

Women's Liberation: What Was in It for Men?*

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Abstract

Women's rights are closely related to economic development. This is true both across countries, where women have most rights in the richest countries, and in time series data: women have slowly improved their legal position in parallel with fast improvements in the standard of living. In most cases, the initial extension of rights to women amounted to a voluntary renouncement of power by men. In this paper, we investigate the economic incentives for men to share power with women. We show that men may want to voluntarily relinquish some of their power once technological change increases the importance of human capital. The reason is that men face a trade-off between how they would ideally like to treat their own wives and how they want other women to be treated. While men might want little rights for their own wives, they may prefer their daughters to have a better bargaining position with future husbands. In addition, a wife's education matters for producing high-quality children. A husband prefers his children to find high-quality mates, and therefore stands to gain from increasing the power of his children's mothers-in-law.

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1 Introduction

“Once married, a bride was obliged by law and custom **to obey her husband** – a requirement so fundamental to the biblical idea of a wife that it remained in most Jewish and Christian wedding vows until the late twentieth century. After all, **wives were considered a husband’s “property,”** alongside his cattle and his slaves.”

Marilyn Yalom, *A History of the Wife* (2001)

Prior to 1850, married women had essentially no rights in the United States. In 1848, a group of women met at the famous Seneca Falls meeting. In the *Declaration of Sentiments*, Elizabeth Cadey Stanton carefully enumerated areas of life where women were treated unjustly. For example, married women had no property rights. Husbands had legal power over and responsibility for their wives to the extent that they could imprison or beat them with impunity. And women had no right to vote. Women who fought for Women’s Rights during the late 19th century saw the right to vote as a means to eventually achieve other reforms benefiting women.

Similarly, in England, married women had little rights of their own until the 20th Century. In 1855, Caroline Norton published her most important pamphlet: “A Letter to the Queen on Lord Chancellor Cranworth’s Marriage and Divorce Bill,” in which she reviewed the position of married women under English law. A married woman had no legal existence whether or not she was living with her husband. Her property was his property, she could not make a will, and she usually could not obtain divorce.¹

Today, women in Europe, the U.S. and many other countries have acquired the same rights as men. Gender inequality seems to be disappearing with development. It seems that as countries get richer they are gradually extending rights to their female population. This apparent connection between economic development and women’s rights is also visible when comparing developed with less

¹See also Stone (1977) for a description of the legal impotence of wives in sixteenth and seventeenth century England.

developed countries today. Cross-country data shows a strong positive correlation between several measures of “female rights” and GDP per capita. Even within a country, more educated and richer men appear to have more positive attitudes towards women.

Yet, we have little understanding of the channels and mechanisms, or even the direction of causality (if any).² It is sometimes argued that more rights for women lead to a more efficient allocation of resources and thereby ultimately contributes to economic development. Several papers have found such an effect in micro data from developing countries (e.g. Fortman, Antinori, and Nobane (1997), Udry (1996), and Goldstein and Udry (2005)). Other people have documented instances where development seems to be causing gender equality (e.g. Munshi and Rosenzweig (2006)). In this paper, we argue that both directions of causality happen simultaneously. The basic idea is that an increase in the return to human capital will lead men to want women to have more rights precisely because women will make the better investments in children, which will then accelerate growth.

Women’s rights is a relatively broad term, and the list of rights that women have historically lacked is long: during marriage, women typically ceased to exist as a legal entity. This meant that they were not allowed to own property, that their own earnings were property of their husband, they were severely restricted in their ability to divorce and they lacked formal rights to their children. Even single women did not enjoy full rights historically. The right to vote is a particularly important right, and one that the American women’s movement during the 19th century largely focused on hoping that it would pave the way to other rights. The frontrunner in granting women the right to vote was Sweden who granted municipal suffrage to tax-paying widows and spinsters in 1863 (Ray (1918)). The first country that extended full suffrage to all women was New Zealand in 1893. Australia joined them in 1902, and for the most part, this trend then moved around Europe, eventually including the United States in 1920. Many more countries joined after the second world war. Most recently, Kuwait granted the right to vote to its women in 2005. Several countries in the Middle East still do not allow

²Duflo (2005) provides an excellent survey of various hypothesis brought forth in the literature.

women to vote.³ Despite trends and influence from other countries, however, each country pro-actively extended a right to women that had the capacity to alter the dynamics of various social, political, and economic spheres. Note that it is always men who have to approve this change and thereby give up some of their political power. In this paper we examine the incentives for men to extend right to vote to women.

The channel we investigate in this paper is related to the fact that many laws that put constraints on women did so for *married* women, but not single women. This suggests that husband's were benefitting from these constraints. It seems quite plausible that a husband prefers to keep his wife's outside option low because this will give him a better bargaining position with his wife.⁴ This hypothesis is supported by some of the arguments made by the anti-suffrage movement. People were concerned about the threat to families if women gained the right to vote (e.g. Orestes Brown, a prominent protestant minister, argued in 1873 that the family would fall apart as soon as women were allowed to enter the public sphere). Why, then, would men ever agree to grant more rights to women?

The idea put forth in this paper is that there is a trade-off between what rights men want for their daughters relative to their wives. We interpret rights broadly here and model it as a bargaining parameter in marriage. That is, women without rights have no bargaining power relative to their husband, while full rights will be captured through equal bargaining power. Men ideally want their wives to have no rights, while they do want full rights for their daughters. We assume that rights are extended by law and thus will affect all women (i.e. daughters and wives) equally. If daughters have no rights, then their future husbands will treat them poorly, which fathers of daughters would like to avoid. In addition, a wife's education matters for producing high-quality children. A husband prefers his children to find high-quality mates, and therefore stands to gain from increasing the power of his children's mothers-in-law. If men can vote on the extent of

³See Wikipedia (2006) for a time line of all countries.

⁴For the case of England, Stone (1993) documents carefully why divorce was not a meaningful outside option for women. Women suing for separation would almost surely bring extreme financial hardship upon themselves, they would lose control, and in many cases even contact with their children, and finally they would face extreme public embarrassment as the only grounds for divorce were extreme cruelty or adultery of which the details would be discussed in court.

women's rights, they will vote to give them rights just enough to equalize the marginal loss from rights to their wife with the marginal benefit from rights to other men's wives (daughters and mothers-in-law of own children etc.). We argue that this trade-off changes over time, because of an increasing importance of human capital. More specifically, as returns to human capital increase, the efficiency loss from under-investment in human capital increases. Eventually, men will benefit from voting for full rights for all women.

Alternative Explanations

Bertocchi (2007) presents an argument for the extension of suffrage to women based on changes in the labor market. The idea is that the process of development narrows the gender wage gap, which reduces disagreement about the optimal tax rate between men and women. While this is an interesting idea, we do not find it particularly plausible for the changes of the 19th century, a period in which most women did not engage in market work. Clark (2005) mentions an idea that is similar to ours briefly and only verbally. Another somewhat related story is advanced in Geddes and Lueck (2002). The authors argue that as wealth increases, women's rights will expand because the incentives under "self-ownership" to use wealth efficiently are greater than when controlled by their husband.⁵ The authors also argue that as market wages increase, women's rights will expand because the gain from shifting women's time from homework to human-capital accumulation and market work is increasing. We do not find this idea very plausible because the timing seems wrong. Most rights were extended *before* women entered the labor force in large numbers. For example, only 5% of married women worked in the market in 1920 the year in which federal suffrage was extended to all women in the United States.

Alternatively, the right to vote may have been given to women based on political economy reasons.⁶ Assuming that women are more left wing than men, left wing parties would have an incentive to extend the voter pool to women simply to shift the median voter in their favor.⁷ However, examining the party in power in

⁵These authors have no formal model.

⁶See Jack and Lagunoff (2006) for a general model of suffrage extension.

⁷The fact that men and women vote differently is carefully documented in Lott and Kenny (1999) for the U.S. and Funk and Gathmann (2006) for Switzerland.

various countries at the time when suffrage was extended shows that there is no clear bias towards left wing parties.

There are also several economic explanations for the general extension of suffrage from the elites to the masses which in principle might apply to the case of women suffrage as well. For example, Diaz (2000) argues that land-owners voluntarily extended the franchise to the landless because this helped them control opposing interests from the middle class. Acemoglu and Robinson (2006) proposes an explanation based on the threat of a revolution, while Lizzeri and Persico (2004) argue that a peaceful extension of the suffrage can happen as a broader electorate may increase the efficiency of public spending.

However, we believe that the case of women is very different. Men make about 50% of the population and are physically stronger than women which should make it relatively easy to control or give private incentives to own wives. This is very different from a situation where 1% of the population (the “elites”) was trying to control the remaining 99%. The parallels between women suffrage and the end of slavery might also come to mind. Note, however, that this is also very different in the sense that all men are connected to at least one woman (their mother) and typically more (their wife, their daughters, etc.), while only a small fraction of the population were slave-owners.

A few authors have empirically analyzed who voted for women suffrage to get an idea of the underlying economic incentives. For example, Jones (1991) uses U.S. cross state data between 1915 and 1919 and finds two important factors that increase the likelihood of a state to vote in favor of federal women suffrage: a higher sex ratio and the existence of state law in favor of women. In a different context, Washington (2006) uses data from the 105th U.S. Congress (1997-98) and finds that congressmen are more likely to vote liberally on reproductive rights the higher their fraction of daughters. Oswald and Powdthavee (2006) find a similar result for the UK.

2 Changes in the Legal Position of Women

In this section, we document the important changes in the legal position of women both in England and for the United States. A more detailed time line for each country is given in Appendix A.

England

Until the mid 19th century a formidable disparity between the legal rights of men and women, and specifically between married and single women, existed in England. Single women had the legal status of *feme sole*, which allowed them the right to own property and make contracts in their own name. Married women, on the other hand, had the legal status of *feme covert*, which meant that upon marriage the legal rights of a woman merged and became that of her husband. Married women had practically no rights regarding property, child custody, or making contracts. The only exception to this general was that from the late 16th century onwards a woman could place her personal property in a trust before marriage which could not be touched by her future husband or his creditors. However this was a rare exception only used by the very wealthy. Overall, married women had virtually no legal rights up until the 19th century.

The 19th century marked a period of considerable change concerning the legal position of married women. One of the earliest of these changes was the *Custody of Infants Act* passed in 1839 which for the first time allowed a mother, under certain circumstances, to be awarded custody of children under seven years in the event of a divorce. Divorce was still rare up until then because it required an Act of Parliament. Thus another significant step was the passing of the 1857 *Matrimonial Causes Act*, which permitted secular divorce in England and allowed both men and women to apply for divorce - albeit under very different circumstances. In particular, men were allowed to file for a divorce on the grounds of adultery, while women file only if the adultery was coupled with incest, bigamy, cruelty or desertion. The Matrimonial Causes Act also established divorced women as *feme sole* and thereby gave them legal rights identical to a single woman. The next monumental changes came in the form of the *Married Women Property Acts* of 1870 and 1882. The acts enabled married women to have control over their earn-

ings, to own separate property, and gave women the ability write contracts involving to their separate property. These changes in the legal position of women eventually lead to the 1918 *Woman Suffrage Act*, which gave women the right to vote and thereby established women as full citizens.

United States

The foundation of American law was based largely on English Common Law. As in England, single women in the United States had the right to own property and make contracts in their own name, while upon marriage, all property and legal rights became the husband's. Therefore prior to the 19th century, women had practically no legal existence during marriage.

The legal status of women in the United States experienced a gradual, but substantial, change that started in the late 18th century and continued until the early 20th century, with most important changes concentrated in the second half of the 19th century. Note that the majority of laws concerning the legal status of women were state laws, which meant that legal rights varied greatly from state to state and that changes occurred at different points in time. States in the South, particularly regarding the right to vote, lagged behind the rest of the United States because many felt the rights of Black men should come before the rights of women.

Different from England, divorce on grounds of cruelty and desertion became an option for American women in many states already during the late 18th century. Initially, as in England, fathers were granted child custody upon divorce. The first state that allowed custody to mothers was Iowa in 1838. Significant advances towards establishing the legal existence of women included the passing of sole trader laws and property laws, which enable married women to act as feme sole traders and control their own property. Both types of laws were first passed in Maine in 1844 and by the end of the 19th century similar laws had passed in almost all states. Another important change was the introduction of earnings laws that enabled women to control their own earnings without their husbands' consent. The frontrunner in earnings laws was again Maine (1857) with almost all states introducing comparable laws by the turn of the century. Wyoming was the first state to grant suffrage to women in 1869. However, other states were more reluctant to give voting rights to women. Colorado followed in

1893 and Idaho in 1996, while all other states passed voting laws between 1910 and 1920. In 1920, the Nineteenth Amendments to the United States constitution came into effect granting full voting rights to women across the nation, marking a significant moment for American women.

3 The Model

The model economy is an overlapping generations model with men and women who are joined in marriage. People live in households composed of one man and one woman and potentially children. Fertility is endogenous and people are altruistic towards their children. Parents can educate their children to increase their human capital, which can lead to economic growth.

A crucial difference between men and women is that women care more about children. A second difference is that only women can bear, rear, and educate children.⁸ The first difference is crucial for our results and we will elaborate on it more below. The second difference is made for realism and simplicity, but weakening this assumption would not alter the main results.

Couples make choices about consumption, production, and fertility. We assume that each couple has an equal number of sons and daughters. People care about their own consumption c_i and their spouse's consumption c_j , their number of children n , and their children's utilities V_{Sons} and $V_{\text{Daughters}}$.

The utility function of an adult i with spouse j is given by:

$$V_{\text{Adult}} = u(c_i, c_j, n) + \gamma^i \left(\frac{V_{\text{Sons}} + V_{\text{Daughters}}}{2} \right),$$

where:

$$u(c_i, c_j, n) = \log(c_i) + \sigma \log(c_j) + \delta \log(n).$$

⁸One reason why women have historically done most of the child-rearing is their ability to breast-feed and the fact that high-quality breast milk substitutes were only developed in the mid 20th century, as documented in Albanesi and Olivetti (2006).

