# Population Review

## Volume 43, Number 2, 2004

**Type: Article pp. 1-31**


## Women's Autonomy and Demographic Behaviour


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**Abstract**

Women's status is a multidimensional concept. A growing body of literature strongly suggests that gender inequality has a significant impact on the demographic transition and on the socio-economic development of countries. The aim of this paper is to investigate the relationships between fertility and women's autonomy in different cultural contexts. Data collected through three surveys conducted in Botswana, South Africa and Rajasthan are analysed. Women, aged 15-49, were interviewed to obtain information about their reproductive life histories and educational and work status. Regression models and causal log-linear models are applied to describe the role of different aspects of women's autonomy on fertility. The results of the analysis carried out show some similarities and also very large differences. In particular, the women of Rajasthan have less autonomy (in terms of women's status) than do the women of Botswana and South Africa.



**Keywords**

Women's autonomy, fertility, regression model, causal log-linear model

## 1. Forward: The Aim of the Paper

A large body of literature, grounded in detailed case studies, suggests that gender inequality influences the demographic transition and impacts the socioeconomic development of a country (Mason, 1984). Amartya Sen (2003) has drawn a clear picture of these studies and suggested relationships:

> *"I have argued for the need to take a plural view of gender inequality, which can have many different faces. The prominent faces of gender injustice can vary from one region to another, and also from one period to the next…. the effects of gender inequality, which can impoverish the lives of men as well as women, can be more fully understood by taking detailed empirical note of specific forms of inequality that can be found in particular regions. Gender inequality hurts the interests not only of girls and grown-up women, but also of boys and men, through biological connections (such as childhood under nourishment and cardiovascular diseases at later ages) and also through societal connections (including in politics and in economic and social life) … empirical work in recent years has brought out very clearly how the relative respect and regard for women's well-being is strongly influenced by women's literacy and educated participation in decisions within and outside the family. Even the survival disadvantage of women compared with men in many developing countries (which leads to such terrible phenomenon as a hundred million of "missing women") seems to go down sharply--and may even get eliminated--with progress in women's empowerment, for which literacy is a basic ingredient.…There is also considerable evidence that fertility rates tend to go down sharply with greater empowerment of women.…There is also much evidence that women's education and literacy tend to reduce the mortality rates of children. These and other connections between basic education of women and the power of women's agency (and its extensive reach) indicate why the gender gap in education produces heavy social penalties."*

In light of the above, the basic aim of this paper can be introduced: to compare the relationship between fertility and women's autonomy in different cultural contexts with special focus on connections between different components of female autonomy and aspects of reproductive behaviour. To this end data was collected from three surveys conducted in Botswana, South Africa and Rajasthan. 1,802 interviews with women aged 15-49 formed the base of the study (641 from Botswana, 569 from South Africa and 593 from Rajasthan). The interviews obtained data on reproductive life histories, educational background and work status. Questions about freedom of movement and gender attitudes among males and females were also asked. Regression models and causal log linear models were applied to assess the relative impact that different aspects of women's autonomy have on fertility.

## 2. Women's Autonomy and Development: A Theoretical Approach

Women's status is a multidimensional concept. Not surprisingly, different studies focus on different aspects of status. The relationship between female status and education or employment, two of the most frequently used indicators, is complex. Better education or engagement in paid economic activity does not necessarily indicate or lead to greater autonomy or better status because women may engage in paid labour activity as a consequence of impoverishment. This is, in point of fact, a well-documented phenomenon. On the other side, even if education leads to better work opportunities, it does not necessarily translate into extra-domestic employment or availability of money, or access to resources for a woman.

The various components of status may move in different directions in any given time period. Consequently, it often becomes difficult to define what does or does not constitute an

'improvement'. For example, when the type of economic activity engaged in conflicts with fertility and maternal roles, women's entry into the labour force may have negative consequences for their health. Also, interpretation may depend on the level of aggregation at which each variable is evaluated. Dixon-Mueller (1978) defines women's status as their overall position in society and distinguishes this from 'power', i.e. influence and control at the interpersonal level. In other words, like children, women too can also be highly valued and, at the same time, controlled and dominated. In a further elaboration of the concept of female power, Safilios-Rothschild (1982) identifies two types of power--one derived from men, and the other derived independently of men. The former consists of the power that women may have depending on who their male relatives are. The latter refers to a woman's ability to make her own decisions about her productive and economic activities. This includes her freedom of movement, control over wages and income, and the degree to which she has an important say in decisions that affect her life. In these terms, the notion of power is very similar to that of female autonomy, defined as "the ability...to obtain information and use it as the basis for making decisions about one's private concerns and those of one's intimates" (Dyson and Moore, 1983). On these concepts and their measure we will base our analysis.

What is the role of education in determining autonomy? Various explanations have been offered with regard to how formal education affects children's behaviour. One is that schools intentionally and unintentionally teach so-called Western values and behaviour. In his review of the literature on children's experience in school, Caldwell (1982) found that school textbooks transmit Western values, as do teachers and parents through a "hidden syllabus".

The other facet of women's autonomy is gender discrimination. Among other important factors, gender discrimination may induce gender inequalities, that is, the gaps from which women suffer in various contexts (e.g., education, work, access to sources of income, availability of resources, prestige) and at different levels (e.g., individual, household, village, country). Concerning relationships between work and fertility, we must underline the point that that the definition of what constitutes work changes and is context dependent. This is, in large part, related to a body of evidence that suggests that women's "modern" employment activities tend to reduce age-specific fertility. In contrast, women's more traditional employment activities (e.g., agricultural and domestic services) tend to not have this effect.

Many developing countries exhibit marked gender inequality in terms of education, employment and health. For example, girls and women in South Asia and China suffer from relatively high mortality rates, to the point that Amartya Sen and others have coined the phrase 'missing women' to describe the irregularities of the age pyramid (Sen, 1989; Klasen, 1994; Jejeebhoy, 1995; http://www.usaid.gov/regions/afr/hhraa/formal/english/eng5.htm). In addition, generally we observe large discrepancies in education between the sexes in South Asia and in Sub-Saharan Africa[1]. Finally, employment opportunities and pay differ greatly by gender in most developing regions (Klasen, 1999).

Gender equity may be considered a development goal in its own right (that is, apart from its beneficial impact on other development goals) as has been recognised, for example, in the Convention on the Elimination of all forms of Discrimination Against Women (CEDAW) which has been adopted (signed and ratified) by a majority of developing countries[2]. But gender inequality may have an adverse impact on a number of valuable development goals. For example,

[1] The gaps between males and females enrolment ratios are not present in whole Africa: Botswana, for example, represents an exception. According to data collected by United Nations in 2000 (World's women: trends and statistics, UN, New York, 2000), combined 1st/2nd level gross enrolment ratio concerning women is equal to 93, while the same indicator is equal to 90 for males.

[2] The Convention on the Elimination of All Forms of Discrimination Against Women adopted in 1979 by the UN General Assembly, is often described as an international bill of rights for women. Consisting of a preamble and 30 articles, it defines what constitutes discrimination against women and sets up an agenda for national action to end such discrimination.

gender inequality in education and access to resources may prevent a reduction of child mortality and fertility, and an expansion of education in the next generation. Moreover, higher education permits a better performance in the labour market that may, as a consequence, lower the number of desired children, increase contraceptive use, and lower population growth. Point estimates suggest that between 0.4-0.9% of the differences in growth rates between East Asia and Sub-Saharan Africa, South Asia and the Middle East can be accounted for by larger gender gaps in education that prevail in the latter regions. (Klasen, 1999)[3].

As relationships may be more complex that we have illustrated, the five types of autonomy above cited may be also analysed following these questions:

- Does female autonomy affect fertility? Only with female education, or even if female education is unchanged?
- Does female education affect autonomy?
- Does female education affect fertility, even with autonomy unchanged?

The literature strongly suggests that longer education usually translates into delayed marriage and union formation. In fact, more-educated women (because they can earn more) have higher opportunity costs of pregnancy, lactation and (especially) child-care, thus lowering fertility. Moreover, it is possible that the children of educated women 'inherit' access to education and knowledge about good choices in education. Certainly, educated women tend to have higher income, making child labour less necessary for the well-being of the household.

. For both reasons, educated women (and their husbands?) are likely to 'substitute quality for quantity' of children. This fact is reinforced by lower child mortality--and hence lower replacement fertility--in households with educated mothers than in other households. If there is “assortive mating” of educated women with educated men, the above tendencies are strengthened. All the above cited factors affect desired family size. But it is also reasonable to assume that education reduces any excess of actual over desired family size by 'modernising' knowledge, attitudes and practice with regard to contraception (though, offsetting this, education may reduce breast-feeding).

