DECENTRALIZATION, SOCIAL SAFETY NET, AND STRATEGIES IN COMBATING MATERNAL MORTALITY IN INDONESIA

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ABSTRACT

According to the World Health Organization, 830 women worldwide die every day from complications related to pregnancy and childbirth in 2015. Decreasing maternal death is an important issue because it remains as an unfinished agenda in the Millennium Development Goals. This study explores how policy change (decentralization) and government intervention (social safety net (SSN)) have affected the uptake of three important strategies in combating maternal mortality: family planning (FP), delivery care, and antenatal care (ANC). The focus is Indonesia because this country has one of the highest maternal mortality in Southeast Asia and where the government has undergone changes in its organization and has sponsored SSN to expand health service provision. Using rounds of the Indonesia Demographic and Health Survey between 1987 and 2012, this study has three important findings. First, although there is no evidence that the decentralization has led to a significant decline in contraceptive use, there is statistical evidence showing that the effectiveness of two instruments of FP program in Indonesia (FP fieldworkers and FP IEC) has declined after the decentralization. . Nevertheless, the two instruments continue to exert positive and significant impacts on contraceptive use albeit at lower levels after the decentralization. Second, the empirical results also indicate that the inequality in delivery care utilization between the eastern and western regions has widened over the years, particularly in the post decentralization period. Third and finally, the results show that the government intervention of SSN has a positive and significant impact on ANC and delivery care utilization particularly the utilization of skilled birth attendant.

DEDICATION

To my dear parents,

and to the one who kept telling me that I can, this one is for you.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATION LISTS

2SLS	Two-staged least squares
ANC	Antenatal care
BAPPENAS	*Badan Perencanaan Pembangunan Nasional* (National Development Planning Agency)
BKKBD	*Badan Koordinasi Keluarga Berencana Daerah* (Regional Family Planning Coordinating Board)
BKKBN	*Badan Koordinasi Keluarga Berencana Nasional* (National Family Planning Coordinating Board)
BPS	*Badan Pusat Statistik* (Statistics Indonesia)
CEMD	Confidential Enquiry into Maternal Deaths
CPR	Contraceptive prevalence rate
DHS	Demographic and Health Survey
DID	Difference-in-difference
DV	Dummy variable
FANC	Four-visit focused ANC: at least one visit in the first trimester, at least one visit in the second trimester, and at least two visits in the third trimester
FP	Family planning
ICT	Information, communication, and technology
IDHS	Indonesian Demographic and Health Survey
IEC	Information, education, and communication
IFLS	Indonesian Family Life Survey
ILO	International Labour Organization
IV	Instrumental variable
LAPMs	Long-acting/permanent methods

LKBN	*Lembaga Keluarga Berencana Nasional* (National Family Planning Institute)
MCH	Maternal and Child Health Program
MDG5	Millennium Development Goal 5
MDGs	Millennium Development Goals
MMR	Maternal Mortality Ratio
MOH	Ministry of Health
NICPS	National Indonesia Contraceptive Prevalence Survey
NGO	Non-governmental organization
PLKB	*Petugas Lapangan Keluarga Berencana* (FP fieldworker)
REPELITA	*Rencana Pembangunan Lima Tahun* (Five Year Development Plan)
SDG3	Sustainable Development Goal 3
SDGs	Sustainable Development Goals
SSN	Social safety net
Susenas	*Survei Sosial Ekonomi Nasional* (National Socioeconomic Survey of Indonesia)
TFR	Total Fertility Rate
UN	United Nations
UNFPA	United Nations Population Fund
WHO	World Health Organization

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CHAPTER 1

INTRODUCTION

1.1   Rationale of the study

Maternal deaths: an unfinished agenda

In September 2015, the United Nations (UN) General Assembly unanimously ratified the Sustainable Development Goals (SDGs) which replaced the old Millennium Development Goals (MDGs). The SDGs has 17 goals and 169 targets to be achieved by 2030. The Sustainable Development Goal 3 (SDG3), "Ensure healthy lives and promote well-being for all at all ages", is a universal response to the failure of the international community to meet Millennium Development Goal 5 (MDG5) "Improve maternal health", i.e. reduce maternal mortality by three quarters and achieve universal access to reproductive health (United Nations [UN], 2015). As of 2015, the maternal mortality ratio has declined by just 45 per cent worldwide falling short of the MDG5 target of 75 per cent (UN, 2015). Target 3.1 of the SDG3 is to reduce the global maternal mortality ratio[1] (MMR) to less than 70 per 100,000 live births. In 2013, the global MMR remains as high as 210 per 100,000 live births (UN, 2015).

As one of the countries that pledged to both the MDGs and the SDGs, Indonesia has also fought against maternal deaths. However, despite its commitments and efforts to achieve the MDGs, Indonesia's MMR reduction still fell short of its MDG5 target.

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[1] Maternal mortality ratio (MMR) is the number of maternal deaths due to birth- or pregnancy-related complications per 100,000 live births. Maternal death is defined as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy but not from accidental or incidental causes" (WHO, n.d.).

Indonesia's MMR initially had decreased from 390 per 100,000 live births in 1990-1994 to 228 per 100,000 live births in 2007 (42 per cent reduction) (Statistics Indonesia [BPS], National Population and Family Planning Board [BKKBN], Ministry of Health of Indonesia [MOH], & ICF International, 2013; BAPPENAS, 2012). However, Indonesia has subsequently experienced a setback in reducing the MMR; the MMR increased from 228 to 359 per 100,000 live births between 2007 and 2012 (Statistics Indonesia, BKKBN, MOH, & ICF International, 2013). The current MMR of 359 is way far behind the MDG5 target of 102 per 100,000 live births.

Causes of maternal deaths can be categorized into two: (i) direct causes which are related to major complications during pregnancy, delivery, and post-partum period, and (ii) indirect causes which are pre-existing conditions that increase the risk of maternal death (Spotlights on Health and Rights, n.d.; WHO, 2015c). The direct causes include severe bleeding (hemorrhage), infection (sepsis), high blood pressure (pre-eclampsia and eclampsia), prolonged labor, and unsafe abortion. The indirect causes include pre-existing conditions such as anemia, malaria, heart diseases, and HIV/AIDS. The recent rising incidence of HIV/AIDS is increasingly an important cause of maternal deaths.

There are three important strategies in decreasing maternal deaths: (1) reducing the likelihood that a woman will experience complications during pregnancy or delivery, (2) improving the outcomes for women with complications during pregnancy and delivery, and (3) enabling women to control birth and to space pregnancy (McCarthy & Maine, 1992; United Nations Population Funds [UNFPA], 2003; World Health Organization [WHO], 2015d). Delivery care (i.e. delivery assisted by skilled attendant

and delivery at health facility) and antenatal care (ANC) are important instruments for strategy (1) and (2); while access to family planning (FP) services, i.e. the contraceptive use, and FP information, education, and communication (IEC) are important instruments for strategy (3) (UNFPA, 2003; WHO, 2015d).

Indonesia's efforts to reduce maternal deaths

The first step of the Indonesian government's plans to achieve the MDGs and the SDGs of maternal death reduction is to revitalize its FP program (Webster, 2012). Fulfilling the unmet need for FP is expected to contribute to a reduction in maternal deaths by nearly one third (WHO, 2015b). Reviving Indonesia's FP program not only aims to contribute to Indonesia's efforts to fight against maternal mortality, but also aims to lower Indonesia's Total Fertility Rate (TFR) that has been steady at 2.6 since 2003 (Harlan, 2014; Hull & Mosley, 2009). The government believes that the FP program has become less effective as shown by a stagnant contraceptive prevalence rate (CPR) and fertility rate in the last decade and thus has emphasized the urgency to revive the program ("Indonesian Family Planning", 2013).

The second government step to combat MMR in Indonesia is improving delivery care utilization, i.e. increasing the number of deliveries assisted by a skilled attendant and the number of deliveries at a health facility (Webster, 2012). Both are crucial factors in improving access to emergency obstetric care which is an important pathway in decreasing maternal deaths (Kosen et al., 2014; Ronsmans et al., 2009; UNFPA, 2003; Webster, 2012; WHO, 2015d). Skilled attendants can identify and prevent medical complications and provide emergency care when complications arise during

delivery while health facility has the necessary instruments and personnel to provide immediate measures in providing emergency obstetric care.

The government strategy to decrease maternal deaths include improving access to ANC. ANC plays an important role in detecting problems during pregnancy to prevent birth defects and delivery complications. Furthermore, it improves the health of the pregnant women through nutritional and preventive routine interventions such as folic acid supplement, magnesium sulfate, and tetanus toxoid vaccine. In addition, ANC conveys knowledge of maternal health and necessary pregnancy practices, and emphasizes the importance of safe delivery and spacing or limiting birth through FP.

Policy changes have altered the way the government carries out its MMR-alleviation-related programs that may affect the effectiveness of the FP, delivery care, and ANC programs. The first policy change is government decentralization that resulted from political turmoil in 1998. Decentralization shifts the decision making on service provision away from the national government to the local district government. Decentralization has particularly affected the authority of Regional Family Planning Coordinating Board (BKKBD) in managing FP fieldworkers that led to the decline in the number of FP fieldworkers who once held an important role in disseminating FP program ("Dilema PLKB", 2007; Hull & Mosley, 2009; Kurniawan, Pratomo, & Bachtiar, 2010; Sukamdi, 2011, UNFPA-Indonesia, n.d.). With decentralization, the BKKBD was put under the control of the local government, and under this new arrangement, FP program was given much less of a priority by local officials. Furthermore, decentralization is believed to have induced priority gap or even priority differences between the central and regional governments, as well as the lack of clarity

in the role and responsibility between the central and regional governments, particularly on program implementation of both FP and delivery care at the local district levels (Green, 2005; Sukamdi, 2011; UNFPA-Indonesia, n.d). In addition, with decentralization, district governments are responsible to raise local revenues to finance their own local healthcare services. Since some districts with poor resources face financial constraints, existing district inequality in maternal care utilization, particularly in delivery care utilization, is suspected to have risen after decentralization (Green, 2005; Kosen et al., 2014).

The second government policy is the social safety net (SSN) program, known as the health card, which is intended to improve healthcare utilization including delivery care and ANC. In our study, we investigate the impacts of the health card in promoting delivery care and ANC utilization, particularly among poor women. Beneficiaries of the health card are eligible to receive free health service that includes inpatient and outpatient care as well as maternal care. As the health card is intended to reduce out-of-pocket spending for accessing the maternal healthcare, women who were covered by the health card program are expected to be more likely to utilize delivery care as well as ANC.

1.2   Objective and contribution of the study

This dissertation contributes to the existing literature on how government programs could affect women's uptake of maternal health care. The focus is Indonesia because this country is one of the countries in Southeast Asia whose progress in achieving the MDG5 went far off-track (Table 1.1). In fact, Indonesia is one of the two countries in Southeast Asia whose MMR has experienced a rising trend (alongside the

Philippines). Indonesia's latest MMR (359 per 100,000 live births) is much higher than that of the Philippines (220 per 100,000 live births). Both countries underwent the process of government decentralization.

As FP program is one of crucial strategy in efforts to combat maternal deaths, it is important to investigate how the decentralization has affected the FP program in Indonesia. It is useful to examine how effective the instruments of the FP program work, particularly because the implementation of the FP program in Indonesia has changed after the decentralization. Chapter 2 serves as a pioneer empirical study that examines how decentralization affects contraceptive use and how the effectiveness of two important strategies of the FP program (FP fieldworker home visit and FP IEC) in promoting contraceptive use has changed after the decentralization.

This paper complements existing literature that lack regression analysis in providing evidence to support their arguments on the impact of decentralization on the implementation of FP program in Indonesia. With no rigorous impact evaluation, the previous studies could not tell the exact direction and magnitude of the effects of the two important FP instruments (FP fieldworker and FP IEC) in promoting contraceptive use before and after the decentralization. Thus this study could provide a more precise guidance on how the government could carry out its FP program to better improve contraceptive use. In other words, with the regression analysis, this study could help the government in pointing out whether FP fieldworker visit and FP IEC are actually effective instruments in promoting FP, how big is their impact in promoting contraceptive use, and how much their effectiveness might have declined after decentralization.