Thus, σ is the weight on spousal consumption, and δ is the weight on the number of children. The only gender-specific part of the utility function is the weight γ^i attached to the welfare of the children. We assume that $\gamma_f > \gamma_m$. Thus, women attach relatively more weight to the welfare of their children than men do.⁹

Both spouses have one unit of time available. Men use all of their time for work t_m , while women split their time between working, t_f , and spending time raising and educating children. The production of men and women is combined by a Cobb-Douglas household production function to produce the final good c . For a family where the husband and wife have human capital H_m, H_f respectively, the budget constraint for the consumption goods is given by:

$$c_f + c_m = A(t_f H_f)^\alpha (t_m H_m)^{1-\alpha}$$

There is a time cost ϕ for raising each boy-girl pair. In addition, the couple can decide to educate their children. The time spend educating the daughters is given by e_f per daughter, and the time spent on educating each son is e_m . The time constraint for women is thus

$$t_f + (\phi + e^f + e^m)n \leq 1$$

The point of education is to increase the children's human capital, which affects their welfare. The laws of motion for human capital are given by:

$$H'_f = \max\{1, (Be^f)^\theta H_f^\beta H_m^{1-\beta}\}$$

$$H'_m = \max\{1, (Be^m)^\theta H_f^\beta H_m^{1-\beta}\}$$

where $\theta \geq 0$. Several features are noteworthy here. First, the human capital of both parents has a positive effect on the productivity of education. Second, our set-up focuses on home schooling as an important input into human capital

⁹Several studies have used natural experiments to show that when women are in control, they tend to spend more on children (e.g. Lundberg, Pollak, and Wales (1997) for the U.K., Pitt and Khandker (1998) for Bangladesh, Case and Deaton (1998) for South Africa, and Attanasio and Lechene (2002) for Mexico). The reason for such behavior may be related to lower paternity certainty for men (e.g. Anderson (2006)). Another reason might be that altruism towards children is increasing in time spent with children, and that women typically do most of the child-rearing.

production.¹⁰

Third, even without education ($e_m = e_f = 0$) the children receive one unit of “basic” human capital. If the education technology is relatively unproductive (i.e., B or θ is low) this opens the possibility of a corner solution in which parents do not educate their children.

Decision-making in a household depends on the political regime. Initially, we assume men make all decisions. We call this the *patriarchal regime*. We also analyze outcomes when decisions are made through efficient bargaining between husband and wife with equal weights. We call this the *power-sharing regime*. Men can vote for the regime. If men vote for power-sharing, then this will affect all current and future marriages equally.

The decision problem of a household can be formulated recursively. Clearly, the human capital of husband and wife H_m and H_f are state variables for a family. However, these state variables are not sufficient to describe the decision problem. Parents care about the welfare of the children, which in turn depends on the human capital of the children’s future spouses. We assume (realistically, one would hope) that the sons and daughters of a given family do not marry each other, but rather draw a spouse at random from other families. We therefore also need a state variables that summarizes the family’s expectations regarding the human capital of their children’s future spouses. Given our setup, these state variable are given by the economy wide averages of male and female human capital.

The recursive formulation of the decision problem (assuming all decisions are made by the husband) is then:

$$V_m(H_m, H_f, \bar{H}_m, \bar{H}_f) = \max \left\{ u(c_m, c_f, n) + \gamma_m \left[\frac{V_m(H'_m, \bar{H}'_f, \bar{H}'_m, \bar{H}'_f) + V_f(\bar{H}_m, H'_f, \bar{H}'_m, \bar{H}'_f)}{2} \right] \right\}$$

subject to the constraints above. Notice that the family has direct control only

¹⁰See, for example, Leibowitz (1974), Behrman, Foster, Rosenzweig, and Vashishtha (1999), and Cunha, Heckman, Lochner, and Masterov (2005) for the importance of home schooling (and the role of mothers) in human capital development.

over the human capital H'_m of their sons and the human capital H'_f of their daughters. In contrast, the human capital of their daughters in law and sons in law is given by economywide averages \bar{H}_f and \bar{H}'_m . These quantities, in turn, are determined by equilibrium laws of motion as a function of current average female and male human capital:

$$\begin{aligned}\bar{H}'_m &= G_m(\bar{H}_f, \bar{H}_m), \\ \bar{H}'_f &= G_f(\bar{H}_f, \bar{H}_m).\end{aligned}$$

The max operator in the above Bellman equation reflects that, at least initially, the husbands make all the decisions. Female consumption is still going to be positive because of the positive weight $\sigma > 0$ that people attach to their spouse's well-being. Female utility is given by:

$$V_f(H_m, H_f, \bar{H}_m, \bar{H}_f) = u(c_f, c_m, n) + \gamma_f \left[\frac{V_m(H'_m, \bar{H}'_f, \bar{H}'_m, \bar{H}'_f) + V_f(\bar{H}_m, H'_f, \bar{H}'_m, \bar{H}'_f)}{2} \right],$$

where all consumption values etc. are the ones chosen by the husband above. Notice that there is no maximization operator in this expression.

The fact that men make all decisions in this economy is at first sight to their advantage: given that $\sigma < 1$, they will assign a disproportionate share of consumption to themselves. However, there are also a couple of frictions in this economy that could make an uneven distribution of power problematic. First, men care about their daughters, and may not want their sons in law to have too much power over them. Second, the welfare of their sons will depend in part of the human capital of their daughters in law. If a lopsided distribution of power reduces incentives to invest in daughters in general, this will also be perceived as a negative. In what follows, we examine the model in more detail, and derive conditions under which may prefer to share power with their wives.

4 Incentives for Power Sharing

From a man's perspective, there are two mechanisms that can lead to an equilibrium allocation that is less than optimal. First, there is disagreement between a man and future decision-makers (his sons-in-law) about the allocation of resources between the son-in-law and his children. This is similar to a mechanism first pointed out by Phelps and Pollak (1968). Second, the model features a general human capital externality brought by the assumption that investing in children will benefit also the spouse (and the spouse's parents).¹¹ A similar mechanism is explored in Echevarria and Merlo (1999). Both mechanisms will lead to under-investment in human capital when men make all choices. Giving women some power, will alleviate this under-investment to some extent, but not fully resolve it. We will explore these mechanisms in more details below.

4.1 The No-Education Regime

Let us first consider the case in which the human capital technology is sufficiently unproductive for zero education to be optimal, $e_m = e_f = 0$. The economy will behave as if $B = 0$, i.e., there is no human capital technology at all. Since in this regime parents do not influence the human capital of their children, the children's utility is exogenous, and the decision problem is static. The simplified problem can be written as:

$$\max \{ \log(c_m) + \sigma \log(c_f) + \delta \log(n) \}$$

subject to:

$$c_m + c_f = A(1 - \phi n)^\alpha,$$

¹¹Laitner (1991) argues that this externality can be resolved in the marriage market. However, note that his argument rests on the assumption that consumption goods are pure public goods in marriage, while in our set-up the disagreement between spouses on the allocation of resources is crucial.

The optimal choices (i.e., optimal from the husband's perspective) are given by:

$$\begin{aligned} c_m^* &= A \frac{1}{1+\sigma} \left(\frac{\alpha(1+\sigma)}{\alpha(1+\sigma)+\delta} \right)^\alpha \\ c_f^* &= A \frac{\sigma}{1+\sigma} \left(\frac{\alpha(1+\sigma)}{\alpha(1+\sigma)+\delta} \right)^\alpha \\ n^* &= \frac{\delta}{\phi(\alpha(1+\sigma)+\delta)} \end{aligned}$$

Let us now consider whether it might be in the interest of the men to share power with the women. The political mechanism that we have in mind is a one-time referendum on granting equal rights to women. If the referendum is passed and the equal-rights policy is subsequently perfectly enforced, household decisions will no longer be made by the husband alone. Rather, we assume that the new outcome is determined by efficient household bargaining with equal weight on the wife's and the husband's utility.¹² Taking the average of the two utility functions, the new household welfare function to be maximized is given by:

$$V_m + V_f = (1+\sigma) \log(c_m) + (1+\sigma) \log(c_f) + 2 \log(n) + \frac{\gamma_m + \gamma_f}{2} [V_m + V_f]$$

Again, without education, everything is stationary, and the object to be maximized is

$$(1+\sigma)(\log(c_m) + \log(c_f)) + 2 \log(n).$$

The optimal value of fertility is unchanged. The consumption choices now become:

$$\begin{aligned} c_m^* &= \frac{A}{2} \left(\frac{\alpha(1+\sigma)}{\alpha(1+\sigma)+\delta} \right)^\alpha, \\ c_f^* &= \frac{A}{2} \left(\frac{\alpha(1+\sigma)}{\alpha(1+\sigma)+\delta} \right)^\alpha, \end{aligned}$$

Not surprisingly, female consumption increases and male consumption decreases after such a referendum. One might think that this implies that men would never favor sharing power. This is however not necessarily true, since men also value

¹²The exact weighting is not essential for the qualitative results, what matters is that the weight of the wives increases.

the utility of their daughters (and granddaughters etc.), which induces a taste for gender equality. Life-time utility for a man can be written as

$$V_m = u(c_m, c_f, n) + \frac{\gamma_m}{1 - \frac{\gamma_m + \gamma_f}{2}} \left[\frac{u(c_m, c_f, n) + u(c_f, c_m, n)}{2} \right],$$

The first term is maximized by the patriarchal choices, but the utility derived from the children's generation onward is actually maximized by the emancipated choices, as men are assumed to care equally about their sons and their daughters. In principle, men could prefer emancipation in this situation, assuming that either γ is sufficiently close to one, or σ is sufficiently close to zero. However, in practice this tradeoff appears to be an unlikely explanation for emancipation, because it works only if men's concern for their wives and daughters is highly asymmetric: men would have to care so little for their wives and treat them so poorly that the prospect of the same treatment applying to their (apparently much more esteemed) daughters made them prefer general power sharing.

We view this scenario as implausible, and conclude that in the no-education regime men are unlikely to support emancipation.¹³ The heart of the issue is that in this regime, the power balance between genders only has a static effect on the distribution of consumption between husbands and wives. Decisions on children do not play any role here for the incentives to share power; men and women agree on the optimal fertility rate, and families do not undertake any investment in their children's human capital.

4.2 The Education Regime

We now move on to the second regime of our model in which investment in education is positive. The switch to this regime can be brought about by an increase in overall return to education, which is measured by the parameter θ . The nature of the family is substantially different in this regime; whereas before the family was mostly about producing and allocating consumption goods, it now becomes

¹³A formal analysis of men's incentives for power sharing in the no-education regime is given in Appendix B.

a center for the accumulation of human capital. As we will see, this has a substantial effect on men's incentives for sharing power with their wives.

As in the previous section, our analytical strategy is to solve for the equilibrium value functions under male power versus power sharing, and then compare the two to determine under which conditions men have an incentive to share power with their wives.

The male and female value functions in the education regime under patriarchal decision making are defined by:

$$V_m(H_m, H_f, \bar{H}_m, \bar{H}_f) = \max \left\{ u(c_m, c_f, n) + \frac{\gamma_m}{2} [V_m(H'_m, \bar{H}'_f, \bar{H}'_m, \bar{H}'_f) + V_f(\bar{H}_m, H'_f, \bar{H}'_m, \bar{H}'_f)] \right\},$$

$$V_f(H_m, H_f, \bar{H}_m, \bar{H}_f) = u(c_f, c_m, n) + \frac{\gamma_f}{2} [V_m(H'_m, \bar{H}'_f, \bar{H}'_m, \bar{H}'_f) + V_f(\bar{H}_m, H'_f, \bar{H}'_m, \bar{H}'_f)],$$

where the maximization is subject to:

$$\begin{aligned} c_m + c_f &= A(t_f H_f)^\alpha H_M^{1-\alpha}, \\ t_f + (\phi + e^f + e^m)n &\leq 1, \\ H'_f &= (B e^f)^\theta H_f^\beta H_m^{1-\beta}, \\ H'_m &= (B e^m)^\theta H_f^\beta H_m^{1-\beta}, \\ \bar{H}'_m &= G_m(\bar{H}_m, \bar{H}_f), \\ \bar{H}'_f &= G_f(\bar{H}_m, \bar{H}_f). \end{aligned}$$

This recursive system can be solved analytically. Define the total consumption of a household as

$$C = A((1 - (\phi + e^f + e^m)n)H_f)^\alpha H_M^{1-\alpha}$$

Conditional on having aggregate consumption C , the optimal sharing between

husband of wife solves the following problem

$$\begin{aligned} \max \log(c_m) + \sigma \log(c_f) \\ c_f + c_m \leq C \end{aligned}$$

The solution to this problem is

$$\begin{aligned} c_m &= \frac{C}{1 + \sigma} \\ c_f &= \frac{\sigma C}{1 + \sigma} \end{aligned}$$

The value functions are log-linear. To prove this, let

$$\begin{aligned} V_m(H_m, H_f, \bar{H}_m, \bar{H}_f) &= a_1 + a_2 \log(H_m) + a_3 \log(H_f) + a_4 \log(\bar{H}_m) + a_5 \log(\bar{H}_f) \\ V_f(H_m, H_f, \bar{H}_m, \bar{H}_f) &= b_1 + b_2 \log(H_m) + b_3 \log(H_f) + b_4 \log(\bar{H}_m) + b_5 \log(\bar{H}_f) \end{aligned}$$

Given the parameters of the value function, the optimal decisions are:

$$\begin{aligned} c_m &= \frac{A \left(\frac{\alpha(1+\sigma)}{\alpha(1+\sigma)+\delta} H_f \right)^\alpha H_m^{1-\alpha}}{1 + \sigma} \\ c_f &= \frac{\sigma A \left(\frac{\alpha(1+\sigma)}{\alpha(1+\sigma)+\delta} H_f \right)^\alpha H_m^{1-\alpha}}{1 + \sigma} \\ n &= \frac{\delta - \frac{\gamma_m}{2} (a_2 + b_3) \theta}{\phi(\alpha(1 + \sigma) + \delta)} \\ e^f &= \frac{\phi \frac{\gamma_m}{2} b_3 \theta}{\delta - \frac{\gamma_m}{2} (a_2 + b_3) \theta} \\ e^m &= \frac{\phi \frac{\gamma_m}{2} a_2 \theta}{\delta - \frac{\gamma_m}{2} (a_2 + b_3) \theta} \end{aligned}$$

Based on these decisions, the explicit solutions for the value function parameters are derived in Appendix C.