There are a large number of studies that link gender inequality in education to fertility and child mortality (e.g. Murthi *et al.*, 1996; Summers, 1994; Hill and King, 1995). For example, Summers (1994) shows that in Africa females with more than seven years of education have, on average, two children less than women with no education. Hill and King (1995) find a similar effect of female schooling on fertility. Over and above this direct effect, lower gender *inequality* in enrolment has an *additional depressing effect* on the fertility rate. Countries with a female-to-male enrolment ratio of less than 0.42 have, on average, 0.5 more children than countries where the enrolment ratio is larger than 0.42 (in addition to the direct impact of female enrolment on fertility). Similar linkages have been found between gender inequality in education and child mortality (Murthi *et al*., 1996; Summers, 1994). Therefore, quite apart from its impact on economic growth (Sen, 1999), reducing gender bias in education furthers two very important development goals, namely, lower fertility and lower child mortality. Finally, due to the difficulty that social scholars and statisticians often meet when they intend to interpret associations among processes, we must add some cautions. If these processes are measured on a longitudinal scale, causation may be established, at least according to a temporal sequence of events. When the analysis is cross-sectional, as in our analysis of survey data, we can only verify associations among processes. We cannot infer causal effects because female autonomy and fertility relationships may be affected by a possible feedback effect: higher level of autonomy may induce a lower demand for children and a larger diffusion of contraception (this is the approach followed in this study). Alternatively, it is also possible that a higher and precocious fertility, with a larger span of life spent in child bearing and rearing, may not

[3] Gender inequality is not the only source of lack of female autonomy, nor always a source of higher fertility. The relationships, once again, depend on the context, both in the family and in the social setting.

allow a woman entry into the education system and labour market. In conclusion, in this second framework very high fertility reduces female autonomy, that is, fertility behaviour tends to diminish the possibility of female empowerment[4].

## 3. Women's Autonomy and Fertility Behaviour in Three Different Cultural Contexts

*3.1 The measurement of women's autonomy*

Since the beginning of the '80s, studies looking at the impact of women's status on demographic behaviour have increased. Empirical research--much of this carried out in India, Nepal, Pakistan and Bangladesh--was based on alternative indicators. In a study of women's status and fertility in Pakistan, Sathar *et al.* (1988) selected three measures of status: women's education, work participation, and age at marriage. Vlassoff (1992) analysed the relationship between women's status and fertility in an Indian village, measuring women's position (or status) following the approach outlined by Mason (1984). In Vlassoff's analysis, the control that women have over various resources, their decision making power, and their degree of isolation from external events were included. A similar methodology underpins a study carried out in two Nepali settings (Morgan and Niraula, 1995; Niraula and Morgan, 1996). The indicators of women's autonomy are women's freedom of movement and women's power in household decision-making. These studies point to the importance of context in determining women's autonomy and its relationship to fertility and contraception.

For example, Dharmalingam and Morgan (1996), who adopt the basic autonomy definition proposed by Dyson and Moore (1983), show that work opportunities influence women's autonomy and contraceptive behaviour in two villages in South India. The indicators these authors use are perceived economic independence, freedom to move, and spousal interaction. Recent studies on this topic suggest that it is important to collect information, not only from women with respect to their views on female economic independence and female freedom of movement, but also from men with regard to their perceptions about the same issues (Mason and Smith, 2000).

In the questionnaire used in this study's surveys carried out in Botswana, South Africa and India--and following Kishor's (1995) approach--questions on women's perceptions of decisional processes regarding family formation and freedom of movement are included. The questions are subdivided into three aggregate groups, A, B, and C. The aspects that we have analysed, and the relative frequencies, are reported in table 1. Type A questions, representing the first aggregation, lead to the building of a "*customary autonomy*" index as defined by Kishor (1995). This index measures the extent to which women believe that they should have the last word in family planning, in the decision to have another child, and in their children's education and marriage. Type B questions, representing the second aggregation, lead to the construction of a "*non-customary autonomy*" index as defined by Kishor (1995). This index measures the extent to which women believe they should have decision-making powers in general and in areas outside of their traditional roles. Type C questions on who is perceived by the respondent to actually have decision-making power within the family and who decides on whether the respondent is allowed freedom of movement outside the home are combined to form the index of "*realized autonomy*." This third aggregation index reflects the actual amount of autonomy women have rather than the amount they believe they should have with regard to decision-making powers in general, as well as in areas connected to household finances (Kishor, 1995).

[4] In this work in fact we have not develop the possibility that fertility and female autonomy may be both endogenous variables that is the existence of feedback relationships.

When a respondent answers "woman" or "both" to all four questions used to construct the customary autonomy index (type A), and to the first three questions used to construct the non customary index (type B), a weight of 1 is assigned. The latter index includes two other answers to B-type questions. The weight of 1 is assigned to the answer "speak up" to the question "If a wife disagrees with her husband should she keep quiet or speak up?" And to the answer "listens and accepts her opinion" to the question "Do you think a wife respects a husband more if he insists she accepts his opinion in everything or if he listens to and accepts her opinion?" a weight of 1 is assigned. For the construction of the realized autonomy index, a woman is considered to be autonomous only if she is allowed to go out alone and if her opinion carries as much weight as her husband's (type C questions).

*3.2 The results of the survey: women's autonomy in Botswana, India and South Africa*

The study is limited to a comparison between the situations of women in three countries: Botswana, India and South Africa. Deep differences between the African countries on one side and India on the other emerge (see table 1). In India, on some specific dimensions in particular, women appear to have markedly low decisional power. On several questions, there seem to be very low proportions of women who have a say. When comparing India with the African countries, the largest differences emerge with regard to both family and extra-domestic issues. In particular, women do not have "the last word" on financial topics, such as the money they earn and decisions on taking out a loan. With regard to reproductive and contraceptive choices (whether to have another child, or to use a particular family planning method), the majority of Indian women follow their partner's decision. Only in the traditional field of "arranging" a child's marriage do Indian women living in Rajasthan have the last word.

A brief divergence is in order to explore the data derived from the last survey on family and fertility carried out in India in 1998-99 (table 2). This sample is a state-level representation that permits us to compare autonomy indicators along the three dimensions discussed previously: women's decision making, freedom of movement, and access to resources (money). In comparison to Indian women in general, the women from Rajasthan appear to be at a distinct disadvantage. This is not surprising. Many factors confirm the division of Indian states into two parts. Amartya Sen (2001) puts clarity to this statement:

> "*There is, however, something of a social and cultural divide across India, splitting the country into two nearly contiguous halves, in the extent of anti-female bias in natality and post-natality mortality.… The use of this dividing line produces a remarkable geographical split of India. There are the States in the north and the west where the female-male ratio of children is consistently below the benchmark figure.. on the other side of the divide, the States in the east and the south tend to have female-male ratios that are above the benchmark line of 94.8 girls per 100 boys.*" Sen continues: "*The north and the west have clear characteristics of anti-female bias in a way that is not present - or at least not yet visible - in most of the east and the south.*"

This dividing line is important to better forecast India's population, consistently affected by future fertility trends (Dyson, 2002), and is confirmed by the current fertility rates (Drèze and Murthi, 1999).

Coming back to the data derived from our survey, it may be interesting to describe women's status in the three countries using aggregated indexes: customary autonomy, non-customary autonomy and realized autonomy that refer to the components outlined above. The distribution of women according to the values of the aggregated indexes and the mean value of these can be read in

figure 1 and table 3[5] respectively. The comparison among the three countries shows deep differences between African and Indian women[6].

The different aspects of the autonomy of women as measured by the three indexes are only moderately correlated in South Africa and India where the de-linking of customary from realised autonomy is observed. The correlation between customary and non-customary autonomy is much higher in Botswana (see table 4).

For India and South Africa this moderate correlation among the three indices supports the assumption that the indicators are concentrating on distinct dimensions of the autonomy of the women interviewed in the different countries. This may be less true in Botswana. The results of the correlation indices seem to show that customary and non-customary autonomy are correlated across households, while realised autonomy seems to not be correlated with other types, except with non-customary autonomy in Botswana. When women's status is analysed by educational level and working status (table 5), it becomes evident that education is strongly related to women's autonomy in all three countries. Everywhere, educated women present higher values in all the three indexes. In all cases, differences are relatively small in India, but large in South Africa and in Botswana.

As expected, work status affects realized autonomy. Working women seem to enjoy more freedom than non-working women. This is also the case in Rajasthan where women present, on average, a low level of status with respect to their counterparts living in Botswana and South Africa. The distribution of the different aspects of women's autonomy measured by the three indexes by age group reveals that younger women have lower values of autonomy, while middle-aged women present higher values of indexes (table 6). Finally, older women present lower values of autonomy indexes. This pattern may depend on two different cohort factors. First, older women probably never attain sufficient empowerment because of lack of education and traditional family values. And second, younger women, even if enrolled in school, likely still have time to assert their personality in their respective environments. The patterns of the other indexes are not clear, even if generally the trends describe a decrease in autonomy with the increase of age.