Chapter 2 also investigates the inequality in delivery care utilization between the eastern and western regions of Indonesia. It may contribute to policy making process by providing some insights on how to reduce the inequality between the western and the eastern regions. We focus on how the inequality in delivery care utilization has changed over the years, particularly in the post decentralization period as theoretical and qualitative studies argued that decentralization may have widened inequality in access to healthcare between regions. The suspected mechanism is that the decentralization might have created financial problems for district governments with low local revenues to finance health care since district governments became responsible to finance their local provision of healthcare services, health facility, and health personnel under the decentralized system.

Chapter 3 explores how the SSN of health card program has affected the uptake of delivery care and ANC utilization. This paper contributes to limited literature that examines the impact of SSN on delivery care and ANC utilization, moving forward from most literature that investigated the impact of SSN on general health care utilization. Without focusing on the two strategies in combating MMR, i.e. delivery care and ANC, studies on the impact of SSN cannot provide useful insights to the Indonesian government to formulate policies aiming to achieve the maternal death reduction. Furthermore, we believe that our methodology of using 2SLS method in dealing with the endogeneity problem is better than the mixed method (mixed of propensity score matching (PSM) and logistic regression) used by one previous study by Brooks et al. (2017). One of the reasons is that in investigating the impact of the health card, the PSM might suffer from a violation of the conditional independence assumption that leads to

unreliability of PSM estimates. There might an unobserved factor that affects the health card participation, i.e. the subjective judgement of the local officials, and hence the conditional independence assumption is violated. Furthermore, we address the external validity concern that exists in the previous literature by using nationally representative datasets. Lastly, we conduct a more comprehensive study by examining both aspects of delivery care (facility-based delivery and delivery by skilled attendant) as well as the ANC.

The empirical findings in this study show no strong statistical evidence that the decentralization has led to a significant decline in contraceptive use. However, we find evidence that the effectiveness of two instruments of FP program in Indonesia has declined after the decentralization even though FP fieldworkers and FP IEC are still positively associated with contraceptive use. In addition, the regression results provide evidence that the inequality in delivery care utilization between the western and the eastern regions has widened over the years, particularly so in the post decentralization period. Furthermore, the OLS estimates imply that SSN has a positive impact on both delivery care and ANC utilization and that the magnitude of impact is the strongest among women in the poorest category. However, the 2SLS estimates suggest that the positive impact of the SSN is significant only on delivery care utilization of skilled birth attendants.

1.3 Roadmap to the dissertation

This dissertation has three remaining chapters. Chapter 2 discusses the impact of the devolution of the BKKBN, the national FP agency, on the effectiveness of the country's FP instruments. Chapter 2 also investigates how the inequality in delivery

care utilization between the western and the eastern regions in Indonesia has changed over the years. Chapter 3 discusses the impact of the SSN on delivery care and ANC utilization. Finally, Chapter 4 summarizes the main findings and policy implications from each of the main chapter.

CHAPTER 2

GOVERNMENT DECENTRALIZATION, FAMILY PLANNING, AND

INEQUALITY IN DELIVERY CARE UTILIZATION[*]

2.1   Introduction

This chapter investigates the impact of government decentralization on the performance of family planning (FP) program in Indonesia, and the linkage between government decentralization and the inequality in delivery care utilization between the eastern and western regions in Indonesia.

FP services which allow couples to plan and time fertility play a vital role in reducing not only fertility but also maternal deaths. Increasing access to contraceptives through FP services could contribute to maternal death reduction by one third (WHO, 2015b). Reviving FP program in Indonesia has become crucial as the FP program could not substantially increase the contraceptive use in the last decade (Figure 2.1). The contraceptive prevalence rate (CPR) has remained relatively steady in the last decade. Similarly, Indonesia's total fertility rate (TFR) has also experienced a flat trend since 2003 at 2.6 which is significantly above the replacement rate at 2.1 (Figure 2.1) (Harlan, 2014; Hull & Mosley, 2009; Kurniawan, Pratomo, & Bachtiar, 2010).

Indonesia was in an intensive period of FP program (1968-1998) under the lead of then Presiden Soeharto. The government was committed to control fertility through an FP program and established Lembaga Keluarga Berencana Nasional (LKBN) in 1968 which later was transformed into Badan Koordinasi Keluarga Berencana Nasional

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[*] Part of this chapter was presented at the 15th International Convention of the East Asian Economic Association on November 5-6, 2016 in Bandung, Indonesia.

(BKKBN) in 1970 whose responsibility is to fully coordinate all national FP program activities. Some important BKKBN strategies in carrying out FP program throughout the country include the deployment of FP fieldworkers and the FP information, education, and communication (IEC). FP fieldworkers go from house to house to disseminate FP ideas and benefit in controlling birth by using contraceptives; while FP IEC conveys FP messages and FP campaign through mass media to promote FP and contraceptive use.

The economic crisis in the late 1990s led to political and civil unrest in Indonesia that forced President Soeharto to step down in 1998. This turmoil was followed by major changes in political and governmental structure foremost of which is the decentralization of the government. Following the decentralization, the authority of BKKBD (Regional Family Planning Coordinating Board) is delegated away from the central government (BKKBN) and to the regional government of district offices. The devolution of BKKBD to the control of local administrators had greatly affected FP fieldworkers who played a very important role in carrying out the FP program during the Soeharto era. This can be seen particularly in the decline in the number of FP fieldworkers and in the percentage of women who are visited by FP fieldworker after the decentralization. Similarly, FP IEC had no longer been as intensive as during the Soeharto regime. For example, the "Two Children is Enough" campaign was no longer carried out after the decentralization. This devolution of BKKBD from the control of BKKBN to the regional offices is suspected to be the major cause in the weakening performance of FP program as can be seen in the stagnant CPR and TFR in the last

decade (Figure 2.1) (Hull & Mosley, 2009; Kurniawan, Pratomo, & Bachtiar, 2010; National Research Council & AIPI, 2013; Sukamdi, 2011; UNFPA-Indonesia, n.d.).

Furthermore, the decentralization may also affect the inequality in delivery care utilization. Over the years, it has been known that there is some development gap between the eastern and western regions in Indonesia where western Indonesia is considerably more developed compared to the eastern regions, including in the health sector (Kosen et al., 2014). WHO has highlighted the importance to address inequality in accessing reproductive healthcare as one of the key challenges to achieve SGD3 (WHO, 2015a). The decentralization might exacerbate income inequality between local governments that in turn will affect access to health care. Following decentralization, the provision of local health facilities and local health personnel becomes the responsibility of the local governments (Kementerian Dalam Negeri [Ministry of Home Affairs of Indonesia], 2014). Some local governments may face financial problems in raising local revenues particularly those with poor resources. This financial problem makes it difficult for the poor local governments to provide quality health facilities and attract health personnel to work in their regions. Hence, the decentralization has raised a concern that it might induces gaps in financial capacity between regions that in turn leads to widened inequality in healthcare utilization between regions.

Therefore, a study that investigates how the decentralization has affected contraceptive use and if decentralization has contributed to the rising inequality in delivery care utilization between the eastern and western region has become necessary as reviving FP program and addressing inequality in delivery care utilization are crucial in efforts to decrease the high MMR in Indonesia. Using pooled cross-sectional data of

the Indonesian Demographic and Health Surveys (IDHS), this chapter contributes to the existing literature by identifying the pathways through which decentralization has affected the usage of contraceptives by women. Specifically, this chapter assesses the relative effectiveness of the two FP instruments (FP fieldworker and FP IEC) before and after the decentralization. This chapter moves on by investigating the linkage between decentralization and inequality in delivery care between the eastern and western regions. The main finding is that decentralization does not necessarily discourage women from using contraceptives although we found evidence which shows that the effectiveness of the two FP instruments has both declined after the decentralization. There is also evidence showing a significant inequality in delivery care utilization between the eastern and western regions and that this inequality has widened even more in the post decentralization period particularly in terms of delivery by skilled attendant.

This chapter is structured as follows. The second section provides literature review on (i) decentralization and good governance, (ii) decentralization in Indonesia, (iii) previous studies on FP, and (iii) literature on inequality in delivery care utilization between regions. The third section provides the history of FP program in Indonesia in three different regimes. The fourth section provides descriptive statistics on the inequality in delivery care utilization between regions in Indonesia. The fifth section is the estimation strategy that is followed by the empirical results. The last section is the conclusion and policy implication.

2.2   Literature Review

2.2.1   *Decentralization, good governance, and efficiency*

The notion to adopt decentralized system comes from the arguments that decentralization would promote good governance. There are at least three underlying mechanisms that are expected to facilitate good governance under decentralized system. First, decentralization promotes accountability of the local officials (Bardhan, 2002; Faguet, 2013; Mbate, 2017). In the decentralized system, local officials are elected by local people and hence directly accountable to local people instead of to the central government. As proposed policies are publicly announced during election campaigns, constituents have the knowledge of what to expect from the elected officials and could supervise the performance of the local government programs. Decentralization also promotes political competition that in turn leads to higher public accountability since political competition often puts the politicians who lost in the election as the oppositions that will look closely on the performance of the elected incumbents. Second, decentralization induces better responses and services to the local people's needs (Faguet, 2013; Mbate, 2017). To ensure people's support in the election, local politicians would construct policies that address concerns of the local people. Once those politicians are elected, they would be more accountable in addressing the constituent's needs to ensure the voters remain supporting them in the next election. Third, decentralization is argued to reduce political and ethnic instability especially in countries with many different ethnicities and religions such as in Indonesia (Faguet, 2013; Mbate, 2017). Decentralization allowed local governments to adjust programs and policies to better suit the local people's needs following the tradition and belief of the locals and hence mitigate the risk of conflicts.

On the other hand, some literature argues the negative impact of decentralization on governance. First, some literature argues that decentralization results in poor local programs and poor quality of public service provisions (Lakshminarayanan, 2003; Mbate, 2017; World Bank, 2011). This problem comes from the fact that local government might have poor technical capability and expertise and hence results in poorly designed programs. Furthermore, poor local resources and low quality of local human capital, exacerbated with the absence of training, capacity building, and monitoring from the central government, leads to poor quality of public service. Second, decentralization might serves the interest of the local elites away from the local people's needs or the central government guidance (Mbate, 2017). Local religious or tribal leaders might play important role during election campaigns and then might use their influence on the elected local officials to change the direction of policies and local government decisions to serve their special interests. Third, decentralization might widen inter-regional inequalities and uneven development across regions due to differences in resource endowment, human capital, geographical location, and local revenue capability (Mbate, 2017). Fourth, decentralization is argued to induce lack of clarity in role and responsibility between the local and central government (Friedman, Heywood, Marks, Saadah, & Choi, 2006; Lakshminarayanan, 2003; Mbate, 2017; McIntyre & Klugman, 2003, Secco et al., 2017). The devolution of power involves many officials in many different levels of governments who may have different preferences and agendas.

The following are some studies on the impact of decentralization on some sectors of development such as education, health, and forestry. Some of these studies found evidence of positive impact of decentralization while some others found evidence

15

of the negative impact of the decentralization on some development sectors. A study by Leer (2016) explores how decentralization in Indonesia is expected to improve school quality and efficiency through better responsiveness to local educational needs as theoretically argued by Faguet (2013) and Mbate (2017). However, using difference-in-difference method, Leer (2016) suggests that the empirical results shows no evidence of a significant impact of decentralization on student's achievement in math and language (the sign of coefficients are negative, but not significant). She also found a significant and negative effect of decentralization on teachers' motivation, that teachers were found to spend fewer hours in the classroom. Other literature found evidence of a positive impact of decentralization on health sector. Kumar & Prakash (2017) found evidence of positive impact of decentralization on facility-based delivery in rural India. Regmi et al. (2010) found evidence that decentralization has improved the health system performance in Nepal by bringing health service closer to the local people. Some other literature, however, found that decentralization has brought negative effects in health sector, particularly the maternal care utilization (Hodge et al, 2015; Lakshminarayanan, 2003; McIntyre & Klugman, 2003). Hodge et al. (2015) found evidence that decentralization has exacerbated the inequality in facility-based delivery among major islands in Indonesia as argued in Mbate (2017) that decentralization might induce inter-regional inequalities. Similarly, Lakshminarayanan (2003) and McIntyre & Klugman (2003) found evidence of the negative impact of decentralization on reproductive health care provision. Lakshminarayanan (2003) found that decentralization in the Philippines has led to poor quality of reproductive health service provision particularly in regions facing financial and human capital problems. The author also found lack of investment in reproductive health care particularly in FP partly because it is not popular among

Catholic Church leaders. McIntyre & Klugman (2003) found evidence that decentralization creates disjuncture between the local and central government that lead to poor access to reproductive health care in South Africa. Other empirical studies on the impact of decentralization on deforestation, for example, Burgess et al. (2012) found that decentralization in Indonesia has induces more permit of deforestation under the authority of the local government. Secco et al. (2017) also found the linkage of decentralization and poor performance in forestry management in Italy due to lack of coordination between the central and local government, conflicting interests among officials from different government level, as well as financial problem faced by the local government.

