Rural Commercialization and Contraceptive Use in Ghana

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The paper will examine the role of rural commercialization in fertility transition by looking at the relationships between household and community level participation in market production and contraceptive use in rural Ghana. It will also examine why commercialization is linked to fertility and some socio-economic factors that condition the relationship. The paper focuses on commercialization because traditional demographic transition theory sees it as a key precondition for fertility decline while research in family sociology has also indicated that commercialization is one of the most powerful forces shaping families, kinship and gender relations in rural societies. The paper will use data from the Ghana Livings Standards Measurement Survey conducted in the late 1980s and early 1990s and the 1984 Ghana Population Census to examine the relationship.

Theory

One argument connecting commercialization with fertility decline focuses on its implications for rural people's welfare. For instance, a variant of the argument claims that production for the market exposes rural people to the risks of price, market and policy instabilities and thus increases awareness of the risk of too many dependents during times of economic difficulty. Presumably, rural people respond to this heightened fear by reducing fertility. Commercialization may also elaborate and diversify household consumption norms and thus create consumption demands that compete with childbearing. Consumption strategies may diversify in part because of the diffusion of urban ways of life into rural areas undergoing commercialization. Consumption demands may also diversify as commercializing communities becoming highly competitive, and households use consumption to publicly signify their success or to build social networks. Whatever the exact structure of their dynamics, changes in consumption styles could influence fertility if they generate demands

that compete with childbearing and rearing.

Other writers claim that commercialization changes the organization of the household's production process and generates pressures for regulating fertility. For instance, commercialization may increase the cost of production by monetizing resources and making those costs more salient in the reproductive decisions made by rural households thus leading them to reduce fertility in response. This mechanism is supposed to be especially powerful because it makes the men who are usually the breadwinners more aware of costs and more willing to reduce childbearing. Commercialization may also make it possible for technological innovations in the household production process to occur. These innovations may involve the substitution of technologies for labor which reduce the labor intensity of the household's production process and make it worthwhile for rural households to reduce fertility.

Commercialization might also affect power structures within families and the fertility decision process in ways that increase interest in reducing family size. For instance, rural commercialization might increase a wife's opportunities for income earning and increase her bargaining power in household decisions. An increase in the wife's bargaining power might lead to an increase in a husband's perceptions of the costs of children for two reasons. First, the opportunity costs of the wife's time can be more directly ascribed a monetary value if she has employment opportunities. Secondly, a wife's improved bargaining power could make it more difficult for the husband to shift the costs of childbearing to her. Both of these effects could lead to increased interest in reducing family size.

Literature Review

Despite the plausible theoretical connections that can be drawn between

commercialization and fertility, previous studies have not found consistent empirical proof for those relationships. Several studies have reported that there is no association between commercialization and fertility. For example, Rodriguez and Cleland's analysis of family level data provided by the World Fertility Surveys concluded that the transition from domestic to wage economy has no impact on fertility. Casterline's review of thirteen studies of the relationship between community level development - agricultural modernization, nonagricultural economic activities, village modernization in terms of access to utilities and amenities - concluded that it rarely shows systematic relationships to fertility.

However, some research claims to find that commercialization reduces fertility. For example, Paiva provides evidence that rural proletarianization in Brazil has led to significant fertility declines. In Italy, Kertzer and Hogan claim that a shift from domestic production to industrial wage labour reduced the labour value of children and the productive contributions of women and thereby generated an interest in using family planning. Raftery et al.'s analysis of the Iranian Fertility Survey concluded that they found considerable evidence indicating that occupational and economic changes explained changes in fertility observed during the 1960s and 1970s.

The inconsistency in the existing research indicates that it is still reasonable to consider the relationship between commercialization and fertility behaviour as a viable hypothesis. However, research has to be careful to overcome difficulties that may have prevented earlier researchers from coming to more definitive conclusions. There are a number of these possible difficulties. For instance, one problem with the existing research is that most of it has often focused on the connections between commercialization and overall fertility. That kind of research may fail to find net effects because the connections are so complex and contradictory. The same kind of problem has been found in research attempting to connect

schooling with fertility. For instance, the studies reviewed by Casterline found that access to schooling did not affect fertility once parental education and other individual level variables were controlled. In contrast, research focused on child schooling's effects on the proximate fertility determinants is more successful as the linkages are less complex and contradictory (Guilkey and Jane; Sathar et al.) .

Another problem with the existing research may be that the measures of commercialization employed in many studies are too crude and need refinement. One way in which these measures may be refined is by distinguishing several forms of commercialization and assessing differences in their impacts on fertility. The case for expecting commercialization to lead to reductions in fertility is strongest for those cases of commercialization involving wage employment as wage dependent households are fully exposed to market fluctuations for wages and business cycles as well as to uncertainties in consumer markets and thus have the most to lose should they be caught with too many dependents during economic downturns. The development of wage earning opportunities may also offer more chances for women to earn income thereby leading to an increase in their domestic bargaining power.