The power sharing regime can be analyzed following the same lines. We will use

γ to denote the average of the male and female weight on children's utility,

$$\gamma = \frac{\gamma_m + \gamma_f}{2}.$$

This γ is the weight applied to children's utilities if decisions are made under power sharing.

The male and female value functions under power sharing are defined by:

$$\hat{V}_m(H_m, H_f, \bar{H}_m, \bar{H}_f) = \left\{ u(c_m, c_f, n) + \frac{\gamma_m}{2} [V_m(H'_m, \bar{H}'_f, \bar{H}'_m, \bar{H}'_f) + V_f(\bar{H}_m, H'_f, \bar{H}'_m, \bar{H}'_f)] \right\},$$

$$\hat{V}_f(H_m, H_f, \bar{H}_m, \bar{H}_f) = u(c_f, c_m, n) + \frac{\gamma_f}{2} [V_m(H'_m, \bar{H}'_f, \bar{H}'_m, \bar{H}'_f) + V_f(\bar{H}_m, H'_f, \bar{H}'_m, \bar{H}'_f)],$$

Decisions are made by maximizing the average of these two value functions

$$\max \hat{V}_m + \hat{V}_f.$$

Given aggregate household consumption C , consumption is now split equally between husband and wife:

$$c_m = c_f = \frac{C}{2}$$

The value functions can be written as

$$\hat{V}_m(H_m, H_f, \bar{H}_m, \bar{H}_f) = \hat{a}_1 + a_2 \log(H_m) + a_3 \log(H_f) + a_4 \log(\bar{H}_m) + a_5 \log(\bar{H}_f)$$

$$\hat{V}_f(H_m, H_f, \bar{H}_m, \bar{H}_f) = \hat{b}_1 + b_2 \log(H_m) + b_3 \log(H_f) + b_4 \log(\bar{H}_m) + b_5 \log(\bar{H}_f)$$

Exact expressions for the value function parameters are derived in Appendix C. Notice that a_2, a_3, a_4 and b_2, b_3, b_4 are written without hats, which reflect that these parameters do not depend on the political regime, i.e., they are identical under

male power and power sharing. The optimal choices under power sharing are:

$$\begin{aligned}
c_m = c_f &= \frac{A}{2} \left(\frac{\alpha(1+\sigma)}{\alpha(1+\sigma) + \delta} H_f \right)^\alpha H_m^{1-\alpha} \\
n &= \frac{\delta - \frac{\gamma_m + \gamma_f}{4} (a_2 + b_3) \theta}{\phi(\alpha(1+\sigma) + \delta)} \\
e^f &= \frac{\phi \frac{\gamma_m + \gamma_f}{4} b_3 \theta}{\delta - \frac{\gamma_m + \gamma_f}{4} (a_2 + b_3) \theta} \\
e^m &= \frac{\phi \frac{\gamma_m + \gamma_f}{4} a_2 \theta}{\delta - \frac{\gamma_m + \gamma_f}{4} (a_2 + b_3) \theta}
\end{aligned}$$

These decisions differ from the choices under male power in two respects. First, men and women now consume both consumption goods in equal amounts. This effect was already present in the no-education regime, and, from the male perspective, presents the utility loss from power sharing (at least as the consumption of their own wife is concerned). The second difference is that education is unambiguously higher under power sharing, since $\gamma > \gamma_m$. Next, we will discuss how this difference affects male incentives for power sharing.

4.3 Voting for Power Sharing

Picture an economy that has just transitioned from the no-education regime to the education regime due to an increase in the return to education. We want to determine whether this regime switch can trigger an expansion of the rights of women. The process that we imagine is a vote among the male population to introduce power sharing. After the reform, the legal position of women in marriage will be equalized to that of men, and decisions will henceforth be taken by maximizing joint utility, rather than just male utility alone.

Men will vote for the introduction of power sharing exactly when their utility under power sharing exceeds the utility under male dominance, i.e., if:

$$V_m(\text{Suffrage}) > V_m(\text{Male Power})$$

In the notation of the previous section, this condition is:

$$\hat{V}_m(H_m, H_f, \bar{H}_m, \bar{H}_f) > V_m(H_m, H_f, \bar{H}_m, \bar{H}_f)$$

We have already determined that $\hat{V}_m(H_m, H_f, \bar{H}_m, \bar{H}_f)$ and $V_m(H_m, H_f, \bar{H}_m, \bar{H}_f)$ only differ in the constant term. The inequality can therefore be written as: $\hat{a}_1 > a_1$, where \hat{a}_1 and a_1 are the respective constants. Writing out this condition and simplifying gives:

$$\begin{aligned} & (2 - \gamma_f + \gamma_m)(1 + \sigma) \log\left(\frac{1 + \sigma}{2}\right) - [(2 - \gamma_f)\sigma + \gamma_m] \log(\sigma) \quad (1) \\ & + \theta \gamma_m \frac{2(1 + \sigma)}{(1 - \bar{\gamma})} \log\left(\frac{\bar{\gamma}}{\gamma_m}\right) \\ & + \left[\theta \gamma_m \frac{2(1 + \sigma)}{(1 - \bar{\gamma})} - (2 - \gamma_f + \gamma_m)\delta \right] \log\left(\frac{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta}{\delta - \frac{\bar{\gamma}}{2}(a_2 + b_3)\theta}\right) > 0 \end{aligned}$$

The first term of this expression is equal to the no-education regime. The remaining terms reflect the role of education. As one would expect, setting $\theta = 0$, the expression reduces to the no-education regime. Further, note that as θ approaches $\bar{\theta} = \frac{\delta[2 - (1 - \beta)\gamma_m - \beta\gamma_f]}{\bar{\gamma}(1 + \sigma)}$, the denominator in the log-term goes to zero and hence, the overall expression goes to ∞ . Since all other terms are finite and because the term in square brackets is positive as θ approaches $\bar{\theta}$, the entire expression goes to infinity. In other words, as θ increases, there will be a point beyond which men strictly prefer power-sharing over patriarchy.

Based on this analysis, the model predicts that the introduction of power sharing will be preceded by an increase in the return to education and human capital. Moreover, in the model fertility falls once the switch to the education regime occurs, as women economize on their number of children in order to invest time into educating their children. Thus, the model also implies that the expansion of female rights should take place during the main phase of the demographic transition. Finally, once female rights have been introduced a further acceleration in the accumulation of human capital and the decline in fertility will occur. In contrast to existing explanations for rising female rights, our model does not imply that the introduction of power sharing should coincide with or be followed by increased female labor force participation. In our theory, the incentives for

sharing power with women derive from what happens in the family, not in the market. Indeed, women continue to devote the same fraction of time to market production before and after. The tradeoff is entirely between the quantity and quality of children.

Another key feature of our explanation for the introduction of power sharing is the role played by the marriage market externality. One of the key motives for men in extending power is to induce the parents of their future sons and daughters in law to invest more in the education of their children. Unless the marriage market fully internalizes the effect of a child's education on future parents in law (which is highly unlikely), there is always a tendency to underinvest in the children's education. By introducing power sharing, men can give more power to family decision-makers that care more about their children's education (i.e., mothers), which alleviates the externality. Crucially, the marriage market externality is a feature which cannot be dealt with within a given family. Consider a hypothetical scenario with full commitment, i.e., the case of a first-generation man who has the ability to impose specific choices on all his descendants. Commitment would allow this man to "fix" the unequal consumption allocations in future generations, but he still would not be able to address the marriage market externality. This would require putting constraints on today's choices of potential in laws who will be linked to the family at a future date through intermarriage. Clearly, this problem cannot be dealt with inside the family, which is one reason why extending female rights has to be done at a political level.

5 Numerical Example and Timing Implications

We now illustrate our result with a computed example of an economy undergoing the transition from patriarchy to power sharing. The parameterization of the model economy is summarized in Table 1. We are interested in economic and political outcomes in an economy that is undergoing a gradual shift in the importance of education and human capital. We model an increase in the return to education through an upward shift in the parameter θ , which governs the elasticity of children's human capital with respect to education. The exogenous

parameter shift represents technological change that increases the demand for skill. The time path for θ is displayed in Figure 1: The parameter is at 0.2 initially, and then increases linearly until it reaches 0.3.

Parameter	Interpretation	Value
γ_f	Female Discount Factor	0.45
γ_m	Male Discount Factor	0.4
σ	Utility Weight on Spouse's Consumption	0.5
δ	Utility Weight on Children	0.6
α	Share of Female Human Capital in Goods Production	0.4
β	Share of Female Human Capital in Education	0.5
ϕ	Time Cost for Each Pair of Children	0.2
B	Productivity of Human-Capital Production Function	100

Table 1: Parameter Values for Model Simulation

Figures 2 to 3 display the evolution of fertility, education, and human capital in the economy throughout this technological shift. In both figures, the solid line represents outcomes under permanent patriarchy (i.e., power sharing is never introduced), where as the dashed line represents outcome under optimal power sharing (where power is shared once it is advantageous for men to do so). Given the parameter values, the economy starts out in the no-education regime. In this regime, the men are in power, and they prefer to stay in power. During the no-education period, fertility is high at 5.0, and human capital is constant at the endowed level. The switch to the education regime takes place in period 3. The fertility rate drops immediately, because now women spend some of their time on educating their children, rather than having even more of them.

Despite the shift to the education regime, in periods 3 to 5 the return to human capital is still too low for men to favor the extension of rights to women. This changes in period 6, when equal rights are finally introduced.¹⁴ Relative to the

¹⁴The timing of the introduction of female rights is computed under the assumption that the parameters of the production function remain constant, i.e., men are assumed not to anticipate the future further increases in the return to human capital. Conceptually, the perfect-foresight case is similar, but more complicated to compute.

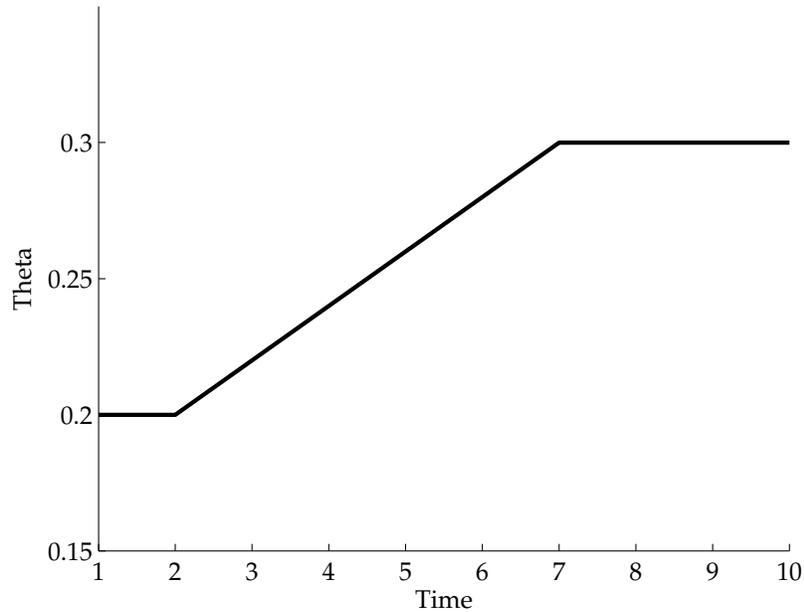


Figure 1: Exogenous Time Path for the Return to Education Parameter θ

case of permanent patriarchy, optimal power sharing results in a further drop in fertility and a further increase in education. As Figure 3 shows, these changes lead to an increasing advantage in terms of human capital under power sharing relative to patriarchy. That, of course, is one of the main reasons why men introduce female rights in the first place: high returns to human capital make the growth effects of female power too big to ignore.

6 Historical Evidence

6.1 Fertility and Education

Our theoretical analysis implies that women's rights are extended after the onset, but before the completion, of the demographic transition. That is, first, fertility starts falling and schooling becomes more important, then rights are extended, which lead to a further drop in fertility and increase in schooling. The

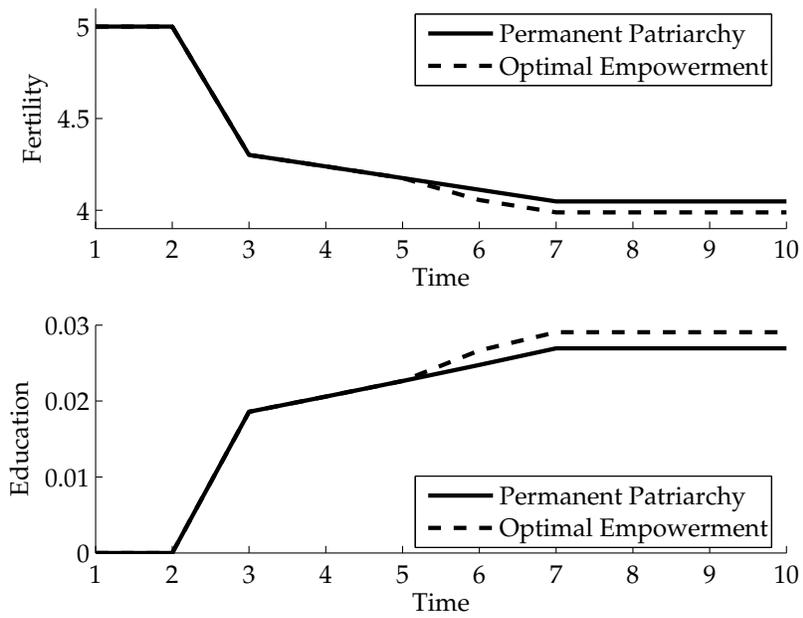


Figure 2: Fertility Rate Female Education in Model Simulation

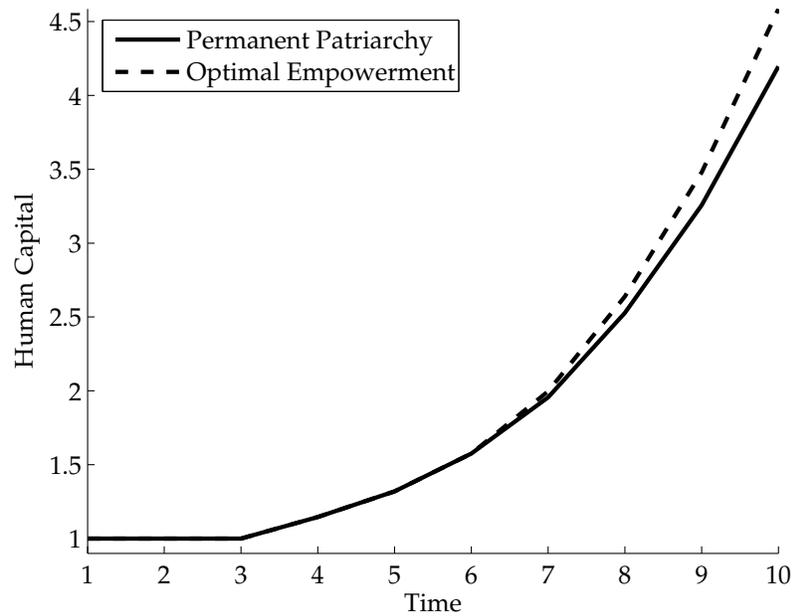


Figure 3: Female Human Capital in Model Simulation

U.S. experience does indeed confirm this timing. Recall that the most important period of gaining rights for women occurred in the second half of the 19th century. During this period, women in most states obtained rights to own property and earnings as well as the ability to divorce, and school suffrage.

