

POLYGyny, WOMEN'S RIGHTS, AND DEVELOPMENT

Michèle Tertilt
Stanford University

Abstract

Many Sub-Saharan African countries are extremely poor. It has been argued that the marriage system—in particular polygyny—is one contributing factor to the lack of development in this region. However, enforcing monogamy has proved to be very difficult. In this paper, I argue that transferring the right of choosing a husband from fathers to daughters might be an alternative policy that could potentially be easier to enforce. I use a calibrated general equilibrium model of polygyny to analyze such a policy. I find that giving daughters more choices has similar economic effects as a ban on polygyny. Both policies decrease the return on wives for men and thereby raise the incentive to invest in alternative assets. This increases the capital stock and hence GDP per capita. Quantitatively, however, I find that enforcing monogamy has much larger effects. (JEL: E0, O11, O55, J12, J13)

1. Introduction

Sub-Saharan African (SSA) countries are generally very poor and have been stagnating over the last 40 years. Although many different explanations have been proposed—most prominently colonial origin and bad institutions (Acemoglu, Johnson, and Robinson 2001) and tropical climate and diseases (Bloom and Sachs 1998)—there is some evidence that the marriage system might also play a role. In particular, polygyny might be an obstacle to economic development.

Many countries in SSA are highly polygynous. The number of married men in polygynous unions ranges from 10.2% in Malawi to 55.6% in Cameroon. In Tertilt (2005), I describe how monogamous countries differ from polygynous ones. In particular, fertility is extremely high (6.8 children per women compared to 4.6 in monogamous countries), the age gap between men and women is very high (almost 6.4 years compared to only 2.8), savings rates are low (13% vs. 19% of GDP), and GDP per capita is very low (\$975 vs. \$2,798).

The economics of polygyny was pioneered by Becker (1974), Grossbard (1978) and Bergstrom (1994). Recently, a small literature has emerged linking

Acknowledgments: Thanks to Sarah Carroll for excellent research assistance. Funding from the Iris F. Litt, M.D., Fund at Stanford and NSF grant SES-0519324w is gratefully acknowledged.

E-mail address: tertilt@stanford.edu

Journal of the European Economic Association April-May 2006 4(2–3):523–530
© 2006 by the European Economic Association

TABLE 1. Polygyny laws in countries with at least 10% of married men in polygynous union.

Law	Countries	Pol. Rate**
Legal	Cameroon, Republic of the Congo, Ghana, Kenya, Malawi, Niger, Sudan, Uganda	22%
Restricted*	Bangladesh, Burkina Faso, Central African Republic, Chad, Gabon, Mali, Mozambique, Senegal, Tanzania	25%
Illegal	Benin, Democratic Republic of the Congo, Cote d'Ivoire, Gambia, Guinea, Togo	29%

Notes: *Either explicit consent of wives required or restrictions on number of wives.

** Average percentage of married men in polygynous union, latest year available.

marriage systems to development (Edlund and Lagerloef 2002; Lagerloef 2005; Gould, Moav, and Simhon 2004). In Tertilt (2005), I suggest the following argument for why polygyny might be bad for economic development. Polygyny drives up the demand for wives, which increases the equilibrium brideprice so that men have to pay a high price to marry. In equilibrium, widespread polygyny is only sustainable if population growth is high and men marry women younger than themselves. Buying wives and selling daughters becomes a good investment strategy that helps provide for retirement. This behavior can crowd out investment in alternative assets. Therefore, investment in physical assets is low, and hence the aggregate capital stock is low. Consequently, GDP per capita is also low. Quantitatively, I find that enforcing a ban on polygyny decreases fertility by 40%, increases the savings rate by 70%, and increases output per capita by 170%.

Some international agencies have made eradicating polygyny an explicit goal.¹ This pressure has led some countries to pass laws that forbid polygyny, or in some cases to allow it only with explicit consent of both spouses at first marriage. Table 1 shows that some of the countries with the highest polygyny rates have officially banned the practice. This shows that the legal attempts have not been very successful so far. Other countries have resisted international pressure to change their family law and polygyny remains legal.

Passing and enforcing such laws might be difficult because it is rooted in strong cultural traditions. This difficulty might also be related to the property rights structure in many of these countries. As long as men “own” their daughters, there is a strong incentive to sell them to the “highest bidder.” Polygyny keeps the price of brides high, which is good for fathers of daughters. However, daughters likely care about more than just the marriage payment. For example, women may care about their husband’s age and about their expected number of children.

1. For example, the U.N. Committee on the Elimination of Discrimination against Women writes in the concluding observations of the Nineteenth session of 22 June–10 July 1998 that “The Committee recommends that a uniform family code in conformity with the Convention be prepared in which unequal inheritance rights, land rights and polygamy are addressed, with the aim of abolishing them.”

