FEMALE AUTONOMY IN RURAL NORTH INDIA:
IMPACT OF ECONOMIC, SOCIAL, AND POLITICAL FACTORS

SHARMISTHA SELF[a] AND RICHARD GRABOWSKI[b*]

[a]*Missouri State University, USA*
[b]*Southern Illinois University, USA*

This paper attempts to answer a number of questions concerning factors which influence female autonomy as measured by mobility in rural north India (Uttar Pradesh). It is hypothesized that a female autonomy outside the home is influenced by social, economic, and political factors. The results of the empirical analysis indicate that the availability of certain types of infrastructure along with off-farm employment opportunities at the village level have a positive influence on female autonomy. In terms of the political structure of local government, there is no evidence to support the notion that having a female Pradhan will result in greater female autonomy. However, female autonomy is enhanced if the Pradhan is from a scheduled caste and/or the Pradhan has significant political experience. Data for the 2000s shows improvements in female autonomy and female participation in local government in Uttar Pradesh. However, significant challenges continue to remain. The results have important policy implications.

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JEL classification: J16, O10, O17

1. INTRODUCTION

What does the term female autonomy mean? Dyson and Moore (1982) define female autonomy as "the capacity to manipulate one's personal environment. Autonomy indicates the ability-technical, social, and psychological - to obtain information and to use it as a basis for making decisions about one's private concerns and those of one's intimates" (p. 45). Kabeer (1999) defines female autonomy or agency as "processes by which those who have been denied the ability to make strategic life choices acquire such

an ability" (p. 437). More specifically, female autonomy is defined as "the ability of women to make choices/decisions within the household relative to their husband's" (Anderson and Eswaran, 2009, p. 179).

Recently, empowering women or increasing a woman's autonomy has been shown to be important in a variety of different ways. It is thought to lead to long-term reductions in fertility, higher child survival rates, and allocations of resources within the household which benefit the children within the household (Anderson and Eswaran, 2009). Thus improvements in women's autonomy have positive, indirect spillover effects.

However, increases in female autonomy also have very direct and important positive effects on females. Specifically, violence against females by males within the family is prevalent in many parts of the world. It is argued by many that increases in a woman's autonomy serves as a very powerful instrument for limiting such violence. Thus factors increasing female autonomy are important in terms of the direct effect of reducing violence against females and the indirect, positive spillover effects.

What factors influence the extent to which females have autonomy? In economics the literature is quite limited. However, outside economics the literature is more abundant. Specifically, the sociological literature tends to focus on those societal factors which tend to create and enforce situations in which female autonomy is greatly reduced. Specifically, the customs and norms of patriarchal societies are thought to be important causal factors in determining female autonomy. They operate both directly and indirectly. "In the direct sense they may limit women's ability and willingness to bargain. In this case issues are not uncontested and natural, but established practices and expectations make success in bargaining extremely difficult. In the indirect sense, norms may influence the access women have to means of improving their bargaining power" (Kantor, 2003, p. 428). From this perspective, policy is viewed as being quite limited in the impact that it can have in terms of enhancing women's autonomy. Instead, cultural and social change are critical (See Narayan, 2005).

The difficulty with the above is that social scientists have little knowledge, wisdom, nor special skills in terms of engineering social change in order to achieve greater autonomy for women. As a result, this paper will focus on policies that can be manipulated so as to bring about changes at the margins of tradition based societies. Thus the focus will not be on engineering dramatic social change which would be transformational in nature, but instead promoting policies that can be manipulated so as to bring about small changes in social relationships which enhance female autonomy. The literature concerning marginal, incremental change and policy is centered in economics.

The main focus of the paper will be to determine those variables which influence the extent of female autonomy in the Indian state of Uttar Pradesh. This state is chosen for two reasons. First, this state represents an environment in which traditionally women have faced significant barriers which have created large gender gaps in terms of employment, health care, and physical mobility. Thus it will be very useful to determine

whether within such an environment there are useful policies which could have been used to enhance female autonomy. Secondly, the data set utilized for Uttar Pradesh contains information on a variety of household and individual variables unavailable in other publicly available data sets.

Section 2 will review the literature while section 3 will present the empirical model that will be estimated as well as discuss the data drawn from the household survey carried out in Uttar Pradesh. Various problems arising with the estimation will also be discussed in some detail. Section 4 will present the results and utilize them to try and determine what variables likely enhance female autonomy. Section 5 will update the results by looking at recent experience in Uttar Pradesh. Finally, Section 6 will summarize the results and present conclusions.

2.   SOME LITERATURE AND THEORETICAL MODELS

The empirical literature focused on female autonomy is very limited. Kantor (2003) sought to analyze the extent to which home based production in the garment sector in Ahmedabad, India empowers females who participate in such activity. Her reading of the economic and sociological literature indicates that both tend to emphasize a women's access to resources as being a key variable. However, she argues that greater access to resources may not be enough. This is the result of the fact that women's decision making may be constrained and filtered by existing social norms.

The work of Rahman and Rao (2004) also seeks to analyze those factors influencing the extent of female autonomy. The paper actually focuses on Dyson and Moore's explanation as to why South Indian women are generally more autonomous than North Indian women. Dyson and Moore's explanation focused on the North's (North India) bias towards favoring exogamous marriage, the wife marrying outside the community and family, with the South (South India) favoring endogamous marriage, within the community and extended family. The latter assures that the wife maintains her kinship network as a support mechanism whereas the former isolates the wife from this network of relationships. The ability of women in the south to depend upon her kinship network allows her greater autonomy whereas in the north the lack of such a network reduces autonomy. Rahman and Rao seek to empirically test this proposition.

In the process of analyzing the above issue the Rahman and Rao paper develops into an analysis of factors influencing female autonomy. They measure female autonomy by looking at two types of measures. The first category measures the extent of female mobility and represents the extent to which a woman can move around without the permission of her husband. A second category of measures seek to quantify the extent to which women participate in various household decision making processes. Right hand side variables include cultural factors such as the extent of village exogamy and consanguity, as well as various female exclusion practices. Village level data on male and female wage rates were used to measure economic opportunity. Finally, measures of

the availability of public infrastructure are also included.

