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EXTENDING HEALTH INSURANCE: EFFECTS OF THE NATIONAL HEALTH INSURANCE SCHEME IN GHANA

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Extending Health Insurance:
Effects of the National Health Insurance Scheme in Ghana

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Abstract

There is considerable interest in exploring the potential of health insurance to increase the access to, and the affordability of, health care in Africa. We focus on the recent experience of Ghana, where a National Health Insurance Scheme (NHIS) became law in 2003 and fully implemented from late 2005. Even though there is some evidence of large coverage levels, the effect of the NHIS on health care demand and out-of-pocket expenditures has still not been fully examined. This paper is an attempt to close this gap. Using nationally-representative household data from the Ghana Demographic and Health Survey, we find that the introduction of the NHIS has a positive and significant effect on the utilisation of health care services, although it does have only a weak effect on out-of-pocket expenditure.

Keywords

1. Introduction[*]

There is considerable interest in exploring the potential of social health insurance to increase the access to, and the affordability of, health care in Africa. Social health insurance is considered as one of the health financing approaches with a strong potential for risk sharing across population groups and time (Wagstaff, 2009). As membership is mandatory, it allows to overcome the adverse selection problems which smaller, voluntary health insurance schemes face. A number of African countries are currently experimenting with different approaches, including Nigeria, Rwanda, Kenya, Tanzania and Ghana. As these schemes have been introduced only recently and are still evolving, few have been systematically evaluated to date. We focus on the recent experience of Ghana, where a National Health Insurance Scheme (NHIS) became law in 2003 and fully implemented from late 2005 (Agyepong and Adjei, 2008; Abekah-Nkrumah *et al*., 2009). Even though there is evidence of large coverage levels (Witter and Garshong, 2009), there is still a lack of evidence of the effect of the NHIS on out-of-pocket expenditures, health care demand, health status and labour productivity. This paper uses the variation over time and enrolment induced by the National Health Insurance to assess the impact of the scheme. We present evidence on how the National Health Insurance Scheme affects the utilisation of health care services and out-of-pocket expenses.

Access to more generous health insurance is hypothesised to affect households in several ways. First, access to health insurance is expected to reduce out-of-pocket health expenses (Xu *et al*., 2003; Chaudhury and Roy, 2008). Uninsured households need to devote a larger part of their budget to resolving health problems, *i.e.*, spending on healthcare, which diverts resources from the consumption of other goods (Gertler and Gruber, 2002; Chetty and Looney, 2006). Second, health insurance might have a negative effect on health (Goldman et al., 2007; Miller et al., 2009; Barros 2009). On the one hand, utilisation of healthcare services might increase, while, on the other, there might be changes in the quality of care as well as in the quantity of care. Third, health shocks might diminish the capacity of households to generate income because, for example, a household member might not be healthy enough to work. If better health insurance leads to better health, then it might cushion households against this labour productivity channel (Barros, 2008; Currie and Madrian, 2005). Finally, health insurance has become essential in mediating the high costs of childbirth. Even though it has been neglected in fertility research, health insurance coverage may be an economic determinant of fertility. Our analysis is an attempt to examine how the NHIS in Ghana affected these various outcomes. This can provide information on the development of the NHIS itself.

There has been little research to date on the impact of the NHIS in relation to household care-seeking and expenditure, particularly as the NHIS has increased in scale. However, two recent studies address a similar research question. Sulzbach (2008) compare baseline data in two districts, before the NHIS (in 2004) and after (in 2007). Their findings suggest that there has been an increase in access to formal care amongst members, as well as a significant decrease in expenditure. However, there was no difference in use of maternal care between women who are enrolled and women who are not. In addition, the study showed that enrolment in the NHIS remained pro-rich. Mensah et al., (2010), address a similar research question, and find that the NHIS has yielded some verifiable positive outcomes: women who are enrolled are more likely to seek maternal health care and less likely to have complications both during and after giving birth. However, since both studies use data purposely selected and not nationally representative, the results may be lacking in general validity.

In this paper, we use nationally-representative household data from the Demographic and Health Survey (DHS), which provide information on a wide range of indicators in the areas of population, health and nutrition. More specifically, the data include information on the respondent's background, health, reproduction and contraception, fertility preferences, husbands' background and woman's work (Ghana Statistical Service, 2009). Since the NHIS was passed into law in 2003, but was only fully implemented in 2005, we consider 2005 as the year of a potential structural break.

Moreover, since the enrolment in the scheme was formally mandatory, but, in practice, was only voluntary, we are able to estimate the effect of the reform on maternity care, in terms of demand for antenatal, delivery and post-delivery services. We analyse a post-reform wave, the 2008 DHS, which includes retrospective information on the pregnancies and births that took place in the five years preceding the survey. We are able to control for the supply side of the health care sector using regional-time varying information provided by the Ghana Health Service (GHS 2005, 2007, 2008, 2009) and by the Ghana Ministry of Health (MOH 2008).

Our findings suggest that the introduction of the NHIS has a positive and significant effect on the utilisation of health care services. In particular, we find that being enrolled in the NHIS positively affects a) the probability of formal antenatal check-ups before delivery; b) the probability of delivery in an institution; and c) the probability of being assisted during delivery by a trained person.

Unfortunately, our findings on the effect of the NHIS on out-of-pocket expenditure are not equally encouraging. Our results suggest that being enrolled in the NHIS has only a weak effect on out of pocket expenditure. These results are robust to the inclusion of different sets of explanatory variables that account for socio-demographic and economic characteristics, as well as for proxies of the supply side of the health sector in Ghana.

The rest of the paper is structured as follows. Section 2 describes the main features of the health system in Ghana. Section 3 provides empirical evidence about the background characteristics of the sample and the determinants of enrolment. Section 4 estimates the effects of the programme, Section 5 concludes.

2. Background

2.1 Historical Context of the Health Insurance in Ghana

Under colonial rule, Ghana, like many other African countries, organised its health system primarily to benefit a small *élite* group of colonials and their workers (McIntyre et al., 2008; Arhin-Tenkorang, 2001). In urban areas, health-care provision occurred mainly through hospitals, with direct payment at the point of use. The rest of the population relied on services from a range of unofficial providers such as traditional healers and missionary health centres. After independence, the government of Ghana mainly addressed the problem of accessibility to health care services of most of the population that was underserved until that time. It provided medical care free of charge to the population at public health facilities. Moreover, health care was financed by general taxes and external donor support, user fees were removed, and attention was directed to developing a wide range of primary health care facilities across the country. By the early 1970s, general tax revenue in Ghana, with its stagnating economy, could not support a tax-based health financing system. In the health sector, there were shortages of essential medicines, supplies and equipment, and poor quality of care. In 1985 Ghana carried out structural adjustment programmes aimed mainly at reducing government spending to address budgetary deficits. Among these programmes, it initiated health sector reforms introducing cost recovery mechanisms through user fees (traditionally known in Ghana as "cash and carry"), and liberalising health services to allow private sector involvement. The financial aims of the reform were achieved and shortages of essential medicines and some supplies improved. However, these achievements were accompanied by inequalities in financial access to basic and essential clinical services (Waddington and Enyimayew, 1990). During the 1990s, several community health insurance

schemes, popularly called Mutual Health Organisations (MHO) developed in Ghana with some external funding and technical support. Most MHO focused on providing financial protection against the potentially catastrophic costs of a limited range of inpatient services. The National Health Insurance Scheme (NHIS) grew out of an election promise made in 2000 by the incoming New Patriotic Party to abolish the "cash and carry" system and to remove financial barriers to the utilisation of health care. The NHIS was launched with the National Health Insurance Act (Act 650), passed into law in 2003, with the aim of replacing out-of-pocket fees at point of service use and of making health care affordable, thus improving access and health outcomes. The implementation of the NHIS in terms of access to benefits began in autumn 2005.

2.2 The National Health Insurance Scheme

The National Health Insurance Act (650, 2003) established a National Health Insurance Authority (NHIA), governed by a Council, to regulate the health care system, including the accreditation of providers, agreeing on contribution rates with the schemes, managing the National Health Insurance Found and approving cards for membership. Act 650 also stated that three types of health insurance schemes may be established and operated in the country: a) district mutual health insurance scheme (DMHIS, one for each district, with a minimum of 2,000 members – we refer to them simply as NHIS); b) private commercial health insurance schemes; and c) private mutual health insurance schemes (not eligible for subsidies from the NHIA). The Council, which includes representatives of main stakeholder groups, establishes formulae for the allocation of funds to pay for subsidies to schemes, the cost of enrolling the indigent, and supporting access to health care. The funding sources come mainly from the National Health Insurance Levy (2.5% of V.A.T.): secondary sources are payroll deductions (2.5% of income) for formal sector employees and premiums for informal sector members. Other funds come from donations or loans.

In terms of membership of the NHIS, the Act establishes that it is mandatory, unless alternative private health insurance can be demonstrated. However, in practice, membership is optional for non-formal sector workers, who represent the bulk of the population. Formal sector workers contribute to the Social Security and National Insurance Trust (SSNIT) fund through a payroll deduction of 2.5%. Informal sector workers are charged premiums that should be income related. Indeed, their contributions are supposed to be defined according to income so that the lowest-income group pays a premium of 7.20 Ghanaian cedi (GH¢) or US$ 8, while those in the highest income group pay a premium of GH¢ 48.00 or US$ 53.[1] In reality, a flat premium payment of GH¢ 7.20 per annum is charged due to the difficulty of categorising people into different socio-economic groups. There is a six-month gap between joining and being eligible for benefits.

All providers must offer a minimum package of services which is quite comprehensive, covering general outpatient and inpatient services at accredited facilities, oral health, eye care, emergencies and maternity care, such as prenatal care, normal delivery and complicated deliveries (HIV retroviral drugs, assisted reproduction and cancer treatment are not included). Diseases covered include malaria, diarrhoea, some respiratory infections, skin diseases, hypertension, asthma, diabetes, etc. The benefit package is the same for all districts that pay providers on a fee-for-service basis. According to the legislative instrument which accompanied Act 650, about 95% of all common health problems in Ghana are covered (Ghana Ministry of Health, 2004a and 2004b). However, it is difficult to establish how this estimate was obtained. The drugs provided are listed in the National Health Insurance Drug List.

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[1] District Health Insurance Committees should identify and categorize residents into four main social groups: the core poor or the indigent, the poor and the very poor, the middle class, and the rich and the very rich. The core poor, together with SSNIT pensioners, over 70s, under 18, when both parents have paid their premium, are exempted from paying any premium.