Hence, if women could make their own marriage decisions, they might make very different choices from their fathers. And in particular, if a father no longer receives a positive brideprice for his daughters' marriages, his incentives to have children and to save for his old age may be dramatically altered. In this paper, I investigate the hypothesis that allowing daughters to make their own marriage decisions is ultimately good for development. In a quantitative general equilibrium model, I show that such a channel might be quantitatively important.

2. Gender Inequality

One way to encourage daughters to make their own marriage decision could be to improve gender equality. More rights for women might be a goal that is easier to achieve than banning polygyny. Improving gender equality is also a proclaimed goal of many international institutions—for example, the third UN Millennium Development Goal is to “promote gender equality and empower women.”² Currently, the rights to own assets, to inherit, and to make decisions are still limited for many women in developing countries. These rights are particularly limited in polygynous countries which might be a reason why fathers often regard daughters as their property. Table 2 compares averages of several measures of gender inequality—all related to the rights of women to make their own decisions—for polygynous and monogamous countries.

Table 2 shows that gender inequality is much more pronounced in polygynous SSA countries than in monogamous countries located in similar climate (as measured by latitude). According to the United Nations Gender Empowerment Measure, women fare much worse in polygynous countries. Although the gender gap in literacy has been shrinking in most parts of the world, a very large literacy

TABLE 2. Polygynous vs. monogamous countries.

	High Polygyny***	Monogamous Latitude < 20
Gender Empowerment Measure (GEM),* 2003	0.22	0.50
Ratio of adult female to male literacy rates, 2000	0.66	0.95
Abortion policy,** 2005	1.4	1.7
Female seats in parliament, 2004	12.6%	14.1%

*A composite index of gender inequality constructed by UNDP, scale from 0 to 1.

**Scale: 1 = illegal, 2 = legal under some conditions, 3 = legal.

***All countries listed in Table 1.

2. Also, the United Nations General Assembly Resolution S25.2 states the following goal: “We resolve to continue to undertake legislative and administrative reforms giving women full and equal access to economic resources, including the right to inheritance and the ownership of land and other property, credit, natural resources and appropriate technologies, and to ensure their right to security of tenure and their right to enter into contractual agreements.” See http://www.unhabitat.org/declarations/declaration_cities.asp.

gap remains for women living in polygynous countries. They also face much less generous abortion laws. Finally, on a national level, women in polygynous countries also have less say in national politics, as measured by the proportion of seats in parliament occupied by women.

These numbers suggest two things. On the one hand, they suggest that given the general low status of women, it might be easy for a father to control his daughter's actions. On the other hand, the large gap with other countries opens the possibility that there is room for policy along this dimension.

For the purpose of this paper, I assume that there are policies that strengthen a daughter's right to choose a husband and analyze the economic effects of such a policy.

3. Model and Results

I consider two property rights systems. In the first one, fathers sell their daughters into marriage; this is described in detail in Tertilt (2005). In the second one, daughters choose their marriage partner, taking a man's behavior in marriage as given. I analyze an infinite-horizon, overlapping generations model of marriage, fertility, and savings. People live for one period as a child and for two adult periods. They make choices only during the adult periods. Young adults are endowed with one unit of labor which they supply inelastically at wage w_t . People derive utility from consumption in both adult periods and from the total number of children. I assume that women can bear children only when they are young adults, while both young and old men can have children, as long as they have a fecund wife/wives. There is a decentralized marriage market in which young women supply themselves and men of both ages may acquire brides. Let p be the bride price. Having children is costly for both fathers and mothers: I assume that if one woman has f children, the total cost is $2\epsilon f^2$ and that this is shared equally between husband and wife. The assumption of equal cost sharing implies that an age i polygynous man with n^i fertile wives and f^i new children (i.e., f^i/n^i children per wife) will pay a total cost of $\epsilon f^{i^2}/n^i$. That is, for a man, the per child cost falls if he has more wives. Further, I assume that half the children are male, and half are female. Omitting all time subscripts, the problem of a man can then be summarized as

$$\begin{aligned} \max_{c, f, s} \quad & \ln c^y + \beta \ln c^o + \gamma \ln(f^y + f^o) \\ \text{subject to:} \quad & c^y + p^y n^y + s + \epsilon \frac{f^{y^2}}{n^y} \leq w \\ & c^o + p^o n^o + \epsilon \frac{f^{o^2}}{n^o} \leq (1 - \delta + r)s, \end{aligned}$$

where f^y and f^o are the number of children born when young and old respectively, c^y and c^o are consumption when young and old, and s are savings.