During the 18th century, women had about six children on average. The demographic transition in the U.S. started around the turn of the 18th century and lasted until the 1930s. At first, fertility declined slowly to about five children for women born in the middle of the 19th century. The most pronounced fertility decline occurred during the second half of the 19th century, where the total number of children born to a woman dropped by almost 2 children within the course of a decade. While women born around 1865 had on average 5 children, women born around 1875 only had 3.3 children. After that, fertility fell further, albeit at a slower pace, to 2.3 children per women for the 1905 birth cohort. Since the average age of a woman giving birth is about 27, the first generation of children with substantially fewer siblings was born around 1902 (i.e. the children of the 1875 birth cohort). These same children attended schools in much greater numbers than previous generations. School enrollment increased very slowly between 1850 and 1900, but accelerated sharply thereafter. The graduation rate (as a percentage of all 17-year old) was well below 10% until the turn of the century, but very quickly increased to 15% by 1920 and 40% by 1940 (see Figure 4). Figure 4 shows the entire time series of fertility as well as two measures of schooling. Overall, it seems then that in the data (as in the model) changes in women's rights were preceded by a fertility decline and increase in education, but also that these demographic trends continued after the rights were implemented.

The key driving force in the model is an increase in the returns to human capital. For this to play a role in the extension of women's rights, we argue that the returns to schooling have been increasing at the end of the 19th century and the beginning of the 20th century. While direct evidence on returns to schooling for this time period is hard to come by, it seems that the dramatic increase in schooling rates must have been driven by something that made schooling more desirable. Whether this was skill-biased technological change or something else is largely irrelevant for our analysis. Factors that indirectly raised the private

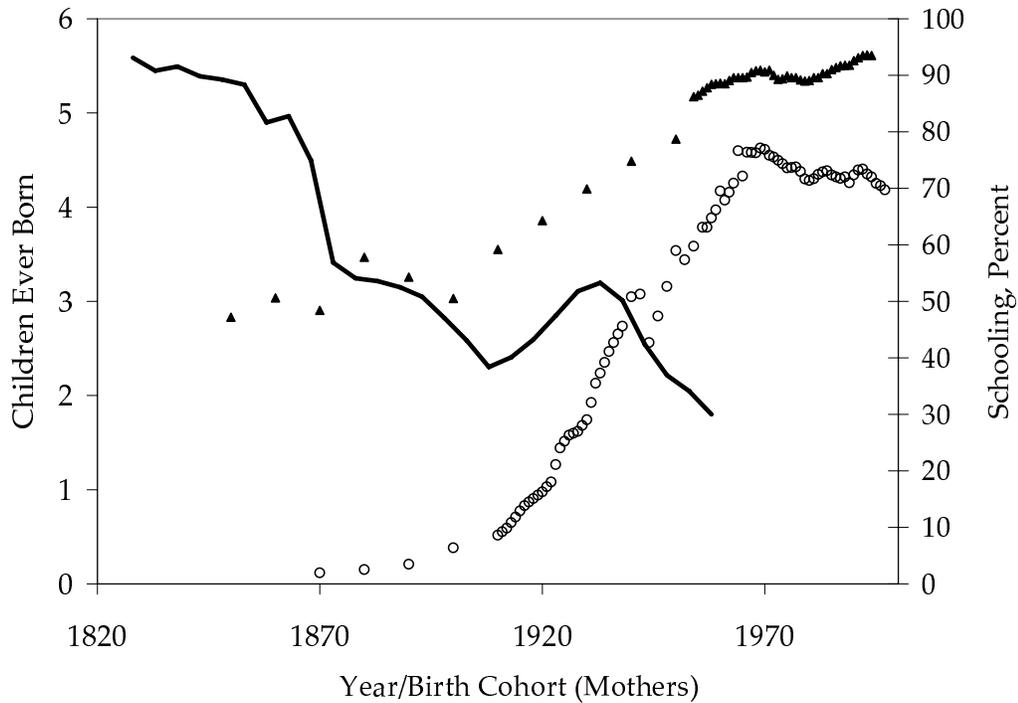


Figure 4: Fertility and Schooling in the United States, – Children ever born by birth cohort of mother, ○ graduation rate of 17 year old, ▲ School Enrollment.

Sources: Jones and Tertilt (2006) and Carter, Gartner, Haines, Olmstead, Sutch, and Wright (2006).

return to schooling around the turn of the century include the public provision of education (by decreasing the private cost of schooling), laws prohibiting child labor (by decreasing the opportunity cost of schooling), as well as widespread public health campaigns such as the hookworm eradication program (around 1910) that improved children’s ability to learn (Bleakley 2007).

6.2 The Changing Role of the Family in the Nineteenth Century

Our theory posits that the expansion of women’s rights is ultimately due to a shift in the role and function of families. In particular, the nurturing and education of

children steadily gained in importance, and it was the mothers who carried most of the expanded responsibilities for child rearing. These changes are reflected not only in aggregate data on fertility and education, but also in observations by social historians on the the shifting organization of family life and changing cultural norms and expectations regarding the roles of the sexes.

One origin of the changed role of the family was the increased separation between the home and work spheres that arose with industrialization. In the pre-industrial period, men and women would often work alongside each other. As a result, both mothers and fathers spent considerable amounts of time with their children and contributed to their upbringing. The nurturing of infants and the youngest children was generally the mother's domain, but from fairly young ages many children (and especially boys) would start working with their fathers, who would then be responsible for much of their further education.

The increased separation of working fathers from their children in the industrialization period resulted in a new family model. "In the course of the nineteenth century, the meaning of a marriage as an economic unit changed radically. A new form of labor division between husband and wife ... became widespread after 1850: the male breadwinner—female homemaker model" (Ehmer 2002, p. 300). The new separation between the spheres of husbands and wives was particularly pronounced for the families of middle-class men who commuted to work. A "husband might well catch an early train to a job in the city and not return until evening. Thus while pre-Victorian texts ... show middle-class men playing an active domestic part, particularly parenting, later in the century the typical middle-class husband's principal function was to provide economic support for the family" (Nelson 2007, p. 31).

The increased gendered division of labor went along with an new emphasis on the nurturing of children. "During the course of the nineteenth century, children gradually moved towards the center of family life. ... Generally speaking, parents tended to bestow more economic, educational, and emotional resources on their children than ever before" (Guttormsson 2002, p. 265). Given the separation of the work and home spheres, the shift towards educating children also redefined the role of mothers. "A transformed and intensified parent-child, and

in particular mother-child relationship was at the heart of the new family model” (Maynes 2002, p. 198). The expanded role of mothers as the educators of their children also raised the value of female education. “As long as there were few schools for very young children, their education was normally the task of mothers. Some mothers felt they had to improve their own education to be fit for the task” (Guttormsson 2002, p. 266). Similarly, among the upper classes “young girls who did attend boarding school were educated ‘to be good mothers to England’s future rulers . . . [rather than to] be shaping England themselves” (Nelson 2007, p. 77). In working-class schools, girls’ education often emphasized the teaching of Christian values. The rationale for this focus was that working-class girls would become “essential conduits of morality” in their future role as mothers (Steinbach 2004, p. 165).

Apart from the increased gendered division of labor, another impetus for the increased role of mothers were changes in the theory of education, as reflected in child-rearing advice literature from the period. “The most striking change, centrally illustrated by the works of Pestalozzi, was the shift from father-centered to mother-centered theories of child raising” (Maynes 2002, p. 198). Similarly, Guttormsson argues that the “mood was shifting away from beating as a routine punishment (except in schools) toward the application of moral and emotional pressures developing in children a capacity for self-government. . . . insistence on this type of moral education which was widely assumed to be beyond the capacity of a father-provider, contributed to valorizing the mother’s moral role” (p. 268).

6.3 Evidence from the Political Debates on Women’s Rights

Arguments for women’s rights based on men’s gain from the extension of rights are mentioned in many different debates about women’s rights. Below, we will give a detailed account of the shift in public opinion for both England and the U.S. However, similar arguments can be found in many different contexts. For example, Southard (1993) provides an excellent summary of the suffrage campaign in Bengal, British India, in the 1920s. The link between suffrage and improved education for women was a major theme. The fact that men would gain from more

educated women was one of the main arguments for suffrage. Southard (1993, p.400) summarizes “Professional men seeking upward mobility found that uneducated wives limited by the *parda* system could not take the lead in the education of their children nor provide wifely support for their professional careers”.¹⁵ Analyzing the debate in Japan, Nolte (1986) mentions arguments about the family on both sides of the debate around a suffrage bill that was eventually passed in 1931. On the one hand, opponents argued that “women’s political participation would have a deleterious effect on, first, home management and, second, education” (Nolte, p. 694). On the other hand, proponents stressed the importance of the nurturing mother and argued that more rights would lead to more informed homemakers.

6.3.1 Shifting Opinion about Women’s Rights in the United States

Initially, many men were opposed to granting women more rights, be it property laws or suffrage, on the grounds that these rights would make women too independent and thereby hurt the family. Chused (1985) analyzes arguments made in Oregon. In the context of a married women’s property provision, debated in 1857, it was argued that “the provision would cause much domestic trouble and many divorces.” A Mr. Kelsay feared that a husband would become “simply a boarder at his wife’s establishment.” (Chused 1985, p. 17). A similar argument was made later in the debate around women’s suffrage. The New York Times reports on April 15, 1880 from the Senate Judiciary Committee’s debate on women’s suffrage: “...he was inclined to favor the enfranchisement of women. But then he bethought himself of the possible time to come when the present head of the family should go to his home and find the fire out, the dinner not ready, and the mother of his children off electioneering for Congress, and then he was perplexed with doubt about the advantages of this reform.”

The idea that women’s education is important because they are the ones raising future generations was already present relatively early. For example, in a letter written to the friends of Female Education, Rev. Dr. Cox asserts, “Women are

¹⁵Parda (or sometimes purdah) is the Hindu or Muslim system of sex segregation, practiced especially by keeping women in seclusion.

the educators (educatresses) of our race. They affect the mind and mould the manners, and form as well as develop the character, ordinarily of every mother's son and daughter of us, before we are three years old - and ought they not to be educated themselves? if in this country, we hope to breed a race of thinkers, doers, achievers, and nobles of the sterner sex, to act and to be as they ought, . . . , we must make their mothers, sisters, wives, and daughters, the normal counterparts of all masculine excellence and worth, in Church and in State." (Rev. Dr. Cox on Female Education, *The New York Times* 4/13/1853). A similar argument can be found in the an editorial from the *Hearst Newspapers*, written by Arthur Brisbane (not dated, but probably around 1917): "The education of a girl is important chiefly because it means the educating of a future mother. Whose brain but the mother's inspires and directs the son in the early years, when knowledge is most easily absorbed and permanently retained? If you find in history a man whose success is based on intellectual equipment, you find almost invariably that his mother was exceptionally fortunate in her opportunities for education." But what exactly this meant for the legal position of women changed very gradually over time.

Initially, limited property rights were extended to women in many states with the main goal of protecting property from a husband's creditor. The idea that protecting property was important to protecting families was part of the discussion at the time. It was thought, however, that these provisions would be used only in the case of an extremely irresponsible husband, i.e. be the exception rather than the norm. This point becomes quite clear in Khan (1996, p. 365) who states that initially the main purpose of earnings laws was to protect "women who were burdened with profligate and irresponsible husbands." *The New York Times* makes a similar point about the purpose of property rights for married women in 1855: "And, by reserving to women the control of their property at all times the temptations to mercenary matches are lessened. And in those unfortunate cases where they may be contracted, the weak woman will have left in her hands a home, by means of which she can keep the man who has deceived her perpetually on his good behavior." (*Rights of Married Women*, *New York Times* 6/7/1855). Similarly, in a debate about Oregon's married women's property act, a Mr. Logan argued that "If he [the husband] was prudent and thrifty she would

give him control of her property. And if he was not, it was better that she should have the power to preserve her property to support herself and educate her children." (as cited in Chused (1985). Chused also mentions others who "noted the desirability of protecting wives' property from husband's creditors, [...] because [...] [the doctrine] protected women and daughters from spendthrift husbands."

