Sacrificing Reproductive Success for the Primitive Accumulation of Cattle

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ABSTRACT: On the basis of ethnographic data provided by Cronk (1989), we have developed a computer simulation of the demographic growth and cattle accumulation processes of the Mukogodo, a low status group in northern Kenya. The Mukogodo appear to be emulating the cultural characteristics and wealth of the Maasai. The process of doing so involves the marrying out of daughters in order to accumulate cattle and parental neglect of sons, in order (we claim) to avoid having sons who would place bridewealth claims against the fledgling herds of their fathers. This process of "primitive accumulation" negatively affects the reproductive prospects of Mukogodo men.

The process of primitive accumulation is only the first of a three phase strategy of "becoming Maasai." We find that while the sizes of Mukogodo lineages are reduced by this strategy, there is a compensating increase in the number of Mukogodo genes that are exported with the out-marrying daughters, leaving reproductive success unaffected.

KEY WORDS: pastoralism, demographic growth, Africa, reproductive success, computer simulation

I. INTRODUCTION

In two earlier papers (Bell and Song 1990, 1990b) we have examined the demographic growth processes of an hypothetical African patrilineage that uses cattle as bridewealth and seeks to maintain a given ratio of cattle and wives per man for each successive generation. This kind of "steady-state" process arises when the rate of growth of the herd, net of a fixed percentage reduction for bridewealth payments (in excess of bridewealth received for daughters), is equal to the rate of growth of population.

If the herd grows faster than the population, a steady-state may be established by regularly using additional cattle for bridewealth, thereby increasing the wives per man ratio. On the other hand, if a lineage desires" to increase the number of cattle per man, given the level of bridewealth, fewer wives must be taken; and there will be an increase in herd growth and a reduction in population growth. Indeed, in the event of a catastrophic decimation of the herd, a group could make an enormous sacrifice in current fertility, take relatively few wives and use bridewealth from the marriage of daughters to accelerate herd growth. Such a policy could be

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expected to arise as a short term response to cattle losses caused by famine, disease or raiding.

However, we would never have imagined a cattle accumulation strategy as Draconian as that which has been attributed to the Mukogodo, a "Dorobo" group of north central Kenya. The Maa term, "il-torrobo," applies to a number of hunter-gatherer groups that inhabited the area above Mt. Kenya prior to the arrival of the Maasai, Samburu and other pastoralists (Chang 1982). The Dorobo have tended to abandon their language, dress and productive technologies in favor of the culture of one of the intruding pastoral societies. The Mukogodo, while adopting the language and dress of the Maasai, began during the 1930s to accumulate cattle by exchanging their daughters for bridewealth cattle from neighboring pastoralists.

Although the use of daughters as an instrument for cattle accumulation is a common element of the herd-population adjustment process, those who already have herds can depend at least in part on the fertility of the herd as a major source of herd growth. However, in the case of the Mukogodo where the herd is initially nonexistent, a process of primitive accumulation is required. That is, cattle must be accumulated without the supplemental reproductivity of an existing herd.

Prior to taking this new road, the Mukogodo had been largely endogamous, using fabricated beehives as bridewealth. However, in order to obtain cattle and the status that cattle represent, they began to marry their daughters to those who could provide bridewealth in the form of cattle. And, in order to build up a herd, they have hoarded the cattle received for daughters, rather than use them to take wives from other groups. Even though the export of daughters reduced the availability of Mukogodo women, it generates bridewealth cattle with which to acquire wives from elsewhere. But this use of cattle is restricted by the effort to build up the herds. The reduction in the number of wives reduces the reproductive success of men. Consequently, it is the process of primitive accumulation (not the export of daughters, per se) that prevents the use of cattle for wife acquisition, thereby reducing the reproductive success of Mukogodo men.

