolved, so did the rules establishing when a marriage could be terminated. Commonly, the state and religious leaders began to assume a larger role in defining and governing marriages. In most religions, traditional marriage was meant to be a lifelong commitment and divorce was discouraged.

These two key aspects of the traditional institution of marriage, maintaining commitment from husbands and gendered social norms are at the heart of our analysis. Marriage institutions allow a society to reap the various benefits of intra-household specialization, most notably the vital role of raising children. A primary role of marriage institutions is to place constraints on husbands, limiting their capacity to abandon their wife once they have made their sunk (and relationship-specific) investment in raising children. In other words, marriage institutions help resolve an inherent commitment problem arising from gender differences in the timing of contributions to the relationship. We explore how the functioning of marriage institutions is influenced by culture–specifically, the norms surrounding the allocation of decision-making authority in the household. Whilst existing work stresses the role of relative outside options in shaping the allocation of decision-making authority within households, we are interested in the role of beliefs and values commonly held by the household's community. For instance, the extent to which the husband identity is bound to an authoritarian disposition, or the extent to which there is a belief that men are superior decision-makers. We are not primarily concerned with the ultimate source of such cultural differences, but rather, with the implications of such cultural differences for size of the underlying commitment problem that marriage institutions are called upon to address. Such an analysis aims to inform the broader issue of identifying the cultural origins of observed marriage institutions. It also aims at offering a glimpse into the origins of norms governing the allocation of intra-household decision-making authority, in particular, suggesting a role for marriage institutions.

We present a simple theory that (i) establishes the central role for marital institutions, and (ii) describes the role of husband authority norms. A standard Coase Theorem argument implies that establishing the social value of marital institutions amounts to providing an account of transaction costs. We show that the key is the non-enforceability of contracts which specify a payment in exchange for the husband forgoing divorce. We then show that stronger husband authority norms ameliorate the underlying commitment problem. Intuitively, stronger husband authority norms raise the husband's payoff to marriage relative to divorce, making them seek inefficient divorce in fewer states of the world.

We then aim to test the model's key prediction that stronger husband authority norms ameliorate the underlying commitment problem. This involves considerable challenges. The first set of challenges relate to measurement. Most obviously, we need to quantify the magnitude of the underlying commitment problem facing each household. To do this we utilize the theory to show that this magnitude corresponds to the optimal magnitude of a divorce-contingent payment that a couple would choose as part of their marriage contract.

Our focus on a divorce-contingent payment relates directly to an observation by Becker (1991) that: "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. Virtually all societies have developed long-term protection for married women; one can even say that "marriage" is defined by a long-term commitment between a man and a woman." (p.30-31). Likewise, Goode (1963) emphasizes that marriage law and contracts have mainly protected domestically specialized women against divorce, abandonment, and other unfair treatment. Goode points to examples of traditional marriage contracts, in both Islam and Judaism, which stipulated an amount paid to wives in the event of divorce, or when Anglo-Saxon law provides alimony and child support to divorced women with children.

To empirically implement the predictions from our model, we use the fact that such divorce-contingent payments are still an integral part of Islamic marriage contracts. In Islam, *mahr* or *sadaq* (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 aim of the payment is to provide the bride with some financial independence within marriage as well as insurance in the case of divorce. 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 *mahr* in any Islamic marriage contract is a fundamental religious right of the wife, and the husband may not reduce the promised amounts (Fluehr-Lobban and Bardsley-Sirois 1990).

We focus our empirical analysis on the deferred dower portion of the marriage payment. We have data on individual marriage payments available from Egypt. We also need to quantify the strength of husband authority norms faced by each household. To do this we create an index that uses survey responses regarding husbands' decision-making power within the household. To focus on norms, we aggregate this index to the Governorate level, the relevant administrative unit in Egypt.

A second set of challenges relate to identification, and concerns regarding omitted variables and reverse causality. The threat of omitted variables arises from the existence of household-level characteristics that affect the deferred dower and are correlated with Governorate-level husband authority norms. First we will control for an extensive range of household characteristics, including marital outcomes beyond the deferred dower, to isolate our specific marital outcome of interest. We also include an extensive list of Governorate-level controls related to economic outcomes and cultural that could be correlated with both the level of deferred dower and husband authority norms. We also employ an instrumental variable strategy that isolates variation due to "exposure" to more equal household authority norms. Recent work has shown how prevailing norms are influenced by exposure to alternatives. Two prominent forms of "exposure" are media access (Jensen and Oster (2009), La Ferrara et al. (2012), Kearney and Levine (2015), and Vigna et al. (2014)) and geographic distance (Fogli and Veldkamp (2011), Becker and Woessmann (2009)).[1]

[1]There is not a clean distinction between the two channels. For instance Jensen and Oster (2009) show that distance

We follow the latter approach, utilizing the geographic distance to the location with greatest exposure to foreign norms: the capital city, Cairo. The argument is that (i) Cairo is the major contact point connecting Egypt with other cultures, and (ii) exposure is expected to decline with geographic distance. The exclusion restriction is that, once we hold fixed the observed characteristics of a household (including other marital outcomes), the observed geographic, economic and cultural characteristics of a Governorate, and the Region of residence, the distance to Cairo has no independent effect on the deferred dower. We perform a series of robustness tests to justify these assumptions.

The structure of the paper is as follows. The next section discusses related literature. 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.

1.1 Related Literature

With our focus on the role of the institution of marriage as a means for the husband to commit to not leaving, our paper is most directly related to the literature on the inefficient divorce problem. Absent some form of transaction costs, inefficient divorce (and inefficient marriage) will not exist because of a standard Coase Theorem argument (Becker et al. (1977), Stevenson and Wolfers (2006), Peters (1986), Allen (1998)). Voena (2015), Becker (1991) (p.331): if he would lose from divorce but their combined wealth would increase, she could bribe him to seek a divorce by offering him a large settlement and if he would gain from divorce ... but their combined wealth would be reduced, she could bribe him not to seek a divorce by offering him a greater share of their married output. We argue that the former is plausible if divorce opportunities are impermanent, but the latter is not. On costly bargaining, Becker: "Still, one might reasonably argue that legal rules make a difference: the anger and other emotion generated by divorce proceedings make bargaining costly and time-consuming, or a spouse might consent to a divorce only because his (or her) life is made difficult until he does". Lafortune and Low (2017) consider this problem in the context of the U.S. and use it to understand patterns in marriage rates. They argue "that assets provide insurance in marriage because they make divorce less likely, thus incentivizing higher investment from the economically weaker partner."

Ambrus et al. (2010) was the first paper to bring the deferred dower aspect of Islamic marriage payments to the attention of economists. Agents in their model do not make effort decisions, and therefore they do not draw out the connection between the deferred dower and the household commitment problem. By considering the specific contracting frictions facing married couples, we are able to derive the non-negativity of deferred dower endogenously rather than assume it. Their empirical setting is in Bangladesh, which is interesting because the prompt payment (unlike the rest of the Muslim world) flows from the wife to husband. They are interested in the impact of law changes, whereas our central focus is the impact of social norms.

More broadly, our paper is related to the literature on marital institutions and marriage payments. In our attempt to explain variation in deferred dower, our paper relates to a literature that explains variation in marriage-related outcomes. For instance, Anderson (2003) on dowry inflation in India, Jacoby (1995) on number of wives in a polygynous society, and Anderson and Bidner (2015) on the bequest/price nature of dowry. Whereas this literature generally points to underlying economic conditions, we are primarily interested in underlying cultural conditions. We also contrast with this literature insofar as we are not interested in the deferred dower per se, but rather, what the deferred dower tells us about the underlying commitment problem facing households.

Our work is also related to the literature explaining particular marriage institutions such as Jacoby and Mansuri (2010) on bride exchange, where they focus on patrilocality and the inability to contract on the treatment of daughters. Botticini and Siow (2003) on dowry as bequest where patrilocality and the

to nearest town is a key determinant of how early an Indian village gets access to cable TV. Geographic proximity is also important in the literature on social learning, including Foster and Rosenzweig (1995), Munshi (2004) and Conley and Udry (2010).

non-contractability of sons' work effort play an important role. Kudo (2017) studies levirate marriage and the role of the absence of inheritance rights in the event of husbands' death. Rainer (2007) focuses on pre-nuptial agreements and the inability to contract on investments within the household. Also Bidner and Eswaran (2015) who study endogamy and arranged marriage and highlight the inability to seek compensation from out of caste marriages.

Our focus on cultural norms determining marital outcomes is a new take but related to the large literature focused on the role of outside options in determining intra-household bargaining outcomes. Research includes considering outside economic opportunities (Anderson and Eswaran (2009), Majlesi (2016), and Bourguignon et al. (2009)). Other outside determinants include government transfer programs, assets before marriage, inherited assets, and legal rights (among others, refer to Doepke and Tertilt 2009, Duflo and Udry 2004, Dercon and Krishnan 2000, Chiappori et al. 2002).

There is a large literature outside of economics on gendered norms in marriage and the evolution of patriarchy. Although defining marriage and enforcing marriage rules were often difficult, there was substantial agreement across cultures on one point: men were to be the dominant partner in the marriage and wives were to be subservient and obedient to their husbands. The dual burdens of bearing children and engaging in productive labour may have made it more difficult for women to survive alone and led them to attach themselves to men, who took advantage of the weaker position of women and forced them into subordination (Reuter and Runner 1931). Others claim that this provider-protector theory of male domination casts women as too passive and suggest a more active role for women in creating the gender order. Shlain (2003), for example, argues that women were the first to recognize the link between sex, pregnancy, and childbirth an important discovery that led women to offer sex more selectively to those men who could provide for them. In all likelihood, a number of biological, economic, and ideological factors such as the discovery of biological paternity, greater male strength, weapons, surplus wealth, and institutionalized religions all converged in fostering male domination in marriages and in the broader societies (Hill 2011). An extreme form of this is the practice of House of Obedience (*bayt al-ta'a*) in Muslim family law. The Islamic marriage institution is established on a fundamental balance of rights and duties: maintenance is the duty of husbands; wives in return, should be obedient (Welchman 2000). The man has clear rights vis-à-vis his wife: obedience and chastisement, and the duty of the wife to stay home (Samara 1987). Despite the profound changes that Muslim-majority societies underwent during the twentieth century, family law reform has been rather slight (Shehada 2009).

Our focus is on norms is specifically husbands' authority in marriage. Other work in economics has focused on the implications of other gendered norms relevant to marriage. In particular, Alesina, Guiliano and Nunn (2013) consider the "appropriate place for women" as a determinant of female outcomes. The inefficient divorce problem helps understand the norm component of this value. When gender specialization is efficient, only the wife has an incentive to renege on the efficient effort allocation. Anticipating future consumption allocations, both sides want to exert more effort working in the current period to put them in a stronger consumption position in the subsequent period. Under specialization, the husband is supposed to behave in this way where as the wife is not. Thus there is a cultural advantage to imposing costs on working women. In this way, the value that "womens' place is in the home" is more than a description of observed gender specialization it is also a prescription that women should face restrictions when pursuing work outside the house. There is an even tighter connection to our paper here. Suppose that a value of a women's place is in the home purely represented the fact that household specialization is optimal. The optimality of specialization underlies the inefficient divorce problem since it leads to differential earning capacities ex post. In this way, gender specialization is expected to strengthen husband authority norms (rather than the other way around). This helps explain why husband authority norms become weaker with development as women (optimally) enter the workforce.

Other related work considers implications of gender identity norms. Bertrand et al. (2015) considers an aversion to a situation where the wife earns more than the husband to explain marriage formation and the likelihood of divorce. Baker and Jacobsen (2007) attempt to endogenize such social norms. They point out that a rule which mandates the customary division of labour within the household can be

Pareto improving if it eliminates wasteful acquisition of human capital aimed to improve one's bargaining position.

2 Theory

2.1 Overview

This section develops a simple model with the aim of (i) formalizing the household commitment problem, (ii) proposing a way to quantify the magnitude of the problem, (iii) identifying the factors that affect this magnitude, and (iv) demonstrating a connection to the deferred dower.

To do so, we start with a basic 'institution-less' setting in order to better understand the underlying problem that marriage institutions are called on to address. Inefficiency arises because of an inability for one agent to compensate the other in exchange for the latter *not* dissolving the relationship. The resulting nature of inefficiency is *inefficient divorce* (as opposed to inefficient marriage).

We then consider the use of separation-contingent payments. This involves the husband paying the wife an amount τ (possibly negative) whenever separation occurs. We then show that efficiency is fully restored with such payments, and that the magnitude of the payment meaningfully captures the magnitude of the underlying commitment problem. We go on to show how a range of variables affect the optimal separation-contingent payment. Specifically, we show that the optimal payment is decreasing in the amount of decision-making authority culturally assigned to that agent's gender (as well as a range of other variables).

We then examine extensions that allow us to understand the particular features of deferred dower payments in Muslim marriage contracts. The main distinguishing feature is that the promised payment is non-negative, with a non-negligible minority of marriages at the zero boundary. To generate this feature, we add the institutional feature that husbands have the sole right to initiate a divorce. Non-negativity arises as a consequence of the reasonable and realistic assumption that wife can pay a husband in exchange for him initiating a divorce.[2]

2.2 Fundamentals

Consider a particular man and woman considering marriage in a two-period setting. In the first period the pair allocate their effort across earning income and producing a household good such as raising children. In the second period there is no household production and the pair earn income. An individual's earnings potential in the second period depends on how much effort was devoted to earning income in the first period. At the end of the first period the pair experience a common preference shock that reflects match quality. After observing this shock, the relationship ends if at least one party chooses to dissolve it.

