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Does Employment before Marriage Exert Autonomy after Marriage? Evidence on Female Autonomy from India

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Abstract: This paper examines the determinants of female autonomy using data from India. We model female autonomy for movement as well as economic decision-making using a summative index approach. Our contributions to the literature include a careful examination of the regional differences, tests of economic and sociological hypotheses on female autonomy and the use of pre-marriage autonomy measures in terms of employment status to determine post-marriage autonomy. Our results suggest that economic, sociological and pre-marriage autonomy factors explain female autonomy. Regional differences regarding the economic, sociological and pre-marriage autonomy factors play a role in determining female autonomy.

JEL: J16, C25, R20

Keywords: Female Autonomy, Multivariate Probit, India

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1. Introduction

The social structure and orthodox traditions present in India encourage gender discrimination in favour of the male child. The situation is compounded due to a lack of adequate state-supported financial and health protection schemes for the elderly. Under the patriarchal social system in India, the sons are not only expected to carry the family lineage but also to provide old age security for parents. Generally, the widespread (and rising) prevalence of dowry and social taboos have meant that daughters are often looked upon as a burden rather than an asset. Over the years India has implemented several measures to improve the status of women including a sub-section [15(3)] of its constitution (Government of India (1950) that allows for affirmative action in favour of women.[1] Specific legislative initiatives include: the 1961 Dowry Prohibition Act; the 1976 Equal Remuneration Act; the 2005 Protection of Women from Domestic Violence Act; and the 2006 Prohibition of Child Marriage Act. In spite of these initiatives, the magnitude and extent of gender discrimination has assumed alarming proportions. This is reflected in the skewed sex ratio and the rising incidents of (sexual) violence against women in recent years. The last few censuses in India have indicated that there has been a clear decline in the sex ratio from 972 females for every 1000 males in 1901 to 943 for every 1000 males in 2011.[2] For the period 2001 to 2006 there has been a general rise in crimes against women. In particular there have been increases in the number of reported dowry deaths from 6,851 to 7,618 and incidents of cruelty by a husband or a relative from 49,170 to 63,128.[3]

In India, considerable regional disparity exists with states located in the southern part of the country registering comparatively lesser gender imbalance than those situated in the north. For example, the sex-ratio in Uttar Pradesh (a northern Indian state) for 1991 and 2011 was 884 and 912 females per 1000 males respectively; while for Tamil Nadu (a southern Indian state) it was 960 and 996 females per 1000 males respectively.[4] The gap in the male/female literacy rate in Tamil Nadu is 12.95 in 2011 as compared to 17.99 in 2001. For

[1]See the Ministry of Women and Child Development (2009: 4-5) for a listing of the constitutional and legal provisions in relation to the protection and promotion of women's rights in India.

[2] Source: For the year 1901, sex ratio is taken from Census of India – 2011a (Gender Composition of the Population – Pg 80 available from http://www.censusindia.gov.in/2011-prov-results/data_files/india/Final_PPT_2011_chapter5.pdf). Note, data for 2011 includes the final estimates as released by the Census of India (2011b).

[3]Source: Ministry of Women and Child Development, Government of India (2007).

[4]Data for both 1991 and 2011 include final estimates as reported by Census of India (2011b). For further details refer to http://www.censusindia.gov.in/DigitalLibrary/archive_home.aspx).

Uttar Pradesh the corresponding literacy gap is 19.98 in 2011 and 26.60 in 2001.[5] In 2015, 1.8 percent of the total reported crime against women was from Tamil Nadu as against 10.9 percent in Uttar Pradesh.[6] These numbers indicate a large north-south gap in the status of women.

Divergent rationales have been provided in the existing literature to explain the large north-south gap in the status of women. Dyson and Moore (1983) explain the evidence of greater autonomy of women in south India compared to that in the north in terms of existing marriage practices. In the northern states, marriages are exogamic – unrelated by kinship and also by place of birth / residence. Neither do women have the right to inherit property. In contrast to this, in southern states marriage practices are endogamous; marriages are more likely to take place between relations and post marriage women reside close to their natal home. Women may also sometimes inherit / transfer property right. Such difference has resulted in better status of women in the south due to more contact with their natal family, greater control over resources (including her dowry) and freedom of movement and communication.[7]

Bardhan (1974) explained the north-south divide in terms of different agricultural systems prevalent in the two regions. Dry land cultivation in the (wheat growing) North-India as compared to the wetland cultivation (rice growing) in the South-India requires less participation of females in the production process, thereby reducing their income generation activities. This in turn has propagated discrimination against daughters in the northern states. This is refuted by Dasgupta (1987) who observed that both Punjab and Haryana have witnessed a high degree of female participation in the agricultural production process (activities like sowing, weeding, harvesting and threshing are considered an integral part of housework). She, in agreement with Dyson and Moore (1987), attributed the regional differences in female status to the exogamous marriage rules in Punjab. This line of argument has also been supported by other studies, such as Basu (1992) and Jejeebhoy and Sathar (2001). However, lack of adequate economic and district controls potentially leads to an overestimate of the regional effect in the above mentioned studies. In part this criticism is validated by the Rahman and Rao (2004) who found that regional differences disappear with

[5]Source: Census of India (2011c). Also literacy rate figures for 2011 are provisional. For further details please refer to 'State of Literacy', Page 116-117 available from http://censusindia.gov.in/2011-prov-results/data_files/india/Final_PPT_2011_chapter6.pdf .