### *3.3. Fertility, contraception and women's autonomy*

Demographic behaviour is strongly related to women's autonomy. Generally the relationships are positive. For example, women using contraceptive methods present a higher level of autonomy than non-using women. The gap is larger in South Africa than elsewhere, and the differences are generally higher on the "customary" autonomy index which takes into account family and reproductive decision processes (table 7).

Table 8 shows relationships among fertility, autonomy and education as well as the mean number of children ever born by education and autonomy indexes. Fertility too seems to depend on education. Educated women typically have fewer children, although the samples are rather small and do not provide firm evidence on this point. Also women with a higher level of autonomy generally bear fewer children, thereby confirming the negative relationship between fertility and women's empowerment during the demographic transition. This result is more evident for educated women. As can be seen in the case of Botswana, women with secondary education are characterised by a higher level of autonomy (customary index) and a lower fertility (table 8 c).

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[5] This table, as the following ones containing proportions and mean values, have only descriptive aims not an inferential ones.

[6] Some caution is needed to interpret these data because of the cultural context in which surveys have been carried out. Although the questionnaire is the same in the three cases, translation into local dialects, and interactions with interviewers and local culture may have led to partially different interpretations in the three cases. For example, the questions regarding the freedom of movement and the decisions about money, in some cases (Indian villages) may have been interpreted as "general considerations", not referred to the woman's personal experience, due to the fact that these issues appear very far from the personal life of the rural women living in Rajasthan, who often are secluded in their household.

To synthesise our findings, and find out which relations are more important and robust, we use some regression models for fertility and contraception. In this analysis we have considered as dependent variables fertility (measured by the number of children ever born) and contraceptive behaviour (ever use of methods of family planning). The explanatory variables in the model for fertility are represented by: age of woman (in years; this is merely a control variable); contraceptive use[7] (a dummy variable: ever use=1; never used=0); education (in years). Finally we have included in the model the three indexes of women's autonomy (considered as a quantitative variable). The results for fertility, shown in Table 9, indicate that customary autonomy is inversely related with fertility, even allowing for age, contraceptive use and education.

From these results it appears that only customary autonomy in South Africa and India, and customary and realised autonomy in Botswana are significantly linked to (fewer) children ever born, with significance levels of 5%, except only 10% in South Africa. We can evaluate, for example, that impacts, measured by the change (the decline, as the coefficient is negative) in children ever born - *coeteris paribus* – is equal to 0.72 and 1.2 respectively in South Africa and India for a rise in customary autonomy index from 0 to 4. Education is not significant, and only when we exclude autonomy from the model does education appear to reduce fertility in any significant way. The correlation between autonomy and education appears indirectly from the comparison of the models.

Table 10 reports the results for contraceptive behaviour which appear to depend on the country under investigation. In Botswana, for instance, where the diffusion of contraception is very large (in our sample the use of contraceptive methods is above 65%), autonomy does not seem to be related with family planning in any significant way. In contrast, in South Africa and India one dimension of the status of woman is significant: for South African women, higher levels of customary autonomy seem to enhance contraception, while in India this happens for women who score particularly high on the non-customary autonomy scale.

The intercept in Botswana is significant at 5%. We can interpret this on the basis of the fact that in Botswana women are very homogeneous and more autonomous. The significance level of intercept in Botswana may depend on the fact that some latent variables explaining differences are not included in the model. Consequently, the unobserved heterogeneity "falls" entirely in the intercept result. If data would allow for a more sophisticated analysis, this aspect could be performed with a model that includes latent variables.

Obviously, some results may depend firstly on missing values (non responses) and secondly on the women's perception of the meaning of the questions. This perception may be different in the three countries examined.

## 4. The Influence of Female Autonomy on Fertility Behaviour: An Analysis by Parity

In this section we try to analyse the relationships between fertility (by parities) and female autonomy index (customary, non customary, and realised index respectively in the three countries analysed) estimating one postulated *a-priori* model among a dependent variable (i.e., CEB=children ever born) and the three indexes considered as explanatory ones. Moreover we have introduced in this model other exogenous variables such as the educational level, the working condition and the age of women.

Suppose we want to investigate the causal relationships between five variables denoted by A, B, C, D, E. Figure 1 shows the assumed causal ordering of these variables and the assumed

[7] To simplify the analysis we have included use of contraceptive methods as a direct explanatory variable in the fertility model. Nevertheless, as it is well known, contraception represents, together with age at marriage, one of the most powerful proximate variable in determining fertility behaviour and background factors act on reproduction through the influence of proximate variables. Bongaarts' model and Easterlin-Crimmins' one are important theoretical and empirical examples in this direction. In the future we intend to apply these approaches to our surveys' data.

relationships between these variables, where a pointed arrow indicates the variables that are directly related to each other and a 'knot' a higher-order interaction.

Variable E (the number of children) is assumed to depend on A (cohorts of women), B (educational level of women), C (working condition of women) and D that is considered as the female autonomy index. Let $\pi_{abcde}$ denote the probability that A=a, B=b, C=c, D=d and E=e. The information on the causal ordering of the variables is used to decompose this joint probability into a product of marginal and conditional probabilities (Bishop, Fienberg and Holland, 1975; Goodman, 1986; Haberman, 1978, 1979; Fiemberg, 1980; Agresti, 1990; Hagenaars, 1990; Goodman,1972 and 1973). In this case, $\pi_{abcde}$ can also be written as

$$\pi_{abcde} = \pi_{abcd}\pi_{e|a}\pi_{e|b}\pi_{e|c}\pi_{e|d}\pi_{e|ab}\pi_{e|ac}\pi_{e|ad}\pi_{e|bc}\pi_{e|bd}\pi_{e|cd}\pi_{e|abc}\pi_{e|abd}\pi_{e|bcd} \quad (6)$$

This is a straightforward way to indicate that the value of a particular variable can only depend on the 'preceding' variables and is not influenced by those that are assumed to 'follow'. Decomposing the joint probability $\pi_{abcde}$ into a set of marginal and conditional probabilities is only the first step in describing the causal relationships between the variables under study. Generally, the aim of an analysis is to reduce the number of parameters in some way, while the right-hand size of equation 6 contains as many unknown (conditional) probabilities as the observed cell frequencies. In other words, the model in equation 6 is a saturated model in which it is assumed that a particular dependent variable depends on all its previous variables, including all the higher-order interaction terms. Generally, one is interested in more parsimonious specifications of the conditional probabilities in which it is possible to specify what variables influence what others. The simplest way to specify more parsimonious models is to restrict directly the conditional probabilities appearing in equation 6. Suppose that, as depicted in figure 1, E depends on A, B, C and D but not on AB, AC, AD, BC, BD, ABC, ABD, BCD. In this case:

$$\begin{aligned}
&\pi_{e|abc} = \pi_{e|ab}\\
&\pi_{e|abd} = \pi_{e|ab}\\
&\pi_{e|bcd} = \pi_{e|bc}\\
&\pi_{e|ab} = \pi_{e|a}\\
&\pi_{e|ac} = \pi_{e|a}\\
&\pi_{e|ad} = \pi_{e|a}\\
&\pi_{e|bc} = \pi_{e|b}\\
&\pi_{e|bd} = \pi_{e|b}\\
&\pi_{e|cd} = \pi_{e|c}
\end{aligned} \quad (7)$$

The above-mentioned method of restricting the general model of equation 6 is similar to the formulation of so-called *chain independent graphical models or block recursive graphical models (*Whittaker, 1990; Wermuth and Lauritzen, 1990). In a chain independence graph, the variables are grouped in blocks which can be completely ordered. The relationships between variables within one block are assumed to be symmetric, while the relationships between variables belonging to different blocks are assumed to be asymmetric. This is depicted graphically by undirected and direct edges, respectively. Like any other graphical model, a chain independence graphical model must be completely formulated in terms of conditional independence. In the same way Goodman's modified path analysis approach consists of using a log-linear or logit parametrization of the marginal and conditional probabilities appearing in equation 7 (Goodman, 1973). A system of logit models

consistent with the path model depicted in figure 2 leads to the following parametrization of the conditional probabilities appearing in equation 6:

$$\pi_{abcd}=\frac{\exp(u_a^A+u_b^B+u_c^C+u_d^D+u_{ab}^{AB}+u_{ac}^{AC}+u_{ad}^{AD}+u_{bc}^{BC}+u_{bd}^{BD}+u_{abc}^{ABC}+u_{abd}^{ABD}+u_{bcd}^{BCD}+u_{abcd}^{ABCD})}{\sum_{abcd}\exp(u_a^A+u_b^B+u_c^C+u_d^D+u_{ab}^{AB}+u_{ac}^{AC}+u_{ad}^{AD}+u_{bc}^{BC}+u_{bd}^{BD}+u_{abc}^{ABC}+u_{abd}^{ABD}+u_{bcd}^{BCD}+u_{abcd}^{ABCD})}$$

$$\pi_{e|abcd}=\frac{\exp(u_e^E+u_{ea}^{EA}+u_{ab}^{EB}+u_{ec}^{EC}+u_{ed}^{ED})}{\sum_e\exp(u_e^E+u_{ea}^{EA}+u_{ab}^{EB}+u_{ec}^{EC}+u_{ed}^{ED})} \qquad (8)$$

