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Does Family Planning Help The Employment of Women? The Case of India

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The Case of India

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ABSTRACT

This paper gives some insight into the existence of a positive effect of family planning programmes on women's employment in developing countries. We study married women aged 15 to 49 living throughout India using a sample drawn from the National Health Family Survey (NFHS-2) for 1998-1999. We focus on a programme of doorstep services delivered by health or family planning (FP) workers who are sent to visit women in their assigned areas. Results derived from the estimation of fixed effect linear probability and conditional *logit* models show a positive and significant correlation of the share of women living in a local area (village, town or city) that has been visited by FP workers with the probability of women's employment. A multinomial analysis also shows that the largest positive effect of FP in rural India is to be found on paid work, as opposed to unpaid work, suggesting a potential empowering feedback of demographic measures through labour earnings.

JEL Classification: J13, J16, J18, J22, O18

Keywords: India, women's employment, family planning, urban and rural development.

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1. INTRODUCTION

Female participation in the labour force is considered one of the main steps towards women's empowerment in developing countries. Increasingly over time, international institutions and national governments have taken actions to enlarge women's participation in the market, as a key strategy towards female empowerment, reduction of fertility and mortality, and improvement of nutrition and welfare. So far, micro credit finance (Pitt et al., 2006) and vocational training (Attanasio et al., 2009), in conjunction with childcare support, are among the most effective policy instruments used. One example of these initiatives is the Development of Women and Children in Rural Areas programme (DWCRA) in India, supporting, among other things, microfinance banking for the creation of female self-employment occupations.[1] Other examples are ProJoven in Peru and Jóvenes en Acción in Colombia, whose scope was to give young women living in the slums equal training opportunities and childcare support.[2]

However, development policies have tended to centre more on women's reproductive rather than productive roles, as shown by the amount of investment in population and family planning programmes that have far exceeded those in women's productive roles (Mehra, 1997).[3]

In this study we investigate whether health and family planning programmes may also lead to a greater involvement of women in the labour market. Among the scarce scientific evidence on this relation, the study by Miller (2010) shows that lowering the cost of contraception in Colombia, as

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[1] This programme was launched by the Government of India in 1982. It aimed at involving the women in development activities by organizing them into groups. Such groups decided on the targets regarding the amount to be saved, the rules and regulations regarding loans, and the interest rate charged on the loans. A group which successfully achieved its savings target became eligible for the availing of credit from the bank for starting income generation activity.

[2] ProJoven provided vocational training to sixteen-to-twenty-four year olds in ten major cities between 1996 and 2003. Jóvenes en Acción, was introduced in Colombia between 2002 and 2005 and provided on-the-job training to young people in the two lowest socio-economic strata of the population. Although targeted to young people of both sexes, these programmes also aimed at promoting women's equal access in the labour market through training in non-traditional skills combined with the provision of additional stipends to cover childcare.

[3] In the second half of the 90's, for instance, expenditures in family planning programmes of the U.S. Agency of the International Development - the main vehicle for the United States' bilateral foreign assistance programs - have amounted to 440 million dollars as compared with 5 to 10 million dollars for programmes supporting the economic function of women in developing countries (Mehra,199, p. 140).

part of the Profamilia project,[4] has mainly favoured first birth postponement and enabled young women to work more and live independently later in life. Our argument in this study is that family planning programmes may also affect women's employment in the short-term, notwithstanding the fact that women's fertility decisions may have been affected by the programme.

These family planning programmes monitor various aspects of women's and children's health, provide information on family planning, and counsel and motivate women to adopt appropriate health and family planning practices. In this respect, they also entail an improvement in household production technology that, we argue, may give women an opportunity of engaging in market activities – good practices and healthier households imply less time needed for caring.

Our focus is on the potential influence that family planning might exert on the employment of women in India, a country of long-standing tradition in demographic policies. We concentrate on the radical reform of population policies that took place in 1996, the so-called Reproductive and Child Health (RCH) programme. With this reform, the Indian government shifted the emphasis from achieving demographic targets, to meeting the reproductive needs of individual clients (Ministry of Health and Family Welfare, 1996). By the second part of the 1990s, fertility had already declined considerably and the new programme aimed to give women advice on many other aspects concerning the daily management of the household. To this end, a programme of doorstep delivery of services was implemented in all States, and, since 1998, the year of actual implementation of this policy, health or family planning (FP) workers are sent to regularly visit households in their assigned areas.

Our hypothesis is that women who live in areas visited by FP workers are exposed - either directly if they receive the visit, or indirectly through contacts with neighbours who have received it - to a kind of informal education that develops health-caring habits. Such improvement in domestic

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[4]Profamilia of Colombia (Asociacion Probienestar de la Familia Colombiana). Profamilia was founded in Bogota´ in 1965 and became the country's dominant family planning provider for three decades (see Miller, 2010).

technology gives women better control over their time resources and a chance to choose whether to work in the market. Also, it is reasonable to expect that the higher the number of households visited, the wider the diffusion of FP knowledge in the place where women live. We therefore test the hypothesis that the probability of working might increase with the share of women of reproductive age who have been visited by an FP worker in the village or in the urban area of residence.

We study married women aged 15 to 49 living in all India using a sample drawn from the National Health Family Survey (NFHS-2) for 1998-1999. The survey provides detailed information on the types of workers who visited the household (public, private or NGO) and on what matters were discussed during the visit (health and/or family planning). Public sector workers provided almost all home visits and a large majority of women who were visited at home reported that they received services predominantly related to health, and only to a lesser extent to fertility control. Following this evidence, at variance with the study by Miller (2010) that focuses on contraception and birth control, we stress the potential role of the education-to-health component of family planning for the reallocation of time from household to market work in the short-term.

Given the high heterogeneity in the implementation of the programme at a geographical level, we include in our model specification, together with a variety of demographic and socio-economic variables, district-level fixed effects. Heterogeneity at a lower level (village, city, town), instead, is captured by our variable of interest, namely the ratio of women of reproductive age who have been visited by an FP worker in the village or in the city/town of residence.

We estimate linear probability models, conditional logit models and multinomial models for all India and, separately, by urban and rural areas of residence.

The paper is structured as follows. Section 2 describes the NFHS-2 used for the analysis, Section 3 describes women's employment in India using NFHS-2 and gives a short account of demographic

policies implemented in India. Section 4 presents the empirical model, Section 5 discusses the results and Section 6 concludes the paper.

2. DATA DESCRIPTION

The micro data we use are drawn from the National Health Family Survey, 1998-1999 (NFHS-2) [5].

This survey is designed to provide state and national estimates of fertility, the practice of family planning, infant and child mortality, mother and child health, and the utilization of health services provided to mothers and children. In addition, the survey provides indicators of the quality of health and family welfare services, women's reproductive health problems, and domestic violence, and includes information on the status of women, their education, work and standard of living.

The NFHS-2 is a household survey with a sample size of around 92500 households and 90300 ever-married women in the age group 15–49. The sample covers more than 99 per cent of the population of India living in all Indian States. The sample size for each state was drawn separately for urban and rural samples in proportion to the size of the urban and rural populations of each state.

NFHS-2 used three types of questionnaire: the Household Questionnaire, the Woman's Questionnaire, and the Village Questionnaire.

The Woman's Questionnaire collected information on the following topics: background characteristics, reproductive behaviour and intentions, quality of care, sources of family planning, antenatal, delivery, postpartum care, breastfeeding and reproductive health, and knowledge of AIDS. The Woman's Questionnaire also investigated the status of women in the household, asking about their autonomy and the violence perpetrated against them. Questions are also asked about the women's husbands.

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[5]The first survey was conducted in 1992-93, before the introduction of the FP programme we focus on.

The Household Questionnaire listed all usual residents in each sample household plus any visitors who stayed in the household the night before the interview. For each listed person in the household, the survey collected background information and indicators of household wellbeing. In addition, the Household Questionnaire included very detailed information on household members' health.