To have a full picture of the NHIS and its sustainability, we should have taken into account its cost-effectiveness and funding mechanisms. Unfortunately, though, as in many African countries, it is very difficult to obtain a comprehensive overview of the funding to the NHIS because fragmentations in funding sources, uses and flows make data not fully reliable. Moreover, mismatches between the funding captured on-plan by the "Programme of Work," on-budget via its "Medium Term Expenditure Framework," and on-account through its "Financial Statement" have also undermined the reliability of the data on health-care financing (Ministry of Health 2008, p.49). Also, while there has been some progress in the Health Care Budget Management Centre's reporting of internally generated funds from out-of-pocket sources and from NHIS subsidies from the government, this is still incomplete and is therefore unreliable for any analysis at national level (Ministry of Health, 2008, 49). Despite these data problems, according to the Independent Review of the Health Sector Programme of Work for 2008, the estimated per capita total expenditure on health was about US$23.23 in 2008 (Ministry of Health, 2009). Moreover, estimates from the Ministry of Health (2008) show that spending on the National Health Insurance Scheme, as a share of the health care sector financing, increased from 5% in 2006 to 29% in 2007. Since the health care is increasingly being delivered and financed through the NHIS, it is reasonable to expect that the weight of the NHIS in the nation's health care budget will also increase. However, the absence of reliable data makes very difficult to evaluate the cost dimensions of the Ghana NHIS scheme, and to estimate the relationships between its financial resources and the improvements in health care delivery. Because of these data problems and because we did not want to be side-tracked from the main focus of the paper, we decided to leave the analysis of the sustainability issue to further studies.

2.3 The Structure and Geography of Health Services in Ghana

Formal health facilities in Ghana are hierarchically organised, and comprise four levels in the urban areas and five in rural areas (Mensah et al., 2010). The health post is the first level provider in the rural areas. Health centres or clinics, district hospitals, regional hospitals and teaching hospitals follow in that order.

The Ghana's health system is characterized by spatial disparity, particularly between northern and southern Ghana, and between the rural and urban areas of the country. Moreover, the health-care system still suffers some serious challenges such as the dearth in health care professionals caused by a serious brain drain: (60% of the doctors trained locally in the 1980s have left Ghana; Mensah *et al.*, 2005). Table 1 shows the population per doctor, per nurse and per government health facility ratios in 2003 and 2008.[2] Even though it is still very high, there has been an improvement in the population per doctor ratio (it decreased during the period 2003-2008) for all the regions in the country with the exception of the Upper East region. There has also been an improvement in the population per nurse ratio in all the regions. Nevertheless, the disparities between regions remain: in 2008, one doctor in the Northern region serves ten times as many people as in Greater Accra (home to the national capital city, Accra), and one nurse in the Northern region serves about twice as many people as in Greater Accra. To give an idea of the size of this lack of health-care professionals, the population per doctor ratio in the Euro area and in the United States is 275 and 374, respectively, and the population per nurse ratio

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[2] We collected also data on population per doctor, per nurse for the years 2004, 2005, 2006, 2007. Data on population per health facility is publicly available only for 2004 and 2007. We use the population per health facility 2004 data also for 2003 and 2005, and we use the 2007 also for 2006 and 2008. These data has been used in the regression analysis to proxy the supply side of the health care sector. While the data on population per doctor and the population per nurse is directly obtained from the cited sources, the data on population per health facility is the outcome of our own calculation. The 2004 data on health facility is obtained from Table 4.1 "Health Facilities by Type and Ownership, 2004" (Ghana Health Service 2005, "Facts and Figures", p. 12). The 2007 data on health facility is obtained from Table 4.1 "Health Facilities by Type and Ownership, 2007" (Ghana Health Service 2008, "The Health Sector in Ghana: Facts and Figures", p. 11). The 2004 and 2007 data on population is obtained from Table 4.4 Ghana Health Service 2008, "The Health Sector in Ghana: Facts and Figures", p. 15).

in the Euro area and in the United States is 126 and 102, respectively (World Bank Development Indicators, 2010: http://databank.worldbank.org/ddp/home.do?Step=1&id=4). While the figures for the population per doctor ratio and the population per nurse ratio are straightforward to read and comment on, some cautions needs to be adopted in the interpretation of the population per health facility. Since we are concerned with the NHIS, we take into account only government health facilities (teaching hospitals, regional hospitals, government district hospitals, government other hospitals, Polyclinics, health centres, clinics and maternity homes). We do not consider privately owned health facilities (this category also includes the Christian Health Association of Ghana, Islamic associations and quasi-government facilities). What we observe is a dramatic picture in terms of the availability of public health facilities, not only in the most deprived regions, but also in the wealthiest regions, Greater Accra, and Volta.

Table 1: Distribution of Health Professionals and Government Facilities in 2003 and 2008.

Region	Population per doctor		Population per nurse		Population per health facility	
	2003	**2008**	**2003**	**2008**	**2004**	**2007**
Ashanti	13,494	9,537	2,243	1,336	24,011	26,856
Brong Ahafo	40,729	21,475	2,879	1,140	14,521	14,883
Central	36,877	26,140	1,713	895	15,745	15,235
Eastern	33,279	16,132	1,331	959	9,726	10,413
Greater Accra	5,604	5,103	917	881	47,942	59,508
Northen	73,262	50,751	2,380	1,534	15,175	15,893
Upper East	32,786	35,010	2,027	956	9,243	8,713
Upper West	50,541	47,932	1,860	870	8,567	6,299
Volta	33,930	26,538	1,440	892	6,366	8,329
Western	35,255	33,187	2,309	1,413	16,052	14,542
National	16,759	12,713	1,649	1,079	14,614	15,600

Souces: Ghana Health Service (2009), "2009 GHS Annual Report", Ghana Health Service (2008), "The Health Sector in Ghana: Facts and Figures"; Ghana Health Service (2005), "Facts and Figures".

3. Data

3.1 Data Description

We use nationally-representative household data from the 2008 Demographic and Health Surveys (DHS).[3] The DHS surveys are designed to provide information to monitor the population and health situation in Ghana. More specifically, the data include information on the respondent's background, health, reproduction and contraception, fertility preferences, her husband's background and woman's work (Ghana Statistical Service, 2009).

For the 2008 survey, each household selected for the DHS was eligible for interview with the Household Questionnaire (11,778 households). In 6,141 of the households selected, a total of 4,916 women aged between 15-49 and 4,568 men aged between 15-59 were interviewed with the Women's and Men's Questionnaires, respectively. Data collection took place over a three-month period, from early September to late November 2008. The Ghana 2008 DHS includes three main questionnaires, the

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[3] The 2008 Ghana DHS is the most recent of the five surveys undertaken in Ghana since 1988 (1988, 1993, 1998, 2003, 2008).

Household Questionnaire, the Women's Questionnaire and the Men's Questionnaire, whose content was based on model questionnaires developed by the MEASURE DHS programme and the 2003 Ghana DHS Questionnaires.

The Household Questionnaire provided a list of all usual members and visitors in the selected households and allowed to identify women and men who were eligible for the individual interview.

The Women's Questionnaire was used to collect information from all women aged between 15-49 in almost half of selected households. These women were asked questions about the children born during the period 2003-2008 and questions about themselves on the following topics: education, residential history, media exposure, reproductive history, knowledge and use of family planning methods, fertility preferences, antenatal and delivery care, breastfeeding and infant and young child feeding practices, vaccinations and childhood illnesses, woman's work and husband's background characteristics, childhood mortality, awareness and behaviour about AIDS, awareness of TB and other health issues. Since we know for each child born since 2003, the date of birth, whether the respondent did attend antenatal care (i.e., tetanus injections and check-ups during pregnancy), whether the delivery was assisted by a trained person (i.e., doctor, nurse, midwife or community health officer), whether she gave birth in a hospital and whether she had to cope with out-of-pocket expenditure, and we know the health insurance status of the woman (i.e., whether she was enrolled in the NHIS), we are able to estimate the effect of being enrolled in the NHIS on antenatal care, delivery care and out-of-pocket expenditure. We focus our attention on the information contained in the Women's Questionnaire.

The Men's Questionnaire was administered to all men aged between 15-59 living in almost half of the selected households in the Ghana DHS sample. The Men's Questionnaire collected much of the same information found in the Women's Questionnaire, but was shorter because it did not contain a reproductive history or questions on maternal and child health or nutrition.

3.2 Background Characteristics

We present simple descriptive statistics of the main background characteristics that will be used in the subsequent sections of the paper. Table A.2 shows the distribution on women aged between 15-49 and men aged between 15-59 by selected background characteristics including age, marital status, urban/rural residence, region, literacy, education, religion, ethnicity, wealth status and occupation.

The age distribution shows that more than half of women (56 percent) and men (49 percent) are under the age of 30. The proportion of respondents in each group generally decreases as age increases, reflecting the young age structure of the Ghanaian population.

Fifty-nine percent of women are married or in union, compared with 53 percent of men. Because men marry later in life than women, 43 percent have never married, compared with 32 of women, who are, on the other hand, more likely than men to be widowed, divorced, or separated. The distribution of respondent by urban/rural residence shows that 48.5 percent of women and 54 percent of men live in urban areas. They are mainly concentrated in the Ashanti region and in Greater Accra. About one in ten are from the Western, Central, Eastern, Northern, Volta and Brong Ahafo regions. The Upper East and Upper West regions have the smallest proportion of respondents.

Literacy and education are particularly important because they have been found to be closely associated with the health of women and children and with the demand for health-care services. Data show that men have more education than women. Sixty-three percent of women and 46 percent of men are not able to read a full sentence. Twenty-one percent of women have never been to school (compared with 14 percent for men), 20 percent (15 percent for men) have some primary education, 55 percent (62 percent for men) have some secondary education and 4 percent (9 percent for men) have attained more than secondary education.

The majority of respondents are Christians: 78 percent of women and 72 percent of men. The rest of the respondents are Muslims (15 percent of women and 17 percent of men), and others (spiritualism, animism, other). With regard to ethnicity, the Akan is the largest ethnic group, with 51 percent of women and 48 of men, followed by the Mole Dagbani and the Ewe.

Along with socio-demographic characteristics, the 2008 Ghana DHS provides information on the wealth status of Ghanaian households and their employment status.

The household wealth is proxied by a wealth quintile index which is a measure of the combined indicators of household income and expenditure. The wealth quintile, as constructed, uses information on household ownership of consumer items, ranging from a television to a bicycle or car, as well as dwelling characteristics, such as sources of drinking water, sanitation facilities, and the type of flooring material. Through a principal component analysis, each asset was assigned a weight and then standardised in relation to a normal distribution. Each household was then assigned a score for each asset, and the scores were summed for each household. The individuals in the sample were then ranked according to the total score of the household in which they resided and divided into quintiles from one (lowest) to five (highest). Table A2 and Figure 3 show the percent distribution of the respondents by wealth quintiles and health insurance coverage. Highest wealth quintiles are strongly associated with higher enrolment in the NHIS (47 percent for women – 40 percent for men - in the highest quintile, 29 percent for women – 18 percent- in the lowest quintile).