Prior to the first period, the pair enter into a marriage contract which stipulates an immediate transfer from groom to bride, T (possibly negative). The pair also agree on the household's first-period effort allocation.[3]

The household good is a public good in marriage, however household income is used to buy a private consumption good with a price normalized to unity. Thus if household income is Y_t at date t, then Y_t units of the private consumption good is to be allocated across the husband and wife. If H_t units of the

[2]There are two possibilities here. If household specialization happened to be such that a wife was more eager to divorce than a husband, then since only husbands can initiate divorce the inefficiency threat is due to *inefficient marriage*, which is overcome via a payment-for-divorce from the wife. If we retain the more reasonable assumption that husbands are more eager to divorce than wives, then a zero payment would be optimal in cases where the law imposes a minimum separation-contingent payment (maintenance, alimony, and so on). If the optimal total compensation to the wife is less than the minimum, the wife simply pays the husband to divorce her.

[3]We assume that this effort allocation can be enforced within the household. This is valuable since it allows us to clarify the source of inefficient divorce. That is, it makes clear that inefficient divorce does not rely on inefficient effort allocations (as would generally be the case if efforts were chosen non-cooperatively, as in Rainer (2008), say).

household good are produced at date t (recalling $H_2 = 0$), and i consumes C_{it} units of the private good in period t, then the marital payoff for i in period t is

$$u_{it} = C_{it} + v(H_t) + \varepsilon,$$

where $\varepsilon \sim F$ is the match quality shock realized at the end of period 1, v is increasing and concave with $v(0) = 0$ and $v'(0) = \infty$.

The allocation of household income to private consumption depends on a vector of variables shaping threat points, z_t, as well as a cultural parameter, $\phi \in [0, 1]$, which is interpreted as the authority of husbands in making household decisions. Specifically, given a total household income of Y_t, the consumption of agent i in period t is

$$\begin{aligned} C_{mt} &= \psi(z_t, \phi) \cdot Y_t \\ C_{ft} &= (1 - \psi(z_t, \phi)) \cdot Y_t. \end{aligned}$$

The vector z_t might include actual incomes, but also the quantity and quality of local economic opportunities.

The payoff in the event of separation, $\tilde{u}_{i2}$, depends on the agent's expected consumption net of the agent-specific cost of divorce (including social sanctions), κ_i. Expected consumption under separation, $\tilde{C}_{i2}$, depends on the agent's economic opportunities at $t = 2$, Y_{i2}, as well as a vector of other variables $\tilde{z}_i$. Specifically, the separation payoff is

$$\tilde{u}_{i2} = \tilde{C}_{i2}(Y_{i2}, \tilde{z}_i) - \kappa_i.$$

We assume that an agent's economic prospects at $t = 2$ has a larger impact on separation payoffs than on marriage payoffs:

$$\frac{d}{dY_{i2}} C_{i2} < \frac{d}{dY_{i2}} \tilde{C}_{i2}. \tag{1}$$

This simply reflects the notion that marriage involves more resource sharing than does separation. This assumption is important for establishing that the commitment problem is more acute when optimal intra-household specialization is more pronounced.

We assume that household authority norms have a greater impact on consumption in marriage than in separation.

$$\left|\frac{d}{d\phi} C_{i2}\right| > \left|\frac{d}{d\phi} \tilde{C}_{i2}\right|. \tag{2}$$

This simply reflects the notion that household authority norms are irrelevant when single, which is more likely when separated. This assumption is important for establishing that the commitment problem is less acute when household authority rests with husbands to a greater extent.

Finally, we assume that, to the extent that household authority norms affect separation payoffs, they do so in a way that leaves the total household separation payoff unchanged:

$$\frac{d}{d\phi}[\tilde{C}_{m2} + \tilde{C}_{f2}] = 0. \tag{3}$$

This assumption is automatically satisfied if separated agents do not join new households or if the formation of new households involves an up-front equilibrium marriage payment that fully takes household authority norms into account. This assumption is not required for the main results, but greatly simplifies the analysis because it implies that the efficient effort allocation is independent of ϕ. This is a testable prediction that we find much empirical support for.

2.2.1 Effort Allocation

At both dates each has one unit of time to allocate between market work and household work. Market work generates household income, Y, and home work generates a household public good, H (e.g. child human capital). If agent $i \in \{m, f\}$ allocates e_{it} units of effort to market work at date $t = 1$, then they earn an income of

$$Y_{it} = e_{it} \cdot w_{it}$$

where w_{it} is i's wage at date t so that total household income is

$$Y_t = \sum_{i \in \{m,f\}} Y_{it}.$$

The wage for market work at date 2 depends on how much market work was performed at date 1:

$$w_{i2} = w(e_{i1}) = w_{i1} \cdot (1 + \mu_i \cdot e_{i1}).$$

Here $\mu_i \geq 0$ captures the gains from experience.

The contribution of i to the household good is

$$H_{it} = (1 - e_{it}) \cdot h_{it},$$

where h_{it} is i's productivity in home production at date t, so that the total amount of household good produced is:

$$H_t = \sum_{i \in \{m,f\}} H_{it}.$$

Make matters stark by assuming $h_{i2} = 0$ (e.g. take H to capture child-rearing, which is only possible at date 1). This immediately implies that optimal efforts at date $t = 2$ are $e_{i2} = 1$ so that $H_2 = 0$. Thus the effort allocation $\mathbf{e} = \{e_{m1}, e_{f1}\}$ fully determines Y_1, Y_2, and H_1 (and $H_2 = 0$).

2.2.2 Timing

Assume the following timing:

1. Terms of marriage are set: $(T, \mathbf{e})$
2. First period consumption occurs, $\{C_{m1}, C_{f1}\}$
3. Preference shock ε realized
4. Each decides whether to dissolve the relationship
5. Second period payoffs are realized

This timing is intended to capture the idea that separation opportunities are impermanent. At some point separating becomes too costly and ceases to be a relevant threat point (e.g. declining re-marriage prospects with age, or improved relationship quality with experience). This matters because the outcome of marital bargaining is sensitive to relevant prevailing conditions, but not to past conditions (in which separation may have been a more relevant threat). We model this in a stark manner by supposing that there is a single opportunity to separate. Agents anticipate that consumption allocations will respond once the separation opportunity has passed, but find it costly to enter into negotiations in which one

partner is to be compensated for remaining in the relationship. In short, marital consumption at $t = 2$ cannot be 'locked in' at the time of the separation decision.[4]

2.2.3 Key Issues

Efficiency may dictate household specialization. This introduces a situation in which economic prospects at the time of the separation decision are asymmetric. This creates a difference in agents' willingness to separate, whereby the agent that specializes in market production (usually the husband) is generally more willing to separate than their partner. An ex post[5] inefficiency arises since there will be states (realizations of ε) in which the husband finds it privately optimal to separate despite the social optimality of not separating. This inefficiency arises because (i) agents cannot commit to state contingent separation decisions, and (ii) there are positive transactions costs arising from the negotiation of the terms governing a relationship's continuation.

For part (i), inefficient separation would clearly be eliminated if the agents were able to write contracts stipulating a state-contingent separation rule. Inefficiency would also be eliminated if the agents were able to use state-contingent marital consumption contracts (as these could be designed to induce efficient separation).[6] However, the non-verifiability of ε makes such contracts unenforceable. Instead, marital consumption is determined by intra-household bargaining. The outcome of this bargaining is sensitive to relevant prevailing conditions, but not to past conditions (in which separation may have been a more relevant threat). Agents' separation opportunities are not permanent, and they anticipate that consumption allocations will respond once the separation opportunity has passed. In other words, marital consumption at $t = 2$ cannot be 'locked in' at the time of the separation decision. However, this by itself need not lead to inefficiency: if negotiating the terms of a relationship's continuation is costless, then agents could achieve the full commitment outcome by negotiating a transfer at the time of the separation decision in which the would-be separator is induced to stay. This is where part (ii) enters: inefficiency also relies on transactions costs associated with negotiating the terms of a relationship's continuation. Such negotiations involve non-trivial costs only because the parties continue to be bound together by the relationship after negotiations cease. The cost comes from the reduced value of the relationship, and not from the negotiation per se.[7] For instance, one would expect negligible negotiation costs if the agents were instead negotiating the terms of the relationship's cessation. The negotiations at the start of the relationship are likely to be relatively costless when such negotiations are the primary responsibility of others, such as parents or kin.[8]

The magnitude of this commitment problem is couple-specific, depending as it does on the degree to which the optimal household effort allocation entails specialization and thus asymmetric economic opportunities at the time of the separation decision. The magnitude of this underlying problem is relevant to understand as it will shape the extent to which marriage institutions can mitigate the problem.

[4] This is similar in spirit to one of the rationales offered in Fearon (1995) for the equilibrium existence of (inefficient) conflict. There, when one side of a conflict has a temporary strength advantage they need to be compensated in order to be deterred from entering into (inefficient) conflict. The impermanence of the strength advantage, however, requires that this compensation be provided up front. The mechanisms differ however in that Fearon (1995) (as well as popular applications of the idea, such as Acemoglu & Robinson (2000)) emphasizes budget constraints as the friction associated with this transfer whereas we emphasize the reduced relationship value stemming from negotiating the transfer.

[5] This is a key point of contrast with hold up problems. Hold-up produces ex ante inefficiency because of incomplete contracts: the non-contractibility of investment leads agents to invest mindful of the implied future (ex post efficient) surplus division. This is not problematic in our model as we allow the couple to enforce any agreed-upon effort allocation and to exchange the ex ante transfer, T. Rather, the issue is one of ex post inefficiency (the existence of which also creates distortions to ex ante investments as agents attempt to mitigate ex post inefficiency).

[6] Or if the separation opportunity were permanent, so that it is taken into account when bargaining each period.

[7] For example, the negotiation process provides incentives for both agents to overstate the value they would get from separation. Such incentives are hardly conducive to household harmony.

[8] Note too that, in the extension of the model that follows, agents fully agree on the optimal deferred dower, and therefore this component of the marriage contract does not generation additional frictions in the negotiation process.

2.3 Analysis

We first derive the efficient (full-commitment) outcomes, and then derive equilibrium outcomes by backward induction. This involves first deriving the equilibrium separation decisions taking the effort allocation as given, and then deriving the optimal effort allocation.

2.3.1 Full Commitment Outcome

Consider the *full commitment* case whereby agents are able to choose both effort *and* the state-contingent separation rule. Given that household welfare is increasing in ε, an optimal state-contingent separation rule can be summarized with a single threshold value, $\hat{\varepsilon}$, whereby the rule dictates separation if $\varepsilon < \hat{\varepsilon}$. Given our transferable utility specification (i.e. ex ante utility is transferable by choice of T), any Pareto efficient marriage contract must maximize the total welfare of the couple:

$$W(\mathbf{e}, \hat{\varepsilon}) = 2 \cdot v(H(\mathbf{e})) + Y_1(\mathbf{e}) + \int_{-\infty}^{\hat{\varepsilon}} [\tilde{u}_m(\mathbf{e}) + \tilde{u}_f(\mathbf{e})] dF(\varepsilon) + \int_{\hat{\varepsilon}}^{\infty} [Y_2(\mathbf{e}) + 2\varepsilon] dF(\varepsilon).$$

For any $\mathbf{e}$ the optimal separation threshold is:[9]

$$\hat{\varepsilon}^*(\mathbf{e}) \equiv \frac{[\tilde{C}_m(\mathbf{e}) + \tilde{C}_f(\mathbf{e})] - [C_{m2}(\mathbf{e}) + C_{f2}(\mathbf{e})] - [\kappa_m + \kappa_f]}{2}.$$

Thus, the optimal effort allocation is

$$\mathbf{e}^* \in \arg\max_{\mathbf{e}} W(\mathbf{e}, \hat{\varepsilon}^*(\mathbf{e})).$$

As an example, if $\tilde{C}_i = Y_{i2}$ (so that a separated agent consumes their income), then $\hat{\varepsilon}^*(\mathbf{e}) = -(\kappa_m + \kappa_f)/2$ and the efficient effort maximizes 'total household output' $Q(\mathbf{e}) \equiv 2 \cdot v(H(\mathbf{e})) + Y(\mathbf{e})$, where $Y(\mathbf{e}) \equiv Y_1(\mathbf{e}) + Y_2(\mathbf{e})$ is total income. We solve this problem in the appendix.

2.3.2 Equilibrium Separations

Since either party can unilaterally separate, for a given $\mathbf{e}$, agent i prefers to separate when

$$C_{i2}(\mathbf{e}) + \varepsilon < \tilde{C}_i(\mathbf{e}) - \kappa_i.$$

That is, when:

$$\varepsilon < \hat{\varepsilon}_i(\mathbf{e}) \equiv \tilde{C}_i(\mathbf{e}) - \kappa_i - C_{i2}(\mathbf{e}).$$

The value of $\hat{\varepsilon}_i$ is interpreted as a net benefit of separation for agent i, against which the match quality shock is to be compared. It is straightforward to show that the efficient separation threshold is the mid-point between the agent's thresholds:

$$\hat{\varepsilon}^*(\mathbf{e}) = \frac{\hat{\varepsilon}_m(\mathbf{e}) + \hat{\varepsilon}_f(\mathbf{e})}{2}.$$

That is, $\hat{\varepsilon}^*(\mathbf{e})$ is the household's net benefit of separation.

Since parties can separate unilaterally, separation occurs whenever

$$\varepsilon < \hat{\varepsilon}(\mathbf{e}) \equiv \max\{\hat{\varepsilon}_m(\mathbf{e}), \hat{\varepsilon}_f(\mathbf{e})\}.$$

[9] This can be derived by either maximizing W with respect to $\hat{\varepsilon}$, or by noting that it is socially optimal to separate when the total payoff from separating, $\tilde{u}_m + \tilde{u}_f$ is greater than the total payoff from not separating, $C_{m2}(\mathbf{e}) + C_{f2}(\mathbf{e}) + 2\varepsilon$.

This will be inefficient whenever $\varepsilon \in (\hat{\varepsilon}^*(\mathbf{e}), \hat{\varepsilon}(\mathbf{e}))$. That is, whenever $\hat{\varepsilon}_m(\mathbf{e}) \neq \hat{\varepsilon}_f(\mathbf{e})$. The inefficiency will always involve inefficient separation, as illustrated in Figure 1.

