

Poverty and the Evolving Public/Private Divide in Institutional Delivery Care in Egypt and India

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Abstract

Neither the debate on the benefits of public/private mix in maternity provision nor the evidence on poverty-constrained access to skilled attendance have addressed the effects of poverty in a maternity service environment which is increasingly run by Private For Profit or Private Not For Profit providers. Furthermore, there is little evidence with which to address questions on appropriate roles for the private sector in the continuum of care. In two countries with an increasing share of institutional deliveries, mainly taken up by the private sector, we investigate the determinants of private delivery care focusing on the role of household wealth as an indicator of poverty. Using Demographic and Health Survey data from successive surveys in Egypt and contrasting states of India, we use regression models to investigate the effect of poverty on delivery options over time. Using the results from this analysis, we assess the evolving nature of inequities in care.

1. Introduction

Privatised maternity care is sometimes described as being complementary to government run services or even substituting for them where State systems are failing. However, given the importance of extending maternity services to the poor, equitable distributions of service uptake are desirable. Thus any increases in the use of private care should be questioned on this basis, as well as on the basis of the quality provided by private providers, especially in a context such as maternity care where overmedicalisation is often associated with private provision.

In both India and Egypt, the low status of women is an important factor in health-seeking behaviours and it has been suggested that a 'culture of silence' constrains women's access to reproductive health services in times of need. Gender constraints can also compromise access to services if women are not well-embedded and supported within families, and this will particularly restrict their ability to seek expensive services. Analysis of maternal care data from a range of Indian states along with Egyptian survey data can provide information on the public/private use divide in these societies and how this is evolving over time. Overmedicalisation is difficult to address in its entirety from sample surveys, but information on Caesarean section (C-section) rates is reliably obtained and can be instructive when examined along with use of private care. We have chosen Karnataka, Kerala, Maharashtra, Madhya Pradesh and Punjab to illustrate a diversity of Indian settings and as comparators to the Egyptian situation.

There now exists a very detailed survey data on institutional delivery from a range of countries in the form of DHS data. In many countries, including Egypt and India, we have more than one survey data set over the last decade. In the case of India there exists a very large data set which has the advantage of including a large range of socioeconomic settings but with, to some extent, a common infrastructure base, and some commonalities in cultural background. The only disadvantage of analysing these data to inform the private/public mix debate is the lack of distinction between PFP and PNFP providers in most surveys. For India, we have analysed both the 1993 and 1998 surveys for the five chosen states to see changes over

the 1990s, and for Egypt, we have particularly looked at the 1992 and 2000 surveys to cover an approximately parallel time period, but we have also looked at the 1995 survey in our later analysis. The latter Indian survey does include a PNFP/PFP distinction, but time trends cannot be examined for these categories, given that the first survey did not distinguish between these. This is an important point when looking at equity of services, as the PNFP sector often (but not always) caters specifically for marginalised groups, and their clients are expected to be very different from PFP clients, and should not be categorised together.

Despite this drawback, the analysis in this paper attempts to answer the following questions:

- What is the extent of private childbirth care utilisation in this range of settings and how is this changing over time?
- To what extent does wealth status affect delivery location, and what other factors are also important or confounding?
- Does the relationship between poverty and private care use change over time, and are any recent increases in private care improving equitability of services?

2. The public/private divide in institutional delivery care

Bennett (1992) defined 'private' providers as those who fall outside the direct control of government and include both for-profit and non-profit providers. These private providers include health care facilities owned by private employers, those operated by religious missions and other non-governmental organisations (Hanson and Berman 1998). Some critics have indicated that there are other aspects of care, which are not captured by the categorisations suggested by Bennett (1992). For example, Daniele et al (1997) noted that in Sub-Saharan Africa, where health care delivery is often provided by individuals or institutions whose administrative responsibility is not to the state, the term private is used to describe and distinguish all such individuals or institutions from public providers of delivery care. But this notion is based on the assumption that the private sector is homogenous and financially self-sustaining, through private funding (user fees, donations, etc), while, the public health sector is funded by the state and protected by a series of privileges regulated by law.

DeJong (1991), Green (1992), Zwarenstein and Price (1990), Smith (1989) documented that there exist a remarkable heterogeneity in the public and private sector in terms of their institutional or administrative set-up. Certainly within the private sector, the range is very wide, although the advantages of private providers are sometimes cited as if they are a homogenous group. Edouard et al sum up the advantages of the private sector in reproductive health by stating that non-governmental organisations, including the private sector, have proven their capability to complement the efforts of governments and to implement innovative approaches (Eduoard et al 2000). Flexibility, innovativeness and ability to reach out to poor and marginalised groups is often associated with the private category of providers. Critics of this position, however cite the niche marketing nature of private care as a development which is not necessarily in tune with public health priorities. Technology assisted delivery care is often criticised in these terms (Ferrinho et al 2001). The role of PFP providers in promoting birth by caesarian section in Brazil is well known (Barros et al 1991), and similar trends are happening in other countries including Mexico and Thailand (Bobadilla and Walker 1991, Hanvoravongchai et al 2000). In 1998 the International Federation of Gynaecology and Obstetrics found it necessary to issue technical guidelines regarding C-section delivery for non-medical reasons (FIGO 2000).

Ferrinho et al describe the possible rationale for increasingly privatised maternity care, whether PFP or PNFP, as providing a complementary or substitutional service to State run care. They go on to describe the range of reasons for promoting such strategies as being justified because private provision is increasingly used, is more efficient and client friendly and ensures a more comprehensive and equitable distribution of the uptake of services. However, they can find very little evidence to show that blanket

recommendations can be made in support of private services as an appropriate support to public health. Given that private services often occupy a competitive, poaching or niche position in the service market and that overmedicalisation is a problem where civil society and regulation are weak, they posit that the rise in private delivery care should be greeted with caution (Ferrinho et al, 2001).

3. Factors determining delivery care: relevant literature

Kunst and Houweling (2001) provide compelling evidence that poverty plays an important part in accessing maternal care by presenting poor-rich differentials in skilled attendance at delivery for a large range of countries. Their analysis shows huge differences between the highest and lowest wealth quintiles for many countries as measured by asset indices. Considering the variation in delivery care between countries, De Brouwere and Lerberghe (2001) reported that only a few countries have virtually no inequalities in delivery care, whereas in many other countries there is the extreme situation of a 100% of women with no attendant at delivery for those of low socio-economic status. A World Bank report by Gwatkin et al (2000) indicated that of 44 countries surveyed, 26 countries have a disparity between the richest and the poorest quintile in delivery attendance of above 50% and 3 countries with disparities above 90%. The same report also shows that disparities in utilisation of delivery care exists between rich and poor individuals as well as rich and poor countries. Other studies have shown that differentials in birth attendant by wealth status are more marked than in child health service uptake or antenatal care (Gwatkin, 2000). However, these analyses do not show how this disparity is changing over time, and the use of asset indices tends to measure urban and rural poverty using the same assets, when household ownership of assets in rural areas are not easily comparable with those in urban areas. In addition, the emphasis on birth attendants gives no insight into institutional delivery choices, and the lack of reference to private services omits the aspect of maternal service use which is most linked to affordability and cost.

Brugha and Pritze-Aliassime (2003) present poor-rich ratios in doctor's attending births as well as for private care use for a range of countries and show that there are large disparities. Looking at these differences over time would give an idea of the scale of the rise in private care in countries, and the examination of differentials would be further clarified by identifying the effect of other factors such as age and education on service use giving an indication of the net effect of wealth on uptake. The conclusion of Brugha and Pritze-Aliassime's study was that private provision has an important role to play, especially in terms of private midwifery. However, the dominant trend in public/private mix for maternity care is more likely to be in the provision of private hospital care rather than private midwifery.

According to the most recent World Development Report, richer groups generally resort more to the private sector worldwide, but they also use public facilities more (World Bank 2004). Many public facilities charge user fees, introducing a market-like transaction in the delivery of public services – and poor people spend substantial sums to use them. Informal payments often boost the costs of 'free' maternity care as, for example, in Bangladesh, where a public sector normal delivery is estimated to cost \$31, a quarter of a households average monthly income, and \$118 for a C section. Also, the portion of private care accessed by poor people is known to be less in maternity care than in other realms of health care (see for instance the comparison of utilisation by the poorest quintiles for delivery care as compared to acute respiratory infection presented in the 2004 World Development report). This is not surprising given the high cost of childbirth interventions, but it may be changing, given the rise in private deliveries.