2.2.2 Decentralization in Indonesia: political and economic difficulties

In Indonesia, following the economic crisis and political turmoil in 1997/1998, the government dealt with great pressure to give a greater autonomy to local governments. Local officials across the nation supported the notion of the decentralization so that they can have greater control over local resources and policies. Decentralization law was finally passed in 1999 through Law 22/1999 and Law 25/1999 on regional autonomy and implemented in 2001. Following the implementation of decentralization in Indonesia, most of the responsibility in public facility and service provision was shifted from the central government to the local government at the district level (Heywood & Harahap, 2009).

In many aspects, Indonesia has the criteria to become successful in achieving good governance and efficiency under the decentralized system. Since the decentralization, Indonesia has a political system with multiple parties which can

promote political competition (as elaborated in the previous section) and lead to higher public accountability (Bardhan, 2002; Faguet, 2013; Mbate, 2017). It also has free press that could help disseminate information to the local people on the local government's programs, performance, and accountability. Lastly, Indonesia adopted democratic system where its people could express their concerns and public preferences. These local voices should have better responses and services under the decentralized system (Faguet, 2013; Mbate, 2017).

However, there are some factors that could become the impediments of a successful decentralization in Indonesia. First, decentralization in Indonesia is more of an administrative decentralization where the level of fiscal decentralization is still low (Green, 2005). The central government still controls more than 80 percent of the local government revenues. This creates disjuncture between local revenue and local expenditure budgets that is needed to finance local government programs. For example, in health sector, local government's responsibility after the decentralization include: (1) building local health facility; (2) ensuring the availability of medical and health personnel; (3) providing affordable medicines; and (4) developing local health system information (Kementerian Dalam Negeri [Ministry of Home Affairs of Indonesia], 2014). Then, after the decentralization, the local government is responsible to pay the salaries of the local health personnel that previously were paid by the central government. Hence, under a more administrative decentralized system, the local governments might not be able to finance the local expenditure without sufficient capability in raising local revenue.

Central government's aids, i.e. general-purpose grant, are given more to district level instead of provinces. Hence, under the decentralized system, district governments

have been given more political and fiscal power. This has led to the emergence of new districts (district splitting). Following the decentralization, the number of districts in Indonesia rose significantly to nearly 70 per cent (BPS-Statistics Indonesia, 1988 & 2013)[2]. Hence, the increase in the number of districts is often used to capture the level of decentralization (Burgess et al.; 2012). The devolution of power that involves many local officials (who may have different preferences and agendas) may create greater possibility of priority gap and conflicts among the local governments and also between the local and central government (Friedman, Heywood, Marks, Saadah, & Choi, 2006).

Decentralization can either reduce or exacerbate the regional inequality. Decentralization in Indonesia is believed to be where decentralization could lead to widened inequality between regions (Green, 2005) due to differences in resource endowment and local revenue capability (Green, 2005; Mbate, 2017). Both resource-rich and resource-poor regions in Indonesia receive the same 80 per cent of their revenue from the central government. However, rich regions have the capability to raise bigger local revenue from its rich local resources compared to those of poor regions. This will result in unequal economic development between regions across the country.

Lastly, the decentralization in Indonesia could lead to low and unequal quality of public service provisions by the local governments (Green, 2005; Hodge et al., 2015). This is resulted from the poor competence and technical capability of the local officials. After the decentralization, training and capacity building program by the central government has largely stopped and the local government with low quality of human resource greatly suffers (Kurniawan, Pratomo, & Bachtiar, 2010).

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[2] The increase in the number of local administrative units (districts) following the decentralization seems to be common where Bolivia also experienced large increase in the number of districts following decentralization in their countries (Bardhan, 2002)

2.2.3   Previous studies on contraceptive use

This study may contribute to several strands of literature. First, health economists have investigated socioeconomic determinants of contraceptive use in some countries in Asia and Africa. They investigated the relationship between contraceptive use and socioeconomic factors such as women's age and education, religion, partner's education, number of children, household's wealth, and some other community and geographical characteristic such as the number of health personnel and health facility and regional or rural-urban classification (Agadjanian, 2015; Cohen, 2000; Hamid & Stephenson, 2006; Magadi & Curtis, 2003; Meng & Polimeni, 2014; Zanin, Radice, & Marra, 2014). Research on this issue in Indonesia, however, remains limited (Meng & Polimeni, 2014; Permana & Westoff, 1999; Rahayu, Utomo, & McDonald, 2009; Schoemaker, 2005). The findings from these previous literatures include the positive relationship between contraceptive use and women's education, partner's education, and the number of children. The relationship between contraceptive use and other factors such as age of the woman, number of health personnel, health facility, and rural-urban classification, however, remains inconclusive. These previous studies guide the choice of control variables used in our study. Our empirical analysis controls for socioeconomic characteristics such as woman's education, woman's age, partner's education, number of children, rural-urban classification, and regional characteristics.

The second strand of literature examines the impact of policy change on a country's FP or contraceptive use. Empirical evidence in this second strand of literature is even more limited where they provide only summary reports and descriptive statistics. Cleland et al. (2006) elaborated how policy change in Kenya affected the FP program performance of the country. When a large proportion of the resources allocated for FP

program were shifted to fund HIV/AIDS alleviation program, it resulted in declining availability of contraceptives and FP services. The percentage of unintended pregnancies increased to 21 per cent in 2003 from 11 per cent in 1998. A qualitative study by Lakshminarayanan (2003) argued that decentralization in the Philippines has led to priority difference on FP program between the central and local governments and resulted in lack of investment in FP by the local governments.

For Indonesian case, previous literature on the impact of policy change on FP performance is limited to theoretical and qualitative study that provides limited descriptive statistics and no regression analysis in providing the empirical evidence. Hull & Mosley (2009), Kurniawan, Pratomo, & Bachtiar (2010), National Research Council & AIPI (2013), Sukamdi (2011), and UNFPA-Indonesia (n.d.) all argued that the decentralization of BKKBN has slowed down the performance of FP program in Indonesia and hampered the progress of MMR alleviation. All the above literature argued that the decentralization resulted in less attention on FP in the local government level (district level) and created priority difference between the central and local government levels on FP. However, the literature does not provide how much the decentralization has led to the decline in contraceptive use and what are the channels or mechanisms from where this decline happened.

Furthermore, Kurniawan, Pratomo, & Bachtiar (2010) and Sukamdi (2011) both elaborated the importance of FP fieldworker visit as the key instrument in carrying out FP program in Indonesia during the active FP regime (prior to the decentralization) and argued that the FP fieldworker has experienced some problems after the decentralization (such as decline in the number of fieldworker and the responsibility that is no longer

focus on FP but merged with program and duty other than FP under the control of local government). However, the literature does not provide empirical analysis whether FP fieldworker really works effectively in promoting the FP program prior to the decentralization and how much their effectiveness has declined after decentralization to support their arguments. Without the regression analysis, the literature cannot help the government in pointing out whether FP fieldworker visit is actually effective instrument for FP, how big is its impact in promoting contraceptive use, and how much its effectiveness has decline after decentralization. For example, if FP fieldworker is actually empirically proven to be not effective in promoting contraceptive use, government should come out with new instrument in their efforts in improving the FP program performance. But, if FP fieldworker is found to be effective, then the deployment of the fieldworker should be continued and the management of the fieldworker under the local government should be improved. Furthermore, FP IEC was also another key instrument that was recognized to play very important role in the success of FP program during the active regime. However, none of the literature investigated how this instrument performs after the decentralization.

In brief, this study contributes to the second strand of the literature by providing an investigation on how the effectiveness of the two important FP strategies (the FP fieldworker home visit and FP IEC) has changed after the decentralization. Multivariate analysis conducted in this study may provide empirical evidence on the significance and the magnitude of the impact of the decentralization as well as the effectiveness of the instruments in promoting FP program. In this way, the findings may provide useful insights for the government in directing their MMR-alleviation policies, enabling them

to focus on certain FP instruments. This cannot be done using the information provided by the previous theoretical and qualitative studies.

2.2.4 *Previous studies on inequality in delivery care utilization*

Finally, this study contributes to limited literature of health and development that investigated the linkage between decentralization and the inequality in maternal care utilization, specifically in this study, delivery care utilization. Qualitative papers by Lakshminarayanan (2003) and McIntyre & Klugman (2003) investigated the impact of decentralization on reproductive health services in the Philippines and South Africa, respectively. They interviewed health worker managers of the local governments to find out information on changes and constraints that the local governments had experienced following the decentralization. They found that after decentralization, local government with limited resources might experience financial problems to fund the health provision. They also found that the decentralization led to priority differences between the central and the local governments, allowing less emphasis on priority program set by the central government in the local government level. They concluded that these financial constraints and priority differences are the major reasons of how decentralization in health sector had negatively affected the quality and the continuation of reproductive health service provision including the provision of the delivery care that resulted in the inequality of services among regions.

Studies by Hodge et al. (2015) and Tripathi & Singh (2017) exploited regional differences in delivery care utilization. Hodge et al. (2015) used IDHS 1991-2007 to investigate the regional differences in delivery at health facility while Tripathi & Singh (2017) used IDHS 2012 to investigate regional differences in delivery by skilled

attendant among major islands in Indonesia. Both studies found that women who lived in Java-Bali islands were more likely to use delivery care compared to those who lived in other areas. Since Hodge et al. (2015) used observations from before and after decentralization, they could also investigate the linkage between decentralization and the regional differences in the facility-based delivery. Using random effect probit, they found that the inequality in facility-based delivery utilization among major islands in Indonesia had exacerbated in the post decentralization period. However, there is at least one drawback in the specification of the two studies. Java-Bali island as the reference category is known to be much more developed than the other major islands, hence the results expectedly should confirm the regional differences between Java-Bali island and the rest of other major islands. In recent years, eastern and western grouping is more commonly used in the reports on maternal health care provision in Indonesia as in Kosen et al. (2014). Hence, our study that use western-eastern grouping should serve the government better in providing some basis in formulating the MMR-alleviation policies.

2.3   Family Planning in Indonesia

This section elaborates the three regimes of FP implementation in Indonesia: (1) Pro-natalist regime (1945-1965), (2) Active FP regime (1965-1998), and (3) Post-decentralization regime (1999 onwards).

2.3.1 Pro-natalist regime (1945-1965)

From independence in 1945 to mid-1960s under the leadership of its first head of state, President Soekarno, Indonesia could be considered under a pro-natalist period. During this period, the use of contraceptives to control birth was regarded as taboo and

against society's norms, especially in this predominantly Muslim population. Indonesian society believes that having more children brings more fortune and wealth; therefore, it is a wise decision for a family to have more children. Importantly, since the government of Indonesia under President Soekarno believed that a big population was needed to fuel the country's economy and development, there was no clear cut FP program.

2.3.2   Active family planning regime (1965-1999)

In 1965, when Soeharto succeeded Soekarno as president of Indonesia, the government's view on population policy changed. During this new era, the Indonesian government believed that a large population would hinder development and economic growth, and thus controlling birth was necessary.