The Village Questionnaire, available only for rural areas, collected information from the *sarpanch* (village head), other village officials, or other knowledgeable persons in the village on the availability of various facilities and services in the village (such as, for example, health and education facilities). Our analysis is based on the Woman's Questionnaire supplemented with information at a household level and our sample includes around 85000 married women with and without children, since the latter represent a target for an FP visit as potential mothers.[6]

3. FEMALE EMPLOYMENT IN INDIA

3.1 Female employment in India: a way towards women's empowerment?

The employment rate of Indian women is low compared to that of other developing and developed countries, but shows an increasing trend in recent years. The National Family Health Survey reports that the employment rate of ever-married women for India as a whole was 32 per cent in 1992-1993 and achieved 37 per cent in 1998-1999 (IIPS and ORC Macro, 2000).[7]

Given the huge size of the population and the obvious different opportunities for work throughout the country, it is not surprising that there is an astonishing difference in women's employment rates among Indian states. The highest percentage of women who work is in the North-Eastern States of Manipur (70 per cent), Nagaland (64 per cent), and Arunachal Pradesh (60 per cent), whereas the lowest is in Punjab (9 per cent) and Haryana (13 per cent). Women's work participation is also

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[6]The NFHS-2 survey does not include never married single women, but does include the no-longer married group formed by widowed, divorced and deserted women. In our analysis we left them out, since this group is traditionally worlds apart from the married women's group. Being no longer married is a negative social stigma in India. In some rural areas it is a common situation that if a husband dies his widow is considered of no use in society.

[7] An analysis of women's employment in India on the same data can also be found in Francavilla and Giannelli, 2010.

relatively low (25 per cent or less) in Assam, Himachal Pradesh, Delhi, Sikkim, Uttar Pradesh, and Kerala. The job participation of women is relatively high in all the Southern States (except Kerala), in all the Western States, and in Madhya Pradesh.

Part of the literature on developing countries attributes an empowering function within the household to employment through a higher control over family resources (see e.g. Folbre, 1984; Haddad et al., 1997; Basu, 2006).

NFHS-2 information on the power to control monetary resources can be used to give some insight into the hypothesis of the empowering effect of monetary earnings. For married women earning cash, around 11 per cent contribute almost none to total family earnings, 47 per cent less than half, 21 per cent about one half, 7 per cent more than one half and 12 per cent all. Figure 1 shows who decides how the wife's earnings will be spent by wife's earnings share of household income.

If we exclude the case in which the wife's earnings are so low that the decision on how to spend them presumably does not involve a bargaining process between partners ("Almost none" in Figure 1), it turns out that the power to decide autonomously increases with the proportion of a wife's earnings on total earnings. From a wife's earnings share of "less than half" to "about half" the wife's power to decide autonomously increases together with that of deciding jointly with her husband, while the husband's power to dispose of his wife's earnings declines. From a wife's earnings share of "more than half" to "all", a wife is more independent in her decisions.[8]

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[8] In the survey, there are other options with very low frequencies: "Someone decides" and "Jointly with someone else".

Figure 1.

Who decides how the wife's earnings will be spent by wife's earnings share of household income.
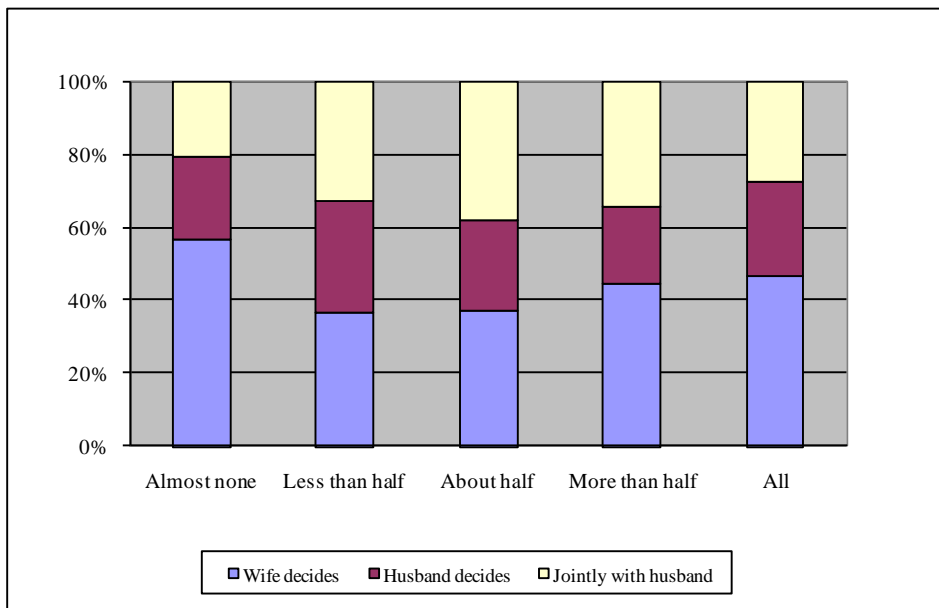
Source: NFHS-2, 1998-1999

Turning to the description of our sample, Table 1 shows that the probability of employment of married women aged 15 to 49 for all India is 33.6 per cent. The probability of employment is lower in urban areas (22.3 per cent) compared to rural areas (38.7 per cent), where women mostly work as agricultural or self-employed labourers, often being exploited in terms of earnings and working times. The higher proportion of women's participation in rural areas may be ascribed to the fact that in developing countries such as India, poverty forces women to join the workforce. The empowering effect of employment, therefore, depends a great deal on the type and the quality of work. It is obvious that women who have occasional, seasonal and/or unpaid jobs, or who are reduced to slavery in rural plantations, are less likely to be empowered by their work. Agricultural workers (including the self-employed) account for about three-quarters of the women who work in rural areas. The self-employed in agriculture, who account for about 60 per cent of all agricultural workers in rural areas, are mostly farmers. Women who work as farmers in rural areas are often

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self-employed on their family farm and are subject to the seasonality of their work. In fact, for the most part, women self-employed in agriculture are unpaid workers and four in ten are employed occasionally or seasonally. Agricultural employees are women employed as agricultural labourers, plantation labourers, forestry workers and related workers. Of them, one woman in ten is unpaid and more than four women in ten are engaged only for seasonal or occasional work. Table 1 shows that 12.6 per cent of our sample works unpaid in all India, a number that rises to 17 per cent in rural areas.

Women in urban areas are involved in more diversified activities: especially skilled and unskilled manual work, sales, and domestic activities, but also in more qualified activities such as nursing, other medical occupations and teaching, and the percentage of unpaid and occasional workers is lower than in the rural areas. One woman in ten is unpaid and two women in ten are engaged only for seasonal or occasional work. In our sample, around 3 per cent of women living in urban areas work unpaid.

Since we believe that women's empowerment is closely related to the earning capacity stemming from a paid job, we address this topic by also studying the determinants of the probability of such an event as opposed to that of not working or being in unpaid employment.

Programmes to ease access to employment have been implemented in India since the 1980s[9]. Some of these were specifically addressed to women with the aim of promoting stable and paid occupations. The National Population Policy adopted by the Government of India in 2000 (Ministry of Health and Family Welfare, 2000) explicitly recognized the importance of women's paid employment in achieving the goal of stabilizing the population and introduced specific measures for paid employment and self-employment. Since women's participation in rural areas is higher, policy

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[9]For a discussion of employment programmes in India see Mahendra (2006).

makers have traditionally concentrated their intervention there with the objective of improving

female work conditions.

Table 1
Descriptive statistics of dependent variables for married women aged 15-49 (percentages in parenthesis)

All India

Question	No work	Work	
	56349	28498	
"Woman is currently working?"	(66.41)	(33.59)	
	No work	Unpaid work	Paid work
	56349	10724	17761
"Woman is currently working as paid worker?"	(66.42)	(12.64)	(20.94)

Urban India

	No work	Work	
	20436	5868	
"Woman is currently working?"	(77.69)	(22.31)	
	No work	Unpaid work	Paid work
	20436	726	5137
"Woman is currently working as paid worker?"	(77.71)	(2.76)	(19.53)

Rural India

	No work	Work	
	35913	22630	
"Woman is currently working?"	(61.34)	(38.66)	
	No work	Unpaid work	Paid work
	35913	9998	12624
"Woman is currently working as paid worker?"	(61.35)	(17.08)	(21.57)

Data source: NFHS-2, 1998-99.