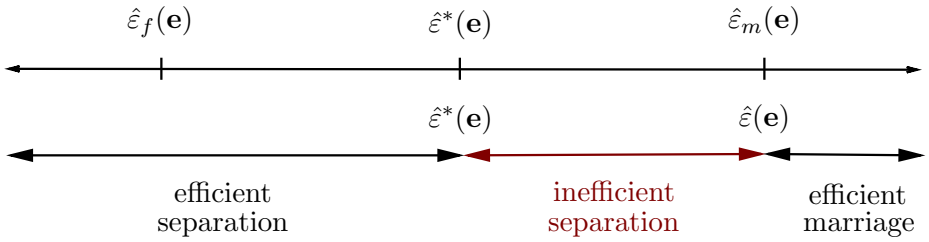


Figure 1: Separation Thresholds and Inefficiency

This ex post inefficiency also induces ex ante inefficiency insofar as effort choices are distorted in the couple's attempt to mitigate the ex post inefficiency. For instance, if total household welfare in separation is very low then the couple loses a great deal from inefficient separation and will seek to avoid it. This provides an impetus towards the equalization of economic opportunities at $t = 2$, which comes at the expense of home production. This would be particularly problematic if home production entailed significant positive externalities (e.g. investing in children's human capital). We now turn to the determination of $\mathbf{e}$.

2.3.3 Effort Allocation

An inability to commit to a separation rule ex ante means that efforts will generally be distorted: the couple chooses $\mathbf{e}$ mindful of the fact that this will also shape separation decisions. That is, the couple solves

$$\max_{\mathbf{e}} W(\mathbf{e}, \hat{\varepsilon}(\mathbf{e})) \tag{4}$$

This problem differs from the full commitment problem to the extent that $\hat{\varepsilon}(\mathbf{e})$ differs from $\hat{\varepsilon}^*(\mathbf{e})$. One natural measure of the commitment problem is then this difference evaluated at the full-commitment efforts:

$$\delta \equiv \hat{\varepsilon}(\mathbf{e}^*) - \hat{\varepsilon}^*(\mathbf{e}^*).$$

This measure is non-negative, and captures the measure of the set of states for which inefficient separation occurs given full-commitment efforts. That is, the size of the "inefficient separation" region in Figure 1 when $\mathbf{e} = \mathbf{e}^*$. The value of δ acts as a wedge: an inability to commit means that agents maximize $W(\mathbf{e}, \hat{\varepsilon}(\mathbf{e}))$, whereas the full-commitment effort maximizes $W(\mathbf{e}, \hat{\varepsilon}(\mathbf{e}) - \delta)$.[10] Therefore there is no inefficiency when $\delta = 0$ and larger values of δ imply a greater distortion from the full-commitment efforts.

Which factors affect δ? Straightforward substitution tells us that we can write

$$\delta = |\tau^*|, \tag{5}$$

where

$$\tau^* \equiv \frac{\hat{\varepsilon}_m(\mathbf{e}^*) - \hat{\varepsilon}_f(\mathbf{e}^*)}{2} = \frac{[\tilde{C}_m(\mathbf{e}^*) - \tilde{C}_f(\mathbf{e}^*)] - [C_{m2}(\mathbf{e}^*) - C_{f2}(\mathbf{e}^*)] - [\kappa_m - \kappa_f]}{2}.$$

That is, τ^* is proportional to the husband-wife difference in the net benefit of separation. Thus the commitment problem, as measured by δ, is increasing in the extent to which there is a gender difference

[10] To see this, note $\max_{\mathbf{e},\hat{\varepsilon}} W(\mathbf{e}, \hat{\varepsilon}) = W(\mathbf{e}^*, \hat{\varepsilon}^*(\mathbf{e}^*)) = W(\mathbf{e}^*, \hat{\varepsilon}(\mathbf{e}^*) - \delta) \leq \max_{\mathbf{e}} W(\mathbf{e}, \hat{\varepsilon}(\mathbf{e}) - \delta) \leq \max_{\mathbf{e},\hat{\varepsilon}} W(\mathbf{e}, \hat{\varepsilon})$. Since the end expressions are the same, it must be $\max_{\mathbf{e},\hat{\varepsilon}} W(\mathbf{e}, \hat{\varepsilon}) = \max_{\mathbf{e}} W(\mathbf{e}, \hat{\varepsilon}(\mathbf{e}) - \delta)$.

in the net benefit to separation. Intuitively, since marriage involves sharing of economic resources in a way that separation does not, this divergence is more pronounced when agents have unequal economic prospects at $t = 2$. In other words, the commitment problem is more acute when the efficient effort allocation involves greater intra-household specialization.

More formally, we have the following comparative statics.[11]

Proposition 1 *The value of* τ^* *is*

1. *increasing in* Y^*_{m2} *and decreasing in* Y^*_{f2},
2. *decreasing in* κ_m *and increasing in* κ_f, *and*
3. *is decreasing in the strength of husband authority norms,* ϕ.

The intuition for these results stems from τ^* representing the husband-wife difference in the net benefit of separation. The effects of $\{Y^*_{m2}, Y^*_{f2}\}$ arise because an increase in Y^*_{i2} raises the separation consumption relative to marriage consumption thereby raising the net benefit of separation for agent i. The effects of $\{\kappa_m, \kappa_f\}$ arise because an increase in κ_i reduces the net benefit of separation for i. Finally, the effect of ϕ arises because an increase in ϕ reduces the net benefit of separation for husbands and increases it for wives.

The general point is that τ^* will increase in any variable that raises the husband's net benefit of separation relative to the wife's net benefit of separation. It bears emphasizing that the particular social norm we focus on, the degree of husband authority, has a predicted effect that differs markedly from the effect of threat points. This is seen most clearly by comparing the effect of Y^*_{m2} to the effect of ϕ. An increase in either of these will raise husband consumption in marriage, but only the effect of Y^*_{m2} is via the husband's threat point.

Since other social norms, including those highly related to husband authority, enter into threat points we have the related point: the degree of husband authority has a predicted effect that differs markedly from the effect of very related social norms. For instance, consider norms that discourage women from participating in the workforce. A strengthening of such norms will tilt household consumption towards the husbands (as with husband authority) but (unlike husband authority) is predicted to *raise* the deferred dower. This is because a strengthening of such norms reduces the net benefit of separation for women (whereas a stronger husband authority raises the net benefit). The distinguishing feature of husband authority norms is that they *only* govern behaviour within households; they represent a husband bias rather than a male bias.

A similar argument applies to norms regarding the treatment of divorced women. For instance, κ_f can be interpreted as a social cost imposed on separated women. Whilst increases in both κ_f and ϕ work against women, the sign of their predicted effect on τ^* differs.

These observations serve to place very strong restrictions on the sorts of empirical patterns that would support the model. Stronger husband authority norms are predicted to reduce τ^*, whereas a range of other characteristics and norms that would also tilt marital consumption in favour of husbands should have the opposite effect. In other words, the effect of ϕ should differ markedly from the effect of other variables which provide husbands greater marital consumption.

2.4 Marriage Transfers, T

Once we have determined the couple's effort choice from (4), the total payoff from marriage is determined. This is allocated between the bride and groom via the initial transfer, T. If we let

$$W_i \equiv v(H(\mathbf{e}^*)) + C_{i1}(\mathbf{e}^*) + \int_{-\infty}^{\hat{\varepsilon}^*(\mathbf{e}^*)} [\tilde{C}_i(\mathbf{e}^*) - \tau_i - \kappa_i] dF(\varepsilon) + \int_{\hat{\varepsilon}(\mathbf{e}^*)}^{\infty} [C_{i2}(\mathbf{e}^*) + \varepsilon] dF(\varepsilon),$$

[11] The same comparative statics apply to δ if $\tau^* > 0$ and the reverse if $\tau^* < 0$.

where $\tau_m = \tau^*$ and $\tau_f = -\tau^*$, then the payoff to marriage given T is:

$$U_m(T) = W_m - T$$
$$U_f(T) = W_f + T.$$

An increase in ϕ raises W_m and reduces W_f: the husband enjoys greater consumption in each state of the world *and* optimally offers a smaller separation-contingent payment.

If T is determined by Nash bargaining where agent i has an outside option worth $\underline{U}_i$ and grooms have a bargaining power parameter λ, then we have

$$T^* = (1-\lambda) \cdot [W_m - \underline{U}_m] - \lambda \cdot (W_f - \underline{U}_f).$$

If the outside option is composed of a flow payoff, ι_i, plus the discounted value of marriage: $\underline{U}_m = \iota_i + \beta \cdot U_m(T^*)$, then

$$T^* = W_m - \lambda \cdot W - \frac{(1-\lambda) \cdot \iota_m - \iota_f}{1-\beta},$$

where $W \equiv W_m + W_f$. An increase in ϕ raises T since it raises W_m. However, a strengthening of husband authority norms (an increase in ϕ) might also reasonably be associated with a strengthening of male bargaining power (an increase in λ) or a decline in womens' unmarried flow payoff (a decrease in ι_f). These latter effects will work in the opposite direction, tending to lower T^*.

2.5 Resolving Inefficiencies

Inefficient divorce can be fully resolved via ex ante commitments to separation-contingent payments. In particular, suppose that agents can agree, at the time of marriage, to an enforceable contract that stipulates that the husband is to pay the wife τ in the event of separation (where $\tau < 0$ is possible, being equivalent to the wife paying the husband). The only required change to the above analysis is that the first-period consumptions are modified to $C_{m1} - \tau$ and $C_{f1} + \tau$ (for husband and wife respectively) in the event of separation. This means that $\hat{\varepsilon}_m(\mathbf{e})$ is reduced by τ and $\hat{\varepsilon}_f(\mathbf{e})$ is increased by τ. The efficient separation threshold is unaffected.

The couple achieves the full-commitment outcome by setting $\tau = \tau^*$.[12] Simply, this ensures efficient separation when making the efficient effort decision: $\hat{\varepsilon}(\mathbf{e}^*) = \hat{\varepsilon}^*(\mathbf{e}^*)$. If such contracts were observed, then an implication of choosing τ optimally is that the absolute value of the promised payment coincides with δ and therefore acts as a measure of the underlying commitment problem in the sense of (5). If $\tau > 0$, then the couple are revealed to be facing a situation where the husband has the stronger ex post incentive to separate whereas the opposite is true if $\tau < 0$.

Muslim marriages contracts contain such a separation-contingent payment: the deferred dower. Unlike the general treatment above, the deferred dower must be non-negative and equals zero in a non-trivial minority of cases. To understand this additional structure, it is sufficient to recognize another key feature of Muslim marriage institutions: separation decisions are one-sided, lying essentially with the husband. If $\tau^* \geq 0$, then the above analysis goes through unchanged (since it will be the husband that is more willing to divorce anyway). If instead $\tau^* < 0$, then there is no efficiency loss from setting $\tau = 0$. The reason is because in this case the one-sided separation decision implies that the only possible inefficiency is inefficient marriage (i.e. the husband is too reluctant to divorce). But in such states, the wife can pay the husband an amount that induces him to grant a divorce.[13] In short, with one-sided separation the

[12] That is, the full-commitment outcome is achieved even if the state (ε) in non-verifiable, and contracts specifying a payment in exchange for the other party *not* separating are unenforceable.

[13] That is, she offers a payment of $\varepsilon - \hat{\varepsilon}_m$ to the husband in exchange for a separation. This payment is made ex post and thus varies with the state. She is willing to make such an offer if $\varepsilon \leq \hat{\varepsilon}_f - (\varepsilon - \hat{\varepsilon}_m)$: i.e. if $\varepsilon \leq (\hat{\varepsilon}_f + \hat{\varepsilon}_m)/2 = \hat{\varepsilon}^*$.

optimal deferred dower is $\tau = \max\{0, \tau^*\}$ and thus is non-negative. Note that the non-negativity result is not due to an assumption that husbands are always more willing to separate (although this seems likely). Rather, the deferred dower is optimally zero in cases where the husband is the more reluctant agent since one-sided divorce only introduces the possibility of inefficient marriage, which can be fully resolved without ex ante commitments.

Proposition 2 *Under one-sided divorce, the full commitment outcome is achieved with a separation-contingent payment of $\tau = \max\{0, \tau^*\}$. The value of the separation-contingent payment continues to measure the extent of the underlying commitment problem.*

2.6 Implications

In addressing the inefficient divorce problem, it is socially valuable if the underlying problem is less severe. That is, society benefits from lower τ^* (equivalently, δ). The reason is that husbands often have alternatives to official divorce, e.g. by abandoning their wife (Ambrus et al. (2010)). Abandonment will be preferred by the husband if the required divorce-contingent payment is too large. Divorce-contingent payments are obviously unhelpful if the husband prefers abandonment over official divorce.

The analysis here suggests a role for cultural norms. In particular, stronger husband authority norms lower the required divorce-contingent payment, and therefore help establish efficient divorce. Note that women do not necessarily lose from stronger husband authority norms since the adverse affects of such norms are anticipated when it comes to the initial transfer, T.[14] The analysis suggests that strong husband authority norms will be more beneficial in places and times where there are strong incentives for household specialization (i.e. a large difference in Y^*_{m2} and Y^*_{f2}). Conversely, such norms are less beneficial when household specialization is less pronounced (e.g. when household technologies render large effort investments unnecessary).

On the other hand, stronger husband authority norms will be costly if the initial transfer T is (socially) costly. That is, it may be increasingly difficult to raise larger prompt dowers before marriage.

These thoughts of why strong husband authority norms arise in some places and times but not others is of course speculative. However our main interest lies in testing one key aspect of the claim: places with stronger husband authority norms face a less severe commitment problem.

