Equity of Access to Maternal Health Care in the Philippines

By

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Abstract

In many developing countries, achieving inclusive growth is one of the major policy concerns. In the Philippines, the wide disparity in the use of maternal health care services among socio-economic groups, is one of the causes that constrained the country in achieving its Millennium Development Goal (MDG) target in reducing the maternal mortality ratio by three quarters until 2015. In this thesis, the sources of inequality in the utilization of maternal health care, specifically in the use of facility-based deliveries were explored using a two-stage regression procedure. The impacts of supply and demand side policy interventions in reducing inequality were also illustrated through the Concentration Curve and Concentration Index. The results show that income, household composition, parity, educational attainment, and health insurance coverage are among the most important factors. Demand and supply side policy interventions are both essential in improving the access among poor women and the results show that their impact can be maximized if both policy interventions are implemented at the same time.

Acknowledgements

Table of Contents

List of Figures

List of Tables

Abbreviations

ARMM	Autonomous Region of Muslim Mindanao
BHFS	Bureau of Health Facilities and Services
CALABARZON	Calamba, Laguna, Batangas, Rizal, Quezon
CAR	Cordillera Administrative Region
CPH	Census of Population and Housing
DOH	Department of Health
DSWD	Department of Social Welfare and Development
GDP	Gross Domestic Product
HDI	Human Development Index
HMO	Health Maintenance Organization
LGU	Local Government Unit
MDG	Millennium Development Goals
MIMAROPA	Marinduque, Occidental Mindoro, Oriental Mindoro, Palawan, Romblon
NCR	National Capital Region
NDHS	National Demographic Health Survey
NHTS	National Household Targeting System
OLS	Ordinary Least Squared
PhilHealth	Philippine Health Insurance Corporation
PhP	Philippine Peso
PSA	Philippine Statistics Authority
SDG	Sustainable Development Goals
UN	United Nations
USD	United States Dollar

1. Introduction

The Philippines is one of the biggest countries in Southeast Asia in terms of population and land area. It is an archipelago comprised of 7,107 mostly uninhabited islands which are categorized broadly into three major island groups: Luzon, Visayas and Mindanao and are further subdivided into 17 regions and 81 provinces (**Appendix 1**). The population is estimated at 102 million[1].

Only 13% of the population lives in the National Capital Region (NCR)[2], the rest is widely dispersed across the 2,000 inhabited islands. The scattered population over such a wide expanse of islands is one of the significant constraints in achieving economic and social development simultaneously. As a result, the economic and human development varies widely across regions. The NCR having the highest per capita income, has the highest Human Development Index (HDI) and lowest poverty rate while the Autonomous Region in Muslim Mindanao (ARMM) lags behind in all metrics. In per capita Gross Domestics Product (GDP) terms, the difference between the two regions is 17 fold! (**Appendix 2**). By international comparison, all regions are sizeable. E.g. in the poorest region of ARMM 3.7 million people struggle for survival – this is the size of Bosnia and Herzegovina or Puerto Rico.

In many developing countries including the Philippines, achieving inclusive growth[3] is one of the major policy concerns. Despite the remarkable economic growth achieved in the recent years, with an average of 5.2% GDP growth from 2000 to 2016, poverty rate was only reduced from 24.9% to 21.6%. Similarly, inequality as measured by the Gini index, barely

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[1] 2015 population projection based on the 2010 Census of Population and Housing (CPH) conducted by the Philippine Statistics Authority (PSA). Source: http://psa.gov.ph/statistics/census/projected-population.

[2] The National Capital Region (NCR) is commonly known as Metro Manila or simply Manila.

[3] The term "inclusive growth" was introduced by the widely disseminated work of Acemoglu and Robinson's *Why Nations Fail* (2012).

declined from 42.8% to 40.1% **(Figure 1).** The Philippine case is a perfect example where economy is significantly growing yet progress is not translated into reducing poverty and inequality by a significant amount.

Figure 1: GDP Growth, Poverty and Inequality, 2000-2016
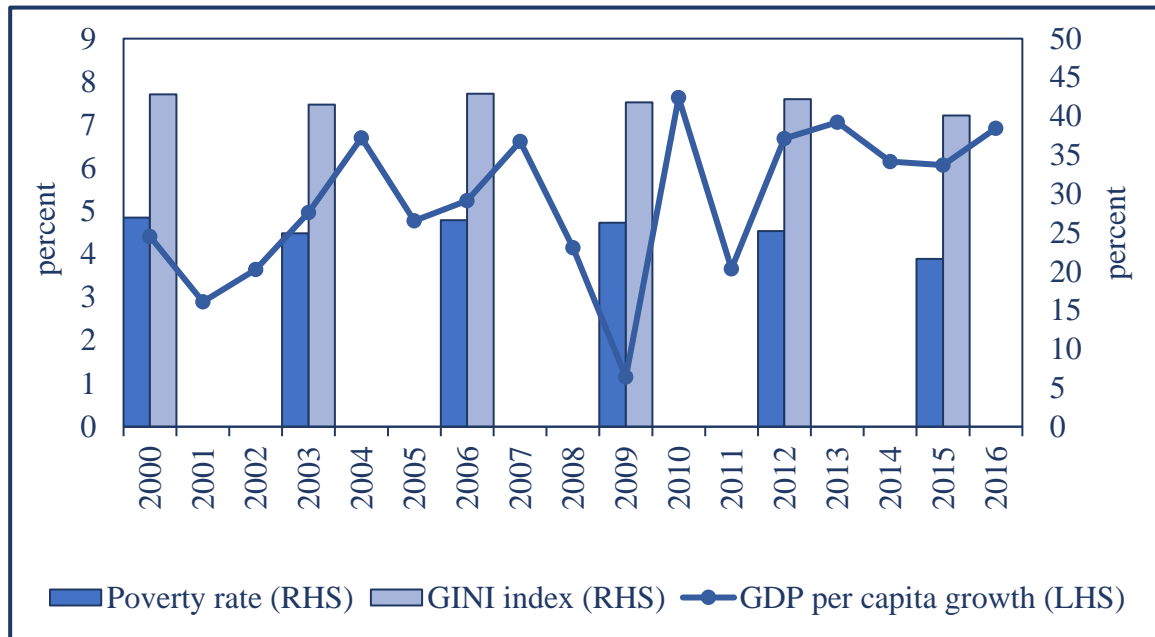
Notes: RHS = right hand side; LHS = left hand side.
Source: World Development Indicators, World Bank (accessed April 2018)

Arguably, providing equal access to basic services such as education, health, clean water and other services are the pillars of achieving inclusive growth (Ali and Zhuang, 2007). From this palette of desirable changes, my thesis focuses only on healthcare, because everyday experience and previous academic studies have clearly shown that wide disparity in access to health care services persists in the Philippines. Data compiled by Ali and Son (2007) more than a decade ago had illustrated, through the opportunity curve, that individuals belonging to the lower income distribution has lower utilization of health care facilities compared to their counterparts at the top end of the income distribution **(Appendix 3)**. Likewise, World Bank

(2010) report pointed out that provision of health care services among regions vary widely, both in terms of quantity and quality.

Under the 1987 Philippine Constitution, the government is mandated to provide affordable and universal access to basic health care. The government is committed to narrow the gap in the access to health care services in order to promote improvements in health outcomes, such as further reductions in child and maternal mortality, prevalence of malnutrition and the incidence of major diseases (DOH, 2012). In the last three decades, various reforms were initiated to achieve this objective. Among them was the devolution of the health service provision function to the Local Government Units (LGU) under the Local Government Code in 1991. LGU's were granted autonomy and responsibility with the aim that it will establish a more effective and efficient provision and management of health care services, as devolved function of service delivery is expected to result in a more responsive and accountable local government (Grundy, et. al, 2003). In addition, the National Health Insurance Act of 1995 was implemented to provide all citizens especially the poor with a health insurance coverage to ensure equal utilization of health care services **(Appendix 4)**.

Despite these efforts, some of the health outcomes, such as maternal health remain to be meager. The Millennium Development Goal (MDG) target in reducing the maternal mortality ratio by three quarters between 1990 and 2015 was not achieved. **Table 1.1** shows that maternal mortality ratio in the Philippines was only reduced by 25%, from a 152 deaths per 100,000 live births in 1990 to 114 deaths per 100,000 live births in 2015. This level is still high considering the level of economic growth the country has achieved in the last decade. Even though, Philippines is not the only country not to have achieved this target compared to its middle income neighbors in Southeast Asia (only Cambodia and Lao PDR reached it), the country's performance is the poorest in reducing maternal mortality. In terms of achieving universal access to reproductive health, Philippines also failed in achieving its target. In 2015,

only 72.8% of births were delivered with the assistance of a skilled health professional[4] while in its regional neighbors Thailand and Malaysia, women have almost 100% access to a skilled health professional **(Table 1.2)**.

Table 1: Selected MDG Maternal Health Indicators

Table 1.1: Maternal Mortality Ratio (per 100,000 live births)

Country	1990	2015	(Reduction, in %)
Cambodia	1,020	161	84.2
Lao PDR	905	197	78.2
Indonesia	446	126	71.7
Viet Nam	139	54	61.2
Myanmar	453	178	60.7
Thailand	40	20	50.0
Malaysia	79	40	49.4
Philippines	**152**	**114**	**25.0**

Table 1.2: Births attended by a skilled health professional, in %

Country	1990	2015
Thailand	99.3	99.6
Malaysia	92.8	98.9
Viet Nam	77.1	93.8
Cambodia	34.0	89.6
Indonesia	31.7	87.4
Philippines	**52.5**	**72.8**
Myanmar	46.3	70.6
Lao PDR	19.4	41.5

Note: Lao PDR stands for Lao People's Democratic Republic.
Source: Millennium Development Goals Indicators database (accessed April 2018)

The poor performance in maternal health in the Philippines is likely to be attributed to the highly unequal access to maternal health care services both among income groups and across geographical location (Lavado and Lagrada, 2008). Delivery of babies in a health facility[5] under the assistance of a health professional is essential in fighting risks during childbirth (PSA and ICF International, 2014). The 2013 National Demographic Health Survey (NDHS) Report shows that a significant disparity in accessing health care facilities during child birth among income groups still exist. In 2013, women belonging to the lowest income quintile mostly delivered their babies at home. Only 33% of births were delivered in a health facility. On the other hand, women in the richest income quintile have safer child births with 91% of

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[4] Skilled health professionals include doctor, nurse and midwife.
[5] Health care facilities include hospitals, infirmaries, birthing homes and lying-in clinics.

4

deliveries held in a health facility. Likewise, the inequality in access to a health facility during childbirth between women in urban and rural areas persist. Seventy two percent of child births in urban areas were delivered in health facilities compared to only 51% child birth delivery rate in the rural areas. In terms of regional disaggregation, child birth delivery in a health facility is mostly common in the NCR. In contrast, poorer regions are lagging behind with only 36.5% of child births were delivered in a health facility in MIMAROPA (Marinduque, Occidental Mindoro, Oriental Mindoro, Palawan, Romblon) and even a lower proportion in ARMM at 12% **(Figure 2)**.