The model for the marginal distribution of the exogenous variables A, B, C and D is saturated since it contains all the interaction terms among A, B, C and D. It would also have been possible to specify a non-saturated model for the relationships between the exogenous variables. In the next equation E appears as dependent variable respectively for A, B, C and D. Moreover, there are no higher-order interactions between E and the independent variables. It is clear that this recursive system of logit equations contains far fewer parameters than the model given in equation 6. Since specifying a logit model for conditional probabilities is equivalent to specifying a log-linear model for a frequency table in which the marginal distribution of the independent variables is treated as fixed, the logit equations given above can also be written as log-linear models. For instance the logit model for $\pi_{abcd}$ (in equation 8) is equivalent to the log-linear logit model {ABCD,ABC,ABD,BCD,AB,AC,AD,BC,BD} for the (marginal) frequency table ABCD, or

$$\log m_{abcd}=\alpha_{abcd}^{ABCD}+u_a^A+u_b^B+u_c^C+u_d^D+u_{ab}^{AB}+u_{ac}^{AC}+u_{ad}^{AD}+u_{bc}^{BC}+u_{bd}^{BD}+u_{cd}^{CD}+u_{abc}^{ABC}+u_{abd}^{ABD}+u_{acd}^{ACD} \qquad (9)$$

where $m_{abcd}$ denotes an expected frequency in marginal table ABCD. Moreover, $\alpha_{abcd}^{ABCD}$ denotes the effect which fixes the marginal distribution of the dependent variable. Thus, specifying a causal log-linear model for a set of categorical variables can be simply accomplished by specifying separate log-linear models for different marginal tables or sub tables. In this case, log-linear or logit models have to be specified for tables ABCD, ABCDE. Goodman (1973) demonstrated that the maximum likelihood estimates for the log-linear parameters and the expected frequencies in the various submodels of a modified path model can be estimated separately for each sub tables. This results from the fact that when the parameters of the various submodels are distinct, the likelihood can be factorised into submodel specific parts which may be maximized separately:

$$\log\lambda=\sum_{abcde}n_{abcde}\log(\pi_{abcde})=\sum_{abcd}n_{abcd}+\log(\pi_{abcd})+\sum_{abcde}n_{abcde}\log(\pi_{e|abcd}) \qquad (10)$$

The factorisation of the likelihood makes it possible to estimate the parameters of a modified path model by means of standard programs for log-linear or logit analysis. The ***lem*** program (log linear equation modelling) (Vermunt, 1996) has extra facilities for defining submodels without actually having to 'input' them. In *lem*, the model specification consists of defining the sub tables and the subtable-specific log-linear models. As previously mentioned, the parameters of the different submodels cab be estimated separately as long as they are distinct, but, when equality restrictions are imposed on parameters coming from different submodels, the parameters of the modified path model must be estimated simultaneously. In *lem*, two types of equality restrictions can be imposed on parameters appearing in different modified path steps: log-linear or logit parameters can be assumed to be equal, and (conditional) probabilities equation can be assumed to be equal. The log-likelihood equation for a log-linear parameter appearing in different submodels is simply the sum of the contributions of the submodels concerned. The factorisation of the contribution of the

submodels to the log-likelihood function can be also used for testing. Goodman (1973) proposed testing the models separately by means of the likelihood-ratio chi-square statistic.

In our analysis we consider the results regarding the conditional probabilities for CEB (children ever born) by customary, non customary and realised index respectively in the three countries. We comment the result only for women age 35-44 that represent the group at the end (or near to) of the reproductive period. For this group of women, in fact, there is the possibility to describe the transition probabilities from one parity to the other (the next one).

Let us first analyse the conditional probabilities of having *n* CEB by customary autonomy index, which takes into account family and reproductive decision processes. In the figures 3a, 3b and 3c we can see that the situation is similar in Botswana and South Africa: the probabilities[8] are higher for women with high levels of autonomy. On the other hand, for high parities we can see that for more autonomous women the conditional probabilities are lower. The same is true for India.

A different result emerges if one refers to the second autonomy index considered here, non-customary, measuring the extent to which women believe that women should have decision-making powers in general and in areas outside their traditional role. From figures 4a, 4b and 4c pattern differences emerge between South Africa and Botswana. In fact, in South Africa women with the two highest levels of autonomy (levels four and five) have about the same probability of having one or no children, while in Botswana more autonomous women (level 5) are more likely to remain childless or to have just one or two children. For higher parities the situation is more regular for South Africa than for Botswana: in the former, women show a decreasing probability of having five or more children as the level of autonomy increases, while for Botswana the picture is more mixed, although it remains true that the most autonomous women have the lowest probability of having five or more children.

For India the pattern according to non customary index, figure 4c, is clearer both at the lower parities and the higher ones. In fact we recorded regular increasing probabilities to remain childless or at one children, and a regular decreasing probability to have five or more children for women who declare to have decision-making powers in general and in areas "*outside*" their decisional role. The "outside" area is explained by Bennett (1992), which characterises gender relations in India in terms of an "*inside/outside"* dichotomy, where the former represents the domestic and reproductive sphere to which women are largely confined and the latter the public domain of fields, markets, government institutions, seen as arenas of male power and control. Whilst this is a useful distinction, it may be limiting in a number of respects. Firstly, there are in fact relatively few women in India (and particular in Northern states such as Rajasthan) that are exclusively associated with the '*outside*' sphere, and their numbers are decreasing. Secondly local culture may have led to partially different interpretations in the three countries. For example, in Rajasthan the extent to which women believe that they should have decision-making powers in areas "*outside"* may have been interpreted as "*general consideration"* due to the fact that these issues appear distant from the personal lives of rural women who are often secluded in their household.

The third index we considered is the realized one. This index reflects the actual amount of autonomy women have rather than the amount they believe that women should have on decision-making powers in general, as well as in areas connected to household finances (Kishor, 1995). According to this measure, the patterns of South-Africa and Botswana are very similar (Figures 5a and 5b).Women that are more autonomous are more likely to have few or no children, and less likely to have several, everything else being equal. These results can perhaps in part be explained by the fact that a higher percentage of households are female-headed and a higher percentage of these include women living alone. Women living outside of the home have more freedom of movement and more decision-making power, two aspects measured by the realized index.

[8] The values analyzed are log-odds that can be used to compare different probability results among different countries without the necessity to include any statistical significance level.

## 5. Concluding Remarks

Female empowerment may impact deeply on the demographic transition and on the socioeconomic development of a country. In this paper we have tried to compare the relationship between fertility and women's autonomy in different cultural contexts, with special focus on the connections between the different components of female autonomy and some aspects of reproductive behaviour. Research on this topic has underlined the importance of context in determining women's autonomy and its relationships with fertility and contraception.

The analysis carried out on data collected in the rural areas of Botswana, India and South Africa has shown some similarities and also very large differences among the study units. In particular, women living in Botswana and South Africa have more autonomy with regard to decisional processes regarding family formation and freedom of movement--as measured following Kishor's approach (Kishor, 1995)--than do women living in Rajasthan. According to descriptive analysis, and considering relationships among fertility, autonomy and education, we can see that women with a higher level of autonomy generally bear fewer children, thereby confirming the negative relationship between fertility and women's empowerment during the demographic transition. This result is more evident for educated women, as we can see, for instance, in Botswana where women with secondary education are characterised by a higher level of autonomy (customary index) and a lower fertility. The same results are confirmed by multivariate model analysis, according to which we can see that the probability to increase parity is lower for more autonomous women.

The results for contraceptive behaviour seem to depend on the country under investigation. In Botswana, for instance, where the diffusion of contraception is very large, autonomy does not seem to be related with family planning in any significant way. On the contrary, in South Africa and India one dimension of the status of woman is significant: for South African women, higher levels of customary autonomy seem to enhance contraception, while in India this happens for women who score particularly high on the non-customary autonomy scale.