2.7 Empirical Predictions

Our main predictions of interest concern the determinants of the deferred dower. Our key focus is on the role of husband authority norms and from Proposition 1, we have:

Prediction 1 *The deferred dower is decreasing in stronger husband authority.*

As emphasized after Proposition 1, the husband authority norms have a predicted effect that differs from a range of other characteristics and norms that would tilt marital consumption in favour of husbands. These latter determinants should instead have the opposite effect. In particular we have:

Prediction 2 *The deferred dower in increasing in male-to-female earnings opportunities.*

Prediction 3 *The deferred dower is decreasing in male-to-female social costs of divorce.*

[14] If women anticipate reduced bargaining power in marriage, then they require a stronger outside option (in the form of property) ex ante. A larger required ex ante transfer perhaps helps to explain why couples complain of large marriage costs (e.g. in terms of real estate) even though such costs are discretionary.

3 Empirical Evidence

3.1 Empirical Strategy

Our main predictions of interests outlined above concern the determinants of the deferred dower. To this end, we estimate the following equation:

$$\tau_{ig} = \alpha \cdot \phi_g + X_g'\beta_1 + X_i'\beta_2 + \varepsilon_{ig}, \tag{6}$$

where τ_{ig} is the log of deferred dower for household i in geographic area g, ϕ_g is measured local husband authority norms, X_g are local characteristics, X_i are household characteristics, and ε_{ig} is the error term.

A key concern with estimating equation (6) in Section 2.7 relates to identification of the relationship from local husbands authority norms to deferred dower. The threat of omitted variables arises from the existence of household-level characteristics that affect the deferred dower and are correlated with Governorate-level husband authority norms. Possible confounding factors include household wealth, wife and husband education levels, urban residence, year of marriage, and so on. In our baseline estimations, we control for an extensive range of basic household characteristics, including all those just mentioned.

Of particular concern are those unobserved characteristics which influence marriage practices in general. To address this, we also control for marital outcomes beyond the deferred dower, such as whether the marriage is a kin marriage, the age of the wife at marriage, whether the couple live in a nuclear arrangement after marriage, the Governorate divorce rate (number of divorces divided by the number of marriages in 2012), and in robustness checks the amount of prompt dower, and the total marriage transfers received by bride and groom. By using these controls, we are isolating a very specific marital outcome.

The threat of omitted variables further arises at the Governorate level. For instance, variables related to economic opportunities and related cultural norms could be correlated with both the level of deferred dower and husband authority norms. In terms of economic opportunities, we control for a host of geographic variables related to agricultural productivity (soil, weather, and crop suitability characteristics) as well as local economic outcomes (employment shares in major industry groups, distance to nearest town, female labour force participation rates). In terms of related cultural norms, we can control for a range of related norms operating at the Governorate level, such as views on gender equality in general, but also on trust, political views and so forth. In addition to all of these controls, we include region fixed-effects.

Reverse causality is still a potential issue insofar as a higher deferred dower makes the wife less vulnerable to divorce, which in turn boosts her bargaining position when it comes to say over household decisions. This would induce a negative correlation between deferred dower and the degree of husband authority across households. But recall that our explanatory variable of interest is the Governorate-level average of husband authority (as opposed to the level prevailing in the respondents' particular household). Still, this is problematic if the household characteristics responsible for the variation in deferred dower (say, wives' education levels) are not equally distributed across Governorates. To help address this and related concerns, we employ an instrument that isolates variation due to "exposure" to more equal household authority norms. Recent work has shown how prevailing norms are influenced by exposure to alternatives. Two prominent forms of "exposure" are media access (Jensen and Oster 2009, La Ferrara et al. 2012, Kearney and Levine 2015, and Vigna et al. 2014) and geographic distance (Fogli and Veldkamp 2011, and Becker and Woessmann 2009).

We follow the latter approach, utilizing the geographic distance to the location with greatest exposure to foreign norms: the capital city, Cairo. The argument is that: (i) Cairo is the major contact point connecting Egypt with other cultures; and (ii) exposure is expected to decline with geographic distance. The exclusion restriction is that, once we hold fixed the observed characteristics of a household (including other marital outcomes), the observed geographic, economic and cultural characteristics of a Governorate, and the Region of residence, the distance to Cairo has no independent effect on the deferred dower. We

perform a series of robustness tests to justify these assumptions.

3.2 Data

Our main data source is the Egypt Labor Market Panel Survey (ELMPS), which contains detailed information on payments at marriage, as well as information on who has the final say on a variety of household decisions. The ELMPS is a longitudinal and nationally representative household survey administered by the Economic Research Forum[15] in cooperation with Egypt's Central Agency for Public Mobilization and Statistics. The study pools the 2006 and 2012 rounds, covering respectively 5,851 and 12,060 households. Our final sample is roughly made of 7,909 married women for who we have complete information on variables of interest.[16]

The ELMPS Survey asks detailed questions to all married women (between the ages 16 and 49) on all of the costs related to their marriage. Specifically the amount of deferred dower and the value of prompt dower are recorded. In addition to these, women report the value of all other transfers at the time of marriage: in the form of jewelry, furniture, household appliances, housing, land, and any other gifts or wedding preparation expenses. For these latter marriage expenses, it is further recorded which proportion were paid for by the groom's side and which by the bride's side. Reported amounts are deflated using the CPI index corresponding to the reported year of marriage, 2000 being the baseline year.[17] Detailed summary statistics on all marriage expenses are listed in Table 1. Payments at marriage are substantial: average costs at marriage are more than 19 times greater than the average household expenditures per capita in 2012.[18] Housing costs and the equipment of the new household represent the major expenses, followed by the deferred dower. Its amount is more than two times greater than that of the prompt dower, greater than the value of jewellery offered at marriage, and equals 1.4 times the average household expenditures per capita in 2012. As marriage payments have a positively skewed distribution, our main dependent variable consists in the logarithm transformation of the deferred dower and its distribution is displayed in Figure 2.

Table 1: Summary statistics on marriage payments (2000 EGP)

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
Deferred dower	7,909	3,369	4,356	0	34,159
Prompt dower	6,670	1,482	3,396	0	24,023
Jewellery	7,809	3,144	3,168	0	25,919
Furniture and appliances	7,538	12,999	14,372	0	106,712
Trousseau	7,576	5,662	6,292	0	46,438
Housing	7,769	18,529	28,696	0	160,154
Celebration costs	7,520	2,369	2,881	0	23,412
Total costs	7,909	45,990	39,446	0	307,846

Source. ELMPS 2006 and 2012.

To capture a measure of husband authority norms, we use the module in the survey aimed at capturing women's status. All ever-married women were asked detailed information on access to financial resources, freedom of mobility, views on domestic violence, and gender-roles.

We use information from the household decision-making module to construct an index of husband authority norms at the Governorate level, ϕ_g.[19] Married women above 15 years old are inquired about who usually has the final say on several decisions, including making large purchases, purchases for daily

[15] OAMDI, 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 elaborated appropriate sampling weights to ensure the representativeness of each round. More details are available in Assaad and Krafft (2013).

[16] We exclude 56 women in polygamous households, as marriage payments and household decision-making may be specific to these unions.

[17] The 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.

[18] Average household expenditures per capita in 2012 are obtained from the Household, Income, Expenditure and Consumption Survey, 2012/2013.

[19] The Governorate corresponds to the first Egyptian administrative level.

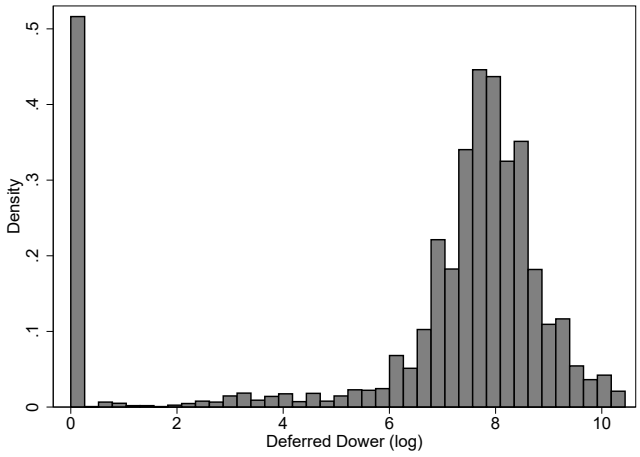


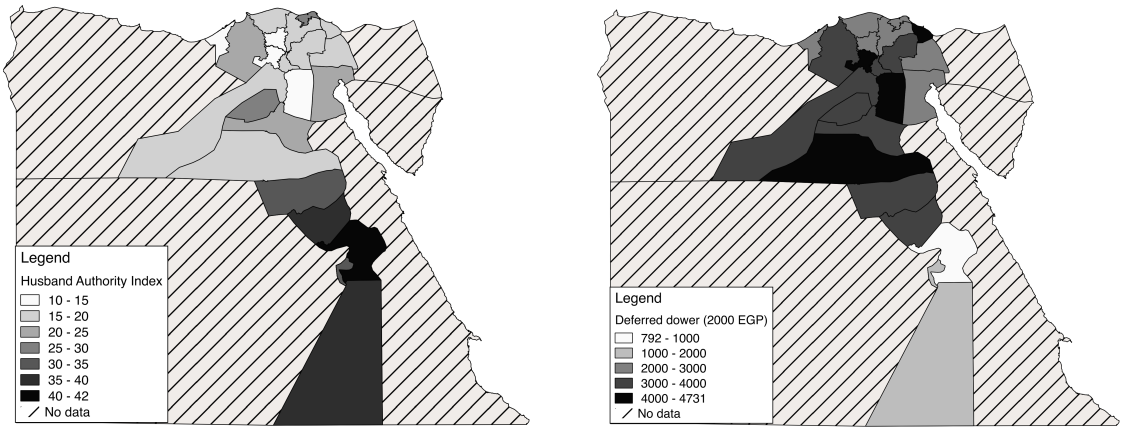
Figure 2: Distribution of Deferred Dower (log)
Source. Authors' calculations based on ELMPS-2006 and ELMPS-2012.

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 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, the husband authority norm. We derive a summary measure of husband authority norms from a data-driven weighting scheme procedure based on Principal Component Analysis (PCA). Relative weights are based on the correlation system of these proxies with respect to husband authority.[20] The contribution of each household decision to the husband authority index is illustrated by eigenvectors given in Table 11 in the Data Appendix. We notice that decisions related to the wife herself have a greater weight in the final index. We obtain a linear combination of the proxies for husband authority that explains 48.76% of the variance between these variables. To ease the interpretation of the results, we normalize this index such that it can vary from 0 to 100. We next compute averages of these individual measures of husband authority norms at the Governorate level. Our measure of husband authority varies from 10 (Cairo) to 42 (Qena). Figure 3 illustrates the geographic distribution of the husband authority index and the deferred dower by Governorate of residence. We see a clear concentration of higher values of the husband authority index in the Southern part of Egypt. In contrast, higher deferred dower payments occur in the Northern part, closer to Cairo.

At the household level, we control for a set of *baseline characteristics* including the wife's and groom's years of schooling at time of survey, the wife's socio-economic background proxied by her parents' education level and an indicator for rural residence. Both husband authority and the deferred dower may depend on ex-ante commitments to future household choices. Hence, we further include the household wealth at time of survey, fertility and an indicator for the wife's current paid work participation. We also control for a set of *marriage characteristics*. Such characteristics include the bride's age at marriage, the year of marriage, an indicator of whether the couple are relatives (kinship unions), and an indicator for whether the couple lived on its own when first married.

Table 2 provides summary statistics on individual and household characteristics. In our sample, women received on average 8 years of schooling and their husband 9 years. Around 80% of women have an illiterate mother and 54% an illiterate father. Paid work participation is very low, with only 14.6% of women working for pay. Marrying a relative is still a widespread practice, with 30.5% of women in this case. More than half of women lived in a nuclear household after marriage. 55% of our sample resides in

[20] Alternatively, we reproduce the results using equal-weighting between indicators of husband authority. These results are listed in Table 17 in the Data Appendix.



(a) Husband Authority Index (b) Deferred dower

Figure 3: Geographic distribution of the husband authority index and the deferred dower Source. Authors' calculations based on ELMPS-2006 and ELMPS-2012.

Table 2: Summary statistics on individual and household characteristics

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
Wife's years of schooling	7,909	7.848	5.490	0	21
Husb's years of schooling	7,909	8.956	5.045	0	20
Wife's mother's illiterate	7,909	0.797	0.402	0	1
Wife's father's illiterate	7,909	0.538	0.499	0	1
Nb of children	7,909	2.258	1.566	0	10
Wife is a paid worker	7,909	0.146	0.353	0	1
Household wealth	7,909	-0.0397	0.860	-3.484	3.557
Wife's age at marriage	7,909	20.35	3.754	11	42
Kin marriage	7,909	0.305	0.460	0	1
Nuclear arrangements	7,909	0.559	0.497	0	1
Year of marriage	7,909	1,998	9.082	1,972	2,012
Rural residence	7,909	0.550	0.498	0	1
Upper Egypt	7,909	0.424	0.494	0	1

Source. ELMPS 2006 and 2012.

rural areas and 42.4% in Upper Egypt, the Southern and less developed part of the country. Our sample contain women who married between 1972 and 2012.

At the local level, we have a set of controls capturing *economic opportunities*. This set includes geographic controls such as the distance to the territorial borders, indicators of land suitability for "pro-female" relative to "pro-male" crops cultivation, soil characteristics, average precipitation and temperature. The set also includes measures of local economic conditions (light density, gross product per capita, land travel time to nearest city, population size, population density, employment shares in major industry groups, women's participation in paid work, education levels and local housing prices). Finally, we have a set of controls capturing local *cultural norms* around marriage, including local divorce rates, average marriage payments, the local prevalence of kin marriages and of nuclear arrangements after marriage, the average share of grooms' contribution to marriage payments and the percentage of copts.[21] More description and summary statistics on the variables included in the regressions is given in the Data Appendix. Regressions also include Region fixed-effects and a dummy for the year of survey.