**Figure 2: Place of Delivery, 2013**
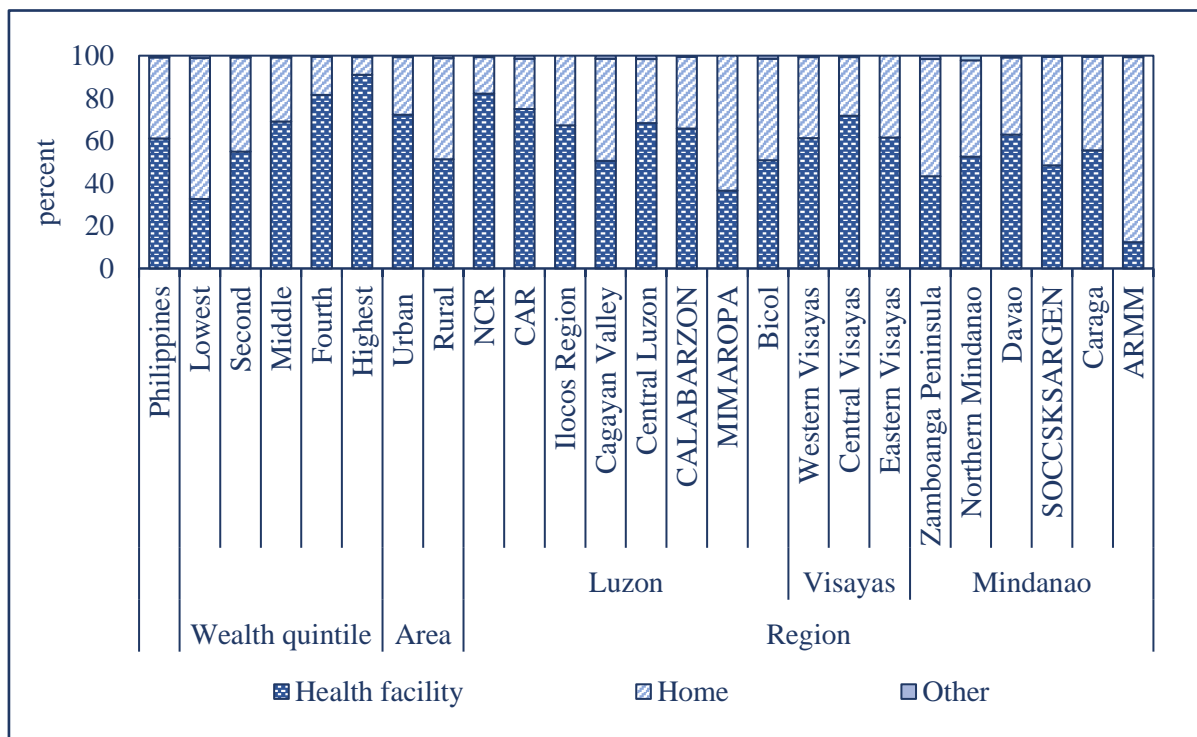
Note: Health facility includes public and private health facility. Includes only the most recent birth in the five years preceding the survey.
Source: PSA and ICF International (2014)

Similar to the place of delivery, the person providing assistance during the delivery is also essential in ensuring the well-being of the mother and the child given that only skilled

health professionals have the capacity to address problems in case of complications (PSA and ICF International, 2014). In 2013, only 42% of the births were assisted by a skilled health professional among women in the poorest income quintile compared to a 96% rate among women in the richest income quintile. The wide disparity across regions is also apparent. While 91% of child births were assisted by a health professional in the NCR, the MIMAROPA and the ARMM regions again were lagging behind. Only 4 out of 10 births are assisted by a health professional in MIMAROPA whereas ARMM is even worse with 2 in 10 births benefitted from services of a health professional. Women in these regions rely highly to the assistance of traditional health attendants which are locally called *hilots*[6] **(Figure 3)**.

Figure 3: Person Providing Assistance during Delivery, 2013
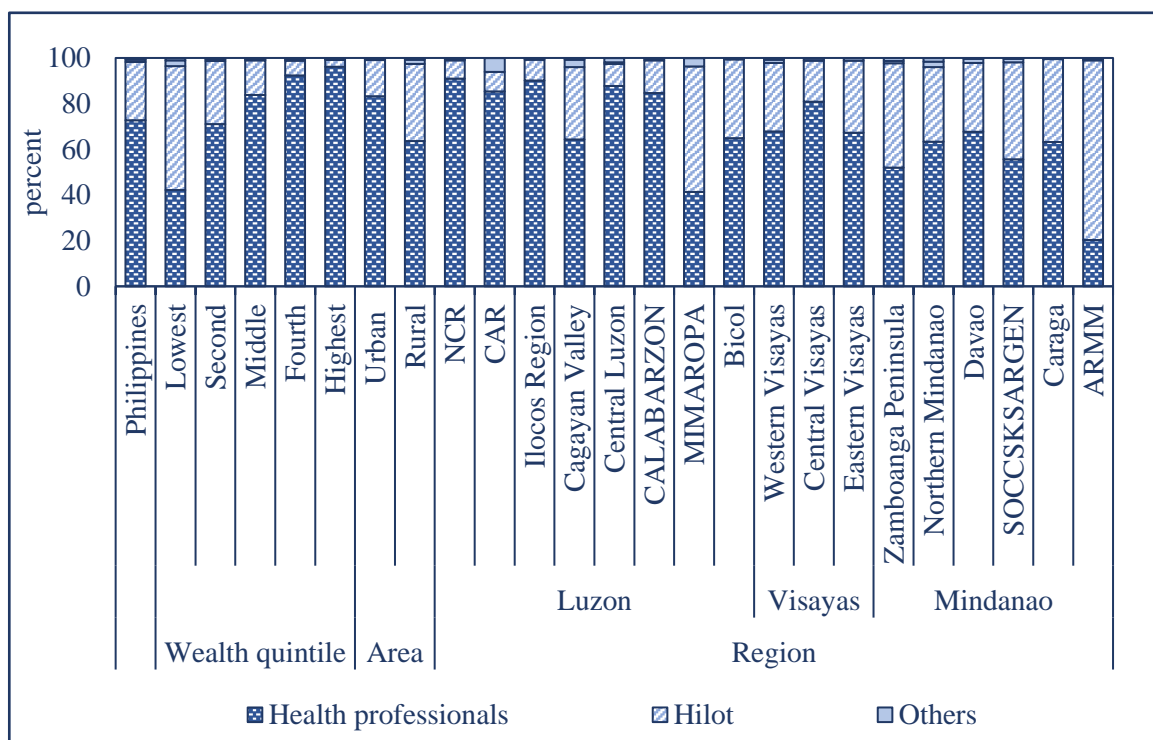
Note: Includes only the most recent birth in the five years preceding the survey.
Source: PSA and ICF International (2014)

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[6] *Hilot* is defined as traditional birth attendants. They are untrained women who is usually called upon by the community to assist during labor and /or after delivery.

6

Prenatal and postnatal care are also important components of maternal health care. Prenatal care helps diagnose early pregnancy-related problems while postnatal care prevents after birth complications. In terms of prenatal and postnatal care use, inequality is also evident. In NCR, 98.5% of women received prenatal care while ARMM has the lowest proportion at 65%. Similarly, 93% of women in NCR have at least one postnatal visit whereas only 23% of women in ARMM visited a health facility for postnatal care (PSA and ICF International, 2014).

The wide disparity in the availability of maternal health facilities partly explains the inequitable utilization of maternal health care services. **Figure 4** shows the distribution of maternal health care facilities in the Philippines. Maternal health care facilities are mainly

Figure 4: Distribution of Maternal Health Care Facilities, 2017
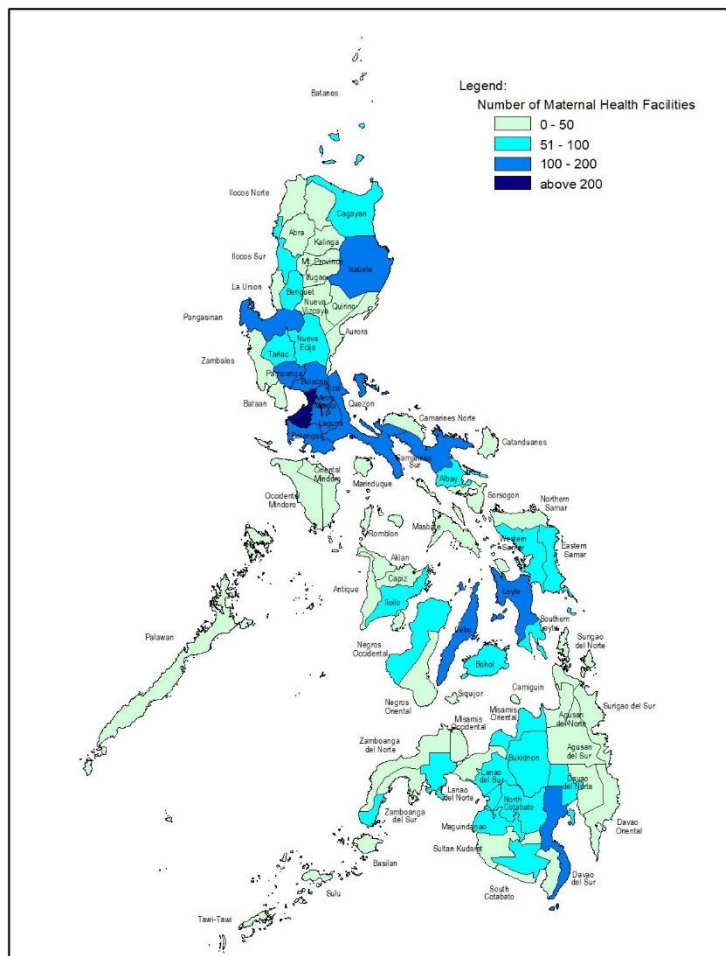
Source: Author's own compilation based on DOH
Health Facilities Database.

concentrated in the richer regions — NCR and its adjacent regions, Central Luzon and CALABARZON (Calamba, Laguna, Batangas, Rizal, Quezon), as well as in Cebu and Davao del Sur which are the key provinces in the Visayas and Mindanao. On the other hand, maternal health facilities are scarce in MIMAROPA and ARMM. It has been previously established that utilization of maternal health care has been low in these regions. On average, the closest maternal health care facility of residents in NCR is less than 2 kilometers away, while in MIMAROPA and ARMM, hospitals are farther away from their residences by 5 kilometers or more[7].

Similarly, health professionals are also unevenly distributed. Absence of doctors and nurses in hard to reach rural areas is typical. **Table 2** shows that the NCR and CAR (Cordillera Administrative Region) has 5.1 and 5.9 public physicians per 100,000 population while ARMM has only 1.8. The same trend can be observed in terms of nurses with NCR and CAR leading with 6.3 and 8.6 public nurses per 100,000 population while ARMM has only 3.2. Similarly, CAR has 41.9 midwives per 100,000 population and ARMM has only 12.3.

In terms of health insurance coverage, ARMM is also lagging. The result of the 2013 NDHS shows that while overall health insurance coverage, which includes maternal care and newborn package **(Appendix 5)**, remains to be low at 63%, coverage rate is even lower in ARMM with 56% of the population are not covered by any health insurance provider[8].

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[7] In the census, the exact distance in kilometers (kms) was not asked. Instead, the respondents were asked to select from three categories: (1) 2 kms or less; (2) more than 2 kms but less than 5 kms; and (3) 5 kms or more. The gap in the distance may be more apparent had the exact distance in kms was asked. Source: Author's own calculation based on the 2010 CPH, Barangay Schedule.

[8] Both public and private health insurance providers are available in the Philippines. The public provider is the Philippine Health Insurance Corporation (PhilHealth) where all regularly employed individuals are covered, as required by the law. Most of the private companies avail additional health insurance from private providers, called Health Maintenance Organizations (HMO), to supplement the public health insurance coverage. Some of the self-employed individuals purchase health insurance plans from HMO's.

Table 2: Number of Public Sector Health Professionals (per 100,000 population), 2008

Region	Doctors	Nurses	Midwives
NCR	5.1	6.3	9.8
CAR	5.9	8.6	41.9
Ilocos Region	3.5	5.7	22.3
Cagayan Valley	3.2	6.3	27.5
Central Luzon	3.1	4.9	18.3
CALABARZON	2.0	4.0	15.5
MIMAROPA	3.2	5.5	21.7
Bicol	3.0	5.3	20.6
Western Visayas	3.4	5.9	26.0
Central Visayas	2.8	5.1	24.0
Eastern Visayas	4.0	5.1	23.1
Zamboanga Peninsula	3.1	6.3	21.6
Northern Mindanao	3.5	6.1	–
Davao	1.8	3.1	17.9
SOCCSKSARGEN	3.0	3.0	16.1
CARAGA	3.4	5.0	26.8
ARMM	1.8	3.2	12.3

Note: – = no available data
Source: DOH (2012)

As shown, the government failed to narrow the gap in access to maternal care despite the health reforms implemented in the 1990's. Maternal health care remains to be highly inequitable among income groups and across regions. The main objective of this thesis is to investigate the sources of inequality in the utilization of maternal health care, specifically in the use of facility-based deliveries. The effects of individual, household and community level circumstance factors on women's access to facility-based deliveries will be examined. In addition, this thesis will also explore how demand and supply side policy interventions reduce inequality. It will look at two major policy interventions. On the **demand** side, will be the extension of the health insurance coverage and on the **supply** side will be the increase in health care facilities.