[6] See Table 5.1, Crime in India (2015), National Crime Records Bureau, Ministry of Home Affairs (Web-Site: http://ncrb.gov.in/index.htm)

[7]For an excellent and in-depth survey of the explanations of differences in autonomy also see Rahman and Rao (2004).

more detailed economic controls.[8] But Rahman and Rao treat the North-South difference as an intercept effect only which is a highly restrictive specification.

The earlier literature focusing on unitary models of the household assumes a single decision-making agent with a single budget constraint corresponding to a single utility function, thus treating the household as an aggregate. In these models, a change in income of either the husband or wife level has identical implications thus giving the impression that a wife has an equal level of autonomy in the household relative to her husband. However, the unitary household models fail to address intra-household inequality and household composition-related issues.

The non-unitary models can be classified into two categories known as cooperative and non-cooperative models. The cooperative models recognize individual utility functions using threat points for each member of the household. The threat points may or may not be external to the household and a function of some distribution factors, for example both husbands' and wives' incomes, but not their pooled income. According to the cooperative models, a household maximizes the weighted sum of a husband and wife's utility functions, where the relative weight of the wife's utility function captures her bargaining power relative to her husband. The relative weight depends on some distributional factors, such as husband and wife's income, educational attainment etc. The main conclusion that emerges from these models is that the consumption decisions are influenced by the distribution factors, which in turn depend on the relative bargaining power between a husband and wife. This is how women's autonomy may be linked with these models of household decision-making processes in the household.

The non-cooperative models concentrate on the 'separate sphere' model of households in particular. In these models, the pooled budget constraint is absent. The husband and wife maximize his/her own utility function subject to individual budget constraints assuming the decisions of others in the household as given. Lundberg and Pollak (1994) also discuss the non-cooperative models by including cultural factors where equilibrium depends on the resource control by a husband or wife. Anderson and Eswaran (2009) find that, in the case of Bangladeshi women, with an increase in the employed status of a woman, her threat utility and level of bargaining power relative to her husband increases. In another study, Eswaran and Malhotra (2011) firmly argue that a family's evolutionary past is more relevant than just employment status for women's household autonomy. In this study domestic

[8]See also Kishor (1993), Malhotra, Vanneman and Kishor (1995), and Menon and Johnson (2007) for studies that also fail to find the north/south differences on female autonomy.

violence experienced by women from her husband was found to impinge her autonomy and in this context evolutionary theory as expounded by psychologists play an important role. The latter associate domestic violence to paternity uncertainty and hence a 'natural' tendency of men to exercise proprietary right over women sexuality and reduce her freedom to inter-act with the outside world / men. More recently, Eswaran et al. (2013) find that cultural factors, including family status and caste, play a substantial role in determining women's autonomy in the case of India.

In our framework, we explicitly control for endogamous marriage and test directly the Dyson and Moore hypothesis, which is our first contribution to the existing literature. Our second contribution to the existing literature is that in addition to marriage pattern, we focus on the role of three new variables on female autonomy: two variables capturing the wife's autonomy prior to marriage, and a third examining the wife's exposure to media. [9,10] Our econometric modelling strategy to examine the determinants of female autonomy also departs from the rest of the literature in two ways. Traditionally researchers have estimated the autonomy equations using single equation techniques. However, we would expect a correlation across these autonomy decisions. We contribute to the existing literature by jointly estimating (using a multivariate probit model) the autonomy equations to take account of the correlation that exists across the autonomy measures. We split the seven autonomy measures into two groups: the first set is movement autonomy for family needs (going to the market to buy foods for family, going to the health care centre, going to the fields and going to the commercial centre) and the second set consists of movement autonomy for leisure activities (going to visit family or friends, going to the fair, and going to the neighbouring village).

The fourth contribution is the specification of regional effects in a way that deviates significantly from the existing literature. Traditionally the regional effects are modelled as either an intercept effect (Rahman & Rao (2004)) or a complete separation of all parameters across the states. We argue that the difference in these regional parameters is due to the socio-cultural differences across the two regions. For this reason, we use interaction terms of

[9]Using data from Bangladesh, Anderson and Eswaran (2009) demonstrate the importance of current income opportunities of the wife and its effect on the wife's autonomy after controlling for the endogeneity of current income by using an instrumental variable (IV) technique. Earned income by the wife does have a significant positive effect on female autonomy. Our model is developed on similar lines.

[10]Bhattacharya, Bedi and Chhachhi (2011) explore the relationship between women's current participation in paid work and the ownership of assets with spousal violence. To control for plausible endogenity between women's current economic status and domestic violence, the paper has simultaneously determined a two-equation violence and work status model using a bivariate probit model. Though the issue covered in this paper is distinctly different from ours the underlying framework is similar.

the regional variables with education, age, dowry, media exposure, husband being a relative, employment before marriage, choice of selection of husband and the development regional dummy as determinants of the autonomy equation.

Our results suggest that marriage to a relative exerts a significant effect on female autonomy in some of the autonomy measures. We also provide some evidence favouring the North-South difference. The Hindu religion dummy has a positive statistically significant effect on all types of autonomy of movement for family needs and two of three categories for leisure activities. Wife's education, media exposure and age play a positive significant role in determining female autonomy in Tamil Nadu (except for one category of movement autonomy in case of wife's education and one category of leisure autonomy for media exposure); however the impact runs in opposite and significant ways in the case of Uttar Pradesh. Also, in Tamil Nadu pre-marriage paid employment in general positively affects movement and leisure autonomy. If the women can exercise her rights in choice for selecting a partner, the association is mainly positive in case of Tamil Nadu.