The results indicate that with respect to economic variables, higher female wages enhance a woman's mobility and her influence in household decision making. Higher male wages have the reverse effect. Also, infrastructure at the village level tends to be strongly associated with improvements in female mobility and enhancement of female involvement in decision making.

Anderson and Eswaran (2009) develop a model of household behavior in order to draw conclusions about factors which increase female autonomy. They then empirically test the hypotheses using data from Bangladesh. The model is very interesting. The household is not viewed as a monolithic unit with a single decision-maker, instead a better approach is to view decision making within the household as being conflictual in nature. Typically, this has resulted in the development of bargaining models in which the influence of the woman is a function of her threat options, measured by the level of well being the woman could obtain if the marriage dissolves (outside threat option). An improvement in the outside threat option enhances the autonomy of the woman within the marriage. This is the model upon which the previously discussed work implicitly depends.

However, Anderson and Eswaran (2009) are really interested in determining whether it is work within the household or work outside the household that is more important in raising the autonomy of women. Also, their data is drawn from Bangladesh where divorce, as a threat option, is not possible. Thus the outside threat of divorce is not relevant. In this case, a breakdown in bargaining by spouses implies that the threat option within the marriage is the critical factor and this threat option will depend on the non-cooperative solution between spouses within the marriage (household). Their model presumes that men can work outside the home or take leisure and the former allows him to consume private goods and contribute income (not labor) to the production of a household public good (not income). The wife can take leisure, devote labor to the production of the household public good, or work outside the home for income. It is assumed in this model that working inside the household by the female does not increase her threat option, it does not increase her ability to work outside the household. So, for example, working on the family farm does not provide her with skills that could be used to earn income outside the household.

So in this model the bargaining position of the wife depends on external earnings possibilities through outside (of the family) work. The greater these opportunities are (increase in wage for external work), the stronger the position of the wife (autonomy). She can significantly harm the position of the husband by choosing to devote more time to external work and reduce how much time she devotes to household work (public good) and leisure. The husband will have to devote greater income to the production of the public good, his consumption of private goods declines, and he works more and consumes less leisure. This is what will happen if cooperation between the wife and husband breaks down. Thus the wife's threat is greater and this allows her more autonomy within the marriage. Using data from Bangladesh they do indeed find that

external work opportunities are the key to enhancing a woman's autonomy, not work within the household. The measures of autonomy used include measures of the female's say in decisions concerning the purchases of various items.

Over and above the factors mentioned so far, one must also consider another important external factor, the local governance institutions. As mentioned earlier, given the low level of political participation of women in the deliberative bodies of India, in 1992 the Constitution of India was amended such that a third of the seats in the Panchayats (local governments), including the chairperson (Pradhan), must be set aside for women. One might think that this should influence political decision making leading to increases in female autonomy (Chhibber, 2002).

Chattopadhyay and Duflo (2003) empirically examined the impact of this amendment by utilizing data from two districts in India: Birbhum, in West Bengal, and Udaipur, in Rajasthan. They found that having women and scheduled castes Pradhans in the Panchayat made a difference. Specifically, women and scheduled caste Pradhans tend to engage in policies which favor women and thus tend to increase their autonomy. Thus the composition of local government may be a critical factor influencing the threat utility levels of women.

Ban and Rao (2008) use data from south India to further investigate these issues. They do not find any evidence to support the idea that female Pradhans are mere tokens. They find evidence that most women leaders are drawn from "the upper end of the quality distribution of women" (p. 501). They also do not find any evidence that female political leaders are likely to make decisions that favor women's concerns. A similar sort of conclusion is reached in Raabe *et al.* (2009) who look to see how political reservations for women affect local governance and rural services in Karnataka, in south India. Their results indicate that women's reservation policies are by themselves ineffective in making provisions for rural services and local governance more inclusive and gender equitable. Similar conclusions are reached in Krishnan (2007) who finds no evidence that lower caste (scheduled tribe) legislators perform any differently than legislators elected from unreserved constituencies. However, this paper finds that scheduled caste legislators perform better at providing greater access to educational facilities, in particular, primary schools, within their districts and constituencies. Rajaram and Gupta (2009) conclude that economic fundamentals trump gender of the village head in policy choices.

Thus a number of specific research questions concerning female autonomy are apparent. Does the opportunity of women to work, whether on the family farm or off-farm, increase the woman's autonomy? Are women in poor relative to non-poor families more likely to be autonomous? Do infrastructural factors have a significant impact on female autonomy? Finally, does a change in the structure of local government (reservations for women Pradhans) herald an increase in female autonomy?

3. DISCUSSION OF DATA AND EMPIRICAL MODEL

The data being utilized for the purpose of this paper comes from the World Bank's Living Standard Measurement Survey of households conducted for the State of Uttar Pradesh in India for the years 1997-98. The survey was conducted for two states, but due to unavailability of relevant data for the state of Bihar, this paper concentrates only on the state of Uttar Pradesh.

The data from Uttar Pradesh is utilized for three important reasons. Although the data is approximately fourteen years old, it is the only publicly available data set that has information on governance in the state. Specifically, information is provided on the sex caste, and length of time in office for village Pradhans. This enables a synthesis of the household level information with the village specific information. In addition, Uttar Pradesh at this period of time was characterized by significant barriers to women's economic, social, and political activities. However, the central government had in 1992 passed amendments to require that a third of the seats in Panchayats (local governments), including the chairperson (Pradhan), be set aside for women. Given that the survey being utilized here took place in 1997-98, it provides an opportunity to determine whether the amendment significantly improved women's autonomy. Last, but not least, to our knowledge there are no other studies which address the question/s addressed in this paper for Uttar Pradesh. This may be because the LSMS data utilized for this paper is the only data set of its kind. Most other studies on this topic use NFHS data (which is state or household level data, not village level) or other data collected by the author/s relating to different states within India. The importance of Uttar Pradesh concerning questions related to female autonomy is discussed in detail in Section 5.