A two-stage regression procedure was employed in analyzing the individual, household and community level factors that affect women's health seeking behavior. On the other hand,

the impacts of supply and demand side policy interventions in reducing inequality were illustrated using the Concentration Curve and Concentration Index. The results show that income, household composition, parity, educational attainment, and health insurance coverage are among the most important factors. Demand and supply side policy interventions are both essential in improving the access among the poor women and the results show that their impact can be maximized if both policy interventions are implemented at the same time.

This thesis is structured as follows. Chapter 2 reviews the related literature in measuring inequality in access to maternal health care, as well as the literature on the determinants of access to maternal health care. The methodology which includes the description of the empirical framework and the data used in analyzing women's health seeking behavior is presented in Chapter 3. Chapter 4 reports the major findings of the empirical analysis and Chapter 5 concludes and offers the policy proposal.

2. Review of Related Literature

2.1   The Concept of Inclusiveness

To date, the concept of inclusive growth is not formally defined. However, according to the various development policy statements, growth is considered to be inclusive if all the members of the society have an equal access to the opportunities created by economic growth, regardless of their circumstance. When a segment of the population is excluded to access this opportunity, the growth process might turn out to be not inclusive and thus unsustainable in the long run (Ali and Zhuang, 2007).

Ali and Son (2007) propose a method to define and measure inclusive growth through the Social Opportunity Function. Growth is defined to be inclusive if it increases the Social Opportunity Function, which depends on two factors: (i) average opportunities available to the population, and (ii) how opportunities are shared among the population. This is illustrated through the Opportunity Curve which plots the distribution of access to opportunities of a particular service. A downward sloping opportunity curve suggests that there are more opportunities available to the poor than to the non-poor, while in contrast, an upward sloping opportunity curve implies that the non-poor benefits more from the opportunities available in the society. This concept was applied to the access to health services in the Philippines for the years 1998 and 2004. The result shows that access to health services favors the rich (**Appendix 3**).

Meanwhile, O'Donnel, et. al. (2008) recommends a method in measuring the inequality in access to health care through the Concentration Curve and Concentration Index. The Concentration Curve provides a picture of how access to health services differs across income groups. It illustrates the cumulative share of access to health services against the cumulative share of individuals ranked according to their living standard (i.e. lowest income to highest income). If the Concentration Curve lies above the line of equality (45 degree line), it implies

that the inequality in health care is pro-poor while it is pro-rich if the curve lies below the line of equality. Nevertheless, if the Concentration Curve lies along the line of equality then it infers that health care can be accessed equally by all members of the society. The Concentration Index on the other hand, quantifies the magnitude of the inequality. It is measured as twice the area between the Concentration Curve and the line of equality. A negative Concentration Index suggests a pro-poor inequality, a positive value implies a pro-rich inequality and an index equal to zero indicate the absence of inequality. Paredes (2018) plotted the Concentration Curves and calculated the Concentration Indexes of access to prenatal care, caesarian section deliveries and facility-based deliveries in the Philippines for the years 2008 and 2013 **(Appendix 6)**. The results show that while there is an improvement in the utilization of maternal health care services from 2008 to 2013, usage is still highly concentrated among the rich.

The sources of inequality in access to opportunities, according to Roemer (2006), results from the individual's circumstance factors, individual's effort or both. Circumstance factors are aspects which an individual has no control. For instance, a woman's access to maternal health services may be limited due to her ethnicity, religion, or to the availability of maternal health facilities in the area of her place of residence. Roemer (2006) suggests that as the individual has no control of these circumstance factors, it should be resolved by a government policy intervention. Thus, a successful inclusive growth policy includes strategies that eliminate inequality that is due to circumstance factors and the inequality that remains would only be due to the differences in individual's effort.

2.2   Circumstance Factors Affecting Utilization of Maternal Health Care

Providing equal access to health which includes maternal care is one of the pillars of inclusive growth. Maternal health care pertains to health of women during pregnancy, delivery of the child and postnatal period. It is an important dimension of health, as the well-being of mothers have a direct link to the health of the next generation (UN, 2009).

12

The developing countries who have signed up to the MDG and now to the Sustainable Development Goals (SDG), have continuously implemented various strategies in order to achieve the targets in improving maternal health. These efforts have resulted in a remarkable progress in the use of maternal health care and reduction of maternal mortalities at the aggregate (nation-wide) level.[9] At the same time, however, these achievements mask an extensive inequality in the utilization of maternal health care services among socio-economic and geographic location groups within a country (Hill et. al., 2007).

This inequality in access to maternal care among groups may be attributed to the interplay of various circumstance factors. Alcock et. al. (2015) theorize that women follow a complex process in their decision to utilize maternal health care services, depending on the availability of health facilities, their economic capacity and their ability to employ their social resources.

Sufficient and equally distributed maternal health care services with adequate skilled health professionals is a key element in equal access to maternal health care. Lipton (1977) argues that in many developing countries, provision of basic public services are usually skewed in **urban** areas. For instance, health facilities and skilled health professionals are highly concentrated in urban areas, leaving the population in the rural areas with limited health care options. Heaton and Forste (2003) claim that limited number of health care facilities results in a lower take up of maternal care. This is supported by the study conducted in Bangladesh where results have showed that the long distance to the health facility limits its use (Anwar et. al., 2004). Likewise, in rural areas in Tanzania, 84% of women who delivered their children at home wanted to give birth in a health facility but was constrained by the distance and poor

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[9] Global births assisted by a skilled health professional increase substantially from 59% in 1990 to 71% in 2014. Subsequently, maternal mortality ratio declined by 45% worldwide (UN, 2015).

13

transportation (Bicego et. al., 1997). Consequently, Gage (2007) suggests that an additional maternal health care facility increases the utilization of maternal health care services. This is not by chance, of course. In the case of skilled health professionals — doctors, nurses and qualified people in general are following their own self-interests. Living and working in the richer part of the country is far more attractive than moving into one of the poor regions. In a democratic society, it is very difficult to incentivize the trained specialists to act against their own interests. Furthermore, the experience of several countries show that if in a developing country the government tries to use force and/or pressure to send people somewhere against their wish, these specialist might choose to leave the country for good.

Moreover, the quality of maternal care facilities in place also matter. The lack of confidence in the public health care system creates segmentation between the rich and the poor. A study conducted in the Philippines by the Asian Development Bank (2007) shows that higher income individuals prefer to use private health facilities as they are perceived to provide better quality services. On the other hand, the population in the lower income groups who cannot afford the high fees charged by private health providers are left with no option but to use public health facilities, which are considered to have low quality.

Together with the delivery strategies of maternal health facilities, women's maternal health care seeking behavior is determined by their demographic and socio-economic characteristics (Phillips et. al., 1998). Results from the previous studies have shown that the interlinkage of myriad of circumstance factors, such as income, educational background, age, culture, religion etc., have significant association on women's decision to utilize maternal health care services.

Income is found to be a major determinant in the uptake of maternal care services. Income is needed to cover maternal health care cost as about 25% of countries worldwide still

fail to provide free health care[10]. Also, even in countries that provide universal health care, women are still exposed to out-of-pocket expenses, which may include transportation cost, medicine, etc. Studies have shown that women at the top end of the income distribution are more likely to have prenatal care, facility-based deliveries and postnatal care. Women in the highest income quintile in Nigeria use health facility seven times more than their counterparts in the lowest end of the income distribution (Ononokpono and Odimegwu, 2014) while in Cambodia, women in the richest households utilize facility-based deliveries twelve times more than the women in the poorest households (Chomat et. al., 2011).

Likewise, **health insurance coverage** increases the uptake of maternal care services. Health insurance mitigates the out-of-pocket expenditures and catastrophic payments (Lagarde and Palmer, 2011). Kibusi et. al. (2018) showed that women covered by a health insurance are more likely to receive prenatal care and deliver their babies with the assistance from a skilled health worker. Similarly, a study on the utilization of maternal care in Indonesia, Ghana and Rwanda showed that health insurance has a positive impact on utilization of maternal care although the effect is more apparent in the uptake of facility-based delivery than use of prenatal care (Wang et. al., 2017). On the other hand, Gajate-Garrido and Ahiadeke (2015) find that health insurance did not increase the quantity of prenatal and postnatal visits but rather it encouraged women to seek for higher quality of maternal care services.

Correspondingly, **women's educational attainment** also plays an important role in the use of maternal health services. Women's formal education has a strong correlation with maternal health literacy. Thus, women with higher educational attainments are more likely to utilize maternal care services (Anwar et. al., 2004; Alcock et. al., 2015; Greenaway et. al., 2012; Goli et. al., 2017; Hossain, 2010). Similarly, the **partner's educational attainment**

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[10] Source: The 2018 STC Health Index. http://globalresidenceindex.com/hnwi-index/health-index/.

augments the woman's maternal care seeking behavior. The result from the cross-country study conducted by Adjiwanou et. al. (2017) in Sub-Saharan Africa and Asia reports that women with educated partners are 43% more likely to have at least four prenatal visits and 55% more likely to give birth with the assistance of a skilled health professional compared to women with uneducated spouses.

Women's age and parity[11] are also found to determine the use of maternal health facilities. Women's age appeared to have a positive effect while in contrast, parity have a negative effect in the utilization of maternal care services (Alcock et. al., 2015; Anwar et. al., 2004; Mekonnen and Mekonnen 2002,). Gabrysch and Campbell, (2009) posits that parity influences the perceived pregnancy-related risks based on previous pregnancies. The negative impact of parity in having a facility-based deliveries may be explained by the fact that women who did not experience any complications in their previous deliveries provided them the confidence to give birth at home.

On the other hand, the **number of household members** may limit or reinforce the use of maternal health care. The dependent members (age less than five years old) of the household could restrict the use of maternal health care as they may take the mother's time and financial resources. However, adult household members may encourage maternal health care use if they serve as support, like in helping take care of the other children while the mother is in labor in the health facility (Alcock et. al., 2015; Mekonnen and Mekonnen, 2002).

The present literature have also reported that **religion, culture** (such as caste system in India, indigenous health care in Africa) and **women's autonomy** affect women's decision in utilizing maternal care services (Alcock, 2015; Cheptum, 2014; Hossain, 2010; Mekonnen and Mekonnen, 2002). But these factors will not be further expanded as these are outside the scope of this thesis.

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[11] Parity is defined as the number times a woman has given birth.

2.3   Philippine Case Studies

In the Philippines, various studies have been conducted with the objective to determine the factors that contribute to the utilization of maternal health care. The results of these studies is in parallel with the studies discussed in the previous section. The results show that higher income, higher levels of education, residence in an urban location, have positive and significant impacts in the utilization of maternal health care. While cost of transportation to maternity health centers and lack of information are identified as some of the reasons for the lower uptake of maternal health care services. A summary of the findings of these studies is presented in **Table 3**.