The remaining parts of this paper are organized into the following sections. The next section will introduce the data set and the variables that we will use to model female autonomy. Section 3 describes the estimation methodology along with the results. We provide a comparison between female employment, autonomy and the socio-economic construct of the two states in Section 4 and Section 5 concludes.

2. Data Set and Variable Description

We use the data set 'Survey on the Status of Women and Fertility' (SWAF), conducted by University of Pennsylvania in the year 1993-94 for five countries.[11] The data for India was collected through the interviews with married women in the age-group of 15 to 39 and their husbands for two Indian states: Tamil Nadu in the south and Uttar Pradesh in the north. Two districts from each state (Meerut and Pratapgarh from Uttar Pradesh, and Coimbatore and Ramanathapuram from Tamil Nadu) were surveyed.[12] The total number of available observations in the data set is 1,842 for the wives; however, only 1,660 husband surveys were completed. Our first restriction is to include only the observations in which both

[11]For a detailed discussion on the sampling design, field reports, codebooks, datasets, questionnaires and publications, see Smith et al. (2000) retrieved from http://swaf.pop.upenn.edu/datasets .

[12]The sex ratio in two districts of Tamil Nadu, Coimbatore (economically advanced) and Ramanathapuram (economically backward), at 959 and 1033 respectively are significantly different in 2001. The districts of Meerut (advanced) and Pratapgarh (backward) in Uttar Pradesh also record a considerably different sex-ratio in 2001 (871 and 983 respectively). So, there exists considerable heterogeneity in female social indicators both across and within the two states.

wives and husbands answered the survey. We also exclude the cases where both partners were married more than once and are left with 1,529 observations. At the state level the observations are 742 from Tamil Nadu and 787 from Uttar Pradesh. [13]

Table 1 reports the descriptive statistics by state for our seven measures of autonomy. We report in the final column the difference in means test and the probability value associated with the test. In each sphere of autonomy, Tamil Nadu has a mean that is larger than that of Uttar Pradesh. The results from the means test provide strong evidence that females in Tamil Nadu enjoy more autonomy except for freedom of movement to visit the next village where no significant difference was established.

[Insert Table 1 approximately here]

Table 2 presents the descriptive statistics (by state) on the variables that we use to explain female autonomy. We consider both cultural and economic factors that may play a role in determining female autonomy. For the cultural factors we use three dummy variables: religion, caste and endogamous marriage, i.e. husband belongs to her natal family. Previous literature documents that in Islamic societies, the position of the women is such that it restricts both her education and autonomy (Caldwell 1986; and Jeejebhoy & Sathar 2001). We use a dummy variable coded as one if the household is Hindu and, given the existing literature, we would expect a positive coefficient associated with this variable. In both states around 50% of the households are Hindu. Given historically determined social fragmentation based on caste system we have introduced a dummy that takes the value of one if the respondent is from a marginalised / backward caste (Jeejebhoy 2000).[14] The percentage of households who belong to the disadvantaged caste is around 12% for both Tamil Nadu and Uttar Pradesh. Dyson and Moore (1983) have highlighted the role of different marriage practices across north and south India. We introduce a variable coded as one if her husband is a direct relative and allow for this parameter to differ across Tamil Nadu and Uttar Pradesh to control for this feature. We observe that 56 percent of the wives in Tamil Nadu are married

[13]With the exception of the caste variable, all the variables used in this framework are derived from the wife's questionnaire. In terms of the autonomy variables there are equivalent answers provided by the husband so it is possible with the SWAF data to examine the issue of convergence/divergence in husband and wife views of female autonomy. Jejeebhoy (2002) examines this and finds that one-half to three-quarters of the husbands disagree with their wife's answer with the husband tending to attribute more autonomy to their wife than the wife's own answer. While this is an interesting issue worthy of further research we would argue that in the context of determinants of female autonomy the wife's answer is the relevant one in this analysis.

[14]In about eleven percent of the cases, the religion and caste of the husband and wife did not match. However, we use husband's religion and caste, as in India the customs and traditions of the husband's family matters irrespective of the wife's religion or caste.

within the natal family compared to only 14 percent in Uttar Pradesh and the difference is statistically significant.

We follow the literature and use standard economic variables that capture labour market opportunities for wives. To control for human capital we use female education (measured as years of education).[15] In our sample, in Tamil Nadu, the average years of schooling for wives is 3.37 compared to 1.95 in Uttar Pradesh and this difference is statistically significant. The impact of education of wives could differ between Tamil Nadu and Uttar Pradesh and to account for this we have interacted wife's years of education with the state dummy. The household bargaining model stresses the importance of the difference in earnings capacity between husband and wife, which we control for by including the difference in education between husband and wife (measured in number of years). According to the bargaining model, this variable should have a negative impact on the wife's autonomy. The average difference in education between husband and wife is significantly higher in Uttar Pradesh.

Consistent with Sathar and Kazi (2000), we control for the age of the wife. In addition to this, to account for the varied regional effect of age, we incorporate an interaction dummy. We also include the difference in age between husband and wife. The age difference variable can have both an economic and cultural interpretation. The economic interpretation is that the difference in age reflects differences in experience and hence in earning capacity. On a cultural level if the age gap between husband and wife is closer, then the probability that they will share similar view-points on several issues is higher. Table 2 indicates that in Tamil Nadu the mean difference in age is 5.6 years and that in Uttar Pradesh is 4.8 years.