3.3 Exclusion Restriction

An ideal instrument would predict husband authority norms, but would not be conditionally correlated with deferred dower. We propose distance to capital (Cairo), with the idea being that more equal authority norms are more modern and will diffuse slowly from more modern parts of the country. Distance to capital

[21] Copts constitute a Christian ethnic group and do not practice *mahr* payments.

is measured as the shortest distance in kilometer from the centroid of the qism of residence to Cairo.[22] The raw bivariate relationship between HAI at the qism level and distance to capital is strong and positive, as displayed in Figure 4.

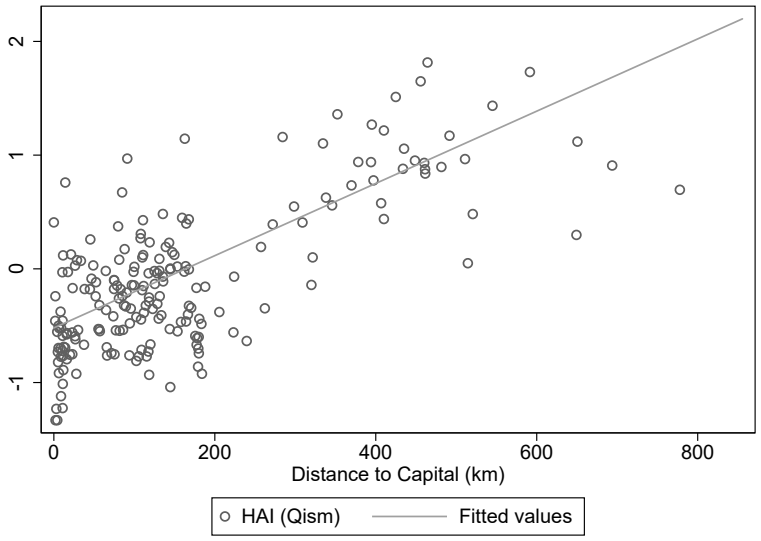


Figure 4: HAI and Distance to Capital

The exclusion restriction requires that, conditional on included controls, distance to Cairo has no effect on the level of deferred dower apart from the effect on husband authority norms. One may be concerned by a spurious relationship between distance to Cairo and the husband authority norms. Table 3 shows that our instrument does not strongly predict other determinants of the deferred dower that may be related to women's agency, such as household wealth, fertility and education levels. Another possible threat to our identification strategy would be a systematic relationship between distance to Cairo and marriage payments. To explore this, we regress different marriage payments on distance to Cairo. Results in Table 4 confirm that our instrument is not strongly correlated with other marriage payments. In addition, distance to Cairo does not predict local differences in divorce rates.

Table 3: Correlation between instrument and HH Characteristics

VARIABLES	(1) Household wealth	(2) Nb of children	(3) Wife's years of schooling	(4) Husb's years of schooling	(5) Wife's mother illiterate	(6) Wife's father illiterate
Distance to Capital	0.011	-0.009	-0.015	0.074	0.002	0.012
(100 kms)	(0.021)	(0.020)	(0.114)	(0.089)	(0.005)	(0.009)
Observations	8,121	8,121	8,121	8,121	8,121	8,121
R-squared	0.475	0.459	0.610	0.500	0.248	0.280
Full set of controls	Y	Y	Y	Y	Y	Y

Standard errors clustered at the qism level.
*** p<0.01, ** p<0.05, * p<0.1
Source. ELMPS 2006 and 2012.

[22]The qism corresponds to the second Egyptian administrative level.

Table 4: Correlation between instrument, marriage payments and divorce rates

VARIABLES	(1) Deferred Dower	(2) Prompt Dower	(3) Bride's transfers at marriage	(4) Groom's transfers at marriage	(5) Groom-side share	(6) Divorce Rate
Distance to Capital	-0.812***	0.166	0.048	-0.029*	-0.005	-0.003
(100 kms)	(0.128)	(0.133)	(0.045)	(0.017)	(0.004)	(0.003)
Observations	7,909	6,884	7,360	7,283	6,168	8,121
R-squared	0.171	0.170	0.262	0.335	0.169	0.796
Full set of controls	Y	Y	Y	Y	Y	Y

Standard errors clustered at the qism level.
*** p<0.01, ** p<0.05, * p<0.1
Source. ELMPS 2006 and 2012.

3.4 Deferred Dower and Husband Authority Norms

We now aim to test our main prediction (Prediction 1) that the deferred dower is decreasing in stronger husband authority. We begin by reporting results from OLS estimations in Table 5 below of the deferred dower as a function of the husband authority index (constructed at the Governorate level).

Table 5: OLS regressions of the deferred dower

VARIABLES	(1) OLS Deferred dower	(2) OLS Deferred dower	(3) OLS Deferred dower	(4) OLS Deferred dower	(5) OLS Deferred dower	(6) OLS Deferred dower	(7) OLS Deferred dower
Husband Authority Index	-0.091***	-0.095***	-0.095***	-0.093***	-0.075**	-0.062**	-0.081***
	(0.029)	(0.032)	(0.031)	(0.030)	(0.028)	(0.028)	(0.023)
Wife's years of schooling		0.010	0.002	0.003	0.007	0.012	0.011
		(0.015)	(0.015)	(0.015)	(0.012)	(0.010)	(0.010)
Husb's years of schooling		0.030**	0.022*	0.024*	0.015	0.014	0.013
		(0.011)	(0.012)	(0.012)	(0.011)	(0.011)	(0.012)
Wife's mother's illiterate		-0.030	0.027	0.042	0.087	0.044	0.042
		(0.116)	(0.123)	(0.123)	(0.121)	(0.115)	(0.124)
Wife's father's illiterate		-0.364***	-0.339***	-0.338***	-0.342***	-0.327***	-0.341***
		(0.101)	(0.100)	(0.101)	(0.100)	(0.101)	(0.100)
Nb of children			0.088***	0.085***	0.081***	0.089***	0.074**
			(0.024)	(0.024)	(0.027)	(0.030)	(0.029)
Wife is a paid worker			-0.012	-0.002	-0.001	-0.069	-0.046
			(0.111)	(0.117)	(0.119)	(0.225)	(0.226)
Household wealth			0.203**	0.205**	0.215**	0.191**	0.202**
			(0.096)	(0.096)	(0.093)	(0.078)	(0.078)
Wife's age at marriage				-0.019	-0.017	-0.015	-0.011
				(0.012)	(0.013)	(0.012)	(0.011)
Kin marriage				-0.403***	-0.399***	-0.382***	-0.370***
				(0.070)	(0.073)	(0.071)	(0.078)
Nuclear arrangements				0.029	0.115	0.091	0.080
				(0.129)	(0.110)	(0.100)	(0.091)
Relative female crop index					1.180	0.302	0.135
					(1.153)	(1.019)	(0.934)
Average FLFP						-0.502	-0.609
						(0.848)	(0.819)
Divorce rate							-4.645
							(2.735)
Year of marriage		-0.009	0.005	0.005	0.003	0.000	-0.003
		(0.006)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Upper Egypt		0.481	0.505	0.540	0.191	0.269	0.868*
		(0.459)	(0.449)	(0.444)	(0.406)	(0.334)	(0.461)
Rural		0.048	0.110	0.119	0.084	-0.149	-0.027
		(0.226)	(0.210)	(0.200)	(0.150)	(0.147)	(0.171)
Geographic controls	N	N	N	N	Y	Y	Y
Economic controls	N	N	N	N	N	Y	Y
Cultural controls	N	N	N	N	N	N	Y
Observations	12,262	8,483	8,483	8,482	7,936	7,936	7,909
R-squared	0.079	0.082	0.085	0.090	0.117	0.135	0.146

Standard errors clustered at the Governorate level. Other geographic controls include distance to borders, indicators of soil quality, land suitability for agriculture, average precipitation and temperature. Economic controls consist in light density, GDP per capita, population size, population density, distance to nearest town, employment shares in agriculture, manufacturing, construction and public sectors, women's education and housing costs. Cultural controls include average marriage costs, prevalence of kin marriages, nuclear arrangements after marriage, divorce rates, percentage of Copts and the average share of grooms' sides' contribution to marriage costs. Detail on these variables and data sources are available in the Data Appendix.
*** p<0.01, ** p<0.05, * p<0.1
Source. ELMPS 2006 and 2012.

In the first column, we only introduce our key variable of interest, the husband authority index. Additional covariates are added sequentially in the subsequent columns. We see that there is a consistently significant negative relationship between the deferred dower and the husband authority norms. This relationship is robust to the inclusion of an extensive set of controls.

We next turn to the results from 2SLS estimations. The estimated coefficient in first-stage is reported

in Table 6.

Table 6: First Stage

VARIABLES	(1) First-stage HAI	(2) First-stage HAI	(3) First-stage HAI	(4) First-stage HAI	(5) First-stage HAI	(6) First-stage HAI	(7) First-stage HAI
Distance to the capital	0.050***	0.040***	0.040***	0.040***	0.035***	0.036***	0.034***
	(0.007)	(0.006)	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)
Wife's years of schooling		-0.002	-0.004	-0.004	-0.024	-0.024	-0.027*
		(0.036)	(0.038)	(0.037)	(0.023)	(0.018)	(0.016)
Husb's years of schooling		0.006	0.001	0.001	-0.005	-0.003	0.001
		(0.027)	(0.023)	(0.023)	(0.012)	(0.011)	(0.008)
Wife's mother's illiterate		0.454	0.482	0.488*	0.222	0.115	0.150
		(0.282)	(0.294)	(0.295)	(0.201)	(0.144)	(0.127)
Wife's father's illiterate		0.130	0.147	0.157	0.067	0.055	0.020
		(0.189)	(0.192)	(0.194)	(0.140)	(0.138)	(0.136)
Nb of children			0.036	0.035	0.023	0.031	-0.012
			(0.051)	(0.052)	(0.037)	(0.032)	(0.030)
Wife is a paid worker			-0.313	-0.266	-0.327*	-1.151**	-0.981**
			(0.287)	(0.310)	(0.186)	(0.476)	(0.459)
Household wealth			0.162	0.156	0.159	0.095	0.141
			(0.237)	(0.231)	(0.157)	(0.126)	(0.119)
Wife's age at marriage				-0.025	0.003	0.003	0.011
				(0.025)	(0.018)	(0.020)	(0.019)
Kin marriage				0.156	0.038	0.062	0.042
				(0.200)	(0.123)	(0.112)	(0.077)
Nuclear arrangements				0.324	0.420*	0.403**	0.245**
				(0.350)	(0.253)	(0.198)	(0.104)
Relative female crop index					-13.841***	-13.583***	-13.698***
					(3.469)	(3.507)	(3.530)
Average FLFP						-8.371***	-6.865***
						(3.068)	(2.090)
Divorce rate							-4.054
							(14.694)
Year of marriage		0.013	0.017	0.019	0.024***	0.024***	0.016**
		(0.014)	(0.017)	(0.016)	(0.008)	(0.007)	(0.007)
Upper Egypt		4.652**	4.684**	4.677**	4.126**	4.780***	6.141***
		(1.953)	(1.921)	(1.892)	(2.021)	(1.569)	(1.640)
Rural		2.092*	2.150*	2.182**	0.705	0.287	0.596
		(1.162)	(1.143)	(1.107)	(0.499)	(0.507)	(0.499)
Geographic controls	N	N	N	N	Y	Y	Y
Economic controls	N	N	N	N	N	Y	Y
Cultural controls	N	N	N	N	N	N	Y
Observations	12,262	8,483	8,483	8,482	7,936	7,936	7,909
IV F-Test	52.58	44.96	44.63	44.68	59.65	36.86	34.70
p-value	3.83e-07	1.23e-06	1.30e-06	1.29e-06	2.81e-07	7.72e-06	1.13e-05

Standard errors clustered at the Governorate level. Other geographic controls include distance to borders, indicators of soil quality, land suitability for agriculture, average precipitation and temperature. Economic controls consist in light density, GDP per capita, population size, population density, distance to nearest town, employment shares in agriculture, manufacturing, construction and public sectors, women's education and housing costs. Cultural controls include average marriage costs, prevalence of kin marriages, nuclear arrangements after marriage, divorce rates, percentage of Copts and the average share of grooms' sides' contribution to marriage costs. Detail on these variables and data sources are available in the Data Appendix.

*** p<0.01, ** p<0.05, * p<0.1

Source. ELMPS 2006 and 2012.

We see that distance to capital is a very strong positive predictor for husband authority across all specifications. Considering the most complete set of controls in Column (7), we see that moving away from the capital by 100km increases the husband authority index by 3.4 units. In other words, residing in the qism (the smallest geographic unit in term of public administration in Egypt, it reflects a municipality) the furthest away from Cairo, in the governorate of Aswan, increases husband authority norms by 29.1 units.

Table 7 below reports the second-stage estimation results.

The results of Table 7 reveal a large and robust negative impact of husband authority norms on the deferred dower. The estimated coefficient remains relatively stable across all specifications. On average, an increase in the husband authority index by 1 unit results in a decrease in the deferred dower by 23.6 percentage points. This implies that the deferred dower would be around 7.5 times lower if the husband authority norm of Cairo Governorate, where it is the lowest in the country, would reach the value of the Governorate of Qena, where it is the highest, holding all else constant. These results strongly support our main theoretical prediction (Prediction 1) implying a negative relationship between the strength of husband authority norms and divorce-contingent payments.