3.2 The Family Planning programme (FP)

The FP Programme[10] in India has undergone important changes in recent years and particularly

during the 1990s. At the beginning in 1952, it was primarily a clinic-based family planning

programme monitoring the family on the basis of family planning targets to achieve a couple's

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[10]The actual name is "Family Welfare Programme".

participation rate in the health system of 60 per cent. After the adoption of the "extension approach" in 1963 and subsequent integrations with the Mother and Child Health Programme, the activities of the programme broadened significantly. In addition to family planning, the programme provided a variety of services to mothers and children, including antenatal, delivery, and postnatal care, the immunization of children against various vaccine-preventable diseases, and counselling on mother and child health problems and nutrition. In the 1970s and 1980s the central administration gave local health workers targets for the number of women they were to sterilize each month. This FP programme was then accused of using unacceptable methods to induce people to be sterilized and to fulfil administrative targets even after the so-called "emergency period" imposed by President Indira Ghandi in 1976-77 (see Saavala, 1999).

The International Conference on Population and Development in 1994 in Cairo marked the abolition of the target-oriented approach. The programme was gradually reoriented towards the Reproductive and Child Health Programme (RCH-I) that includes instructions relating to sexually transmitted diseases and infections of the reproductive tract. After a piloting period in 1995-96, in April 1996 the "target-free" approach was implemented throughout the country, reflecting a change in what was believed to be the appropriate method to achieve fertility goals. This event signed the beginning of a bottom-up approach in which health workers were expected to consult families and local communities at the beginning of every year in order to assess their needs and then establish the requirements for the coming year. The transition to a target-free approach was not straightforward and the health workers were concerned about how to achieve objectives without specific targets. After two national workshops in August 1996 the requirements for the family planning workers were readdressed and as result of this process the free target approach was renamed the Community Needs Assessment approach (CNA).

This approach modified the system of monitoring the programme. From then on, a home visit programme has been implemented, in which trained FP workers give advice on a series of matters, not only concerning reproductive health, but also nutrition, disease prevention, sanitation and child care (Ministry of Health and Family Welfare, 1998).

Even if the main objective of FP programmes was demographic, indirect effects on women's economic conditions through maternal and child health improvements may be expected. In this paper we are interested in estimating whether the introduction of a monitoring process at the local level by the FP worker visits to the households and in the village community centres has affected women's allocation of time. The hypothesis is that the advice provided by the FP worker might determine an improvement in domestic technology that gives the woman an opportunity to employ her time resources more efficiently (see Appendix A).

3.3 The Community Need Assessment approach and the family planning worker visit

The start of the RCH-I programme marked the beginning of a new philosophy on the way in which the country controls the population growth. The experience of previous decades and the international debate led the Government of India to believe that parents will spontaneously keep their family small if they were assured about the health, survival and longevity of their children. Therefore, the overall strategy of the government was the provision of health care for the mothers and young children combined with the promotion of the use of contraceptives and terminal methods for the couples desiring them (Indian Department of Family Welfare, Ministry of Health and Family Welfare, Government of India, 1998).

In this context, Auxiliary Nurse Midwives (ANMs) were identified as the key persons on whom the outcome of the programme depended. With the new bottom-up approach ANMs were responsible for the Sub-centre Action Plan that was designed to provide a basis for determining the service

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requirements of the population in the local area.[11] The workload for each Public Health Centre (PHC) was then established, to be obtained by adding up the workload of the different ANMs under the same PHC. ANMs were required to contribute to this process by means of two methods, first conducting a household interview (in February/March of each year) to collect relevant information; second, validating the requirement which emerged from the survey with anganwadi workers, Mahila Swasthya Sangh and Panchayat health committee members in the community and through a comparison of the identified targets with both the achievements of the previous year and demographic calculations obtained using pre-established rigid formulas.

The ANM was expected to be a qualified person who regularly participated in training for up-grading of her knowledge and skills. It was also identified as an essential requirement that she had fixed days of the week in the office so that people would know that she was available and fixed days of the week in which she visited villages, as far as possible according to a fixed roster.

It was also expected that during her household visits she motivated women in receiving ante-natal and post natal care and educated them to bring the children for examination and treatment to the sub-centre when needed. During the village visits, it was expected that she visited the anganwadis to motivate and counsel the community about health care reproductive health and the risk of pregnancy. It was also required that she listened to women's views in the anganwadis and through meetings with the Mahila Swasthya Sangh and counselled them on appropriate health care and contraception use. It was also expected that she visited as many families as possible in the village and motivated people to avail themselves of the health care facilities that she could provide and possibly visited schools and undertook health-checks to ensure that children had full immunization

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[11] Health services in India are organized in a hierarchical structure composed, from the bottom to the top, by Sub-centre, Public Health Centre, FRUs/Sub District Hospitals, District, with the last level reporting directly to the Director Family Welfare in the State Government and to the Department of Family Welfare Government of India. In this structure the ANMs operate in the Sub-centre and are responsible for the Action Plans of the Sub-centres that have to be prepared every year for the financial year in order to assess the needs of the community and set down targets for the ANM's work during the coming year.

and were referred to check-ups at PHCs by the medical officer if they suspected any health problems.

From the previous discussion it is evident that targets were established at the local level by the ANMs and that a close relationship with the community was considered essential as well as the individual visits to women in their households. With this programme, for the first time, the target decisions were taken at sub-centre level by the ANMs on the basis of a consultation process with the interviewed women and the community. As a consequence of this process, as well as other drivers such as different resource allocation across States, the type of services provided (e.g. number of visits in each village, town and city) was highly heterogeneous across States. Figure 2 accounts for the variability between States, showing that in both rural and urban areas the FP visit coverage varies from a minimum of 20 per cent of cities, towns and villages receiving at least one visit to a complete coverage in which all the cities, towns and villages receive at least one FP visit.

Figure 2

Fraction of cities/towns/villages with at least one visit

Rural	Urban

Source: NFHS-2, 1998-99
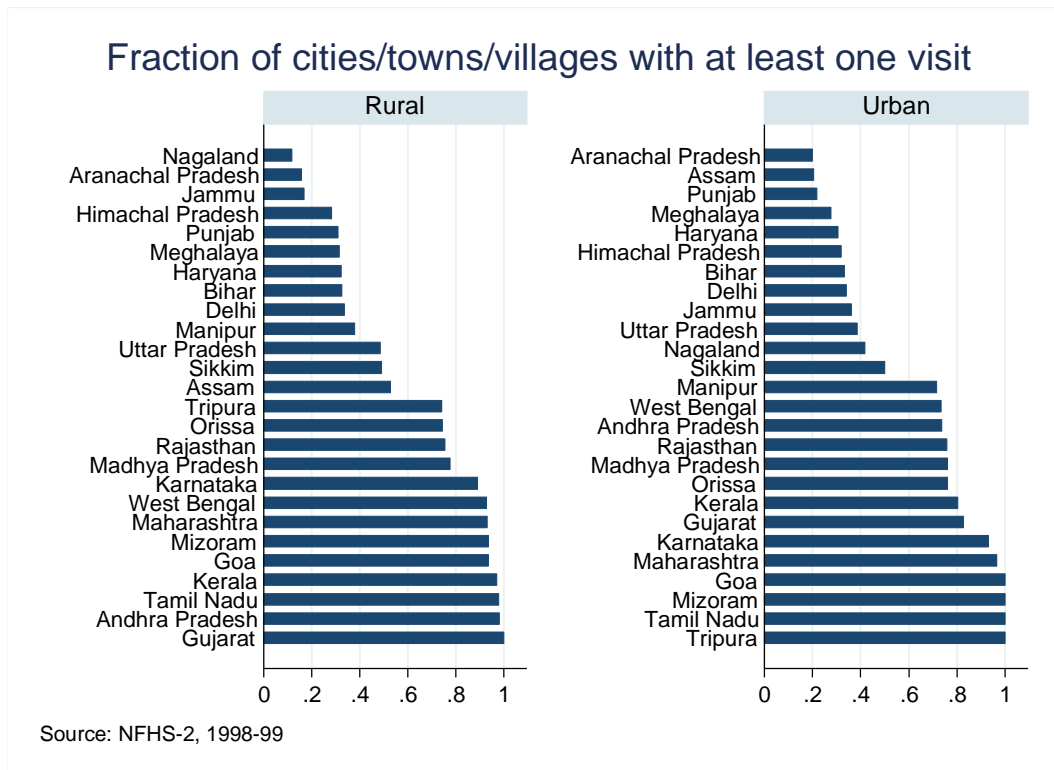
Of course, variability between local areas is also observed in the number of FP visits provided at a local level. Figure 3 shows, for urban and rural areas separately, the fraction of women who receive the visit in each city, town, and village. Local areas are sorted by the fraction level from those with no visits in the area to a maximum ratio of 80 per cent in rural areas and 50 per cent in urban areas.