The choice of public or private delivery care is assumed to be based on a range of factors including distance, price of medical care, opening hours, availability of health personnel and their speciality, availability of drugs, inpatient care, number of beds and availability of medical equipments among others (Akin and Hutchinson, 1999). Brugha and Zwi (1998) documented that in many countries, including developing countries, patients prefer to use private (for profit) providers of health care despite the higher user fees than the official charges in the public sector. The reason for this pattern of utilisation has been attributed to a number of factors, which were not very different from that reported by Akin and Hutchinson (1999) - ease of access, shorter waiting times, acceptability and longer or more flexible

opening hours, availability of drugs, good patient/health personnel relationship, and greater confidentiality.

Although clearly socio-economic status constrains access to delivery care in developing countries, the mechanism by which socio-economic status hinders options in maternal care and how this may be mediated by other factors is not known. For example, Hanson and Berman (1998) indicated that existing conceptual frameworks do not clearly depict the evolution of the relative share of the private and public sector as income increases. According to Hanson and Berman (1998) this is because the relationship between the size of the public and the private sector health care delivery is likely to depend on a host of other factors such as relative quality, institutional features and payment systems.

Comparing studies from maternal mortality and morbidity and delivery care systems in developing countries, it was identified that some of the factors that influence the level of maternal mortality and morbidity and choice of health care systems in developing countries also influence choice of delivery care. Like in maternal mortality and morbidity and choice of health care, these factors do not operate independently but operate collectively to influence choice of delivery care. Confirming this finding, were publications by the WHO (1998) and Magadi et al (2002) which reported that obstacles which result in the low utilisation of delivery services are caused by a range of factors which include distance from health services; costs, including user fees as well as the cost of transport, quality of care, drug, supplies and attitudes of health personnel, multiple demands on women's time; and women's lack of autonomy in decision-making.

Inequalities in access to delivery care between the poor and rich have become a global concern to all health stakeholders. Economic obstacles to the choice of health services can be grouped into two main categories - fees that users must pay to health providers and the travel cost and the opportunity cost of the patient's time and that of a care giver where necessary. Studies such as Elo (1992), Kuate Defo (1997) and Raghupathy (1996) have documented evidence on the high levels of differentials in utilisation of delivery care services by socio-economic status. Kutzin (1993) reported that poorer women tend to have a greater burden of ill health, yet they use health services to a lesser extent than their wealthier counterparts due to their inability to afford user fees. The introduction of user fees in 1987 as a means of ensuring accessible and affordable health services and also improving quality of health services (Madise and Johnson, 2001) further created a problematic barrier to poor pregnant women who need delivery in health facilities (Kutzin, 1993). A report on the analysis of household level data from Cote d'Ivoire and Peru by Gertler and Van der Gaag (1990) revealed that user fees were more of a deterrent to women from poorer socio-economic backgrounds seeking delivery care than to their richer counterparts. These women may delay seeking treatment until serious a complication develops, with possible life threatening consequences.

The deterrent effects of the monetary expense of travel to seek delivery care and the opportunity cost of patients and caregivers time, where necessary, have significant impact on utilisation of delivery care services. A study in Cameroon by Litvack and Bodart (1992) cited by Kutzin (1993) revealed that transport cost and the opportunity cost of patients and caregiver(s), where necessary, had a significant negative impact on utilisation of delivery care services. In Cote d'Ivoire, a study by Gertler and van de Gaag (1990) found that, travel time, which reflects the opportunity cost of an individual's time, was of a more deterrent to utilisation of delivery services to poor persons.

Autonomy of women in decision-making, norms and beliefs that have been identified to influence levels of maternal mortality in developing countries, also affect the choice of delivery care. For example, Ascadi and Johnson-Ascadi (1993) argued that in some African, Latin American and South Asian cultures, pain and illness are considered to be a normal part of women's life, therefore it is deemed unnecessary to seek medical care, including delivery care. According to Kutzin (1993) the inability of women in some developing countries to make decisions in relation to choice of medical care severely affects their choice of delivery care. A conflict between biomedical and traditionally perceived causes of health conditions also limits women's access to delivery care. In some parts of Africa it is perceived that a

prolonged labour is a punishment for past infidelity and an unassisted delivery a sign of courage, therefore it is discouraged to seek of delivery care (Thaddeus and Maine, 1990). Wall (1998) also reported that in Hausa societies shame plays an important role particularly in the first birth, and newly pregnant girls are expected to exhibit modest behaviour by remaining quiet in their vital condition and not talk at all about their pregnancy, the social pressure may create a major barrier to seeking antenatal care or delivering in hospital.

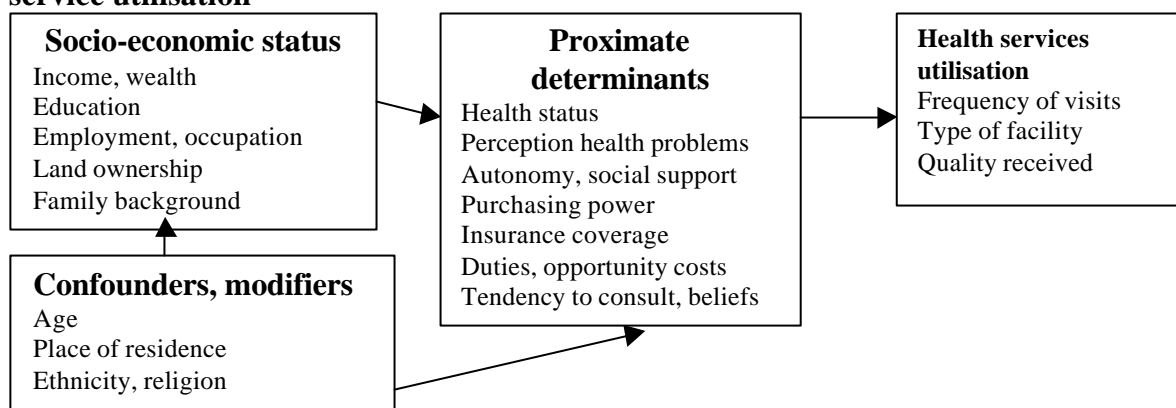
Despite the enactment of the Declaration of Alma-Ata in 1978 in Alma-Ata, USSR, to promote “health for all” through primary health care (Madise and Johnson, 2001), health care resources are often concentrated in large urban cities (Kutzin, 1993), making them inaccessible to a high proportion of the population. Madise and Johnson (2001) citing Boulle (1997) and Chigunta (1998) revealed that 56% of rural south Africans live more than five kilometres from a health facility as compared to 13% of their urban counterparts and in Zambia 52% of the rural population live outside the perimeter of five kilometres to the nearest health centre. Madise and Johnson (2001) noted that the distance barrier to health care services hinder women’s choice for delivery care resulting in a high percentage of non-institutional delivery care and inaccessible emergency obstetric care.

The quality of care provided by health services has also been identified to affect women’s health and influence their acceptability and uptake of such services. Hulton et al (2000) citing Lyun (1983), Stock (1983) and Mwabu (1986) noted that the quality of care can affects women’s decision to seek care. Most often than not, this may result in delays in decision to seek care, irrespective of the availability of services. For example, Hulton et al (2000) indicated that a woman with a complication is likely to delay or avoid accessing care from a health facility where she has experienced a good but disrespectful treatment in a previous normal birth in favour of staying at home a little longer or travelling to a facility where it is perceived, thought not necessarily true that care is of higher standard.

A large variation has been observed in terms of inequalities in delivery care. In countries where literacy rates are high, the disparities in delivery care in relation to educational status is relatively small, while for countries where literacy rates are low, there exists a high disparity in delivery care. Recent evidence from the 2000 Malawi Demographic and Health Survey and 1999 Tanzania Reproductive Demographic and Health Survey reveals that the number of institutional deliveries increases with levels of education, with 87.5% and 78.5% highly educated women (secondary+) in Malawi and Tanzania respectively, resorting to institutional deliveries. From the Malawi DHS, of the 87.5% who seek institutional delivery care, public delivery care constituted 68.7% and 31.3 private delivery care.

A summary of the influences on delivery care highlighted in various studies as described above could be brought together in a conceptual framework. Such a framework has been suggested by De Brouwere and Van Lerberghe and is reproduced below in Figure 1.