The government commitment to control birth began in 1967 when President Soeharto joined other world leaders in signing the United Nations Declaration on Population which stated that "the ability to decide the number of children and to space birth is a basic human right" (UN, n.d.). In October 1968, National Family Planning Institute or Lembaga Keluarga Berencana Nasional (LKBN) was established through President's Instruction. LKBN was then transformed to National Family Planning Coordinating Board or Badan Koordinasi Keluarga Berencana Nasional (BKKBN) through Presidential Decree in 1970 whose responsibility is to fully coordinate all national FP program activities.

In carrying out the FP program, the government included the FP program in the Five Year Development Plan/Rencana Pembangunan Lima Tahun (REPELITA). In the first REPELITA in 1969/1970-1973/1974, the FP program was carried out in Java

and Bali only, the most densely populated islands. After the program gained a remarkable success in Java and Bali, in the beginning of the second REPELITA in 1974, the FP program was expanded to the outer Java-Bali area that include other 10 provinces: Aceh, North Sumatra, West Sumatra, South Sumatra (covering Bangka Belitung), Lampung, West Nusa Tenggara, South Kalimantan, West Kalimantan, North Sulawesi (covering Gorontalo), and South Sulawesi (covering West Sulawesi), which were known as outer Java-Bali I. Within this first decade, the number of FP participants rose significantly. In 1969/1970, the number of FP participants was not more than 54,000 whereas five years later, in 1973/1974, the number skyrocketed to more than 1,300,000 people. The number reached more than 2,250,000 participants in 1978/1979 (Sukamdi, 2011). The FP program was finally expanded nationwide during the third REPELITA; the provinces included in this period: Riau (covering Kepulauan Riau), Jambi, Bengkulu, East Nusa Tenggara, Central Kalimantan, East Kalimantan, Central Sulawesi, South East Sulawesi, Maluku (covering North Maluku) and Papua (covering West Papua), were called outer Java-Bali II.

During the active FP regime, FP campaign "Dua Anak Cukup" or "Two Children is Enough" was well-known and widely spread among households. To achieve the goal of fertility decline, the government realized the need to penetrate FP ideas deeper to the villagers. For this purpose, the government trained and deployed the so called *petugas lapangan keluarga berencana* (PLKB) or FP fieldworkers. These fieldworkers went from house to house, disseminating FP ideas, promoting FP services, and encouraging women to join FP program, to plan their ideal number of children, and to control birth or space their pregnancies by using contraceptives. The fieldworkers were recruited from among the local people so that they could understand the

characteristics of the community better, and thus understand the needs of the targeted women. They also insert FP socialization session during the village meetings which turned out to be an effective way of FP campaign (Hull, Hull, & Singarimbun, 1977; Kurniawan, Pratomo, & Bachtiar, 2010; Sukamdi, 2011). The fieldworkers during this period were under the supervision and paid for under the budget of the BKKBN which is a national agency.

The economic crisis in the late 1990s led to political and civil unrest that forced President Soeharto to step down in 1998 after 32 years in office. This turmoil was followed by major changes in political and governmental system, including decentralization of government powers away from the national and into local government. Decentralization was then a popular idea based on the presumption that the local administrators have a better knowledge of the needs of their constituents. Since 2001, following decentralization regulation based on Law No.22 in 1999, the regional government (provincial and municipality/regency office) was given more power on raising revenue and budget allocation.

Following decentralization, the authority of human resource management, budgeting, and documentation of BKKBD (the Regional Family Planning Coordinating Board) was delegated from the central government (BKKBN) to the local government offices of district offices. Since then, BKKBD practically no longer existed because it was either merged as part of regional government offices or transformed to other type of district offices (such as district office of family welfare) based on the decision and specific policies of each of the local governments ("Dilema PLKB", 2007; Hull & Mosley, 2009; Kurniawan, Pratomo, & Bachtiar, 2010). The loosened authority of the central government on FP program had weakened the functions of the BKKBN which

27

before the decentralization had the full responsibility on the management of each of the BKKBD in each of its regional offices. This loosened control of BKKBN on each of the BKKBD regional offices had resulted in the weakening performance of FP program and hence MMR alleviation program (Hull & Mosley, 2009; Kurniawan, Pratomo, & Bachtiar, 2010; National Research Council & AIPI, 2013; Sukamdi, 2011; UNFPA-Indonesia, n.d.).

The devolution of BKKBD to the control of local administrators had greatly affected the existence of FP fieldworkers who played a very important role in carrying out the FP program during the Soeharto era as the FP fieldworkers were a major conduit of FP information. When BKKBD was transformed, the FP fieldworkers were assigned by the local administrators to other offices or shifted to other duties other than FP (BKKBN, 2006; Hull & Mosley, 2009; Kurniawan, Pratomo, & Bachtiar, 2010). As a result, the number of FP fieldworkers declined from 26,074 before decentralization to only 19,586 after the decentralization ("Dilema PLKB", 2007). In addition to the decline in the actual number of FP workers, the intensity of home visits might have also declined. As will be discussed below there was a decline in the proportion of women visited by FP fieldworkers.

2.3.3 Post-decentralization period (1999 onwards)

Since 2004, following the Presidential Decree No. 09 in 2004, the authority and management of FP program has been delegated to local governments, i.e., BKKBN was decentralized and led to the transformation or the merger of BKKBD with the regional government office. This structural change of BKKBD resulted in the decline in the number of FP fieldworkers and the coverage of FP fieldworker visits.

In 1987, the percentage of women who were visited by FP fieldworkers in the last 6 months was around 18 per cent and this number rose to around 25 per cent by the end of Soeharto regime. In the post decentralization period, the slowdown in the FP program, particularly the coverage of FP fieldworker visit, became apparent. In 2002, the percentage of who were visited by FP fieldworkers was only around 6 per cent and this figure declined further to about 5 per cent in 2012 (Table 2.1). This declining access to FP services is suspected to have led to the declining use of contraceptives and the reason for the stagnant TFR (at 2.6 births per woman) since 2002.

In addition, the intensity of FP IEC through mass media, had also been declining. The FP IEC on radio in recent years had been replaced by the TV (Table 2.2) because of the rise in the number of TVs at home. But with high cost of television advertisement and reduced budgetary allocation on FP IEC, FP messages on TV had declined. In 1987, the percentage of women who heard about FP on the radio was around 30 per cent. But this number sharply declined to just about 10 per cent in 2012. The percentage of women who never heard or read about FP from any form of mass media reached an all-time high at 67 per cent in 2007. The high proportion of unexposed women is mainly because of the sharp decline in the percentage of women who saw FP IEC on television; the percentage of women who saw FP IEC on television declined from 46 per cent in 2002 to 27 per cent in 2007.

2.3.4 Overview of contraceptive use

The percentage of currently married women using contraceptive or known as the Contraceptive Prevalence Rate (CPR) has increased from around 48 per cent in 1987 to 62 per cent in 2012 (Table 2.3, second row). The CPR previously had an increasing

trend in the period before the decentralization, from 48 per cent in 1987 to 57 per cent in 1997; but then the CPR had very slight increases in the period after decentralization, particularly after the decentralization of the BKKBN in 2004, from around 61 per cent in 2007 to 62 per cent in 2012. In addition, in this post decentralization era (2002-2012), the TFR was stagnant at 2.6 (Figure 2.1).

Furthermore, Table 2.3 shows that there has been a shift in the preference of contraceptive methods from long-acting/permanent methods (LAPMs) to short-term methods. During the active FP regime (1987-1998) IUD, which is one of the LAPMs, was the second most popular method. However, since mid-1990s, and particularly post decentralization, the popularity of IUD has been replaced by the short-term methods such as injectables and pills.

Hull & Mosley (2009) argued that the privatization in FP has led to the changing trend towards short-term contraceptives and the emergence of hidden unmet need for FP. The decentralization induces the evolution of private FP services more than in the active FP regime. Village midwives, the major FP services provider in rural areas, mostly transformed themselves into general health providers after they finished the government contract (Hull & Mosley, 2009). As private providers, FP services have become one of their sources of income. Short-term contraceptives, which last usually in one month, are recommended by private providers because it can offer them more regular source of income compared to LAPMs that can last in three to five years. Table 2.3 shows that in 2012, the proportion of currently married women who were using injectables was about one third; and the proportion of those who were using pills, which is also a short-term method, was around 13 per cent of women (pills has become the second mostly used contraceptives replacing IUD).

2.4 Delivery Care Utilization by Regions

The latest descriptive statistics of delivery care utilization by province in Table 2.4 shows that the percentages of women who delivered at health facility and who delivered with assistance from skilled attendant vary by province. Table 2.4 shows that the percentage of women who delivered at a health facility is quite high in some western provinces such as DKI Jakarta (97 per cent), DI Yogyakarta (95 per cent), and Bali (98 per cent); while in other eastern provinces such as Central Kalimantan (25 per cent), West Sulawesi (22 per cent), and Maluku (23 per cent), the percentage is still low. Similarly, Table 2.4 shows that in some provinces such as DKI Jakarta, DI Yogyakarta, and Bali, the percentage of women who delivered with assistance from skilled attendant is also quite high (96, 92, and 93 per cent, respectively) while in other provinces such as Southeast Sulawesi, West Sulawesi, and Papua, the percentage is still low (41, 31, and 42 per cent, respectively).

In general, provinces in the western part of Indonesia, i.e. provinces in Sumatra, Java, Bali and Nusa Tenggara, show better figures of delivery care utilization; while provinces in the eastern part of Indonesia, i.e. provinces in Kalimantan, Sulawesi, Maluku, and Papua, show lower percentage of delivery care utilization. Therefore, regional grouping of eastern and western regions has been commonly used in the reports from government and international organization. Figure 2.2 clearly shows that the inequality in delivery care utilization has widened over the years. In terms of delivery at health facility, the difference in the proportion of women who deliver at health facility between the eastern and western regions is consistently increasing from around 5 per cent in 1987 to 30 per cent in 2012 (Table 2.5, row 3). Similarly, Figure 2.3 shows that

the inequality in the utilization of skilled birth attendant has widened over the years. Table 2.5 (row 6) shows that the difference of the utilization of skilled birth attendant between the eastern and western regions has increasing from around 6 per cent in 1987 to 21 per cent in 2012.

Table 2.5 also shows the latest statistics in delivery care utilization, that in 2012, only 39 per cent of women who live in east part of Indonesia delivered at health facility while 68 per cent of those who lived in the western part of Indonesia delivered at health facility. Similarly, in 2012, while only 53 per cent of women who live in the eastern part of Indonesia delivered with the assistance from skilled attendant, a higher percentage of women who live in the western part of Indonesia delivered with the assistance from skilled attendant (74 per cent). The two-group mean t-test confirms that there is a difference in the two-group means in the proportion of women who utilized facility-based delivery at 1% significance level between women who live in western part of Indonesia and those who live in the eastern part of Indonesia (Table 2.6). The two-group mean t-test also confirms that there is a difference in the two-group means in the proportion of women who utilized skilled birth attendant at 1% significance level between women who live in western regions and those who live in the eastern regions (Table 2.6). In brief, there is a clear gap in the utilization of facility-based delivery and skilled birth attendants between the western and the eastern regions.

2.5   Estimation Strategy

This study uses data from the National Indonesia Contraceptive Prevalence Survey (NICPS) 1987, Indonesia Demographic and Health Survey (IDHS) 1994, IDHS

2007, and the latest IDHS 2012. The NICPS 1987 and IDHS 1994 are used to represent the period prior to the BKKBN decentralization while IDHS 2007 and IDHS 2012 represent the period after the decentralization[3]. The IDHS (previously known as NICPS in 1987) interviewed ever-married women age 15-49 from a nationally representative sample of households to collect socioeconomic and health information that include family planning, fertility, and maternal and child health services. In NICPS 1987, the sample size is around 11, 800 ever married women age 15-49. In 1994, the sample size increase to around 28,100 ever-married women age 15-49; where in 2007 and 2012, the sample increase to around 32,800 and 34,000 ever-married women, respectively. IDHS surveys are designed to provide demographic and health information at national, rural-urban, and provincial level. All IDHS surveys use the sample from the Socioeconomic Survey of Indonesia (Susenas) of the corresponding IDHS survey year as the sampling frame. Household listing is done covering all Susenas census blocks. In each province, census blocks are selected covering rural and urban areas. In each census block, households are randomly selected. Ever-married women age 15-49 in the selected households are eligible for the individual interview. The main IDHS data is complemented by data of number of districts and number of villages from Statistics Indonesia.