# Tables and Figures

## Table 1 – Distribution of women according to the single items concerning autonomy

| | | Answers | | |
|---|---|---|---|---|
| *Questions type A:* | | *S.Africa* | *India* | *Botswana* |
| Who should have the last word on the following topics: | | | | |
| | Others | 32.85 | 81.45 | 22.37 |
| 1. Whether to have another child | Woman | 67.15 | 18.55 | 77.63 |
| 2. Whether the child should continue its education | Not the woman | 41.67 | 61.89 | 16.72 |
| | Woman | 58.33 | 38.11 | 83.28 |
| 3. What to arrange for a child's marriage plans | Not the woman | 46.26 | 33.9 | 18.95 |
| | Woman | 53.74 | 66.1 | 81.05 |
| 4. Whether to use a particular family planning method | Not the woman | 21.74 | 77.57 | 9.93 |
| | Woman | 78.26 | 22.43 | 90.07 |
| *Questions type B:* | | | | |
| Who should have the last word on the following issues? | | | | |
| 4. Changing the make-up of household spending | Not the woman | 24.86 | 18.38 | 9.48 |
| | Woman | 75.14 | 81.62 | 90.52 |
| 5. Whether to visit friends or relatives | Not the woman | 27.01 | 58.35 | 13.16 |
| | Woman | 72.99 | 41.65 | 86.84 |
| | Not the woman | 52.3 | 98.15 | 26.89 |
| 6. Taking a new loan | Woman | 47.7 | 1.85 | 73.11 |
| 7. Now I would like to talk to you about a different topic. In general if a wife disagrees with her husband should she keep quiet or speak up? | Quiet | 53.3 | 37.61 | 27.87 |
| | Speak Up | 46.7 | 62.39 | 72.13 |
| | Insists | 44.02 | 18.72 | 36.09 |
| 5 Do you think a wife respects a husband more if he insists she accepts his opinion in everything or if he listens to and accepts her opinion? | Accepts | 55.98 | 81.28 | 63.91 |
| *Questions type C*: | | | | |
| In your home does your point of view carry the same weight as your husband's less weight than his point of view or isn't taken into account at all? | Not same | 72.97 | 91.06 | 61.92 |
| | Same weight | 27.03 | 8.94 | 38.08 |
| Do you go out with your husband to purchase major household items/clothing? | No | 38.08 | 19.39 | 30.85 |
| | Yes | 61.92 | 80.61 | 69.15 |
| Does your husband allow you to go out alone or with your children to buy households items? | No | 57.44 | 64.76 | 52.51 |
| | Yes | 42.56 | 35.24 | 47.49 |
| Who mainly decides how the money you earn will be used? | Not woman | 39.83 | 88.7 | 49.5 |
| | Woman | 60.17 | 11.3 | 50.5 |

NOTE: In this tables, as in the following ones, values are not weighted.

**Table 2 - Women's autonomy indicators: Rajasthan and India, 1998-1999**

| *Indicators* | *Rajasthan* | *India* |
|---|---|---|
| Percentage not involved in any decision making | 13.3 | 9.4 |
| Percentage involved in decision making: | | |
| - What to cook | 82.3 | 85.1 |
| - Own health care | 40.6 | 51.6 |
| - Purchasing jewellery | 42.7 | 52.6 |
| - Staying with her partner | 39.3 | 48.1 |
| Percentage who do not need permission to: | | |
| - Go to the market | 19.0 | 31.6 |
| - Visit friends/relatives | 17.0 | 24.4 |
| Percentage with access to money | 40.5 | 59.6 |

Source: National Family Health Survey (NFSH-2), 2000

**Table 3 – Mean value of autonomy indexes: Botswana, South Africa and India**

| | Mean values of indexes | | |
|---|---|---|---|
| *Countries* | *Customary* | *Not customary* | *Realised* |
| Botswana | 3.33 | 3.86 | 2.03 |
| South Africa | 2.60 | 2.97 | 1.92 |
| India | 1.45 | 2.69 | 1.36 |

**Table 4 - Correlation coefficients among the three autonomy indexes: Botswana, South Africa and India**

| Indexes | Customary autonomy | Non customary autonomy | Realized autonomy |
|---|---|---|---|
| *Botswana* | | | |
| Customary autonomy | 1 | 0.613 (<0.0001) | 0.186 (0.0016) |
| Non customary autonomy | | 1 | 0.412 (<0.0001) |
| Realised autonomy | | | 1 |
| *South Africa* | | | |
| Customary autonomy | 1 | 0.507 (<0.0001) | 0.222 (<0.0001) |
| Non customary autonomy | | 1 | 0.170 (0.0026) |
| Realised autonomy | | | 1 |
| *India* | | | |
| Customary autonomy | 1 | 0.491 (<0.0001) | 0.056 (0.1764) |
| Non customary autonomy | | 1 | 0.260 (<0.0001) |
| Realized autonomy | | | 1 |

NOTE: In the brackets we report the values of the standard errors.

**Table 5 - Mean values of autonomy indexes according to professional status and level of education**

| SOUTH AFRICA | | | | |
|---|---|---|---|---|
| | | | | |
| Professional status | Level of education | C.A. | NC.A. | R.A. |
| Work | None | 1.91 | 2.55 | 1.36 |
| | Primary | 2.87 | 3.13 | 2.31 |
| | Secondary | 3.31 | 3.31 | 2.18 |
| | Dip. Degree | 3.20 | 3.33 | 2.83 |
| Not work | None | 1.60 | 2.52 | 1.45 |
| | Primary | 2.07 | 2.77 | 1.77 |
| | Secondary | 2.70 | 2.95 | 1.96 |
| | Dip. Degree | 3.09 | 3.27 | 1.70 |
| BOTSWANA | | | | |
| Professional status | Level of education | C.A. | NC.A. | R.A. |
| Work | None | 3.00 | 3.67 | 2.07 |
| | Primary | 3.45 | 4.15 | 2.45 |
| | Secondary | 3.34 | 3.76 | 2.35 |
| | Dip. Degree | 3.88 | 4.75 | 2.71 |
| Not work | None | 3.08 | 3.67 | 1.84 |
| | Primary | 3.19 | 3.92 | 1.81 |
| | Secondary | 3.44 | 3.82 | 2.06 |
| | Dip. Degree | 3.79 | 4.42 | 1.89 |
| INDIA | | | | |
| Professional status | Level of education | C.A. | NC.A. | R.A. |
| Work | None | 1.43 | 2.73 | 1.48 |
| | Primary | 1.83 | 3.17 | 1.55 |
| | Sec. + | 2.33 | 3.10 | 1.86 |
| Not work | None | 1.25 | 2.40 | 1.05 |
| | Primary | 1.80 | 2.80 | 1.00 |
| | Sec. + | 1.71 | 2.57 | 1.14 |

**Table 6 - Mean value of the indexes by age group**

| | Botswana | | | South Africa | | | India | | |
|---|---|---|---|---|---|---|---|---|---|
| Age | C.A. | NC.A. | R.A. | C.A. | NC.A. | R.A. | C.A. | NC.A. | R.A. |
| | | | | | | | | | |
| 15-19 | 4.00 | 4.17 | 2.00 | 2.89 | 3.44 | 1.86 | 0.89 | 2.22 | 1.22 |
| 20-24 | 3.24 | 4.16 | 2.30 | 3.03 | 3.52 | 2.04 | 1.57 | 2.33 | 1.38 |
| 25-29 | 3.50 | 4.12 | 2.20 | 2.78 | 3.02 | 1.96 | 2.00 | 2.91 | 1.53 |
| 30-34 | 3.54 | 3.76 | 1.98 | 2.66 | 2.85 | 2.06 | 1.49 | 2.65 | 1.43 |
| 35-39 | 3.28 | 3.96 | 2.10 | 2.60 | 2.71 | 2.16 | 1.51 | 2.86 | 1.58 |
| 40+ | 3.15 | 3.73 | 1.93 | 2.36 | 2.94 | 1.73 | 1.32 | 2.68 | 1.27 |

**Table 7 - Mean value of the indexes by contraceptive use**

| | Botswana | | | South Africa | | | India | | |
|---|---|---|---|---|---|---|---|---|---|
| Contr. Use | C.A. | NC.A. | R.A. | C.A. | NC.A. | R.A. | C.A. | NC.A. | R.A. |
| | | | | | | | | | |
| Ever use | 3.32 | 3.85 | 2.04 | 2.93 | 3.16 | 2.01 | 1.53 | 2.87 | 1.40 |
| Never use | 3.38 | 3.96 | 2.08 | 2.18 | 2.75 | 1.82 | 1.41 | 2.57 | 1.34 |

**Table 8 - Mean number of children by autonomy indexes and by education**

Panel a)

| | Botswana | | | | South Africa | | | | India | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C.A. | None | Prim. | Sec. | Dip.+ | None | Prim. | Sec. | Dip.+ | None | Prim. | Sec.+ |
| | | | | | | | | | | | |
| 0 | 6.00 | 3.75 | 5.75 | | 3.50 | 5.07 | 3.00 | | 5.21 | 4.00 | 5.00 |
| 1 | 4.80 | 5.75 | 3.75 | | 4.85 | 4.00 | 2.92 | 1.50 | 4.91 | 4.27 | 2.29 |
| 2 | 5.00 | 5.50 | 3.50 | 3.00 | 5.14 | 4.88 | 2.67 | 2.67 | 4.42 | 4.40 | 2.22 |
| 3 | 3.80 | 5.11 | 3.18 | 2.00 | 4.00 | 4.11 | 2.16 | 1.00 | 3.80 | 3.89 | 2.88 |
| 4 | 3.91 | 4.30 | 3.07 | 3.14 | 3.67 | 4.16 | 2.96 | 1.44 | 2.80 | 3.00 | 3.33 |