Figure 1: A conceptual framework for analysing socio-economic inequalities in health service utilisation



Source: De Brouwere and Lerberghe (2001)

4. Data and Methods

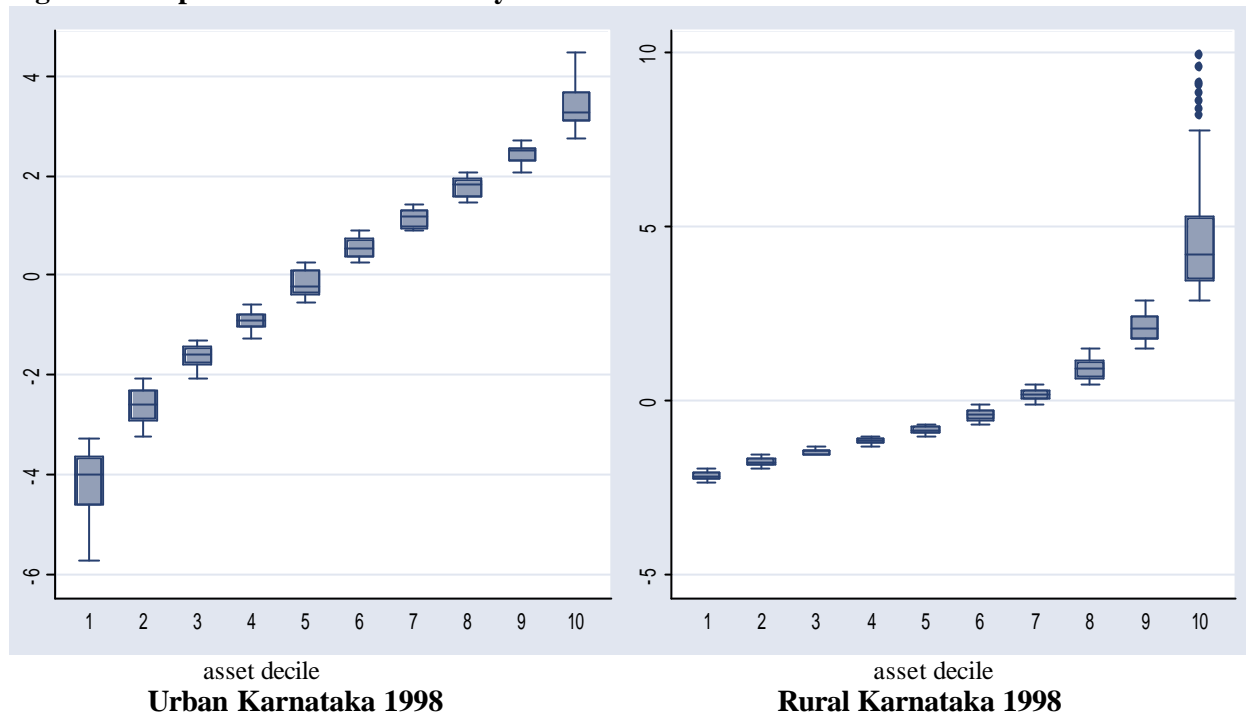
The datasets for this study come from the 1993 and 1998 Indian National Family Health Surveys (NFHS-1 and NFHS-2) and the three consecutive DHS surveys from Egypt conducted in 1992, 1995 and 2000. These are nationally representative surveys conducted to collect information on demographic and health indicators. DHS and NFHS surveys provide information on family planning, maternal and child health, child survival, HIV/AIDS/STIs and reproductive health, are funded by USAID and implemented by Macro International Inc. The surveys use multistage sampling designs which are based on sampled Primary Sampling Units, so that small groups of the sampled women come from the same small area and whose responses are likely to be correlated. Urban areas (and other domains) in the surveys are over-sampled to achieve precision on estimates from subgroups and point estimates are weighted to take account of this. When selecting the data from the surveys that relates to delivery care, the section of the questionnaire is selected which refers to children born with in the last three or five years preceding each survey. Thus each surveyed women who has given birth can contribute more than one delivery to the dataset. This could introduce additional correlational structure to the dataset as a series of deliveries to one woman can follow common patterns. In the analysis presented below, we have used only the most recent birth of women to examine C section and private delivery trends and determinants. Although there is little risk of recall error for place of delivery and C-section, this also minimises the effects of assigning wealth status to women based on assets owned at the time of the survey and linking these with deliveries that may have taken place earlier in the woman's life.

Turning to our treatment of measuring wealth status, the DHS and NFHS survey instruments do not include questions on income and expenditure on which to base poverty indices. However, they do include a range of questions on the ownership of assets such as bicycle, refrigerator or television, as well as dwelling characteristics such as type of roof and flooring material and type of toilet, and access to basic services, including clean water and electricity. Although the primary purpose of these questions was not to construct indicators of socio-economic status, they have increasingly been used for such purposes, and our analysis follows a variant of the now customary approach to combining these variables to arrive at an asset index for each woman which is a proxy for her wealth status. Principal components is the usual method used to determine weightings to apply to asset variables in order to arrive at an appropriate index value for each woman. This approach was pioneered by Filmer and Pritchett (1998) who contend that the resulting asset index has 'reasonable coherence' with current consumption expenditures and worked as well as or better than traditional expenditure-based measures in a range of analyses (Filmer and Pritchett 1999). They also note that their asset index is better thought of as acting as a proxy for long run household wealth rather than current per capita consumption (Falkingham and Namazie 2002). The asset index arrived at through this approach is commonly ranked, then women are divided into quintiles with the top fifth of asset scores representing the upper quintile of wealth, and the lower fifth the lowest quintile – or poorest group.

There are, however, problems with this approach in generalising indicators across over urban and rural areas. This is a particularly important concern when linking poverty to health service and specifically hospital utilisation. As most hospitals are located in urban areas, there is a danger that we over-state the link between rural dwellers (almost all of which may fall in the lowest quintiles) and low use of facility births (almost none of which take place in rural areas). Although the disparity between rural and urban areas cannot be denied, the agglomeration of this analysis means that we omit the nuances of the relationship which may have different characteristics in urban and rural areas. Furthermore, ownership of assets and housing characteristics are not equivalent across urban and rural areas. For example urban slum dwellers often live in brick and concrete houses but in far worse conditions than rural families in thatched or tin houses (Kausar et al 1999). For these reasons, our analysis of poverty constrained access to private care is conducted separately for urban and rural areas. The resulting separate indices for urban and rural areas showed interesting characteristics as shown in Figure 2 below which is based on data from Karnataka (other states and Egyptian data show similar traits). The Figure groups the asset indices in deciles rather than the conventional quintiles, and shows that the rural wealthy only really distinguish themselves from others in the highest decile, and that this group contains a wide range of asset rich and

very rich households. Urban wealth is much more of a smooth ladder with regular rungs from poor to rich, with the poorest decile containing a herogenous group of very poor and extremely asset poor households.

Figure 2 Boxplots of asset indicators by wealth decile in urban and rural Karnataka



Our approach to analysing the data for private care and C-sections in the selected settings was to approach the first question for analysis; the extent of private childbirth care utilisation in this range of settings and the trends over time, using point estimates of proportions for each data set in turn. These are presented in the next section. To answer the more analytical questions on the effect of wealth status on delivery location, and the effect of other factors, we used regression analysis which is presented in the subsequent section. This approach also helped us to tackle the issue of possible increases in equitability over time.

This study was aimed at analyzing public/private locations of delivery care. The outcome variable, birth location, can be seen as a dichotomous response variable if we consider only institutional births. The categorization of the dependent variable (place of delivery) was based on the categorization adopted by the 1993 and 1998 NFHS. Institutional deliveries comprised deliveries in government hospitals, health centers, health posts and other government health facilities as well as deliveries in private hospitals and clinics, maternity homes and other private health institutions. Non-institutional deliveries comprised of deliveries in respondents homes, TBAs homes and other home deliveries. Public sector institutional deliveries constituted deliveries in government hospitals, health centers, health posts and other government health facilities, while private sector deliveries comprised deliveries in private hospitals and clinics, maternity homes and other private health facilities. All data was included in the analysis, combining survey data from successive surveys in the same model. Urban and rural data were, however, separated, and also separate models run for each state or country, with a total of 12 final models arrived at: one for each of the six countries/states, for urban and rural data separately.

The statistical technique adopted for analysis was multilevel logistic regression. The regression approach was used to identify variables that are significant predictors of delivery care location and their extent of influence. Due to the hierarchical structure of the dataset, multilevel logistic regression was used to account for the variability associated with nesting of data within Primary Sampling Units. Snijders and Bosker (1999), Madise et al (2000) and Pferffermann et al (1998), indicate that ignoring the hierarchical structure (clustering effect) of data may lead to biased inferences about model parameter estimates and

their standard errors. To account for the hierarchical structure imposed by the sampling technique, the multilevel approach allows for the correlation of outcomes at each level to be modelled, understand where and how effects are occurring, avoids exaggerating the sample size and ensures that standard errors associated with estimated parameters in the model are correctly estimated (Goldstein, 1995, Snijders and Bosker, 1999, Rasbash, 2000 and Griffiths et al, 2004).

