Marriage Laws and Growth in Sub-Saharan Africa

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Many countries in Sub-Saharan Africa (SSA) are highly polygynous. The percentage of married men in polygynous unions ranges from 10.2 in Malawi to 55.6 in Cameroon. Polygynous countries are poorer than similar nonpolygynous countries, and are characterized by higher fertility, higher spousal age gaps, and lower savings (Tertilt, 2005).

The economics of polygyny was pioneered by Gary S. Becker (1974) and Amyra Grossbard (1978). Recently, a small literature has emerged analyzing the link between marriage institutions and economic outcomes (Hanan G. Jacoby, 1995; Lena Edlund, 1999; Edlund and Nils-Peter Lagerloef, 2004; Eric D. Gould et al., 2004). Tertilt (2005) argues that polygyny might be contributing to underdevelopment in SSA. Polygyny raises demand for wives, which increases the equilibrium bride price. While men pay to obtain brides, they are also the recipients of these payments when selling their daughters. Investment in wives then crowds out investment in physical assets, lowering the aggregate capital stock. Moreover, the incentives to have children are high. Together, a low capital stock and high fertility lead to low output. Based on a calibrated model, Tertilt (2005) argues that enforcing a ban on polygyny might decrease fertility by 40 percent, increase the savings rate by 70 percent, and increase GDP per capita by 170 percent.

If enforcing monogamy raises output, then an obvious questions is: should countries in SSA be encouraged to give up their traditions and enforce monogamy? The United Nations (UN), for example, has been pursuing such a policy. In this paper, we analyze the transitional dynamics following a marriage reform. We study how rapidly the economy converges to the new, higher-savings steady state. We also identify the winners and losers along the transition.

The results may shed some light on recent experiences in countries like Gambia and Togo which have made polygyny illegal but have found enforcement to be difficult (Tertilt, 2006). While some of the resistance may be due to cultural factors, we argue that there are also economic forces that work against moving to a monogamous society. While output might increase in the long run, we find that initial generations of men are clear losers from the marriage reform. Hence, it is difficult to argue that enforcing monogamy is unambiguously beneficial.

I. Model

We add transitional dynamics to the steady-state model described in Tertilt (2005). The framework is an infinite-horizon, overlapping-generations model of marriage, fertility, and savings. People live for one period as a child and for two adult periods. Young adults are endowed with one unit of labor, which they supply inelastically at wage w_t. People can save assets at interest rate r_t. Utility depends on consumption and on the total number of children. Women are fertile only when young, while men can always have children as long as they have a fertile wife. We assume that fertility is chosen by men. Women have no control over their own fertility; they choose savings and consumption to maximize utility. Having children is costly. If a woman has f children, the total cost is $2\varepsilon f^2$, which is shared equally between husband and wife. We assume that half of the children are female. There is a decentralized marriage market where fathers sell daughters and men of both ages may acquire brides at price p_t. Marriage market clearing requires that all men and women get married.

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There is an aggregate technology that uses capital and labor to produce the consumption good, $Y_t = AK_t^{\alpha}L_t^{1-\alpha}$. The capital stock available for production in $t + 1$ is equal to aggregate savings in t. Labor supply equals the total number of young adult men and women. Wages and interest rates are equal to the marginal products of labor and capital.

We assume that the economy starts at time $t = 0$ in the steady state associated with the absence of marriage legislation, calibrated to the average polygynous country as in Tertilt (2005). A permanent and unexpected reform that perfectly enforces monogamy is carried out in the middle of period $t = 1$, after marriage decisions have taken place, but before consumption and fertility decisions have been made.[1] The first period in which all new marriages are monogamous is period $t = 2$. Fertility and consumption choices already adjust in period $t = 1$, in anticipation of the falling demand for brides.