Panel b)

| | Botswana | | | | South Africa | | | | India | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| NC.A. | None | Prim. | Sec. | Dip.+ | None | Prim. | Sec. | Dip.+ | None | Prim. | Sec.+ |
| | | | | | | | | | | | |
| 0 | 6.00 | 2.50 | | | 5.00 | | 3.00 | 2.00 | 5.23 | 7.50 | 1.00 |
| 1 | 5.50 | 3.00 | | | 5.00 | 5.40 | 2.36 | 3.00 | 5.11 | 4.00 | 3.00 |
| 2 | 5.17 | 6.00 | | | 3.67 | 4.38 | 3.50 | 2.50 | 4.50 | 3.13 | 2.75 |
| 3 | 4.17 | 5.73 | 3.00 | | 4.56 | 4.20 | 2.89 | 1.00 | 4.58 | 4.00 | 2.45 |
| 4 | 3.59 | 4.35 | 2.89 | | 4.27 | 3.81 | 2.27 | 1.63 | 4.48 | 4.39 | 2.90 |
| 5 | 4.33 | 4.23 | 3.07 | | | 4.45 | 2.47 | 0.50 | 3.80 | | |

Panel c)

| | Botswana | | | | South Africa | | | | India | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| R.A. | None | Prim. | Sec. | Dip.+ | None | Prim. | Sec. | Dip.+ | None | Prim. | Sec. |
| | | | | | | | | | | | |
| 0 | 5.20 | 7.00 | 5.00 | 1.00 | 5.17 | 5.38 | 3.50 | 3.00 | 5.27 | 3.00 | 4.00 |
| 1 | 3.93 | 4.43 | 3.53 | 2.80 | 3.57 | 4.46 | 2.46 | 1.33 | 4.63 | 4.55 | 2.75 |
| 2 | 4.91 | 4.07 | 3.30 | 3.36 | 4.64 | 4.32 | 2.92 | 2.17 | 4.46 | 3.75 | 2.70 |
| 3 | 3.31 | 4.84 | 3.09 | 2.88 | 6.50 | 4.19 | 2.41 | 1.00 | 4.36 | 4.33 | 2.00 |
| 4 | 5.00 | 6.00 | 1.89 | 3.00 | 5.00 | 3.00 | 3.33 | | 4.83 | | |

## Table 9 – Regression model - Dependent variable=Children ever born

**Botswana**

R-Square=0.4241

| Variable | DF | Parameter Estimate | Standard Error | t value | Pr>\|t\| |
|---|---|---|---|---|---|
| Intercept | 1 | -0.99885 | 0.68686 | -1.45 | 0.1476 |
| Age of woman | 1 | 0.14900* | 0.01234 | 12.08 | < .0001 |
| Contraceptive use | 1 | 0.72990* | 0.23020 | 3.17 | 0.0017 |
| Years of education | 1 | -0.02385 | 0.03322 | -0.72 | 0.4733 |
| Cust. Autonomy | 1 | -0.29551* | 0.10661 | -2.77 | 0.006 |
| Non customary Aut. | 1 | 0.12992 | 0.11113 | 1.17 | 0.2434 |
| Realized Autonomy | 1 | -0.24080* | 0.11472 | -2.10 | 0.0365 |

**South Africa**

R-Square=0.319

| Variable | DF | Parameter Estimate | Standard Error | t value | Pr>\|t\| |
|---|---|---|---|---|---|
| Intercept | 1 | -0.19436 | 0.62891 | -0.31 | 0.7576 |
| Age of woman | 1 | 0.11553* | 0.01268 | 9.11 | < .0001 |
| Contraceptive use | 1 | 0.54948* | 0.25728 | 2.14 | 0.0337 |
| Years of education | 1 | 0.00029 | 0.00039 | 0.74 | 0.4577 |
| Cust. Autonomy | 1 | -0.18212** | 0.10453 | -1.74 | 0.0827 |
| Non customary Aut. | 1 | -0.10226 | 0.10814 | -0.95 | 0.3453 |
| Realized Autonomy | 1 | -0.09104 | 0.12339 | -0.74 | 0.4613 |

**India**

R-Square=0.2768

| Variable | DF | Parameter Estimate | Standard Error | t value | Pr>\|t\| |
|---|---|---|---|---|---|
| Intercept | 1 | 2.25713 | 0.47245 | 4.78 | < .0001 |
| Age of woman | 1 | 0.07652* | 0.00614 | 12.46 | < .0001 |
| Contraceptive use | 1 | -0.24803 | 0.17478 | -1.42 | 0.1564 |
| Years of education | 1 | -0.06410 | 0.04654 | -1.38 | 0.1689 |
| Cust. Autonomy | 1 | -0.31944* | 0.09138 | -3.50 | 0.0005 |
| Non customary Aut. | 1 | -0.01946 | 0.08579 | -0.23 | 0.8207 |
| Realized Autonomy | 1 | -0.02040 | 0.10850 | -0.19 | 0.8509 |

*= significant at 5% level

**=significant at 10% level

## Table 10 - Logistic Model - Dependent variable=Ever Use of contraception

**A) Botswana**

| Variables | Parameter Estimate | St. Error | ChiSq | Pr> ChiSq | Point Estim. |
|---|---|---|---|---|---|
| Intercept | 2.2795* | 0.969 | 5.538 | 0.019 | |
| Age of woman | -0.0217 | 0.018 | 1.452 | 0.228 | 0.979 |
| Years of education | 0.0396 | 0.049 | 0.666 | 0.415 | 1.040 |
| Cust. Autonomy | 0.0185 | 0.158 | 0.014 | 0.907 | 1.019 |
| Non customary Aut. | -0.1470 | 0.167 | 0.776 | 0.378 | 0.863 |
| Realized Autonomy | -0.0100 | 0.169 | 0.004 | 0.953 | 0.990 |

**B) South Africa**

| Variables | Parameter Estimate | St. Error | ChiSq | Pr> ChiSq | Point Estim. |
|---|---|---|---|---|---|
| Intercept | 0.8202 | 0.723 | 1.287 | 0.257 | |
| Age of woman | -0.0585* | 0.016 | 13.987 | 0.000 | 0.943 |
| Years of education | 0.0009** | 0.000 | 3.473 | 0.062 | 1.001 |
| Cust. Autonomy | 0.3966* | 0.123 | 10.364 | 0.001 | 1.487 |
| Non customary Aut. | 0.0634 | 0.130 | 0.237 | 0.626 | 1.065 |
| Realized Autonomy | 0.1150 | 0.149 | 0.597 | 0.440 | 1.122 |

**C) India**

| Variables | Parameter Estimate | St. Error | ChiSq | Pr> ChiSq | Point Estim. |
|---|---|---|---|---|---|
| Intercept | -0.4439 | 0.392 | 1.284 | 0.257 | 0.257 |
| Age of woman | -0.0137* | 0.006 | 4.606 | 0.032 | 0.986 |
| Years of education | 0.0050 | 0.046 | 0.012 | 0.914 | 1.005 |
| Cust. Autonomy | -0.0422 | 0.092 | 0.208 | 0.648 | 0.959 |
| Non customary Aut. | 0.2365* | 0.089 | 6.999 | 0.008 | 1.267 |
| Realized Autonomy | -0.0302 | 0.110 | 0.075 | 0.784 | 0.970 |