[Insert Table 2 approximately here]

An important family wealth variable is dowry but it raises some important conceptual issues especially in terms of the intra-household resource allocation models.[16] The practice of dowry has a long history in the north of India and for the upper castes/classes in South India (Srinivasan and Bedi 2007). At the present time, exchange of dowry during marriage is practiced by all castes/classes in India. However, the operation of the dowry differs across the north and south of India. In the south women have ownership of a large part of their dowry and enjoy a say over its usage after marriage. In the north, the practice is that the husband has

[15]Jeejebhoy and Sathar (2001) report that secondary school educated women participate more in family decisions than those with less education, using data from the States of Tamil Nadu and Uttar Pradesh in India and Punjab in Pakistan.

[16]See Bloch and Rao (2002) and Srinivasan (2005) for an analysis of dowry payments in India.

command over the dowry once it has been exchanged.[17] Hence, in the south, a greater dowry would mean a higher contribution of the woman in household's pool of resources and hence a higher autonomy. However, in the north the dowry would increase the husband's economic status and would have a negative effect on female autonomy. Given this difference in plausible impact of dowry across the two regions we need an interaction term between dowry variable and regional location. We do not use the actual value of the dowry, rather we use whether land, cash, jewellery or car/livestock was exchanged at the marriage, weighted by village level incidence of each of the potential forms of the dowry. As Table 2 indicates the dowry index in Uttar Pradesh is significantly larger than the value obtained for Tamil Nadu.

In the data set there is a variable which labels the level of economic and social development by district and about 50 percent of the district are labelled as backward in both states. This indicates that there is economic and social heterogeneity within the states that needs to be controlled for. This variable will help to control for the intra-state economic differences that will affect the opportunities females have in the labour market. As discussed in relation to Bardhan's (1974) work it is important to consider the structure of the economy when examining states in the north and south of India and for this reason we will interact this with the Uttar Pradesh dummy variable.

Although we control for education, exposure to knowledge / information can also take place through other channels, for instance 'access to media'. We use a dummy variable coded as one if the wife is exposed to the media (newspaper, television or radio). This exposure will make her more aware and cognisant about the environment, and represents an increase in her general knowledge. For both these reasons we expect it positively to influence the autonomy the wife enjoys. In Tamil Nadu, around 57% of the wives have experienced media exposure compared to 43% in case of Uttar Pradesh, and this proportional difference is significant.

Finally, we introduce two new variables to the literature capturing past autonomy behaviour enjoyed by the wife before marriage. Our underlying hypothesis is that autonomy is a learned behaviour and that past autonomous behaviour impacts on today's behaviour. Our first variable looks at woman's paid labour supply prior to marriage.[18] The dummy variable is coded as one if the wife had a paid job prior to marriage. In our sample, 37% of the females

[17]Based on the same dataset, Jeejebhoy (1998) constructs an index of "say over dowry". The average for women in Tamil Nadu is 1.53 as compared to 0.62 for women in Uttar Pradesh where the higher value indicates higher control with the highest taking a value of 2.

[18]There is a more general labour supply variable that captures both paid and unpaid labour supply but we use the paid only version. We were concerned that unpaid version was also capturing free family labour that was not autonomous.

in Tamil Nadu were involved in terms of paid work outside her household before marriage while only 4% of the wives in Uttar Pradesh were. Besides the learned behaviour argument the women with past work experience can enjoy more opportunities in the labour market after marriage, which can increase the wife's bargaining power within the household, and this is also represented by this variable. Both of our arguments postulate a positive effect on female autonomy within the household. But the paid employment variable is plausibly correlated with other unobserved attributes of both the husband and wife (e.g., the wife having a special skill), and this unobserved attribute could be driving autonomy later. Our framework takes into account this potential endogeneity. We also postulate that the impact of this variable could vary across states simply because of divergent labour market opportunities and therefore we allow for the presence of regional effect in this variable.

Autonomy enjoyed by the woman pre-marriage is also deciphered by the freedom she could exercise in the choice of her husband. In particular, the wife was asked about her role in the choice of husband with two possible answers: she chose her partner or her parents consulted her prior to the choice being made. In our sample only 5% of the Tamil Nadu females enjoyed this freedom while 7% of the wives in Uttar Pradesh had such a role in the choice of husband. This shows that the vast majority are arranged marriages in which the wife to be plays no role. In India parents typically arrange marriages, and marriages are assortative in nature. Therefore this variable could be potentially endogenous with the decision-making after marriage, especially if the husband is a relative. In our framework, we have already controlled for the husband being a relative variable, and we argue that if a wife was able to exercise at least some measure of autonomy in the marriage decision then they would expect some autonomy in decision making after the marriage. So we expect this variable to have a positive effect on female autonomy.

3. Estimation Methodology and Empirical Results

3.1 Estimation Methodology

We use multivariate probit model by focusing on two aspects of female movement autonomy: movement for family needs, and movement for leisure activity. Multivariate probit model estimates M-equation probit models by the method of maximum simulated likelihood (MSL) and allows for the presence of correlations in the variance-covariance matrix of the cross-

equation error-terms.[19] In our case, for the family movement autonomy, we estimate a 4-equation model where as in case of leisure autonomy we have a 3-equation model. In all cases when the woman is able to exercise autonomy the variable is coded as one. Actual autonomy (y^*) is unobserved but we will assume it is a function of various socio-economic characteristics. To estimate this we will use a latent variable construct so that the underlying the model for autonomy in a single equation is thus given by:

$$y^* = x\beta + \varepsilon. \quad (1)$$

where x denote various socio-economic characteristics, β a vector of behavioral parameters and we will assume that $\varepsilon_i \sim N(0,1)$. We use the multivariate probit model as this model will capture the latent correlations capture the cross–dependencies in latent utilities across categories in autonomy. This model is analogous to the SUR model with binary variables.