All men from period 1 onward must choose whether to marry when young or when old. The problem of a man after the reform is[2]

$$(1)\quad \max_{c,s,n,f} \ln c_t^y + \beta \ln c_{t+1}^o + \gamma \ln(f_t^y + f_{t+1}^o)$$

$$\text{s.t. } c_t^y + p_t n_t^y + s_t^y + \varepsilon \frac{(f_t^y)^2}{n_t^y} \leq w_t$$

$$c_{t+1}^o + p_{t+1} n_{t+1}^o + s_{t+1}^o + \varepsilon \frac{(f_{t+1}^o)^2}{n_{t+1}^o} \leq (1 - \delta + r_{t+1}) s_t^y + p_{t+1} \frac{f_{t+1}^y}{2}$$

$$(1 - \delta + r_{t+2}) s_{t+1}^o + p_{t+2} \frac{f_{t+1}^o}{2} = 0,$$

$$(n_t^y, n_{t+1}^o) \in \{(1, 0), (0, 1)\}$$

where c_t^y, c_{t+1}^o denotes consumption, s_t^y, s_{t+1}^o savings, f_t^y, f_{t+1}^o fertility, and n_t^y, n_{t+1}^o bride choices when young and old, respectively.

The problem of an old man during the reform period is

$$(2)\quad \max_{c_1^o, f_0, s_0^o} \beta \ln c_1^o + \gamma \ln(f_1^o)$$

$$\text{s.t. } c_1^o + p_{ss} n_{ss} + s_1^o + \varepsilon \frac{(f_1^o)^2}{n_{ss}} \leq (1 - \delta + r_1) s_{ss}^y$$

$$(1 - \delta + r_2) s_1^o + \frac{p_2 f_1^o}{2} = 0$$

where the subscript *ss* denotes steady-state values, which are determined before the reform is announced.

In period 1, all young women are already married, hence, there are no further brides available and the initial young men have to marry when old. As long as there is positive population growth, from period $t = 2$ onward, some young women will marry old men, and the remaining young women will marry young men.[3] The bride price will adjust to assure that men are indifferent about the timing of marriage. Along the transition, there will be (ex post) different types of men, those who marry with an age gap and those who have a same age bride. The composition of types will change along the transition. Fertility choices of each type, together with the type composition, will determine the population size in the next period.

II. Results

A marriage reform that enforces monogamy drastically reduces demand for brides, which immediately affects the bride price. Figure 1 shows that p_t falls within one period from +\$1,000 to −\$1,700, where a period is interpreted as 15 years. This has tremendous effects on the initial old men. They married many brides planning to have many daughters who they intended to sell at a high price. Instead, suddenly daughters are a liability. Initial old men immediately reduce fer-

[1] Alternatively, if a reform was passed after fertility decisions had been made, then there would be a generation of men who would not be able to repay their loans. Since the model does not allow for default, we do not consider this possibility.

[2] This formulation assumes that daughters are always sold, even when this is costly. This is a reduced form formulation of a more explicit model where fathers incur a cost of providing for their unmarried daughters (Tertilt, 2005).

[3] Women are typically not indifferent between marrying a young or an old man. Since marriage is not a choice for women, however, a utility differential is consistent with equilibrium.