Furthermore, the Mukogodo adopted practices that systematically reduced the survival rates of males between birth and age four, so that the ratio of males to females at age four was found to be 66 to 98. Cronk (1989) presents evidence that the difference in survival rates between boys and girls is a consequence, at least in part, of giving greater attention to the needs of females. However, for this form of neglect to constitute "female-biased parental investment," it is necessary that the reduced attention to males become a precondition for the survival of females; resources must be insufficient for the survival of all offspring.[1] Since Mukogodo women have higher reproductive success than do Mukogodo men, female-biased parental investment would increase reproductive

success of the parent. However, in the absence of any data to suggest the infeasibility of balanced investment, Cronk's data imply a form of parental neglect that has negative reproductive consequences. There is a negative consequence because young man are often able to earn money through urban employment with which to buy cattle and obtain wives. Hence, without sacrifice to the growth of the herd, they would be able to add to the reproductive success of their parents. However, since the number of wives obtained by these young men is relatively small, the neglect of males does not have a major effect on reproductive success.

Since the neglect of boys has no evident benefit in terms of cattle accumulation and a slight negative impact on reproductive success, this rather unusual practice requires explanation. We find a probable answer by generating baseline data on the Mukogodo with and without parental neglect, but without altering the policy of primitive accumulation. This exercise demonstrates that a failure to reduce the number of male offspring would change the number of wives held by the powerful group of men, aged 43 to 58, from 1.26, to 0.85! So, instead of experiencing a modest, and marginally respectable, degree of polygyny, there emerges the necessity of lifetime wifelessness for a substantial number of men. In this eventuality the strategy of primitive accumulation would be placed at risk. We see, then, that the neglect of boys is an essential component of the process of primitive accumulation; it is not a strategy for increasing reproductive success.

II. ANALYSIS OF THE GROWTH PROCESS

It is true by definition that the reproductive success of any person is a function of that person's behavior and that of the descendants. This set of persons never acts as a group, since its members are not coterminous in time or space. But in order for the reproductive prospects of a person to be maximized, it is logically necessary that the cultural rules (the "strategy") that guide the behavior of these people constitute an optimal reproductive strategy for that person. The question we ask is: What are the cultural practices that constitute this strategy?

Then, there is the agnatic group. Although there are 11 socially recognized patrilineages among the Mukogodo, we shall use the term patrilineage to denote a proper subset of a person's descendants. That is, we will consider each male at time zero to be the original ancestor of an ego-generated "patrilineage." It is this group that actively pursues a self-interested strategy for obtaining resources (wives and cattle) in an effort to replicate the characteristics of the Samburu or the Maasai. That strategy begins with a process that we are calling the primitive accumulation of cattle.

On the basis of the data provided by Cronk (1989) we simulate the demographic growth process of a set of Mukogodo patrilineages over an indefinite period and we record the evolution of the patrilineage, the associated sets of descendants that includes the progeny of out-marrying women, and the resources (wives and cattle) of the patrilineage. Women are assumed to have a total fertility of seven, of which 4.2 survive to age 15. The ratio of boys to girls who reach age four is 66/98. The bridewealth received for Mukogodo girls is 5.8 cattle, while the cattle required to acquire'a wife from outside is 6.5. We make use of Cronk's data on the number of wives per man for each of our age categories among the Mukogodo and the Samburu; and we assume that men under the age of 32 must provide half of their bridewealth for themselves by working in the city, while older men use cattle from the herd. Consistent with Maasai-Samburu practice, widows are not remarried but remain within the agnaticgroup and continue to reproduce to (we assume) one-half the standardrate.[2]

Finally, we assume that cattle are owned only by men over the age of 43 and that the cattle per "man" ratio is 15 among the Mukogodo, 80 among the Samburu and 120 among the Maasai. These assumptions are almost sufficient as a basis for simulating the current strategy of the Mukogodo. We need, additionally, information about the age structure and growth processes of cattle herds. For this purpose we adopt the characteristics of the Dahl and Hjort (1976) "normal herd" growth scenario. In year zero, the baseline population of the set of Mukogodo patrilineages is 1,000. The age and sex structure of this group is derived by the same method that Dahl and Hjort develop the structure of the baseline herd, that is, by allowing its age and gender dimensions to evolve from the set of assumptions that govern behavior within the group (e.g. fertility rates, age and sex specific survival rates and exogamy rates. The structure of the non-patrilineal descendants is constructed in a similar fashion. We assume that the initial size of this "outside" group is 312; however, experimentation with other sizes, up to 15,607, show that this assumption is inconsequential.