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[3] We decided to exclude IDHS 1997 and IDHS 2002/2003 in our estimations. We exclude IDHS 1997 because it is the period when the economic crisis happened in Indonesia; hence we would like to exclude the data that is affected by the economic shock. Then, the exclusion of IDHS 2002/2003 is because it is in the transition period after the passing of decentralization law in 1999 to the decentralization of BKKBN in 2004.

2.5.1 Investigating the impact of decentralization on FP performance

To investigate how decentralization affects contraceptive use, we use the following difference-in-difference (DID) model[4] (Wooldridge 2002, 2009):

$$usecont_{ijt} = \beta_0 + \beta_1 d_t + \beta_2 highdec_j + \delta_1 (d_t * highdec_j) + X_{ijt}\gamma + P_j + T_t + \varepsilon_{ijt}$$

(Eq. 2.1)

We use a dependent variable of whether or not a woman is using contraceptive, $usecont$, that takes a value of 1 if a woman is using contraceptive and 0 otherwise. d_t is a dummy variable for post decentralization period where for observations from year t=1987 and t =1994, $d_t = 0$, and for t=2007 and 2012, $d_t = 1$. The dummy variable $highdec$ is used to capture the level of decentralization of each province; it takes a value of 1 if the province is highly decentralized and 0 otherwise. We use the same argument from the paper by Burgess et al. (2012) that the rise in the number of districts well represents the level of authority decentralization[5].

Burgess et al. (2012) investigates whether the increasing authority of the local governments (district offices) following the decentralization leads to greater deforestation in Indonesia. Under decentralization, the local government holds the authority to issue logging permit which determines how much deforestation could be done by logging firms. Similar to this study, local governments (district offices) are given more power following the decentralization and hold important role in the management of BKKBD (the regional family planning office) and hence in the management of FP fieldworker and FP IEC in their own district area. Individual district governments decide whether the BKKBD should be merged with other working units

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[4] Appendix Table A2.1 gives an illustration of the DID method.
[5] In 1988, the number of districts in Indonesia was 296 while in 2012 the number increases significantly to 497 (BPS-Statistics Indonesia, 1988 & 2013).

within their own local government (e.g. welfare offices). The FP program might no longer become the priority of the local governments leading to the decline in the number and coverage of FP fieldworker visit and FP IEC in their own locality.

Burgess et al. (2012) use the number of districts to proxy the level of decentralization in each province because the number of districts rose significantly by almost 70 per cent following decentralization. Burgess et al. (2012) argues that the higher number of districts could mean a higher probability that district officials could issue illegal permits triggered by bribes from the logging firms. In our case, a greater number of districts could mean a higher probability that FP service provision is no longer the priority of district governments.

To determine whether a province is highly decentralized or lowly decentralized we apply two different thresholds in our estimations. First, a province is highly decentralized if the rise in the number of districts is more than 50 per cent; and second thresholds is that a province is highly decentralized if the rise in the number of districts is more than 100 per cent between 1988 to 2012. With the first specification, 23 provinces are categorized as highly decentralized and 10 are lowly decentralized while with the second specification, 18 provinces are categorized as highly decentralized and 15 provinces are categorized as lowly decentralized. Our focus is the interaction term between $highdec$ and the post-decentralization dummy variable, d, where a statistically significant negative coefficient would imply a negative impact of decentralization on contraceptive use. We use clustered standard errors at provinces across all estimations to allow the errors to be correlated within the same province since the unobservable of women who live in the same province (e.g. cultural and traditional factor) is likely to be

correlated. This first specification is trying to find evidence whether the following hypothesis is true:

Hypothesis 2.1 (H2.1): Decentralization of the BKKBN decreases the probability of women using contraceptives.

2.5.2 *Investigating the impact of FP fieldworker visit and the FP IEC in promoting contraceptive use before and after decentralization*

In this section we construct Equation 2.2 to examine the effectiveness of FP fieldworker visit and FP IEC in promoting contraceptive use. We try to answer whether the following hypothesis hold true:

Hypothesis 2.2a (H2.2a): Women who were visited by FP fieldworkers are more likely to use contraceptive.

Hypothesis 2.2b (H2.2b): FP IEC through mass media enables women to have better idea, understanding, and knowledge about FP and thus is expected to have positive correlation with contraceptive use.

Furthermore, we also try to find evidence if the following hypothesis holds true:

Hypothesis 2.2c (H2.2c): The impact of the FP fieldworker visit in promoting contraceptive use has declined after the decentralization.

Hypothesis 2.2d (H2.2d): The impact of FP IEC through mass media in promoting contraceptive use has declined after the decentralization.

To answer whether the effectiveness of FP fieldworker visit and FP IEC in promoting contraceptive use has declined after the decentralization period, we focus on the interaction terms between decentralization and FP fieldworker visit as well as the

interaction terms between decentralization and FP IEC. The negative and significant coefficients of the interaction terms would imply that the impact of the instruments in promoting contraceptive use has declined after the decentralization.

The model can be written as follows:

$$usecont_{ijt} = \beta_0 + \beta_1\, d_t + \beta_2\, visited_{ijt} + \beta_3 IEC_{ijt} +$$

$$\delta_1 \left(d_t * visited_{ijt}\right) + \delta_2 \left(d_t * IEC_{ijt}\right) + X_{ijt}\gamma + P_j + T_t + \varepsilon_{ijt}$$

(Eq. 2.2)

where $usecont_{ij}$, represents the probability that woman i th in province j use contraceptive, , d_t is a dummy for post decentralization period where for observations from year t=1987 and t =1994, $d_{it} = 0$, and for t=2007 and 2012, $d_t = 1$, $visited_{ij}$ is a dummy for a visit by FP fieldworker, IEC_{ij} is a dummy representing woman's exposure to FP messages through mass media, X_{ij} is a vector of controls that include exogenous individual, household, and community-level characteristics, P_j is the province fixed effect, T_t is the time fixed effect, and ε_{ij} is the error term that represents the unobserved characteristics of women which are assumed to be independently and identically distributed (i.i.d). Since the dependent variable, $usecont$, is a binary variable, in addition to the above linear probability model (LPM), we also estimate the impact of two instruments of FP program using logistic regression.

The concern for endogeneity problem arises from simultaneity that may exist between *contraceptive use* and *FP fieldworker visit* as well as *FP IEC*. As we may argue that a visit by FP fieldworker and exposure to FP IEC will increase the likelihood of a woman using contraceptive, at the same time, when a woman cares more about

childbearing and is interested in or decides to use contraceptive, she may be more welcome to FP fieldworker when she got visited and actively more involved in the FP discussion, as well as becomes more aware to FP IEC in mass media.

To deal with the above endogeneity problem, we apply 2SLS using some instruments that must satisfied both relevance and exogeneity (exclusion restriction) condition. The instruments set that we propose are: (i) number of districts in the province and (ii) number of villages in the province. In terms of the relevance condition, the rationale for instruments (i) and (ii) is that the provision and effectiveness of FP fieldworker and FP IEC have been affected by the authority decentralization (Kurniawan, Pratomo, & Bachtiar, 2010; Sukamdi, 2011)[6]; and as argued by Burgess et al. (2012) and Bardhan (2002), number of districts and villages in the province well represent the degree of authority decentralization[7]. Therefore, these two instruments are likely to be correlated with the endogenous variables (FP fieldworker and FP IEC). In terms of the exogeneity condition, the number of districts and the number of villages in the province, which is administrative unit information, have nothing to do with a woman's decision to use contraceptive and hence they are highly unlikely to directly affect the dependent variable. The results of the weak identification test and Hansen J-test of the 2SLS estimates in Table 2.9 confirm the relevance and exogeneity condition of our instruments set.

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[6] As previously described in Section 2.2.2, under the authority of the local government, the number of FP fieldworkers has declined as well as the coverage of their visits. Similarly, FP IEC is no longer as intensive as before under the authority of local government (Kurniawan, Pratomo, & Bachtiar, 2010; Sukamdi, 2011).

[7] While during Soeharto regime the number of districts throughout Indonesia was generally remained unchanged, the number has increased significantly after the decentralization. The total number of districts was 292 in 1998 and increased sharply to 483 in 2008. Therefore, district splits is argued to well represent the authority decentralization (Burgess et al, 2012).

Thus, the first stage of our 2SLS estimates is

$$visited_{ijt} = \tilde{\beta}_0 + \tilde{\beta}_1\,d_t + +X_{ijt}\tilde{\gamma} + \pi\tilde{Z}_j + \tilde{\varepsilon}_{ijt}$$

(Eq. 2.3′)

$$IEC_{ijt} = \acute{\beta}_0 + \acute{\beta}_1\,d_t + X_{ijt}\,\acute{\gamma} + \acute{\pi}Z_j + \acute{\varepsilon}_{ijt}$$

(Eq. 2.3″)

where Z_j is the vector of the instrument set.

and the second stage is

$$usecont_{ijt} = \beta_0 + \beta_1\,d_t + \beta_2\,\widehat{visited}_{ijt} +$$

$$\delta_1\left(d_t * \widehat{visited}_{ijt}\right) + X_{ijt}\gamma + \varepsilon_{ijt} \qquad \text{(Eq. 2.3a)}$$

$$usecont_{ijt} = \beta_0 + \beta_1\,d_t + \beta_2\widehat{IEC}_{ijt} +$$

$$\delta_1\left(d_t * \widehat{IEC}_{ijt}\right) + X_{ijt}\gamma + \varepsilon_{ijt} \qquad \text{(Eq. 2.3a)}$$

Where $\widehat{visited}_{ijt}$ and $\widehat{IEC}_{ijt}$ are the predicted variables of FP fieldworker visit and IEC, respectively.

The vector of control variable X_{ij} is socioeconomic variables that include the individual characteristics: age (which is expected to have the inverted U-shaped relationship with contraceptive use), woman's education (which is expected to have a positive relationship with contraceptive use), religion (where Muslim women is suspected to be less likely to use contraceptives), and number of living children (which is expected to have a positive correlation with contraceptive use); the household characteristics: husband's education and household wealth (which are expected to have a positive correlation with contraceptive use; and the community characteristics include the rural-urban classification (where living in urban area is expected to have a positive

relationship with contraceptive use), and regional groupings (where women living in outer Java-Bali area are suspected to be less likely to use contraceptives).

2.5.3 *Investigating the inequality in delivery care utilization between regions before and after decentralization*

We investigate whether the inequality in delivery care utilization between the eastern and western regions of Indonesia has widened over the years, using the following model:

$$fbd_{ijt} = \beta_0 + \beta_1\, east_j + \beta_2\, year2_t + \beta_3\, year3_t + \beta_4\, year4_t + \beta_5\, year5_t +$$
$$\delta_1\left(year2_t * east_j\right) + \delta_2\left(year3_t * east_j\right) + \delta_3\left(year4_t * east_j\right) + +\delta_4\left(year5_t *\right.$$
$$\left. east_j\right) + X_{ijt}\gamma + P_j + \varepsilon_{ijt}$$

(Eq. 2.4a)

$$skilled_{ijt} = \beta_0 + \beta_1\, east_j + \beta_2\, year2_t + \beta_3\, year3_t + \beta_4\, year4_t + \beta_5\, year5_t$$
$$+ \delta_1\left(year2_t * east_j\right) + \delta_2\left(year3_t * east_j\right) + \delta_3\left(year4_t * east_j\right)$$
$$+ \delta_4\left(year5_t * east_j\right) + X_{ijt}\gamma + P_j + \varepsilon_{ijt}$$

(Eq. 2.4b)

Variable $year1 - year5$ represent the year of the (IDHS survey): 1987, 1994, 2002/2003, 2007, and 2012 where we use $year1$ as the reference category. $east_j$ is a dummy that value =1 if the woman i in province j lives in eastern regions and =0 if the woman lives in western regions. fbd_{ijt} and $skilled_{ijt}$ are the dependent variables representing the delivery care while X and P represent controls and the province fixed

effect respectively as mentioned in the previous section. We examine the sign of the δs and compare the magnitude of the coefficients of the interaction terms to examine the change in the inequality in delivery care utilization between eastern and western regions over the years.