Figure 3

Fraction of women who receive the visit in each city/town/village

Source: NFHS-2, 1998-99   cities/towns/villages

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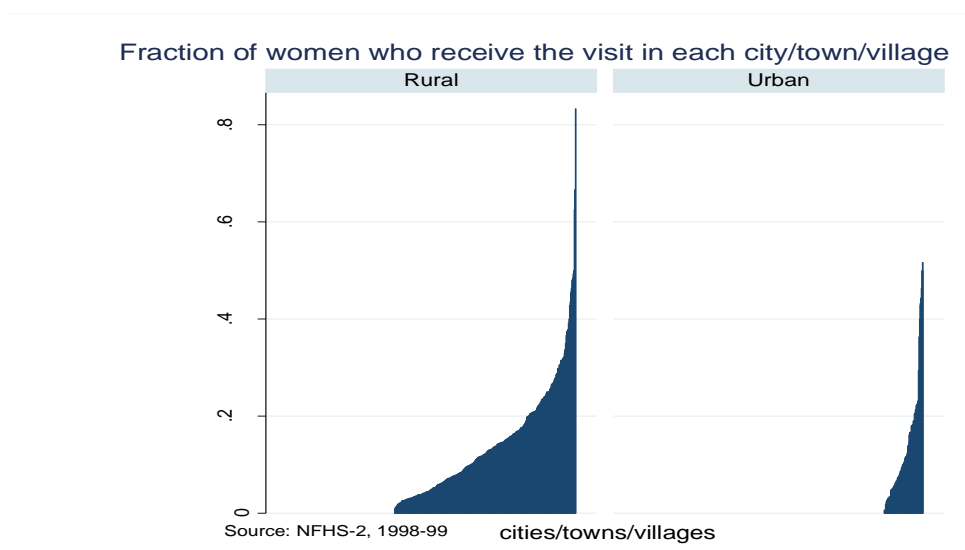
In all India, thirteen per cent of women aged 15-49 received at least one visit in the 12 months before the interview (indeed, three visits on average) which is an impressive result considering the huge Indian population.

The majority of women are visited by ANM/LHV (65.6 per cent), followed by other public sector health workers (7.4 per cent), public health nurses (6.6 per cent), male planning workers (6.1 per cent), anganwadi workers (5.2 per cent), doctors (3.24 per cent), and private doctors (2.6 per cent). Among the topics discussed with the family planning worker the most frequent are immunization (43.1 per cent), treatment of health problems (35.5 per cent), child care (21.3 per cent), family planning (15.1 per cent), and disease prevention (13.4). Other topics discussed with a percentage lower than the 5 per cent (excluding the generic categories of others) are: delivery care, breastfeeding, supplementary feeding, nutrition, post-partum care, sanitation and cleanliness, and oral rehydration.

4. EMPIRICAL MODEL

As discussed in the previous sections, while visiting families, FP workers not only give advice on fertility, but also on health, nutrition, child care and other related matters. As a result, we argue that FP visits imply an improvement in household domestic technology that gives women an opportunity to employ their time resources more efficiently. We use an empirical approach to test this hypothesis, namely, whether the FP policy gives women, through a better control over time, an opportunity to work in the market. Appendix A reports a baseline theoretical model that, in a two-period framework, describes how domestic technology may change after the FP visits.

We devise an econometric model reflecting the economic model outlined in Appendix A. The objective is to test whether the participation decision is significantly correlated with the fraction of women receiving FP in the local area (city, town, or village).

Different outcomes are considered. First we estimate the effect of the intensity of FP visits in the local area on two mutually exclusive states for the woman: not working and working. Then we specify further the woman's outcomes considering three mutually exclusive states: not working, working unpaid and working paid.

4.1 Econometric models and outcome variables

The following empirical discrete choice model emerges from a utility maximisation framework with fixed effects. Individual i of group k gains utility from choosing state j represented by the utility latent indicator:

$$u_{ijk} = \underline{x}_{ijk}'\beta_j + \alpha_{jk} + \varepsilon_{ijk}$$

$i=1,...,N$, $j=1,...,J$, $k=1,...K$, where N is the total number of individuals in the sample, J is the number of states the individual can choose, K is the number of groups (districts), x_{ijk} is a vector of observed explanatory variables describing women's characteristics which are assumed to determine the women's work decision. α_{jk} is the fixed effect of the group (in our case the district of residence) for choice j. We are interested in deducing what the unknown parameter vectors β_j, $j=1,...,J$, are. The utility indicator u_{ijk} is latent, but we observe the realisation: $y_{ik} = j$ if $u_{ijk} > u_{isk}$ $\forall s \neq j$, i.e. we observe the individual i in state j if she derives the greatest utility from this state.

We first specify two outcome variables of female employment (j=work, no work), and estimate (i) a linear probability model with fixed effects[12] and (ii) a Conditional Maximum Likelihood logit model with fixed effects (Chamberlain, 1980).

In case (ii) the logit model amounts to estimating the parameters of:

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[12] This is equivalent to introducing district dummies in the linear regression.

$$\Pr\left(y_{ik} = 1\right) = \frac{\exp\left(\alpha_k + x_{ik}\beta\right)}{1 + \exp\left(\alpha_k + x_{ik}\beta\right)}$$

Maximizing the likelihood conditioning on the sufficient statistic for α_k, that is, $\sum_i y_{ik}$, yields consistent estimators for the β's.

We then specify a multinomial logit with three states, j=0,1,2 (no work, unpaid work, paid work respectively). In this case we introduce the district dummies to estimate the α_{jk} directly into the model, without conditioning the maximum likelihood.[13]

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[13] The conditional multinomial logit model has not been implemented in any of the available econometric software.However, for a large number of observations in each group (i.e. districts) the bias of the unconditional fixed-effects estimator is not a concern, and we can confidently use the multinomial logistic regression with an indicator variable for each group.

4.2 Constructing the FP indicator

Information on FP is drawn from the Woman's Questionnaire. The survey contains information on several FP services provided by public and private health centres. Most of this information, however, is demand-driven, like, for example, the number of times a woman went to the hospital for FP advice. We do not use these indicators, since they would be endogenous to women's choices. A possible indicator of FP exposure is whether the interviewed woman was visited by an FP worker in the previous twelve months. While this indicator would be less endogenous than that of the woman visiting the FP centre, it could still suffer from the problems of selection. To better understand whether the women who were visited are in other ways different from those who were not, we have estimated the probability of receiving at least one visit in the previous year controlling for women's, partners' and household's characteristics and including district fixed effects. The results show that, for instance, women who are more educated and with more educated partners are more likely to receive the visit. Not surprisingly the presence of own children aged 0-5 is positively correlated with the probability of receiving the visit, both in rural and urban areas, but in rural areas the probability of receiving the visit is also positively correlated with the presence of small children of other women. Religion and caste seem to matter, since women in Scheduled Castes are more likely to receive the visit and Christian women in urban areas less likely to receive it. Unfortunately the complexity of the programme and the limited information on its implementation at the village/district level do not allow us to identify exactly how women are targeted for the visits. The results of our analysis seem to confirm the descriptive information reported in the documentation provided by the Indian Ministry of Health and Family Welfare. The programme, in fact, specifically targeted families with young children and aimed at improving the outreach of services for vulnerable groups of the population, namely people leaving in urban slums and tribal populations

(Ministry of Health and Family Welfare, 1997). At the same time, the analysis reveals a potential problem of self-selection since more educated women are more likely to receive the visit.