Other forms of commercialization may be more insulated from market risk than wage households and offer fewer chances for women to earn independent incomes. Commercial farmers and households which commercialize via nonagricultural self-employment may be offered some protection from market instabilities as they can plant subsistence crops at the same time as they cultivate cash crops or produce self -made goods. In fact, such households may actually face heightened demands for labour and react by increasing fertility. Also as farming and self-employment often rely heavily on family resources women in such households may not be offered a whole lot of opportunities for earning independent incomes.

Even within agriculture, there may be differences in the reproductive imperatives faced by commercial farmers who cultivate their own or family land versus those who cultivate rented land as the latter may face greater costs of production than the former group.

Also some of the problems may have arisen because the research has not applied appropriate analytic frameworks. A substantial amount of the research employed family or individual level data, thus overlooking the possibility that commercialization effects may have important institutional effects. Commercialization may influence fertility behaviour affecting the opportunity structure that is available to family members rather than by influencing specific family enterprises. In addition, commercialization may influence the normative structures that affect all individuals within a context whether or not they are a part of that production process. The most suitable specification for analyzing commercialization effects may have to combine both family level and contextual levels of analysis.

The objective of this study is to examine the role of commercialization in fertility transition in a way that allows it to avoid some of the difficulties of earlier research. The study will focus on contraceptive use rather than overall fertility. It will also look at several forms of commercialization as well as use both family level and community level measures of commercialization.

Fertility Decline in Ghana

Ghana is a very good location for this analysis. Fertility has begun to decline in Ghana. Initial progress was slow and erratic but the pace has picked up in recent years. Between 1960-65 and 1998, there was a decline of 35% in Ghana's total fertility rate from 7.1 to 4.6. Most but not all of the decline occurred in urban areas. Between 1979 and 1988, most if not all of the decline was the result of increasing contraceptive prevalence. Traditional contraception, particularly, periodic abstinence, played a more important role than modern

contraception in the decline before 1988. In fact, there was a decline in modern contraceptive use between 1977 and 1988. Since 1988, contraception has become less influential as a proximate determinant of fertility change but levels of both modern and traditional contraception have increased.

Traditional contraceptives are less efficient than modern contraceptives and are not usually expected to be important ingredients in sustaining modern day fertility transitions. However, they have been important in the Ghanaian fertility decline because a local culture of modern contraception has not as yet developed. Ghana was among the countries demonstrating early support for population activities and starting in the late 1960s served as the testing ground for a number of innovative delivery strategies. But Ghanaian family planning program has not lived up to its early promise. Many changes in the policy environment have created major discontinuities and disruptions in the supply of contraception. Currently, modern contraceptives are expensive, in very limited supply and receive little outreach support for their use.

The paper will examine traditional and modern contraception separately so that differences in their determinants can be highlighted. Ultimately, a culture of modern contraception will have to be developed to sustain the Ghanaian fertility transition. However, the determinants of modern contraception in a weakly developed family planning culture are likely to be weak. In contrast, because the culture of traditional contraception is better developed, the determinants of traditional method use can provide better insight into those social forces that will lead the transition in reproductive behavior.

Measures

The two dependent variables are a woman's use of traditional and modern contraception. Traditional contraception includes periodic abstinence, rhythm, withdrawal,

herbs and potions. Modern contraception includes douche, condoms, spermicides, diaphragms, pills, IUD and injectables. I will employ two versions of each dependent variable, recent use and lifetime use. Recent use refers to contraception within 12 months of the survey while lifetime use includes earlier reports of contraceptive behavior. Recent use is the more appropriate measure for this study because it reflects contraceptive dynamics at the time of the survey and during the period covered by most of my independent variables. Lifetime use is also important because it provides a check on the intertemporal validity of the models estimated. Very large differences between results for the recent use and lifetime use models would raise questions about model adequacy. Also since lifetime contraception includes short-term, experimental and uncommitted contraceptive use it can provide some insight into the dynamics of weak motivations for family limitation

The two key independent variables are household commercialization and community level commercialization. Household commercialization is measured by the husband's commercial strategy. I distinguished three types of commercial strategy using the husband's reported occupation and additional questions on relationship to employer and type of remuneration. Commercial farmers include husbands in agriculture working for cash. Nonagricultural self-employees include husbands working for cash in nonagricultural occupations who are either self-employed or work for family members. Wage earners include husbands in agricultural and nonagricultural employment who were not self-employed or family employees. The comparison group of noncommercial husbands included all those who worked for noncash remuneration.

Three types of community level commercialization will be distinguished. Each type will be comparable to a household level commercialization process but will be intended to measure the normative and opportunity structure effects associated with commercialization.

For instance, the community level counterpart of the commercial farmer variable will be measured as the percent of persons in a district who are commercial farmers. The community level counterpart of the nonagricultural self-employment variable will be measured as the proportion of men in nonagricultural self-employment. The community level counterpart of the wage earner variable will be the percent of men in wage employment.