From an initial phase emphasizing rights for wives of the exceptional irresponsible husband, the public debate shifted to families more generally. Proponents of women's rights emphasized that giving more rights to women would not be the loss of husbands. For example, Chused (1985) cites a Mr. Smith who argued that separate property rules did not cause divorce. Similar arguments were made in the context of women's suffrage. In a speech at the Brooklyn Academy of Music, Beecher states, "If woman gets the suffrage, she will not abandon the household; she will make it stronger ... We need, for the sake of making better families, that woman should have more power and influence." (Equal Rights-Mr. Beecher on the Woman Question, *The New York Times* 12/21/1869). In an address to The Young Men's Woman Suffrage Association, George Kilmer goes even further by arguing that more independent women are the more desirable one in the marriage market. Quoting the NY Times, Mr. Kilmer argued that "It was a well-known fact that women in active life - in those pursuits and employments which have been thought to unsex them - were the ones overwhelmed with offers of marriage, as the ones most likely to make good wives and mothers. Woman was a citizen of the nation and community, as much so as man, and as such should be placed in possession of those political rights which belong to citizenship." (Woman Suffrage, *The New York Times* 09/24/1874)

Granting school suffrage to women (i.e. the right to vote for school board members) was probably the least controversial right extended to women. The arguments centered around women's special knowledge and expertise with children. A letter written by several women and endorsed by a number of men, to the Mayor of Brooklyn, states that "We would urge upon your consideration the fact that interest in the public schools belongs largely to women as educators and even more distinctively as mothers; that wherever the training of children is to be considered experience with child life gives value to the judgment of intelligent

women" (Women Want Five Places, New York Times 6/9/1894). Similarly, in an address to the New Jersey Voters by Republican Party it was argued that "The third proposed amendment, giving votes to women in school elections, widens the suffrage in regard to a subject which has been shown by the history of our State schools, to be one concerning which women are clearly entitled to have a voice." - (Address to New Jersey Voters, New York Times 09/20/1897). Similar arguments were made in the context of medicine. Dr. Julia E. Bradner in her address to the Alumnae Association of the Women's Medical College and Hospital was quoted saying, "...if our country is to continue a model republic its women must represent the highest type of women. Napoleon said: 'The future destiny of the child is always the work of its mother,' and we women physicians demand of the State of New-York that it grant its women the same vote in the health and morals of its children that they already have in their education: that the women who are privileged to vote for School Commissioners be also allowed to vote for Excise Commissioners." (Women Physicians Wish A Vote, New York Times 04/24/1891)

Some proponents of suffrage link women's ability to make political decisions to her contribution to the family. For example, in a letter to the editor of The New York Times, Henry S. Allen argues, "what would be the home if the husband ruled it regardless of the wife? It takes two, a man and a woman, husband and wife, to make a perfect home. The minds of both are required to manage its varied and complex affairs. An so it is with the affairs of the world - the one great family. The minds of both man and woman are required to make just and impartial laws, which discriminate against neither sex, guaranteeing equal rights to both." (Justice For Woman, The New York Times 3/6/1900)

Further, several historians emphasize the importance of the family in these law changes by arguing that the main arguments were neither based on an increased participation of women in the labor market nor simply male sympathy for women's rights. Khan (1996) states very clearly that women's property rights were *not* related to women entering the labor force: "legal historians have for the most part [...] argued that the antebellum property rights reforms increased the responsibility of women for the welfare of their families, without improving their eco-

conomic status or their standing in the labor market.’ In her book on child custody rights in the U.S., Mason (1994, p.56) argues that “it was not necessarily sympathy for the cause of women’s rights that prompted men to vote for women’s property rights but rather [...] because they perceived plainly that their own wealth, devised to daughters, who could not control it, might be easily gambled away, or wasted through improvidence or diverted to the use of strangers.”

6.3.2 The Debate on Women’s-Rights Legislation in England

In England, the first milestone in the expansion of women’s rights was the passing of the Custody of Infants Act in 1839. Central to the impetus for change at this time was the case of Caroline Norton, who separated from her husband and was subsequently denied all access to her three children, in addition to being deprived of her earnings. Norton became a major campaigner for women’s rights, and was instrumental in the passage of both the 1839 Custody of Infants Act and the 1857 Matrimonial Causes Act. As a well-connected member of the upper class, she was able to find allies in Parliament who could advance her cause.

Before 1839, mothers had no parental rights at all with regards to their legitimate children. In contrast, a father’s rights to his legitimate children extended even beyond his own death: he could appoint a guardian to exercise his rights, who could then deny the mother all access to her own children. In 1837, Norton’s ally Thomas Talfourd proposed a moderate bill that would have enabled separated or divorced women to apply to a court for obtaining visitation rights to their children. In the discussion of the bill in the House of Commons, Talfourd argued that “... to deprive the mother of any contact was cruel and against nature both to her and the child” (Wroath 1998, p. 98). The central argument of the MPs opposing the bill was that it would undermine marriages. Much was made of the fact that given that the bill was to apply to divorced women, it would in particular apply to adulteresses. An opponent argued that “he could not conceive a more impolitic provision. If the father wished to preserve his children from contamination he should keep them separated from such a woman” (p. 99). In contrast, adultery of the husband was not a concern. In 1838, the bill was defeated in the House of Lords. A modified bill was brought forward again and

ultimately passed in 1839. The bill gave mothers the right to apply for custody of their children under the age of seven. However, to make the bill palatable, a special provision explicitly excepted adulteresses from this possibility.

From a modern perspective, the Custody of Infants Act was a rather moderate advance for women's rights, as it applied only to divorced or separated mothers, and merely opened the possibility of applying to a court in cases of hardship. The courts still could, and often would, decide against awarding custody to the mother. Nevertheless, the bill marked a change in principle: "It was a modest step in real terms but a landmark in the history of English law. For the first time the mother of a legitimate child was given some rights in respect to it" (Wroath 1998, p. 112). What is significant from our perspective is that this first advance in women's right was directly related to women's role in the upbringing of their children. In an 1849 landmark decision applying the Act, the Lord Chancellor argued that the courts should "... apply a course which seems best for the interests of the children, without regard, so far as it interferes with that object, to the pain which may be inflicted on those who are authors of the difficulty" (cited in Wroath 1998, p. 115). Wroath comments that this "must be one of the earliest court decisions where the welfare of the children was considered as overriding the interests of the father."

The continuing shift in emphasis from the rights of men to the needs of children can also be gleaned from the editorial pages of the Times of London. In 1864, commenting on a court case involving the Custody of Infants Act, the Times still upholds the traditional view: "We must in the first place get rid of the notion that the fault is always on the side of the man, and that the morals of the children would necessarily be safer under the eye of a mother. ... we must here, as ever, adapt human laws to the natural inequality of the sexes, and give the superiority of right to that which cannot but have the superiority of power" (London Times, April 4 1864, p. 8). In 1873, women's child custody rights were further extended; women could apply for custody of children regardless of age, and adultery no longer led to automatic disqualification. On this occasion, the Times supported the reform: "The Court ... has struggled to mitigate the harshness of the rule which rigorously denies to a mother, however great may be her claims, the care of

her infant children, and gives it over, without consideration or scruple, to a father, however manifestly unfit he may be. . . . To rob the mother of her children was indefensible; but was it less so to take them from her, against their will and hers, by a rigid rule, irrespective of any consideration whether her separation from her husband were his fault or hers, after they had grown up in her society, had become accustomed to her love, her sympathy, and her watchful guidance, and had developed morally and intellectually under her training?" (London Times, April 22, 1873, p. 9)

Following the Custody of Infants Act, the next major area of reform was the law of divorce. The 1857 Matrimonial Causes Act simplified divorce procedures and made divorce more accessible especially to the middle and lower classes. Most significantly, both men and women could now apply for divorce. The only permissible reason was adultery; however, women could obtain divorce only in the presence of an aggravating factor such as rape, sodomy, or cruelty. The law also changed the position of separated wives. In regards to any further property acquired after separation or divorce women were to be treated as *feme sole*, i.e., as single women. The support for these reforms came from two different corners. On the one side, there was the nascent women's movement, whose ultimately aim was complete equality of women and men before the law. The second group consisted of lawyers whose objective was to simplify the law. Before 1857, divorce could be only be granted by an Act of Parliament, which was impractical for men and women alike. In addition, divorce laws were already different in Scotland, which, for example, caused problems with the status of couples who were married in England and divorced in Scotland. For the women's movement, the Matrimonial Causes Act was on the whole a disappointment, as it only improved the position of the relatively few divorced and separated women, while leaving inequities within marriage intact.

The cause of women's rights gained speed in the 1860s, ultimately leading up to the Married Women's Property Act of 1870, which was further expanded in 1874 and 1882. The acts dramatically improved the legal position of married women relative to their husbands by giving them control over their earnings and ultimately their property. In this period, John Stuart Mill (who was an independent

MP from 1865 to 1868) emerged as a major proponent of equality before the law. He argued that equality would have many advantages for men, not least for their own education: "Think what it is to a boy, to grow up to manhood in the belief that without any merit or any exertion of his own, . . . by the mere fact of being born a male he is by right the superior of all and every one of an entire half of the human race . . . What must be the effect on his character, of this lesson?" (Mill 1869, p. 88). Mill felt that for boys to learn that "merit, not birth, is the only rightful claim to power and authority," equality has to start in the family: "The child would really, for the first time in man's existence on earth, be trained in the way he should go, and when he was old there would be a chance that he would not depart from it" (p. 89). Mill also ascribed great advantages to the improved education of women that would follow from equality: "The second benefit . . . would be that of doubling the mass of mental faculties available for the higher service of humanity" (p. 89). Improved female education would not only be relevant in the workplace, but also in the family: "The influence of mothers on the early character of their sons, and the desire of young men to recommend themselves to young women, have in all recorded times been important agencies of the formation of character, and have determined some of the chief steps in the progress of civilization" (p. 91).

To be sure, even though Mills arguments started to resonate more widely, his views were extreme for the time. The opponents of reform continued to argue that extending rights to married women would endanger the institution of marriage. For example, in 1868 an editorial writer for the London Times claims that "... the proposed change would totally destroy the existing relation between husband and wife. That relation is at present one of authority on the one side and subordination on the other. The law of husband on wife goes on the principle that there can only be one head to the family, and that the husband is the proper head. . . . If a woman has her own property, and can apply to her separate use her own earnings, she is practically emancipated from the control of her husband. . . . what is to prevent her from going where she likes and doing what she pleases? . . . The family would lose its unity, and the basis of our whole social life would be destroyed" (London Times, April 23, 1868, p. 8).

The arguments of the supporters of the legislation were altogether more practical. In July 1868, A Select Committee in the House of Commons issued a report on a proposed bill, and advocated in favor of reform. Much of the testimony received by the committee suggests that reform would be particularly beneficial to working women from the lower classes, who may need protection from unreliable husbands: "Evidence has also been given as to the effect of the law which gives the wife's earnings to her husband. Very numerous cases of hardship occur; it is not uncommon for husbands to take the wives' earnings to spend them in drinking and dissipation" (British Parliamentary Papers 1970, p. 13). Another recurring theme is the effects of the legislation on children's welfare and education: "It cannot be doubted that, even among the rich, occasional cases of great hardship happen where . . . the property of the wife becomes subject to the misfortunes, improvidence, or bad conduct of the husband; or where after-acquired property of the wife goes to the creditors or assignees of the husband, instead of to the maintenance of her or her children" (p. 13). Similarly, when asked whether the bill would have "generally a good effect upon the moral condition of the women," a witness from Belfast replied: "I think it would; and perhaps it would be even more advantageous as regards the children, for they often cannot get an education under present circumstances" (p. 99).

A number of witnesses who report on the effect of similar laws in the United States cite the same reasons in support of reform. A New York merchant states that one of the reasons for reforming the law in that state was "the desire to furnish mothers with power to supply the wants of their children when the husband neglects to do so" (p. 14). He also argues that instead of endangering marriage, improved equality had the effect of promoting mutual affection between husbands and wives. Asked whether he had "seen any alteration in the condition of married women of the labouring class since the alteration of the law," the witness replied: "I think there has been a gradual improvement ever since I have notice the women are being more educated, and are more desirous to educate their children. They send their children almost universally to school" (p. 77). By 1869, a London Times editorial reflects many of these arguments: "It is true that theoretically [the husband] is liable to maintain her, as well as their children. But this liability is practically qualified. . . . As for children, no degree of neglect short of

criminal maltreatment brings the father within the penalties of the law . . . It must, therefore, be admitted that while the Common Law makes the husband master of all his wife's personal property, no equivalent obligation to support her or their children in tolerable comfort is imposed upon him" (London Times, March 27, 1869).

7 Cross-Country Evidence

The patterns implied by our model can also be seen in cross-country data. Assuming that countries differ in their available human capital technology, the model implies that countries with a poor technology (low θ) will have low levels of schooling, high levels of fertility, and at the same time few rights for women. Countries with a more advanced technology (high θ), on the other hand, should have high levels of schooling, low fertility and more rights for women. In this section, we show that this relationship between schooling, fertility, and rights can indeed be found in recent cross country data.¹⁶

It should be noted that in the model e_m and e_f is the time that parents spend educating each of their children and that θ is the return to this parental time investment. Note that the return on parental time investment is not only determined by the usual measures of returns to schooling as estimated from wages. Rather, it is also affected by child mortality rates, overall life expectancy, the availability of public schooling, and laws banning child labor, in addition to the conventional measures of labor market returns. Constructing a measure of returns to schooling that incorporates all these factors would be difficult. Instead, we focus on schooling outcomes. As shown by Cunha, Heckman, Lochner, and Masterov (2005), early childhood education by parents is an important complement for formal schooling. Hence, it would seem logical that parents find it beneficial to spend more time preparing their children for school and helping with their homework

¹⁶Technically, the model has only two different level of rights of women: no rights or equal rights. However, it is straightforward to extend the model to allow for intermediate values by assuming that decisions in the family are made according to $V_m + \lambda V_f$ and that men can vote on the value for λ . This allows for a more realistic heterogeneity in rights across countries.

etc. in those countries where schooling is more important, as measured by the average years of schooling.