The 2008 survey also provides detailed information on the health insurance coverage of the respondents. Thirty-nine percent of women and 29.7 percent of men are covered by the NHIS, compared with 1.08 percent of women and 1.21 of men, who are covered by the community-based and mutual health organisation insurance schemes. Health insurance through an employer is almost non-existent, with less than 0.3 percent of respondents covered by insurance through their employer or by privately purchased commercial insurance. A high proportion of women (59.81 percent) and men (68.98 percent) say that they are not covered by any type of the health insurance scheme. Women aged between 20-24 (33.9 percent) and men aged between 25-29 (20.51 percent) are the least likely to be covered by the NHIS. Urban residents are more likely than rural residents to be covered by the NHIS. Regional differentials show that at least half of women in the Eastern, Brong Ahafo, and Upper East regions are covered by the national health insurance scheme. The Brong Ahafo region has the highest coverage (58.94 percent of women and 44.38 percent of men), compared with other regions (see Figure 1).

Figure 1: NHIS Enrolment by Region
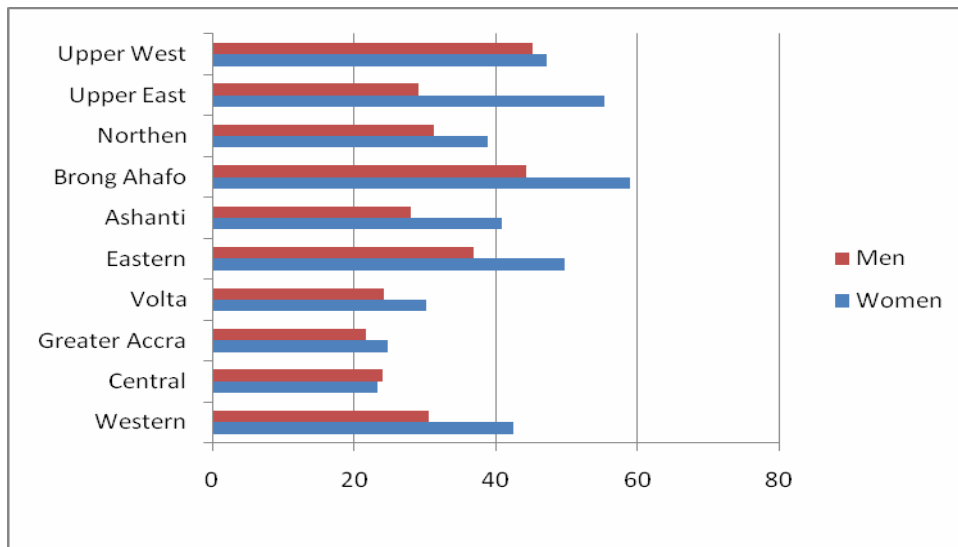
Source: 2008 Ghana DHS- Own elaboration.

Women and men, who have secondary or higher education, are more likely to be covered by the national health insurance scheme than women and men with no education (see Figure 2).

Figure 2: NHIS Enrolment by Education Level
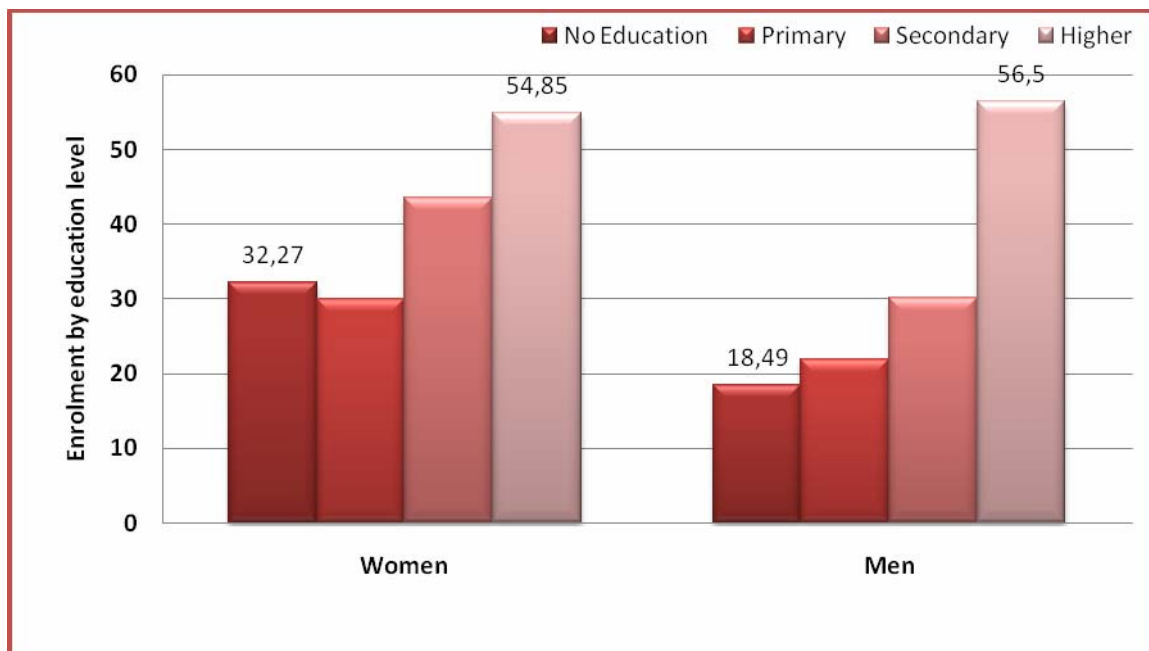
Source: 2008 Ghana DHS- Own elaboration

Likewise, respondents in the highest wealth quintile are more likely to be covered by the health insurance scheme than those in lower wealth quintiles (see Figure 3).

Figure 3: Enrolment by Wealth Status
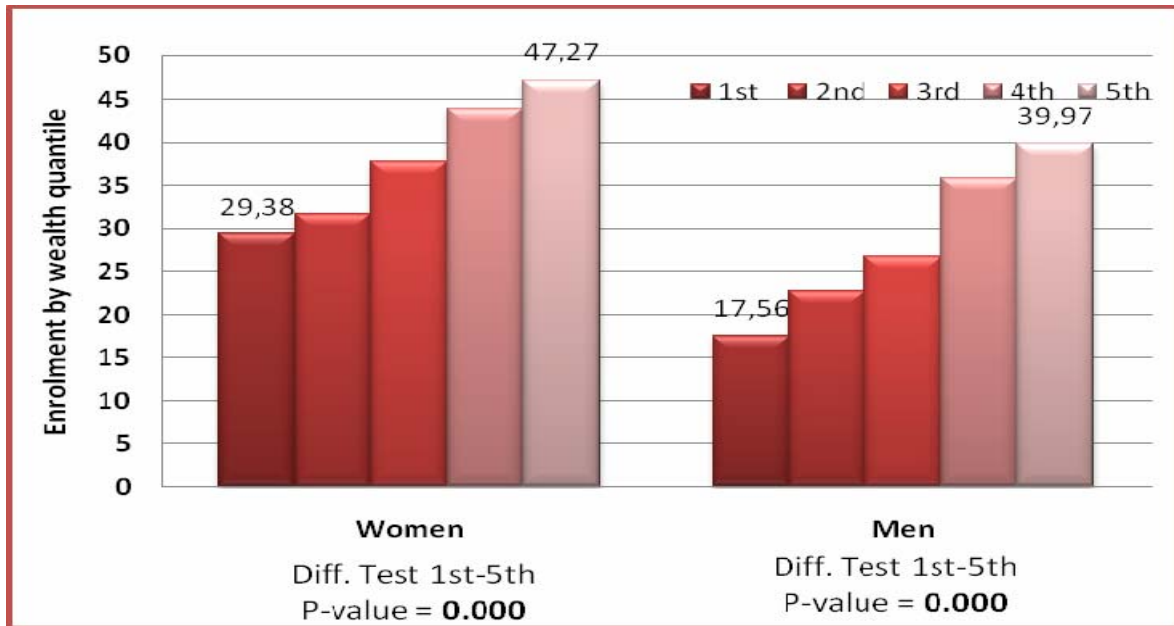
Respondents working in professional, managerial and clerical roles are significantly more likely to be enrolled. However, the data show that the difference in enrolment between respondents not working at all and respondents involved in the service sector or in skilled manual jobs is not significant (see Figure 4).

3.3 Determinants of enrolment in the NHIS

The literature is quite rich in providing evidence of the determinants of the health insurance coverage (Grossman 1972; Manning et al., 1987; Liu and Chen 2002; Jütting 2005). In this section, we provide some empirical evidence, derived by regression analysis, of the most relevant socio-demographic and economic characteristics that affect enrolment in the NHIS. Table 2 shows the main finding for the sample of women interviewed. We run a probit model for the binary variable entitled "Enrolment in the NHIS", which takes the value of one when the respondent is enrolled and takes the value of zero otherwise. We provide different specifications, whose results are reported in different columns. Column 1 includes only socio-demographic characteristics (age, age squared, marital status, religion, ethnicity, literacy and education); Column 2 adds economic variables (wealth index and occupation of the respondents); and Column 3 adds proxies of the supply side of the health sector in Ghana (population per health facility and population per doctor).[4]

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[4] See section 4.1 for a discussion on the proxies of the supply side.

Figure 4: Enrolment by occupation

Source: 2008 Ghana DHS- Own elaboration

The results show that the scheme is successfully capturing Christian and Moslem women (with regard to traditional/spiritualist or no religion), women with a higher educational background, and those with a higher wealth status, mainly professionals and skilled workers. However, the results also show that the scheme is not capturing the most vulnerable sections in Ghanaian society: unmarried women, those with low education, those in the agriculture sector, and women from the Mole-Dagbani ethnicity. Moreover, the marginal effect of the population per health facility suggests that the scarcity of public health care providers may disincentive the enrolment in the scheme.

Table 3 shows the main findings for the sample of men interviewed. Also for the analysis for the men, we consider three specifications. The results are consistent with those for women, with the important differences that education level is not significant when controlling for wealth, and working in sales, services, agriculture, skilled or unskilled manual jobs negatively affect enrolment with regard to not being in work (this is probably due to the fact that the "not working" are included in the "indigent category" that has exemption from the payment of enrolment fees, while the others are not included).