Most papers relating to female autonomy concentrate on her autonomy within the household. This paper begins by taking a different view by measuring female autonomy outside the household. Specifically, it looks at two measures: a woman being able to leave the house to see a doctor without the permission of a male member of the family and a woman being able to go to a doctor's office unescorted by a male member. Thus, here we are not focusing on mobility for its own sake, which is important in itself, but we are looking at mobility that is associated with a definite purpose and thus even more important. A woman may need to visit the doctor for her own health or for her children or any other member of the family. Both of the variables being utilized as the dependent variables measure whether females enjoy freedom or autonomy of mobility outside the home.

The survey being utilized for this paper uses data based on interviewing 2000 women spread over 64 villages and 11 *tolas* (districts) within the state of Uttar Pradesh. The respondents are chosen as the (female) spokesperson for the family. Thus each respondent represents one family. Upon closer inspection of the data it appears that even though these respondents were supposed to be a representative female from each family, some respondents were male. These respondents are dropped from the sample. This leaves us with 1963 responses by females and this constitutes our sample. The summary

statistics with a brief definition of the variables are provided in Table 1.

Table 1.   Summary Statistics

Variable	Description	Obs	Mean	Std Dev	Min	Max
Indiv/Household Variables						
Age	Age of respondent	1013	36.91017	12.60036	13	90
Age of Household Head	Age of respondent's husband	1011	46.81405	14.36018	17	95
Education	Educational attainment: 1 if illiterate, 2 if literate but no schooling, 3 if less than primary, 4 primary, 5 middle, 6 matriculate (10th grade), 7 intermediate (12th grade), 8 bachelors degree, 9 masters degree, 10 professional degree, 11 diploma	1013	1.673248	1.663026	1	11
Hindu	1 if household head is Hindu, 0 otherwise	1013	0.9296029	0.2559306	0	1
Caste	1 if high caste, 0 Otherwise	1013	0.1569507	0.3639175	0	1
Average Child Age	Average age of children in household	1013	15.35039	10.46729	0	50
Poor	1 if family below poverty line	1013	0.3043088	0.4603207	0	1
Femalehead	1 if household head is female, 0 otherwise	1013	0.032287	0.1768406	0	1
Working for Wage	1 if respondent is employed for wage income, 0 otherwise	1004	0.3525896	0.4409816	0	1
Average Land Holding	Total agricultural land owned in acres.	1013	3.342029	2.669647	0.5440869	12.48908
Village Level Variables						
Female Pradhan	1 if pradhan (leader of village governance) is female, 0 otherwise	63	0.2857143	0.4553826	0	1

PradhnSC	1 if pradhan (leader of village governance) is from the lowest caste known as Scheduled Caste, 0 otherwise	64	0.25	0.4364358	0	1
Pradhanlength	Number of years the current pradhan (leader of village governance) has been in office	64	4.186094	3.370063	0	15
School	1 if village has access to a school, 0 otherwise	64	0.6875	0.4671766	0	1
Telephone	1 if village has access to a telephone	64	0.171875	0.3802542	0	1
Off-farm Income	Share of houeholds which have significant off-farm source of income	62	41.37097	28.66782	2	95
Roadaccess	1 if part if at least some part of the village is accessible by trail only, 2 if temporaary road, 3 if paved road, 4 if permanent road	64	2.671875	0.9767892	0	4

A preliminary look at the data shows wide variability in terms of both measures of female autonomy being used in this paper. In terms of leaving the house without permission, these proportions range from 0% of the women needing permission (three villages) to 76% of the women needing permission to leave the house. On average about 35% of women needed the permission of a male member of the family. In terms of whether or not a woman has the freedom to visit the doctor without a male escort, the values range from 0% of the women needing a male escort to 69% needing male escort. On average, about 33% of women overall need a male escort. Given this variability in a woman's freedom of movement outside the home, a natural question arises regarding what factors might be able to explain or influence the variation in female autonomy within any particular village, as well as across villages.

It is hypothesized that a woman's autonomy outside the home is influenced by social, economic, and political factors. For ease of analysis these characteristics have been bundled under individual, household and village characteristics. Individual characteristics can be both economic and/or social in nature, as are household characteristics. Village characteristics measure the infrastructural support, degree of economic development, and political factors that are hypothesized to have an impact on

female autonomy of movement. Over and above the variables of interest, the explanatory variables also include control variables.

In terms of some overall social/cultural characteristics of the sample a majority of the women in the sample are Hindu with only about 7% being Muslim. Additionally, about 85% of the women belong to the low caste. Caste is seen as a symbol of social status in India, especially in rural areas. According to Deshpande (2002), an assessment of the contemporary state of the gender-caste overlap suggests that the economic condition of women continues to be defined and constrained by their caste status.

Some additional characteristics relating to education and employment, we find that about 79% of the women in the sample are illiterate. Additionally, for women in the working age group the average age of the respondent is thirty-seven, with her husband typically about ten years older. This age difference between the spouses is not uncommon for Asia, especially South Asia. About 54% of the women in the sample report being employed (with 85% in the agricultural sector) but only 35% earn a wage income.

In terms of household characteristics, a majority of households earn income above the poverty line. However, a third of the households are very poor, that is, their household income is below the poverty line (this is discussed in more detail below). Over and above being poor, most families are large with an average household consisting of seven members and at least one child and more than 20% of the families having children six years of age or under. Additionally, as expected, men head most households in the sample with only about 3% of households being headed by women.

In terms of access to resources, this paper looks at various different facilities accessible to the villages where the respondents live. These include access to an urban area, access to people outside the home and outside the village, access to education, and access to employment opportunities outside the agricultural sector. Empirical evidence shows that infrastructure is an important measure of economic well-being of a community (Rioja, 2001). These resources are expected to increase a woman's autonomy outside the home. For example, access to roadways would increase her ease of transportation and opportunities for employment outside the village. Access to a telephone would increase her ability to contact people if necessary, while access to a school is expected to increase her chances of being educated. Additionally, having a large percentage of the villagers reporting some non-agricultural source of income is seen as a sign of a reduced dependence of the community on agriculture.

The data show that on average villages are accessible by semi-permanent or paved roadways. Additionally, even though about 61% of the villages claim to be electrified, on average only 21% of each village has access to electricity. Moreover, only 17% of the villages have access to a telephone. In terms of access to education, about 69% of the villages have access to a school. On average, villages report that a majority of households are dependent primarily on agriculture. Only about 41% report income from a non-agricultural source.