A woman can choose to sell herself to one of two types of husbands (young or old, denoted by $i = y$ and $i = o$, respectively). Because men make fertility decisions, she is not necessarily indifferent about the type of husband. Let p^i be the market clearing price for a marriage of type i . Given a husband choice $i = y, o$, her problem is

$$V^i = \max_{c^y, c^o, s} \ln c^y + \beta \ln c^o + \gamma \ln(\bar{k}^i)$$

subject to: $c^y + s_f + [\varepsilon(\bar{k}^i)^2 - p^i] \leq w$

$$c^o \leq (1 + r - \delta)s_f,$$

taking her husband's fertility decisions $\bar{k}^i = f_i/n_i$, $i = y, o$, as given. That is, \bar{k}^y denotes the optimal number of children per wife conditional on having a fecund wife when young, and \bar{k}^o stands for the optimal number of children per new wife conditional on being newlywed when old. Given p^i , a woman then chooses a husband to maximize utility. Let I^i denote a woman's marriage decision: $I^y = 1$ means that she marries a young man, this is optimal if $V^y \geq V^o$. $I^o = 1$ means that she marries an old man, which is optimal if $V^o \geq V^y$.

Let M_t be the number of young adult men in period t . Let $\eta = M_{t+1}/M_t$ be the population growth factor. There is also an aggregate technology that uses capital and labor to produce the consumption good. I assume a standard Cobb-Douglas production function, $Y_t = AK_t^\alpha L_t^{1-\alpha}$. The representative firm maximizes profits. Each young adult (both men and women) supplies one unit of labor inelastically, hence aggregate labor supply is $L_t = 2M_t$. In equilibrium, the capital stock used for production in $t + 1$ is equal to aggregate savings in t . On a balanced growth path, the capital-output ratio can be written as

$$\frac{K}{Y} = \frac{1}{A} \left(\frac{s_f + s}{2\eta} \right)^{1-\alpha}. \quad (1)$$

DEFINITION 1. A balanced growth path (BGP) for this economy is an allocation—consumption (c^y, c^o, c_f^y, c_f^o), savings (s, s_f), number of wives (n^y, n^o), female marriage decisions (I^y, I^o), number of children (f^y, f^o)—prices (p^y, p^o, r, w), a population growth factor η , and a capital-output ratio, K/Y such that the following hold.

- Given prices, (c, s, n, f) solves the man's problem.
- Given prices and (\bar{k}^y, \bar{k}^o) , women choose $(c_f^y, c_f^o, s_f, I^y, I^o)$ optimally, where \bar{k}^i is a man's optimal number of children per wife, conditional on being newlywed at age i .
- Marriage markets clear: $n^y M_t = I^y M_t$ and $n^o M_{t-1} = I^o M_t$.

- Population dynamics is satisfied $M_{t+1} = \frac{1}{2}[M_t f^y + M_{t-1} f^o]$.
- $K/Y = A^{-1}((s_f + s)/(2\eta))^{1-\alpha}$.
- Profit maximization holds: $r = \alpha Y/K$ and $w = (1 - \alpha)A^{\frac{1}{1-\alpha}}(K/Y)^{\frac{\alpha}{1-\alpha}}$.

The balanced growth path is then characterized by the following proposition.

PROPOSITION 1. Any symmetric BGP with $r - \delta > 0$ has the following properties:³

1. $p^y, p^o > 0$;
2. $n^y = 0, n^o > 0$ and $I^y = 0, I^o = 1$;
3. $n^o = M_t/M_{t-1}$;
4. $M_t/M_{t-1} = \sqrt{f^o/2}$.

The proof is given in the appendix. The proposition says that the equilibrium brideprice is always strictly positive, that there is a spousal age gap, and that the number of wives equals the population growth rate. The “demographic features” of this BGP are very similar to the BGP in an economy where daughters are sold by their fathers, as laid out in Tertilt (2005). In contrast, enforcing monogamy changes the structure of the family, the spousal age gap, and the sign of the marriage payment. None of these effects occurs with the policy considered in this paper, yet the return on wives is decreased for men, which affects equilibrium savings. But is it quantitatively important?

The quantitative results are summarized in Table 3.⁴ The first two columns repeat the results from Tertilt (2005), and the last column shows the effects of

TABLE 3. Numerical results—change in property rights.