The multilevel logistic regression uses an extension of the standard logistic regression model. The response variable Y_{ijk} has a binary outcome: 1 indicates private sector delivery care for woman i nested within PSU j , 0 indicates public sector delivery care. Therefore,

$$y_{ijk} \sim \text{Binomial}(P_{ij}, 1),$$

$$\text{var}(y_{ij}|P_{ij}) = P_{ij}(1 - P_{ij})$$

and

$$g(P_{ij}) = \ln\left(\frac{P_{ij}}{1 - P_{ij}}\right) = \mathbf{b}_0 + \mathbf{b}_1 X_{1ij} + \dots + \mathbf{b}_p X_{pij} + u_{0j}$$

where \mathbf{b}_0 = a constant

$\mathbf{b}_1 - \mathbf{b}_p$ = p explanatory variables

u_{0j} = the variation due to woman i of PSU j , and,

where $u_{0jk} \sim N(0, \mathbf{s}_u^2)$

Simple and multiple linear models were initially fitted to determine variables that predict delivery care choice. Firstly, a null model containing the random intercept for PSU but not containing any explanatory variable was fitted to determine the basic partitioning of the variability in the data (Snijders and Bosker, 1999). From the literature review, it was identified that socio-economic status of women have a parallel influence on most of the determinants of delivery choice such as education, antenatal care seeking, parity, religious and cultural beliefs as well as health care seeking behaviours and attitudes. Thus an initial model (uncontrolled) containing only standard of living index and the random intercept was fitted to determine the influence of socio-economic status on women's choice of delivery care. Other maternal and household variables were then included in the model, checking significance each time a new variable was added to determine how other maternal characteristics influence delivery choices. The models were fitted using the marginal quasi likelihood (MQL) estimation method. Although Rasbash et al (2000) argued the second order penalised quasiliikelihood (PQL) estimates are the least biased; it was not adopted for this analysis because of its failure to converge.

The significance of variables were assessed using the change in deviance approach (c^2 test) given by the equation below:

$$c^2 = -2(\ln L_i - \ln L_f)$$

where $\ln L_i$ is the initial or iteration 0 loglikelihood and $\ln L_f$ is the final iteration's loglikelihood (Hamilton, 1998). Comparing the resulting test statistic to a c^2 distribution with degrees of freedom equal to the difference in complexity (number of variables dropped) leads to either accepting or rejecting the null hypothesis that the final iteration model is not significant, that is, all the coefficients in the model, except the constant are zero (Hamilton, 1998). The c^2 test was preferred to the asymptotic z (standard normal) test, because of its general validity (Hamilton, 1998). Rasbash et al (2000) argued that it is inappropriate to compare models with different number of missing cases. Therefore based on the argument of Rasbash et al (2000), all variables with missing cases less than one percent of the sample size were deleted from the analysis, while, those with missing cases greater or equal to one percent were categorised. Estimates for missing categories were not reported. The statistical software packages used for the analysis were SPSS version 10.1 for data preparation and preliminary data analysis, STATA

version 7.0 for preliminary data analysis and standard logistic regression and MLWin version 2.1 for the multilevel logistic regression modelling.

5. Private delivery and C section -Levels and trends

On the whole in these states, institutional delivery has gone up by around 10 percentage points from the early to the late 1990s. The proportion of hospital births that have been in private institutions has also risen by about the same amount, with private births now representing more than half of institutional births. These are reasonably large changes overall, but in some settings the changes have been dramatic as can be seen from the point estimates shown in Table 1. For example the percentage of private facility births in urban Egypt has doubled over the period and risen substantially in urban Punjab. Urban Kerala, Maharashtra and Madhya Pradesh have risen only a little but there are some substantial changes in the rural areas of all of these Indian states and Egypt too. Starting from a low base in rural areas (much of which might represent mission hospital and PNFP providers), doubling and tripling of rates is not uncommon, except in Kerala where private deliveries were already established in rural areas. An analysis of the PFP and PNFP divide would be instructive here although the data are not available. C-section rates have increased even more dramatically, many of which are now higher than the 15% estimated as the upper limit necessary for medical indications.

Table 1 Percentage of births by location and Caesarean section over time in Egypt and selected states of India

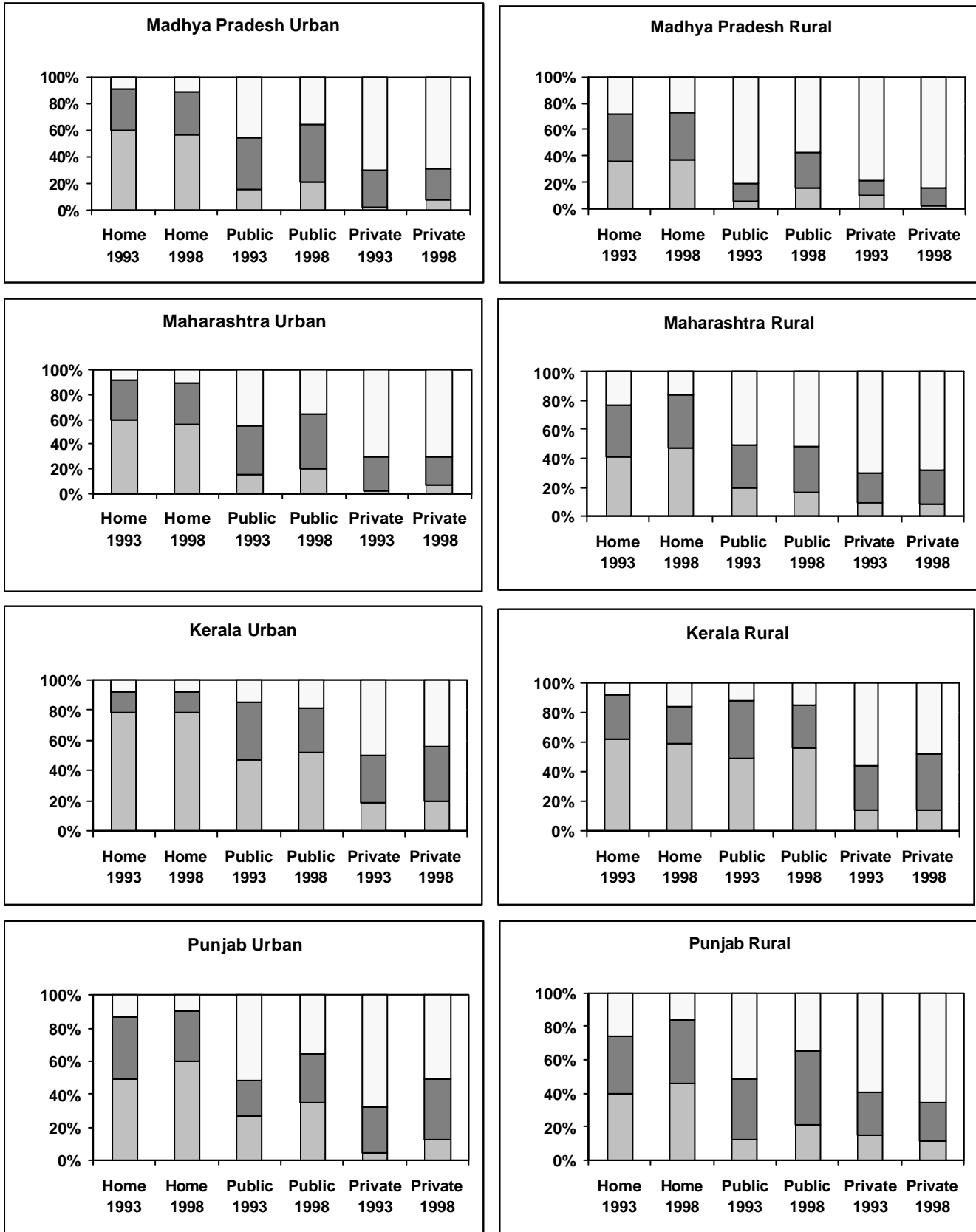
		Home birth		Public facility		Private facility		C-section	
		1993	1998	1993	1998	1993	1998	1993	1998
Urban	Karnataka	30.8	21.1	35.9	38.6	33.2	40.2	7.9	23.2
	Kerala	4.3	0.0	42.3	42.1	53.3	57.3	5.9	37.9
	Madhya Pradesh	49.0	50.1	35.6	30.4	15.4	18.7	0.0	14.3
	Maharashtra	23.6	18.6	33.8	36.1	42.6	44.7	3.1	17.1
	Punjab	62.3	44.0	8.5	9.3	29.2	46.8	0.8	14.2
	Egypt*	52.0	30.0	30.4	33.4	17.5	36.4	9.5	17.5
Rural	Karnataka	75.1	60.7	15.0	22.9	9.8	15.6	2.0	15.3
	Kerala	13.5	7.3	38.5	35.0	48.0	56.5	4.6	29.9
	Madhya Pradesh	92.6	86.5	6.3	8.3	1.0	3.8	0.0	7.4
	Maharashtra	74.7	64.7	14.0	16.8	11.3	17.7	0.8	10.3
	Punjab	77.4	68.3	10.4	7.1	12.3	24.5	0.5	14.3
	Egypt*	85.3	65.3	8.9	15.2	5.7	19.4	3.2	6.9