In counting the number of non-patrilineal descendants, we encounter a problem in comparing genetic reproduction on the outside with reproduction within the patrilineage. The problem is that the Mukogodo are assumed to marry endogenously, subsequent to the period of primitive accumulation, while taking only a small percentage of additional wives from the outside. Descendants, on the other hand, do not marry endogenously. Consequently, there will be seven off-spring from each pair of Mukogodo, but fourteen off-spring from every pair of outside descendants (who marry unspecified others). We deal with this problem by ignoring the off-spring of males on the outside. At first thought, this procedure appears to understate the rate of reproduction on the outside, because men are

polygynous. However, polygyny does not imply greater reproductive success for men relative to women.

Bell and Song (1990) have shown that in a system where the sex ratio at birth and age-specific survival rates are the same for each sex, most of the polygyny within a cattle-based system of demographic growth is due to the difference in the marriage age of men and women. And in this study, if we simulate the growth process of the Samburu and replicate their overall, as well as their age-specific, degree of polygyny, we find that only 2.4 percent of their wives are imported from outside. The enormous difference in age at first marriage, plus the tendency of very old men to take additional wives, is the basis of Samburu polygyny. Many (and perhaps, most) man die leaving wives who are actively reproductive. Consequently, the reproductive success of women is almost identical to that of men (on the average), in spite of considerable polygyny among men.

Differences in marriage ages of males and females and the strongly biased sex ratio produce a large number of potential brides per Mukogodo male and a large percentage of wives are obtained from other groups. Consequently, at least 67 percent of Mukogodo females must marry out, for otherwise Mukogodo men would have more wives than reported. Cronk's data suggest a much lower marrying-out rate, but those data are retrospective to the year 1900 (Cronk 1991), thereby including a period for which the current strategy is not relevant.

Given the number of female births per wife, our simulation shows that the production of daughters is actually reduced by the current process of primitive accumulation. The export of daughters and the failure to use bridewealth from those marriages to obtain wives leads to an 11 percent decline in the size of Mukogodo patrilineages over a 250 year period. The shrinking of the patrilineages leads to a decline in the number of girls that are exported over time and the reduced rate of export reduces the rate at which non-Mukogodo descendants increase over time.

Given an indefinite continuation of the current strategy of primitive accumulation, the outside group grows to 423,923 by the end of the 250 year period. However, this rather large number of outsiders does not compensate for the loss of patrilineal descendants that arises from the strategy of primitive accumulation. The reproductive success of any man is greater when the current policy is terminated immediately. If the policy of primitive accumulation is abandoned, total population grows to 729,942, a 72 percent improvement in reproductive success.

The positive aspect of the current policy is a prodigious rate of growth in cattle. If this policy is not eventually abandoned, it leads to unmanageably large herds. For example, if we assume that the Mukogodo wish to become like the Samburu in terms of cattle per man and wives per man, then in the absence of wars, famines and other very likely catastrophes, this goal could be reached in just 34 years. The rate of growth of the herds

is remarkable, because with the passage of time, internal herd growth processes supplement growth from bridewealth. Consequently, by the end of a 115 year period, the current policy produces a cattle per man ratio of 1,000. Quite evidently, this growth process cannot continue indefinitely. The human resources for managing the growing herd are -declining in the face of a rapidly growing need for additional work power. Hence, the current strategy is necessarily transitional and unsustainable. We may reasonably presume that, after the passage of time, it will be followed by a stable and sustainable "steady-state" strategy (see Bell and Song 1990b). This steady-state strategy will necessarily feature balanced parental care of children because of the increasing need for sons to act as herders of cattle. Furthermore, the bridewealth from daughters must be used increasingly for wife acquisition and not for primitive accumulation. Otherwise the herd grows too fast. Hence, the primitive accumulation of cattle, with its negative consequences for reproductive success, is only a phase of a larger process.