Moreover, as discussed in subsection 3.3, with the new bottom-up approach introduced with the CNA the ANMs were responsible for the Action Plan for the Sub-centres at the lowest geographical level, this implying that targets could be very different across geographical areas. This is confirmed by the high heterogeneity in the visits provided at different geographical levels (see Figure 2 and Figure 3). In addition, there might be a diffusion of FP advice to neighbouring women who have not received the visit. The more the women were visited, the more intense would be this neighborhood effect. This implies that an indicator of whether the woman receives the FP visit would be insufficient to capture the women's exposure to the FP programme.

To take into account all these aspects, we opted for a variable measuring the intensity of the exposure to the programme computed at village (or town or city) level. This is given by the share of married women aged 15-49 who receive the visit on the total number of married women in the same age group who live in the same village (or town or city).

Descriptive statistics of this variable (see Appendix B) show that the average share of beneficiaries at local level (there are around 3100 villages/towns or cities) is 11 per cent, 9 and 12 per cent distinguishing by urban and rural areas respectively. A distribution by local areas shows that around one third does not receive this FP service, one half has at most 5 per cent coverage and that in the top decile are local areas that have a coverage ranging from 30 per cent to total coverage.

4.3 Control variables

Control variables included in the empirical analysis are classified in four groups: women's characteristics, partners' characteristics, household characteristics, and geographical areas.

The first group of variables includes age, education, religion, caste and tribe. Age is a standard variable used in empirical studies on employment to control for the different participation of women in different life periods. In this study it is also important for an additional reason, since women at different ages may be differently exposed to an FP visit. As far as education is concerned, a huge amount of evidence documents the fundamental role of education for development. Various studies have shown the positive effect of maternal education on child health and survival (among these, Dreze and Murthi, 2001). Analyzing the data of NFHS-1, 1992-93, Govindasamy and Ramesh (1997) found that a mother's education continues to be a powerful, positive and significant predictor of the utilization of child health care services in India, even after controlling for a number of other demographic, socioeconomic and spatial variables. Mothers' education is also found to reduce the gender discriminatory practices among mothers of children seeking medical treatment during the post-neonatal and later childhood period (Ghosh, 2004, on NFHS-2). Other studies have stressed the important roles of mothers' education in Asian societies, such as improving their children's welfare and education (Behrman, Foster, Rosenzweig and Vashishtha, 1999). Several studies failed to find evidence of a positive link between women's education and female autonomy, casting doubt on one of the major pathways through which the former was supposed to reduce fertility (see, for example, Jeffery and Basu, 1996; Jeffery and Jeffery, 1996). However, Dreze and Murthi (2001), find strong empirical support for the negative association between education and fertility in India.

Any study on India has to include controls for the households' caste or tribe. [14] Low-caste households and tribal minorities suffer disproportionately from poverty and discrimination, even if

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[14] The caste system is an expression of the Hindu religion embraced by 80 per cent of the population. Moreover, the country has a huge tribal population that is mainly concentrated in rural and forested areas . Around 50 million people are organised in tribal communities.

after independence the untouchables have been abolished as a caste by the constitution with norms that protect Scheduled Castes (SC) and Scheduled Tribes (ST).[15]

However, Kijima's study (2006) shows that SC and ST are much poorer than non-SC/ST, and this is partly due to geographical differences (especially for ST that live in the most unreachable areas of the country) and partly to the fact that they are still disadvantaged in obtaining well-paid jobs.[16]

Among partners' characteristics, occupational position approximates family earnings, a variable not available in the survey, which should capture the effect of non-labour income on women's employment decisions.

Household's characteristics include variables on the household head (age and gender) and on household size and a range of variables on the number of children in the household, divided by sons and daughters of the observed woman and other children in the household, grouped according to their age. As is well known in the literature, the presence of children in the household can affect mothers' time allocation and their work preferences. Moreover, in developing countries where enlarged families are quite common, it is also important to control for the presence of children who are not the own children of the observed mother, since they might represent a potential increase in child care tasks for all members (especially female) in the household.

The group of household characteristics also includes the wealth index to control for household economic condition. The wealth index takes into account almost all household assets and utility services and does not produce results that are comparable to either an income or expenditure-based

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[15] SC and ST, previously called the "depressed classes" by the British are population groupings that are explicitly recognized by the Constitution of India.

[16] Bhaumik and Chakrabarty (2010), for example, show that between 1987 and 1999 positive earning differentials between "upper" castes and SC/ST have declined, while they have increased between non-Muslims and Muslims. They also show that inter-caste and inter-religion differences in earnings can be explained to a great extent by differences in educational capital and returns on work experience. Other studies focus on the reasons why the incidence of poverty in SC and ST households is significantly higher than among non-scheduled households (see for example Gang, Sen and Su Youn, 2008).

index.[17] All these variables help to control for the heterogeneity of households where the decision whether to participate in the labour market is taken. District fixed effects are included among the control variables to control for heterogeneity in both the female employment and the intensity of family planning programme at a geographical level.

5. RESULTS

We estimate women's employment probability using a Linear Probability Model (LPM) and a Conditional Maximum Likelihood logistic model (CML, see Chamberlain, 1980) for all States of India and distinguishing between urban and rural India. We then estimate a Multinomial Logistic Model (MLM) introducing a further distinction between working paid (in cash or kind) and working unpaid, since women in the latter state are quite a relevant number, as the descriptive analysis has shown. In order to absorb as much unobserved heterogeneity as possible in both female employment and the intensity of the FP programme, the LPM, the CML and the MLM include fixed effects at the district level. Results of this analysis are shown and discussed in the following sub-sections.

5.1 The employment probability and FP

Table 2 reports the coefficients for the LPM and the marginal effects for the CML of the determinants of the probability of working of married women aged 15-49 in all Indian States, and in rural and urban areas respectively. We are interested in understanding whether, controlling for all the relevant covariates and for district fixed effects, the share of married women who received at

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[17]The wealth index is a composite measure of the cumulative living standard of a household. It is calculated using data on a household's ownership of selected assets, such as televisions and bicycles, materials used for housing construction, and types of water access and sanitation facilities. The principal components analysis is used to assign the indicator weights. This procedure first standardizes the indicator variables (calculating z-scores) and then calculates the factor coefficient scores (factor loadings). Finally, for each household, the indicator values are multiplied by the loadings and added to produce the household's index value. In this process, only the first of the factors produced is used to represent the wealth index. The resulting sum is itself a standardized score with a mean of zero and a standard deviation of one (Filmer and Pritchett, 2001).

least one FP visit in a local area - namely village, or town or city - is correlated with the probability of working of married women.

The coefficient of the proportion of women receiving the visit in the village is highly significant for all India both with the LPM and the CML, indicating that an increase of one percentage point in the share of beneficiaries is correlated with an increase in the probability of working of 0.15 with LPM and 0.08 with CML percentage points in the probability of being currently employed. The separate analysis for urban and rural areas reveals that the marginal effect is significant for rural India only. This might be interpreted by the fact that in urban areas, that typically are in a more advanced stage of development, the FP programme does not produce such relevant changes in household technology as in rural areas. There might also be a statistical reason for this result, namely, that some significance is lost when splitting the sample.