In Table 2 we show that average years of schooling is highly negatively correlated with the lack of rights for women. Good measures of women's rights are of course hard to find. The United Nations publish two gender-specific indices to compare the status of women's across countries: the Gender Development Index (GDI) and the Gender Empowerment Measure (GEM). Both indices are highly correlated with GDP per capita. However, both of these indices are a composite index of measures of "economic outcomes" such as female labor supply and female education, relative to men. For the arguments made in this paper, legal constraints are more relevant. Legal constraints are harder to measure, but several proxies exist. In particular, the OECD Gender Statistics Data Base (2006) has collected data on the ability of women to access land and bank loans. The incidence (and acceptability) of violence against women in a society could also be interpreted as a measure of constraints imposed on women. As another measure of violence against women, we include an index on the prevalence of Female Genital Mutilation. The legality of abortion can also be interpreted as a measure of a women's right to choose. Data on the lack of abortion rights is available from the Population Reference Bureau (2005). The most direct measure is probably the year in which women obtained the right to vote which is available through the United Nations (2004). Note that all indexes are normalized so that a higher number means fewer rights. Hence, we would expect a negative correlation between average years of schooling and these measure of the lack of women's rights. As Table 2 shows, this is indeed the case. We find a correlation or at least -0.5. between years of schooling and all available measures of lack of rights for women.

The model also implies that women have more rights in those countries that have a lower fertility rate as well as higher per capita income. Using the same measures, we again find high negative correlations between the lack of rights for women and GDP per capita. The total fertility rate is highly positively correlated with the constraints faced by women.

Measure of Lack of Rights	GDP p.c.	TFR	schooling (yrs)
	WDI (2005)	WDI (2005)	WDI (2003)
Abortion policy (PRB 05)	-0.41	0.56	-0.56
Yr first woman in parliament (UN 04)	-0.62	0.35	-0.64
Partial women suffrage (UN 04)	-0.50	0.58	-0.69
Women's access to land (OECD 06)	-0.50	0.78	-0.68
Access to bank loans (OECD 06)	-0.44	0.69	-0.58
Female Genital Mutilation (OECD 06)	-0.32	0.54	-0.51
Violence against women (OECD 06)	-0.40	0.54	-0.63

Sources: OECD Gender Statistics (2006), World Development Indicators (2003), the UN Women Indicator Statistics (1999) and the UN Human Development Report (2004).

Table 2: Correlations between Women's Rights and Economic Development in Cross-Country Data

8 Extensions

8.1 Narrowing of the Education Gap

[TO BE COMPLETED]

8.2 Gradual Power Sharing

[TO BE COMPLETED]

8.3 Heterogeneity across Families

[TO BE COMPLETED]

9 Conclusion

[TO BE WRITTEN]

A Detailed Time Lines of the Legal Position of Women

In this appendix, we give more detailed time lines of the acquisition of rights for women in England and the United States. The U.S. time line is based on Hecker (1971), Salmon (1986), and Khan (1996), while the time line for England is based on Hecker (1971), Shanley (1986), and Kertzer and Barbagli (2001).

A.1 United States

1769 “The very being and legal existence of the woman is suspended during the marriage...” (from English common law)

1785 Pennsylvania was the first state to pass a statute that allowed both men and women to file for *divorce* under extreme circumstances (desertion of at least four years, bigamy, sexual incapacity before marriage, and cruelty). Other states followed shortly.

1838 Kentucky gave *school suffrage* (the right to vote at school meetings) to widows with children of school age.

1839 Mississippi was the first state that gave married women very limited *property rights*.

1844 Maine passed *Sole Trader Law* which granted married women the ability to engage in business without the need for her husband’s consent. Maine also passed a *Property Law* that granted married women separate control over property. Other states followed over the course of the 19th century.

1857 Maine passed an *Earnings Law* which granted married women the rights to their own earnings without the need for the husband’s consent. Other states followed.

1861 Kansas gave school suffrage to all women. Many states followed before the turn of the century.

1869 Wyoming was the first state that gave women the same *voting rights* as men. Most states did not follow until the beginning of the 20th century.

1886 By 1886 all but six states allowed divorce on grounds of cruelty.

1895 By 1895 almost all states had passed some form of Sole Trader Laws, Property Laws, and Earnings Laws.

1920 Nineteenth amendment granting all women right to vote.

1965 Weeks vs. Southern Bell: many restrictive labor laws were lifted, opening previously male-only jobs to women.

1973 Roe v. Wade: legalization of abortion.

1974 Credit discrimination against women outlawed by Congress.

1975 States are denied the right to exclude women from juries.

1981 The Supreme Court rules that excluding women from the draft is unconstitutional.

A.2 England

From late 16th century on Women were allowed to place personal property before marriage into a trust that could not be touched by her future husband or his creditors.

until mid 19th century Clear disparity between legal rights of married vs. single women. Single women were considered *feme sole* which allowed them the right to make contracts and own property in their own name. Married women were legally considered *feme covert* which meant that upon marriage the legal rights of the woman merged and became that of her husband. Married women had practically no rights regarding property, child custody, or the ability to make contracts.

1839 *Custody of Infants Act*, which for the first time granted mothers (under special circumstances) custody of children under 7 years in the event of divorce.

1857 *Matrimonial Causes Act*, which permitted secular divorce in England, allowing both men and women to file. Note though that this law allowed men to file on grounds of adultery, while women could initiate a divorce only if adultery was coupled with incest, bigamy, cruelty, or desertion. This act also gave divorced women the status of *feme sole*.

1869 England granted municipal suffrage to single women and widows.

1870 Act to provide public elementary education in England and Wales. This act created school boards and gave women the same rights as men, both regards electing and being elected.

1870 The *Married Women Property Act* granted women limited control over their earnings and modest legacies. This act did not give women the same property rights as men, rather it was intended to protect the most vulnerable women from their husband's exploitation.

1873 *Second Custody of Infants Act* which allowed mothers to petition for child custody of children up to 16 years old.

1878 The *Matrimonial Causes Act* allowed courts to absolve a wife from her obligation to co-habit and to require her husband to pay a weekly sum to support her, if he had been convicted of aggravated assault against her and she was considered in further danger.

1882 *Act to Consolidate and amend Acts relating to the Property of Married Women*. Gave women the ability to hold separate property and to contract with respect to their separate estates.

1886 Married Women Act. Allowed maintenance orders to be issued against men who neglected, willfully refused to support, or deserted their wives.

1888 *County Suffrage*

1894 *Parish and District Suffrage* gave both single and married women the right to elect and be elected to parish and district councils.

1907 England made women eligible as mayors, aldermen, an county and town councilors.

1918 *Women Suffrage Act*

1935 Act passed that secured a married women's right to assume personal liability for her contracts.

B Incentives for Power Sharing in No-Education Regime

The male value function in the static world is

$$V_m = u(c_m, c_f, n) + \gamma_m \left(\frac{V_m + V_f}{2} \right)$$

where c_m , c_f . and n are the values that come from the male optimization problem (in the patriarchal regime) and the joint decision problem (in the power sharing regime), respectively.

Similarly, the female value function is

$$V_f = u(c_f, c_m, n) + \gamma_f \left(\frac{V_m + V_f}{2} \right)$$

Adding the two value functions, we can solve for the average of the value functions:

$$\frac{V_m + V_f}{2} = \frac{u(c_m, c_f, n) + u(c_f, c_m, n)}{2 - (\gamma_m + \gamma_f)}$$

Using this, the male value function can be written as

$$V_m = u(c_m, c_f, n) + \frac{\gamma_m}{2 - (\gamma_m + \gamma_f)} [u(c_m, c_f, n) + u(c_f, c_m, n)]$$

So far, this is still true for both regimes. The difference between the two regimes is in the policy functions. Let's start with the patriarchal regime:

$$\begin{aligned} V_m &= u(c_m, c_f, n) + \frac{\gamma_m}{2 - (\gamma_m + \gamma_f)} [u(c_m, c_f, n) + u(c_f, c_m, n)] \\ &= \frac{2 - \gamma_f}{2 - (\gamma_m + \gamma_f)} u(c_m, c_f, n) + \frac{\gamma_m}{2 - (\gamma_m + \gamma_f)} u(c_f, c_m, n) \\ &= \frac{2 - \gamma_f}{2 - (\gamma_m + \gamma_f)} [\log(c_m) + \sigma \log(c_f) + \delta \log(n)] \\ &\quad + \frac{\gamma_m}{2 - (\gamma_m + \gamma_f)} [\log(c_f) + \sigma \log(c_m) + \delta \log(n)] \\ &= \frac{2 - \gamma_f + \gamma_m}{2 - (\gamma_m + \gamma_f)} \left\{ (1 + \sigma) \log(c_m) + \delta \log(n) \right\} + \frac{(2 - \gamma_f)\sigma + \gamma_m}{2 - (\gamma_m + \gamma_f)} \log(\sigma) \end{aligned}$$

The value function for the power-sharing regime is more symmetric:

$$\hat{V}_m = \frac{2 - \gamma_f + \gamma_m}{2 - (\gamma_f + \gamma_m)} \left\{ (1 + \sigma) \log(\hat{c}_m) + \delta \log(\hat{n}) \right\}$$

Now we want to know under what conditions $\hat{V}_m > V_m$. This happens iff

$$> \frac{2 - \gamma_f + \gamma_m}{2 - (\gamma_f + \gamma_m)} \left\{ (1 + \sigma) \log(\hat{c}_m) + \delta \log(\hat{n}) \right\} \\ > \frac{2 - \gamma_f + \gamma_m}{2 - (\gamma_m + \gamma_f)} \left\{ (1 + \sigma) \log(c_m) + \delta \log(n) \right\} + \frac{(2 - \gamma_f)\sigma + \gamma_m}{2 - (\gamma_m + \gamma_f)} \log(\sigma)$$

Plugging in for \hat{c}_m, c_m, \hat{n} , and n and cancelling terms, this reduces to

$$[2 - \gamma_f + \gamma_m](1 + \sigma) \log\left(\frac{1 + \sigma}{2}\right) > [(2 - \gamma_f)\sigma + \gamma_m] \log(\sigma)$$

Note that if $\sigma = 1$, then this holds with equality and a man is indifferent between the two regimes. Next, if $\gamma_m = \gamma_f = \gamma$, then the condition becomes

$$(1 + \sigma) \log\left(\frac{1 + \sigma}{2}\right) > \sigma \log(\sigma) + \frac{\gamma}{2}(1 - \sigma) \log(\sigma)$$

Solving for γ this becomes

$$\gamma > \frac{2}{(1 - \sigma)(-\log(\sigma))} \left[\sigma \log(\sigma) - (1 + \sigma) \log\left(\frac{1 + \sigma}{2}\right) \right]$$

So, as long as γ is larger than this expression, then power-sharing is preferred. Define

$$\bar{\gamma}(\sigma) \equiv \frac{2}{(1 - \sigma)(-\log(\sigma))} \left[\sigma \log(\sigma) - (1 + \sigma) \log\left(\frac{1 + \sigma}{2}\right) \right]$$

Note that $\bar{\gamma}$ increases in σ .

We can derive a very similar condition for the more general case $\gamma_f \neq \gamma_m$. Define $\gamma_f = \gamma_m + \Delta$. Then $\hat{V}_m > V_m$ becomes

$$(2 - \Delta)(1 + \sigma) \log\left(\frac{1 + \sigma}{2}\right) > [(2 - \Delta)\sigma + (1 - \sigma)\gamma_m] \log(\sigma)$$

Note that for $\gamma_m = 0$ this reduces to

$$(1 + \sigma) \log\left(\frac{1 + \sigma}{2}\right) > \sigma \log(\sigma)$$

which is NEVER true! Further, note that the RHS is strictly increasing in γ_m and that it converges to $-\infty$ as γ_m approaches ∞ , while the LHS is a constant. Hence, there must be a cut-off γ_m such that the condition is true. In fact, we can solve for this cut-off:

$$\bar{\gamma}_m \equiv \frac{2 - \Delta}{(1 - \sigma)(-\log(\sigma))} \left[\sigma \log(\sigma) - (1 + \sigma) \log\left(\frac{1 + \sigma}{2}\right) \right]$$

which is a slightly generalized version of $\bar{\gamma}(\sigma)$, but still increases in σ , as before. So again, for any $\gamma_m \leq \bar{\gamma}_m$, the patriarchal regime is strictly preferred.

C Solving for the Equilibrium Value Functions in the Education Regime

In this section, we formally derive the equilibrium value functions in the education regime, both under male and shared power.