We start from the prior understanding that the parameters represent behavioural effects on female autonomy. This viewpoint suggests that we require a theoretical or institutional reason for a regional effect to allow for the estimation of a separate parameter across the two states. For a number of variables the arguments suggests that the parameters will differ across the two states. Following the theoretical guidance for this difference, we have estimated an interaction version of the autonomy equation for variables such as education, age, dowry, media exposure, husband being a relative, employment before marriage, choice of selection of husband and the development regional dummy.

3.2 Empirical Results

One may argue that employment before marriage is an endogenous variable. To address this issue, we have conducted Hausman test for each variable.[20] We report the results in Table 3. A uniform conclusion emerges from Table 3: employment before marriage is exogenous in our framework.

Table 3 should be inserted here

[19]For details, see Greene (2012).

[20] We run a linear probability model where we claim that marriage before employment depends on whether the female is staying in a city; the number of years she is single; and the number of years of education that her parents have. We calculate the estimated value of the residual of this regression and use this simultaneously with the original previous employment variable. If the coefficient of the estimated residual is insignificant, then we claim that marriage before employment is exogenous in our framework. We also estimate another version of the multivariate probit model by allowing for another equation for pre-employment marriage where pre-employment marriage is being modeled as a function of whether the female is staying in a city, number of years she is being single, and number of years of education that her parents have along with state and region effects. The results from this model remain qualitatively the same as the one reported in the paper.

Table 4 and 5 report the results of the Multivariate Probit estimation of our two measures of female movement autonomy. The religion dummy is statistically significant for movement autonomy in case of family needs in all four cases, and two out of three categories in case of leisure movement autonomy. The result implies that Hindu families do offer greater female autonomy than the non-Hindu families. The caste variable is almost insignificant except for family autonomy measure captured in terms of going to a field or a commercial centre and our result contrasts with Eswaran et al. (2013). The coefficient associated with the variable 'husband being a relative' is positively significant in two of three leisure autonomy measures, and only in one case for the movement autonomy. We also observe that there exists evidence of behavioural differences across the North and South of India as the interaction parameter is statistically significant in few cases. Our result is thus supportive of the Dyson and Moore hypothesis to some extent.

Our intra-state heterogeneity variable 'Backward District' produces different patterns of effects across the two forms of autonomy. With respect to family movement autonomy we find a volume effect; however an increase in female movement autonomy (for both family need and leisure) in Uttar Pradesh is observed if the wives live in the backward districts except for visiting a friend/relative. The sum of the two coefficients (volume effect and interaction effect) is positive in most of the cases and our result is in contrast with the prediction of Bardhan (1974).

Table 4 and 5 should be inserted here

The education and age effects are critical to the economic explanations of female autonomy and, in particular, intra-household bargaining models. An increase in the number of years of education increases female leisure autonomy. The coefficient of the interaction term (education interacting with Uttar Pradesh dummy) is negative and significant, implying that in Uttar Pradesh an increase in number of years of education decreases female autonomy. The sum of the coefficients (direct and interaction term) is negative. The result for the difference in education of the husband relative to their wife is negative and significant in three categories, justifying the bargaining explanation. The result for the wife's age portrays a positive and significant effect on all forms of female autonomy, although the same is not the case with Uttar Pradesh. The sum of the coefficients (direct and interaction term) is positive. The result on the age difference between husband and wives is mostly significant. So the results on these explicit earnings capacity variables as highlighted by the bargaining models produce a mixed result. Now human capital accumulation, and hence the opportunity set for the wife, is best viewed as a continuous process and, as argued in the previous section, our

media exposure variable and the results in Table 4 and Table 5 are consistent with this interpretation. But the impact varies across the two states. Both the education and the media exposure variable highlight the regional difference existing in India.

The results regarding the composite dowry variable imply that in Tamil Nadu, an increase in dowry increases the level of female autonomy while in Uttar Pradesh it results in a decrease in female autonomy in the case of family movement autonomy. However in the case of leisure movement autonomy, the result is exactly the opposite. The sum of the two coefficients (direct and the interaction term) is negative in two cases and positive in the remaining five cases. Our first result is consistent with the prediction of the intra-household bargaining model since males control the dowry resources in the northern states such as Uttar Pradesh while women control these assets in the southern states. However our second result differs from the prediction of the intra-household bargaining model.

In terms of our pre-marriage employment autonomy variable all four parameter estimates in the family movement autonomy equations are positive and significant. This is in line with what our learned behaviour hypothesis implies. In the case of leisure movement we obtain significant parameter estimates in all the three categories. The differential impact estimates for Uttar Pradesh differs across the category but the coefficient is significant in five out of seven cases. The other pre-marriage female autonomy variable captured in terms of expressing a choice in selecting partner is significant in most of the cases, and the differential impact for Uttar Pradesh is negative. Each of our variables provides evidence that prior autonomy does affect intra-family female autonomy, while the estimates of the parameters highlight the existing regional difference in India. We end this section with the following observation: all the correlation coefficients capturing the cross–dependencies in latent utilities across items in autonomy are significant, and this justifies the use of a multivariate probit model.