Table 2

Probability of working of Indian women aged 15- 49. Coefficients of LPM and marginal effects of CML, district fixed effects

	Linear Probability Model			Conditional Logistic Model		
	All India	Urban	Rural	All India	Urban	Rural
	Coef.	Coef.	Coef.	Mfx	Mfx.	Mfx.
Share of beneficiaries of FP[§]	**0.15 *****	**0.07**	**0.06 ****	**0.08 *****	**0.03**	**0.04 ****
Woman's characteristics						
Muslim	-0.09 ***	-0.06 ***	-0.10 ***	-0.09 ***	-0.03 **	-0.09 ***
Christian	0.05 ***	0.08 ***	0.04 **	0.03 ***	0.02 **	0.03 **
Scheduled caste	0.04 ***	0.02	0.06 ***	0.03 ***	0.01	0.04 ***
Scheduled tribe	0.10 ***	0.08 ***	0.09 ***	0.06 ***	0.02 *	0.05 ***
Woman's age	0.02 ***	0.03 ***	0.02 ***	0.02 ***	0.01 **	0.01 ***
Woman's age square	0.00 ***	0.00 ***	0.00 ***	0.00 ***	0.00 ***	0.00 ***
Woman's years of education	-0.03 ***	-0.03 ***	-0.03 ***	-0.03 ***	-0.01 **	-0.02 ***
Woman's yrs of edu. squared	0.00 ***	0.00 ***	0.00 ***	0.00 ***	0.00 **	0.00 ***
Partner's characteristics						
Partner's age	0.00	0.00	0.00	0.00	0.00	0.00
Partner's age square	0.00 *	0.00	0.00	0.00 **	0.00	0.00 *
Partner's years of education	-0.01 ***	-0.01 ***	-0.01 ***	-0.01 ***	0.00 **	-0.01 ***
Partner's years of edu. Squared	0.00	0.00	0.00	0.00	0.00	0.00
Professional	-0.03 **	-0.05 ***	-0.03 **	-0.03 *	-0.02 *	-0.03
Salesman	-0.06 ***	-0.09 ***	-0.06 ***	-0.06 ***	-0.04 **	-0.05 **
Self-employed in agriculture	0.02	-0.01	0.02	0.01	-0.01	0.01
Skilled blue collar	-0.06 ***	-0.08 ***	-0.05 **	-0.05 **	-0.03 **	-0.03 *
Unskilled blue collar	-0.04 ***	-0.04 **	-0.03 **	-0.03 **	-0.02 *	-0.02
Other employment	-0.07 ***	-0.09 **	-0.05 **	-0.06 **	-0.04 **	-0.04
Household composition						
The household head is woman	0.09 ***	0.09 ***	0.10 ***	0.06 ***	0.02 **	0.05 ***
Age of the household head	0.00	0.00 *	0.00 **	0.00	0.00 *	0.00 ***
Household size	0.00 ***	-0.01 ***	0.00	0.00 **	0.00 **	0.00
Own children aged 0-2	-0.05 ***	-0.04 ***	-0.05 ***	-0.04 ***	-0.02 **	-0.04 ***
Own children aged 3-5	0.00	0.00	0.00 **	0.00 *	0.00	0.00
Own children aged 6-14	0.01 ***	0.01 ***	0.01 **	0.01 **	0.01 *	0.01 **
Own children aged 15-17	0.01 *	0.01 **	0.01	0.01 *	0.00	0.01
Other children in the hh. aged 0-2	0.00	0.00	0.00	0.00	0.00	0.00
Other children in the hh. aged 3-5	0.01	0.02 ***	0.00	0.00	0.01 **	0.00
Other children in the hh. aged 6-14	0.01	0.01 ***	0.00	0.00	0.00 **	0.00
Other children in the hh. aged 15-17	0.00	0.01	0.00	0.00	0.00	0.00
Wealth index	-0.08 ***	-0.07 ***	-0.08 ***	-0.07 ***	-0.03 **	-0.06 ***
Urban/Rural area of residence						
Urban areas	-0.04 ***	-	-	-0.03 **	-	-
Constant	0.04	-0.10	0.05	-	-	-
Sigma_u	0.18	0.13	0.22			
Sigma_e	0.40	0.38	0.42			
rho	0.17	0.11	0.22			
R2 (between and within)	0.15	0.13	0.16			
Pseudo R2				0.12	0.11	0.10
Number of observations	82240	25534	56706	78868	25303	56510
Number of districts	440	333	426	440	333	426

Notes.

*** p<0.01, ** p<0.05, * p<0.1

Robust standard errors. Adjustement clustered by state.

§: Number of women who received at least one FP visit over the total number of women aged 15-49 living in the village/town/city.

Mfx stands for Average Marginal Effects.

Differences in the number of observations in the two models are due to some districts predicting failure perfectly. Observations for All India in the Conditional Logit Model are a 95% random sample of the total observations because Stata was not able to estimate the full model.

As to dummy variables, the marginal effects are for a discrete change from 0 to 1.

Data source: NFHS-2, 1998-99.

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Some results concerning the other control variables are worth commenting on.

As to the effects of religion we find that, with respect to Hindu, Muslim women have a lower probability of working, whereas Christian women have a higher one. This estimate is highly statistically significant in India as a whole as well as in rural and urban areas with both models.

Women in scheduled caste and scheduled tribes have a higher probability of working in rural areas while the coefficient for scheduled tribe is also positive and statistically significant in urban areas. These results are in line with the evidence emerging from other studies. Deshpande (2007) shows that, over the period of the liberalization of the Indian economy, there has been a decline in the proportion of women belonging to SC and ST who declare they are not working. The same trend is not clearly visible for the other castes.

The effect of the number of a woman's small children is negative, but only for children up to the age of two. The negative effect of small children is relatively small (ranging from 5 to 2 percentage points) as compared to that emerging for developed countries.

The result that children from 3 to 5 do not impede women's work could be explained by the fact that more than two-thirds of residents live in villages that have an anganwadi (a nursery school for children of that age). The positive effect of older children may have the interpretation that they can contribute substantially to household work. Children of other cohabiting mothers have no significant influence except for a positive effect of children aged 3-14 in urban areas.

A husband's professional position should capture the income effect. In fact, all types of husband's employment positions reduce a woman's probability of working, except that of a self-employed husband in agriculture, with the obvious implication that wives are involved in the family farm activity.

The coefficient of the wealth index is negative, large and highly significant, thus suggesting that in wealthier Indian households women tend to stay at home.

As to the role of education, we test for a non-linear correlation between years of education and female employment and find that education has a significant quadratic coefficient. The linear and quadratic coefficients are both highly statistically significant in all estimated models. On the same survey data, Mahendra (2004), who analyses the association between female work participation and the level of schooling using the household sample of the NFHS-2, finds a negative relation with schooling in rural areas, and a positive, but much less significant, association in urban areas. However, his sample is a larger sample than ours (our sample is composed of married women aged 15-49, therefore less numerous), including all women (married and unmarried, with children and without) aged 15-59.

5.2 The probability of paid employment and FP

As for the estimation procedure of the MLM, we have directly introduced the district dummies (around 440) in the model. Given the high number of observations for each group (district) – minimum 16 maximum 2200 - the asymptotic properties of the estimated parameters should be fulfilled (see Chamberlain, 1980).

We distinguish, among working women, those paid in cash or in kind, from those unpaid, since the latter are quite a relevant number, as the descriptive analysis has shown. The marginal effects derived from this MLM (see Table 3) show that the most significant effect of the intensity of FP visits in the local area is to be found on the probability of "working paid", namely, the percentage of beneficiaries in the local area is positively correlated with the probability of working paid. In fact, an increase of one percentage point in the share of beneficiaries is correlated with an increase

in the probability of working paid of 0.08 percentage points for all India. Again, this is only significant for rural India, where an increase of one percentage point in the share of beneficiaries is correlated with an increase in the probability of working paid of 0.04 percentage points.