Then, the following equations describe another specification that we use to examine the inequality in delivery care utilization between the eastern and western regions particularly after the decentralization period, where we group the observations from before and after decentralization using dec dummy variable:

$$fbd_{ijt} = \beta_0 + \beta_1 \, dec_t + \beta_2 \, east_j + \delta \left(dec_t * east_j \right) + X_{ijt}\gamma + P_j + \varepsilon_{ijt}$$

(Eq. 2.5a)

$$skilled_{ijt} = \beta_0 + \beta_1 \, dec_t + \beta_2 \, east_j + \delta \left(dec_t * east_j \right) + X_{ijt}\gamma + P_{jt} + \varepsilon_{ijt}$$

(Eq. 2.5b)

where dec_t represents dummy that takes value $=1$ if the observation is from the period after decentralization $t=2002, t = 2007$ or $t = 2012$, and $=0$ when $t = 1987$ or $t = 1994$.

The above specifications try to find evidence whether the following hypothesis is true:

Hypothesis 2.3 (H2.3): The inequality in delivery care utilization between the eastern and western regions has widened over the years, and particularly so in the post decentralization period.

2.6   Empirical Results

2.6.1   *Impact of decentralization on FP program performance*

Table 2.7 corresponding to Equation 2.1 shows the estimated impact of decentralization on contraceptive use. Since the unobservable factors affecting contraceptive use (e.g. cultural factor, ethnicity) of women who live in the same province is likely to be correlated, we use clustered standard errors at provinces to allow the errors to be correlated within province. The results suggest that after the decentralization, women are more likely to use contraceptive by around 6 to 7 percentage points. The results also suggest that women who live in highly decentralized province are generally found to be less likely to use contraceptive by 4 to 5 percentage points (column 1, column 3 and column 4) compared to those who live in lowly decentralized province. However, although the signs of the coefficients of the interaction terms are negative, the magnitudes are relatively small and not significant; and therefore we do not have enough evidence to imply that women are less likely to use contraceptives because of the decentralization.

Hence, this finding rejects *H2.1 that decentralization decreases the probability of a woman using contraceptive.* Similar finding on the impact of decentralization on human development sector was also found by Leer (2016) that investigated the impact of decentralization on student's performance in Indonesia. Using the DID method, although she found negative coefficients of the interaction terms between post decentralization period and student's achievement, the coefficients are not significant, suggesting no significant effect of decentralization on student's achievement. As there are no previous empirical studies on the impact of decentralization on FP, this paper could not compared its results on previous studies with similar topics. However, since

the coefficients of the interaction terms in our findings are not significant, it suggests that decentralization does not significantly affects women's probability in using contraceptives.

Related to FP implementation, the previous studies suggest underlying mechanisms on how decentralization might lead to declining performance in healthcare service. These include: first, poor quality of service under the management of local governments due to less monitoring and training from central government, low quality of local human capital, and low financial capability of the local governments in building quality health facility (Hull & Mosley, 2009; Lakshminarayanan, 2003; McIntyre & Klugman, 2003). Second, decentralization might allow greater influence from local religious or tribal leaders and redirect local government policies towards serving their special interests and away from unpopular issues such as FP (Mbate, 2017). Third, decentralization creates ambiguity in role and responsibility among different level of government officials and creates disagreements on who should be responsible on underperformed programs (Mbate, 2017, McIntyre & Klugman, 2003; Sukamdi, 2011).

2.6.2 The impact of FP fieldworker visit and FP IEC in promoting contraceptive use before and after decentralization

The results in Table 2.8 column (1) and (2) corresponding to Equation 2.2 indicate that in the post decentralization period, women are more likely to use contraceptives by 15 to 16 percentage points. Furthermore, the results confirm the positive correlation between contraceptive use and FP fieldworker visit and FP IEC as shown by the significant and positive coefficient of the two instruments. The results suggest that the impact of FP fieldworker visit in promoting contraceptive use ranged

around 25 to 26 percentage points while the impact of FP IEC is around 7 percentage points. This finding gives supports to *H2.2a* and *H2.2b* that *women who were visited by FP fieldworkers are more likely to use contraceptives* and that *FP IEC through mass media has positive correlation with contraceptive use,* respectively. However, the results indicate that the effectiveness of FP fieldworker visit and FP IEC in promoting contraceptive use has declined in the post decentralization period as shown by the negative coefficients of the interaction terms. The results suggest that the impact of FP fieldworker visit in promoting contraceptive use declined by around 18 to 19 percentage points while the effectiveness of FP IEC declined by 6 percentage points. This declining effectiveness of the two FP instruments might be the underlying reason behind the stagnant CPR and TFR in the last decade.

The declining effectiveness of the two FP instruments may come from several factors that have changed after the decentralization such as: (1) Transformation of BKKBD into other unit of local offices (such as welfare unit) that leads to declining intensity of FP IEC and hence ineffective FP campaign; (2) declining fund allocated for FP campaign and FP IEC in the local government affects the quality and effectiveness of FP campaign and FP IEC; (3) FP campaign that became less strong after decentralization (from "two children is enough" to "two children is better" and also from "small family happy family" to "plan your pregnancy for a happy family") cannot penetrate deeply into the society; (4) FP fieldworkers no longer focus on FP duty, but also work on other duties such as welfare program; (5) FP is no longer a priority of the local government that leads to declining capacity building and evaluation of FP fieldworkers; and (6) the declining number of the fieldworkers leads to the possibility of

declining intensity of the visits and hence leads to ineffective FP visits (Hull & Mosley, 2009; Kurniawan, Pratomo, & Bachtiar, 2010; Lakshminarayanan, 2003).

Furthermore, the coefficient of the variable $after\_dec$ in Table 2.8 implies that the increase in the probability of using contraceptive even without being exposed to FP visit and FP IEC is quite large at around 15 to 16 percentage points. The evolution of private sector as a main provider of family planning services might be one of the reasons behind the increase in contraceptive use over time. The increase in the FP provision by the private sector has started before the decentralization but the increasing trend has become more apparent in the post decentralization period (Hull & Mosley, 2009). Appendix Table A2.5 panel A shows that prior to the decentralization of the BKKBN in 2004, the government remained the major provider of the modern contraceptives (i.e. pills, IUD, and injectibles) even though the percentage of private sector as the FP provider has showed an increasing trend. In 1987, the government accounts for more than 80 per cent as the main source of modern contraceptives. The percentage of the government as the FP provider declined to around 50 per cent in 1994 and the emergence of the private FP providers has become stronger during this period. Women who accessed modern contraceptives from private providers have increased from around 15 per cent in 1987 to around 26 percent in 1994. In the post decentralization period, as shown in panel B of Appendix Table A2.5, private sector has replaced the government as the main provider of the FP services. In 2007 and 2012, government providers account for only 25 per cent and 27 per cent, respectively, as the modern contraceptive providers while the private sector accounts for as high as 65 per cent and 68 per cent, respectively.

Table 2.9 shows the results from the 2SLS estimate corresponding to Equation 2.3. The results from the weak identification test and the overidentification test confirm the validity of our instrument set. The F-statistics of the weak IV test are greater than 10, confirming the relevance of the instrument set and the p-value of the Hansen J-statistic are greater than 0.1, implying that our datasets cannot provide enough evidence to reject the null hypothesis that our instrument set is exogenous. The signs of the coefficients from the 2SLS estimate suggest the a positive relationship between the two FP instruments (FP fieldworker visit and FP IEC) and contraceptive use which is consistent with the results from LPM and logistic estimate in Table 2.8. However, the 2SLS estimate suggests that the impact of FP fieldworker visit and FP IEC on contraceptive use is not significant. The interaction terms of the 2SLS estimates also provide no significant evidence of the declining impact of the FP visit and FP IEC on contraceptive use after the decentralization. Hence while the results from LPM and logistic estimates give strong support to *H2.2c* and *H2.2d that the impact of the FP fieldworker visit and FP IEC in promoting contraceptive use has declined after the decentralization,* the 2SLS estimates cannot provide additional evidence to support the hypotheses.

Other socioeconomic factors affecting contraceptive use

The relationships between the use of contraceptives and control variables can be summarized as follows: First, the regression results suggest an inverse U-shaped relationship between woman's age and the use of contraception where women at a very young age were found to be less likely to use contraceptives but then the use of contraceptives increased as women entered adulthood until they got older and found themselves no longer in need to use contraceptives. Second, women who were better

educated and had a larger number of living children were more likely to use contraceptives. Third, a woman whose partner has higher education is also found to be more likely to use contraceptive. Fourth, the results indicate that regional factors have significant impact on contraceptive use, where women who lived in Java-Bali area were found to be more likely to use contraceptives than those who lived outside the Java-Bali area. Fifth, the number of living children seems to have a positive relationship with contraceptive use; the more number of living children a woman has, the more likely a woman to use contraceptives. Lastly, our finding implies that Indonesian women who lived in rural areas were more likely to use contraceptives compared to those who lived in urban areas. Even though this result on urban-rural classification is not so intuitive; some other studies on Indonesia by Permana & Westoff (1999) and Schoemaker (2005) have found similar conclusion. We suspect that this unusual phenomenon in Indonesia resulted from (1) the fact that rural areas were the main focus of FP program during the active FP regime so that FP infrastructure might be more developed in rural areas, (2) the fact that urban areas were where the privatization of FP services was first implemented in early 1980s through KB Mandiri, a system where women are expected to pay for FP services.

We also did estimations on the determinants of contraceptive method choices (Appendix Table A2.5-A2.5). To examine factors affecting contraceptive method choices, we use multinomial logit method, where the dependent variables are choices in using contraceptives, categorized into: not using (the reference category), pills, injections, IUD, other modern methods (such as female or male sterilization, implants, and norplant), and traditional method of contraceptives. The overall findings from these estimations are that women's decision to use more long-term contraceptives is

explained by their age, education, and the number of living children. The older and the better educated women are more likely to use long-acting/permanent methods (LAPMs) and women who have a greater number of living children are more likely to be on LAPMs. This finding appears to hold true before and after the decentralization. The impact of the FP fieldworkers and FP IEC through television on using LAPMs has declined after decentralization possibly because the lower coverage and intensity of FP fieldworker visits and lower intensity of television coverage on FP messages. Since the emergence of private providers, particularly after the decentralization, that promoted mainly pills and injectables, the short term methods has become the most accessible options. Thus, it seems that after decentralization a renewed government intervention to promote LAPMs is necessary to enable women to have far greater access to various forms of contraceptives including those offered by private providers and those offered by the government.

2.6.3   The inequality in delivery care utilization among regions in Indonesia

The statistically significant and negative coefficients of the eastern region dummy variable in Table 2.10 suggest that the women who live in the eastern regions were less likely to utilize delivery care. This results hold to be true for both aspects of delivery care: delivery at health facility and delivery by skilled attendant. In terms of delivery at health facility, women who live in the eastern region are less likely to deliver at health facility by 9 percentage points compared to those who live in the western regions. In terms of delivery by skilled attendant, the results suggest that women who live in the eastern region are 23 percentage points less likely to deliver by skilled attendant. Furthermore, over the years, women were found to be more likely to use

delivery care as shown by the positive signs of year dummy variables. For example, in 2007, women are more likely to deliver at health facility by 13 percentage points compared to women in 1987. The negative coefficient of the interaction terms between the year and eastern dummy variables suggest that the inequality between eastern and western regions has exacerbated over the years as shown by bigger and bigger magnitude of the coefficient of the interaction terms. This is particularly consistently significant in terms of delivery at health facility.

Similarly, when we group the observations based on the years of the survey into before and after the decentralization, the result in Table 2.11, corresponding to equation 2.5a-2.5b, shows that after the decentralization, women are more likely to utilize delivery care by 16 percentage points in terms of health facility and by 11 percentage points in terms of skilled attendant. The result also suggests that women who live in eastern part of Indonesia are less likely to deliver at health facility by 13 percentage points and are less likely to deliver by skilled attendant by 30 percentage points compared to those who live in the western region. Furthermore, the sign of the coefficient of the interaction term between the decentralization and the eastern region dummy variable support the hypothesis that after the decentralization, the inequality in delivery care utilization between western and eastern regions of Indonesia has widened particularly in terms of facility-based delivery by 18 percentage points. In terms of delivery by skilled attendant, the results suggest that the utilization between western and eastern regions has widened by the 2 percentage points although the coefficient is not significant. Hence, overall, the above findings generally give some evidence to support *H2.3 that the inequality in delivery care utilization between the eastern and western*

regions has widened over the years, and particularly so in the post decentralization period.