*= significant at 5% level
**=significant at 10% level

**Figure 1 – Distribution of women according to the values of the indexes of autonomy**

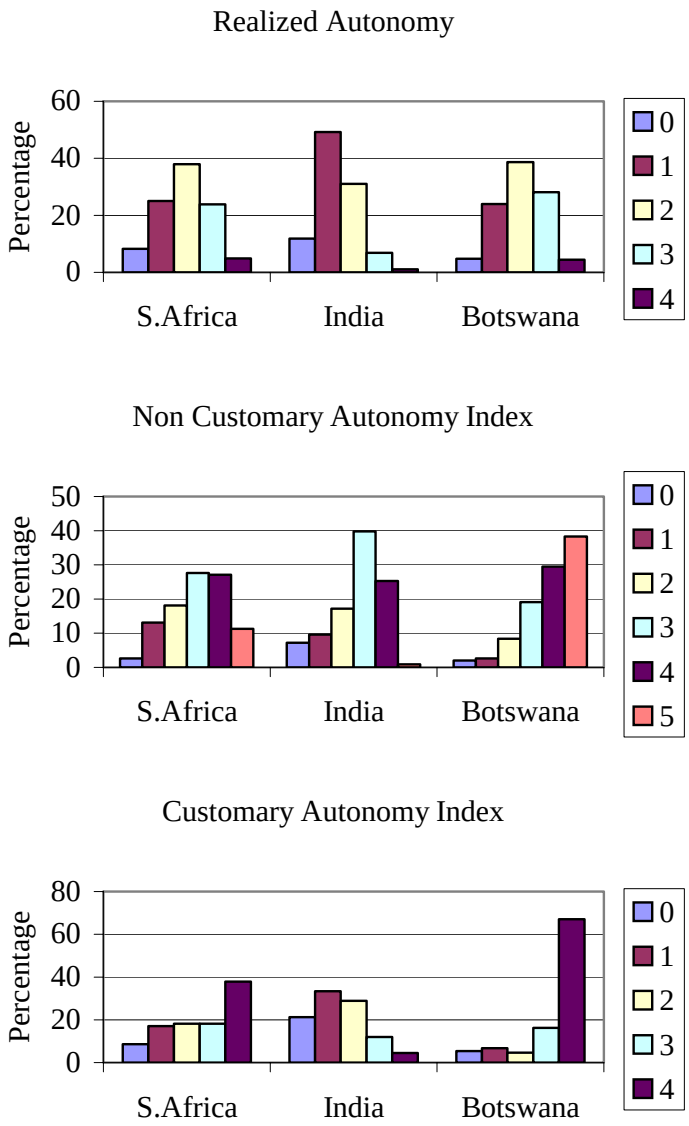


**Figure 2. Path diagram between independent variable E and four indicators A, B, C and D**

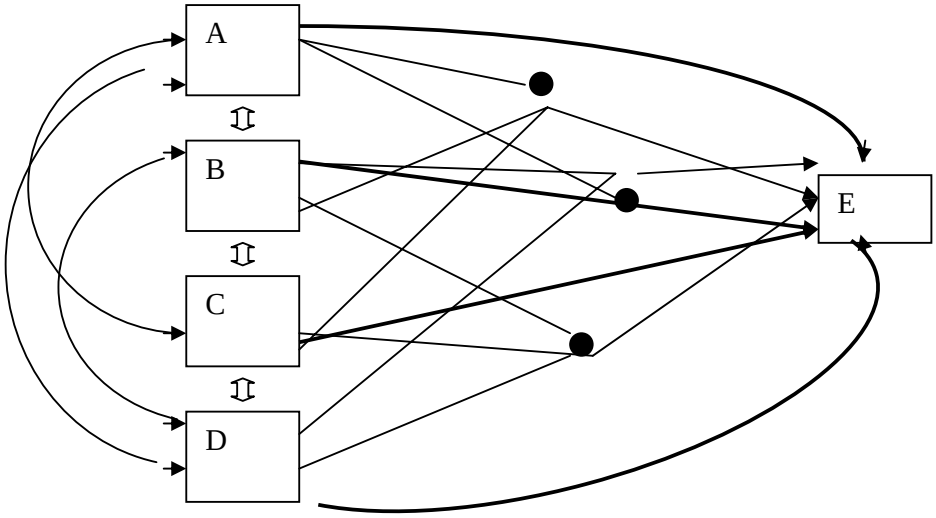


**Figure 3a - Conditional Probabilities of having n Ceb (children ever born) by customary index of autonomy in South-Africa**