Table 3

Probability of not working, working unpaid or working paid of Indian women aged 15- 49. Marginal effects of MLM, district fixed effects

Multinomial Logistic Model

	All India			Urban			Rural		
	Not working Mfx	Working unpaid Mfx	Working paid Mfx	Not working Mfx	Working unpaid Mfx	Working paid Mfx	Not working Mfx	Working unpaid Mfx	Working paid Mfx
Share of beneficiaries of FP§	**-0.10 *****	**0.02**	**0.08 *****	**-0.09**	**0.04 ***	**0.04**	**-0.06 *****	**0.02**	**0.04 *****
Woman's characteristics									
Muslim	0.09 ***	-0.05 ***	-0.04 **	0.06 ***	-0.02 ***	-0.05 ***	0.10 ***	-0.07 ***	-0.03 *
Christian	-0.04 ***	0.01	0.04 ***	-0.06 ***	0.00	0.06 ***	-0.04 ***	0.01	0.03 *
Scheduled caste	-0.04 ***	-0.04 ***	0.07 ***	-0.01	-0.01 **	0.02 *	-0.05 ***	-0.05 ***	0.09 ***
Scheduled tribe	-0.08 ***	0.01	0.06 ***	-0.06 ***	0.00	0.06 ***	-0.08 ***	0.02 *	0.06 ***
Woman's age	-0.02 ***	0.00 ***	0.02 ***	-0.03 ***	0.00	0.03 **	-0.02 ***	0.01 **	0.01 ***
Woman's age square	0.00 ***	0.00 **	0.00 ***	0.00 ***	0.00	0.00 **	0.00 ***	0.00 *	0.00 ***
Woman's years of education	0.03 ***	0.00	-0.02 ***	0.02 ***	0.00	-0.02 ***	0.03 ***	0.00 *	-0.02 ***
Woman's yrs of edu. squared	0.00 ***	0.00 **	0.00 ***	0.00 ***	0.00	0.00 ***	0.00 ***	0.00 ***	0.00 ***
Partner's characteristics									
Partner's age	0.00 ***	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Partner's age square	0.00 *	0.00	0.00 **	0.00	0.00	0.00	0.00	0.00	0.00 *
Partner's years of education	0.01 ***	0.00 ***	-0.01 ***	0.01 ***	0.00	-0.01 ***	0.01 ***	0.01 ***	-0.01 ***
Partner's years of edu. Squared	0.00	0.00 ***	0.00 ***	0.00	0.00	0.00	0.00	0.00 ***	0.00 ***
Professional	0.03 *	0.01	-0.04 ***	0.05 ***	-0.01	-0.04 ***	0.03 *	0.02 *	-0.05 ***
Salesman	0.06 ***	0.03 ***	-0.10 ***	0.09 ***	0.02 **	-0.11 ***	0.06 ***	0.03 ***	-0.09 ***
Self-employed in agriculture	-0.01	0.07 ***	-0.06 ***	0.04 ***	0.03 ***	-0.07 ***	-0.02	0.09 *	-0.07 ***
Skilled blue collar	0.05 ***	0.00	-0.05 ***	0.07 ***	0.00	-0.07 ***	0.04	0.00	-0.04 ***
Unskilled blue collar	0.04 ***	-0.02 **	-0.02 **	0.04 **	0.00	-0.04 ***	0.04 ***	-0.03 ***	-0.01
Other employment	0.06 ***	0.02	-0.08 ***	0.08 ***	-0.01	-0.07 ***	0.05 ***	0.03 **	-0.08 ***
Household characteristics									
The household head is woman	-0.09 ***	0.05 ***	0.04 ***	-0.07 ***	0.01	0.06 **	-0.09 ***	0.06 *	0.04 **
Age of the household head	0.00	0.00	0.00 **	0.00 **	0.00 **	0.00	0.00 ***	0.00	0.00 ***
Household size	0.01 ***	0.01 ***	-0.01 ***	0.01 ***	0.00	-0.01 ***	0.00 ***	0.01 ***	-0.01 ***
Own children aged 0-2	0.05 ***	-0.02 ***	-0.03 ***	0.05 ***	-0.01 ***	-0.04 ***	0.05 ***	-0.02 ***	-0.03 ***
Own children aged 3-5	-0.01 ***	0.00	0.01 ***	0.00	0.00	0.01	-0.01 **	0.00	0.01 ***
Own children aged 6-14	-0.01 ***	0.00	0.01 ***	-0.01 ***	0.00	0.01 ***	-0.01 ***	0.00	0.01 ***
Own children aged 15-17	-0.01 ***	0.00	0.01 ***	-0.01 **	0.00	0.01 **	-0.01 **	0.00	0.01 ***
Other children in the hh. aged 0-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.01 *
Other children in the hh. aged 3-5	0.00	0.00	0.01 ***	-0.02 **	0.00 **	0.02 *	0.00	-0.01 **	0.01 **
Other children in the hh. aged 6-14	0.00	-0.01 ***	0.01 ***	-0.01 **	0.00	0.01 ***	0.00	-0.01 ***	0.01 *
Other children in the hh. aged 15-17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wealth index	0.08 ***	-0.02 ***	-0.06 ***	0.07 ***	0.00 *	-0.07 ***	0.08 ***	-0.02 ***	-0.06 ***
Urban/Rural area of residence									
Urban areas	0.06 ***	-0.09 ***	0.03 ***						
Pseudo R2		0.24			0.19			0.2735	
Number of observations		82227			25529			56698	
Number of districts		440			333			426	

Notes.

*** p<0.01, ** p<0.05, * p<0.1

Robust standard errors. Adjustement clustered by state.

§: Number of women who received at least one FP visit over the total number of women aged 15-49 living in the village/town/city.

Mfx stands for Average Marginal Effects.

For dummy variables the marginal effects are for a discrete change from 0 to 1.

Data source: NFHS-2, 1998-99.

As for the effects of religion we find that, with respect to Hindu, Muslim women have a higher probability of not working and a lower probability of working paid and unpaid. The effect on Christian compared to Hindu is different, they show a lower probability of being not working and a higher probability of working paid. Results for religion are strongly statistically significant both in urban and rural areas.

Women in SC and ST have a much higher probability of working paid both in rural and urban areas, SC, moreover, seem also to reduce the probability of unpaid work favour paid work both in urban and rural areas, even if the effect in rural areas is higher and more statistically significant. As to the role of education, the linear marginal effects are highly statistically significant for not working and working paid, the quadratic term is also statistically significant but very low.

The effect of the number of woman's small children on working is confirmed negative, with small children reducing both the likelihood of the mother working paid and unpaid. This result is observed for rural, urban areas and India as a whole. The results also confirm a positive effect of children aged over 3 years on their mothers' employment and, interestingly, the positive effect is found only on paid employment, both in rural and urban areas.

As noted before, the husband's professional position should capture the income effect. In urban areas all types of husband's occupation reduce a woman's probability of working paid, but a husband working in the agricultural sector or as salesman also increases the probability of working unpaid. Results are slightly different in rural areas where a husband working in agriculture will reduce both the likelihood of no working and working paid in favour of working unpaid. All the other husband's occupations have the expected sign, the income effect reducing the likelihood of working paid. Interestingly, excluding women married to skilled blue collar workers, all the other husband's professions also have a positive effect on unpaid work, suggesting that women, when possible, help their husbands as unpaid workers.

The coefficient of the wealth index is again large and highly significant indicating that in wealthier Indian households women tend to stay at home not working either as paid or unpaid workers.

7. CONCLUSIONS

Our analysis has shown that demographic and health policies in India may have a relation with female employment. Our argument is that these policies improve the efficiency of domestic and care work, thus giving women a chance to choose whether to participate in the labour force. Our econometric evidence for India does not reject this hypothesis, showing a positive correlation of a particular demographic programme – family planning worker visits to women aged 15 to 49 – with the probability of women finding employment. This correlation is highly significant for all India. Distinguishing by urban/rural areas this relation remains significant only for rural India. There might be an economic interpretation of this result, namely, that in urban areas the technological improvement in household production implied by family planning may have already exhausted its effects. There might also be a statistical interpretation, namely, that some significance is lost when splitting the sample.

Our results also show that the largest positive effect of FP in rural India is to be found on paid work, as opposed to unpaid work, suggesting a potential empowering feedback of demographic measures through labour earnings. These results are robust in all estimated models, also controlling for district fixed effects.

Given the remarkable amount of investment in family planning that governments and international institutions make in developing countries, it would be relevant to investigate if there is a causal nexus between family planning and women's employment. This would help in finding the optimal policy mix capable of transforming unintended effects into explicit employment policy choices.

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Appendix A. A baseline theoretical model

In our household model with home production, decision-making is in the hands of the partners. In line with the "collective approach" (see, for example, Bourguignon and Chiappori, 1992), the partners have two distinct utility functions, $U_i(.)$, with i=1,2, that they maximize as a weighted average with weights representing the balance of power in the household. We assume that men always work in the market[18], the partners consume a bundle of domestic (X_d) and market (X_m) goods, and the woman has to distribute her working time between hours of domestic activities, H_d, market work, H_m, and leisure, L. We identify domestic work with time spent providing food and preparing meals, preventing and curing diseases of all the family members, and time spent looking after children.