2.6.4 *Possible factors behind the widened inequality after the decentralization*

A further work is required to provide evidence on causal link between the decentralization and the inequality in delivery care; however, some studies below may provide some insights on how the decentralization might affect the delivery care utilization and lead to widened inequality in the delivery care utilization. The first two studies are qualitative work by McIntyre & Klugman (2003) and Lakshminarayanan (2003) that elaborate how the decentralization has negatively affected the reproductive care utilization in South Africa and the Philippines, respectively. Both studies found that the decentralization has created a disjuncture and allowed priority differences in the reproductive healthcare provision between the central government and the lower level governments. While the central government is primarily responsible to set the national goal, priority policy and program; the provincial and district level governments are responsible to carry out the program and provision of health services including the development of local health facilities as well as the provision of local health personnel such as doctors, nurses, and midwives. Lakshminarayanan (2003), for example, found that due to some financial constraints, some local governments did not bolster family planning program even though family planning was set as the country's priority in the health sector. Furthermore, they found that local governments with low revenues struggled to provide necessary instruments for reproductive health services that lead to inequality in accessing the reproductive health services. This condition is exacerbated by the discontinuation in training and supervision by the central government that

resulted in lower service quality. Discontinuation in training and technical capacity building of local officials by the central government has also occurred in Indonesia following the decentralization (Kurniawan, Pratomo, & Bachtiar, 2010). Similarly, McIntyre and Klugman (2003) found that financial constraints of the local governments led to shortage in the availability of drugs and number of health personnel that affected the quality of the reproductive health services. This problem may create gaps in service provision between disadvantaged regions and more wealthy regions. Since local officials are motivated more to work on projects that attract votes and since maternal health care programs are not particularly attractive to voters, it is thus not surprising that local officials do not put so much priority on maternal health.

After the decentralization, in Indonesia, the provision of local health facilities and personnel as well as the implementation of health policy and program became the responsibility of the local governments (Kementerian Dalam Negeri [Ministry of Home Affairs of Indonesia], 2014). Over the years, eastern regions in Indonesia have been associated with lower utilization in maternal health care compared to that of the western regions (Kosen et al., 2014). Health care providers in the eastern regions are mostly public while in the western regions private providers have become more common (Kosen et al., 2014). Hence, health care provision by the local governments may greatly affect access and quality to health care services in the eastern regions. After the decentralization, building local facility and deploying health personnel to eastern regions might become more challenging because some local governments, especially those with low local revenues (Green, 2005; Mbate, 2017). Local government of poor regions cannot promise clear career path; provide good working facilities; or provide enough monetary compensation. Lack of amenities in eastern regions exacerbates the

low motivation of health personnel to work in the eastern regions. This low motivation and moral of health personnel may affect the quality of health services. Similar phenomenon of low morale among the devolved health personnel due to the change in career prospects was found in the Philippines (Lakshminarayanan, 2003). Local governments with higher revenues or those in western regions might not experience the above problems, hence creating widened inequality in maternal care utilization between rich regions in the west and poor regions in the east.

Furthermore, a cultural aspect also significantly affects maternal health care utilization in the eastern regions (Kosen et al., 2014). Generally, women and their families expect privacy during delivery. The financial constraints of the local governments and less financial support from the central government after the decentralization may result in lower quality of local health facility (Green, 2005). This low-quality local health facility often cannot provide enough privacy to the women and their family during delivery and hence lower motivation to deliver at the health facility. Belton, Myers, & Ngana (2014) found that some village women did not want to deliver in the sub-district clinic in eastern Indonesia because they perceive the lack of privacy to deliver in the local facility. This unaddressed cultural aspect might also become the reason behind the widened inequality in delivery care utilization between the eastern and the western regions in Indonesia.

2.7   Conclusion and Policy Implications

Indonesia is in efforts to reduce its high MMR. In the last decade, FP, as one of the strategies to reduce maternal death, could not contribute much to the MMR

reduction since the CPR has been relatively stagnant. The unfavorable trend of the CPR is suspected to have been caused by the decentralization which led to the declining effectiveness of the two FP instruments, FP fieldworker and FP IEC, in promoting contraceptive use. Decentralization is also suspected to have exacerbated inequality in delivery care utilization between the western and the eastern regions. This chapter explored how the decentralization has affected the contraceptive use and the effectiveness of the two FP instruments, FP fieldworker visit and FP IEC, in promoting contraceptive use. Furthermore, the chapter also discussed how the inequality in delivery care utilization has changed over the years, particularly in the post decentralization period.

BKKBN, the national coordinating board of FP, was decentralized in 2004. The decentralization of the BKKBN has brought changes in the implementation of FP program in Indonesia. Following the decentralization, the regional FP board, BKKBD, was either abolished or merged into other units of district offices. As a result, the two instruments of FP program, FP fieldworkers visit and FP IEC, have experienced a decline both in number and coverage. The regression results show no significant evidence of decentralization leads to a decline in contraceptive use. Furthermore, the regression results show a positive impact of FP fieldworkers visit and FP IEC in promoting contraceptive use. However, the impact of FP fieldworkers visit and FP IEC in promoting contraceptive use was found to be declining after decentralization. This might be the underlying reason behind the stagnant CPR and TFR in the last decade. Furthermore, this finding is consistent with the arguments in the previous literature of the negative impact of government decentralization on the implementation of the FP program (Hull & Mosley, 2009; Kurniawan, Pratomo, & Bachtiar, 2010;

Lakshminarayanan, 2003; National Research Council & AIPI, 2013; Sukamdi, 2011; UNFPA-Indonesia, n.d).

Chapter 2 also investigates whether the decentralization has resulted in widened inequality in delivery care utilization between the eastern and western regions. Over the years, it is widely known that the western regions in Indonesia are generally more developed compared to the eastern regions. Hence, the western region was also known to have a better quality of health care services compared to the eastern region (Kosen et al., 2014). The regression results show that the inequality in delivery care utilization between the western and eastern regions has widened over the years, particularly in the post decentralization period (especially in terms of facility-based delivery). Following the decentralization, the district governments are responsible to finance the provision of local public services including the provision of local health services, local health facilities, and local health personnel (Kementerian Dalam Negeri [Ministry of Home Affairs of Indonesia], 2014). Hence, after the decentralization, poor local governments with low local revenues (mostly located in the eastern provinces) might face financial constraints in providing quality health services in their local regions and in turn leads to widened inequality between the western and eastern regions in Indonesia (Green, 2005; Mbate, 2017).

Findings in chapter 2 implies the need to revitalize FP fieldworker home visits and FP IEC to boost the contraceptive use as the regression results suggest that their impacts in promoting contraceptive use have declined in the post decentralization period. Since after the decentralization the provision of FP fieldworker visit and FP IEC has become the responsibility of the local government of district offices, this implies the need to strengthen the implementation of FP program in the district levels. This can be

done through coordination between the district government and central government in carrying out the FP program. Since the current implementation of FP program under the local government is lack of coordination and quality supervision from the central government, this can be improved in the following ways. First, instead of giving full discretion to local governments in carrying out FP program in their local areas, central government should actively monitors the performance of the local governments in carrying out the FP program. Second, to ensure quality local FP services particularly after the abolishment of the BKKBD, training and capacity building from the central government is needed. Thus, priority difference and disjuncture in implementing FP program between district and central government can be avoided. Third, the local government should increase the number of FP fieldworkers to address the declining coverage of women who were visited by the FP fieldworkers. Lastly, FP IEC should be done stronger and more intensive. For example, this can be done with replacing the current campaign of "plan your pregnancy" with a stronger FP campaign such as "two children is enough" or "two children is better".

The widened inequality in delivery care utilization (particularly in terms of facility-based delivery) between the eastern and western regions in Indonesia highlights the importance of a more inclusive national program and health sector development in the eastern regions. Lack of quality local facilities and personnel is suspected to be the impediment in improving delivery care utilization in the eastern regions due to revenue constraints faced by poor local governments in financing health care services in their local regions. Therefore, since sufficient local (district) revenues are necessary to finance quality local provision of health care services, a health subsidy or grant program from the central government to the poor local governments in the eastern regions is

needed. Furthermore, training and capacity building from the central government could help to improve the competence of local health personnel (particularly in the eastern regions whose quality of human resources is still low). This will promote good quality of local health personnel that leads to quality local health services and in turn will promote health care service utilization including delivery care.

CHAPTER 3

SOCIAL SAFETY NET, DELIVERY CARE,

AND ANTENATAL CARE UTILIZATION

3.1   Introduction

3.1.1   Strategies in combating maternal mortality: delivery care and antenatal care

Delivery by skilled attendant and delivery at health facility (also known as institutional delivery or facility-based delivery) are the two essential measures in reducing the number of maternal deaths. Delivery assisted by a skilled attendant is a crucial (Ronsmans et al, 2009; World Health Organization [WHO], 2002, 2015c) as complication during pregnancy and delivery has been the major factors responsible for maternal deaths in developing countries, including Indonesia (Analen, 2007; Kosen, et al., 2014; Say et al., 2014; WHO, 2015c). Skilled attendants can identify and prevent medical complications and provide emergency care when complications arise (United Nations Population Fund [UNFPA], 2003; WHO, 2015d).

Recent articles on maternal health have been emphasizing the importance of emergency obstetric care in combating maternal mortality (Kosen et al., 2014; Ronsmans et al., 2009; UNFPA, 2003; Webster, 2012; WHO, 2015d). Emergency obstetric care is facilitated through delivery at health facility in addition to the presence of skilled attendants during delivery (UNFPA, 2003; WHO, 2015d). Delivery in a health facility is important because health facility has the necessary instruments and personnel to provide immediate measures of emergency obstetric care when complications arise. Kosen et al. (2014) argued that delivery by non-skilled attendants, lack of access to emergency obstetric care, and poor health care quality are the major

factors behind high maternal mortality in Indonesia. In addition, Kosen et al. (2014) reported that areas with the highest number of deliveries at health facilities are areas with the least number of maternal deaths.

Another important strategy that may help achieve goals in maternal health is the antenatal care (ANC). ANC plays a crucial role in detecting pregnancy problems at early stage. It is also an essential practice in improving mother's health and the baby's by providing nutritional supplement to the pregnant women and through routine preventive measures such as tetanus injection, folic acid, etc. (Abou-Zahr & Wardlaw, 2003; Agus & Horiuchi, 2012; World Health Organization [WHO], 2016b). Furthermore, ANC facilitates the dissemination of maternal health information including the importance of family planning (FP) and delivery care (Abou-Zahr & Wardlaw, 2003). However, improving access to quality ANC remains one of the challenges to achieve SDG3 despite the increasing trend of ANC utilization (WHO, 2015a).

The MDG5 indicators of ANC include at least 1 ANC visit and at least 4 ANC visits. However, the MoH Indonesia recommends at least four ANC visits with 1-1-2 scheme, i.e. at least one visit in the first trimester (0-12 weeks), at least one visit in the second trimester (12-24 weeks), and at least two visits in the third trimester (24 weeks onwards), following the WHO four-visit focused ANC (FANC) model (Kementrian Kesehatan RI [MoH Indonesia], 2015; Statistics Indonesia, BKKBN, MoH, & ICF International, 2013; WHO, 2016a). The contents of ANC services according to the recommendations of MoH Indonesia include: (1) height and weight measurement, (2) maternal blood pressure measurement, (3) mid-upper arm circumference measurement, (4) fundal uterus height measurement, (5) tetanus toxoid vaccination, (6) iron and folic

acid supplement, (7) fetal heartbeat measurement, (8) maternal care counselling and education, including family planning, and (9) basic laboratorial test such as blood count test and urine test (Kementrian Kesehatan RI [MoH Indonesia], 2015).