* For Egypt dates are 1992 and 2000

Based on most recent birth of all surveyed women with a birth <3 years before the survey: NFHS and DHS data

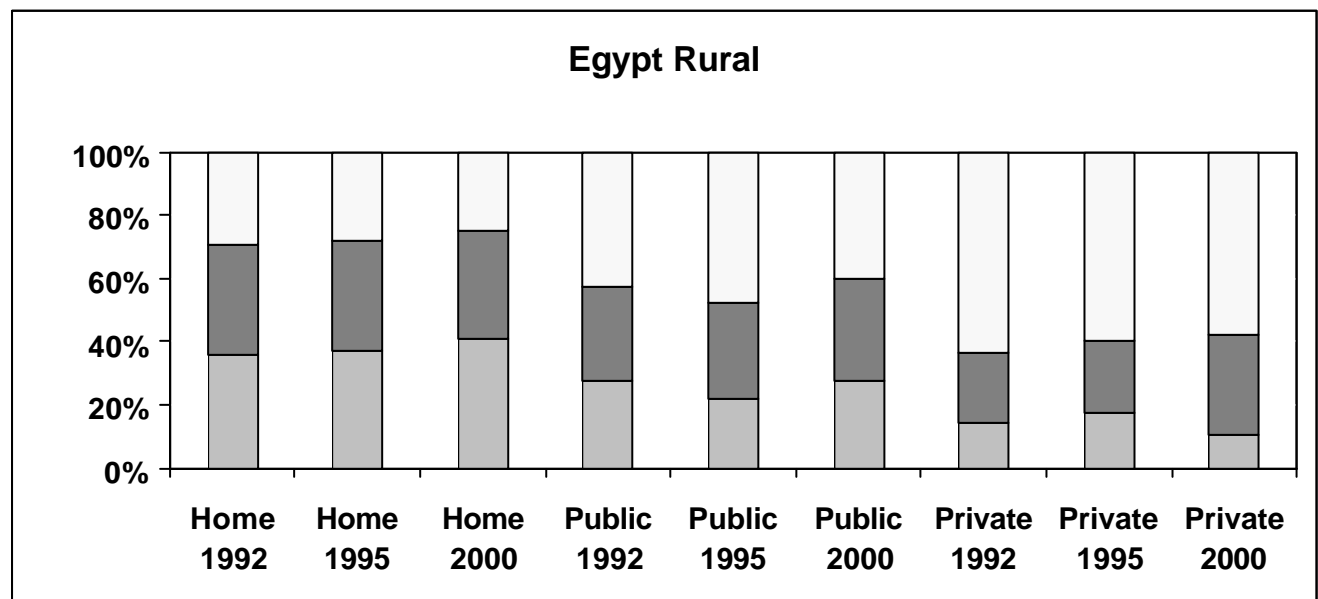
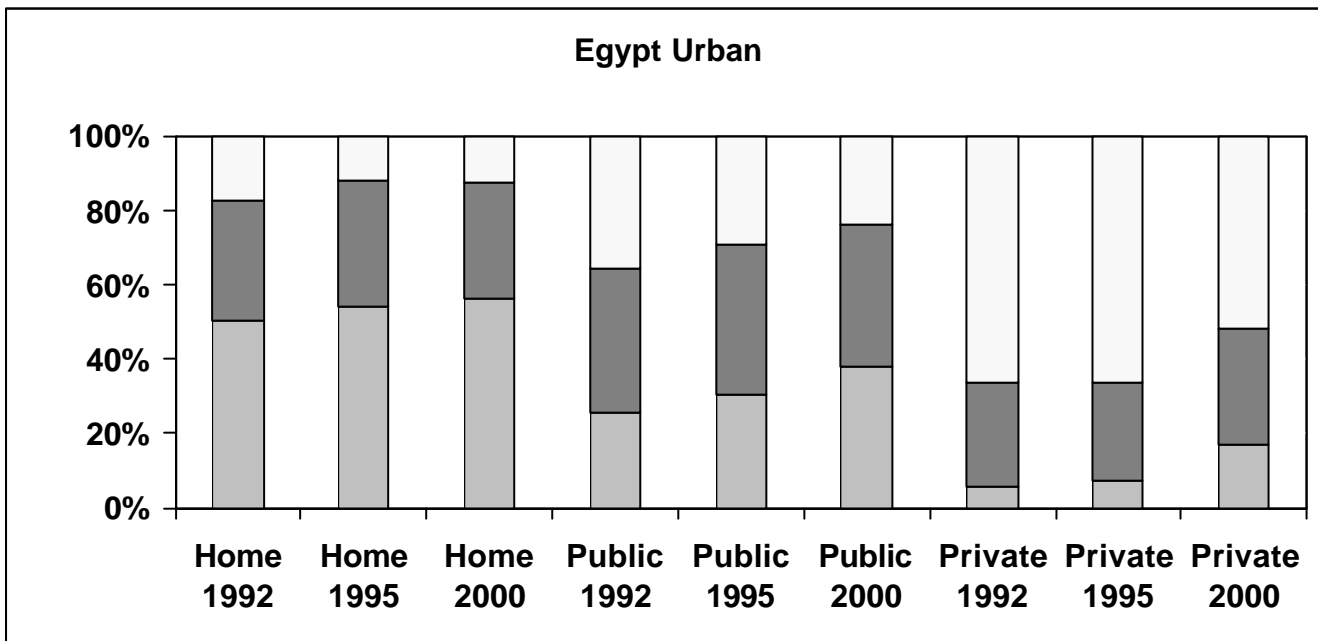
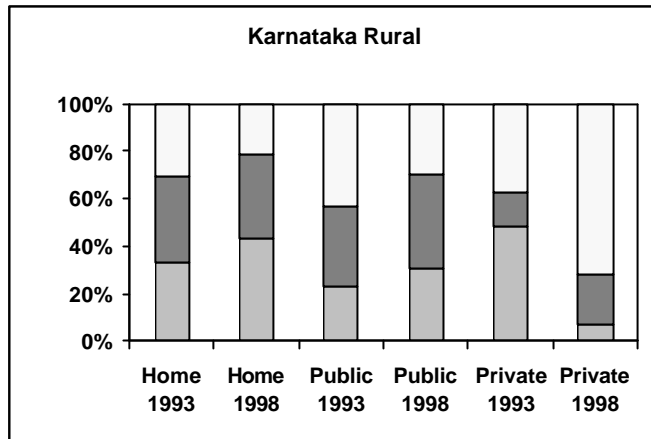
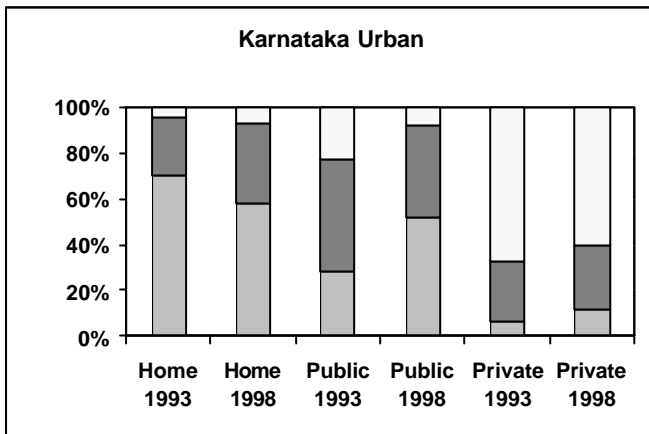
From Figure 3 overleaf, which shows the characteristics of home, public and private births by wealth quintile as measured by the asset index, it can be seen that there is little change over time. Small variations over time in the percentage of private births which have been accessed from women in the lowest wealth quintile are seen in Karnataka, Kerala, Madhya Pradesh, Punjab and Egypt, but these are not large enough to be the result of significant changes. Small changes such as these can be attributable to the lumpy distribution of the asset index, for which many households can attain the same score, and the allocation into quintiles is compromised resulting in more (or less) than 20% being included in each quintile group. For Karnataka the changes are more marked, with fewer lower quintile women with home births in urban areas during the later part of the 1990s compared with the earlier part. Lower quintile women were, however, becoming more prominent in public institution over that time in urban Karnataka, with poor women's access to private facilities remaining fairly static. In rural areas of Karnataka, however, poor women's representation among private births has dramatically reduced over time. There is a strong representation of mission hospitals in rural Maharashtra, which might be part of the explanation for this, but to what extent this is changing over time is an interesting issue (Matthews et al, 2001).