C.1 Patriarchal Regime

We have defined:

$$\begin{aligned} V_m(H_m, H_f, \bar{H}_m, \bar{H}_f) &= a_1 + a_2 \log(H_m) + a_3 \log(H_f) + a_4 \log(\bar{H}_m) + a_5 \log(\bar{H}_f) \\ V_f(H_m, H_f, \bar{H}_m, \bar{H}_f) &= b_1 + b_2 \log(H_m) + b_3 \log(H_f) + b_4 \log(\bar{H}_m) + b_5 \log(\bar{H}_f) \end{aligned}$$

Plugging this into the definition of V_m on both sides:

$$\begin{aligned} a_1 + a_2 \log(H_m) + a_3 \log(H_f) + a_4 \log(\bar{H}_m) + a_5 \log(\bar{H}_f) &= \max \{ \log(c_m) + \sigma \log(c_f) + \delta \log(n) \\ &+ \frac{\gamma_m}{2} [a_1 + a_2 \log(H'_m) + a_3 \log(\bar{H}'_f) + a_4 \log(\bar{H}'_m) + a_5 \log(\bar{H}'_f)] \\ &+ \frac{\gamma_m}{2} [b_1 + b_2 \log(\bar{H}'_m) + b_3 \log(H'_f) + b_4 \log(\bar{H}'_m) + b_5 \log(\bar{H}'_f)] \} \end{aligned}$$

and similarly for V_f :

$$\begin{aligned} b_1 + b_2 \log(H_m) + b_3 \log(H_f) + b_4 \log(\bar{H}_m) + b_5 \log(\bar{H}_f) &= \log(c_f) + \sigma \log(c_m) + \delta \log(n) \\ &+ \frac{\gamma_f}{2} [a_1 + a_2 \log(H'_m) + a_3 \log(\bar{H}'_f) + a_4 \log(\bar{H}'_m) + a_5 \log(\bar{H}'_f)] \\ &+ \frac{\gamma_f}{2} [b_1 + b_2 \log(\bar{H}'_m) + b_3 \log(H'_f) + b_4 \log(\bar{H}'_m) + b_5 \log(\bar{H}'_f)] \} \end{aligned}$$

Plugging in the optimal decisions and the laws of motion on the right hand side, gives

the following for the male value function:

$$\begin{aligned}
& a_1 + a_2 \log(H_m) + a_3 \log(H_f) + a_4 \log(\bar{H}_m) + a_5 \log(\bar{H}_f) = \\
& \max \left\{ \log \left(\frac{A \left(\frac{\alpha(1+\sigma)}{\alpha(1+\sigma)+\delta} H_f \right)^\alpha H_m^{1-\alpha}}{1+\sigma} \right) + \sigma \log \left(\frac{\sigma A \left(\frac{\alpha(1+\sigma)}{\alpha(1+\sigma)+\delta} H_f \right)^\alpha H_m^{1-\alpha}}{1+\sigma} \right) \right. \\
& + \delta \log \left(\frac{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta}{\phi(\alpha(1+\sigma) + \delta)} \right) \\
& + \frac{\gamma_m}{2} \left[a_1 + a_2 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m}{2} a_2 \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right)^\theta H_f^\beta H_m^{1-\beta} \right) \right. \\
& + a_3 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m}{2} b_3 \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta} \right) \\
& + a_4 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m}{2} a_2 \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta} \right) \\
& \left. + a_5 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m}{2} b_3 \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta} \right) \right] \\
& + \frac{\gamma_m}{2} \left[b_1 + b_2 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m}{2} a_2 \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta} \right) \right. \\
& + b_3 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m}{2} b_3 \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right)^\theta H_f^\beta H_m^{1-\beta} \right) \\
& + b_4 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m}{2} a_2 \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta} \right) \\
& \left. + b_5 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m}{2} b_3 \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta} \right) \right] \left. \right\}
\end{aligned}$$

For the female value function we get:

$$\begin{aligned}
& b_1 + b_2 \log(H_m) + b_3 \log(H_f) + b_4 \log(\bar{H}_m) + b_5 \log(\bar{H}_f) \\
&= \log \left(\frac{\sigma A \left(\frac{\alpha(1+\sigma)}{\alpha(1+\sigma)+\delta} H_f \right)^\alpha H_m^{1-\alpha}}{1+\sigma} \right) + \sigma \log \left(\frac{A \left(\frac{\alpha(1+\sigma)}{\alpha(1+\sigma)+\delta} H_f \right)^\alpha H_m^{1-\alpha}}{1+\sigma} \right) \\
&+ \delta \log \left(\frac{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta}{\phi(\alpha(1+\sigma) + \delta)} \right) \\
&+ \frac{\gamma_f}{2} \left[a_1 + a_2 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m}{2} a_2 \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right)^\theta H_f^\beta H_m^{1-\beta} \right) \right. \\
&+ a_3 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m}{2} b_3 \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta} \right) \\
&+ a_4 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m}{2} a_2 \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta} \right) \\
&\left. + a_5 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m}{2} b_3 \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta} \right) \right] \\
&+ \frac{\gamma_f}{2} \left[b_1 + b_2 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m}{2} a_2 \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta} \right) \right. \\
&+ b_3 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m}{2} b_3 \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right)^\theta H_f^\beta H_m^{1-\beta} \right) \\
&+ b_4 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m}{2} a_2 \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta} \right) \\
&\left. + b_5 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m}{2} b_3 \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta} \right) \right]
\end{aligned}$$

Collecting terms from the male value function gives the following five equations:

$$a_2 = (1 + \sigma)(1 - \alpha) + (1 - \beta) \frac{\gamma_m}{2} (a_2 + b_3) \quad (2)$$

$$a_3 = (1 + \sigma)\alpha + \beta \frac{\gamma_m}{2} (a_2 + b_3) \quad (3)$$

$$a_4 = (1 - \beta) \frac{\gamma_m}{2} [a_3 + a_4 + a_5 + b_2 + b_4 + b_5] \quad (4)$$

$$a_5 = \beta \frac{\gamma_m}{2} [a_3 + a_4 + a_5 + b_2 + b_4 + b_5] \quad (5)$$

From the female value function we have another 5 equations:

$$b_2 = (1 + \sigma)(1 - \alpha) + (1 - \beta)\frac{\gamma_f}{2}(a_2 + b_3) \quad (6)$$

$$b_3 = (1 + \sigma)\alpha + \beta\frac{\gamma_f}{2}(a_2 + b_3) \quad (7)$$

$$b_4 = (1 - \beta)\frac{\gamma_f}{2}[a_3 + a_4 + a_5 + b_2 + b_4 + b_5] \quad (8)$$

$$b_5 = \beta\frac{\gamma_f}{2}[a_3 + a_4 + a_5 + b_2 + b_4 + b_5] \quad (9)$$

The solutions for a_2 and b_3 and a_3 and b_2 are:

$$\begin{aligned} b_3 &= \frac{(1 + \sigma)(2\alpha + (1 - \alpha)\beta\gamma_f - \alpha(1 - \beta)\gamma_m)}{2 - (1 - \beta)\gamma_m - \beta\gamma_f} \\ a_2 &= \frac{(1 + \sigma)(2(1 - \alpha) - (1 - \alpha)\beta\gamma_f + \alpha(1 - \beta)\gamma_m)}{2 - (1 - \beta)\gamma_m - \beta\gamma_f} \\ a_3 &= (1 + \sigma) \left(\alpha + \frac{\beta\gamma_m}{2 - (1 - \beta)\gamma_m - \beta\gamma_f} \right) \\ b_2 &= (1 + \sigma) \left((1 - \alpha) + \frac{(1 - \beta)\gamma_f}{2 - (1 - \beta)\gamma_m - \beta\gamma_f} \right) \end{aligned}$$

Further, we have

$$\begin{aligned} a_4 &= \left(\frac{(1 - \beta)\frac{\gamma_m}{2}}{(1 - \gamma_m/2 - \gamma_f/2)} \right) \left(\frac{(1 + \sigma)[2 + (1 - 2\beta)(\gamma_f - \gamma_m)]}{2 - (1 - \beta)\gamma_m - \beta\gamma_f} \right) \\ a_5 &= \left(\frac{\beta\frac{\gamma_m}{2}}{(1 - \gamma_m/2 - \gamma_f/2)} \right) \left(\frac{(1 + \sigma)[2 + (1 - 2\beta)(\gamma_f - \gamma_m)]}{2 - (1 - \beta)\gamma_m - \beta\gamma_f} \right) \\ b_4 &= \left(\frac{(1 - \beta)\frac{\gamma_f}{2}}{(1 - \gamma_m/2 - \gamma_f/2)} \right) \left(\frac{(1 + \sigma)[2 + (1 - 2\beta)(\gamma_f - \gamma_m)]}{2 - (1 - \beta)\gamma_m - \beta\gamma_f} \right) \\ b_5 &= \left(\frac{\beta\frac{\gamma_f}{2}}{(1 - \gamma_m/2 - \gamma_f/2)} \right) \left(\frac{(1 + \sigma)[2 + (1 - 2\beta)(\gamma_f - \gamma_m)]}{2 - (1 - \beta)\gamma_m - \beta\gamma_f} \right) \end{aligned}$$

Finally, one can solve for the constants, a_1 and b_1 as follows. Collecting all remaining terms from the male value function, the coefficients have to satisfy the following equa-

tion:

$$\begin{aligned}
a_1 = & \log \left(\frac{A}{1+\sigma} \left(\frac{\alpha(1+\sigma)}{\alpha(1+\sigma)+\delta} \right)^\alpha \right) + \sigma \log \left(\frac{\sigma A}{1+\sigma} \left(\frac{\alpha(1+\sigma)}{\alpha(1+\sigma)+\delta} \right)^\alpha \right) \\
& + \delta \log \left(\frac{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta}{\phi(\alpha(1+\sigma)+\delta)} \right) + \frac{\gamma_m}{2}(a_1 + b_1) \\
& + \frac{\gamma_m}{2}[a_2 + a_4 + b_2 + b_4] \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m}{2} a_2 \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right)^\theta \right) \\
& + \frac{\gamma_m}{2}[a_3 + a_5 + b_3 + b_5] \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m}{2} b_3 \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right)^\theta \right)
\end{aligned}$$

This can be written as

$$a_1 = M_1 + \frac{\gamma_m}{2}(a_1 + b_1) + M_2$$

where M_1 and M_2 are defined as follows:

$$\begin{aligned}
M_1 = & \sigma \log(\sigma) + (1+\sigma) \log \left(\frac{A}{1+\sigma} \left(\frac{\alpha(1+\sigma)}{\alpha(1+\sigma)+\delta} \right)^\alpha \right) \\
& + \delta \log \left(\frac{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta}{\phi(\alpha(1+\sigma)+\delta)} \right) \\
M_2 = & \frac{\gamma_m}{2} \theta \log(a_2)[a_2 + a_4 + b_2 + b_4] \\
& + \frac{\gamma_m}{2} \theta \log(b_3)[a_3 + a_5 + b_3 + b_5] \\
& + \frac{\gamma_m}{2} \theta [a_2 + a_3 + a_4 + a_5 + b_2 + b_3 + b_4 + b_5] \log \left(B \left(\frac{\phi \frac{\gamma_m}{2} \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right) \right)
\end{aligned}$$

Collecting the remaining terms from the female value function gives:

$$\begin{aligned}
b_1 = & \log(\sigma) + (1+\sigma) \log \left(\frac{A}{1+\sigma} \left(\frac{\alpha(1+\sigma)}{\alpha(1+\sigma)+\delta} \right)^\alpha \right) \\
& + \delta \log \left(\frac{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta}{\phi(\alpha(1+\sigma)+\delta)} \right) + \frac{\gamma_f}{2}(a_1 + b_1) \\
& + \frac{\gamma_f}{2} \theta \log(a_2)[a_2 + a_4 + b_2 + b_4] + \frac{\gamma_f}{2} \theta \log(b_3)[a_3 + a_5 + b_3 + b_5] \\
& + \frac{\gamma_f}{2} \theta [a_2 + a_3 + a_4 + a_5 + b_2 + b_3 + b_4 + b_5] \log \left(B \left(\frac{\phi \frac{\gamma_m}{2} \theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right) \right)
\end{aligned}$$

Again, this can be written as

$$b_1 = F_1 + \frac{\gamma_f}{2}(a_1 + b_1) + F_2$$

where F_1 and F_2 are defined as

$$\begin{aligned} F_1 &\equiv \log(\sigma) + (1 + \sigma) \log \left(\frac{A}{1 + \sigma} \left(\frac{\alpha(1 + \sigma)}{\alpha(1 + \sigma) + \delta} \right)^\alpha \right) \\ &\quad + \delta \log \left(\frac{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta}{\phi(\alpha(1 + \sigma) + \delta)} \right) \\ F_2 &= \frac{\gamma_f}{2}\theta \log(a_2)[a_2 + a_4 + b_2 + b_4] \\ &\quad + \frac{\gamma_f}{2}\theta \log(b_3)[a_3 + a_5 + b_3 + b_5] \\ &\quad + \frac{\gamma_f}{2}\theta[a_2 + a_3 + a_4 + a_5 + b_2 + b_3 + b_4 + b_5] \log \left(B \left(\frac{\phi \frac{\gamma_m}{2}\theta}{\delta - \frac{\gamma_m}{2}(a_2 + b_3)\theta} \right) \right) \end{aligned}$$

It is easy to solve for the sum $a_1 + b_1$:

$$a_1 + b_2 = \frac{2}{2 - (\gamma_m + \gamma_f)}[M_1 + M_2 + F_1 + F_2]$$

which gives us immediately b_1 and b_2 :

$$\begin{aligned} b_1 &= \frac{\gamma_f}{2 - (\gamma_f + \gamma_m)}(M_1 + M_2) + \frac{2 - \gamma_m}{2 - (\gamma_m + \gamma_f)}(F_1 + F_2) \\ a_1 &= \frac{2 - \gamma_f}{2 - (\gamma_m + \gamma_f)}(M_1 + M_2) + \frac{\gamma_m}{2 - (\gamma_f + \gamma_m)}(F_1 + F_2) \end{aligned}$$

C.2 Equal Rights

We have defined:

$$\begin{aligned} V_m(H_m, H_f, \bar{H}_m, \bar{H}_f) &= a_1 + a_2 \log(H_m) + a_3 \log(H_f) + a_4 \log(\bar{H}_m) + a_5 \log(\bar{H}_f) \\ V_f(H_m, H_f, \bar{H}_m, \bar{H}_f) &= b_1 + b_2 \log(H_m) + b_3 \log(H_f) + b_4 \log(\bar{H}_m) + b_5 \log(\bar{H}_f) \end{aligned}$$