Table 3: Literature on Determinants of Maternal Health Care in the Philippines

Studies	Findings
Rogan, Shanna Elaine and Maria Virginia Olveña. 2004. <u>Factors Affecting Maternal Health Utilization in the Philippines</u>	Trained prenatal care providers are being accessed more by women with college education. Socio-economic factors such as urbanity, age and parity are the most prominent determinants of usage of postnatal services.
Landicho, Nancy. 2006. Recent <u>Pregnancies of Filipino Mothers: The Link Between Maternal Health Status and Health Care Utilization</u>	Women's level of education and residential location have a positive and significant influence in the utilization of maternal health care. Maternal health care seeking behavior however were indicated for curative than for preventive purposes.
Lavado, Rouselle and Leizel Lagrada. 2008. <u>Are Maternal and Child Care Programs Reaching the Poorest Regions in the Philippines?</u>	Utilization of maternal care has improved at the national level. However, the variations in the utilization of maternal care is prominent among the region and income groups. Use of maternal care remains very low among the poor.
Pambid, Racquel. 2015. <u>Factors Influencing Mothers' Utilization of Maternal and Child Care (MCC) Services</u>	Higher income and higher educational attainment of women resulted in higher availment of maternal care services. Women who gave birth in a health facility are more likely to avail of other maternal care services compared to mothers who gave birth at home. In rural areas, women availed more prenatal services than postnatal services. Lack of information is also seen as one of the reasons for the low uptake of maternal health care services.

17

Studies	Findings
Valera, Marian Theresia and Denise Valerie Silfverberg. 2015. <u>Determinants Of Maternal Health Care Utilization Among Beneficiaries Of Conditional Cash Incentives: Evidence From A Post-Disaster Setting</u>	The socio-demographic factors that affect the use of prenatal care services are birth order of child and women's age at first pregnancy. Likewise, supply-side factors such as availability of urinalysis services in health centers, cost of transportation to the maternity health centers are important determinants of utilization of prenatal care services. In addition the use of prenatal care services has a significant effect in the utilization of facility-based deliveries.
Paredes, Karlo Paolo. 2016. <u>Inequality in the Use of Maternal and Child Health Services in the Philippines: Do Pro-Poor Health Policies Result in More Equitable Use of Services?</u>	Intake of maternal health care improved from 2008 to 2013. However, utilization of prenatal and delivery in a health facility remain to be unequal with the poor having less access.
Cananua-Labid, Sherrie Ann. 2017. <u>Predicting Antenatal Care Utilization in the Philippines: A CHAID Analysis</u>	The location where women resides is found to be the most important factor of prenatal care use. Women in NCR, CAR, Ilocos Region, Cagayan Valley, Central Luzon, CALABARZON, Bicol, Western and Central Visayas, Davao and CARAGA are most likely to use prenatal care than their counterparts in other regions. Religion was also shown as a factor determining prenatal care usage. Muslim women have lower uptake of prenatal care compared to Christian women. Likewise income and women' educational attainment are found to be significant factors in prenatal care use.

Source: Author's own compilation.

One of the limitations that is observed in these studies is that only the demand-side factors were analyzed. The approach of these studies focused on identifying the pertinent demographic and socio-economic characteristics that influence the maternal health care seeking behavior of women. Supply-side factors such as the impact of the presence of maternal health care facilities in the area of residence were not factored in.

Apart from identifying the key circumstance factors that affect women's maternal health seeking behavior, this thesis contributes to the present literature by providing an understanding of the impact of health insurance coverage and the availability of maternal health

facilities in explaining women's decision to utilize facility-based deliveries. Further, this thesis illustrates the results of policy interventions in reducing the inequality (due to differences in circumstance factors) in access among the women population.

3. Methodology

3.1   Empirical Framework

This thesis used two empirical frameworks. First, the two-stage regression procedure[12], was employed to analyze the effects of the *"supply and demand side"* circumstance factors. In this step, the objective is to identify the relevant demographic, socio-economic, household and community characteristics that affect women's decision to have facility-based birth deliveries. The main variable of interests are health insurance coverage and the availability of maternal health facilities[13].

Second, the Concentration Curve and the Concentration Index[14] were adopted to illustrate the effects of policy interventions on women's decision to use health facilities. This step aims to answer the following policy questions:

- Will an increase in the number of maternal health centers increase the access of women in the lower end of the income distribution?

- Will a 100% health insurance coverage among the poor result in a significant increase in the utilization of health facilities during child births?

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[12] The methodology is based from the Chapter on the *Multivariate Analysis of Health Survey Data* (Chapter 10, pp. 115-128) of the World Bank's technical guide, "Analyzing Health Equity Using Household Survey Data" by O'Donnel et. al. (2008).

[13] The data on the availability of maternal health facility is only available at the community-level. Hence, the two-stage regression approach was adopted. According to O'Donnel et. al. (2008), in a cross section analysis, if the community-level variables are estimated with the individual-level variables, the community level variables will be perfectly correlated with the unobservable community effects. Therefore, they suggested that a two-stage approach is appropriate. In the first stage, estimates of the fixed effects is obtained from the fixed effects model and in the second stage, the community effects estimates is regressed with the community-level variables. This approach removes the bias of the community effects in the first stage and the effect of the community-level variable to the outcome is analyzed in the second stage.

[14] The methodology is based from the Chapter on the *Concentration Curve* (Chapter 7, pp. 83-92) and the *Concentration Index* (Chapter 8, pp. 95-106) of the World Bank's technical guide, "Analyzing Health Equity Using Household Survey Data" by O'Donnel et. al. (2008).

The Concentration Curve was plotted using the cumulative share of access to facility-based deliveries and the cumulative share of wealth quintile[15]. On the other hand, the Concentration Index is calculated as twice the area between the Concentration Curve and the line of equality. It is computed as follows:

$$Concentration\ Index = \frac{2}{\mu}\ covariance\ (y, w)$$

where *y* is the access to facility-based deliveries, μ is the mean of *y* and *w* is wealth quintile (rank variable). To reiterate what was already mentioned in the previous chapter, a Concentration Curve that lies above the line of equality signifies a pro-poor inequality while it is pro-rich if the curve lies below and inequality does not exist if it lies along the equality line. Accordingly, a negative Concentration Index suggests a pro-poor inequality, a positive value implies a pro-rich inequality and an index equal to zero indicate the absence of inequality.

This section describes in further detail the methodologies used. In the first stage, a logit probability regression model on women's decision to have a facility-based delivery, with community fixed effects, was estimated. The regression model is as follows:

$$\Pr\ =\ (Y_i = 1 \mid X_i, C_i)\ =\ \frac{\exp(\alpha + \beta_1 X_i + \beta_2 C_i)}{1 + \exp(\alpha + \beta_1 X_i + \beta_2 C_i)}$$

where the dependent variable Y_i is a dummy variable that refers to the utilization of a health facility of the *ith* woman. Y_i takes a value of one if the woman utilized a health facility while it takes a value of zero if not. The explanatory variables are X_i, which is a vector of individual and household characteristics of the *ith* woman and C_i is a vector of community dummy variables to represent the community fixed effects. α is the intercept and the *β's* are the

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[15] Wealth quintile is based on the wealth index variable in the NDHS dataset, which is a factor score that measures household's living standard. It is derived using the principle component analysis based on household ownership of selected consumer items such as televisions and bicycles, materials used for roofs and walls of the house and type of water and sanitation facilities. The wealth index is divided into five equal groups. The first quintile refers to the households with the lowest living standards and the fifth quintile is the group with the highest standard of living.

coefficients of explanatory variables. The set of variables used will be discussed in the next section.

After the first stage, each woman will have a predicted probability of their use of health facilities during child birth. The average probabilities were calculated by wealth quintile and were used to plot the Concentration Curve and to compute the Concentration Index. This serves as the baseline Concentration Curve and Concentration Index.

In the second stage of the O'Donnel methodology, the marginal effects of the community dummies were derived as follows:

$$\widehat{ME} = \Pr(Y = 1 \mid \bar{X}, C_j = 1) - \Pr(Y = 1 \mid \bar{X}, C_j = 0)$$

where ME is the marginal effect, X is a vector of the average values of the woman's individual and household characteristics and C_j is the community-level dummy of the jth community. The derived marginal effects are then linked to the community-level variables. The premise is that the marginal probability of utilizing health facilities is affected community-level factors. Hence, an ordinary least squared (OLS) regression model is estimated as follows:

$$\widehat{ME}_j = \alpha + \beta K_j + \varepsilon_j$$

where ME_j is the predicted marginal effect of province j, K_j is the vector of community-level variables of province j, α is the intercept, β is the coefficient of the community-level variables and ε is the error term.

The succeeding steps identifies the effects of policy interventions. For instance, if the number of maternal health facilities is increased from K_{j0} to K_{j1}, the change will result in a change in the marginal effects of the community dummy variables, which is expressed as:

$$\Delta\widehat{ME}_j = \hat{\beta}(K_{j1} - K_{j0})$$

To estimate the impact of the policy intervention, the change in marginal effects ($\Delta\widehat{ME}_j$) is plugged into the logit regression model estimated in the first stage. This will result in a new

predicted probability of use of health facilities for each woman i in community j. The new predicted probability is calculated as follows:

$$\widehat{Pr} = (Y_{ij} = 1 \mid X_{ij}, C_{ij}) = \frac{\exp(\alpha + \hat{\beta}_1 X_{ij} + (\widehat{\beta_{2j}} + \Delta \widehat{ME_j})C_j))}{1 + \exp(\alpha + \hat{\beta}_1 X_{ij} + (\widehat{\beta_{2j}} + \Delta \widehat{ME_j})C_j))}$$

The new predicted outcome is used to plot the new Concentration Curve and Concentration Index. The difference between the baseline Concentration Curve (Index) and the new Concentration Curve (Index) may be concluded as the effect of the policy intervention.

3.2 Data

In analyzing women's maternal health-seeking behavior, this thesis used the 2013 Philippine NDHS, which is part of the worldwide program of the MEASURE Demographic Health Surveys and is undertaken by the Philippine Statistics Authority (PSA) every five years[16]. The 2013 NDHS is designed to provide variety of information on health-related topics including maternal health[17]. It has 14,804 household and 16,155 individual women samples which are representative both at the national and the regional levels.

Administrative data from the Department of Health (DOH) was also utilized. The DOH Health Facility Database provides the list of maternal health facilities present in each province, as of year 2017[18]. The database contains information on the ownership classification[19] and license status[20] of health facilities.

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[16] The 2013 NDHS microdata can be accessed through the DHS data repository: www.dhsprogram.com.

[17] The individual module contains the information on maternal health which was obtained from women aged 15 to 49 years.

[18] Ideally, the list of health facilities used should be as of year 2013, however due to data constraints, 2017 list was used.

[19] Health facilities are classified based on ownership as public or private.

[20] Health facilities are mandated by the DOH to secure a license from the Bureau of Health Facilities and Services (BHFS). The license is granted to health facilities who reached the approved minimum standards.

This section describes the variables used in analyzing the determinants of women's maternal health seeking behavior. The dependent variable, *Facility_delivery* takes on a value of one if the woman gave birth in a health facility and zero if the woman gave birth elsewhere (e.g. at home). The set of independent variables represent the circumstance factors which pertain to the woman's characteristics, partner's characteristics and household and community characteristics. The variables include the following: age, parity, years of education, employment, wealth quintile, health insurance coverage, household composition, urbanity and provincial dummy variables.

The years of education of the woman and her partner *(Yrseduc_woman, Yrseduc_partner)* represent their health literacy. Individuals with higher educational attainments are expected to have higher probability to utilize health facilities, as they are more likely to understand the perils of delivering the newborn outside a health facility.

Variables that represent the ability to pay for the out-of-pocket costs are employment status, wealth index and health insurance coverage. The employment status of the woman and her partner represents their ability to earn income. The employment variable *(Employed_woman, Employed_partner)* takes the value of one if the individual is gainfully employed[21], zero otherwise. The wealth index represents the individual's living standard. Individuals with higher living standard have higher capacity to pay health care costs. Five dummy variables were constructed to represent each quintile *(Wealth_quintile1,..., Wealth_quintile5).* The wealth quintile dummy variable takes on a value of one if the woman belongs to that particular wealth quintile, zero otherwise. Lastly, the variable *Health_insurance* represents whether the woman is covered by a health insurance. This variable represents the mitigation effect of the health insurance to maternal health care cost. *Health_insurance* takes

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[21] Gainfully employed is defined as those who are employed in a professional, technical or managerial position.

on a value of one if the woman is covered by a health insurance, either as a paying member, a beneficiary or an indigent member[22], zero if not.