Marriage system	Fathers “own” daughters		Women choose husband
	Polygyny	Monogamy	Polygyny
Children per woman	5.01	2.91	4.44
Number of wives per man	2.51	1	2.22
Savings rate as % of GDP	13	22	21
GDP per capita	975	2,648	1,570
Male steady state utility	12.3	12.7	12.5
Female steady state utility	11.3	12.5	12.51
Marriage payments/GDP	0.04	0.10	0.13
Child-rearing costs/GDP	0.29	0.04	0.12

3. The assumption that the net interest rate be positive is only relevant for parts 2–4 of the Proposition.

4. The parameters are calibrated so that the version of the model where fathers sell their daughters matches the fertility rate, the savings rate, and GDP per capita in the average polygynous country.

a policy that empowers daughters. The new policy significantly increases the incentive to save as fathers lose the ability to use daughters as an investment vehicle. The savings rate increases by 60% and reaches a level similar to the monogamous one. Output per capita increases also by 60%. Note that per capita output is still well below the monogamous level. The reason is that fertility remains high when daughters choose their own husband. Hence, the ratio of working population to overall population is low, leading to low per capita output. Output per worker, on the other hand, is very similar under both policies. The policy changes the structure of families very little: Polygyny and fertility remain high, and spousal age gaps persist. Fertility remains high, despite a considerably higher child cost, because of the higher steady state income, which makes people willing to spend more resources on children.

The above exercise shows that enforcing monogamy is not the only way of raising the incentives to save in polygynous countries. However, the increase in GDP is significantly lower than what can be achieved by enforcing monogamy.

Appendix: Proof of Proposition 1

The first order condition of the man's problem are:

$$\begin{aligned} n^y : p^y &\geq \varepsilon \left(\frac{f^y}{n^y} \right)^2 \\ n^o : p^o &\geq \varepsilon \left(\frac{f^o}{n^o} \right)^2 \\ f^y : \frac{2\varepsilon f^y}{c^y n^y} &\geq \frac{\gamma}{f^y + f^o} \\ f^o : \frac{\beta 2\varepsilon f^o}{c^o n^o} &\geq \frac{\gamma}{f^y + f^o} \\ s : \frac{1}{c^y} &= \frac{\beta}{c^o} (1 - \delta + r), \end{aligned}$$

where all equations hold with strict equality if the respective variable is strictly positive.

Part (1) is true because otherwise demand for wives would be infinity, which would violate market clearing. Given part (2), (3) follows directly from the age-gap marriage market clearing condition. Part (2) also implies that young men cannot have any children, $f^y = 0$, which together with the law of motion for population dynamics then implies that fertility and population growth are linked by condition (4). Part (2) is a little more subtle. Note that it follows from the first order conditions of the man's problem that, conditional on having a new wife at

age i , the optimal child/wife ratio is such that the per-wife cost of child-rearing is exactly equal to the brideprice.

$$p^i = \varepsilon \left(\frac{f^i}{n^i} \right)^2 \quad i = y, o \quad (\text{A.1})$$

Thus, the brideprice exactly covers the child-rearing cost for a woman, $p^i = \varepsilon \bar{k}^i$. This implies that the cost cancels out of the woman's problem in equilibrium and that her utility is strictly increasing in own fertility. Thus, she prefers the husband who wants more children, irrespective of the brideprice. To show that any equilibrium will involve an age gap, consider three cases. Suppose first that $p^y = p^o$. Then a man would choose to marry only women that are younger because this allows him to postpone child-bearing, which makes having children ultimately cheaper as long as interest rates are strictly positive, $r - \delta > 0$. Next, suppose $p^y > p^o$, then men would still strictly prefer to marry when old. So $p^y < p^o$ is necessary to make a man prefer to marry a wife of his own generation. But equation (A.1) implies that the number of children per wife is higher conditional on marrying when old. This means that a woman strictly prefers to marry an old man. Hence there can be no equilibrium in which men and women of the same age marry. \square

References

- Acemoglu, Daron, Simon Johnson, and James A. Robinson (2001). "The Colonial Origins of Comparative Development: An Empirical Investigation." *American Economic Review*, 91(5):1369–1401.
- Becker, Gary S. (1974). "A Theory of Marriage: Part II." *Journal of Political Economy*, 82(2):S11–S26.
- Bergstrom, Theodore C. (1994). "On the Economics of Polygyny." Department of Economics, University of California Santa Barbara, Paper 1994A.
- Bloom, David, and Jeffrey D. Sachs (1998). "Geography, Demography and Economic Growth in Africa." *Brookings Papers on Economic Activity*, 2, 207–295.
- Edlund, Lena, and Nils-Peter Lagerloef (2002). "Implications of Marriage Institutions for Redistribution and Growth." Working paper, Columbia University.
- Gould, Eric D., Omer Moav, and Avi Simhon (2004). "The Mystery of Monogamy." The Hebrew University Working Paper.
- Grossbard, Amyra (1978). "Towards a Marriage between Economics and Anthropology and a General Theory of Marriage." *American Economic Review Papers and Proceedings*, 68(2), 33–37.
- Lagerloef, Nils-Peter (2005). "Sex, Equality, and Growth." *Canadian Journal of Economics*, 38, 807–831.
- Tertilt, Michèle (2005). "Polygyny, Fertility, and Savings." *Journal of Political Economy*, 113(6), 1341–1371.

Copyright of *Journal of the European Economic Association* is the property of MIT Press and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.