To sum up, these findings for health insurance enrolment suggest that the introduction of the NHIS has been so far a pro-rich reform. Indeed, they show that the better off in the population are more likely to enrol, suggesting that the cost component of the NHIS is determinant in the decision to enrol, as well as literacy and education that are key characteristics for enrolment. These results are partly consistent with Mensah et al., (2010). However, since they do not control for economic characteristics such as wealth and occupation, the results are not fully comparable.

**Table 2: Determinants of National Health Insurance Scheme Enrolment –
Probit Regression - Women**

National Health Insurance Scheme Enrolment	(1) dF/dx	(2) dF/dx	(3) dF/dx
Number of previous pregnancies	-0.01**	0.00	0.00
	(0.01)	(0.01)	(0.01)
Age	0.00	0.00	0.00
	(0.01)	(0.01)	(0.01)
Age Squared	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)
Residence: Urban	0.09***	-0.05**	-0.02
	(0.02)	(0.02)	(0.02)
Marital Status: Married or living in couple	0.12***	0.13***	0.14***
	(0.03)	(0.03)	(0.03)
Marital Status: Other	-0.01	0.02	0.05
	(0.04)	(0.04)	(0.04)
Religion: Christian	0.14***	0.11***	0.1***
	(0.03)	(0.03)	(0.03)
Religion: Moslem	0.17***	0.14***	0.1**
	(0.04)	(0.04)	(0.04)
Ethnicity: Akan	0.05*	0.03	-0.05*
	(0.03)	(0.03)	(0.03)
Ethnicity: Ga-Dangme	-0.01	0.00	-0.07*
	(0.04)	(0.04)	(0.04)
Ethnicity: Ewe	-0.06*	-0.05	-0.18***
	(0.04)	(0.04)	(0.03)
Ethnicity: Mole-Dagbani	-0.1***	-0.1***	-0.01
	(0.03)	(0.03)	(0.03)
Not able to read	-0.1***	-0.06**	-0.05**
	(0.02)	(0.02)	(0.02)
Education: Primary	0.02	-0.01	-0.02
	(0.03)	(0.03)	(0.03)
Education: Secondary and higher	0.12***	0.08***	0.1***
	(0.03)	(0.03)	(0.03)
Wealth Index 2	-	0.11***	0.03
	-	(0.03)	(0.03)
Wealth Index 3	-	0.2***	0.1***
	-	(0.03)	(0.03)
Wealth Index 4	-	0.29***	0.19***
	-	(0.04)	(0.03)
Wealth Index 5	-	0.41***	0.3***
	-	(0.04)	(0.04)
Occ.: manager, professional, clerical	-	0.08*	0.07*
	-	(0.04)	(0.04)
Occ.: sales, services and skilled manual	-	-0.02	-0.03
	-	(0.02)	(0.02)
Occ.: agriculture, unskilled manual	-	-0.06**	-0.07**
	-	(0.03)	(0.03)
Population per Government health facility	-	-	-0.08***
	-	-	(0.01)
Population per doctor	-	-	0.00
	-	-	(0.01)
Obs.	4885	4836	4836

Note: Marginal Effects Reported (Huber-White heteroskedasticity-consistent standard errors in parentheses). Sample weights are applied. Reference category for education is "No education". Reference category for religion is "Traditional/Spiritualist" or "No religion". Reference category for wealth index is "Wealth Index 1 (poorest)". Reference category for respondent occupation is "Not working". Column (1) and (2) also include regional dummies.

**Table 3: Determinants of National Health Insurance Scheme Enrolment –
Probit Regression -Men**

National Health Insurance Scheme Enrolment	(1) dF/dx	(2) dF/dx	(3) dF/dx
Age	-0.01**	-0.01*	-0.01*
	(0)	(0.01)	(0.01)
Age Squared	0**	0**	0**
	(0)	(0)	(0)
Residence: Urban	0.1***	-0.02	-0.01
	(0.02)	(0.02)	(0.02)
Marital Status: Married or living in couple	0.05**	0.07**	0.07**
	(0.03)	(0.03)	(0.03)
Marital Status: Other	-0.08*	-0.08*	-0.08*
	(0.04)	(0.04)	(0.04)
Religion: Christian	0.11***	0.09***	0.08***
	(0.02)	(0.03)	(0.03)
Religion: Moslem	0.09**	0.04	0.04
	(0.04)	(0.04)	(0.03)
Ethnicity: Akan	0	-0.02	-0.07**
	(0.03)	(0.03)	(0.03)
Ethnicity: Ga-Dangme	-0.03	-0.03	-0.06
	(0.04)	(0.04)	(0.04)
Ethnicity: Ewe	-0.06*	-0.07**	-0.14***
	(0.03)	(0.03)	(0.02)
Ethnicity: Mole-Dagbani	-0.08***	-0.06**	-0.02
	(0.03)	(0.03)	(0.03)
Not able to read	-0.16***	-0.11***	-0.11***
	(0.02)	(0.02)	(0.02)
Education: Primary	0.07**	0.04	0.05
	(0.03)	(0.03)	(0.03)
Education: Secondary and higher	0.08**	0.03	0.03
	(0.03)	(0.03)	(0.03)
Wealth Index 2	-	0.13***	0.09***
	-	(0.03)	(0.03)
Wealth Index 3	-	0.2***	0.13***
	-	(0.04)	(0.03)
Wealth Index 4	-	0.34***	0.27***
	-	(0.04)	(0.04)
Wealth Index 5	-	0.45***	0.37***
	-	(0.04)	(0.04)
Occ.: manager, professional, clerical	-	0.01	0.01
	-	(0.03)	(0.03)
Occ.: sales, services and skilled manual	-	-0.13***	-0.12***
	-	(0.02)	(0.02)
Occ.: agriculture, unskilled manual	-	-0.08**	-0.07**
	-	(0.03)	(0.03)
Population per Government health facility	-	-	-0.05***
	-	-	(0.01)
Population per doctor	-	-	0.02**
	-	-	(0.01)
Obs.	4533	4385	4385

*Note: Marginal Effects Reported (Huber-White heteroskedasticity-consistent standard errors in
parentheses). Sample weights are applied. Reference category for education is "No education".
Reference category for religion is "Traditional/Spiritualist" or "No religion". Reference category
for wealth index is "Wealth Index 1 (poorest)". Reference category for respondent occupation is
"Not working". Column (1) and (2) also include regional dummies.*

4. The Effects of the programme

In this section, we provide some preliminary evidence of the effects of the reform on demand for antenatal and delivery care, as well as the effect of the reform on out-of-pocket expenditure. In particular, we try to answer to the following questions:

1. Did the reform increase the demand for antenatal care (in terms of visits performed by a trained person and injections of tetanus toxoid vaccination)?

2. Did the reform increase the demand for delivery care (in terms of delivery in institutions and delivery assisted by a trained person)?

3. Did the reform increase/decrease the out-of-pocket expenditures?

Clearly, there are many other interesting and relevant questions that we could formulate. However, in this analysis, we preferred to focus on a few particular aspects in order to be able to draw policy suggestions more focussed on particular issues.

4.1 The Effect of the Programme on Antenatal Care

The major objectives of antenatal care are to identify and treat problems during pregnancy. It is during an antenatal care visit that screening for complications and advice on a range of issues, including birth preparedness, place of delivery, and referral of mothers with complications, can occur. We consider two indicators of antenatal care: received care from a health professional (doctor, nurse, midwife or community health officer), and received tetanus toxoid (TT) vaccinations before delivery. Under normal circumstances, the World Health Organisation (WHO) recommends that a woman without complications have at least four antenatal care visits, the first of which should take place during the first trimester. (Descriptive statistics of antenatal care are provided in Table A4 in Appendix.)

Differences in antenatal care coverage by women's age at birth are not large; however, there are some differences by birth order. Mothers in Ghana are somewhat more likely to receive antenatal care from a health professional for the first birth (98 percent) than for the fifth birth (93 percent).

Neonatal tetanus is a leading cause of neonatal death in developing countries where a high proportion of deliveries take place at home or in places where hygienic conditions may be poor. Tetanus toxoid (TT) immunisation is given to pregnant women in order to prevent neonatal tetanus. If a woman has received no previous TT injections, a pregnant woman needs two doses of TT during pregnancy for full protection. The 2008 Ghana DHS collected information on whether women received at least two TT injections, and whether the pregnancy for the most recent live birth in the five years preceding the survey had been protected against neonatal tetanus.

Older women and those with six or more births are the least likely to receive two or more tetanus injections during the pregnancy for their last live birth, possibly because, by that time, they have already received all five doses required for lifetime protection, compared with younger and lower parity women. There is little variation in tetanus toxoid coverage by age at birth and birth order; however, there are differences by residence. For example, 62 percent of births in urban areas are protected against tetanus, compared with 53 percent of births in rural areas. Education of the mother is positively related to tetanus toxoid coverage in Ghana; 60 percent of births to women with secondary or higher education are protected against neonatal tetanus, compared with 53 percent of births to women with no education. Similarly, women living in wealthier households are more likely to have received two or more tetanus toxoid injections during their last pregnancy and their births are more likely to be protected against tetanus than women in the lowest wealth quintiles.

Tables 4 and 5 show the effect of enrolment in the NHIS on formal antenatal check-ups and tetanus toxoid injections, respectively. In these and in the following regressions, we consider three different specifications: first, we control only for socio-demographic characteristics, second, we add economic characteristics, and, finally, we include two proxies of the supply side of the health care sector, i.e., the

population per government health facility and the population per doctor (the complete results for the three different specifications are reported in Table A5 and A6 in Appendix).[5] While the first and the second specifications are straightforward, the inclusion of two proxies of the supply side in the third specification is worthy of at least two comments. First, in order to assess the effectiveness of the NHIS, it is extremely important to acknowledge the supply side because improved access to health-care through the NHIS will not necessarily increase the demand for health-care if the services are not easily available and if the quality is questionable.[6] Second, the population per health-facility only takes the government health-facilities into account because the NHIS may improve access to health-care only for the services provided publicly. Moreover, with the exclusions of private health-care facilities, we reduce issues related to simultaneity between supply and demand since the public sector is generally less sensitive to positive shocks in the health-care demand.

Leaving aside potential problems of sample selection into NHIS enrolment, the regression analysis shows that, controlling for different set of confounding factors, enrolment in the NHIS is significantly and positively correlated with formal antenatal check-up intake (marginal effect always positive and statistical significant), while it is only weakly positively correlated with tetanus injections during pregnancy (the marginal effect is always positive but is statistically significant only in the first specification).