4. Recent Trends in Autonomy, Female Employment and Socio-economic Status

Given that the SWAF survey belongs to 1993-94, one can argue that the mobility of women has grown in leaps and bounds since then as has the economic condition with modernisation and different policy initiatives aimed at the uplifting of women's status. In this section, hence, we compare the trends for the last twenty years and focus on key variables such as female employment, autonomy, and their socio-economic status. A comparison of the literacy

rate using the Census of India from both 2001 and 2011[21], as shown earlier, reveals that for both Uttar Pradesh and Tamil Nadu, the gender gap in the literacy rate has declined – but even in 2011 the male literacy rate is considerably higher than the female literacy rate. In Table 6, we focus on female employment, and autonomy using the National Family Health Survey data (rounds 2 and 3, conducted in 1998-99 and in 2005-06 respectively).

Table 6 inserted here

We observe that the percentage of employed female who were paid in cash only has increased in Tamil Nadu by 4.2 percent where as in Uttar Pradesh it has fallen by 2.9 percent. In the case of female autonomy, the situation in Tamil Nadu has worsened in two dimensions - seeking own health care and visiting parents/relatives; but increased in the case of purchasing jewellery or major household items. One can infer that employed women paid in cash enjoy greater autonomy at least in their purchasing decisions of major household items i.e. economic autonomy. The scenario in Uttar Pradesh is rather gloomy: both economic and movement autonomy has decreased from 1998-99 to 2005-06.

5. Conclusion

This paper is concerned with the intra-family decision-making and, in particular, the level of autonomy the wife enjoys in movement decisions, independent of her husband. To examine this issue we use the SWAF data set for the Indian states of Tamil Nadu and Uttar Pradesh. Prior theoretical and empirical literature which examined the determinants of autonomy identified the role of both sociological and economic factors. In India an important regional differential in female autonomy has been observed in the previous literature, and in this paper we use theory and institutional factors to determine the amount of regional variation. A final innovation introduced into this paper is the use of indicators of pre-marriage autonomy to determine post-marriage autonomy. Our results indicate that the pre-marriage employment autonomy variable shows a significant association with post-marriage autonomy. We also document that wives exercising a role in their choice of husband plays a role in the level of autonomous decisions that wives are able to make after marriage. Our other findings corroborate the existing literature: religion, education, and age play a role in determining the autonomy that a wife enjoys. Our results suggest the presence of the traditional North-South difference in female autonomy.

[21] Census of India (2011c), op cit

The policy implications of our results are standard in one respect. Our education, functional literacy and age results all point towards a policy of universal and free basic education which provides women with earnings capacity and thus enhances their autonomy. Further, our dowry results suggest that policies that enhance female control of resources within the family are extremely important. For example, like the dowry, land inheritance has a similar North-South split (Agarwal 2003): women in Uttar Pradesh are severely constrained by state law in inheriting land. The states of Andhra Pradesh, Maharashtra, Karnataka, and Tamil Nadu in 1986, 1989, 1994, and 1994, respectively amended the 1956 Hindu Succession Act (HSA) by ordering that the daughter of a coparcener i.e. an individual with ownership rights of an undivided estate will become a coparcener herself by birth, i.e. acquiring a status equal to that of a son. Similar national-level changes were made in 2005. Deininger et al. (2006) observe that the amendments to HSA act led to genuine improvement in women's socio-economic status. Our result in terms of dowry suggests that this change in owner-ship right of women will have a strong effect on female autonomy and can indicate a potential policy change.

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Table 1
Dependent Variable: Sample Descriptive Statistics and State Differences

State	Tamil Nadu (South India)		Uttar Pradesh (North India)		TN>UP t-Stat
Variable	**Mean**	**Standard Deviation**	**Mean**	**Standard Deviation**	
Movement Autonomy for Family Needs					
Going to Market to buy food	0.815	0.014	0.097	0.011	28.264 (0.000)
Going to Health Care Centre	0.441	0.018	0.108	0.011	14.654 (0.000)
Going to Field	0.315	0.017	0.066	0.009	12.493 (0.000)
Going to Commercial Centre	0.238	0.016	0.074	0.009	8.933 (0.000)
Movement Autonomy for Leisure Activity					
Going to visit Family/Friend	0.647	0.018	0.086	0.010	22.842 (0.000)
Going to a Fair	0.164	0.014	0.057	0.008	6.719 (0.000)
Going to a Neighbouring Village	0.034	0.007	0.058	0.008	-2.299 (0.989)
Observations	742		787		

Note: In the column TN>UP t-Stat the number in () is the probability value associated with the alternative hypothesis that the proportion differs between the two states.

Table 2
Independent Variables: Sample Descriptive Statistics and State Differences

State	Tamil Nadu (South India)		Uttar Pradesh (North India)		Not Equal Test Statistic
Variable	**Mean**	**Standard Deviation**	**Mean**	**Standard Deviation**	
Religion Dummy: Dummy Variable Coded 1 if Wife is Hindu	0.508	0.018	0.513	0.018	-0.206 (0.837)
Caste Dummy: Dummy Variable Coded 1 if Wife a Member of Lower Caste	0.116	0.012	0.127	0.012	-0.667 (0.505)
Husband a Relative: Dummy Variable Coded 1 if Husband is from Natal Family	0.569	0.018	0.140	0.012	17.600 (0. 000)
Schooling of Wife (Years of Schooling)	3.368	3.391	1.945	3.369	8.224 (0.000)
Difference in Schooling between Husband and Wife (Years of Schooling)	1.597	3.529	4.437	4.632	-13.532 (0.000)
Age of the Wife (Years)	29.022	6.163	27.464	6.449	4.829 (0.000)
Difference in Age between Husband and Wife	5.643	2.796	4.795	2.823	6.470 (0.000)
Composite Dowry Exchanged: Number of components {land, cash, jewelry, car/livestock} in the dowry received weighted by village average.	0.517	0.573	0.691	0.605	-5.760 (0.000)
Media Exposure of Wife: Dummy Variable Coded 1 if exposed to the media {newspaper, radio and/or TV}.	0.573	0.018	0.431	0.018	5.551 (0.000)