Plugging this into the definition of V_m on both sides:

$$\begin{aligned}
a_1 + a_2 \log(H_m) + a_3 \log(H_f) + a_4 \log(\bar{H}_m) + a_5 \log(\bar{H}_f) &= \log(c_m) + \sigma \log(c_f) + \delta \log(n) \\
&+ \frac{\gamma_m}{2} [a_1 + a_2 \log(H'_m) + a_3 \log(\bar{H}'_f) + a_4 \log(\bar{H}'_m) + a_5 \log(\bar{H}'_f)] \\
&+ \frac{\gamma_m}{2} [b_1 + b_2 \log(\bar{H}'_m) + b_3 \log(H'_f) + b_4 \log(\bar{H}'_m) + b_5 \log(\bar{H}'_f)]
\end{aligned}$$

and similarly for V_f :

$$\begin{aligned}
b_1 + b_2 \log(H_m) + b_3 \log(H_f) + b_4 \log(\bar{H}_m) + b_5 \log(\bar{H}_f) &= \log(c_f) + \sigma \log(c_m) + \delta \log(n) \\
&+ \frac{\gamma_f}{2} [a_1 + a_2 \log(H'_m) + a_3 \log(\bar{H}'_f) + a_4 \log(\bar{H}'_m) + a_5 \log(\bar{H}'_f)] \\
&+ \frac{\gamma_f}{2} [b_1 + b_2 \log(\bar{H}'_m) + b_3 \log(H'_f) + b_4 \log(\bar{H}'_m) + b_5 \log(\bar{H}'_f)] \}
\end{aligned}$$

Plugging in the optimal decisions and the laws of motion on the right hand side, we get

the following equation from the male value function:

$$\begin{aligned}
& a_1 + a_2 \log(H_m) + a_3 \log(H_f) + a_4 \log(\bar{H}_m) + a_5 \log(\bar{H}_f) = \\
& \log\left(\frac{A}{2} \left(\frac{\alpha(1+\sigma)}{\alpha(1+\sigma)+\delta} H_f\right)^\alpha H_m^{1-\alpha}\right) + \sigma \log\left(\frac{A}{2} \left(\frac{\alpha(1+\sigma)}{\alpha(1+\sigma)+\delta} H_f\right)^\alpha H_m^{1-\alpha}\right) \\
& + \delta \log\left(\frac{\delta - \frac{\gamma_m + \gamma_f}{4}(a_2 + b_3)\theta}{\phi(\alpha(1+\sigma) + \delta)}\right) \\
& + \frac{\gamma_m}{2} \left[a_1 + a_2 \log\left(B^\theta \left(\frac{\phi \frac{\gamma_m + \gamma_f}{4} a_2 \theta}{\delta - \frac{\gamma_m + \gamma_f}{4}(a_2 + b_3)\theta}\right)^\theta H_f^\beta H_m^{1-\beta}\right) \right. \\
& + a_3 \log\left(B^\theta \left(\frac{\phi \frac{\gamma_m + \gamma_f}{4} b_3 \theta}{\delta - \frac{\gamma_m + \gamma_f}{4}(a_2 + b_3)\theta}\right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta}\right) \\
& + a_4 \log\left(B^\theta \left(\frac{\phi \frac{\gamma_m + \gamma_f}{4} a_2 \theta}{\delta - \frac{\gamma_m + \gamma_f}{4}(a_2 + b_3)\theta}\right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta}\right) \\
& \left. + a_5 \log\left(B^\theta \left(\frac{\phi \frac{\gamma_m + \gamma_f}{4} b_3 \theta}{\delta - \frac{\gamma_m + \gamma_f}{4}(a_2 + b_3)\theta}\right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta}\right) \right] \\
& + \frac{\gamma_m}{2} \left[b_1 + b_2 \log\left(B^\theta \left(\frac{\phi \frac{\gamma_m + \gamma_f}{4} a_2 \theta}{\delta - \frac{\gamma_m + \gamma_f}{4}(a_2 + b_3)\theta}\right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta}\right) \right. \\
& + b_3 \log\left(B^\theta \left(\frac{\phi \frac{\gamma_m + \gamma_f}{4} b_3 \theta}{\delta - \frac{\gamma_m + \gamma_f}{4}(a_2 + b_3)\theta}\right)^\theta H_f^\beta H_m^{1-\beta}\right) \\
& + b_4 \log\left(B^\theta \left(\frac{\phi \frac{\gamma_m + \gamma_f}{4} a_2 \theta}{\delta - \frac{\gamma_m + \gamma_f}{4}(a_2 + b_3)\theta}\right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta}\right) \\
& \left. + b_5 \log\left(B^\theta \left(\frac{\phi \frac{\gamma_m + \gamma_f}{4} b_3 \theta}{\delta - \frac{\gamma_m + \gamma_f}{4}(a_2 + b_3)\theta}\right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta}\right) \right]
\end{aligned}$$

From the female value function we get:

$$\begin{aligned}
& b_1 + b_2 \log(H_m) + b_3 \log(H_f) + b_4 \log(\bar{H}_m) + b_5 \log(\bar{H}_f) \\
&= \log \left(\frac{A}{2} \left(\frac{\alpha(1+\sigma)}{\alpha(1+\sigma)+\delta} H_f \right)^\alpha H_m^{1-\alpha} \right) + \sigma \log \left(\frac{A}{2} \left(\frac{\alpha(1+\sigma)}{\alpha(1+\sigma)+\delta} H_f \right)^\alpha H_m^{1-\alpha} \right) \\
&+ \delta \log \left(\frac{\delta - \frac{\gamma_m + \gamma_f}{4} (a_2 + b_3) \theta}{\phi(\alpha(1+\sigma) + \delta)} \right) \\
&+ \frac{\gamma_f}{2} \left[a_1 + a_2 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m + \gamma_f}{4} a_2 \theta}{\delta - \frac{\gamma_m + \gamma_f}{4} (a_2 + b_3) \theta} \right)^\theta H_f^\beta H_m^{1-\beta} \right) \right. \\
&+ a_3 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m + \gamma_f}{4} b_3 \theta}{\delta - \frac{\gamma_m + \gamma_f}{4} (a_2 + b_3) \theta} \right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta} \right) \\
&+ a_4 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m + \gamma_f}{4} a_2 \theta}{\delta - \frac{\gamma_m + \gamma_f}{4} (a_2 + b_3) \theta} \right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta} \right) \\
&+ a_5 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m + \gamma_f}{4} b_3 \theta}{\delta - \frac{\gamma_m + \gamma_f}{4} (a_2 + b_3) \theta} \right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta} \right) \left. \right] \\
&+ \frac{\gamma_f}{2} \left[b_1 + b_2 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m + \gamma_f}{4} a_2 \theta}{\delta - \frac{\gamma_m + \gamma_f}{4} (a_2 + b_3) \theta} \right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta} \right) \right. \\
&+ b_3 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m + \gamma_f}{4} b_3 \theta}{\delta - \frac{\gamma_m + \gamma_f}{4} (a_2 + b_3) \theta} \right)^\theta H_f^\beta H_m^{1-\beta} \right) \\
&+ b_4 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m + \gamma_f}{4} a_2 \theta}{\delta - \frac{\gamma_m + \gamma_f}{4} (a_2 + b_3) \theta} \right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta} \right) \\
&+ b_5 \log \left(B^\theta \left(\frac{\phi \frac{\gamma_m + \gamma_f}{4} b_3 \theta}{\delta - \frac{\gamma_m + \gamma_f}{4} (a_2 + b_3) \theta} \right)^\theta \bar{H}_f^\beta \bar{H}_m^{1-\beta} \right) \left. \right]
\end{aligned}$$

Collecting terms from the male value function gives the following five equations:

$$a_2 = (1 + \sigma)(1 - \alpha) + (1 - \beta) \frac{\gamma_m}{2} (a_2 + b_3) \quad (10)$$

$$a_3 = (1 + \sigma)\alpha + \beta \frac{\gamma_m}{2} (a_2 + b_3) \quad (11)$$

$$a_4 = (1 - \beta) \frac{\gamma_m}{2} [a_3 + a_4 + a_5 + b_2 + b_4 + b_5] \quad (12)$$

$$a_5 = \beta \frac{\gamma_m}{2} [a_3 + a_4 + a_5 + b_2 + b_4 + b_5] \quad (13)$$

From the female value function we have another 5 equations:

$$b_2 = (1 + \sigma)(1 - \alpha) + (1 - \beta)\frac{\gamma_f}{2}(a_2 + b_3) \quad (14)$$

$$b_3 = (1 + \sigma)\alpha + \beta\frac{\gamma_f}{2}(a_2 + b_3) \quad (15)$$

$$b_4 = (1 - \beta)\frac{\gamma_f}{2}[a_3 + a_4 + a_5 + b_2 + b_4 + b_5] \quad (16)$$

$$b_5 = \beta\frac{\gamma_f}{2}[a_3 + a_4 + a_5 + b_2 + b_4 + b_5] \quad (17)$$

Note that this is the same system of equations as in the patriarchal regime, hence, the solutions will be the same. Next, we solve for the constants \hat{a}_1 and \hat{b}_1 . Collecting the remaining terms from the male value function gives:

$$\begin{aligned} a_1 = & (1 + \sigma) \log \left(\frac{A}{2} \left(\frac{\alpha(1 + \sigma)}{\alpha(1 + \sigma) + \delta} \right)^\alpha \right) \\ & + \delta \log \left(\frac{\delta - \frac{\gamma_m + \gamma_f}{4}(a_2 + b_3)\theta}{\phi(\alpha(1 + \sigma) + \delta)} \right) + \frac{\gamma_m}{2}(a_1 + b_1) \\ & + \frac{\gamma_m}{2}\theta \log(a_2)[a_2 + a_4 + b_2 + b_4] + \frac{\gamma_m}{2}\theta \log(b_3)[a_3 + a_5 + b_3 + b_5] \\ & + \frac{\gamma_m}{2}\theta[a_2 + a_3 + a_4 + a_5 + b_2 + b_3 + b_4 + b_5] \log \left(\frac{B\phi^{\frac{\gamma_m + \gamma_f}{4}}\theta}{\delta - \frac{\gamma_m + \gamma_f}{4}(a_2 + b_3)\theta} \right) \end{aligned}$$

Collecting the remaining terms from the female value function gives:

$$\begin{aligned} b_1 = & (1 + \sigma) \log \left(\frac{A}{2} \left(\frac{\alpha(1 + \sigma)}{\alpha(1 + \sigma) + \delta} \right)^\alpha \right) \\ & + \delta \log \left(\frac{\delta - \frac{\gamma_m + \gamma_f}{4}(a_2 + b_3)\theta}{\phi(\alpha(1 + \sigma) + \delta)} \right) + \frac{\gamma_f}{2}(a_1 + b_1) \\ & + \frac{\gamma_f}{2}\theta \log(a_2)[a_2 + a_4 + b_2 + b_4] + \frac{\gamma_f}{2}\theta \log(b_3)[a_3 + a_5 + b_3 + b_5] \\ & + \frac{\gamma_f}{2}\theta[a_2 + a_3 + a_4 + a_5 + b_2 + b_3 + b_4 + b_5] \log \left(\frac{B\phi^{\frac{\gamma_m + \gamma_f}{4}}\theta}{\delta - \frac{\gamma_m + \gamma_f}{4}(a_2 + b_3)\theta} \right) \end{aligned}$$

Again, define some constants to make this easier to solve:

$$\begin{aligned}
\hat{M}_1 &= (1 + \sigma) \log \left(\frac{A}{2} \left(\frac{\alpha(1 + \sigma)}{\alpha(1 + \sigma) + \delta} \right)^\alpha \right) + \delta \log \left(\frac{\delta - \frac{\gamma_m + \gamma_f}{4} (a_2 + b_3) \theta}{\phi(\alpha(1 + \sigma) + \delta)} \right) \\
\hat{M}_2 &= \frac{\gamma_m}{2} \theta \log(a_2) [a_2 + a_4 + b_2 + b_4] + \frac{\gamma_m}{2} \theta \log(b_3) [a_3 + a_5 + b_3 + b_5] \\
&\quad + \frac{\gamma_m}{2} \theta [a_2 + a_3 + a_4 + a_5 + b_2 + b_3 + b_4 + b_5] \log \left(\frac{B \phi^{\frac{\gamma_m + \gamma_f}{4}} \theta}{\delta - \frac{\gamma_m + \gamma_f}{4} (a_2 + b_3) \theta} \right) \\
\hat{F}_1 &= (1 + \sigma) \log \left(\frac{A}{2} \left(\frac{\alpha(1 + \sigma)}{\alpha(1 + \sigma) + \delta} \right)^\alpha \right) + \delta \log \left(\frac{\delta - \frac{\gamma_m + \gamma_f}{4} (a_2 + b_3) \theta}{\phi(\alpha(1 + \sigma) + \delta)} \right) \\
\hat{F}_2 &= \frac{\gamma_f}{2} \theta \log(a_2) [a_2 + a_4 + b_2 + b_4] + \frac{\gamma_f}{2} \theta \log(b_3) [a_3 + a_5 + b_3 + b_5] \\
&\quad + \frac{\gamma_f}{2} \theta [a_2 + a_3 + a_4 + a_5 + b_2 + b_3 + b_4 + b_5] \log \left(\frac{B \phi^{\frac{\gamma_m + \gamma_f}{4}} \theta}{\delta - \frac{\gamma_m + \gamma_f}{4} (a_2 + b_3) \theta} \right)
\end{aligned}$$

This gives an analogue system of equations to solve as in the patriarchal regime:

$$\begin{aligned}
\hat{a}_1 &= \hat{M}_1 + \frac{\gamma_m}{2} (\hat{a}_1 + \hat{b}_1) + \hat{M}_2 \\
\hat{b}_1 &= \hat{F}_1 + \frac{\gamma_f}{2} (\hat{a}_1 + \hat{b}_1) + \hat{F}_2
\end{aligned}$$

So the solution are:

$$\begin{aligned}
\hat{b}_1 &= \frac{\gamma_f}{2 - (\gamma_f + \gamma_m)} (\hat{M}_1 + \hat{M}_2) + \frac{2 - \gamma_m}{2 - (\gamma_m + \gamma_f)} (\hat{F}_1 + \hat{F}_2) \\
\hat{a}_1 &= \frac{2 - \gamma_f}{2 - (\gamma_m + \gamma_f)} (\hat{M}_1 + \hat{M}_2) + \frac{\gamma_m}{2 - (\gamma_f + \gamma_m)} (\hat{F}_1 + \hat{F}_2)
\end{aligned}$$

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