The continuous variables *Hhmembers and Less5* represent the household composition. It is expected that adult household members (*Hhmembers*) will have a reinforcement effect and the members aged less than five years old (*Less5*) will have a diminishing effect to the use of maternal health facilities. The remaining continuous variables, *age* and *parity* are also expected to have contradicting impacts, with age having a positive effect while parity a negative effect to the utilization facility-based deliveries.

The last set of explanatory variables include the 79[23] province dummy variables (*NCR[24], Abra, Agusan del Norte… Zamboanga Sibugay*). The province dummies represent the community fixed effects. It captures the unobservable community effects that were not explained by the individual and household level characteristics included in the logit regression. It takes on a value of one if the woman's place of residence is in that particular province, zero otherwise.

Table 4 reports the descriptive statistics of the variables used in the first-stage (logit) regression analysis of women's decision to have a facility-based delivery. Among the 16,155 individual women sample, 5,301 women gave birth in the last five years preceding the survey. Only 62.1% of women who gave birth had a facility-based delivery. Average age is 30 years old and is on their third pregnancy. Both women and their spouses have at least reached

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[22] Indigent members are individuals identified by the Department of Social Welfare and Development (DSWD), through the National Household Targeting System (NHTS), who has no means of income or whose income falls below the subsistence level.

[23] Among the 81 provinces, 2 provinces, namely Batanes and Camiguin, were not included in the 2013 NDHS sample.

[24] The NCR is composed of 17 independent cities but does not belong to any province. Hence, in conducting a provincial-level analysis, the NCR is considered as one province.

secondary level education. Only 14%[25] of women are engaged in gainful employment while spouses' employment rate is even lower at 11%[26]. Only 61% of women have health insurance coverage. Average number of adult household members is five and there are two members who are less than five years old. Twenty five percent of women belong to the lowest quintile while only 15% of women are in the richest quintile. Among the provinces, the largest share are residing in the NCR.

Table 4: Descriptive Statistics of the Individual and Household Variables

Variables	Obs	Mean	Std dev	Min	Max
Facility_delivery, (1=yes; 0=no)	5301	0.621	0.485	0	1
Age	5301	29.994	7.209	15	49
Parity	5301	3.010	2.15	1	12
Yrseduc_woman	5301	9.568	3.573	0	17
Employed_woman, (1=yes; 0=no)	5301	0.139	0.346	0	1
Yrseduc_partner	5114	9.103	3.904	0	17
Employed_partner, (1=yes; 0=no)	5114	0.114	0.318	0	1
Health_insurance, (1=yes; 0=no)	5301	0.611	0.488	0	1
Wealth_quintile1	5301	0.246	0.431	0	1
Wealth_quintile2	5301	0.212	0.408	0	1
Wealth_quintile3	5301	0.205	0.404	0	1
Wealth_quintile4	5301	0.185	0.389	0	1
Wealth_quintile5	5301	0.152	0.359	0	1
Less5	5301	1.549	0.831	0	6
Hhmembers	5301	4.704	2.274	1	18
Urbanity, (1=urban; 0=rural)	5301	0.480	0.500	0	1
Community fixed effects					
NCR	5301	0.157	0.364	0	1
Abra	5301	0.002	0.044	0	1
Agusan Del Norte	5301	0.010	0.098	0	1
Agusan Del Sur	5301	0.008	0.091	0	1
Aklan	5301	0.008	0.092	0	1
Albay	5301	0.012	0.110	0	1
Apayao	5301	0.001	0.024	0	1
Antique	5301	0.003	0.057	0	1
Aurora	5301	0.001	0.034	0	1
Basilan	5301	0.006	0.078	0	1
Bataan	5301	0.004	0.062	0	1
Batangas	5301	0.022	0.146	0	1
Benguet	5301	0.008	0.089	0	1
Biliran	5301	0.000	0.019	0	1
Bohol	5301	0.009	0.096	0	1
Bukidnon	5301	0.016	0.124	0	1

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[25] 50% of women have no employment while 36% are in engaged in menial jobs, such as employment in household and domestic, unskilled manual and agriculture.

[26] Only 2% of the spouses are not employed, however, a huge proportion are engaged in low paying jobs, such as manual work and agriculture.

Variables	Obs	Mean	Std dev	Min	Max
Bulacan	5301	0.029	0.169	0	1
Cagayan	5301	0.013	0.113	0	1
Camarines Norte	5301	0.006	0.077	0	1
Camarines Sur	5301	0.020	0.141	0	1
Capiz	5301	0.009	0.093	0	1
Catanduanes	5301	0.002	0.048	0	1
Cavite	5301	0.034	0.182	0	1
Cebu	5301	0.039	0.194	0	1
Compostela Valley	5301	0.006	0.078	0	1
Davao Del Norte	5301	0.013	0.115	0	1
Davao Del Sur	5301	0.029	0.167	0	1
Davao Oriental	5301	0.009	0.092	0	1
Dinagat Islands	5301	0.001	0.029	0	1
Eastern Samar	5301	0.004	0.065	0	1
Guimaras	5301	0.001	0.032	0	1
Ifugao	5301	0.001	0.037	0	1
Ilocos Norte	5301	0.004	0.065	0	1
Ilocos Sur	5301	0.008	0.087	0	1
Iloilo	5301	0.019	0.136	0	1
Isabela	5301	0.016	0.126	0	1
Kalinga	5301	0.001	0.035	0	1
La Union	5301	0.006	0.076	0	1
Laguna	5301	0.030	0.171	0	1
Lanao Del Norte	5301	0.015	0.122	0	1
Lanao Del Sur	5301	0.010	0.102	0	1
Leyte	5301	0.017	0.129	0	1
Maguindanao	5301	0.013	0.115	0	1
Masbate	5301	0.009	0.096	0	1
Misamis Occidental	5301	0.003	0.053	0	1
Misamis Oriental	5301	0.013	0.114	0	1
Mountain Province	5301	0.002	0.046	0	1
Negros Occidental	5301	0.028	0.164	0	1
Negros Oriental	5301	0.014	0.120	0	1
North Cotabato	5301	0.013	0.114	0	1
Northern Samar	5301	0.008	0.088	0	1
Nueva Ecija	5301	0.022	0.147	0	1
Nueva Vizcaya	5301	0.006	0.077	0	1
Occidental Mindoro	5301	0.006	0.075	0	1
Oriental Mindoro	5301	0.007	0.081	0	1
Palawan	5301	0.009	0.096	0	1
Pampanga	5301	0.019	0.137	0	1
Pangasinan	5301	0.027	0.163	0	1
Quezon	5301	0.021	0.143	0	1
Quirino	5301	0.003	0.058	0	1
Rizal	5301	0.027	0.162	0	1
Romblon	5301	0.003	0.052	0	1
Sarangani	5301	0.002	0.050	0	1
Samar	5301	0.005	0.070	0	1
Siquijor	5301	0.001	0.038	0	1
Sorsogon	5301	0.008	0.089	0	1
South Cotabato	5301	0.017	0.131	0	1
Southern Leyte	5301	0.004	0.059	0	1
Sultan Kudarat	5301	0.009	0.096	0	1
Sulu	5301	0.006	0.080	0	1
Surigao Del Norte	5301	0.007	0.083	0	1
Surigao Del Sur	5301	0.006	0.075	0	1
Tarlac	5301	0.013	0.113	0	1
Tawi-Tawi	5301	0.003	0.052	0	1
Zambales	5301	0.007	0.084	0	1

Variables	Obs	Mean	Std dev	Min	Max
Zamboanga Del Norte	5301	0.012	0.108	0	1
Zamboanga Del Sur	5301	0.026	0.160	0	1
Zamboanga Sibugay	5301	0.007	0.081	0	1

Note: Standard error is stratification and cluster adjusted.
Obs=observations; std dev= standard deviation; min=minimum; max=maximum.
Source: Author's own computation based on the 2013 NDHS.

In the second-stage of the regression model, the community-level variables that were used are the ratios of public (*Public_pop*) and private health facilities (*Private_pop*) and ratio of licensed (*Licensed_pop*) health facilities. The ratio of public and private health facilities represent the presence of facilities that are available for use while the ratio of licensed health facilities represents the quality of the available health facilities. **Table 5** reports the descriptive statistics of the community-level variables. On average, there are eight private health facilities and four government health facilities per 100,000 population. Among them, only two health facilities are licensed.

Table 5: Descriptive Statistics of the Ownership Structure at the Community Level

Variables	Obs	Mean	Std dev	Min	Max
Private_pop	79	7.95	5.48	0.00	22.2
Public_pop	79	3.98	3.56	0.60	20.1
Licensed_pop	79	1.53	1.59	0.00	5.6

Note: Obs=observations; std dev= standard deviation; min=minimum; max=maximum
Source: Author's own computation based on the administrative data from the DOH.

4. Results and Discussion

The objective of the empirical analysis is to identify the pertinent circumstance factors that influence women's health seeking behavior and to illustrate the effects of policy interventions on equity. The results of the empirical analysis are discussed in this section.

4.1 Two-Stage Regression Model

The estimates from the logit regression (1st stage) model which examines the effects of circumstance factors on women's decision to utilize health facility during childbirth is presented in **Table 6.** The second column shows the marginal effects on the probability of use of a health facility and the third column reports the corresponding standard errors.

The results show that parity has a negative impact on having a facility-based delivery. Women with more previous pregnancies are less likely to deliver in a health facility. This is in parallel with the results of the previous studies. Women with more successful pregnancies in the past may have lower perception of the risks involved during childbirths which may have resulted in a lower usage of health facilities in their succeeding pregnancies. Alternatively, the likelihood of women with higher parity to have children under five years old is high as the average birth interval in the Philippines is only 35 months[27], hence the negative impact may also be due to the time and financial constraints the dependents pose on women.

Women with more dependents (members who are less than five years old) are less likely to use health facilities. This therefore supports the latter premise that women with more dependents are faced with time and financial constraints. For instance, in Agusan del Sur[28], the average fee of giving birth at home with an aid from a *hilot* only costs less than 1,000 PhP (≈

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[27] The birth interval value is based on the results of the 2013 NDHS.

[28] Based on the 2013 NDHS, a huge percentage of women in Agusan del Sur gave birth at home, which stands at 63%.

20 USD[29])   while giving birth in a hospital costs 10,251 PhP (≈220 USD)[30]. With this large gap, women with more dependents are faced with a huge opportunity cost in delivering their babies in a hospital, as they can use the difference in cost in providing the needs of their other dependents. Another explanation why women with more dependents may prefer to give birth at home, aside from they do not have to leave their children at home with no one taking care of them, *hilots* offer additional services such as taking care of their other children, washing their clothes and even cooking for them (Sheker, 2011).

Education also appeared to be an important determinant of women's maternal health care seeking decision. Both women's education and the education of their partners have shown a positive significant impact in the use of facility-based deliveries. On average, women who have higher formal education by 10 years have 25 percentage points higher probability of using a health facility. The result shows that women's literacy is augmented by their partner's education. Women with husbands who have higher education by 10 years have 12 percentage points higher probability of having a facility-based delivery.

The wealth quintile index dummies are all significant in explaining the probability of having a facility-based delivery. With the poorest quintile (*wealth1*) being the reference category in the logit regression, women belonging in the higher quintiles (*wealth2…wealth5*) have higher probability of using maternal health facilities by 6.2 to 22.3 percentage points, compared to their counterparts in the lowest quintile. This supports that cost is an important factor in utilizing health facilities. Poor women have less capacity to afford the delivery costs in health facilities. This is in parallel with the response of women in the 2013 NDHS when

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[29] The exchange rate used is 1 USD = 47 Philippine pesos (PhP). Philippines official exchange rate for the year 2016 (Source: World Development Indicators, World Bank)

[30] The data on the costs of child birth deliveries are taken from a policy brief by Lavado (2010).

asked as to the reason why they did not give birth in a health facility. The main reason cited was because it "cost too much"[31].