Table 2 Continued on Next Page

Table 2
Independent Variables: Sample Descriptive Statistics and State Differences

State	Tamil Nadu (South India)		Uttar Pradesh (North India)		Not Equal Test Statistic
Variable	**Mean**	**Standard Deviation**	**Mean**	**Standard Deviation**	
					Table 2 Continued on Next Page
Wife had paid work before Marriage: Dummy Variable.	0.371	0.018	0.038	0.009	16.261 (0.000)
Wife Enjoyed some Choice in Selecting Partner: Chose or Consulted by Parents.	0.047	0.008	0.074	0.009	-2.169 (0.030)
Observations	742		787		

Note: In the column Not Equal t-Stat the number in () is the probability value associated with the alternative hypothesis that the two means are different from one another.

Table 3
Hausman Test for Endogeneity of Prior Employment

	Family Movement Autonomy			
	Market	**Health Center**	**Field**	**Commercial Center**
χ^2 test -statistic	1.715	1.027	0.015	0.792
p-value	0.190	0.311	0.904	0.374
	Leisure Activity Movement Autonomy			
	Family/Friend	**Fair**	**Neighboring Village**	
χ^2 test -statistic	1.958	0.181	0.927	
p-value	0.162	0.671	0.336	

Table 4
Multivariate Probit Results from Individual Family Autonomy Measures

	Autonomy Measures			
Explanatory Variables	**Market**	**Health**	**Field**	**Commercial**
Religion Dummy	0.205**	0.420***	0.479***	0.396***
	(0.103)	(0.037)	(0.030)	(0.030)
Caste Dummy	0.168	-0.042	0.198***	0.082**
	(0.151)	(0.047)	(0.050)	(0.040)
Dummy if Husband from Natal Family	-0.022	0.034	0.078***	-0.021
	(0.055)	(0.024)	(0.019)	(0.016)
UP* Husband a Relative Dummy	0.064	-0.045	0.249***	0.271***
	(0.224)	(0.062)	(0.029)	(0.054)
Backward District Dummy	0.207***	-0.260***	-0.027*	-0.104***
	(0.048)	(0.018)	(0.015)	(0.012)
UP*Backward District Dummy	0.286***	1.003***	0.520**	0.542***
	(0.073)	(0.026)	(0.023)	(0.017)
UP Dummy	-2.060***	-2.042***	-0.686***	-0.828***
	(0.136)	(0.059)	(0.040)	(0.033)
Wife's Education	-0.011***	0.021***	0.0004	0.020***
	(0.002)	(0.001)	(0.001)	(0.001)
UP*Wife's Education	-0.059***	-0.083***	-0.090***	-0.072***
	(0.007)	(0.001)	(0.005)	(0.004)
Difference in Education	-0.025***	-0.014***	0.002*	0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
Wife's Age	0.054***	0.034***	0.038***	0.034***
	(0.001)	(0.002)	(0.000)	(0.0004)
UP*Wife's Age	-0.0002	0.030***	-0.003**	0.001*
	(0.003)	(0.001)	(0.001)	(0.0007)
Difference in Age	-0.039***	-0.013***	-0.019***	-0.002*
	(0.003)	(0.001)	(0.001)	(0.001)
Composite Dowry Exchanged	0.092***	0.317***	0.161***	0.141***
	(0.032)	(0.009)	(0.009)	(0.010)
UP*Composite Dowry Exchanged	-0.004	-0.382***	-0.292***	-0.046**
	(0.055)	(0.032)	(0.013)	(0.023)
Media Exposure of Wife	0.309***	0.129***	0.252***	0.128***
	(0.010)	(0.005)	(0.007)	(0.006)
UP*Media Exposure of Wife	-0.458***	-0.083***	-0.493***	-0.218***
	(0.020)	(0.021)	(0.026)	(0.006)
Employment Before Marriage Dummy	0.258***	0.100***	0.269***	0.153***
	(0.028)	(0.001)	(0.011)	(0.010)

Table 4 Continued on Next Page

Table 4
Multivariate Probit Results from Individual Family Autonomy Measures

	Autonomy Measures			
Explanatory Variables	**Market**	**Health**	**Field**	**Commercial**
UP* Employment Before Marriage	-0.158* (0.085)	0.246*** (0.012)	-0.040 (0.170)	0.104 (0.110)
Choice in Selecting Partner Dummy	-0.174*** (0.036)	0.186*** (0.015)	0.195*** (0.010)	0.356*** (0.011)
UP*Choice in Selecting Partner	-0.100 (0.101)	-0.042 (0.036)	-0.323* (0.166)	-1.065*** (0.220)
Testing and Diagnostics				
Joint Significance of Uttar Pradesh Interaction Terms	351.419 {8} [0.000]	192.440 {8} [0.000]	161.712 {8} [0.000]	217.63 {8} [0.000]
$\rho(\text{Health, Market})$		0.889*** (0.001)		
$\rho(\text{Field, Market})$		0.815*** (0.007)		
$\rho(\text{Commercial, Market})$		0.741*** (0.002)		
$\rho(\text{Field, Health})$		0.733*** (0.006)		
$\rho(\text{Commercial, Health})$		0.773*** (0.001)		
$\rho(\text{Commercial, Field})$		0.811*** (0.001)		
Joint Significance of ρ estimates		918.207 {6} [0.000]		
Log Pseudolikelihood		-1862.604		
Observations		**1529**		

Notes: Robust standard errors are in parentheses under the coefficient, * significant at 10%, ** significant at 5%; *** significant at 1%. Constant term is included in the model, but not reported.{} is degrees of freedom and [] is the probability value.