Figure 3 Delivery location by wealth quintile in India and Egypt over time



Highest wealth quintile
 Inner 60 percent
 Lowest wealth quintile

Figure 3 continued Delivery location by wealth quintile in India and Egypt over time



Highest wealth quintile
 Inner 60 percent
 Lowest wealth quintile

Looked at from the perspective of rich-poor ratios in these settings, the overall finding is that the ratio has become more equitable in urban areas, both for private delivery and C-section, but in rural areas there may be a worsening equity situation (see Table 2).

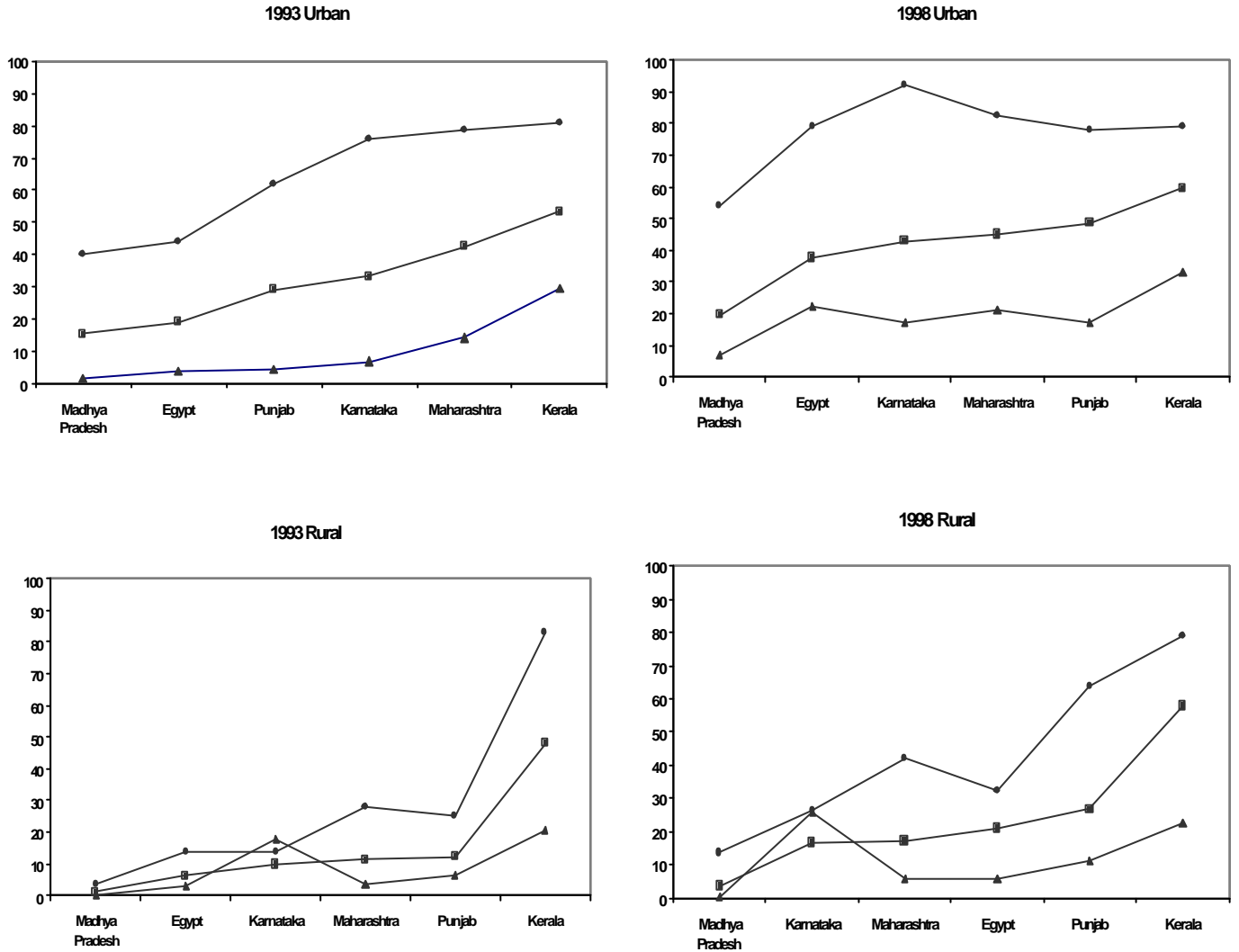
Table 2 Rich/poor ratios over time for private facility births and C-sections

		Private facility		C-section	
		1993	1998	1993	1998
Urban	Karnataka	11.2	5.3	15.3	3.6
	Kerala	2.7	2.4	1.8	1.3
	Madhya Pradesh	30.8	8.1	0.0	4.8
	Maharashtra	5.6	3.9	5.4	2.8
	Punjab	13.7	4.5	-	2.2
	Egypt*	11.1	3.6	2.2	2.0
	Average	12.5	4.6	4.1	2.8
Rural	Karnataka	0.8	1.0	1.1	1.8
	Kerala	4.0	3.5	2.8	1.7
	Madhya Pradesh	8.5	27.2	0.0	1.3
	Maharashtra	7.8	7.4	1.0	1.8
	Punjab	3.9	5.7	1.0	2.9
	Egypt*	4.3	5.5	3.0	4.1
	Average	4.9	8.4	1.5	2.3

* For Egypt dates are 1992 and 2000

These inequities are shown graphically in Figures 4 and 5, which show upper and lower quintile estimates of delivery location and C-section respectively. They show the wide inequities persisting, especially in urban areas, and also a few anomalies appearing. For instance in urban Kerala, where C-sections are soaring above 40% in recent years, women from both the lowest and the highest quintiles have lower C-section rates than women from the middle range asset index group. A number of speculative explanations could be offered for this, but it is an interesting trend. In rural Karnataka, lower quintile women have higher rates of private care use than for the population as a whole (and in 1993 it was higher than for the upper quintile women). This is surely a result of PNFP hospital activity in the region.

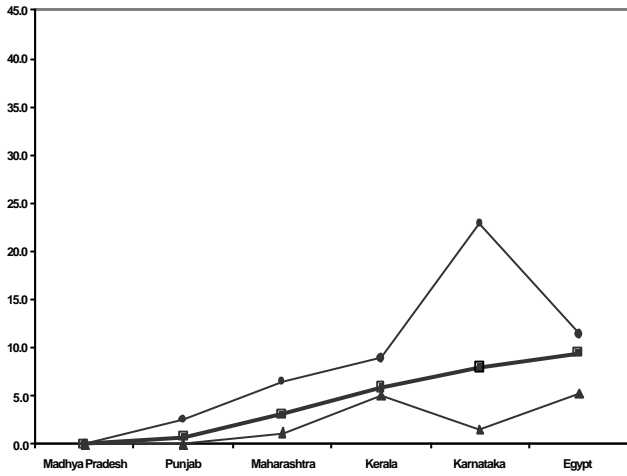
Figure 4 Proportion of women with childbirth at private facilities by wealth quintile



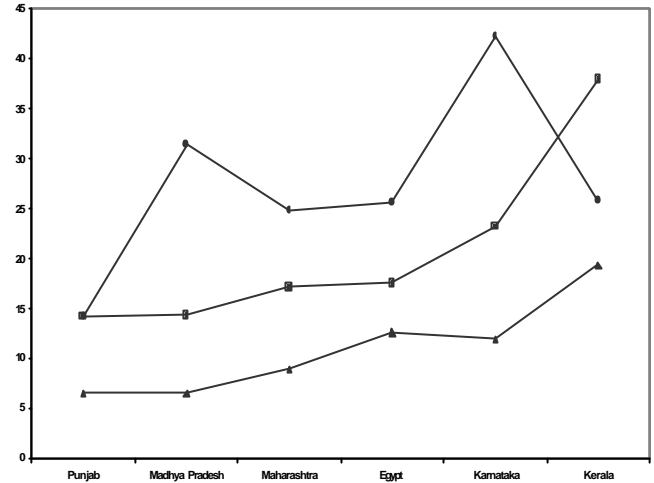
▲ lowest quintile ■ total population ● highest quintile

Figure 5 C-section rates in the poorest quintile, the richest quintile and the total population