Health insurance mitigates the out-of-pocket cost to a certain extent, as women who are covered by a health insurance is more likely to use health facilities by 6.8 percentage points. The marginal effect however is relatively lower than the marginal effects of the wealth quintile variables (*wealth4 and wealth5*). The lower marginal effect of insurance may be due to the low amount of maternity benefits. The PhilHealth's Maternity and Newborn package benefit for the use of health facility and doctor's fee only amounts to 6,500 PhP (≈140 USD) (**Appendix 5**). On the other hand, the average normal delivery in a public hospital costs 10,000 (≈20 USD) to 30,000 (≈640 USD) and 30,000 to 100,000 (≈2,000 USD) PhP in private hospitals[32]. Hence, even women who have health insurance, are still faced with quite a significant amount of out-of-pocket cost, on top of other costs such as transportation, medicine, etc.

Likewise, the marginal effects of provincial dummies show that the community has a significant impact in the health seeking behavior of women. With NCR as the reference category in the logit regression, the result indicates that women who reside outside the NCR are about 8 to 60 percentage points less likely to use health facilities, except the for eight provinces in the Luzon and in the Visayas, which are Aklan, Bataan, Bohol, Catanduanes, Cebu, Eastern Samar, Romblon, Southern Leyte. Unfortunately, these eight provinces do not elicit a common characteristic aside from the broad geographic grouping. The most

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[31] In the 2013 NDHS, the top three reasons cited by women who did not deliver in a health facility are as follows: 37% said that it "cost too much", 32% considers it as "not necessary" and 25% find the health facility "too far".

[32] The data on the costs of child birth deliveries in a health facility are taken from the Infographic : How Much Pregnancy Really Costs in the Philippines. https://www.ecomparemo.com/info/infographic-how-much-pregnancy-really-costs-in-the-philippines/

disadvantaged provinces are mostly in the ARMM region (Basilan, Maguindanao and Sulu), with 40 to 60 percentage points lower odds of having a facility-based delivery.

Table 6: Results from the Logit Model (1st Stage)

Variables	Marginal Effects	Standard Error
Age	0.000	0.002
Parity	-0.038***	0.007
Yrseduc_woman	0.025***	0.003
Employed_woman (1=yes; 0=no)	0.031	0.027
Yrseduc_partner	0.012***	0.002
Employed_partner (1=yes; 0=no)	0.011	0.032
Health_insurance, (1=yes; 0=no)	0.068***	0.018
Wealth_quintile2	0.062***	0.022
Wealth_quintile3	0.088***	0.025
Wealth_quintile4	0.15***	0.027
Wealth_quintile5	0.223***	0.029
Less5	-0.010***	0.004
Hhmember	0.011	0.011
Urbanity	0.033	0.021
Community fixed effects		
Abra	-0.077	0.116
Agusan Del Norte	-0.251***	0.066
Agusan Del Sur	-0.211***	0.069
Aklan	0.139*	0.076
Albay	-0.189**	0.082
Antique	-0.466***	0.112
Aurora	0.008	0.170
Basilan	-0.455***	0.078
Bataan	0.227**	0.111
Batangas	-0.262***	0.064
Benguet	0.089	0.059
Bohol	0.251***	0.049
Bukidnon	-0.165**	0.069
Bulacan	-0.111*	0.064
Cagayan	-0.187***	0.068
Camarines Norte	-0.406***	0.088
Camarines Sur	-0.299***	0.063
Capiz	0.087	0.083
Catanduanes	0.259***	0.075
Cavite	-0.269***	0.057
Cebu	0.119***	0.042
Compostela Valley	-0.057	0.095
Davao Del Norte	-0.008	0.071
Davao Del Sur	0.017	0.052
Davao Oriental	-0.164*	0.088
Dinagat Islands	0.086	0.204
Eastern Samar	0.233***	0.087
Guimaras	-0.540***	0.076
Ifugao	0.075	0.104
Ilocos Norte	0.153	0.104
Ilocos Sur	-0.055	0.090
Iloilo	-0.057	0.068
Isabela	-0.202***	0.063
Kalinga	-0.071	0.129

32

Variables	Marginal Effects	Standard Error
La Union	-0.046	0.100
Laguna	-0.343***	0.055
Lanao Del Norte	-0.214***	0.068
Lanao Del Sur	-0.374***	0.061
Leyte	0.164***	0.048
Maguindanao	-0.406***	0.060
Marinduque	0.027	0.139
Masbate	-0.111	0.086
Misamis Occidental	-0.117	0.125
Misamis Oriental	-0.009	0.070
Mountain Province	-0.165	0.115
Negros Occidental	0.022	0.053
Negros Oriental	0.067	0.062
North Cotabato	-0.213***	0.068
Northern Samar	-0.399***	0.070
Nueva Ecija	-0.024	0.062
Nueva Vizcaya	-0.229***	0.081
Occidental Mindoro	-0.463***	0.063
Oriental Mindoro	-0.13	0.080
Palawan	-0.352***	0.062
Pampanga	0.112	0.070
Pangasinan	-0.108**	0.058
Quezon	0.022	0.064
Quirino	-0.347***	0.102
Rizal	-0.331***	0.056
Romblon	0.165**	0.078
Samar	-0.404***	0.106
Siquijor	-0.405**	0.179
Sorsogon	0.128	0.077
South Cotabato	-0.167**	0.065
Southern Leyte	0.235***	0.078
Sultan Kudarat	-0.089	0.082
Sulu	-0.603***	0.030
Surigao Del Norte	-0.037	0.077
Surigao Del Sur	0.108	0.069
Tarlac	-0.085	0.084
Zambales	-0.094	0.111
Zamboanga Del Norte	-0.162**	0.074
Zamboanga Del Sur	-0.194***	0.051
Zamboanga Sibugay	-0.281***	0.092

Observations[33] = 5079
Pseudo r-squared = 0.2210

Notes: The reference category for the wealth quintiles is the poorest wealth quintile (1st quintile), on the other hand the reference category for the provincial dummies is the NCR.
Standard error is robust standard error.
* significant at 10% ; ** significant at 5%; *** significant at 1% levels
Source: Author's own computation based on the 2013 NDHS.

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[33] From the 5,301 observations, 222 observations were due to the following reasons: (1) 187 observations do not have partners or partner's information were missing; (2) a total of 35 observations from Apayao, Biliran and Tawi-Tawi provinces were dropped due to perfect collinearity.

The result of the OLS (2nd stage) regression model shows the positive impact of the availability of public and private health facilities in the marginal effects of the province dummies in the use of health facilities during childbirths. It implies that the presence of health facilities is an important factor on women's decision to have facility-based deliveries. This is in congruence to the result of the 2013 NDHS where it reports that the third most cited reason for not delivering in a health facility is due the distance. Twenty five percent of women who gave birth at home find health facilities too far. The presence of health facilities in the area give women more options with less travel time to get into to the health facility.

Table 7: Results from the OLS Model (2nd Stage)

	Variables	*Coefficient*	*Standard Error*
	Private_r	0.357*	0.206
	Govt_r	0.637**	0.312
	Licensed_r	-1.430	0.712
	Constant	-0.793	0.307
	Observations = 76[34]		
	r-squared = 0.1070		

Notes: Standard error is robust standard error.
* significant at 10%; ** significant at 5%; *** significant at 1% levels
Source: Author's own computation based on the 2013 NDHS and administrative data from DOH.

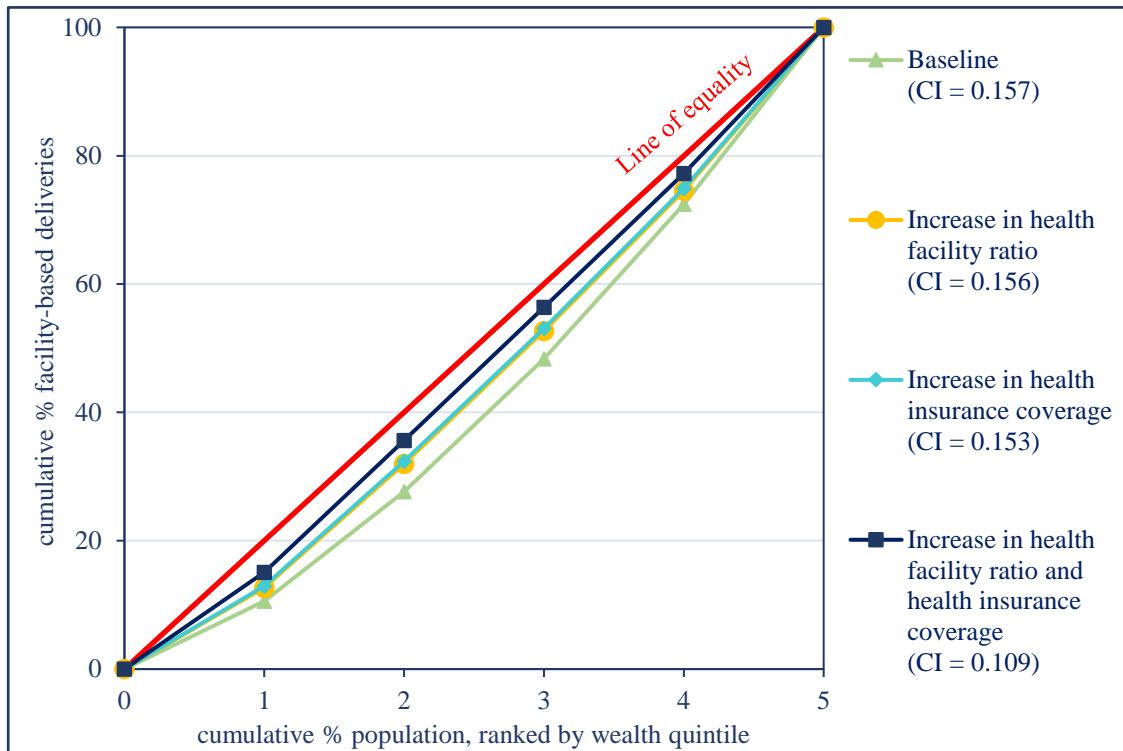## 4.2   Concentration Curve and Concentration Index

To illustrate the impact of policy interventions in access to facility-based deliveries, the following simulations were done. First, in provinces with a government health facility ratio lower than the average, the ratio was increased to reach the average ratio. Second, the health insurance coverage of poor women[35] was increased to 100%. Lastly, the first and second policy interventions were applied simultaneously. **Figure 5** shows the movements of the

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[34] Five provinces were dropped due to Biliran and Camiguin are not in the 2013 NDHS sample and Apayao, Biliran and Tawi-Tawi were dropped in the logit regression.

[35] Poor women are defined as those who belong to the first and second wealth quintile.

Concentrations Curves and the changes in the Concentration Indexes upon the imposition of the different policy interventions.

Figure 5: Concentration Curve of Facility-Based Deliveries

Note: CI = Concentration Index.
Source: Author's own computation based on the 2013 NDHS.

The baseline Concentration Curve and Concentration Index suggest that a pro-rich inequality exists in the use facility-based deliveries among women in the Philippines. The results of the simulation exercise showed that increasing the government health facility ratios and health insurance coverage have both resulted in an improvement in the access of facility-based deliveries among women in the lower segment of the income distribution, as manifested by the upward movements of the Concentration Curves. The baseline Concentration Curve which is represented by the green line, both moved in the direction closer to the line of equality (red line). The new Concentration Curves are represented by the yellow line (increase in health facility ratios) and the cyan line (increase in insurance coverage). However, the improvement

is meager as shown by the small reductions in the Concentration Indexes. It declined from a baseline of 0.157 to 0.156 with the increase in health facility ratios and to 0.153 with the increase in health insurance coverage.

Meanwhile, it is noteworthy that the equity impact of the interventions is much more pronounced if they are implemented simultaneously. This is signified by the larger upward movement of the Concentration Curve. After increasing the health facility ratios and the insurance coverage at the same time, the baseline Concentration Curve (green line) moved much closer to the line of equality as represented by the dark blue Concentration Curve. Accordingly, the Concentration Index was significantly reduced to 0.109.