At the village level we also consider the governance process at the local level. The

choice of a leader in village governance (Pradhan) is expected to influence the social and political environment of the community. As mentioned earlier, Chattopadhyay and Duflo (2003) find that women benefit when the village Panchayat is led by a woman or people from a scheduled caste. According to the data, on average 28% of the villages in the sample have female Pradhans and about 25% of the villages have a Pradhan who belongs to a scheduled caste, which is the lowest caste. One of the hypotheses that will be tested concerns whether or not those villages having a female or someone from the scheduled caste as a Pradhan will be characterized by greater autonomy for its females. Also the length of time a Pradhan is in office may also be important. In the sample utilized here the average length of time a Pradhan has been in power is a little over four years. However, there is variation in the distribution of this variable.

Next, we construct an empirical model that will enable us to analyze the data and answer the research questions raised above. A binomial logit model is utilized for the analysis. There are two different dependent variables being utilized for this analysis since we are looking at female autonomy measured by two different measures of mobility outside the house. In one instance the dependent variable takes the value 1 if the respondent can visit a doctor without the permission from a male member of the family and 0 otherwise (*Docpermission*). In the second instance, the dependent variable takes the value 1 if the respondent can visit a doctor without a male escort and 0 otherwise (*Docescort*).

The regression model that is estimated is given by

$$W_{ijk} = \alpha + \beta_1 Individual + \beta_2 Household + \beta_3 Village + \varepsilon_i, \tag{1}$$

where W_{ijk} is a zero - one variable representing whether a woman i in household j and village k has the freedom of movement outside her home, measured the two ways discussed in the previous paragraph. *Individual*, *Household*, and *Village* are vectors of individual, household, and village characteristics. The β's are the parameters to be estimated.

Several different specifications of the above model are utilized to test for robustness of the empirical results. In addition, we also carried out the analysis utilizing the Heckman two-stage procedure to see whether the logit results were biased due to selection bias. The logit analysis relates to responses of women who acted as the spokeswoman for their respective families. In contrast, the first stage of the Heckman estimations, which is the selection estimation, tested to see what factors influence a woman being selected to be the respondent to the survey questionnaire. The second stage of the estimation, the outcome equation, tested to see what factors affect the autonomy of women in the family being represented by the spokeswoman. The Heckman results (available upon request) which pertain to all women in the sample are almost identical to the logit results in terms of signs and statistical significance.

The selection of explanatory variables is influenced by existing literature, theory and

the hypotheses being tested in this paper. In terms of individual characteristics, first we consider the respondent's age (*Age*). The literature shows that older women are more experienced and have a better understanding of how to get what they need. Additionally, they are seen to enjoy a closer relationship with the husband (and his family), having fulfilled particular social obligations such as bearing children (Mason and Smith, 2003).

The second variable we look at is the respondent's husband's age (*Age of household head*). It is believed that the older the husband or the wider the age gap between the husband and the wife, the lower is the level of a woman's autonomy. The literature on female empowerment finds support for this hypothesis (Cain, 1993; Presser, 1975).

The third individual level variable is the respondent's level of educational attainment (*Education*). This is a continuous variable and Table 1 gives a detailed description of this variable. There is a wealth of empirical literature in support of the importance of education in general and for women in particular. For example, Maitra (2002) shows that the sex of the household head, the education attainment of the household head, ethnicity and region of residence have significant effects on both the poverty status and standard of living of the household in South Africa. It is expected that if a woman is educated she will have a higher probability of being gainfully employed which would increase her autonomy.

The fourth variable relates to the respondent's economic status by measuring not just her employment, but whether or not she works for wages (*Work for wages*). This is a binary variable which takes the value 1 if the woman is employed and earns a wage income, regardless of whether she is employed in the agricultural or non-agricultural sector, and 0 otherwise. A woman is expected to be more mobile and therefore enjoy greater autonomy if she makes a financial contribution to the family. This is expected to increase her bargaining power within the family while at the same time increasing her access to resources.

The fifth and sixth individual variables have to do with a woman's social status. These are her religion (*Hindu*) and her caste (*Caste*). Religion is measured by a binary variable which takes the value 1 is the respondent in Hindu and 0 otherwise. The only other religion that is found in the sample is Muslim. The majority of the women in the sample are Hindu. Religion has been found to have profound influence on social institutions which in turn have an impact on women. For example, Mason *et al.* (2003) find differences between Muslim and non-Muslim women that live in the same geographical area.

The *Caste* variable is also a binary variable taking the value 1 if the respondent belongs to the high caste and 0 otherwise. Given that India is a caste based society, caste plays an important role in determining social status. This is particularly relevant for the state of Uttar Pradesh. Jejeebhoy and Sathar (2001) find that for Uttar Pradesh female autonomy measured in a variety of ways is influenced by social status along with education and economic activity. Thus caste is expected to play a role in determining female autonomy.

The household level variables being considered are whether or not the family's

income level lies below the poverty line (*Poor*), average size of land holding (*Average land holding*) which is expected to reflect the family's wealth status, whether or not he family is headed by a female (*Femalehead*), and the average age of children in the household (*Average child age*). Both *Average land holding* and *Poor* are used to measure the economic condition of the family, while *Femalehead* and *Average child age* are used to measure the freedom the woman has in terms of making decisions and in terms of mobility. The assumption is that if a woman has infant children or children who are not going to school, she will have less mobility and freedom of movement outside the house. *Femalehead* is a binary variable which takes the value 1 if the household is headed by a female and 0 otherwise. It is assumed that a family that is headed by a woman will be more enabling for women than a household headed by a man.

Poor is used as a proxy for the family's income. A household below the poverty line "qualifies for the Below Poverty Line (BPL) subsidy for food grains offered through the revamped Public Distribution System (PDS)" (Sakamoto, 2006). This is measured by a binary variable, which takes the value 1 if the family's income is below the poverty line and 0 otherwise.