The IV estimate of the effect of ϕ is smaller (more negative) than the OLS estimate. This is consistent with the existence of unobserved economic opportunities that enter into threat points and conflate the measure of ϕ. This is also consistent with an estimate that becomes more negative as further controls are

Table 7: Second Stage

VARIABLES	(1) 2SLS Deferred dower	(2) 2SLS Deferred dower	(3) 2SLS Deferred dower	(4) 2SLS Deferred dower	(5) 2SLS Deferred dower	(6) 2SLS Deferred dower	(7) 2SLS Deferred dower
Husband Authority Index	-0.128***	-0.157***	-0.157***	-0.155***	-0.195***	-0.202***	-0.236***
	(0.030)	(0.032)	(0.032)	(0.031)	(0.039)	(0.050)	(0.060)
Wife's years of schooling		0.011	0.004	0.005	0.007	0.008	0.006
		(0.016)	(0.016)	(0.016)	(0.013)	(0.010)	(0.011)
Husb's years of schooling		0.031***	0.023**	0.024**	0.015	0.014	0.015
		(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Wife's mother's illiterate		-0.001	0.050	0.063	0.105	0.060	0.073
		(0.120)	(0.131)	(0.131)	(0.130)	(0.117)	(0.125)
Wife's father's illiterate		-0.313***	-0.290***	-0.290***	-0.309***	-0.301***	-0.321***
		(0.105)	(0.105)	(0.105)	(0.096)	(0.101)	(0.101)
Nb of children			0.099***	0.096***	0.086***	0.093***	0.071**
			(0.025)	(0.025)	(0.026)	(0.031)	(0.028)
Wife is a paid worker			-0.067	-0.057	-0.075	-0.325	-0.292
			(0.102)	(0.109)	(0.113)	(0.285)	(0.288)
Household wealth			0.194*	0.195*	0.209**	0.207**	0.232***
			(0.117)	(0.116)	(0.106)	(0.087)	(0.082)
Wife's age at marriage				-0.017	-0.013	-0.011	-0.006
				(0.011)	(0.012)	(0.012)	(0.012)
Kin marriage				-0.359***	-0.366***	-0.347***	-0.338***
				(0.081)	(0.075)	(0.078)	(0.087)
Nuclear arrangements				0.038	0.148	0.138	0.110
				(0.137)	(0.128)	(0.112)	(0.094)
Relative female crop index					-2.102	-2.637**	-2.860**
					(1.298)	(1.113)	(1.363)
Average FLFP						-2.696**	-2.626**
						(1.244)	(1.149)
Divorce rate							-6.291*
							(3.472)
Year of marriage		-0.009	0.006	0.006	0.003	0.002	-0.002
		(0.006)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Upper Egypt		1.152**	1.170**	1.194**	0.974*	1.004	1.983**
		(0.543)	(0.548)	(0.549)	(0.569)	(0.615)	(0.801)
Rural		0.226	0.283	0.290	0.181	-0.117	0.038
		(0.271)	(0.256)	(0.250)	(0.151)	(0.136)	(0.159)
Geographic controls	N	N	N	N	Y	Y	Y
Economic controls	N	N	N	N	N	Y	Y
Cultural controls	N	N	N	N	N	N	Y
Observations	12,262	8,483	8,483	8,482	7,936	7,936	7,909
R-squared	0.066	0.062	0.065	0.070	0.080	0.094	0.099

Standard errors clustered at the Governorate level. Other geographic controls include distance to borders, indicators of soil quality, land suitability for agriculture, average precipitation and temperature. Economic controls consist in light density, GDP per capita, population size, population density, distance to nearest town, employment shares in agriculture, manufacturing, construction and public sectors, women's education and housing costs. Cultural controls include average marriage costs, prevalence of kin marriages, nuclear arrangements after marriage, divorce rates, percentage of Copts and the average share of grooms' sides' contribution to marriage costs. Detail on these variables and data sources are available in the Data Appendix.

*** p<0.01, ** p<0.05, * p<0.1

Source. ELMPS 2006 and 2012.

added.

3.5 Further Predictions

We now turn to testing Predictions 2 and 3 of the model which pertain to the costs of divorce. Any characteristic that would tilt household consumption in favour of husbands (as with husband authority) will raise the deferred dower (unlike husband authority). This follows because such characteristics reduce the net benefit of separation for women (whereas stronger husband authority raises the net benefit).

In this sense, we should expect any variables that determine male to female outside economic opportunities to be positive determinants of the deferred dower (Prediction 2). We should expect these relative male to female measures to be positively correlated with husband authority norms but also positively correlated with the deferred dower.

To this end, we consider determinants such as suitability of male to female crops (as considered by Alesina et al. 2013). Male crops correspond to crops suitable for plough cultivation. Because of the high physical strength requirement of plough cultivation, men had a historical relative advantage in plough agriculture relative to women. Alesina et al. (2013) show that indicators of the geo-climatic suitability for growing crops differently prone to plough cultivation are good predictors of historical plough-use. We use similar indicators as proxies for the historical relative role of men in agriculture. We see that male crop suitability is a positive determinant of husband authority norms (Table 6) and also a positive determinant of the deferred dower (Table 7). In the same vein, we see that average female participation in paid work

by qism is negatively related to husband authority norms (Table 6) and also negatively related to the deferred dower (Table 7).

Note that the husband-wife gap in economic opportunities need not stem from external economic conditions. It could also arise because households differ in their optimal effort allocation, with some optimally devoting more effort to the household public good than others (due to productivities, preferences, etc.). If the number of children is taken to be a proxy for household good production, then those households with more children will have a greater husband-wife gap in economic opportunities on average and thus are predicted to have a greater deferred dower. This is indeed what we find in Table 7.

We should also expect that the deferred dower is decreasing in the relative male to female social costs of divorce (Prediction 3). To test this we use the argument that kin marriages are able to exert additional social sanctions on opportunistic husbands and provide more ready support to divorced wives (Weinreb (2008)). The prediction that τ is lower in kin marriages in borne out in Table 7. Related to this, we see that the deferred dower is negatively related to the overall divorce rate (Table 7).

We also examine other implications of the theory in the appendix. First, the theory predicts that a strengthening of husband authority norms will increase the prompt dower. Table 21 shows 2SLS estimates of the effect of HAI on the prompt dower. We see that the estimated effect is positive across all columns but that the effect is small and not statistically significant. To examine whether this is due to the confounding effects of other gender norms as anticipated, we also control for such norms in Table 22 where we see the effect becomes larger and statistically significant. The theory also predicts that husband authority norms will not affect the optimal effort allocation. We explore this in Table 23, where we find no statistically significant effect of HAI on wealth, the number of children, husband and wife schooling, or divorce rate. There appears to be an effect on whether the wife is a paid worker, however this is likely due to (unobserved) norms regarding working women that are correlated with husband authority norms.

3.6 Robustness Results

In this section we run a series of robustness exercises on our key results. First, it is important to note that there is a non-negligible percentage (approximately 13%) of zero values for the deferred dower. Tables 15 and 16 in the Data Appendix reproduce our baseline OLS and IV-regressions (Tables 5 and 7 in Section 3.4) using instead tobit and IV-tobit models. Our conclusions are not challenged by these alternative specifications.

An important challenge we face lies in our ability to effectively observe and measure the strength of husband authority norms. To address this concern, we first check alternative measures.

We begin by considering alternative indicators of gender norms available in the ELMPS. These include indices of wives' direct access to household money, their fear of disagreement with male members, restriction on their physical mobility, negative attitudes towards gender roles and opinions about domestic violence. The results from analogous IV-estimations using these alternative measures of male dominance norms are provided in Table 8 below.

We see that other indicators of women's lack of agency within the household (Columns 1 to 3) significantly decrease the deferred dower. The remaining two indices (Columns 4 and 5), which capture opinions regarding gender roles and domestic violence are also negatively related to the deferred dower but are not statistically significant. Our confidence in these results is tempered by a fairly weak first stage.

Second, we turn to alternative data sources for a measure of norms aggregated up to the Governorate level. In particular, we use the Demographic Health Survey (DHS) for Egypt (2005 and 2008), which is a nationally representative survey that interviews women between the ages of 15 and 49. The survey contains detailed information on relative male-to-female decision making within the household, attitudes towards domestic violence, as well as fertility preferences by gender and also attitudes towards female genital mutilation (a very common practice in Egypt). Analogous IV estimation results are presented in Table 9 below.

Table 8: 2SLS regressions of the deferred dower on other gender norms

VARIABLES	(1) 2SLS Deferred dower	(2) 2SLS Deferred dower	(3) 2SLS Deferred dower	(4) 2SLS Deferred dower	(5) 2SLS Deferred dower
Beating Justifications Index					-0.183
					(0.264)
Negative Attitudes Index				-0.715*	
				(0.385)	
No Mobility Index			-0.349***		
			(0.114)		
Afraid of disagreement		-0.181***			
		(0.050)			
No access to household money	-0.297***				
	(0.111)				
Full set of controls	Y	Y	Y	Y	Y
Observations	7,909	7,909	7,909	7,909	7,909
R-squared	-0.090	-0.046	-0.166	-0.737	-10.062
IV F-Test	6.018	8.179	5.916	5.294	0.384

Standard errors clustered at the Governorate level.
*** p<0.01, ** p<0.05, * p<0.1
Source. ELMPS 2006 and 2012.

Table 9: 2SLS regressions of the deferred dower on other HAI and other gender norms from DHS

VARIABLES	(1) 2SLS Deferred dower	(2) 2SLS Deferred dower	(3) 2SLS Deferred dower	(4) 2SLS Deferred dower	(5) 2SLS Deferred dower
Support female circumcision					1.424
					(2.383)
Ideal share of boys				-0.293***	
				(0.051)	
Beating Justifications Index (DHS)			-6.999		
			(4.404)		
No decision on the husband's money		-0.451			
		(0.371)			
Husband Authority Index (DHS)	-0.395***				
	(0.124)				
Full set of controls	Y	Y	Y	Y	Y
Observations	7,528	7,528	7,528	7,528	7,528
R-squared	-0.037	-1.459	-3.595	0.106	-12.976
IV F-Test	10.12	1.512	2.536	124	0.311

Standard errors clustered at the governorate level.
*** p<0.01, ** p<0.05, * p<0.1
Source. ELMPS 2006 and 2012.

Once more, the negative relationship between these gendered norms are the deferred dower are supported, though not all are statistically significant. An exception is support for female genital mutilation.

Another check we consider is to demonstrate that our key results are not sensitive to an equal-weighted HAI, that can be interpreted as the average percentage of decisions from which women are excluded (refer to Table 17 in the Data Appendix). We also estimate the deferred dower as a function of each individual decisions used to compute the HAI index separately. Table 18 in the Data Appendix demonstrates that they all have a significantly large negative impact on the deferred dower.

Of further importance is defining the geographic unit as the relevant dimension for gendered social norms. Indeed, there may be a great deal of heterogeneity within Governorates. We alternatively estimate the deferred dower as a function of husband authority norms (HAI) defined aggregated up from a smaller geographic unit, the qism, and also just use the individual level measures. The results from these estimations are reported in Table 19 in the Data Appendix. We see that our key relationship holds in these alternative specifications.

Measurement error in marriage payments due to recall bias may also be an issue. To address this, we provide analogous estimation results in Table 20 in the Data Appendix restricting our sample to marriages within 10 years of each survey round. Despite a significant reduction in the sample size, our results remain robust.

Finally, we confirm that our results are not sensitive to a potential relationship between other cultural norms and the deferred dower. In Table 10 below we include as controls alternative measures of gendered norms (as described above), derived from the ELMPS and DHS surveys. We also consider other measures of cultural norms constructed from the Afrobarometer Survey (2013) for Egypt, which capture measures of

attitudes towards women, trust, support of political Islam, and support of authoritarian regimes. We see that our key coefficient of interest on husband authority norms remains strong and significantly negative.

Table 10: 2SLS regressions of the deferred dower including other norms as additional controls

VARIABLES	(1) 2SLS Deferred dower [Other Payments]	(2) 2SLS Deferred dower [ELMPS]	(3) 2SLS Deferred dower [DHS]	(4) 2SLS Deferred dower [AfroBar]
Husband Authority Index	-0.253***	-0.360**	-0.603***	-0.317***
	(0.068)	(0.148)	(0.216)	(0.098)
Negative Attitudes on Women Index				0.074*
				(0.039)
Political Islam Index				-0.046
				(0.039)
Mistrust Index				-0.044
				(0.089)
Authoritarianism Index				0.011
				(0.033)
No decision on the husband's money			0.150***	
			(0.057)	
Beating Justifications Index			0.561**	
			(0.246)	
Ideal share of boys			0.354*	
			(0.186)	
Support female circumcision			0.118***	
			(0.042)	
No access to household money		0.129		
		(0.088)		
Afraid of disagreement		0.056		
		(0.046)		
No Mobility Index		-0.086		
		(0.059)		
Negative Attitudes Index		0.043		
		(0.051)		
Beating Justifications Index		-0.006		
		(0.005)		
Bride's transfers at marriage	-0.008			
	(0.034)			
Groom's transfers at marriage	0.437***			
	(0.072)			
Prompt dower	0.087***			
	(0.026)			
Groom's side's share	-1.406***			
	(0.433)			
Full set of controls	Y	Y	Y	Y
Observations	6,019	7,909	7,528	7,094
R-squared	0.128	0.058	0.087	0.058
IV F-Test	38.83	14.71	8.585	22.07

Standard errors clustered at the Governorate level.
*** p<0.01, ** p<0.05, * p<0.1
Source. ELMPS 2006 and 2012.

4 Conclusions

Traditional marriage institutions are built on two key aspects, placing constraints on husbands and gendered social norms. Marriage institutions help to resolve an inherent commitment problem arising from gender differences in the timing of contributions to the relationship. We explore how the functioning of marriage institutions is influenced by male dominance norms. Whilst existing research explores the role of outside options in shaping decision-making authority within households, we are instead interested in cultural norms. We present a simple theory that demonstrates how male dominance norms can ameliorate the commitment problem. Our model shows how the magnitude of the commitment problem corresponds to a divorce-contingent payment.

Exploiting an important feature of Muslim marriage contracts, the deferred dower, we can obtain a measure of divorce-contingent payments to test our model empirically. Using our models predictions, we are able to empirically distinguish between the role of male dominance norms and better relative outside options for men. The empirical results line up with the predictions of the model.