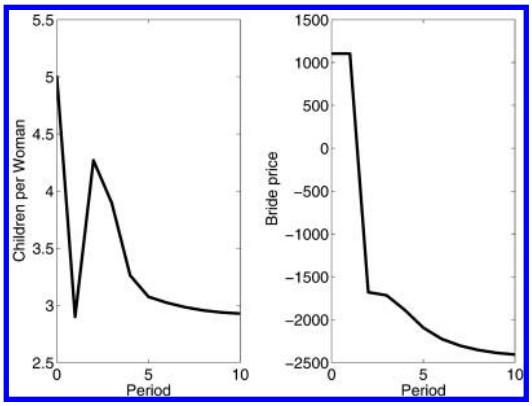

FIGURE 1. FERTILITY AND BRIDE-PRICE TRANSITION

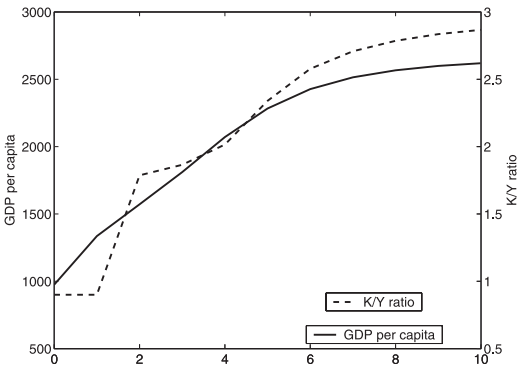

FIGURE 2. GDP AND CAPITAL-OUTPUT RATIO

tility from 12.5 to 7.5 children. Thereafter, fertility declines monotonically to three children. Figure 1 depicts the number of children per woman. The nonmonotonicity in period 1 results from the initial old men having 2.5 wives. Note that the marriage composition also changes over time. The fraction of age gap marriages falls from 100 percent in period 1 to 30 percent in period 3 and disappears entirely in the long run.

Since a daughter's marriage will be costly, men now have to save for their daughters' dowries, which increases savings and, thereby, the capital stock. The investment rate reaches the new steady-state value in period 3. The capital stock and output are the slowest to adjust, as can be seen in Figure 2. Starting from about 0.9, it takes the capital-output ratio about ten periods to reach its new steady state level of 2.8. GDP per capita grows about 2 percent annually during the first model period and 1 percent annually

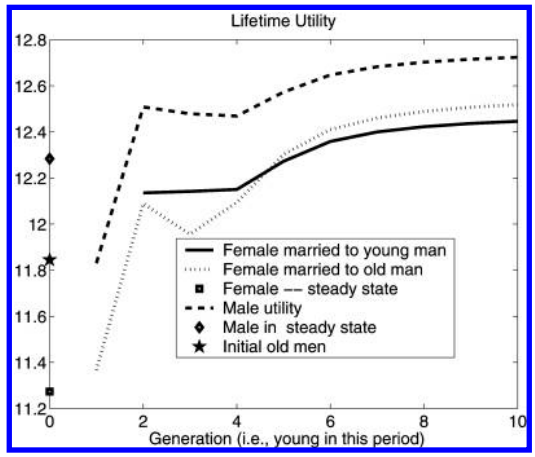

FIGURE 3. LIFETIME UTILITY ALONG THE TRANSITION

for another three periods. After four periods, i.e., 60 years, the output gap between the polygynous and monogamous steady states is still only halfway closed.

While in the long run, the marriage reform unambiguously increases output per capita, which benefits future generations, the reform also creates losers along the transition. Figure 3 shows utility for each generation. All adult men who are alive during the reform period—men born one and two periods before the reform—experience a utility loss. Everyone else—all subsequent men and all women—gains.[4] The utility of initial old men declines because they unexpectedly lose the ability to sell their daughters. Initially, young men suffer from a decrease in interest rates in addition to also losing the ability to use women as assets. All future men benefit from higher wages due to a higher capital stock, which more than compensates for the loss of polygyny. Initially, young women are also hurt by the fall of interest rates. They benefit from lower child-rearing costs due to reduced fertility, however, which amounts to a net gain in utility.

If women do not vote, then the reform would not pass majority voting, since no man alive at the time will benefit. If women do vote, at best one could have a tie, but only if all indifferent women vote in favor of the reform. Note also that the initial young women do not have

[4] The initial old women are indifferent, as they are not affected by the reform.

enough resources to compensate the initial men for their losses. Even if future generations are integrated into the transfer scheme, there is no allocation such that all agents benefit and no one is worse off. More precisely, holding the fertility transition path fixed, we show computationally that there does not exist a transfer scheme across agents that assures that all agents alive at the time of implementation benefit from the switch to monogamy. This result shows that depending on which social welfare criterion is used, a ban on polygyny may or may not be socially desirable.[5] This finding may also explain why implementing a ban on polygyny has been difficult in many countries.

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[5] Note that Pareto efficiency is not defined in this environment (Golosov et al., 2006).