Finally, the village level political variables include whether or not the village has a female Pradhan as the leader of the village Panchayat (*Female Pradhan*), whether or not the Pradhan belongs to the scheduled caste (*PradhanSC*), and how long the Pradhan has been in power (*Pradhanlength*). The first two are binary variables which take the value 1 if the Pradhan is a female (for *Female Pradhan*) or from the scheduled caste (for *PradhanSC*) or 0 otherwise. The third is a continuous variable and measures the number of years the current Pradhan has been in power.

The other village level variables measure the village's access to resources such as access by road (*Roadaccess*), access to a school (*School*), access to a telephone (*Telephone*). All three are binary variables. All three variables are expected to proxy for the extent of infrastructure in the village the respondent lives in. There is one additional village level variable. This measures the general economic environment of the village. This is a measure of the proportion of people in the village that earn a significant portion of their income from non-agricultural or off-farm sources (*Off-farm income*). This last variable is a continuous variable.

4.   RESULTS

Results are reported for the *Docpermission* (freedom to go to a doctor without the permission of a male member of the family) variable as the dependent variable. Results relating to *Docescort* (freedom to go to the doctor without a male escort) are not reported since they are very similar to those relating to *Docpermission* (available upon request). Before discussing regression results, we try to gain some intuition about the relationship between the variables being considered in this analysis. Thus, to begin with, we look at pair-wise correlations between the different variables. These correlations

shed light on the fact that the relation between the dependent variable and the independent variables are endogenous and complex. One needs to be aware that the relation between the variables might introduce bias in the regression results. Thus, before we begin any discussion about the regression results, the correlations are expected to set the stage in terms of how the variables are related. All correlations are presented in Tables 2A and 2B. Over and above presenting the correlations, the table also identifies those correlations which are statistically significant at 95% or above.

Table 2A. Correlations

	Docper-mission	Age	Hindu	Caste	Age of HH Head	Average Land Holding	Tele-phone	Female HH Head
Docpermission	1							
Age	0.072*	1						
Hindu	0.027	0.007	1.000					
Caste	-0.041	0.014	-0.294*	1.000				
Age of HH Head	-0.032	0.504*	0.016	0.059*	1.000			
Average Child Age	-0.033	0.335*	0.046	0.089*	0.85*	1.000		
Average Land Holding	-0.143*	-0.078*	0.108*	0.022	-0.052*	-0.022	1.000	
Telephone	0.022	-0.048*	-0.095*	0.056*	-0.037	-0.030	0.014	1.000
Female HH Head	0.189*	0.139*	-0.05*	0.027	-0.023	-0.011	-0.043	0.103*
Education	-0.017	-0.072*	-0.001	0.282*	0.082*	0.096*	0.024	0.075*
Poor	0.132*	-0.026	0.076*	-0.126*	-0.116*	-0.096*	-0.062*	-0.040
Female Pradhan	-0.030	0.048*	-0.225*	0.084*	0.031	-0.004	-0.233*	0.095*
Pradhan SC	0.077*	-0.069*	0.036	-0.11*	-0.054*	-0.058*	-0.079*	0.245*
Pradhan Length	0.044*	-0.015	0.061*	0.021	-0.012	-0.007	0.021	0.115*
Off-Farm Income	0.079*	0.079*	0.08*	-0.007	0.061*	0.046	0.1277*	-0.091*
Road Access	0.132*	0.034	-0.079*	-0.005	0.016	-0.028	-0.341*	0.19*
School	0.051*	-0.036	0.032	0.027	0.008	-0.026	0.115*	0.034
Work for Pay	0.107*	0.062*	0.043	-0.109*	-0.074*	-0.089*	-0.096*	-0.084*

Note: * statistically significant at 5%.

Table 2B. Correlations Continued

	Female HH Head	Education	Poor	Female Pradhan	Pradhan SC	Pradhan Length	Off-Farm Income	Road Access	School	Work for Pay
Female HH Head	1.000									
Education	-0.023	1.000								
Poor	0.056*	-0.109*	1.000							
Female Pradhan	0.014	0.018	-0.01	1.000						
Pradhan SC	-0.007	-0.052*	0.13*	-0.089*	1.000					
Pradhan Length	0.054*	0.041	0.028	-0.217*	-0.269*	1.000				
Off-Farm Income	-0.067*	0.009	0.06*	-0.012	0.134*	0.049*	1.000			
Road Access	0.019	-0.019	0.008	-0.04	0.272*	0.048*	-0.085*	1.000		
School	-0.011	-0.042	0.104*	-0.063*	0.164*	0.085*	0.032	-0.022	1.000	
Work for Pay	0.117*	-0.117*	0.17*	-0.06*	-0.032	0.011	-0.015	0.036	0.015	1.000

Note: * statistically significant at 5%.

The first column in Table 2A presents correlations between the dependent variable and all other explanatory variables. These show that at the individual level, the dependent variable is positively and statistically significantly correlated with age of the respondent and if the respondent works for wages. At the household level the dependent variable is positively and statistically significantly correlated with poverty and if the household has a female household head and negatively with the average size of land holding or wealth of the family. At the village level, the dependent variable is positively related to the proportion of villagers earning income from some non-agricultural/farm source and if the village has access to the nearest town via roads. Additionally, at the political level, the dependent variable is positively and statistically significantly correlated with the caste of the village Pradhan and political stability as measured by the length of time a Pradhan has been in office. The other columns show the direction of correlation between the explanatory variables.

What is important to note from the correlations is that the correlation between the dependent variable and whether or not the Pradhan is a female is negative and not statistically significant. However, a woman's autonomy appears to be positively correlated with whether the village has a Pradhan from a scheduled caste/tribe and the length he/she stays in office. This seems to imply that having a female for a village Pradhan is not strongly related to the degree of autonomy a woman enjoys in terms of

freedom of movement outside the house. However if the Pradhan belongs to a low caste it seems to imply that females in that village enjoy greater freedom of movement.