4.3   Robustness Check

Some robustness checks were done to see how consistent the estimated coefficients are. The model was re-estimated using two age groups (**Appendix 7**). Theory suggests that the 15-20 and 31 and above age groups have the highest pregnancy-related risks while the 21-30 age group is the relatively safer group. However, there are only a few samples in the 15-20 age group that's why it was decided to be dropped in the robustness check.

The results show that the coefficients are quite stable in the 21-30 and 31 and above age groups except for the partner's education and quintile dummies. But, overall it can be concluded that the coefficients from the re-estimations elicit the same trend with the regression which uses the 15-49 age group.

4.4   Limitations of the Study

As presented in the first chapter, a wide disparity in access to maternal health care exists among women by income groups and by region. The simulation exercise aims to illustrate how supply and demand side policy interventions will reduce the inequality. However, the Concentration Curve and the Concentration Index are tools that can only illustrate the

(in)/equality among income groups. This thesis was not able to illustrate how policy interventions reduce inequality among regions.

In addition, it would also be insightful to look at how access to facility-based deliveries will improve among the women in poorer income groups or women in disadvantaged regions. For instance, a simulation that will look at the effect of increasing the amount of the maternity and newborn package from 6,500 PhP to a certain amount, say to 10,000 PhP (average cost of delivering in a public health facility), in reducing inequality. However, due to data constraint, this was not viable.

5. Conclusion and Policy Proposals

The result of the two-stage regression model showed that individual, household and community circumstance factors have a significant impact on the decision of women to utilize health facilities. With this information at hand, further government interventions may be implemented to encourage poor women to utilize facility-based deliveries. Parity, educational attainment, dependent household members, health insurance coverage and wealth index are found to be the most prominent determinants of women's maternal health seeking behavior. The negative impact of parity and the number of dependents on the use of health facilities may support the promotion of family planning and birth spacing. On the other hand, the positive impact of education on health facility utilization may encourage the government to target the current information dissemination campaigns on the risks of childbirth to women who have lower educational attainments. The campaign may be through media or through the barangay health workers, whichever is deemed to be more effective in the community. The government should continue its effort in providing free PhilHealth coverage among the poor as supported by the positive impact of health insurance to health facility utilization. However, as the result have shown, the low impact of health insurance in mitigating the out-of-pocket cost of maternity care calls for an increase in the amount of PhilHealth's maternity and newborn package benefits. The amount of benefits should at least cover the entire health facility delivery cost.

Moreover, the result of the simulation exercise illustrated that employing supply and demand side interventions to the underprivileged segments of the population reduces inequality. An increase in the number of public maternal health facilitates in areas where it is lacking, incentivize women to give birth in a health facility, which may due to reductions in travel time. On the other hand, provision of health insurance encourages women to use health facilities it mitigates the cost. However, if these policy interventions are implemented

38

separately, the impact may not be substantial (as shown by the first and second simulation exercise). This may be attributed to the fact that a demand side intervention alone may be constrained by supply side factors. For instance, providing sufficient health facilities may not encourage a lot of poor women to utilize health facilities as they may simply cannot afford it. On the other hand, if health insurance coverage is increased solely, the effect on the access of poor women may also be small. Poor women may not be incentivized enough as it still means for instance that they may still have to travel far to reach the nearest health facility.

This is what has happened in the Philippines, despite the substantial increase in the PhilHealth's indigent members starting year 2010, improvements in access to maternal health care was meager (Paredes, 2016). The persistent inequality may be attributed to the fact that the government may have put effort in providing the poor access to financial resources to afford health care services, on the other side, the government is not providing sufficient health budget leaving some rural health facilities lacking the necessary equipment and skilled health personnel to have birth delivery services (Jara, 2017). Hence, a poor woman in the rural area who has a health insurance coverage may want to give birth in a health facility but is constrained as she still has to travel far.

Therefore, if the government wants to achieve a significant improvement in the utilization of facility-based deliveries, supply side and demand side factors have to be implemented simultaneously, as supported by the result of the third simulation exercise, where the number of public health facilities and insurance coverage were increased at the same time.

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Appendixes

Appendix 1: The Map of the Philippines
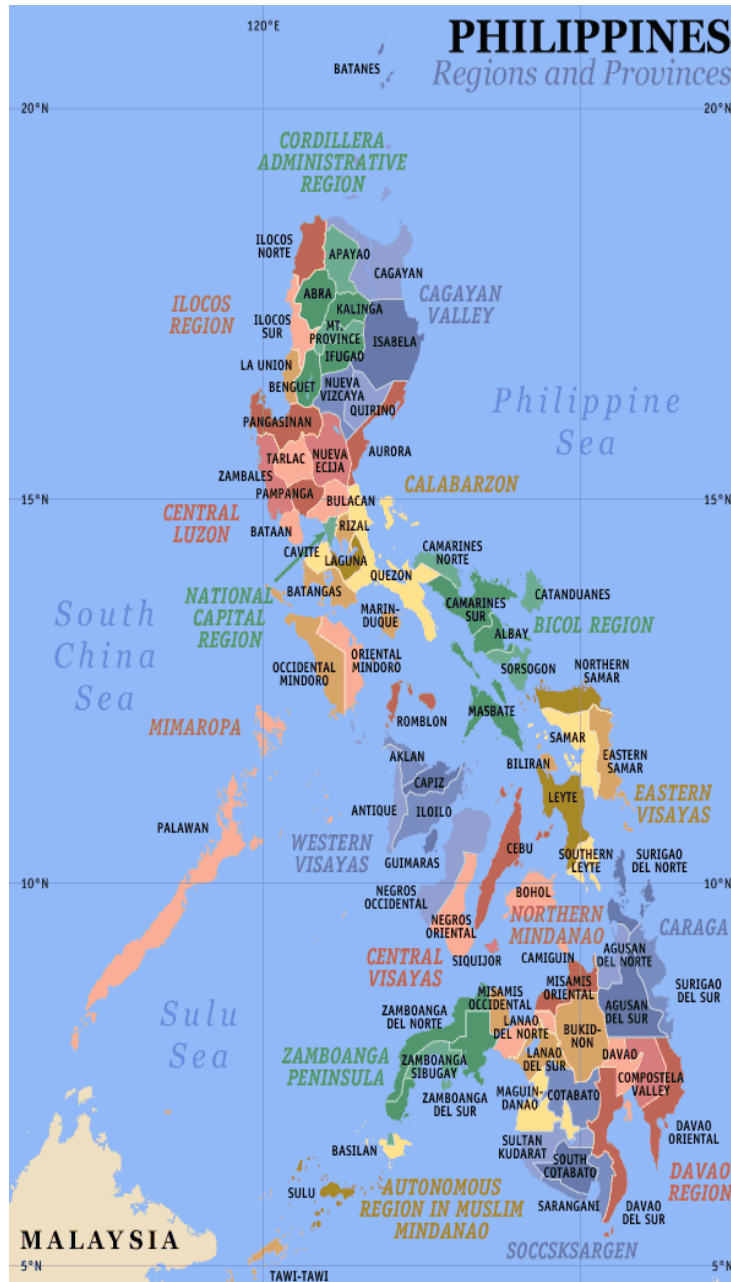
Notes: **NCR**= National Capital Region; **CAR= Cordillera Administrative Region** (Abra, Apayao, Bengue, Ifugao, Kalinga, Mountain Province); **Ilocos Region** (Ilocos Norte, Ilocos Sur, La Union, Pangasinan); **Cagayan Valley** (Batanes, Cagayan, Isabela, Nueva Vizcaya, Quirino); **Central Luzon** (Aurora, Bataan, Bulacan, Nueva Ecija, Pampanga, Tarlac, Zambales); **CALABARZON** (Calamba, Laguna, Batangas, Rizal, Quezon); **MIMAROPA** (Marinduque, Occidental Mindoro, Oriental Mindoro, Palawan, Romblon); **Bicol** (Albay, Camarines Norte, Camarines Sur, Catanduanes, Masbate, Sorsogon); **Western Visayas** (Aklan, Antique, Capiz, Negros Occidental, Guimaras, Iloilo); **Central Visayas** (Bohol, Cebu, Negros Oriental, Siquijor); **Eastern Visayas** (Biliran, Eastern Samar, Leyte, Northern Samar, Southern Leyte, Western Samar); **Zamboanga Peninsula** (Zamboanga del Norte, Zamboanga del Sur, Zamboanga City, Zamboanga Sibugay); **Northern Mindanao** (Bukidnon, Camiguin, Lanao del Norte, Misamis Occidental, Misamis Oriental); **Davao Region** (Davao del Norte, Davao del Sur, Davao Oriental, Compostela Valley, Davao Occidental); **SOCCSKSARGEN** (South Cotabato, Cotabato, Sultan Kudarat, Sarangani plus General Santos City); **CARAGA** (Agusan del Norte, Agusan del Sur, Surigao del Norte, Surigao del Sur, Dinagat Islands); **ARMM= Autonomous Region of Muslim Mindanao** (Basilan, Lanao del Sur, Maguindanao, Sulu, Tawi-tawi).
Source: PSA and ICF International (2014)

Appendix 2: Selected Statistics by Region

Region	Population (2015)	HDI (2012)	Gini Index (2015)	Poverty Rate, in % (2015)	Per Capita RGDP, in '000 pesos (2016)
LUZON					
NCR	12,651,700	0.83	0.391	3.9	232.8
CAR	1,783,500	0.54	0.421	19.7	75.3
Ilocos Region	5,136,000	0.66	0.398	13.1	49.5
Cagayan Valley	3,497,900	0.58	0.407	15.8	39.2
Central Luzon	11,098,900	0.64	0.397	11.2	68.6
CALABARZON	14,127,200	0.70	0.401	9.1	94.8
MIMAROPA	3,089,300	0.56	0.457	24.4	39.8
Bicol	6,032,100	0.51	0.396	36.0	26.7
VISAYAS					
Western Visayas	7,704,400	0.61	0.436	22.4	41.5
Central Visayas	7,446,800	0.61	0.465	27.6	69.4
Eastern Visayas	4,537,200	0.49	0.465	38.7	37.3
MINDANAO					
Zamboanga Peninsula	3,764,700	0.51	0.436	33.9	43.1
Northern Mindanao	4,706,700	0.53	0.464	36.6	63.9
Davao	4,963,100	0.52	0.430	22.0	65.8
SOCCSKSARGEN	4,599,200	0.48	0.463	37.3	45.5
CARAGA	2,716,700	0.51	0.434	39.1	35.7
ARMM	3,706,900	0.33	0.280	53.7	13.4

Notes: HDI = Human Development Index. The HDI values per region are simple the averages of the provincial HDI's; RGDP = Regional Gross Domestic Product, in constant prices (2000=100). Sources: Population: http://psa.gov.ph/statistics/census/projected-population; Poverty Rate: http://psa.gov.ph/poverty-press-releases/data; Gini Index: https://psa.gov.ph/sites/default/files/attachments/ird/pressrelease/tab4%265.pdf; HDI and RGDP: Philippine Statistical Yearbook 2016. https://psa.gov.ph/content/2016-philippine-statistical-yearbook