The woman (1) and the man (2) value the two goods in the same way, but the woman also has her leisure L in her utility function. The man's leisure is assumed to be zero. The husband is only indirectly interested in his wife's time, since the household needs to consume at least a minimum level of domestic goods, which he is not able to produce himself being specialized in market labour.[19]

Under these hypotheses the household utility to be maximized is simply:

$$\text{Max } U = \Theta\, U_1(X,L) + (1-\Theta)U_2(X) \qquad\qquad (1)$$

where $0 < \Theta < 1$ is a coefficient that is positively related to the power of the wife.

To begin with, imagine a situation of underdevelopment where women are forced to allocate all their time to domestic work. To give an example, suppose that a couple is not able to control fertility, that the health of the household members is continuously at risk, that water and food is difficult to provide and to transform into safe drinks and meals. In sum, domestic production

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[18] In our sample, 97 per cent of husbands work.
[19] Alternatively, it can be assumed that L directly enters the husband's utility function, as in Basu (2006), if he draws utility from his wife's leisure.

technology is very poor. As a result, the woman will be overburdened by domestic tasks, and all her time will be barely sufficient to provide her family and herself with the means to survive. The man gives the household a labour income Y, used to buy market goods. Note that Y may also include public subsidies deriving from GP. We call this period 1.

Period 1: no choice

In period 1 a woman in the household has no choice over the way she can use her time. She has to produce a given minimum amount of domestic goods, $X_{d,min}$, for her own and her family's survival. This activity will take all her time T, she will have no alternative, and her power will be null, that is $\Theta = 0$. Hence, in the beginning the household preference coincides with the husband's preference. If $X_d = f(H_d)$ is the domestic production function, we assume that at time 1 the wife will have to produce survival $X_{d,min} = f(T)$. The household will also consume some market goods, that is $X_m = Y$. Suppose the government decides to intervene to improve a household's welfare with an FP policy that sends FP workers to visit families and give them advice on health, fertility, child care and other related matters. This implies a sudden improvement in domestic technology that gives the woman an opportunity to employ her time resources more efficiently, and, consequently, a certain degree of control over them. We call this period 2.

Period 2: the participation decision

At time 2, after this exogenous shock, the domestic production function becomes $X_d = g(H_d)$ with $g'(H_d) > f'(H_d)$ for all H_d. At this point, since now producing at least the survival $X_{d,min}$ no longer involves all her time, the woman acquires some degree of freedom over her time allocation, that is $\Theta > 0$ if $H_{d,min} < H_d < T$.

The utility maximization (1) is now subject to the new domestic production function constraint:

$$X_d = g(H_d) \; ; \; g' > 0 \; ; \; g'' < 0 \; ; \; g'(H_d) > f'(H_d) \text{ for all } H_d \; ; \; X_{d,min} = f(T) = g(H_{d,min}); \qquad (2)$$

the consumption constraint

$$X = X_d + X_m; \tag{3}$$

the time constraint

$$T = H_d + H_m + L; \quad H_{d,min} < H_d < T; \tag{4}$$

and the budget constraint

$$X_m = WH_m + Y; \tag{5}$$

where H_m is hours of the woman's market work and W is the real hourly female wage prevailing on the market.

Depending on the woman's preferences and the market wage, two situations may occur. In one situation the woman maximizes her utility by specializing in domestic work ($H_m = 0$). This is a case of no participation, according to which utility maximization occurs at the reservation wage $W_R = g'(H_d) > W$. In the other situation, for a given wage, the woman's preferences are such that it becomes convenient to enter the labour market. She will decide to participate and contribute to household income. The first order conditions of the maximization of $U_1(.)$ with respect to H_m and H_d are:

$$\frac{U_L}{U_X} = W \tag{6}$$

and

$$\frac{U_L}{U_X} = g'(H_D) \tag{7}$$

where (6) corresponds to Pareto efficiency in the consumption allocation. From (6) and (7) the equilibrium condition of equality of the marginal product of household production and the wage rate is derived. Supposing the price of X_m equals unity, then in monetary terms (6) and (7) yield $w = g'(H_D)$, that is, in equilibrium, the revenue of an extra hour of domestic work must equal its marginal cost.

Appendix B. Descriptive statistics of the sample of married women

	All India		Urban		Rural	
	Mean	St. dev.	Mean	St. dev.	Mean	St. dev.
Share of beneficiaries of FP*	0.11	0.14	0.09	0.12	0.12	0.15
Woman's characteristics						
Muslim[§]	0.12	0.32	0.15	0.36	0.11	0.31
Christian[§]	0.05	0.23	0.06	0.24	0.05	0.22
Scheduled caste[§§]	0.17	0.38	0.14	0.35	0.18	0.39
Scheduled tribe[§§]	0.12	0.32	0.06	0.24	0.14	0.35
Woman's age	31.03	8.63	32.26	8.31	30.48	8.72
Woman's yrs of edu.	3.99	4.76	6.82	5.26	2.71	3.90
Partner's characteristics						
Partner's age	36.97	9.82	38.03	9.37	36.50	9.97
Partner's yrs of edu.	6.58	5.08	9.02	4.93	5.48	4.75
Partner's yrs of edu. sq.	69.06	75.32	105.72	86.81	52.60	62.95
Professional	0.13	0.34	0.25	0.43	0.08	0.28
Salesman	0.11	0.31	0.20	0.40	0.07	0.26
Self-employed in agriculture	0.36	0.48	0.05	0.23	0.50	0.50
Skilled blue collar	0.22	0.41	0.31	0.46	0.18	0.38
Unskilled blue collar	0.10	0.30	0.09	0.28	0.10	0.30
Other employment	0.05	0.22	0.07	0.26	0.04	0.20
Household characteristics						
The household head is woman	0.02	0.14	0.02	0.12	0.02	0.14
Age of the household head	45.52	13.54	45.61	12.92	45.49	13.80
Household size	6.82	3.63	6.39	3.38	7.02	3.72
Own children aged 0-2	0.36	0.55	0.31	0.53	0.38	0.56
Own children aged 3-5	0.38	0.59	0.32	0.55	0.41	0.61
Own children aged 6-14	1.05	1.21	0.97	1.15	1.09	1.24
Own children aged 15-17	0.25	0.50	0.26	0.53	0.24	0.49
Other children in the hh. aged 0-2	0.19	0.51	0.14	0.45	0.21	0.54
Other children in the hh. aged 3-5	0.16	0.50	0.12	0.43	0.18	0.53
Other children in the hh. aged 6-14	0.39	0.99	0.30	0.87	0.43	1.03
Other children in the hh. aged 15-17	0.17	0.47	0.13	0.41	0.19	0.49
Wealth index[§§§]	0.02	1.00	0.90	0.91	-0.38	0.75
Geographic area						
Urban areas (base: Rural areas)	0.31	0.46	1.00	0.00	0.00	0.00

Data source: NFHS-2, 1998-99

Notes

*: Number of women who received at least one FP visit over the total number of women aged 15-49 living in the village/town/city.

§: The base categories are Hindu and all other religions. **§§**: Scheduled Caste and Scheduled Tribes are disadvantaged groups of the population who are recognised by the Constitution of India. The base categories are: other backward class, other. **§§§** The wealth index is a composite measure of the cumulative living standard of a household. It is calculated using data on a household's ownership of selected assets, such as televisions and bicycles, materials used for housing construction, and types of water access and sanitation facilities. The principal components analysis is used to assign the indicator weights. This procedure first standardizes the indicator variables (calculating z-scores) and then calculates the factor coefficient scores (factor loadings). Finally, for each household, the indicator values are multiplied by the loadings and added to produce the household's index value. In this process, only the first of the factors produced is used to represent the wealth index. The resulting sum is itself a standardized score with a mean of zero and a standard deviation of one (Filmer and Pritchett, 2001).