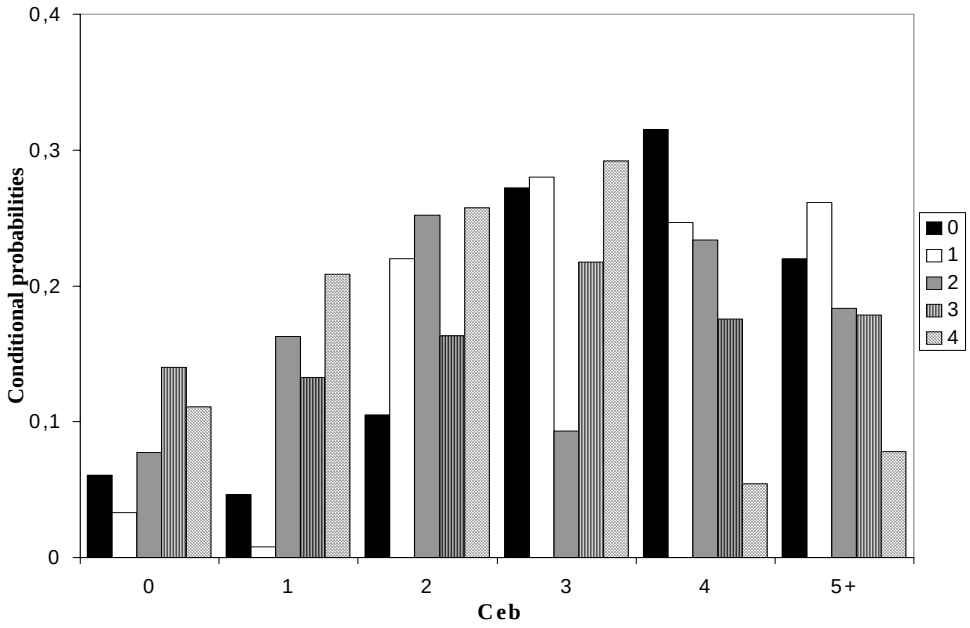


**Figure 3b Conditional Probabilities of having n ceb (children ever born) by customary index of autonomy in Botswana**

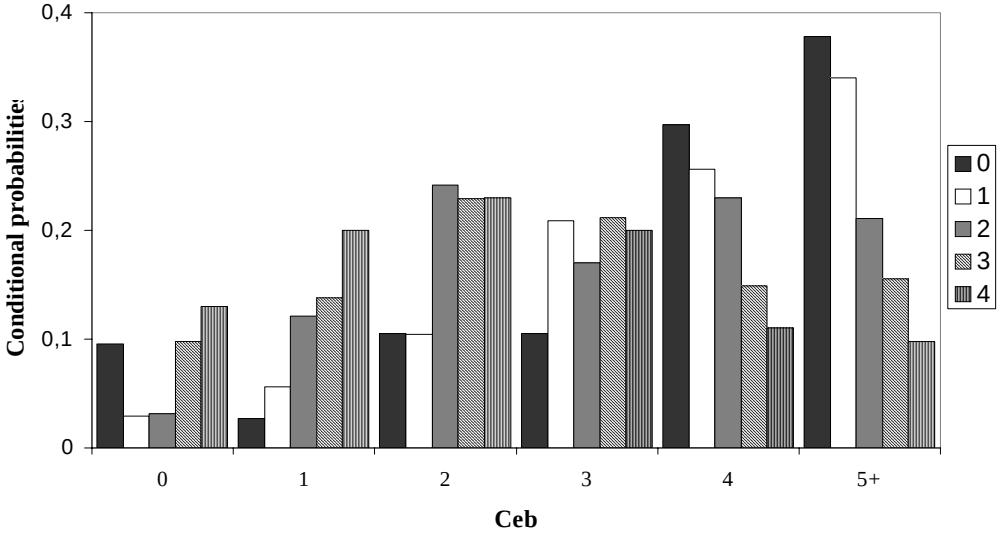


**Figure 3c Conditional Probabilities of having n ceb (children ever born) by customary index of autonomy in India.**

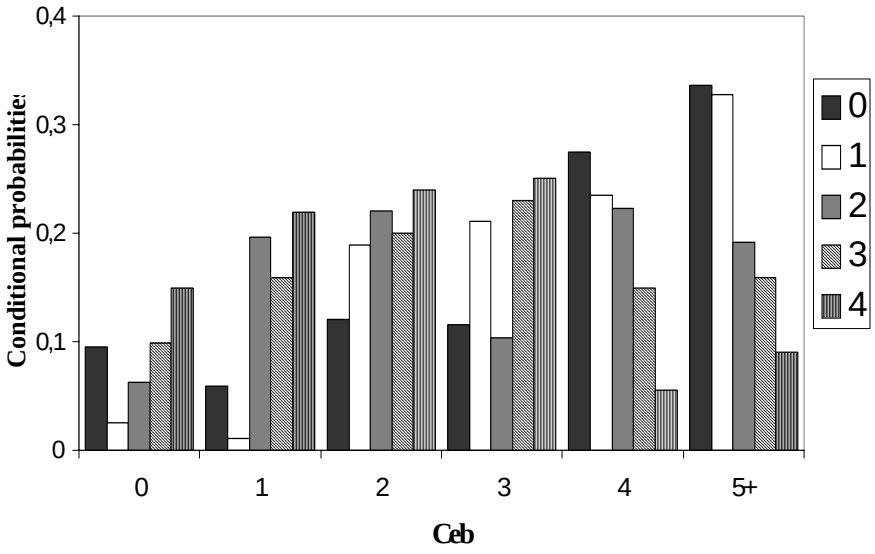


**Figure 4a Conditional Probabilities from a multivariate logit model for ceb by non customary index in South Africa**

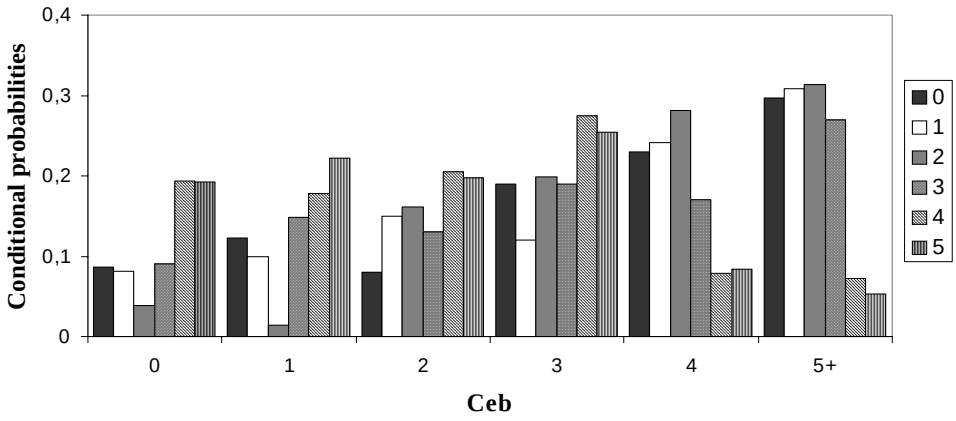


**Figure 4b Conditional probabilities from a multivariate model for ceb by non customary index in Botswana**

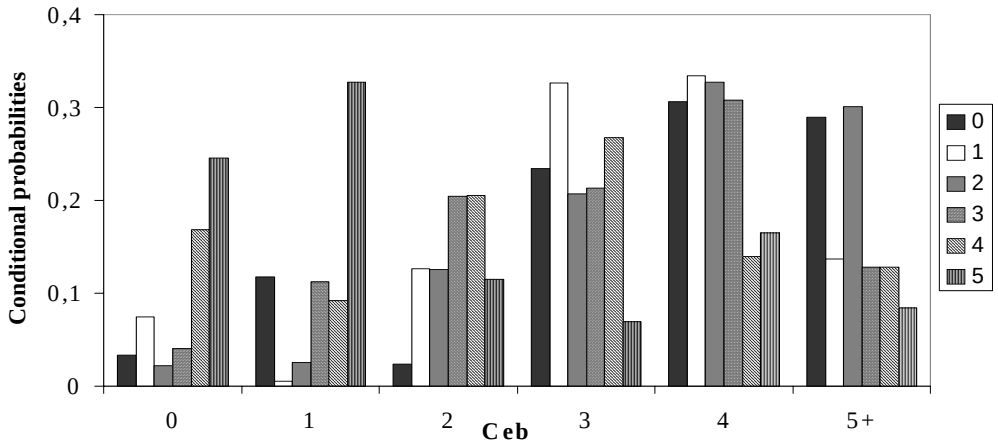


**Figure 4c Conditional probabilities from a multivariate model for ceb by non customary index in India**

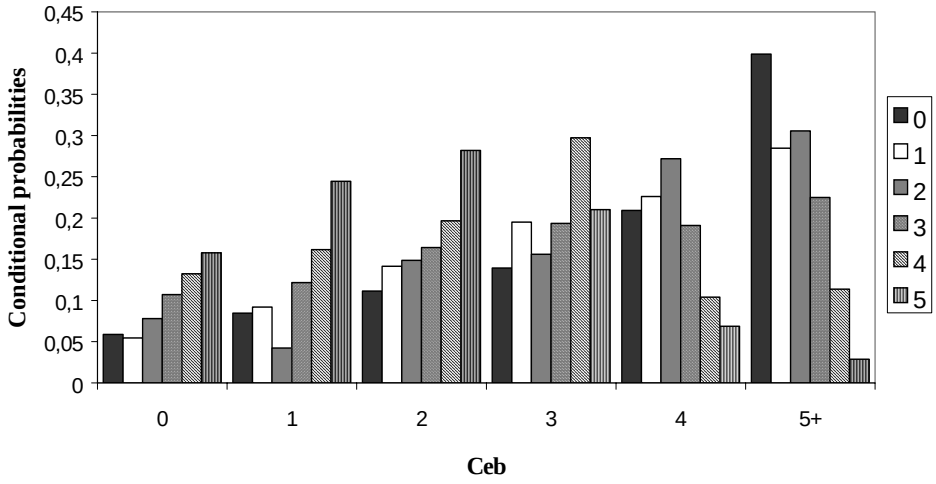


**Figure 5a Conditional probabilities from a multivariate model for ceb by realized index in South Africa**

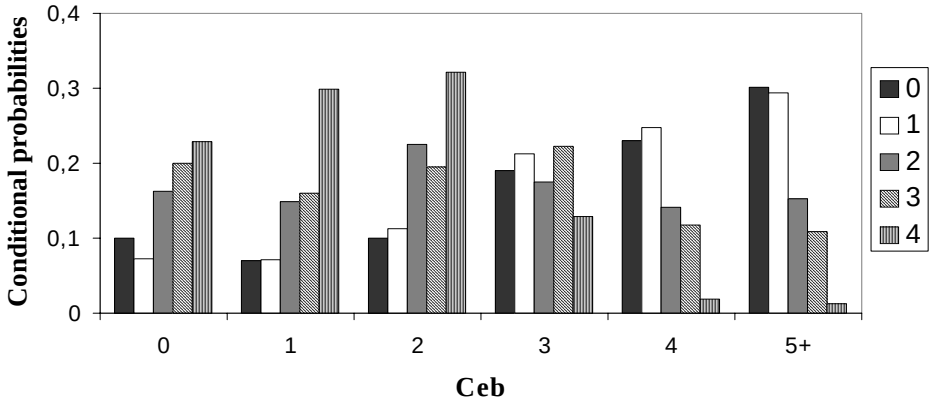


**Figure 5b Conditional probabilities from a multivariate model for ceb by realized index in Botswana**

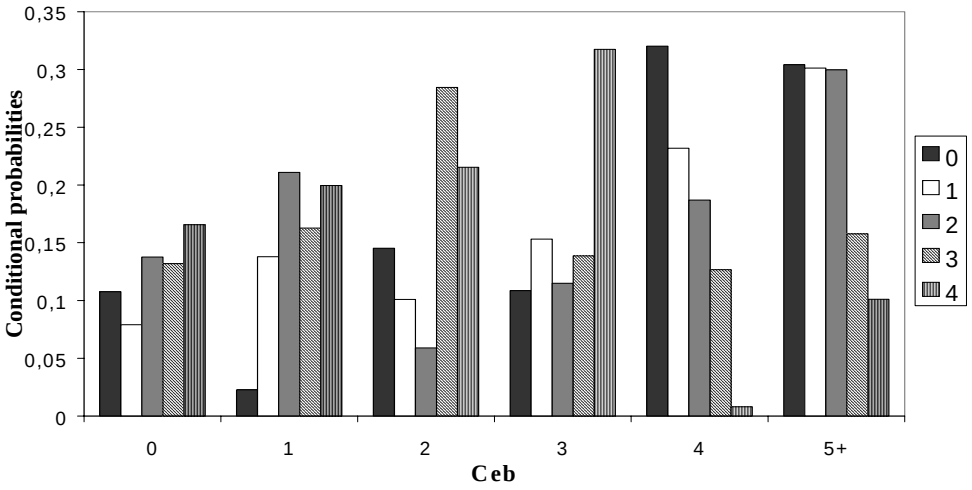
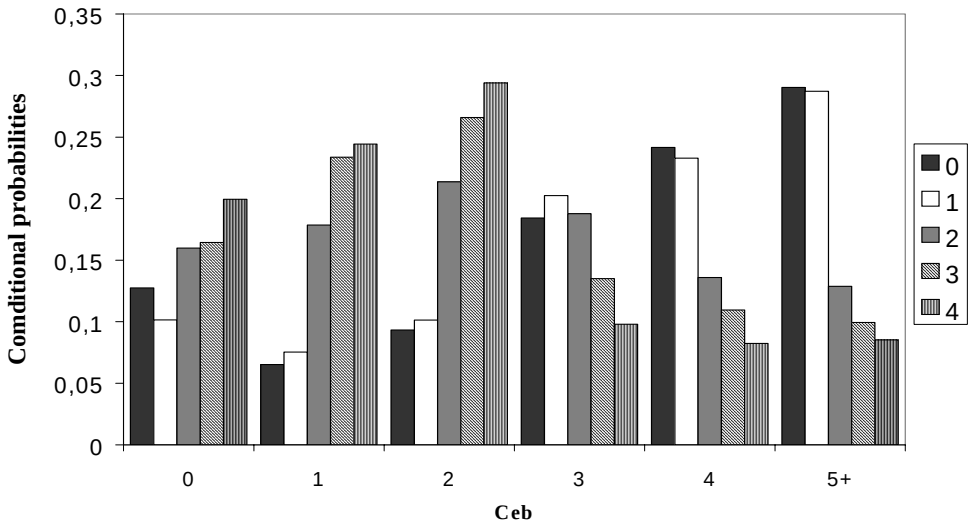


**Figure 5c Conditional probabilities from a multivariate model for ceb by realized index in India**



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