Appendix 3: Opportunity Curve of Access to Health Facilities, 1998 and 2004

       The figure below shows the opportunity curve of access to health facilities, which is calculated based on the proportion of sick people who sought treatment in one of the available health facilities in the Philippines for the years 1998 and 2004. It suggests that health facilities in the Philippines are largely utilized by individuals belonging at the top end of the income distribution. The average access to health service of the bottom 20% of the population is only about 33% in 1998 and 36% in 2004 while the average access of those who belong at the top quintile stands at about 45%.
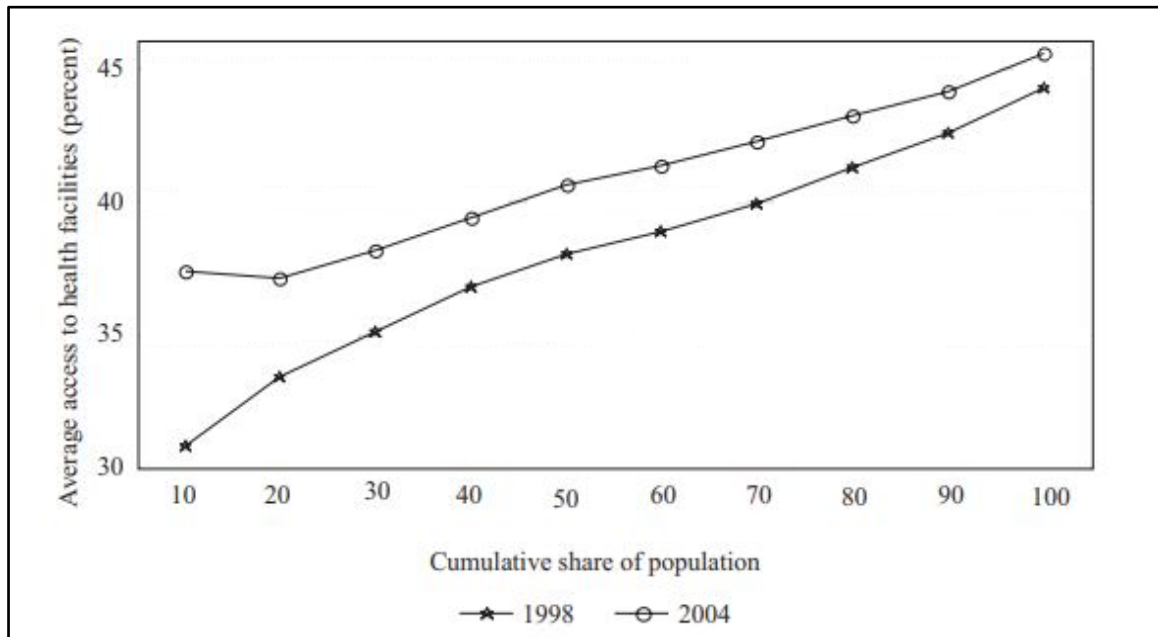
Source: Ali and Son (2007)

Appendix 4: Principal Legislation in the Health Sector

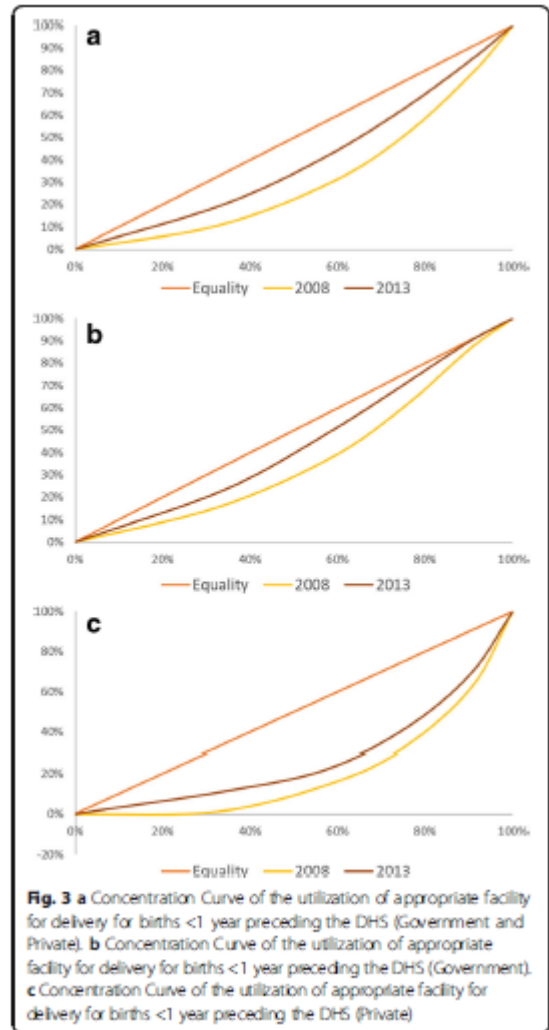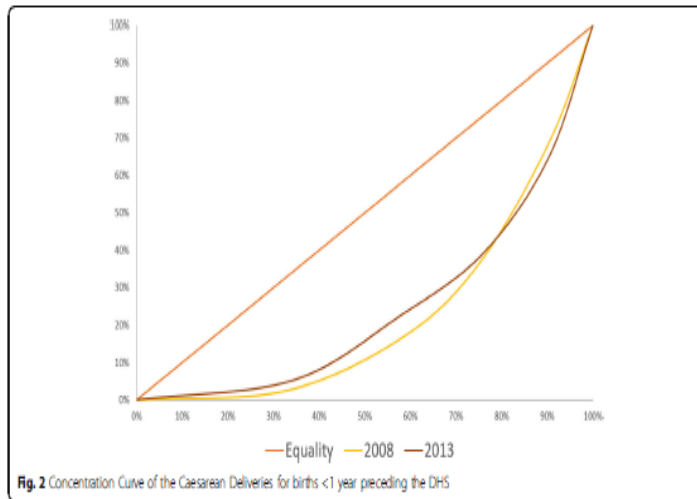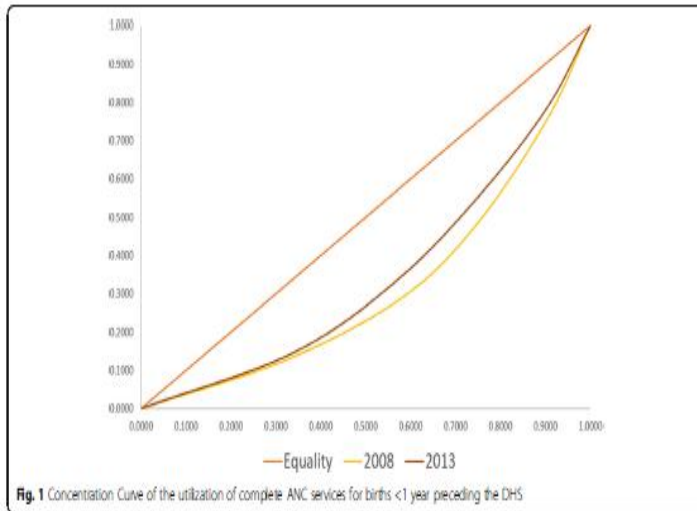| Year	Act
1954	Republic Act No. 1082 "Rural Health Act"
1957	Republic Act No. 1939 "Contributions for the Maintenance of Hospital Beds"
1959	Republic Act No. 2382 "Medical Act"
1979	Adoption of primary health care (PHC)
1982	Executive Order 851 "Reorganizing the Ministry of Health, Integrating the Components of Health Care Delivery into its Field Operations, and for Other Purposes"
1987	Constitution of the Republic of the Philippines
1988	Republic Act No. 6675 "Generics Act"
1991	**Republic Act No. 7160 "Local Government Code"**
1994	Republic Act No. 7722 "Higher Education Act"
1995	**Republic Act No. 7875 "National Health Insurance Act"**
1997	Republic Act No. 8344 "An Act Prohibiting the Demand of Deposits or Advance Payments for the Confinement or Treatment of Patients in Hospitals and Medical Clinics in Certain Cases"
1999	Republic Act No. 7305 "Magna Carta for Public Health Workers"
2003	Republic Act No. 9184 "Government Procurement reform Act"
2004	National Health Insurance Act of 1995 amended to Republic Act No. 9241
2008	1988 Generics Act– amended to Republic Act No. 9502 "Cheaper and Quality Medicines Act"
2010	Republic Act No. 7432 'Senior Citizens Act" – amended to Republic Act No. 9994 "Expanded Senior Citizens Act"

Appendix 5: PhilHealth's Maternity Care Package and Newborn Care Package

Maternity Care Package	
Who can avail	Members and qualified Dependents
What services	Prenatal care, delivery and postnatal care
Important Features	P1,500 prenatal care fee and P6,500 facility fee including professional fee
Inclusion	Covers first 4 normal (uncomplicated) spontaneous deliveries. It should be low risk at the start and throughout labor and delivery; infant in vertex position; infant in 37 to 42 weeks AOG.
Exclusion	5th and subsequent deliveries are not covered and maternal conditions that are considered high risk as enumerated in Circular 20, s 2008: - Age less than 19y/o - First pregnancy at the age of 35 or greater - Multiple pregnancy - Ovarian abnornality (ovarian cyst) - Uterine abnormality (myoma uteri) - Placental abnormality (placenta previa) - Abnormal fetal presentation (ie breech) - History of 3 or more abortions/miscarriage - History of 1 stillbirth - History of major obstetric/gynecologic surgical operations (ie CS, uterine myomectomy) - History of medical conditions (hypertension, pre-eclampsia, thyroid disorder) - Other risk factors that warrant
Newborn Care Package	
Who can avail	Qualified dependents (newborn) of members; No limit as to number of births
What services	Newborn care, screening tests – newborn screening and hearing, Vaccination – hepatitis B and BCG and EINC protocol
Components of Newborn Care Package	Immediate drying of the newborn, early skin-to-skin contact, cord clamping, non-separation of mother/baby for early breastfeeding initiation, eye prophylaxis, Vitamin K administration, Weighing, BCG Vaccination, Hepatitis B Vaccination, newborn Hearing Test, newborn Screening Test

Appendix 6: Concentration Curve and Concentration Index of Maternal Health Care Services in the Philippines

The figures below show the Concentration Curves for the utilization of complete prenatal care, caesarian deliveries and facility-based deliveries. All the curves of the three maternal care services all lie below the line of equality (45 degree line), which implies that the access to these services are concentrated among the rich households.

Accordingly, the Concentration Indexes of the three maternal services (prenatal care: 0.3206, caesarian section: 0.5162 and facility-based deliveries: 0.2128) for the year 2013 are all positive values, indicating pro-rich use of the service.

Fig. 1 Concentration Curve of the utilization of complete ANC services for births <1 year preceding the DHS

Fig. 2 Concentration Curve of the Caesarean Deliveries for births <1 year preceding the DHS

Fig. 3 a Concentration Curve of the utilization of appropriate facility for delivery for births <1 year preceding the DHS (Government and Private). **b** Concentration Curve of the utilization of appropriate facility for delivery for births <1 year preceding the DHS (Government). **c** Concentration Curve of the utilization of appropriate facility for delivery for births <1 year preceding the DHS (Private)

Source: Paredes (2018)

Appendix 7: Robustness Check

	20 to 30 yrs old		31 yrs old and above	
	Marginal Effects	**Standard Error**	**Marginal Effects**	**Standard Error**
Age	-0.005	0.005	0.005	0.003
Parity	-0.042***	0.014	-0.044***	0.009
Yrseduc_woman	0.024***	0.005	0.031***	0.005
Employed_woman (1=yes; 0=no)	0.053	0.041	0.014	0.038
Yrseduc_partner	0.021***	0.004	0.004	0.005
Employed_partner (1=yes; 0=no)	0.017	0.047	0.030	0.044
Health_insurance, (1=yes; 0=no)	0.079***	0.025	0.084***	0.030
Wealth_quintile2	0.039	0.033	0.097***	0.034
Wealth_quintile3	0.071*	0.037	0.105***	0.039
Wealth_quintile4	0.133***	0.040	0.175***	0.042
Wealth_quintile5	0.175***	0.045	0.256***	0.0452
Less5	-0.000	0.017	-0.025	0.019
Hhmember	0.003	0.005	0.010	0.007
Urbanity	0.034	0.031	0.000	0.034
Province dummies	Yes		Yes	
Observations	2348		2330	
Pseudo r-squared	0.223		0.248	

Notes: The reference category for the wealth quintiles is the poorest wealth quintile (1st quintile).
Standard error is robust standard error.
* significant at 10% ; ** significant at 5%; *** significant at 1% levels
Source: Author's own computation based on the 2013 NDHS.