



# Pre-marital confinement of women: A signaling and matching approach



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## ABSTRACT

Parents in several cultures ‘discipline’ their daughters to inculcate the supposedly feminine virtues and improve their prospects in the marriage market. This process invariably involves imposing restrictions on their behavior, movement, and social relations. We refer to such practices as pre-marital confinement and provide a unified game-theoretic framework which encompasses the different arguments that have been advanced by social scientists to explain pre-marital confinement. The proposed framework views confinement by parents as an intrinsically valueless or valuable signal of some unobservable characteristic of their daughters which is valued by men in the marriage market. We focus on identifying the conditions that lead to a societal norm of confinement. We also show that, behind a veil of ignorance where gender is unknown, agents will choose to prohibit rather than permit confinement if it is intrinsically valueless and the parameters characterizing the society are such that the ex-post equilibrium would involve pooling.

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## 1. Introduction

Women have been expected to play a subservient role to men during a significant part of our history. In this paper we focus on the pre-marital confinement of unmarried women where confinement will be broadly interpreted as restrictions regarding their behavior and social relations which may be either self-imposed or dictated by their parents.

Pre-marital confinement of women has taken various forms across space and time. Seclusion remains a fact of daily life for millions of girls in various parts of the world even today. Depending upon the region, about 50–80% of women in China underwent footbinding around mid-eighteenth century (Levy, 1966). It is estimated that the number of women living in various parts of Africa who have undergone genital mutilation (FGM) exceeds 100 million.

One of the major aims of confinement, irrespective of the particular form, is to control the premarital sexual behavior of women and improve their prospects in the marriage market. For example, Mackie

(1996) summarizes the views of sociologists regarding footbinding and FGM by stating that “[B]oth customs are nearly universal where practiced...control sexual access to females and ensure female chastity and fidelity...seem to have a past of contagious diffusion...are believed to be sanctioned by tradition and necessary for proper marriage and family honor.”

Edlund and Korn (2002, pp. 208–209) capture these ideas succinctly with the remark that “...women have suffered seclusion, bound feet, and mutilation as a result of inability to commit to fidelity.” It is crucial to note that potential husbands would want the commitment of fidelity. However, it used to be the parents who would bind the feet of their daughters in China (Dorothy, 2005), and it is primarily young unmarried girls who have to undergo FGM under the supervision of their parents.

The timing and motivation of instruments that qualify as pre-marital confinement are consistent with the claim that they may serve either as an intrinsically valueless or valuable *signal* of some trait of a woman that men perceive to be correlated with the likelihood that she will remain fidel after marriage. However, the likelihood that a woman will remain fidel after marriage is hard to estimate. If men care about post-marital fidelity of their prospective wives, then they would value other attributes in women that *they believe* are correlated with the likelihood of post-marital fidelity. For ease of exposition, we shall use the term

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*docility* to refer to all such attributes and assume that parents find it relatively easier to confine their daughters if they are relatively more docile. The reader may bear in mind the dictionary description of docility: ‘easily managed or handled’, and ‘readily trained or taught.’<sup>1</sup>

Our key underlying assumption is that, *ceteris paribus*, men would prefer to spend resources on their ‘own’ children. Therefore, men would prefer those women as marriage partners who are more likely to remain fidel ([Dickemann, 1981](#); [Ortner, 1978](#); [Posner, 1992](#)). The additional underlying assumption is that men may lack precise information about some *characteristics* of women which they believe are correlated with the likelihood of post-marital fidelity and use pre-marital behavior of women to make inferences about their likelihood of post-marital fidelity (and thus their desirability as a marriage partner).<sup>2</sup> We set up a model where parents confine their daughters to signal how obedient their daughters are going to be to their future husbands.

The paper argues that pre-marital confinement of women can be understood as an equilibrium outcome of a *signaling and matching* game between (parents of) women and men where confinement acts either as an intrinsically valuable or valueless signal of a woman’s unobservable type. The *baseline* model involves two types of women (docile and non-docile) and two types of men (rich and poor). Men, irrespective of their wealth, are assumed to prefer a docile woman over a non-docile woman as a marriage partner. We assume that there is an excess supply of men and the match between any man and any woman generates a strictly positive net surplus. Further, in the baseline model, confinement is assumed to act purely as a signal and men do not value it directly.

Our baseline model involves nature first determining the type of each woman and this information is privately held by her family. Parents, knowing the type of their daughters, choose a level of confinement for their daughters. Cost of confinement depends on the type of the daughter and marginal costs of confinement are relatively higher for parents with non-docile daughters. Men update their common prior beliefs regarding the type of each woman after observing her level of confinement. A marriage market then ensues where transfers are possible (both to and from men). We shall refer to the first stage of the game, involving confinement choices by parents and belief updating by men, as the *signaling stage*. The confinement levels of women and the updated beliefs of men regarding the type of each woman serve as the input in the *matching stage* that follows. The equilibrium for the overall game combines elements of a non-cooperative solution concept (*sequential equilibrium*) for the signaling stage and a cooperative solution concept for the matching stage (*stability*).<sup>3</sup> We employ the D1 refinement ([Cho and Kreps, 1987](#)) to restrict the set of equilibria.