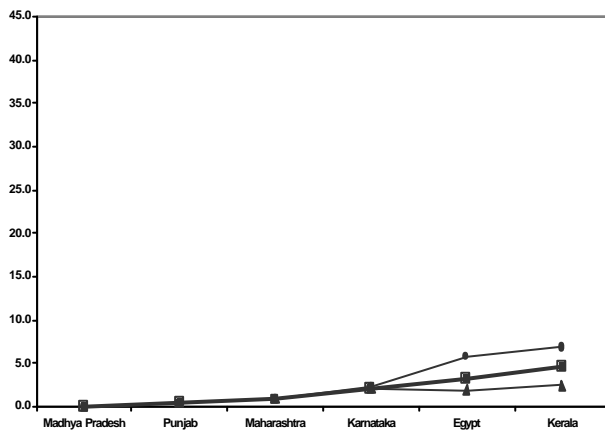
1993 Urban



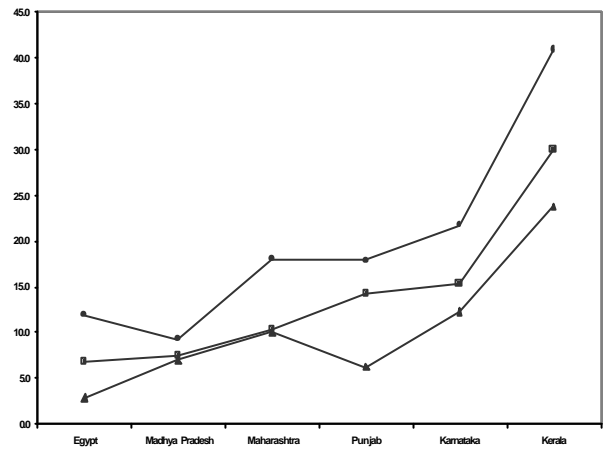
1998 Urban



1993 Rural



1998 Rural



▲ lowest quintile ■ total population ● highest quintile

6. Determinants of private deliveries

Combining successive survey data in one model allowed the fitting of survey date as a covariate. Thus the results of the regression analysis showed the net effect of wealth on private delivery probability over time, controlling for effects such as education and parity. Using only institutional births is justified as we are examining the effect of wealth on the choice of a private provider for institutional birth, given that an institutional birth is either necessary or desired. Fitting interactions in the model is also instructive, especially when testing the significance of wealth quintile with survey date; although the lack of significance of any such interaction showed that such differences over time are not important. Wealth quintiles were calculated separately for the successive surveys, then after quintiles had been allocated to each woman, the data were used together in the model and the wealth quintiles used as a covariate in the models. Calculating quintiles over time, and also using the same asset index cut-off points for each successive survey were also tried, but gave very similar results.

The results of the modelling process are summarised in Table 3 below: showing the controlled and uncontrolled effect of wealth quintiles on private delivery from each of the 12 models. The results show a strong and enduring effect of wealth, even after controlling for other factors. (A list of the factors that were included in the models appears in Annex 1, and a tabular summary of significant correlates from each model is included in Annex 2). Effects are particularly strong in rural areas of Kerala and urban areas of Madhya Pradesh, but not significant in rural Madhya Pradesh or Punjab.

Table 3
Effect of wealth on private delivery in India and Egypt controlling for other covariates

Survey	Odds of private delivery for highest quintile women compared with lowest quintile women with institutional births			
	Urban		Rural	
	Uncontrolled odds ratio	Odds ratio controlled for other socio-demographic factors	Uncontrolled odds ratio	Odds ratio controlled for other socio-demographic factors
Karnataka	20.3 **	13.1 **	4.0 **	2.4 **
Kerala	8.6 **	6.2 **	18.0 **	13.0 **
Madhya Pradesh	13.2 **	13.2 **	4.0 *	3.0
Maharashtra	12.6 **	10.4 **	3.1 **	2.2 *
Punjab	6.4 **	6.2 **	1.6	0.7
Egypt	7.9 **	5.2 **	2.6 **	1.8 **

The effect of survey date on the regression results showed, unsurprisingly, a rise in odds of private delivery over the 1990s. As can be seen in Table 4 below, this is a significant effect in Madhya Pradesh, Punjab and Egypt.

Table 4
Effect of survey timing on private delivery in India and Egypt controlling for other covariates

Survey	Odds of private delivery for later survey compared earlier survey for women with institutional births	
	Urban	Rural
Karnataka	1.67 *	1.35
Kerala	1.24	1.18
Madhya Pradesh	3.09 **	5.28 **
Maharashtra	0.78	1.54
Punjab	2.14	3.29 **
Egypt	2.38 **	2.22 **

The finding that there are no interactions shows that; although use of private delivery care is increasing, and therefore also care accessed by the poor is increasing, this is only an effect of the growing dominance of the private sector. In other words the equitability of private care provision remains the same over time (and it remains very inequitable) with very significant bias in favour of richer people.

The fitting of a multi-level regression model allows the fitting of a parameter showing the variability of private deliveries across primary sampling units. This is important in the case of maternity care, as women surveyed in the same locality will naturally return a private delivery response where there is a local private hospital. Unsurprisingly, the random intercept term in all of these models were significant, showing that the choice of private delivery care varies substantially with locality. The significance of other correlates of delivery care is correspondingly affected by the dominance of this effect.

7. Discussion

Women are increasingly delivering in an institution both in India and in Egypt. As the rise in institutional delivery is being provided almost exclusively by the private sector, this could be seen as an improvement in the accessibility of maternal health services without extra governmental expenditure in these settings. However, the fact that there are no interactions in the models shows that – although use of private delivery care is increasing, and also care accessed by the poor is increasing, this is only an effect of the growing dominance of the private sector. In other words the equitability of private care provision remains the same over time – and it remains very inequitable – with very significant bias in favour of richer people. This finding is of some concern when seen alongside a burgeoning overmedicalisation of delivery as evidenced by rising C-section rates. We know that there is a serious problem of quality regulation in the private sector and that there is a very large gulf between good quality and poor quality private provision. The quality of private services accessed by better off populations is likely to be considerably higher than private care accessed by poorer people. A lack of change in equitability of access alongside a large increase in use and overmedicalisation is likely to be opening up a growing inequity in quality between rich and poor private clients. The two tier system will manifest in term of two tiers of private providers, largely unregulated either by governments or civil societies.

The rise in private provision is a challenge. The fact that private care is increasing does not present a case that it is complementing or substituting the provision of maternal health care by governmental services in a way that is commensurate with public health interests. To know whether this is really true would require more indepth research including an analysis of the whole range of private providers and their characteristics. It could be argued that private care is allowing more access to delivery care for an increased proportion of the population and thus promoting equity – but we don't know about quality of

care. Does this proliferation of private care serve the public interest and allow redirection of scarce resources? Given the link between catastrophic health spending and cycles of poverty in families, this may not be a rational redirection of scarce resources for society as a whole. Given also the large out of pocket spending needed at government institutions it might be fair to say that private care is competing directly with government services in a way that does not necessarily promote public health.

Given the weak lobby for accountability and regulation that goes with most reproductive health care for women, a rise in privately provided delivery care should be treated with caution as well as an opportunity.

7. References

Akin, J.S. and P. Hutchinson. 1999. *Health-Care facility Choice and the Phenomenon of Bypassing*. Health and Policy Planning; 14(2): 135-151. Oxford University Press.

Ascadi, G. and G. Johnson-Ascadi. 1993. *Socio-Economic, Cultural and Legal factors Affecting Girls' and Women's Health and their Access to and Utilization of Health and Nutrition Services in Developing Countries*. Background Paper for the World Bank Best Practices Paper on Women's Health and Nutrition. Population and, Health and Nutrition Department, Washington, DC.

Barros, F.C., Vaughan, J.P., Victora, C.G. and Huttly, S.R. (1991) Epidemic of caesarian sections in Brazil, *Lancet* 338 (8760) pp 167-169

Bobadilla, J.L., and Walker, G. 1991 Early neonatal mortality and caesarian delivery in Mexico City, *Am J of Obstetrics and Gynaecology*, 164 (1) pp 22-28

Brugha, R and A. Zwi. .1998. *Improving the Quality of Private Sector Delivery of Public Health Services: Challenges and Strategies*. Health Policy and Planning, 13(2): 107-120. Oxford University Press.

Brugha, R. and Pritze-Aliassime 2003 Promoting safe motherhood through the private sector in low and middle income countries, *Bulletin of the World Health Organisation*, 81 (8), pp 616-623)

Daniele, G., B. Criel, X. De Betheune. 1997. *Viewpoint: Public Versus Private Health Care Delivery: Beyond the Slogans*. Health and Policy Planning; 12(3) 193-198.