The *Female Pradhan* variable itself is negatively and statistically significantly correlated with a Pradhan belonging to the scheduled caste/tribe (*PradhanSC*) or the length of time (*Pradhanlength*) and, surprisingly, to the presence of a school (*School*) in the village. The negative correlation between Female Pradhan and PradhanSC seems to support Ban and Rao (2008) that female Pradhans are selected from the "upper end of the quality distribution of women" (p. 501). Thus they are perhaps less likely to belong to the scheduled caste or tribe. Additionally the negative correlation between having a female Pradhan in local governance and the existence of a school in the village appears to echo Raabe *et al*. (2009) who did not find a link between political reservations for women and rural services for the state of Karnataka.

Unlike the *Female Pradhan* variable, the *PradhanSC* variable and the *Pradhanlength* variables are both positively and statistically significantly correlated with the proportion of villagers earning income from a source alternative to farming (*Off-farm income*), better access to other towns via roads (*Road access*) and to the presence of a school in the village. These seem to suggest a strong link between the caste of the Pradhan of the village (who perhaps continues to be in that position for any length of time) and better provision for rural services. Since women, more than men, are affected by the provision for different services, this may explain the strong positive correlation between these two political variables and the dependent variable. This may also be a reflection of Anderson's (2011) paper based on rural villages in India. This paper finds income to be substantially higher for low-caste households residing in villages dominated by a lower castes. Since a majority of our sample belongs to the lower caste, this may be a reflection of a woman's ability to earn a higher income (and thus enjoy greater freedom) if she resides in a village governed by a lower caste Pradhan. One should also take note that the election of a scheduled caste person as the leader of the village panchayat may itself be a reflection of a majority of the populace belonging to the lower caste or of being accepting of being led by someone from the lower caste (unless this is a result of reservation of the position for a scheduled caste member).

Next we turn our attention to the regression results. An important issue that needs to be addressed before discussing and analyzing regression results is the issue of endogeneity. Endogeneity refers to the fact that an independent variable included in the model is potentially a choice variable and thus correlated with unobservables relegated to the error term. For example, in our sample, a woman who wishes to enjoy freedom of mobility outside the home may choose to settle in a village which is being governed by a female Pradhan. Similarly a woman belonging to a low caste, but wanting to work outside the home may choose to settle in a village with a Pradhan from a low caste. Another case can be made concerning female headed households and a woman's freedom of mobility or a woman's employment and her mobility and/or her level of education and her mobility outside the home. These may be simultaneously influenced by a third factor such as the family's economic status or the general social environment

in the village. The gender and caste of the village Pradhan itself could be considered to be endogenous unless we can control for the reservation status of the Pradhan seat. Failure to control for this will likely under-estimate the effect of having a female Pradhan or a low caste Pradhan on women's freedom of movement outside the home.

Needless to say, an endogenous relation is potential for almost all of the explanatory variables (with the exception of the respondent's age, her religion, and her caste) in this analysis. If the variables mentioned above are indeed endogenous a regular logit estimation would possibly generate biased and inconsistent estimates of the impact of the explanatory variable/s on the outcome. A common strategy for dealing with this endogeneity is to use instrumental variables (IV) estimation, where "instruments" are variables assumed to have no direct association with the outcome. However, the available data limits the ability to find or construct appropriate instruments for all the explanatory variables. Thus, we control for the three truly exogenous variables (*Age, Hindu*, and *Caste*) and then add the other explanatory variables. The results remain robust to inclusion of the independent variables. Additionally, they reflect the intuitive relations we find using correlation analysis. Thus one can assume that the results have not been biased due to potential endogeneity and/or multicollinearity issues. However, one needs to interpret the results with caution and understand that, given these possible limitations, the explanatory variables are possibly going to under-estimate the true impact of these variables on the dependent variable.

Logit results pertaining to the overall sample are presented in Table 2. The results include the elasticities (*dy/dx*) obtained from marginal probability analysis. All standard errors are robust and heteroscedastically consistent. The regression analysis does not find support for female Pradhans (*Female Pradhan)* having any statistically significant impact on female autonomy. However, the impact of Pradhans from scheduled castes (*PrahdanSC)* and the length of time a Pradhan has served in office (*Pradhanlength*) are statistically significant in all but the very last estimation. The very last estimation finds these two variables to lose statistical significance, but this may be due their high correlation with the access to better roads (*Roadaccess*) which is included in the last estimation.

Similar to the correlation analysis, the regression analysis seems to indicate that both low caste Pradhans and the time spent in office increase a woman's freedom of mobility outside the home. Thus, while we do not see support for female Pradhan's increasing the likelihood of women in the village enjoying greater freedom of movement, having a low caste Pradhan (male or female) is found to be beneficial as is the possible political stability that comes with the leader being in office for some length of time. The apparent lack of impact of having a female as the village leader found in this paper is also reflected in Ban and Rao (2009) and Raabe *et al*. (2009). Rajaram and Krhsinan (2009) find that ultimately economic fundamentals are more important in determining policy outcomes rather than the gender of the governing body. The reason may possibly be one identified by Ban and Rao (2009) that most of the time female leaders are simply tokens and the real decision-making is still being done by men. Our results find support for the village Pradhan being from a lower caste to have a beneficial impact on female

autonomy in the village. These results are somewhat reflected in Krishnan (2007) who finds that scheduled caste legislators perform better at providing greater access to educational facilities, in particular, primary schools, within their districts and constituencies. Since women are in general greater beneficiaries of such public goods, this possibly explains our results as well.