The stable matching between men and women in every equilibrium is positively assortative with respect to the wealth of men and

posterior beliefs about women. The equilibrium confinement levels may lead to (i) a *pooling* equilibrium where all women have the same level of confinement, (ii) a *semi-pooling* equilibrium where docile women have a strictly positive level of confinement and non-docile women mimic the choice of docile ones with some probability, or (iii) a *separating* equilibrium where docile women have a strictly positive level of confinement and non-docile women have a relatively lower level of confinement. We interpret a common level of confinement as representing a social *norm* regarding the behavior of women prior to marriage. Such an outcome materializes with certainty whenever a pooling equilibrium exists and probabilistically when a semi-pooling equilibrium exists. A detailed comparative statics analysis is conducted with a special emphasis on identifying the conditions that lead to a social norm of confinement.

We then extend the baseline model in two directions. The first assumes confinement acts as an intrinsically *valuable* signal which, under complete information, reduces to the case where confinement acts purely as a pre-marital investment. In the second, confinement of a woman imposes *externalities* on others. Confinement can generate externalities if peer-pressure influences the choice of confinement and we show that it generally increases the likelihood of observing a norm of confinement.

The present paper is broadly related to two distinct literatures. We add to the emerging theoretical literature on signaling-and-matching ([Hopkins, 2012](#); [Hoppe et al., 2009](#)) by providing a complete characterization of the symmetric equilibrium in a model with finite number of agents when transfers in the matching stage are possible. The analysis of peer-pressure in such a setting is also unique to our paper. The models presented in the paper can thus be meaningfully adapted to investigate other phenomena where signaling precedes matching. Labor markets with finite sets of agents are an obvious domain (for example, the market for CEOs). The paper also relates to the literature on women rights and economic development ([Doepke et al., 2012](#)) by highlighting that pre-marital confinement is expected to be low when the available modes of production in a society are such that female labor is valued beyond the household.

Before proceeding we would like to remark that, from a methodological perspective, we are interested in a *positive* theoretical analysis of pre-marital confinement using assumptions that can be empirically validated to some extent. We do not seek to provide a normative justification for the various manifestations of confinement. In this sense, the present paper shares similar goals as evident in the work of [Akerlof \(1976\)](#) on the persistence of caste based discrimination and the work of [Fogel and Engerman \(1974\)](#) on the economic viability of slavery. In fact, we shall show that behind a veil of ignorance where gender is unknown, agents will choose to prohibit rather than permit confinement if it is intrinsically valueless and the parameters characterizing the society are such that the ex-post equilibrium would involve pooling. This suggests that if confinement acts purely as a signal then it is welfare reducing in precisely those societies where it is a norm.

## 2. The baseline model

Let there be  $m$  number of men and  $w$  number of women. We assume that there are two types of men—poor men with wealth  $L > 0$  and rich men with wealth  $H > L$ . The number of rich men is  $h < m$ . Each woman may be of two types—docile (type- $d$ ) or non-docile (type- $n$ ). Our first assumption is as follows.

$$\text{Excess supply of men : } m > w > h \geq 1. \quad (\text{A1})$$

The number of men exceeds that of women but there are more women than rich men. Men will thus compete for women because women are in short supply. At the same time, women compete for

<sup>1</sup> [Fisman et al. \(2006\)](#) conduct a speed dating experiment and conclude that “...on average men do not value intelligence or ambition in women when it exceeds their own; moreover, a man is less likely to select a woman whom he perceives to be more ambitious than he is.” Some men probably entertain the belief that more intelligent and ambitious women are not likely to be ‘easily managed or handled.’

<sup>2</sup> There is ample evidence that men use the information regarding pre-marital sexual behavior of women in evaluating their desirability as a long-term partner even in contemporary western societies ([Crawford and Popp, 2003](#); [Fromme and Emihovich, 1998](#); [Oliver and Sedikides, 1992](#)). Further, [Thompson \(1989\)](#) finds that girls realize this, draw fine lines as to what constitutes good and bad behavior, and often use these to orient themselves as ‘good’ rather than ‘easy’ girls. These findings are consistent with, if not direct evidence for, the claim that men are concerned about the post marital fidelity of their partner; and girls realize that in order to be considered for a long term relationship they need to signal that they are of the ‘good’ type. Moreover, the usage of the term ‘good’ seems equivalent to ‘likely to remain fidel.’

<sup>3</sup> [Cole et al. \(1992\)](#) introduced this *hybrid* solution concept in games of complete information. [Hopkins \(2012\)](#) extends it to analyze games of asymmetric information.

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