De Brouwere, V. and W. Van Lerberghe. 2001. Safe Motherhood Strategies: A Review of Evidence. *Studies in Health Services Organisation & Policy*, 17, 2001

DeJong, J. 1991. *Non-Governmental Organisations and Health Delivery in Sub-Saharan Africa*. Working Paper. Population and Human Resources Department. The World Bank.

Eduoard, L., Dodd, N. and Bernstein, S. 2000, The implementation of reproductive health programs: experiences, achievements and challenges. *Int J Gyn Obs* 70, pp 25-34

Elo, I. 1992. *Utilization of Maternal Health Care Services in Peru: The Role of Women's Education*. *Health Transition Review* 2, 49-61.

El-Zanaty, F. and A. Way. 2001. *Egypt Demographic and Health Survey 2000*. Calverton, Maryland [USA]: Ministry of Health and Population [Egypt], National Population Council and ORC Macro.

Falkingham and Namazie 2002 *Measuring Health and Poverty: A review of approaches to identifying the poor*, DFID Health Systems Resource Centre Issues Paper, London

Ferrinho, P., Bulgalho, A.M. and Van Lerberghe, W. (2001) Is there a case for privatising reproductive health? Patchy evidence and much wishful thinking, *Studies in Health Services Organisation and Policy*, 17, pp 343-371

Fortney, J.A. et al. 1985. *Maternal Mortality in Indonesia and Egypt*. Paper presented at WHO Paper presented at WHO Interregional Meeting on the Prevention of Maternal Mortality, Geneva, 11-15 November.

FIGO, 2000 *Recommendations on ethical issues in obstetrics and gynaecology by the FIGO committee for the ethical aspects of human reproduction and women's health*, FIGO, London

Filmer, D., and Pritchett, L.Z. 1998 *Estimating wealth effects without income or expenditure data – or tears: Educational enrolment in India*, World Bank Policy Research Working Paper No 1994, Washington DC, World Bank (also published in *Demography*, 2001 Vol 38 No 1.)

Filmer, D. and Pritchett, L.Z. 1999, The effect of household wealth on educational attainment: Evidence from 35 countries, *Population and Development Review*, Vol 25, No 1

Gertler, P. and J. van de Gaag. 1990. *The Willingness to Pay for Medical Care*. Baltimore: The Johns Hopkins University Press.

Goldstein, H. 1995. *Multilevel Statistical Models*. Second Edition. Kendall's Library of Statistics 3.

Graham, W.J. et al. 1996. *Demonstrating Programme Impact on Maternal Mortality*. *Health Policy and Planning* 11(1): 16-20

Green, A .1992. *Planning for Health: An Introduction to Health Planning in Developing Countries*. Oxford Medical Publications, pp77.

Griffiths, P.L., J.J. Brown, P.W.F. Smith. 2004. A Comparison of Univariate and Multivariate Multilevel Models for Repeated Measures of Use of Antenatal care in Uttar Pradesh. *Forthcoming in Journal of the Royal Society of Statistics*

Gwatkin, D.R., S. Rutstein, K. Johnson, R.P. Pande, A. Wagstaff. 2000. *Socio-Economic Differences in Health, Nutrition and Population*. Washington, World Bank, HNP/Poverty Thematic Group.
Hamilton, L.C. 1998. *Statistics with STATA 5*. Duxbury Press. An International Thomson Publishing Company.

Hanson, K. and P. Berman. 1998. *Private Health Care Provision in Developing Countries: A Preliminary Analysis of Levels and Composition*. *Health Policy and Planning*; 13(3): 195-211.

Hanvoravongchai, P., Letendumromg, J. Teerawattananon, Y. and Tangcharoensathien, V. 2000 Implications of private practice in public hospitals on the caesarian section rate in Thailand, *Human Resources for Health Development Journal* 4(1) pp2-12

Hulton, L.A., Z. Mathews, R.W. Stones. 2000. *A Framework for the Evaluation of Quality of Care in Maternal Services*. Reproductive Health Research, Opportunities and Choices, University of Southampton.

Kausar, F.K., Griffiths, P. and Matthews Z. 1999, *Poverty and maternal health care utilization in Maharashtra; Associated influences on infant mortality and morbidity* Social Statistics Working Paper 1999-04 Division of Social Statistics, University of Southampton, Southampton UK

Kuate Defo, B. 1997. *Effects of Socio-Economic Disadvantage and Women's Status on Women's Health in Cameroon*. Social Science and Medicine 44, 1023-1042

Kunst, A.E. and Houweling, T.H. (2001) A global picture of poor-rich differences in the utilisation of delivery care, *Studies in Health Services Organisation and Policy*, 17, pp 297-316

Kutzin, J. 1993. *Obstacles to Women's Access: Issues and Options for More Effective Interventions to Improve Women's Health*. World Bank, Human Resources Development and Operations Policy.

Madise, N.J. and F. Amoako Johnson. 2001. *Review of Health Sector Reforms: Impact of Family Planning and Reproductive Health in Africa*. Department of Social Statistics, University of Southampton.

Madise, N., R. Stephenson, D. Holmes, Z. Matthews. 2002. *Impact of Estimation Techniques on Regression Analysis: An Application to Survey Data on Child Nutritional Status in Five African Countries*. Department Of Social Statistics, University of Southampton.

Magadi, M., I. Diamond, N. Madise. 2001. *Analysis of Factors Associated with Maternal Mortality in Kenyan Hospital*. J. biosoc. Sci, (2001) 33, 375 – 389.

Matthews, Z., Mahendra, S., Kilaru, A. and Ganapathy, S. (2001), Antenatal care, care-seeking and morbidity in rural Karnataka, India: Results of a prospective study, *Asia-Pacific Population Journal*, June, 11-28.

Pferffermann, D., C.J. Skinner, D.J. Holmes, H. Goldstein, J. Rasbash. 1998. *Weighting for Unequal Probability of Selection Probabilities in Multilevel Models*. Royal Statistical Society.

Rasbash, J., Browne, W., Goldstein, H., Yang, M. Plewis, I., Healy, M. Woodhouse, G., Draper, D., Langford, I., and Lewis, T. 2000. *A User's Guide to MLwiN*. Version 2.1c. Centre for Multilevel Modelling. Institute of Education, University of London

Smith, J.B, J.A. Fortney, E. Wong, R. Amatya, N.A. Cole. 2001. *Estimates of Maternal Mortality Ratio in Two Districts of the Brong Ahafo Region, Ghana*. Bulletin of World Health Organization, 79: 400-408

Smith, K. 1989. Non-Governmental Organisations in the Health Field: Collaboration, Integration and Contrasting Aims. *Social Science and Medicine* 29(3): 395-402.

Snijders, T and R. Bosker. 1999. *Multilevel Analysis: An Introduction to Basic and Advance Multilevel Modeling*. SAGE Publications.

Wall, L.L 1998. *Dead Mothers and Injured Wives: The Social Context of Maternal Morbidity and Mortality among the Hausa of Northern Nigeria*. *Studies in Family Planning*, Volume 29, Issue 4, 341-359.

WHO. 1998. *World Health day: Safe Motherhood*. Maternal Mortality (WHD98.1), World Health Organisation, Geneva,

World Bank 2004, World Development Report 2004; Making Services Work for Poor People, The World Bank, Washington

Zwarenstein, M and M.R. Price. 1990. *The 1983 Distribution of Hospitals and Hospital Beds in the Republic of South Africa*. *South African Medical Journal* 77: 448-52.

Poverty and the Evolving Public/Private Divide in Institutional Delivery Care in Egypt and India

ANNEX 1 – Socio-demographic factors entered into regression models

Factor	Categories
Education	No school At least some primary Secondary or more
Literacy	Literate Not Literate
Age	<20 years 20-34 years 35+ years
Birth order	1 st birth 2 nd or third birth 4+ birth
Religion	Hindu Muslim Other (for India) Muslim Other (for Egypt)
Occupation	Working Not working
Access to radio	Has a radio No radio
Access to television	Has a tv No tv
Region	Only for Egypt
Survey date	1993 1998 (for India) 1992 1995 2000 (for Egypt)

ANNEX 2 – Significant other factors in regression models

	Urban	Rural
Karnataka	Age Birth order Education	Age Birth Order Literacy Television
Kerala	Age Birth order Literacy Radio Religion	Age Birth order Television Religion
Madhya Pradesh	Age Birth Order	Age Birth Order Literacy
Maharashtra	Age Birth order Literacy Religion	Age Birth order Occupation
Punjab	Age Birth order	Age Birth order Literacy Religion Television Radio
Egypt	Age Birth order Education Occupation Region	Age Birth order Education Region Occupation