Table 4: Antenatal Checkup - Probit Regressions

Dep. Variable: Checkup performed by a trained person	(1) dF/dx	(2) dF/dx	(3) dF/dx
NHIS Enrolment	0.02** (0.01)	0.01* (0.01)	0.02** (0.01)
Obs.	2132	2120	2120

Notes: Marginal Effects Reported (Huber-White heteroskedasticity-consistent standard errors in parentheses). Sample weights are applied. Column 1 includes only socio-demographic characteristics as explanatory variables. Column 2 adds economic characteristics. Column 3 adds the population per health facility and the population per doctor. Statistical significance: *** 1%, ** 5%, * 10%.

As already suggested by the descriptive analysis, the better off are more likely to seek antenatal care: the marginal effect of the highest income group is always positive and statistical significant. Moreover, the availability of government health-facilities, proxied by the population per health-facility, affects the demand for health-care: a greater value of this proxy (service less available) reduces the probability of seeking antenatal care.

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[5] We run the regressions with three additional specifications that are not reported and discussed in this paper: i) respondent's partner characteristics; ii) the population per nurse; and iii) the institutional maternal mortality ratio as proxy of the quality of the supply side. The effect of enrollment in the NHIS on antenatal care, delivery care and out-of-pocket expenditure is robust to the inclusion of all different sets of control variables.

[6] While the population per government health-facility is clearly a proxy of the "quantity" of the supply side, the population per doctor can be interpreted as a proxy of both "quantity" and "quality".

Table 5: Tetanus Injections during pregnancy - Probit Regressions

Dep. Variable: At least two TT injections during pregnancy	(1) dF/dx	(2) dF/dx	(3) dF/dx
NHIS Enrolment	0.04* (0.03)	0.01 (0.03)	0.02 (0.03)
Obs.	2107	2095	2095

Notes: Marginal Effects Reported (Huber-White heteroskedasticity-consistent standard errors in parentheses). Sample weights are applied. Column 1 includes only socio-demographic characteristics as explanatory variables. Column 2 adds economic characteristics. Column 3 adds the population per health-facility and the population per doctor. Statistical significance: *** 1%, ** 5%, * 10%.

4.2 Effect of the Programme on Delivery Care

Labour and delivery is the shortest and most critical period of the pregnancy-childbirth continuum because most maternal deaths arise from complications during childbirth. Even with the best possible antenatal care, any childbirth can become a complicated one and, therefore, skilled assistance is essential for a safe childbirth. For numerous reasons, many women do not seek skilled care even when they understand the safety reasons for doing so. Some reasons for this are the cost of service, the distance to the health facility, and the quality of care. Focusing on the NHIS enrolment, we try to investigate whether the health insurance, reducing the cost of the service, leads to an increase in childbirth care, in terms of birth in a health-facility (public and private) and the delivery assisted by a trained person (doctor, nurse, midwife or community health officer). The introduction of free maternity services and locating CHPS (Community-based Health Planning Services) compounds closer to where people live are some of the efforts that have been made to remove barriers to accessing skilled maternity care. Indeed, in September 2003, the government of Ghana introduced the policy of exempting users of maternity services from childbirth fees, aimed at reducing financial barriers to using maternal services, as part of the Save the Motherhood Initiative (http://www.safemotherhood.org/) launched by the WHO in 1987, and other international agencies. This policy was initially introduced in the four most deprived region of Ghana, which are the Central, Northern, Upper West and Upper East Regions. The policy was later extended to the remaining six regions of Ghana in April 2005. In order to secure sustainability, the Ministry of Health established a tariff which set up re-imbursement rates according to the type of delivery and the characteristic of the facility. Asante et al., (2007), Bosu et al., (2007) show that there was a statistically significant decrease in the mean out-of-pocket payment for childbirth at the health facility after the exemption policy. A similar pattern was also observed in the mean share of childbirth fees in total out-of-pocket payment for childbirths.

We use two proxies of childbirth care: birth in health facility and birth assisted by a trained person (doctor, nurse, midwife or community health officer). Descriptive statistics of delivery care are provided in Table A4 in Appendix.

Leaving aside potential problems of sample selection into NHIS enrolment, the regression analysis shows that, controlling for different set of confounding factors, enrolment into NHIS is significantly and positively correlated with the probability of giving birth in a hospital and with the probability of being assisted by a trained person (doctor, nurse, midwife or community health officer). The marginal effect of NHIS enrolment is always positive and statistical significant (for the complete set of results, see Table A7 and A8 in the Appendix).

Table 6: Delivery in Health Facility - Probit Regressions

Dep. Variable: Delivery in Institutions	(1) dF/dx	(2) dF/dx	(3) dF/dx
NHIS Enrolment	0.18***	0.15***	0.15***
	(0.02)	(0.03)	(0.02)
Exemption delivery fees	-0.01	0.00	0.00
	(0.02)	(0.02)	(0.02)
Obs.	2975	2961	2661

Notes: Marginal Effects Reported (Huber-White heteroskedasticity-consistent standard errors in parentheses). Sample weights are applied. Column 1 includes only socio-demographic characteristics as explanatory variables. Column 2 adds economic characteristics. Column 3 adds the population per health facility and the population per doctor. Statistical significance: *** 1%, ** 5%, * 10%.

As suggested by the descriptive analysis, women who are more educated, wealthier and living in urban areas, are more likely to give birth in institutions and to be assisted by a trained person during childbirth, while women with a higher number of previous pregnancies are less likely to seek delivery care.

Table 7: Delivery Assisted by a Trained Person - Probit Regressions

Dep. Variable: Delivery Assisted by a Trained Person	(1) dF/dx	(2) dF/dx	(3) dF/dx
NHIS Enrolment	0.17***	0.13***	0.13***
	(0.02)	(0.03)	(0.02)
Exemption delivery fees	0.01	0.02	0.02
	(0.02)	(0.02)	(0.02)
Obs.	2961	2947	2947

Notes: Marginal Effects Reported (Huber-White heteroskedasticity-consistent standard errors in parentheses). Sample weights are applied. Column 1 includes only socio-demographic characteristics as explanatory variables. Column 2 adds economic characteristics. Column 3 adds the population per health-facility and the population per doctor. Statistical significance: *** 1%, ** 5%, * 10%.

Moreover, the dearth of health-care professionals and the low availability of government health-facilities, proxied respectively by the population per doctor and by the population per health facility, are a disincentive to seek formal health care.

In order to take the potential problem of sample selection in NHIS enrolment into account, we also adopted an Instrumental Variable (IV) approach that allows us to obtain consistent estimates when the explanatory variables are correlated with the error terms. In the specific context of our analysis, the simple probit model estimates can be inconsistent because there are relevant explanatory variables which are omitted from the model. The exogenous variable included as exclusion restriction in the first step of the IV regressions is a binary variable for the health care reform in 2005.

Table 8: Delivery in Health Facility - Instrumental Variable Regressions

Dep. Variable: Delivery in Institutions (Public or Private Hospital)	(1) dF/dx	(2) dF/dx	(3) dF/dx
Instrument at the first step: Dummy variable for health care reform in 2005	0.41*** (0.02)	0.39*** (0.02)	0.40*** (0.02)
NHIS Enrolment	0.22*** (0.08)	0.19** (0.08)	0.17** (0.07)
Exemption delivery fees	-0.04** (0.02)	-0.03 (0.02)	-0.03 (0.02)
Obs.	2975	2961	2661

Notes: Marginal Effects Reported (Huber-White heteroskedasticity-consistent standard errors in parentheses). Sample weights are applied. Column 1 includes only socio-demographic characteristics as explanatory variables. Column 2 adds economic characteristics. Column 3 adds the population per health facility and the population per doctor. Statistical significance: *** 1%, ** 5%, * 10%.

Table 9: Delivery Assisted by a Trained Person - Instrumental Variable Regressions

Dep. Variable: Delivery Assisted by a Trained Person	(1) dF/dx	(2) dF/dx	(3) dF/dx
Instrument at the first step: Dummy variable for health care reform in 2005	0.41*** (0.2)	0.39*** (0.2)	0.38*** (0.03)
NHIS Enrolment	0.23*** (0.08)	0.21*** (0.08)	0.21*** (0.08)
Exemption delivery fees	-0.04* (0.02)	-0.03 (0.02)	-0.03 (0.02)
Obs.	2975	2961	2664

Notes: Marginal Effects Reported (Huber-White heteroskedasticity-consistent standard errors in parentheses). Sample weights are applied. Column 1 includes only socio-demographic characteristics as explanatory variables. Column 2 adds economic characteristics. Column 3 adds the population per health facility and the population per doctor. Statistical significance: *** 1%, ** 5%, * 10%.

We argue that the health care reform is a strong instrument because is very likely to be correlated with the enrolment in the NHIS (note that the reform introduced the NHIS and formally boosted the enrolment), and it is very unlikely to be correlated with the error terms in the regressions for the proxies of delivery care.[7]

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[7] The instrument used as exclusion restriction in the IV regression is likely to be uncorrelated with the error terms in the regressions for the proxies of delivery care as far as the health-care supply (in terms of number of hospital, health-care posts) did not change significantly after the 2005 reform.

4.3 Effect of the Programme on Out-Of-Pocket Expenditure

In developing countries, the cost of health-care services covered by out-of-pocket payments can constitute a significant portion of household resources. It may reduce other consumption (including spending on food and education) and may have both an immediate and intergenerational effect on household poverty and on the equity of heath-service delivery. Policy intervention addressed towards an improvement of the health-care system, as well as an improvement of the general population's health status, should consider a reduction of the out-of-pocket expenditure as one of its main goals. Since the 2008 DHS survey asks whether respondents did have to pay out-of-pocket for drugs and services some time before the survey, we investigate whether the introduction of the NHIS had any effect on the reduction/increase of the out-of-pocket expenditure. Descriptive statistics of out-of-pocket expenditure are provided in Table A4 in Appendix. Differences across sub-groups by background characteristics are small. Women in the Eastern region and those in the highest wealth quintiles are the least likely to pay out-of–pocket expenditure.

Table 10: Out-of-pocket Expenditure - Probit Regressions

Dep. Variable: Out of Pocket Expenditure	(1) dF/dx	(2) dF/dx	(3) dF/dx
NHIS Enrolment	-0.04* (0.02)	-0.04* (0.02)	-0.04* (0.02)
Obs.	1358	1348	1348

Notes: Marginal Effects Reported (Huber-White heteroskedasticity-consistent standard errors in parentheses). Sample weights are applied. Column 1 includes only socio-demographic characteristics as explanatory variables. Column 2 adds economic characteristics. Column 3 adds the population per health facility and the population per doctor. Statistical significance: *** 1%, ** 5%, * 10%.