Table 3. Results (Elasticities) for Full Sample: Dependent Variable *Docpermission*

Variables	dy/dx	dy/dx	dy/dx	dy/dx	dy/dx
Age	0.0130***	0.0145***	0.0204***	0.0196***	0.0149**
	(0.00398)	(0.00404)	(0.00564)	(0.00565)	(0.00588)
Hindu	0.130	0.129	0.300	0.259	0.318
	(0.203)	(0.213)	(0.229)	(0.229)	(0.236)
Caste	-0.254	-0.190	-0.161	-0.121	-0.141
	(0.160)	(0.160)	(0.180)	(0.180)	(0.191)
Age of HH Head			-0.03***	-0.028***	-0.0322***
			(0.00785)	(0.00784)	(0.00819)
Average Child Age			0.0245**	0.0233**	0.0281***
			(0.0100)	(0.0101)	(0.0105)
Work for Wages			0.534***	0.453***	0.462***
			(0.116)	(0.119)	(0.120)
Education			0.0395	0.0484	0.0213
			(0.0423)	(0.0425)	(0.0463)
Female Headed HH			1.570***	1.537***	1.652***
			(0.281)	(0.275)	(0.295)
Poor				0.338***	0.348***
				(0.104)	(0.108)
Telephone					-0.0729
					(0.144)
School					0.152
					(0.135)
Off-Farm Income					0.00873***
					(0.00204)
Roadaccess					0.330***
					(0.0567)
Female Pradhan		-0.0151	0.0225	0.0160	0.0567
		(0.111)	(0.116)	(0.117)	(0.122)
PradhanSC		0.415***	0.379***	0.343***	0.0558
		(0.0992)	(0.106)	(0.108)	(0.126)
Pradhanlength		0.0526***	0.0504***	0.0480**	0.0254
		(0.0175)	(0.0189)	(0.0189)	(0.0205)
Observations	1001	997	997	996	996

Notes: All equations have a constant term not presented in the Table; *, **, *** stand for statistical significance at 10%, 5%, and 1% respectively; results presented with heteroscedacticity consistent standard errors in parentheses.

In terms of the impact of some of the other variables, results in Table 3 show that access to resources plays an important role in promoting female autonomy outside the home. Access to roadways (*Roadaccess*) and access to education (*School*) have statistically significant positive impacts on female autonomy. Additionally, villages with a greater proportion of people relying on some source of off-farm income (*Off-farm income*) are also found to increase the likelihood of a woman enjoying greater freedom of mobility. In terms of household characteristics, not having to care for young children (*Average child age*) at home increases a woman's mobility. In terms of individual characteristics, older women (Age) and an improved economic status which comes from being employed and earning a measurable monetary wage (*Work for wages*) also greatly enhances a woman's mobility. Families headed by female household heads (*Female head*) are found to increase a woman's mobility outside the home as well. Women in poorer families (*Poor*) are found to have greater freedom of mobility. This mobility could be due to their financial situation which probably requires the family members to leave home to look for work and/or food. Wealth as measured by the size of land holding (*Average land holding*) and husband's age (*Age of household head*) are both found to have a negative and statistically significant impact on a woman's freedom of movement outside the home.

This result relating to wealth (and conversely to poverty) having a negative (positive) impact on mobility is consistent with theory as long as the higher standard of living is a result of higher income for the husband. Unfortunately, it is not clear whether the families that are wealthy are so as a result of higher income for the husband or it is wealth that is inherited through marriage. However, given the patriarchal nature of the society under consideration one can assume that the husband has control over family's resources regardless of its source. If we presume that this is the case, then these results appear to be consistent Kantor's (2003) findings.

In summary, we find that families headed by females increase a woman's mobility outside the house. Additionally, women who earn a wage income are more likely to enjoy greater freedom of movement. Access to resources is found to play a very important role in increasing women's freedom of mobility. Political factors are also found to play an important role. Women who live in villages where the Pradhan belongs to the lower caste are more likely to enjoy greater freedom of movement. Having older spouses is found to reduce the likelihood of women enjoying greater freedom of mobility as is belonging to wealthier families with large land holdings.

5.   WHERE THINGS STAND NOW

The data utilized in this paper was collected in 1997-1998, approximately thirteen years ago. One might argue that since that time dramatic changes in the status of women in Uttar Pradesh may have altered the relevance of the analysis or its policy implications. Therefore, this section will seek to update the situation in Uttar Pradesh.

The state of Uttar Pradesh has long been subject to a patriarchal structure which has greatly limited opportunities for women. Although the constitutional amendment that one third of the Panchayats membership and the Pradhans should be women, initially in the early 1990s in Uttar Pradesh only 25% had been reserved for women. Also during this time period the state had one of the lowest voter turnouts for women and a very small percentage of women in the state legislature. The local government was "almost nonexistent" (Chhibber, 2002). The female to male ratio was 879, the lowest among Indian states and female literacy rates showed a gender gap of 33% when comparing males to females. Further the infant mortality rates showed significant gender differences. Mean year of marriage for females was reported at 17.27 and the total fertility rate was at 5.60.

Since then there have been improvements in the status of women in this state. In terms of literacy rates, these have risen for both men and women. However, the gap between male and female literacy remains high at 27.25% (in 2001). Infant mortality rates for both sexes have declined from 99.9 per thousand in the early 1990s to 73 per thousand in the early 2000s as reflected in the National Health Surveys. However, significant gender differentials still remain. The infant mortality rate is 76 per thousand for males relative to 84 per thousand for females. This is significantly higher than the all India average. The age of marriage remains low with 53% of the respondent women (National Family Health Survey 3) between the ages of 20 to 24 being married by the age of 18 (Government of Uttar Pradesh, 2007). Finally, there has been improvement in the sex ratio in Uttar Pradesh, rising to 908 females per 1000 males in the early 2000s.

In terms of economic empowerment there have also been improvements, but significant gender bias remains. National Sample Surveys (61st round) indicate that in Uttar Pradesh work participation rates were 50.2% for men and 21.6% for females. As compared to males, more females are crowded into lower paid manual work. Additionally, according to this survey, 80 % of female workers are engaged in agricultural production relative to 53.4% of males. Women workers make up only one tenth of the organized formal sector workers in the state (Government of Uttar Pradesh, 2007).

In this paper we are utilizing a woman's freedom of movement as a measure of her autonomy. According to the last round (2005-2006) of the National Family Health Survey (NFHS-3), at the national (all India) level on average only one-third of women are allowed to go by themselves to the market, to a health facility, and to places outside their own community. Women are least likely to have freedom to travel outside their own village or community (38%) and most likely to be allowed to go to the market alone (51%). Urban women, older women, and women in nuclear households have more freedom of movement than other women. The numbers for Uttar Pradesh imply that about 62% of women have the freedom to visit a health facility alone, about 60% have the freedom to go to the market alone and about 45% have the freedom to visit places outside their village/community. Thus these numbers show that women in Uttar Pradesh have greater freedom of mobility outside the home compared to national averages. We

cannot necessarily compare these values to the values discussed earlier using the LSMS data because the NFHS-3 values are at the state level, while the LSMS data are at the household level. Additionally, the question asked in the LSMS survey related to whether or not women needed permission to visit a health facility on their own. The NFHS-3 does not provide data relating to that particular question, but it does give us some insight about a woman's freedom of movement outside the home.