Appendix

A Data Appendix

A.1 The Husband Authority Index

Table 11: Relative weights of indicators of husband authority based on PCA (eigenvectors)

VARIABLES	First component
Large purchases	0.345
Daily purchases	0.378
Visits	0.439
Cooking	0.383
Own health	0.457
Buying own clothes	0.435

Source. ELMPS-2006 and 2012

A.2 Set of controls for economic opportunities

Our set of controls for economic opportunities are computed at the qism level from the ELMPS or external data sources using a Geographic Information Systems software. Local averages based on the ELMPS account for sampling weights and exclude the observation of the individual under study. Summary statistics on local characteristics are displayed in Table 12.

Table 12: Summary statistics on local characteristics

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
Soil- Rooting Conditions (index)	7,909	1.713	1.184	1	7
Soil- Terrain Slope (index)	7,909	95.64	5.177	75.32	99.86
Soil- Workability (index)	7,909	2.034	1.174	1	7
Land suitability (index)	7,909	0.0119	0.0142	0.00200	0.0920
Relative female crop index	7,909	0.0434	0.131	-0.457	0.343
Distance to borders (km)	7,909	103.1	58.26	3	214
Average precipitation 1950-2005 (ml)	7,909	101.1	31.34	70.78	211.5
Average temperature 1950-2005 (Celsius)	7,909	21.60	1.041	20.40	26.47
Light density in 1992	7,909	28.59	17.61	2.937	63
Gross product per capita (2000 USD)	7,909	3,786	738.2	2,374	7,180
Population size	7,909	3.758e+06	3.669e+06	4	1.074e+07
Travel-time to the nearest city (min)	7,909	75.77	45.68	23	474
Average female participation in paid work	7,909	0.155	0.0984	0	1.000
Local employment in the public sector	7,909	0.141	0.182	0	1
Local employment in agriculture	7,909	0.194	0.235	0	0.853
Local employment in manufacturing	7,909	0.0465	0.0655	0	1.000
Local employment in construction	7,909	0.0324	0.0408	0	0.775
Average level of women's years of schooling	7,909	6.689	2.498	0	15
Average housing costs (2000 EGP)	7,909	19,354	14,035	41.72	141,376
Average kinship marriages	7,909	0.298	0.148	0	1.000
Average nuclear arrangements	7,909	0.546	0.235	0	1.000
Average costs of marriage (2000 EGP)	7,909	24,760	9,135	4,934	131,240
Divorce rate in 2012	7,909	0.159	0.0560	0.0857	0.264
Percentage of Copts	7,909	5.187	4.910	0	17

Source. ELMPS 2006 and 2012.

Indicators of soil quality are derived from the FAO's Global Agro-Ecological Zones (GAEZ).[23] *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.

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

Land suitability for cultivation comes from the Global Land Use Database.[24]

Relative female crop index is derived from the difference between indices of female and male crops based on Alesina et al. (2013). They correspond respectively to indicators of "plough-negative" and "plough-positive" crops. Because of the high physical strength requirement of plough cultivation, men have a relative advantage in plough agriculture relative to women. Alesina et al. (2013) show that indicators of the geo-climatic suitability for growing crops differently prone to plough cultivation are good predictors of historical plough-use. They focus on a set of cereal crops similar in many dimensions but their degree of suitability to plough cultivation. Hence, *male crops* refers to a measure of the suitability of the land for the cultivation of "plough-positive" cereal crops that are rye, wheat and barley. Specifically, it is defined by the average value of crop suitability indexes[25] issued from the FAO's GAEZ dataset, over the maximum value of this index for any cereal crop of interest. We follow the same strategy to define *female crops*, based on "plough-positive" cereal crops that are sorghum and millet. In addition, with regards to the importance of cotton cultivation in Egyptian agriculture and women's role in cotton harvests (e.g., Toth, 1991), we include cotton in female crops. However, our results are not sensitive to its exclusion.

Distance to borders is obtained from the PRIO-GRID dataset[26] and gives the average of shortest distances in kilometer from the cell centroids of the qism of residence to the territorial outline of Egypt. From the same dataset, we compute the average of yearly total amounts of *precipitation* (in millimeter) and the average of yearly mean *temperatures* (in degrees Celsius) between 1950 and 2005.

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 archive begins 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.

Gross product per capita is obtained from the PRIO-GRID and measured in USD for the year 2000.[27]

Population size and the log of *population density* are obtained from the PRIO-GRID for the year 2000 and originally extracted from the Gridded Population of the World, version 3.

Travel-time to the nearest city is obtained from the PRIO-GRID and correspond to the travel time (in minutes) by land transportation to the nearest city of more than 50,000 inhabitants.

As indicators of men's and women's relative economic opportunities, we compute from the ELMPS the local rate of *women's participation in paid work*, local employment in the public sector, in the agricultural sector, in the manufacturing sector and in the construction sector (defined as the respective percentage of workers in these sectors among all workers) and *women's average year of schooling*, for each survey year. Agriculture, manufacturing and construction constitute more than 50% of workers. While more than half of agricultural workers are women, occupations in manufacturing and construction sectors are prominently occupied by men (respectively 84% and 99% of workers in these sectors). The public sector is the main employer of women paid workers, employing 60% of them.

Local *housing costs* correspond to average expenses in housing reported at marriage in the ELMPS

[24] Center for Sustainability and the Global Environment (SAGE), University of Wisconsin. Global Land Use Database. Available at http://nelson.wisc.edu/sage/data-and-models/global-land-use/index.php.

[25] We retain indexes for intermediate input level on current irrigated land.

[26] http://www.prio.no/CSCW/Datasets/PRIO-Grid/

[27] The original data comes from Nordhaus (2006). Detail on the methodology for Egyptian data are available at http://gecon.yale.edu/egypt.

and are expressed in 2000 EGP.

A.3 Set of controls for cultural norms

We want to capture marriage norms that may not be related to the inefficient divorce problem through the husband authority norm, but that may affect dower payments. To do so, we include the local *prevalence of kinship marriages*, *of nuclear arrangements* after marriage, the local *share of the groom's side's contribution* to total marriage costs (in percentage) and the local *average of total costs of marriage* (in 2000 EGP, excluding housing costs).

Local *divorce rates* correspond to the number of divorces divided by the number if marriages in 2012 by Governorate and obtained from CAPMAS Vital Statistics.

Local *percentage of Copts* are obtained from Mohamoud et al. (2013), who compute these estimates using the 2008 EDHS and the 2006 Population Census.

A.4 Other measures of social norms

From Egypt Labor Panel Market Surveys - No access to household money corresponds to the local percentage of women reporting that they don't have a direct access to household money in their hand to use. *Afraid of disagreement* corresponds to the local percentage of women reporting to be often or generally afraid of disagreeing with their husband or other males in their household. The *No mobility index* corresponds to the average number of destinations to which a woman need permission to go or cannot go alone, among which the local market, local health center of doctor, taking children to the health center or doctor, to the home of relatives or friends in the neighborhood. The *Beating Justifications Index* is the average number of situations for which domestic violence is justified, among which if the wife burns the food, if she wastes her husband's money, if she neglects the children, if she argues with him, if she refuses to have sex with him, and if she talks to other men. The *Negative Attitudes Index* is the average number of propositions in favor with gender equality with which women disagree or strongly disagree: "a woman's place is not only in the household but she should be allowed to work", "if the wife has a job outside the house then the husband should help her with the children", "if the wife has a job outside the house then the husband should help her in household chores", "Girls should go to school to prepare for jobs not just to make them good mothers and wives", "For a woman's financial autonomy, she must work and have earnings", "Women should continue to occupy leadership positions in society"; and if they agree or strongly agree with "A thirty year old women who has a good job but is not yet 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".

From Demographic and Health Surveys - The 2005 and 2008 rounds of DHS are part of a series of nationally representative population and health surveys that were conducted in Egypt. The survey was designed to allow for a good degree of representativeness at the Governorate level for the most populous regions of Egypt, the one we are also looking at (i.e., excluding Frontier Governorates) and most of its variables. Though its primary objective is to inform on the population's health, it also includes information on women's participation in household decisions and key information on gender unequal opinions and practices. As for norms based on the ELMPS, all indices issued from the DHS are based on Principal Components Analysis, whose detail is given in Table 13. We normalize these indices such that they vary from 0 to 100 and compute local weighted averages at the Governorate level.

Our index on *husband authority* is based on women's reported exclusion from four household decisions: health care for themselves, major household purchases, daily household needs, visiting their family or relatives.The index on *beating justifications* is computed from five propositions: if the wife goes out without telling her husband, if she neglects the children, if she argues with him, if she refuses to have sex

with him, and if she burns the food. We also compute the local percentage of women reporting that their husband decides alone on how to use their earnings (*No decision on the husband's money* and of women reporting that the practice of female circumcision should be continued (*Support female circumcision*). The *Ideal share of boys* correspond to local averages of the number of desired boys divided by the number of desired children, reported by women.

Table 13: Relative weights of indicators of other gender norms from DHS (eigenvectors)

INDEXES	Husband Authority		Beating justifications
	First components		First components
Large purchases	0.509	Goes out w/o telling	0.464
Daily purchases	0.464	Neglects children	0.474
Visits	0.524	Argues	0.469
Own health	0.502	Refuses sex	0.402
		Burns food	0.422
Observations	33,333		36,001
Eigenvalue	2.11		3.31
% of variance	52.77		66.30

Source. Authors' calculations based on DHS 2005 and 2008

From the Afrobarometer- Afrobarometer surveys are nationally representative surveys of citizens in the age of voting on their attitudes towards democracy, governance, economic and social issues. The computation of indices issued from the Afrobarometer follow the same procedure as with DHS and ELMPS. Results from the PCA are given in Table 14.

The index on *negative attitudes towards women* is based on seven variables: agreeing or strongly agreeing with "Men make better political leaders than women, and should be elected rather than women", with "Women have always been subject to traditional laws and customs, and should remain so", with "If funds for schooling are limited, a boy should always receive an education in school before a girl", disagreeing or strongly disagreeing with "Women and men should have equal work opportunities", with "A woman can become the prime minister or president of a Muslim state", with "Women's share of inheritance should be equal to that of men"; and with "Women and men should have equal rights in making a decision to divorce". 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 on 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 consider 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".

Table 14: Relative weights of indicators of other social norms from Afrobarometer (eigenvectors)

INDEXES	Negative attitudes		Political Islam		Mistrust		Authoritarianism
	First components		First components		First components		First components
(a)	0.414	(h)	0.572	(l)	0.577	(o)	0.358
(b)	0.359	(i)	0.460	(m)	0.620	(p)	0.272
(c)	0.288	(j)	0.590	(n)	0.532	(q)	0.262
(d)	0.433	(k)	0.337			(r)	0.369
(e)	0.444					(s)	0.337
(f)	0.305					(t)	0.427
(g)	0.373					(u)	0.375
						(v)	0.397
Observations	1,083		958		1190		955
Eigenvalue	2.60		1.50		1.97		2.13
% of variance	37.14		37.60		65.66		26.65

Source. Authors' calculations based on Afrobarometer 2013

A.5 Robustness tables

Table 15: Tobit regressions of the deferred dower

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		Tobit	Tobit	Tobit	Tobit	Tobit	Tobit	Tobit
EQUATION	VARIABLES	Deferred dower	Deferred dower	Deferred dower	Deferred dower	Deferred dower	Deferred dower	Deferred dower
model	Husband Authority Index	-0.103***	-0.107***	-0.107***	-0.105***	-0.085***	-0.071**	-0.092***
		(0.034)	(0.037)	(0.036)	(0.035)	(0.032)	(0.033)	(0.028)
	Wife's years of schooling		0.009	0.001	0.002	0.007	0.012	0.011
			(0.017)	(0.017)	(0.018)	(0.014)	(0.011)	(0.011)
	Husb's years of schooling		0.032**	0.024*	0.025*	0.015	0.013	0.013
			(0.013)	(0.013)	(0.013)	(0.013)	(0.012)	(0.013)
	Wife's mother's illiterate		-0.021	0.039	0.055	0.106	0.057	0.055
			(0.131)	(0.139)	(0.138)	(0.135)	(0.129)	(0.139)
	Wife's father's illiterate		-0.398***	-0.372***	-0.372***	-0.378***	-0.362***	-0.377***
			(0.118)	(0.116)	(0.117)	(0.116)	(0.117)	(0.116)
	Nb of children			0.102***	0.099***	0.094***	0.104***	0.087**
				(0.029)	(0.029)	(0.032)	(0.037)	(0.035)
	Wife is a paid worker			-0.012	0.000	0.003	-0.073	-0.045
				(0.122)	(0.129)	(0.130)	(0.258)	(0.258)
	Household wealth			0.213*	0.215*	0.224**	0.198**	0.213**
				(0.110)	(0.110)	(0.107)	(0.089)	(0.090)
	Wife's age at marriage				-0.021	-0.019	-0.017	-0.012
					(0.014)	(0.014)	(0.014)	(0.012)
	Kin marriage				-0.442***	-0.438***	-0.418***	-0.405***
					(0.081)	(0.085)	(0.082)	(0.089)
	Nuclear arrangements				0.021	0.118	0.091	0.079
					(0.149)	(0.125)	(0.113)	(0.103)
	Relative female crop index					1.314	0.323	0.128
						(1.310)	(1.167)	(1.090)
	Average FLFP (by qism)						-0.652	-0.753
							(0.990)	(0.959)
	Divorce rate							-5.191
								(3.260)
	Year of marriage		-0.007	0.009	0.009	0.006	0.003	0.000
			(0.007)	(0.009)	(0.009)	(0.010)	(0.009)	(0.009)
	Upper Egypt		0.532	0.555	0.592	0.221	0.310	0.997*
			(0.526)	(0.515)	(0.509)	(0.456)	(0.379)	(0.536)
	Rural		0.055	0.119	0.125	0.088	-0.178	-0.037
			(0.256)	(0.237)	(0.227)	(0.172)	(0.168)	(0.194)
sigma	Constant	3.064***	2.990***	2.985***	2.977***	2.971***	2.939***	2.917***
		(0.283)	(0.260)	(0.258)	(0.258)	(0.270)	(0.264)	(0.254)
	Observations	12,262	8,483	8,483	8,482	7,936	7,936	7,909