The results from the regression analysis suggest that the enrolment in the NHIS has only a weak effect on out-of-pocket expenditure (for the complete set of results, see Table A9 in the Appendix). The marginal effect of the NHIS enrolment is negative, but it is only statistically significant at 10%. Moreover, the results do not change even when we control for the potential problem of sample selection into enrolment through an instrumental variable approach (the results are not provided).

5. Conclusions and Discussion

We have focused on the recent experience of Ghana, in which a National Health Insurance Scheme (NHIS) was enacted in 2003 and fully implemented from late 2005 onwards. Even though there is evidence of an increasing level of coverage, there has been little research to date on the impact of the NHIS in relation to household care-seeking and expenditure. This paper uses the variation over time and enrolment induced by the National Health Insurance to assess the impact of the Scheme. Using data from the 2008 Demographic and Health Survey, we have presented some evidence on how the National Health Insurance Scheme affected the utilisation of health care services and out-of-pocket expenditure of households.

Our findings suggest that the introduction of the NHIS has had a positive and significant effect on the utilisation of health-care services. In particular, we find that being enrolled in the NHIS positively affects: a) the probability of formal antenatal check-up before childbirth; b) the probability of childbirth taking place in an institution (public or private hospital); and c) the probability of being assisted during birth by a trained person. With regard to findings (b) and (c), taking the potential

problem of sample selection into NHIS enrolment into account, we do find very strong results. Indeed, these results show that the marginal effect of being enrolled in the NHIS increases, and is still statistically significant. Moreover, the results are robust with regard to the inclusion of different sets of explanatory variables that account for socio-demographic and economic characteristics, as well as the proxies of the supply side.

Since a greater utilisation of health-care services, especially during the perinatal period, has a strong positive effect on the current and future health status of women and their children, the health-care authorities in Ghana should make every effort to extend this coverage. In particular, since the analysis of the determinants of the enrolment suggests that cost is one of the major obstacles to enrolment, we argue that the health-care authorities in Ghana should work in two directions: i) to differentiate the premium on an income/wealth basis[8] in order to generate a progressive system in which the lowest income group pays effectively less than the highest income group; and ii) find more effective methods to identify the poor who should be exempted from the premium. Moreover, because the educational attainment of women is a strong determinant of enrolment, and those with low education and unable to read are less likely to enrol, information on the NHIS should be disseminated in ways that reach those with little or no education. Finally, our findings indicate that the availability of government health facilities in a region is associated with higher likelihood of enrolment in the NHIS. Accordingly, extending geographical access is an important strategy for expanding NHIS membership and improving access to health-care.

Unfortunately, our findings on the effect of the NHIS on out-of-pocket expenditure are not equally encouraging and are not fully consistent with those in Mensah et al., (2010). Our results suggest that the enrolment in the NHIS has only a weak effect on the reduction of out-of-pocket expenditure. As for the rest of the analysis, these results are robust to the inclusion of different sets of explanatory variables that account for socio-demographic and economic characteristics, and the proxies of the supply side, such as the population per health-facility and the population per doctor. There are different potential explanations that deserve a separate analysis. Here, we mention only two of them: i) some of the accredited facilities might not provide for free all the general outpatient and inpatient services; and ii) the indirect costs of the service (informal payments to obtain the service, the cost of food during the stay in hospital, etc.).

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[8] Contributions by those outside the formal sector are supposed to be defined according to income such that the lowest income group pays a premium of 7.20 Ghanaian cedi (US$ 8) while those in the highest income group pay a premium of 48 Ghanaian cedi (US$53). In reality, to date, a flat premium payment of 7.20 Ghanaian cedi *per annum* is charged to all, irrespective of income.

References

Abekah-Nkrumah G., Dinklo T. and Abor J (2009), "Financing the Health Sector in Ghana: a Review of the Budgetary Process", European Journal of Economics, Finance and Administrative Sciences, 17, 45-59.

Agyepong I.A. and Adjei S. (2008), "Public social policy development and implementation: a case study of the Ghana National Health Insurance Scheme", Health Policy and Planning, 23, 150-160

Arhin-Tenkorang D., (2001), "Mobilizing resources for health: the case for user fees revisited", Working Paper no. 81, Harvard University

Barros R. (2009), "Wealthier but not much Healthier: Effects of a Health Insurance Program for the Poor in Mexico", PhD Dissertation Stanford University.

Chaudhury A. and Roy K (2008), "Changes in out-of-pocket payments for healthcare in Vietnam and its impact on equity in payments, 1992–2002", Health Policy, 88, 38-48.

Chetty R. and Looney A. (2006), "Consumption smoothing and the welfare consequences of social insurance in developing economies", Journal of Public Economics, 90, 2351-2356.

Currie J. and Madrian B. (2005), "Health, Health Insurance and the Labor Market", Handbook of Labor Economics, Volume 3, Chapter 50. Edited by O. Ashenfelter and D. Card.

Gertler P., and Gruber J. (2002), "Insuring Consumption Against Illness", American Economic Review, 92, 51-76.

Ghana Statistical Service (GSS), Ghana Health Service (GHS), and ICF Macro. 2009. Ghana Demographic and Health Survey 2008. Accra, Ghana: GSS, GHS, and ICF Macro.

Ghana Health Services (2005), Facts and Figures, PPME-GHS 2005.

----------------------(2007), The Health Sector in Ghana: Facts and Figures, PPME-GHS 2007.

----------------------(2008), The Health Sector in Ghana: Facts and Figures, PPME-GHS 2008.

----------------------(2009), The Health Sector in Ghana: Facts and Figures, PPME-GHS 2009.

Goldman D., Joyce G. and Zheng Y. (2007), "Prescription Drug Cost Sharing: Association With Medication and Medical Utilization and Spending and Health", JAMA, 298, 61-69.

Grossman M. (1972), "On the concept of health capital and the demand for health", Journal of Political Economy, 80, 223-255.

Jutting J. (2005), "Health Insurance for the Poor in Developing Countries". Ashgate publication, England.

Liu T., and Chen C. (2002), "An analysis of private health insurance purchasing decisions with national health insurance in Taiwan", Social Science and Medicine, 55, 755-774.

Manning WC., Marquis MS. (1996), "Health insurance: the trade-off between risk pooling and moral hazard", Journal of Health Economics, 15, 609-639.

McIntyre D., Garshong B., Mtei G., Meheus F., Thiede M., Akazili J., et al. (2008), "Beyond fragmentation and toward universal coverage: insights from Ghana, South Africa and the United Republic of Tanzania", Bulletin of the World Health Organization, 86, 871-876.

Mensah J., Oppong J., Bobi-Barimah K., Frempong G. and Sabi W. (2010), "An Evaluation of the Ghana National Health Insurance Scheme in the Context of the Health MDGs", Working Paper No.40, Global Development Network 1999-2009, Working Paper Series.

Miller G., Pinto D. and Vera-Hernandez M. (2009), "High-Powered Incentives in Developing Country Health Insurance", NBER Working Paper 15456.

Ministry of Health Ghana (2004a), Legislative Instrument on National Health Insurance, Accra: National Parliament of Ghana Press.

----------------------------------(2004b), Guideline for Designing and Implementing District-wide MHOs in Ghana, Accra: Government of Ghana Publishing House.

----------------------------------(2008), Independent Review: Health Sector Programme of work 2007, Draft Report April 2008.

Sulzbach, S. (2008), Evaluating the Impact of National Health Insurance in Ghana, Health Systems 20/20, Accra.

Xu K., Evans D., Kawabata K., Zeramdini R., Klavus J. and Murray C. (2003), "Household catastrophic health expenditure: a multicountry analysis", Lancet, 362, 111-117.

Waddington CJ and Enyimayew KA (1990), "A price to pay, part 2: the impact of user charges in the Volta region, Ghana", International Journal of Health Planning and Management, 5, 287-312.

Wagstaff A. (2009), "Social Health Insurance Reexamined", Health Economics, Published online in Wiley InterScience. DOI: 10.1002/hec.1492

Witter S. and Garshong B. (2009), "Something old or something new? Social health insurance in Ghana", BMC International Health and Human Rights, 9:20. Online at http://www.biomedcentral.com/1472-698X/9/20

Appendix

Table A1: Health Insurance Coverage – 2008 Ghana DHS- Percent Distribution by type of health insurance

	Female Obs. 4916	Male Obs. 4569
No Health Insurance	59.81	68.98
National Health Insurance Scheme	38.93	29.7
Health Insurance through employer	0.08	0.19
Mutual/Community based health organisation	1.08	1.21
Privately purchased commercial insurance/other	0.1	0.07

Table A2: Background Characteristics of the Sample

	Full Sample		Enrolled in the NHIS	
	Female	Male	Female	Male
Background Characteristics				
Age				
15-19	20.84	19.94	19.85	22.75
20-24	17.86	15.42	15.56	11.72
25-29	16.93	13.66	17.57	9.44
30-34	13.1	11.66	14.12	13.33
35-39	12.99	11.57	14.07	12
40-44	9.56	8.62	10.58	8.91
45-49	8.72	7.96	8.26	7.54
50-54	-	6.51	-	8.16
55-59	-	4.66	-	6.13
Marital Status				
Never married	32.41	42.52	29.94	41.03
Married/living together	58.51	52.64	62.37	56.16
Other	9.08	4.84	7.69	2.81
Urban/Rural residence				
Urban	48.48	46.53	52.2	54.29
Region				
Western	9.1	10.48	9.99	10.82
Central	8.62	8.24	5.15	6.65
Greater Accra	17.35	16.08	11.01	11.74
Volta	8.77	9.17	6.81	7.5
Eastern	9.82	10.3	12.55	12.73
Ashanti	20.56	18.77	21.57	17.75

Brong Ahafo	8.65	8.43	13.14	12.61
Northen	9.5	10.45	9.5	11
Upper East	5.15	5.46	7.27	5.35
Upper West	2.49	2.64	3.02	3.84
Literacy				
Not able to read a full sentence	63.1	46.43	56.93	32.11
Education				
No education	21.21	14.03	17.6	8.74
Primary	20.1	14.51	15.55	10.68
Secondary	54.8	62.46	61.42	63.5
Higher	3.89	9	5.43	17.07
Religion				
Christian	77.53	72.33	80.15	77.18
Moslem	15.02	16.59	15.23	16.32
Other	7.45	11.08	4.63	6.5