III. THE GROWTH OF PATRILINEAGES AND THE GROWTH OF DESCENDANTS

The Mukogodo, like other "Dorobo" groups, attempt to mimic the cultural characteristics of the elite pastoral groups. We assume that they will seek to have a cattle per man ratio similar to that of the Samburu or the Maasai, which are specified as 80 and 120, respectively. We also assume that when their cattle resources permit, they will adopt the same degree of polygyny as one of those groups. Cronk (1989) has provided a table that shows wives per man for each of four age categories among the Samburu. Given these data, we have simulated the growth processes of the Mukogodo and constructed the scenario that would generate precisely these Samburu ratios. After about 80 years, these ratios are attained and the system settles down into a "steady-state" that maintains those ratios within a growing population of people and cattle.

The scenario that carries a Mukogodo lineage from the stage of primitive accumulation to a desired steady-state requires an abandonment of the policy of primitive accumulation long before the steady-state is reached (Figure 1). If the goal is 80 cattle per man, then the current policy of the Mukogodo should be abandoned after only 28 years, by which time there will be 49 cattle per man and the system will make its transition to a steady-state during the following 50 years. If the goal is 120 cattle per man like the Maasai, then the period of primitive accumulation continues for 42 years until they will have reached 85 cattle per man. As shown in Figure 1, the period of primitive accumulation is followed by a "takeoff" period and concludes with an indefinite period of sustained growth in

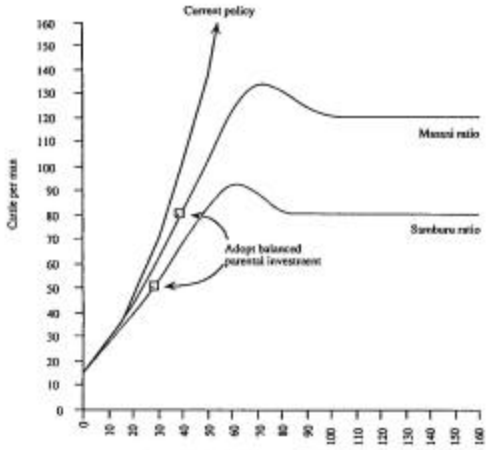

Fig. 1. Cattle per man under three policies.

steady-state. These stages recapitulate the "stages of growth" popularized by W. W. Rostow (1956) with reference to processes of capitalist development.

It should now be clear that the sacrifice in reproductive success that attends the primitive accumulation of cattle is a necessary condition for the rapid acquisition of prestigious goods, cattle and women. However, the effort to achieve this larger resource base is very costly in terms of the size of the patrilineage. That is, were the Mukogodo to put an immediate end to the current policy of primitive accumulation and if they were to adopt a policy of balanced parental care, the set of patrilineages would (theoretically) reach a population of 600,805 after 250 years, while more than doubling their cattle ratio to 33.46. However, if they aspire to have a cattle per man ratio similar to that of the Maasai, they must pursue the current policy for 85 years, and the population of the Mukogodo would be only 368,563. However, these losses on the inside are more or less replaced by gains on the outside.

Given a baseline of 312, an immediate termination of the current strategy leads to an outside group of only 129,137, whereas becoming Maasai leads to an outside group of 321,163. That is, attempting to become Maasai leads to a 38.6 percent reduction in the size of the patrilineage relative to the population reached when the current policy is abandoned immediately. However, the size of the outside group increases

by an amount that is almost sufficient to compensate for declines of the inside group.

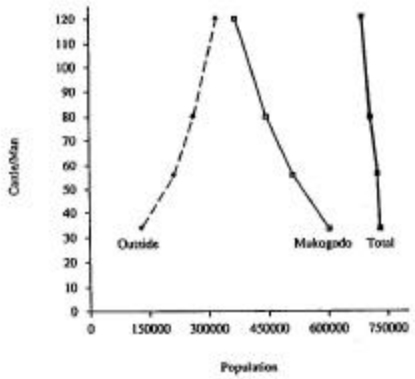

Fig. 2. After 250 years, inside, outside, and total population in relation to the cattle per man ratio.