The study will examine some of the mechanisms through which commercialization is expected to influence fertility. Several variables are included to assess how commercialization influences fertility. For instance, I will use information on whether the household employs any technologies in production and whether the household is renting land, hiring labor or borrowing capital to assess the claim that commercialization influences fertility by increasing the costs of production. I will also use survey information the number of types of income sources (a measure of the household's exposure to risk) and information expenditures on food (a measure of elaborate consumption) to assess the claim that commercialization impacts fertility by increasing risk and diversifying consumption. And I will also examine the possibility that the wife's socioeconomic status (measured by her participation in independent cash earning employment and her income) mediate the connection between commercialization and fertility.

Other variables included in the analysis will measure social influences that could confound associations between commercialization and fertility. These include household wealth which will be measured by a husband's years of schooling and whether or not the household has a nonfarm business. Classical demographic transition theory states that nonagricultural development reduces the demand for children by limiting opportunities for child labor as well as by upgrading occupational requirements and providing parents with the

incentive to educate children. The extent of these opportunities will be operationalized by the percent of the adult labor force in a district engaged in nonagricultural jobs. A woman's experience of child mortality will also be included as demographic transition theory claims that it is a major determinant of fertility behavior.

Considerable literature claims that women with human capital assert domestic power by using contraception to regulate family building. A woman's possession of human capital will be measured by her years of schooling and age at first sexual cohabitation. Diffusionist theories also claim that the physical and psychic costs of fertility regulation negatively influence contraceptive use. The measures of physical and psychical costs will be the community presence of a family planning clinic or worker, proximity to a modern hospital as well as the presence of a motorable road in a community.

Several demographic variables will also be included to suppress demographic confounding and to validate the credibility of the analyses reported here. A woman's age negatively influences her level of fecundity and reduces the chances that she will contracept. Family size will be used to measure household economic and social pressures that motivate contraception while marital status measures exposure to sexual intercourse, an important proximate determinant of childbearing risk and hence of contraceptive use. The ethnicity of a woman's household head will also be used here as an additional control because of long established differences in reproductive behavior found among Ghanaian ethnic groups.

Data

Most of the study's data will come from a pooled data set constructed from the the1987/1988, 1988/89 and 1991/92 Ghana Living Standards Surveys (GLSS) carried out by the Ghana Statistical Service with assistance from the World Bank. The surveys selected one woman at random from among women in a household aged 15-50 to respond to questions on

fertility, birth history, contraceptive knowledge and use. These data provide information for the contraceptive use measures. The measures of household socioeconomic and demographic characteristics come from portions of GLSS dealing with household members' education, employment and income, migration, self-employment, consumption and farming. GLSS information about village demography, economy and infrastructure, education, health and agriculture, which were obtained from village leaders, supplied measures of the socioeconomic and policy characteristics of the communities. These community level measures will be supplemented with district level aggregate measures from the 1984 Ghana population census.

The three rounds of the GLSS collected data from about 10,965 households, but only 7900 of them had eligible women between the ages of 15 and 50 who supplied information on contraceptive behaviour and only 5216 of these women lived in rural and semi-urban localities.

Multivariate Analysis

I will employ probit regression methods for the multivariate analysis. Probit regressions model the probability of the i^{th} woman using contraception (p_i) as a function (F) of a vector of independent variables, X_{ij}, and a matrix of unknown regression parameters, a and $b_{j,}$ where F is the standard normal cumulative distribution function.

$$pi = F(a+bjXij).$$

Ordinarily, maximum likelihood procedures are used to estimate the unknown regression parameters, a and b_j. In this study one problem complicates estimation. The problem arises because combining community and household level data generates spatially correlated errors. In the presence of spatial auto-correlation maximum likelihood methods underestimate standard errors and produce over-optimistic significance tests (Bilsborrow and Guilkey). To

resolve problems of spatial autocorrelation, I will use SAS PROC NLMIXED to estimate the unknown quantities in the probit equations. Spatial autocorrelation is modeled in the probit equation as a community level random effect, u_k.

$$p_{ik} = F(a_k + b_j X_{ikj} + u_k)$$

$$u_k \sim N(0, sigma_k)$$

where p_{ik}, a_k, b_j, X_{ikj}, and F have the same interpretations as before except that they refer to the ith woman in the kth community. SAS PROC NLMIXED employs dual quasi-Newton optimization to maximize an adaptive Gaussian quadrature approximation to the probit's likelihood function integrated over the fixed and random coefficients. Successful convergence of the optimization problem results in parameter estimates along with their approximate standard errors computed from the second derivative matrix of the likelihood function.

Conclusion

The role of commercialization in fertility transition is an issue with great policy importance. Classical demographic transition theory sees commercialization procceses as important determinants of fertility decline and family sociologists claim that they are powerful forces shaping family life in rural societies. Yet the research linking commercialization to fertility is inconistent and has failed to yield definitive results. This study examines the issue again. It takes into consideration a number of the omissions in the existing reasearch that could have led to the failure to find relationships between commercialization and fertility.