Table 5
Multivariate Probit Results from Individual Leisure Autonomy Measures

	Autonomy Measures		
Explanatory Variables	**Friend/Relative**	**Fair**	**Neighboring Village**
Religion Dummy	0.075 (0.109)	0.208*** (0.045)	0.185*** (0.047)
Caste Dummy	0.181 (0.138)	-0.010 (0.045)	-0.009 (0.041)
Dummy if Husband from Natal Family	0.074 (0.056)	0.047* (0.026)	0.092* (0.052)
UP* Husband a Relative Dummy	0.215 (0.133)	0.225*** (0.052)	-0.060 (0.075)
Backward District Dummy	0.587*** (0.043)	-0.278*** (0.023)	-0.552*** (0.042)
UP*Backward District Dummy	-0.186* (0.099)	0.943*** (0.048)	1.018*** (0.070)
UP Dummy	-1.444*** (0.073)	-1.090*** (0.026)	0.282*** (0.064)
Wife's Education	0.024*** (0.004)	0.064*** (0.002)	0.044*** (0.001)
UP*Wife's Education	-0.089*** (0.004)	-0.167*** (0.004)	-0.109*** (0.003)
Difference in Education	-0.009*** (0.003)	0.012*** (0.001)	0.009*** (0.002)
Wife's Age	0.034*** (0.0002)	0.043*** (0.001)	0.065*** (0.002)
UP*Wife's Age	-0.001 (0.0007)	0.010*** (0.001)	-0.009*** (0.002)
Difference in Age	0.0002 (0.002)	0.006*** (0.001)	-0.003*** (0.001)
Composite Dowry Exchanged	-0.216*** (0.027)	-0.054*** (0.009)	-0.203*** (0.008)
UP*Composite Dowry Exchanged	0.347*** (0.063)	0.077* (0.038)	0.289*** (0.028)
Media Exposure of Wife	0.371*** (0.003)	-0.009 (0.009)	-0.203*** (0.018)
UP*Media Exposure of Wife	-0.362*** (0.015)	0.028 (0.020)	0.215*** (0.018)

Table 5 Continued on Next Page

Table 5
Multivariate Probit Results from Individual Leisure Autonomy Measures

	Autonomy Measures		
Explanatory Variables	**Friend/Relative**	**Fair**	**Neighboring Village**
Employment Before Marriage Dummy	0.224*** (0.025)	0.347*** (0.011)	0.340*** (0.020)
UP* Employment Before Marriage	0.172* (0.089)	0.196*** (0.029)	-0.126** (0.049)
Choice in Selecting Partner Dummy	0.216*** (0.019)	0.251*** (0.013)	0.929*** (0.020)
UP*Choice in Selecting Partner	-0.425*** (0.030)	-0.853*** (0.079)	-1.074*** (0.028)
Testing and Diagnostics			
Joint Significance of Uttar Pradesh Interaction Terms	638.791 {8} [0.000]	242.176 {8} [0.000]	161.299 {8} [0.000]
$\rho(\text{Fair, Relative})$		0.732*** (0.002)	
$\rho(\text{Next Village, Relative})$		0.750*** (0.013)	
$\rho(\text{Next Village, Fair})$		0.845*** (0.004)	
Joint Significance of ρ estimates		4811.564 {3} [0.000]	
Log Pseudolikelihood		-1167.161	
Observations		**1529**	

Notes: Village clustered robust standard errors are in parentheses under the coefficient, * significant at 10%, ** significant at 5%; *** significant at 1%. Constant term is included in the model, but not reported.{} is degrees of freedom and [] is the probability value.

Table 6: Selected Indicators for Married Women in the Age-group of 15-49 Tamil Nadu and Uttar Pradesh		
	Tamil Nadu	
	1998-99	**2005-06**
Employment Status		
Percentage of women who worked in past 12 months	53.8	48.4
Percentage of employed women who were paid in cash only	71	75.2
Autonomy Indicators where respondent / wife only decides on:		
Obtaining health care for herself / own health care (in percentage)	45.5	29.1
Purchasing jewellery or other major household item (in percentage)	17.7	21.3
Visiting her parents or other relatives (in percenatge)	29.6	20.7
	Uttar Pradesh	
	1998-99	**2005-06**
Employment Status		
% of women who worked in past 12 months	23.4	33.8
% of employed women who were paid in cash only	30.9	28
Autonomy Indicators where respondent / wife only decides on:		
Obtaining health care for herself / own health care (in percentage)	25.7	27
Purchasing jewellery or other major household item (in percentage)	7.2	5.6
Visiting her parents or other relatives (in percentage)	8.4	6.4

Source: National Family Health Survey 2 and 3, India

Appendix

Can Autonomy before Marriage Exert Autonomy after Marriage? Evidence on Female Autonomy from India

Table A.1
Sample Restrictions

	Total	Tamil Nadu	Uttar Pradesh
Complete Sample	1842	983	859
Excluded observations in which the husband did not respond.	1660	826	834
Excluded observations in which the wife was married more than once.	1624	809	815
Excluded observations in which the husband was married more than once.	**1529**	**742**	**787**