In Figure 2 we show the sizes of the inside and outside groups, as well as the total set of descendants, as a function of the steady-state cattle ratio. We see that by becoming Maasai, rather than immediately terminating the accumulation process, the Mukogodo suffer loss of inside population that is nearly compensated by the outside gain, for a net loss of 5.5 percent. In the context of this simulation, a five percent differential is negligible. Hence, we cannot suggest that there is a notable reduction in reproductive success as the steady-state cattle ratio increases. However, these results strongly contradict the common socio-biological presumption of a positive relation between wealth and reproductive success (e.g. Daly and Wilson 1983).

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III. REMARKS

It has been assumed in this paper that a person remains identifiably Mukogodo over the course of the cattle accumulation process. In fact there is reason to believe that individuals will attempt to abandon their Mukogodo label as soon as their wealth, their cultural characteristics and the limited memory of others permit. This means that the socially recognized division between the "inside" and the "outside" groups vanishes over the course of time. Furthermore, this process will be accomplished at varying rates of speed among Mukogodo, since there is considerable inequality in

cattle holdings among them. Consequently, the period of primitive accumulation will be reached at different points in time among the Mukogodo.

Lee Cronk (1989) has presupposed that the current strategy of the Mudogodo is consistent with the maximization of reproductive success, whereas these simulations of that process effectively challenge that presumption. On the other hand, we must recognize that the evolutionary time horizon over which Darwinian processes become manifest is quite long and complex. It is not inconceivable, for example, that the pastoral form of economy will prove to be a poor choice in terms of the vitality of Mukogodo (or Maasai) genes. The odds may strongly favor agriculturalists. We cannot presume to know.

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NOTES

1 A commonly accepted definition of "parental investment" is provided by Trivers (1972:139) as "any investment by the parent in an individual offspring that increases the off-spring's chance of surviving (and hence reproductive success) at the cost of the parent's ability to invest in other offspring." Given this definition, biased parental investment is not the converse of parental neglect. The latter does not require a trade-off among offspring.

2 This assumption is made without supporting evidence. We simply presumed that women would act to reduce the rate of completed fertility (and their own work load) if they had no husband from whom completed fertility was demanded, the public adherence among women to an ideology of high fertility, notwithstanding. This assumption has no consequence for our qualitative conclusions since it applies equally to women inside of the patrilineage and to non-patrilineal descendants.

REFERENCES

Bell, Duran and Shunfeng Song 1990 Growth and Process in a Lineage-Based Social Technology. Journal of Quantitative Anthropology 2(1): 17—45.

Bell, Duran and Shunfeng Song 1990b Characteristics of Bridewealth under Restricted Exchange. Journal of Quantitative Anthropology 2(3): 243—256.

Chang, Cynthia 1982 Nomads without Cattle: East African Foragers in Historical Perspec-

tive. In Politics and History in Band Societies. Eleanor Leacock and Richard Lee, eds. Cambridge: Cambridge University Press.

Cronk, Lee 1989 Low Socioeconomic Status and Female-Biased Parental Investment: The Mukogodo Example. American Anthropologist 91(2): 414—429.

Cronk, Lee 1989b From Hunters to Herders: Subsistence Change as A Reproductive Strategy among the Mukogodo. Current Anthropology 30(2): 224—234.

Cronk, Lee 1991 Intention Versus Behavior in Parental Sex Preferences Among the Mukogodo of Kenya. Journal of Biosocial Science 23: 229—240.

Dahl, Gudrun and Anders Hjort 1976 Having Herds: Pastoral Herd Growth and Household Economy. Department of Social Anthropology, University of Stockholm.

Daly, Martin and Margo Wilson 1983 Sex, Evolution and Behavior. Boston:Willard Grant Press.

Rostow, Walter W. 1956 The Take-Off into Self-Sustained Growth. The Economic Journal: March.

Trivers, Robert L. 1972 Parental Investment and Sexual Selection. In Sexual Selection and the Descent of Man. B. Campbell, ed. Chicago: Aldine.