In terms of political participation, traditionally political participation by women in Uttar Pradesh has been limited. The first legislative assembly had 13 female members. This rose to 30 in 1985. Since then it has fluctuated such that by 2002 there were only 26 members. Recent studies by the government of Uttar Pradesh indicate that about 50% of families surveyed showed that females are heavily influenced by the men in the family when it comes to exercising their right to vote. This does, however, represent an improvement from the past (Government of Uttar Pradesh, 2007).

There does seem to be a significant increase in participation of women as elected representatives to the Panchayat system. As of 2005 there has been a significant increase in the number of females elected and females as leaders, beyond the reserved positions set aside for women by the constitution (1/3). Thus women have become active participants in this local level of government (Government of Uttar Pradesh, 2007).

The evidence cited above indicates that there have been improvements in the status of women in Uttar Pradesh and that while political participation of women at the state level is weak, there have been improvements at the local level. However, significant gender differentials remain in terms of literacy, infant mortality, etc. In addition, women still seem to marry at a very early age and although the total fertility rate has fallen to 3.8, this is still quite high. Gender differentials are also quite high in terms of employment opportunities for men relative to women. In terms of political influence, women at the state level seem to wield less influence if one uses number of representatives that are female. However, at the local level women's participation has increased.

The quantitative analysis results of this paper based on historical data indicate that female Pradhans at the local level of governance do not seem to enhance the autonomy of women. If this study was carried out using more recent data the result might have been different given the fact that women's influence at the local level in Uttar Pradesh has increased. Thus there may be a time element involved in the quantitative analysis. As women's participation has grown through time, perhaps this would allow greater female influence over issues that would enhance female autonomy.

Some doubt, however, is cast on this idea if one examines the analysis of the impact of female participation at the local level in other states in India. Of particular importance is the recent work of Raabe *et al*. (2009). They have examined the effects of political reservations for women on the provision of rural services. This study is enlightening for the fact that it is focused on the state of Karnataka. "Among the Indian states, Karnataka is one of the earliest to have brought legislation that incorporates the provision of the 73rd Constitutional Amendment Act and streamlined decentralized government structures and service provision by promoting major institutional, administrative, and

fiscal change" (p. 8). Karnataka has a history of decentralizing governance structures. It started in 1983 with legislation that devolved government and mandated reservations for women and scheduled castes. Thus this state had begun the process of incorporating women and others into the local political system before the constitutional amendment was passed. This longer history with this issue implies a strong commitment to these policies by the state government.

The empirical analysis carried out by Raabe *et al*. (2009) finds little support for the idea that gender reservation policies resulted in local governance and rural service provision favorable to the interests of women. Local governance and the provision of services were primarily determined by "social, economic, and institutional factors that are unrelated to women's reservation requirements" (p. 7). Similar conclusions are reached by Ban and Rao (2009) and Rajaram and Gupta (2009).

This suggests possibilities for future research. Although the results of this paper's analysis of women's autonomy in Uttar Pradesh finds little support for the influence of reservation on policies aimed at women, this may be an artifact of the time period covered. A follow up study might be very useful.

6. SUMMARY AND CONCLUSION

This paper has attempted to answer a number of questions concerning factors which influence women's autonomy, as measured by mobility, in rural north India (Uttar Pradesh). The paper undertakes a detailed quantitative analysis using household level data for the late 1990s. Thereafter, it updates the information using latest available data for 2005-2006. The latter data is at the state level, but it provides intuition in terms of changes relating to female autonomy and village governance that have taken place Uttar Pradesh in recent years. The updated state-level data gives us reason to be cautiously optimistic about female autonomy for the future. One can see improvements have been made but much still needs to be accomplished.

The overall results relating to the household survey data from the late 1990s indicate that the availability of certain types of infrastructure have a positive influence. In addition, if a village offers many opportunities to earn off-farm income, this also has a positive impact. The implication then is that policies aimed at promoting infrastructure investment and the availability of off-farm employment opportunities would enhance women's autonomy. More recent evidence suggests marked improvement in female mobility outside the home in Uttar Pradesh.

In terms of the political structure of local government, there is no evidence to support the notion that having a female Pradhan will result in greater female autonomy. The results concerning the impact of female Pradhans is consistent with the work of Ban and Rao (2008), Raabe *et al*. (2009), and Rajaram and Gupta (2009). This may be a reflection of the dominance of a patriarchal-type society in Uttar Pradesh. More recent evidence suggests increases in female participation in village governance in Uttar

Pradesh. This may be a sign of changing status of females in society.

The results also suggest that female autonomy is enhanced if the village Pradhan is from a scheduled caste and/or the Pradhan has significant political experience (length of time in office). Thus political reform that increases access to political office of individuals from lower castes is likely to increase female autonomy. The results concerning lower caste Pradhans is also consistent with Ban and Rao's (2008) work. They found that women who live in villages less dominated by upper castes do relatively better. Our results indicate that in villages having a scheduled caste Pradhan, women are likely to have greater autonomy.

With respect to household characteristics, the age of the household head has a negative impact while being a female household head has a positive impact on autonomy. A surprising result is that education which is not found to have a significant impact on women's autonomy as measured by female mobility. This is likely due to the low educational attainment of most women in the sample. This result may not hold up in samples which include greater levels of education. The bulk of the sample women were illiterate or semi-literate.

In summary, several policies suggest themselves. The creation of additional off-farm employment opportunities involving wage payments for female will enhance their autonomy. In addition, infrastructure investment will also have similar effects. Finally, political reform which breaks down caste barriers will improve women's autonomy as measured by mobility.

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Hitotsubashi University.

Mailing Address: Sharmistha Self, Department of Economics, Missouri State University, 901 S. National Avenue, Springfield, MO 65897, USA. Tel: 417 836 5740. E-mail: SSelf@MissouriState.edu.