	Full Sample		**Enrolled in the NHIS**	
	Female	**Male**	**Female**	**Male**
Ethnicity				
Akan	50.73	47.38	55.37	50.77
Ga/Dangme	6.99	6.54	5.36	6.05
Ewe	12.88	14.73	9.51	12.29
Mole-Dangbani	16.17	16.64	16.77	16.21
Other	13.23	14.71	12.99	14.68
Wealth Quintile				
Lowest	15.93	17.71	12.01	10.48
Second	18.31	17.84	14.96	13.64
Middle	19.92	17.16	19.39	15.5
Fourth	22.76	23.63	25.7	28.54
Highest	23.08	23.65	27.94	31.83
Occupation				
Not working	22.54	18.3	22.65	21.57
Professional/technical/managerial	3.64	10.35	5.74	19.84
Clerical	1.41	7.17	1.68	6.73
Sales	31.34	6.83	32.41	5.9
Agriculture-Self employed	23.37	34.09	18.67	25.29
Agriculture	0.12	1.33	0.11	1.53
Services	9.01	3.73	8.28	3.48
Skilled Manual	8.43	17.42	10.39	14.73
Unskilled Manual	0.13	0.79	0.08	0.94

Table A3a: Health Insurance Coverage- 2008 Ghana DHS
Percent distribution by type of health insurance, according to selected background
characteristics-Women

	No Health Insurance	National Health Insurance Scheme	Health Insurance through employer	Mutual/ Community based health organization	Privately purchased commercial insurance/other
Age					
15-19	61.44	37.09	0.15	1.33	0.17
20-24	65.22	33.9	0	0.8	0
25-29	58.44	40.34	0	1.15	0
30-34	56.96	41.89	0	0.93	0.22
35-39	57.43	42.26	0	0.57	0
40-44	55.01	43.01	0.54	1.36	0
45-49	60.59	37.02	0	1.67	0.32
Urban/rural residence					
Urban	56.43	41.93	0.17	1.3	0.11
Rural	63	36.11	0	0.88	0.08
Literacy					
Able to read	52.81	45.52	0.14	1.39	0
Not able to read	63.91	35.08	0.05	0.88	0.15
Education					
No education	67.32	32.27	0	0.58	0
Primary	68.82	30	0	1.02	0.15
Secondary	54.94	43.63	0.1	1.23	0.11
Higher	41.66	54.85	0.71	2.24	0
Wealth Index					
Lowest	70.01	29.38	0	0.95	0.07
Second	67.58	31.74	0	0.68	0
Middle	61.51	37.87	0	0.53	0
Fourth	54.33	43.9	0	1.34	0.36
Highest	50.56	47.27	0.36	1.73	0

Table A3b: Health Insurance Coverage- 2008 Ghana DHS
Percent distribution by type of health insurance, according to selected background characteristics-Men

	No Health Insurance	National Health Insurance Scheme	Health Insurance through employer	Mutual/ Community based health organization	Privately purchased commercial insurance
Age					
15-19	65.42	33.91	0	0.67	0
20-24	76.53	22.59	0.17	0.71	0
25-29	79.19	20.51	0	0.3	0
30-34	63.95	33.92	0.21	2.37	0
35-39	67.65	30.78	0.23	1.81	0
40-44	68.34	30.66	0	1	0
45-49	70.03	28.09	0.56	1.32	0
50-54	59.46	37.37	0.36	3.05	0
55-59	57.93	39.16	1.05	1.2	0.67
Urban/rural residence					
Urban	63.28	34.68	0.41	1.68	0
Rural	73.93	25.37	0	0.81	0.06
Literacy					
Able to read	60.71	37.52	0.31	1.43	0.06
Not able to read	78.73	20.44	0.06	0.97	0
Education					
No education	81.28	18.49	0	0.23	0
Primary	77.67	21.92	0	0.61	0
Secondary	68.21	30.2	0.19	1.47	0.25
Higher	40.84	56.5	0.84	2.03	0
Wealth Index					
Lowest	82.44	17.56	0	0	0
Second	77.03	22.68	0	0.54	0
Middle	72.06	26.82	0	1.04	0.18
Fourth	62.22	35.92	0.39	1.73	0
Highest	57.36	39.97	0.43	2.25	0

Table A4: Descriptive Statistics: Antenatal Care, Delivery Care and Out-of-Pocket Expenditure

	Formal Antenatal Check Up	Tetanus Injection	Delivery in Institution	Delivery attended by a Trained Person	Out-Of-Pocket Expenditure
Total Sample	95.54	56.83	57.08	58.94	17.44
Age					
15-19	97.57	56.41	53.29	54.05	4.85
20-24	93.78	56.35	53.28	54.88	16.3
25-29	95.87	59.76	57.54	59.31	16.48
30-34	96.51	58.24	64.06	66.78	16.02
35-39	97.03	55.22	55.74	58.27	17.35
40-44	92.21	50.46	58.67	58.83	21.52
45-49	94.91	52.66	40.12	40.83	15.56
Marital Status					
Never married	96.72	56.15	66.17	68.81	11.89
Married/living together	95.64	57.15	56.36	58.29	17.52
Other	93.05	53.06	60.59	60.76	17.49
Urban/Rural residence					
Urban	97.98	61.86	82.31	84.71	21.37
Rural	93.9	53.44	41.66	43.18	14.58
Number of previous pregnancies					
0	98.09	63.91	68.09	69.61	17.99
1	95.92	58.95	60.03	61.78	18.23
2	95.23	56.29	55.23	57.56	17.08
3	93.9	49.6	52.2	54.49	16.6
4	94.85	59.1	49.33	51.08	15.83
5+	93.41	48.16	40.18	41.7	13.38
Region					
Western	95.75	54.68	58.29	62.2	15.9
Central	93.2	55.53	51.67	54.84	15.61
Greater Accra	95.69	66.63	83.71	84.31	29.59
Volta	91.06	50.73	53.65	53.65	37.36
Eastern	96.03	48.96	58.97	60.77	25.16
Ashanti	97.29	57.39	69.99	72.75	15.02
Brong Ahafo	96.44	59.94	64.72	65.54	15.32
Northen	95.59	54.61	26.07	27.47	10.59
Upper East	96.3	65.51	46.11	47.15	4.39
Upper West	97.56	46.53	45.35	46.35	7.8
Literacy					
Not able to read	94.94	55.09	50.84	85.06	28.47
Able to read	97.78	63.34	82.78	52.61	14.33
Education					
No education	93.57	53.29	34.44	36.63	11.13
Primary	93.78	54.46	53.31	54.8	15.35
Secondary and higher	97.84	60.46	76.68	7838	22.19
Religion					
Christian	95.82	58.29	63.25	65.06	18.35
Moslem	97.98	58.44	50.12	51.86	14.61
Other	89.23	43.35	30.14	32.42	14.48

	Formal Antenatal Check Up	Tetanus Injection	Delivery in Institution	Delivery attended by a Trained Person	Out-Of-Pocket Expenditure
Ethnicity					
Akan	96.84	59.24	65.46	68.46	17.27
Ga/Dangme	95.86	51.94	58.02	61.13	31.84
Ewe	93.8	51.23	64.18	63.31	37.66
Mole-Dangbani	95.7	57.36	43.16	44.81	7.6
Other	92.76	55.04	45.77	46.35	12.24
Wealth Quintile					
Lowest	92.64	50.44	23.53	24.41	8.01
Second	93.2	52.42	48.68	50.15	15.54
Middle	96.06	51.81	61.93	65.18	16.81
Fourth	97.73	66.21	80.06	81.98	19.75
Highest	99.64	66.16	92.76	94.82	25.89
Occupation					
Not working	97.74	60.82	65.52	68.4	13.88
Professional/technical/managerial	98.65	75.38	95.93	95.26	25.51
Sales, Services, Skilled manual	96.7	59.47	68.58	71.24	19.96
Agriculture, unskilled manual	92.7	49.65	35.11	35.77	13

Table A5: Formal Antenatal Check up- Probit Regressions

Formal Antenatal Check up	(1) dF/dx	(2) dF/dx	(3) dF/dx
NHIS Enrolment	0.02**	0.01*	0.02**
	(0.01)	(0.01)	(0.01)
Number of previous pregnancies	-0.01**	0.00**	-0.01**
	(0.00)	(0.00)	(0.00)
Age	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)
Age Squared	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)
Residence: Urban	0.03***	0.01	0.01
	(0.01)	(0.01)	(0.01)
Marital Status: Married or living in couple	0.00	0.00	0.00
	(0.02)	(0.01)	(0.02)
Married Status: Other	-0.02	-0.02	-0.02
	(0.03)	(0.03)	(0.03)
Religion: Christian	0.02*	0.02*	0.01
	(0.01)	(0.01)	(0.01)
Religion: Moslem	0.04***	0.03***	0.03***
	(0.01)	(0.01)	(0.01)
Ethnicity: Akan	0.03***	0.03**	0.00
	(0.01)	(0.01)	(0.02)
Ethnicity: Ga-Dangme	0.02*	0.02**	-0.02
	(0.01)	(0.01)	(0.02)
Ethnicity: Ewe	0.02**	0.02**	-0.02
	(0.01)	(0.01)	(0.02)
Ethnicity: Mole-Dagbani	-0.01	-0.01	-0.03
	(0.01)	(0.01)	(0.03)
Not able to read	0.00	0.01	0.01
	(0.01)	(0.01)	(0.02)

Education: Primary	0.00	0.00	-0.01
	(0.01)	(0.01)	(0.01)
Education: Secondary	0.02	0.01	0.01
	(0.01)	(0.01)	(0.01)
Wealth Index 2	-	0.00	0.00
	-	(0.01)	(0.01)
Wealth Index 3	-	0.01	0.00
	-	(0.01)	(0.01)
Wealth Index 4	-	0.02*	0.01
	-	(0.01)	(0.01)
Wealth Index 5	-	0.04***	0.04**
	-	(0.01)	(0.01)
Occ.: manager, professional, clerical	-	-0.03	-0.03
	-	(0.05)	(0.05)
Occ.: sales, services and skilled manual	-	-0.01	-0.01
	-	(0.01)	(0.01)
Occ.: agriculture, unskilled manual	-	-0.02	-0.02
	-	(0.02)	(0.02)
Population per Government health facility	-	-	-0.01*
	-	-	(0.00)
Population per doctor	-	-	0.00
	-	-	(0.00)
Obs.	2132	2120	1880
Pseudo R^2	0.1271	0.1484	0.1613