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 16: IV-Tobit regressions of the deferred dower

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
		IV-Tobit	IV-Tobit	IV-Tobit	IV-Tobit	IV-Tobit	IV-Tobit	IV-Tobit
EQUATION	VARIABLES	Deferred dower	Deferred dower	Deferred dower	Deferred dower	Deferred dower	Deferred dower	Deferred dower
Deferred_dower	Husband Authority Index	-0.144***	-0.176***	-0.176***	-0.173***	-0.220***	-0.229***	-0.268***
		(0.035)	(0.037)	(0.037)	(0.037)	(0.047)	(0.060)	(0.072)
	Constant	9.576***	23.213*	-10.109	-10.706	-11.397	-3.974	14.302
		(0.703)	(13.639)	(18.504)	(18.164)	(23.918)	(23.489)	(19.949)
Husband Authority Index	Constant	13.282***	-14.800	-23.036	-26.378	-44.954*	-48.270**	-20.048
		(1.439)	(25.889)	(32.906)	(31.940)	(27.179)	(20.729)	(23.504)
alpha	Constant	0.143***	0.170***	0.169***	0.167***	0.244***	0.253***	0.271***
		(0.038)	(0.047)	(0.047)	(0.047)	(0.076)	(0.081)	(0.092)
lns	Constant	1.102***	1.079***	1.077***	1.075***	1.071***	1.063***	1.055***
		(0.095)	(0.089)	(0.088)	(0.089)	(0.091)	(0.091)	(0.089)
lnv	Constant	1.532***	1.390***	1.389***	1.388***	1.207***	1.175***	1.135***
		(0.132)	(0.121)	(0.121)	(0.121)	(0.103)	(0.093)	(0.083)
	Observations	12,262	8,483	8,483	8,482	7,936	7,936	7,909

Standard errors clustered at the governorate level.
*** p<0.01, ** p<0.05, * p<0.1
Source. ELMPS 2006 and 2012.

Table 17: 2SLS regressions of the deferred dower on an equal-weighted HAI

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
VARIABLES	Deferred dower	Deferred dower	Deferred dower	Deferred dower	Deferred dower	Deferred dower	Deferred dower
Husband Authority Index (w/o PCA)	-0.124***	-0.152***	-0.152***	-0.150***	-0.193***	-0.196***	-0.228***
	(0.028)	(0.030)	(0.030)	(0.030)	(0.039)	(0.049)	(0.058)
Observations	12,262	8,483	8,483	8,482	7,936	7,936	7,909
R-squared	0.065	0.059	0.062	0.068	0.075	0.093	0.099

Standard errors clustered at the governorate level.
*** p<0.01, ** p<0.05, * p<0.1
Source. ELMPS 2006 and 2012.

Table 18: 2SLS regressions of the deferred dower on individual (local average) decisions

	(1)	(2)	(3)	(4)	(5)	(6)
	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
VARIABLES	Deferred dower	Deferred dower	Deferred dower	Deferred dower	Deferred dower	Deferred dower
The wife buying clothes						-0.341**
						(0.155)
The wife's health					-0.360***	
					(0.126)	
Cooking				-0.302***		
				(0.081)		
The wife's visits to friends/relatives			-0.301***			
			(0.100)			
Daily purchases		-0.104***				
		(0.015)				
Large purchases	-0.239***					
	(0.092)					
Constant	12.166	17.349	3.456	27.428	19.620	31.122*
	(17.703)	(16.585)	(24.476)	(16.746)	(20.532)	(17.373)
Full set of controls	Y	Y	Y	Y	Y	Y
Observations	7,909	7,909	7,909	7,909	7,909	7,909
R-squared	-0.083	0.164	-0.145	0.062	-0.076	-0.051
IV F-Test	14.50	28.29	13.32	20.64	19.37	11.14

Table 19: 2SLS regressions of the deferred dower on other dimensions of the HAI

	(1)	(2)
	2SLS	2SLS
VARIABLES	Deferred dower	Deferred dower
Husband authority index (ind)		-0.265***
		(0.102)
Husband authority index (qism)	-0.262***	
	(0.086)	
Observations	7,909	7,770
R-squared	-0.057	-5.721
IV F-Test	23.52	12.53

Standard errors clustered at the governorate level.
*** p<0.01, ** p<0.05, * p<0.1
Source. ELMPS 2006 and 2012.

Table 20: 2SLS regressions of the deferred dower for marriages within 10 years before the survey

	(1) 2SLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS	(6) 2SLS	(7) 2SLS
VARIABLES	Deferred dower	Deferred dower	Deferred dower	Deferred dower	Deferred dower	Deferred dower	Deferred dower
Husband Authority Index	-0.132***	-0.156***	-0.154***	-0.152***	-0.179***	-0.192***	-0.227***
	(0.030)	(0.034)	(0.034)	(0.033)	(0.041)	(0.051)	(0.061)
Observations	7,477	4,811	4,811	4,811	4,486	4,486	4,462
R-squared	0.083	0.077	0.081	0.085	0.108	0.119	0.122
IV F-Test	51.65	44.25	44.19	43.99	58.70	36.81	33.68

Standard errors clustered at the governorate level.
*** p<0.01, ** p<0.05, * p<0.1
Source. ELMPS 2006 and 2012.

Table 21: 2SLS regressions for Prompt dower

	(1) 2SLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS	(6) 2SLS	(7) 2SLS
VARIABLES	Prompt dower	Prompt dower	Prompt dower	Prompt dower	Prompt dower	Prompt dower	Prompt dower
Husband Authority Index	0.071**	0.049	0.047	0.047	0.025	0.029	0.027
	(0.029)	(0.043)	(0.042)	(0.043)	(0.043)	(0.046)	(0.046)
Wife's years of schooling		-0.026**	-0.017	-0.015	-0.010	-0.000	-0.007
		(0.012)	(0.013)	(0.013)	(0.012)	(0.011)	(0.010)
Husb's years of schooling		-0.019	-0.013	-0.013	-0.013	-0.012	-0.015
		(0.014)	(0.013)	(0.014)	(0.011)	(0.011)	(0.011)
Wife's mother's illiterate		0.018	-0.043	-0.047	0.074	0.015	-0.011
		(0.158)	(0.161)	(0.164)	(0.136)	(0.140)	(0.144)
Wife's father's illiterate		-0.026	-0.052	-0.058	-0.072	-0.080	-0.079
		(0.131)	(0.129)	(0.130)	(0.135)	(0.130)	(0.138)
Nb of children			0.054	0.054	0.074	0.052	0.053
			(0.051)	(0.051)	(0.050)	(0.049)	(0.051)
Wife is a paid worker			-0.036	-0.043	-0.095	-0.242	-0.057
			(0.135)	(0.127)	(0.128)	(0.294)	(0.293)
Household wealth			-0.191	-0.186	-0.204*	-0.170	-0.088
			(0.129)	(0.126)	(0.106)	(0.121)	(0.098)
Wife's age at marriage				0.001	-0.001	0.002	0.007
				(0.016)	(0.015)	(0.016)	(0.015)
Kin marriage				-0.061	-0.009	-0.001	0.043
				(0.129)	(0.141)	(0.144)	(0.126)
Nuclear arrangements				-0.145	-0.114	-0.065	0.044
				(0.157)	(0.134)	(0.139)	(0.121)
Relative female crop index					2.856**	2.503*	2.935**
					(1.424)	(1.406)	(1.484)
Average FLFP (by qism)						0.946	1.658
						(1.467)	(1.416)
Divorce rate							-11.675**
							(5.217)
Year of marriage		-0.081***	-0.077***	-0.076***	-0.073***	-0.076***	-0.078***
		(0.015)	(0.018)	(0.018)	(0.017)	(0.017)	(0.017)
Upper Egypt		0.081	0.048	0.037	0.579	0.243	1.098**
		(0.674)	(0.666)	(0.658)	(0.822)	(0.754)	(0.526)
Rural		0.796**	0.717**	0.688*	0.771***	0.358	0.426
		(0.365)	(0.344)	(0.353)	(0.280)	(0.276)	(0.282)
Geographic controls	N	N	N	N	Y	Y	Y
Economic controls	N	N	N	N	N	Y	Y
Cultural controls	N	N	N	N	N	N	Y
Region FE	N	Y	Y	Y	Y	Y	Y
Observations	10,865	7,276	7,276	7,275	6,906	6,906	6,882
R-squared	0.017	0.114	0.115	0.115	0.140	0.155	0.177
IV F-Test	53.01	48.55	48.14	48.12	59.36	37.52	37.67

Standard errors clustered at the governorate level.
*** p<0.01, ** p<0.05, * p<0.1
Source. ELMPS 2006 and 2012.

Table 22: 2SLS regressions for Prompt dower with Norms Controls

	(1) 2SLS	(2) 2SLS	(3) 2SLS	(4) 2SLS	(5) 2SLS	(6) 2SLS	(7) 2SLS
VARIABLES	Prompt dower	Prompt dower	Prompt dower	Prompt dower	Prompt dower	Prompt dower	Prompt dower
Husband Authority Index	0.109***	0.099**	0.097**	0.098**	0.065**	0.084**	0.116***
	(0.031)	(0.041)	(0.040)	(0.040)	(0.031)	(0.034)	(0.037)
Negative Attitudes Index	-8.089*	-13.035***	-12.824***	-12.850***	-11.654***	-11.762***	-13.912***
	(4.703)	(4.523)	(4.514)	(4.502)	(3.051)	(3.217)	(3.390)
Beating Justifications Index	-0.661**	-0.905***	-0.916***	-0.913***	-1.318***	-1.281***	-1.094***
	(0.318)	(0.335)	(0.333)	(0.335)	(0.321)	(0.286)	(0.212)
Afraid of disagreement	1.081	-0.085	-0.091	-0.144	2.678	1.832	-0.037
	(2.233)	(2.711)	(2.690)	(2.705)	(2.011)	(1.818)	(2.164)
No Mobility Index	-4.771	-4.902	-4.781	-4.730	-4.834**	-6.042***	-3.568
	(3.146)	(3.409)	(3.338)	(3.323)	(2.055)	(2.274)	(2.653)
Constant	5.360***	167.643***	157.225***	156.111***	142.311***	156.553***	167.144***
	(1.864)	(30.343)	(36.738)	(36.460)	(34.060)	(34.121)	(34.795)
Observations	10,865	7,276	7,276	7,275	6,906	6,906	6,882
R-squared	0.029	0.140	0.142	0.142	0.175	0.187	0.196
IV F-Test	25.57	31.88	31.69	31.54	53.27	35.65	42.83

Standard errors clustered at the governorate level.
*** p<0.01, ** p<0.05, * p<0.1
Source. ELMPS 2006 and 2012.

Table 23: 2SLS: HAI and other Outcomes

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Household wealth	Nb of children	Wife is a paid worker	Wife's years of schooling	Husb's years of schooling	Divorce rate
Husband Authority Index	0.003	-0.003	-0.005**	-0.004	0.022	-0.001
	(0.004)	(0.007)	(0.002)	(0.019)	(0.022)	(0.001)
Observations	8,121	8,121	8,121	8,121	8,121	8,121
R-squared	0.476	0.459	0.643	0.610	0.500	0.796
Full set of controls	Y	Y	Y	Y	Y	Y
IV F-Test	34.49	34.62	37.21	34.08	34.57	35.92

Standard errors clustered at the Governorate level.
*** p<0.01, ** p<0.05, * p<0.1
Source. ELMPS 2006 and 2012.

B Model Details and Proofs

B.1 Optimal Efforts: Details

As mentioned in the text, the effort allocation $\mathbf{e} = \{e_{m1}, e_{f1}\}$ fully determines Y_1, Y_2, and H_1 (and $H_2 = 0$):

$$\begin{aligned} H_1 &= (1 - e_{m1}) \cdot h_{m1} + (1 - e_{f1}) \cdot h_{f1} \\ Y_1 &= e_{m1} \cdot w_{m1} + e_{f1} \cdot w_{f1} \\ Y_2 &= w_{m1} \cdot (1 + \mu_m \cdot e_{m1}) + w_{f1} \cdot (1 + \mu_f \cdot e_{f1}). \end{aligned}$$

It follows then that the total household 'output' is given by:

$$\begin{aligned} Q(\mathbf{e}) = 2 \cdot v\left((1 - e_{m1}) \cdot h_{m1} + (1 - e_{f1}) \cdot h_{f1}\right) + w_{m1} + w_{f1} \\ + [w_{m1} \cdot (1 + \mu_m)] \cdot e_{m1} + [w_{f1} \cdot (1 + \mu_f)] \cdot e_{f1} \end{aligned}$$

Assume women have a comparative advantage in home production:

$$\frac{h_{m1}}{w_{m1} \cdot (1 + \mu_m)} < \frac{h_{f1}}{w_{f1} \cdot (1 + \mu_f)}.$$

This is sufficient to ensure that $e^*_{1f} < e^*_{1m}$. If we further assume

$$\frac{h_{f1}}{w_{f1} \cdot (1 + \mu_f)} < \frac{1}{2 \cdot v'(h_{f1})},$$

then the solution will involve men allocating effort only to earning income and women allocating effort to both activities:

$$\begin{aligned} e^*_{m1} &= 1 \\ 2 \cdot v'((1 - e^*_{f1}) \cdot h_{f1}) \cdot h_{f1} &= w_{f1} \cdot (1 + \mu_f). \end{aligned}$$

The value of e^*_{f1} is increasing in w_{f1} and μ_f. The effect of h_{f1} is ambiguous in general.

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