Table A6: Tetanus Injection - Probit Regressions

Tetanus Injection	(1) dF/dx	(2) dF/dx	(3) dF/dx
NHIS Enrolment	0.04*	0.01	0.02
	(0.03)	(0.03)	(0.03)
Number of previous pregnancies	-0.03**	-0.02*	-0.02**
	(0.01)	(0.01)	(0.01)
Age	0.02	0.02	0.01
	(0.01)	(0.01)	(0.01)
Age Squared	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)
Residence: Urban	0.03	-0.02	-0.02
	(0.03)	(0.03)	(0.03)
Marital Status: Married or living in couple	0.05	0.04	0.06
	(0.06)	(0.06)	(0.06)
Married Status: Other	0.00	0.00	0.02
	(0.07)	(0.07)	(0.07)
Religion: Christian	0.13***	0.12**	0.1**
	(0.04)	(0.04)	(0.04)
Religion: Moslem	0.14***	0.13**	0.09**
	(0.05)	(0.05)	(0.05)
Ethnicity: Akan	0.12*	0.09	0.09
	(0.06)	(0.06)	(0.06)
Ethnicity: Ga-Dangme	0.03	0.01	0.03
	(0.07)	(0.07)	(0.06)
Ethnicity: Ewe	0.06	0.03	0.1
	(0.08)	(0.08)	(0.06)
Ethnicity: Mole-Dagbani	0.07	0.04	0.08
	(0.07)	(0.07)	(0.06)
Not able to read	-0.02	0.00	-0.01
	(0.04)	(0.04)	(0.04)
Education: Primary	-0.01	-0.02	-0.02
	(0.04)	(0.04)	(0.04)
Education: Secondary	0.00	-0.02	-0.02
	(0.04)	(0.04)	(0.04)
Wealth Index 2	-	0.02	0.00
	-	(0.04)	(0.04)
Wealth Index 3	-	0.00	-0.02
	-	(0.05)	(0.04)
Wealth Index 4	-	0.12**	0.1**
	-	(0.05)	(0.05)
Wealth Index 5	-	0.09	0.07
	-	(0.06)	(0.06)
Occ.: manager, professional, clerical	-	0.1	0.1
	-	(0.08)	(0.08)
Occ.: sales, services and skilled manual	-	-0.01	-0.01
	-	(0.04)	(0.04)
Occ.: agriculture, unskilled manual	-	-0.05	-0.04
	-	(0.05)	(0.05)
Population per Government health facility	-	-	0.01
	-	-	(0.01)
Population per doctor	-	-	0.00
	-	-	(0.01)
Obs.	2107	2095	2095
Pseudo R^2	0.0326	0.0326	0.027

Table A7: Delivery in Health Facility - Probit Regressions

Delivery in Institutions (Public and Private Hospital)	(1) dF/dx	(2) dF/dx	(3) dF/dx
NHIS Enrolment	0.18***	0.15***	0.15***
	(0.02)	(0.03)	(0.02)
Exemption delivery fees	-0.01	0.00	0.00
	(0.02)	(0.02)	(0.02)
Number of previous pregnancies	-0.05***	-0.04***	-0.05***
	(0.01)	(0.01)	(0.01)
Age	0.04***	0.03**	0.03**
	(0.01)	(0.01)	(0.01)
Age Squared	0.00**	0.00	0.00
	(0.00)	(0.00)	(0.00)
Residence: Urban	0.3***	0.16***	0.17***
	(0.03)	(0.04)	(0.03)
Marital Status: Married or living in couple	-0.01	-0.05	-0.02
	(0.06)	(0.05)	(0.06)
Married Status: Other	-0.03	-0.04	-0.01
	(0.08)	(0.08)	(0.08)
Religion: Christian	0.1**	0.07	0.07
	(0.04)	(0.04)	(0.04)
Religion: Moslem	0.13**	0.11**	0.09*
	(0.05)	(0.05)	(0.05)
Ethnicity: Akan	0.12*	-0.04	-0.06
	(0.06)	(0.05)	(0.05)
Ethnicity: Ga-Dagme	0.19***	-0.1	-0.17**
	(0.06)	(0.08)	(0.07)
Ethnicity: Ewe	0.11	0.08	0.01
	(0.07)	(0.06)	(0.05)
Ethnicity: Mole-Dagme	0.14**	-0.03	0.00
	(0.07)	(0.04)	(0.04)
Not able to read	-0.06	-0.02	-0.02
	(0.04)	(0.04)	(0.04)
Education: Primary	0.08**	0.06	0.06
	(0.04)	(0.04)	(0.04)
Education: Secondary	0.19***	0.15***	0.15***
	(0.04)	(0.04)	(0.04)
Wealth Index 2	-	0.16***	0.14***
	-	(0.04)	(0.03)
Wealth Index 3	-	0.2***	0.18***
	-	(0.04)	(0.04)
Wealth Index 4	-	0.29***	0.27***
	-	(0.04)	(0.04)
Wealth Index 5	-	0.36***	0.34***
	-	(0.04)	(0.04)
Occ.: manager, professional, clerical	-	0.21**	0.19**
	-	(0.07)	(0.08)
Occ.: sales, services and skilled manual	-	0.00	-0.01
	-	(0.05)	(0.04)
Occ.: agriculture, unskilled manual	-	-0.04	-0.04
	-	(0.05)	(0.05)
Population per Government health facility	-	-	-0.01
	-	-	(0.01)
Population per doctor	-	-	-0.04***
	-	-	(0.01)
Obs.	2975	2961	2961
Pseudo R^2	0.2415	0.2661	0.2604

Table A8: Delivery assisted by a trained person - Probit Regressions

Delivery assisted by a trained person	(1) dF/dx	(2) dF/dx	(3) dF/dx
NHIS Enrolment	0.17***	0.13***	0.13***
	(0.02)	(0.03)	(0.02)
Exemption delivery fees	0.01	0.02	0.02
	(0.02)	(0.02)	(0.02)
Number of previous pregnancies	-0.05***	-0.04***	-0.05***
	(0.01)	(0.01)	(0.01)
Age	0.05***	0.04***	0.04***
	(0.01)	(0.01)	(0.01)
Age Squared	0.00**	0.00**	0.00**
	(0.00)	(0.00)	(0.00)
Residence: Urban	0.32***	0.18***	0.18***
	(0.03)	(0.03)	(0.03)
Marital Status: Married or living in couple	-0.02	-0.05	-0.02
	(0.06)	(0.05)	(0.06)
Married Status: Other	-0.06	-0.08	-0.05
	(0.08)	(0.08)	(0.08)
Religion: Christian	0.08**	0.04	0.04
	(0.04)	(0.04)	(0.04)
Religion: Moslem	0.11**	0.09*	0.07
	(0.05)	(0.05)	(0.05)
Ethnicity: Akan	0.11	-0.01	-0.02
	(0.07)	(0.05)	(0.04)
Ethnicity: Ga-Dagme	0.13*	-0.04	-0.13*
	(0.06)	(0.08)	(0.07)
Ethnicity: Ewe	0.06	0.06	-0.01
	(0.08)	(0.06)	(0.05)
Ethnicity: Mole-Dagme	0.09	-0.03	0.00
	(0.07)	(0.04)	(0.04)
Not able to read	-0.09**	-0.05	-0.05
	(0.04)	(0.04)	(0.04)
Education: Primary	0.06	0.03	0.03
	(0.04)	(0.04)	(0.04)
Education: Secondary	0.16***	0.11**	0.11**
	(0.04)	(0.04)	(0.04)
Wealth Index 2	-	0.15***	0.14***
	-	(0.03)	(0.03)
Wealth Index 3	-	0.2***	0.18***
	-	(0.04)	(0.04)
Wealth Index 4	-	0.27***	0.26***
	-	(0.04)	(0.04)
Wealth Index 5	-	0.36***	0.35***
	-	(0.04)	(0.04)
Occ.: manager, professional, clerical	-	0.11	0.1
	-	(0.08)	(0.09)
Occ.: sales, services and skilled manual	-	-0.02	-0.03
	-	(0.05)	(0.04)
Occ.: agriculture, unskilled manual	-	-0.09*	-0.08*
	-	(0.05)	(0.05)
Population per Government health facility	-	-	-0.02*
	-	-	(0.01)
Population per doctor	-	-	-0.04***
	-	-	(0.01)
Obs.	2961	2947	2947
Pseudo R^2	0.2491	0.2772	0.271

Table A9: Out of Pocket Expenditure - Probit Regressions

Out of Pocket Expenditure	(1) dF/dx	(2) dF/dx	(3) dF/dx
NHIS Enrolment	-0.04*	-0.04*	-0.04*
	(0.02)	(0.02)	(0.02)
Exemption delivery fees	0.00	0.00	0.00
	(0.02)	(0.02)	(0.03)
Number of previous pregnancies	-0.02	-0.02	-0.02
	(0.01)	(0.01)	(0.01)
Age	-0.01	-0.01	-0.01
	(0.02)	(0.02)	(0.02)
Age Squared	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)
Residence: Urban	0.01	0.01	0.00
	(0.03)	(0.04)	(0.04)
Marital Status: Married or living in couple	0.06	0.06	0.06
	(0.07)	(0.07)	(0.07)
Married Status: Other	0.21*	0.22*	0.21*
	(0.15)	(0.15)	(0.15)
Religion: Christian	-0.06	-0.07	-0.07
	(0.07)	(0.08)	(0.07)
Religion: Moslem	0.02	0.01	0.01
	(0.08)	(0.08)	(0.07)
Ethnicity: Akan	0.04	0.05	0.03
	(0.06)	(0.06)	(0.05)
Ethnicity: Ga-Dagme	0.10	0.16*	0.14*
	(0.11)	(0.11)	(0.11)
Ethnicity: Ewe	0.24***	0.25***	0.30***
	(0.10)	(0.10)	(0.09)
Ethnicity: Mole-Dagme	-0.1**	-0.10*	-0.11***
	(0.04)	(0.04)	(0.04)
Not able to read	-0.03	-0.03	-0.03
	(0.04)	(0.04)	(0.04)
Education: Primary	0.02	0.01	0.02
	(0.05)	(0.05)	(0.05)
Education: Secondary	0.05	0.04	0.05
	(0.05)	(0.05)	(0.05)
Wealth Index 2	-	0.13**	0.12**
	-	(0.07)	(0.07)
Wealth Index 3	-	0.04	0.04
	-	(0.06)	(0.07)
Wealth Index 4	-	0.1	0.11
	-	(0.07)	(0.07)
Wealth Index 5	-	0.07	0.08
	-	(0.08)	(0.08)
Occ.: manager, professional, clerical	-	-0.01	0.01
	-	(0.08)	(0.09)
Occ.: sales, services and skilled manual	-	0.00	0.00
	-	(0.05)	(0.06)
Occ.: agriculture, unskilled manual	-	-0.02	-0.02
	-	(0.06)	(0.06)
Population per Government health facility	-	-	0.02*
	-	-	(0.01)
Population per doctor	-	-	0.01
	-	-	(0.01)
Obs.	1358	1348	1348
Pseudo R^2	0.1036	0.1135	0.1039

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