3.1.2 *Objective and contribution of this chapter*

Countries which have pledged to achieve MDGs and also SDGs, including Indonesia, have carried out some policies to improve delivery care and ANC utilization. One of the policies aiming to improve access to health care is the social safety net (SSN), importantly the health insurance for the poor or known as the health card program in Indonesia. Having a health card should lower the out-of-pocket expenditure in health care and hence expected to improve health care utilization of poor households including utilization of maternal health care services (delivery care and antenatal care).

Despite the fact that SSN holds a strategic role in improving access to delivery care and ANC, empirical studies that investigate whether SSN works effectively in increasing access to delivery care and ANC remains limited. This study will contribute to the limited empirical literature that investigates the impact of SSN on maternal healthcare utilization (delivery care and ANC utilization) and how effective SSN is in improving poor women's access to live-saving maternal health services. This chapter aims to investigate whether the SSN, i.e. the health card program, has a positive impact on delivery care and ANC utilization.

Our study is unique to previous literature that investigates the impact of SSN on healthcare utilization in the following ways. First, we believe that our choice to use 2SLS method in dealing with the endogeneity problem is better than the mixed method (mixed of propensity score matching (PSM) and logistic regression) used by one

previous study by Brooks et al. (2017) in investigating the impact of SSN on delivery care utilization in Indonesia. One of the reasons is that the PSM applied by Brooks et al. (2017) may not be reliable because there is an unobserved factor that affects the health card participation, i.e. the subjective judgement of the local officials (more detail in section 3.2 and section 3.3.1). Hence, there is a violation of the conditional independence assumption which is required for the PSM to be reliable. Second, unlike previous studies that investigated the impact of SSN on general healthcare utilization, our study focuses on the impact of the SSN on two important strategies that help reduce maternal death: delivery care and ANC. Without focusing on strategies that help reducing maternal death, previous studies could not provide useful guidance to direct MMR-alleviation policies and could not help the government to provide insights whether or not the government intervention of SSN could work effectively to help solving the current high level of maternal deaths. Third, our study is better compared to the previous literature since it uses nationally representative datasets of Indonesia Demographic and Health Survey (IDHS), enabling nationwide conclusion. Existing literature that covered limited areas (2 districts out of total 400 districts) could not provide any significance contribution in guiding national policy in MMR-alleviation program since their finding cannot be generalized nationwide. Fourth and finally, we also conduct a more comprehensive study that simultaneously examines both aspects of delivery care: delivery at health facility (facility-based delivery) and delivery by skilled attendant as well as the ANC.

This chapter is structured as follows. The next section summarizes previous literature on delivery care and ANC in Indonesia. The third section provides brief overview of SSN in Indonesia. The fourth section provides an overview of the latest

statistics of delivery care and ANC in Indonesia. The fifth section describes the estimation strategy, followed by the empirical results in the sixth section. Seventh and finally, this chapter closes with conclusion and policy implications.

3.2 Literature Review

Our paper fits into several strands in the literature. First, it contributes to public health literature that examines the determinants of maternal care utilization, i.e. delivery care and ANC. Previous studies that investigated determinants in delivery care utilization include those by Hodge et al. (2015), Ronsmans et al. (2009), Thind & Banerjee (2004), Titaley et al. (2010), and Titaley, Dibley, & Roberts (2011) while those that investigated the socioeconomic determinants in ANC include those by Agus & Horiuchi (2012), Celik & Hotchkiss (2000), Obiyan & Kumar (2015), Simkhada et al. (2008), Tenkorang (2016), Titaley et al. (2010). Second, it contributes to limited studies that investigated the impact of SSN on health care utilization, particularly maternal care utilization (Brooks et al., 2017; Lu et al., 2012; McQuestion & Velasquez, 2006; Smith & Sulzbach, 2008; Quayyum et al., 2010).

Our study distinguishes itself from the existing literature on the impact of SSN on maternal care utilization in Indonesia in the following ways. First, our study provides more useful insights to the issue of MMR-alleviation program (compared to studies that investigates the impact of SSN on general health care utilization) since it focuses the investigation on the impact of SSN specifically on delivery care and ANC utilization, the two strategies to combat maternal deaths. Second, we address the external validity concern raised in the previous literature by using nationally representative datasets. Third, we conduct a more comprehensive study by examining both aspects of delivery

care (facility-based delivery and delivery by skilled attendant) as well as the ANC. Fourth and finally, we use a more rigorous method in dealing with the endogeneity problem of the interest variable health card by applying the 2SLS method instead of applying PSM method as in Brooks et al. (2017). PSM validity depends on the conditional independence assumption where there is no unobserved factor affects the participation. In the case of health card, it is likely that this assumption will be violated due to unobserved factor of subjective judgment of the district officials in identifying eligible beneficiaries of the health card.

Focusing on MMR-alleviation policy

Previous studies on the impact of SSN were mostly investigated the impact of SSN on general health care utilization, i.e. not focusing on delivery care or ANC utilization (Johar, 2009; Pradhan, Saadah, & Sparrow, 2007; Sparrow, Suryahadi, & Widyanti, 2013). Pradhan, Saadah, & Sparrow (2007) and Sparrow, Suryahadi, & Widyanti (2013) investigated the impact of SSN, i.e. health card, on outpatient healthcare utilization while Johar (2009) examined the impact of health card on outpatient and inpatient care by family hierarchy of household head or husband, wife, and child. Using Susenas data of 1999 and 2005/2006, respectively, studies by Pradhan, Saadah, & Sparrow (2007) and Sparrow, Suryahadi, & Widyanti (2013) found that health card was positively associated with the use of outpatient care. Similarly, using IFLS 1993, 1997, and 2000, Johar (2009) found that SSN was positively associated with public service utilization for outpatient care (not significant for inpatient care).

The above literature, however, could not contribute much in providing insights to government efforts in achieving SGG3 without focusing on strategies that help to

reduce the maternal deaths. Very limited number of literature examined the impact of SSN specifically on maternal care utilization, i.e. delivery care and ANC utilization. A paper by Smith & Sulzbach (2008) investigated the impact of health insurance on delivery care utilization in West African countries. They found that in both Senegal and Mali, women who were covered by health insurance are more likely to deliver at health facility compared to those who are not covered by insurance. They also found that the health insurance coverage significantly affects the ANC utilization in Mali although they found that the impact of SSN on ANC is not statistically significantly different from zero in Senegal. Lu et al. (2012) investigated the impact of community-based health insurance program, *Mutuelles*, on improving access to health services including delivery care in Rwanda. They found that the insurance program is positively associated with the utilization of skilled birth attendant and delivery at health facility. Nguyen et al. (2012) investigated the impact of a voucher program for maternal health that was launched in Bangladesh. They found that women with vouchers were more likely to use ANC (had more number of ANC visits) than those who do not have vouchers.

Addressing external validity concern

Some previous studies on determinants of delivery care utilization have external validity concern. Studies by Ronsmans et al. (2009) and Quayyum et al. (2010) investigated the determinants of utilization of skilled attendant during delivery in two Indonesian districts (Serang and Pandeglang in Banten Province) while Titaley, et al. (2010) investigated the delivery care utilization in only six villages in West Java Province. The small coverage of the data in these studies limits their applicability to the entire country.

Quayyum et al. (2010) investigated the relationship between insurance coverage and maternal healthcare expenditure. They found that in the two districts of Serang and Pandeglang in Indonesia, the insurance coverage was positively associated with expenditure for maternal health care. However, since their research was limited to only two Indonesian districts, their paper has external validity limitation, where nationwide generalization was not possible due to the very limited number of the districts that were investigated (2 districts out of 465 districts nationwide). Furthermore, their choice of dependent variable, expenditure in maternal healthcare, may not be directly linked to the role of insurance in promoting delivery care utilization (of skilled assistance during delivery and facility-based delivery) to women since increasing expenditure in maternal healthcare may come from emergency obstetric care that was needed during delivery, which most of the time was the decision of the health personnel instead of the women's choice.

Conducting a more comprehensive study

In addition, most previous studies that investigated the determinants of delivery care utilization investigated only one of the aspects of delivery care, i.e. either covering only investigation on skilled attendant during delivery or only on facility-based delivery (Hodge et al., 2015; McQuestion & Velasquez, 2006; Ronsmans et al., 2009; Thind & Banerjee, 2004; Titaley, Dibley, & Roberts, 2011). Most of the studies, such as those by Ronsmans et al. (2009), Thind & Banerjee (2004), Titaley, Dibley, & Roberts (2011) investigated the determinants of the utilization of the skilled birth attendant while Hodge et al. (2015) and McQuestion & Velasquez (2006) investigated the determinants of utilization of facility-based delivery. Furthermore, Thind & Banerjee (2004) and

64

Titaley, Dibley, & Roberts (2011) investigated delivery assistance only on home deliveries; hence, it investigates the determinants of the presence of skilled attendant during delivery only on a fraction of overall deliveries, i.e. only those occurred at home. In general, the above studies found that mother's education, partner's education, birth order, and wealth were important determinants in delivery care utilization. Similarly, previous studies that investigated factors affecting ANC utilization found that women's education, partner's education, household wealth, parity[8], and rural-urban classification are significant determinants of ANC utilization (Agus & Horiuchi, 2012; Celik & Hotchkiss, 2000; Obiyan & Kumar, 2015; Simkhada et al., 2008; Tenkorang, 2016; Titaley et al., 2010).

Applying better methodology

In Indonesian case, a paper by Brooks et al. (2017) applied mixed method of the PSM and logistic regression on IDHS 2012 dataset. They tried to address the non-random selection of health card by applying the PSM method to construct the new PSM dataset that consists of the treated and control groups (those who receive health card and those who do not receive health care among eligible individuals). Then they applied the logistic regression on the newly created PSM dataset to investigate the impact of the SSN on delivery care utilization. PSM validity depends on the condition where there is no unobserved factor that affects the participation (conditional independence assumption). In the health card case, as the verification process in identifying the

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[8] Parity is defined as the number of times that a woman has given birth to a fetus aged 24 weeks or more.

eligible households is fully given to the local officials, the local criteria might be subjective and discretionary (more detail in section 3.3.1). This subjective judgement from district official (that might come from a close relationship between the household head and the district official) is an unobserved factor, and hence can harm the reliability of the PSM (due to the violation of the conditional independence assumption). Furthermore, in constructing the comparison group, PSM depends on the model of the probability of being covered in the health card that needs rich set of observed characteristics and may also depends on logistic or probit model assumption when constructing the balancing score. Therefore, given the above limitations of the PSM method, we believe that our paper that apply 2SLS method is better since it deals with the endogeneity problem in our interest variable, health card.

In terms of the choice of dependent variable, in our study, to better capture the impact of SSN on delivery care utilization, our choice of dependent variable follows the dependent variable specified in a paper by Smith & Sulzbach (2008), Lu et al. (2012) and Brooks et al. (2017). We use a dichotomous variable of delivery at health facility that takes a value of 1 when women deliver at health facility and 0 otherwise instead of maternal care expenditure as in Quayyum et al. (2010). In addition, we also use another dichotomous dependent variable of delivery by skilled attendant to capture the impact of SSN on utilization of this other aspect of delivery care.

Most of studies on ANC specify a binary dependent variable of whether or not a woman ever receives ANC throughout her pregnancy. Some of the studies specify more detail dependent variables of ANC utilization such as whether or not the women have 4 or more number of ANC visits; others specify more detail ANC variable of whether or

not they follow the WHO recommendation of the timing of ANC visits, i.e. 1-1-2 FANC (one visit in the first trimester, one in the second trimester, and two visits in the third trimester of the pregnancy). In this study, we specify two dependent variables for ANC utilization, (i) whether or not a woman has at least 1 ANC visit, and (ii) whether or not a woman has at least 1-1-2 four ANC visits.

3.3   Social Safety Net: the Health Card Program

In 1994, to help poor people access health services, the Indonesian government launched an SSN in health sector, known as health card[9]. Health card holders were entitled to free health services at the designated health facilities that cover both inpatient and outpatient care, diagnostic examination, and child and maternal care (Johar, 2009 ; "Keputusan Menteri", 1994). *Jamkesmas* or *Jaminan Kesehatan Masyarakat* was then launched to replace the health card program (1994-2001). Jamkesmas beneficiaries were entitled to the same benefits as those of health card holders that include inpatient and outpatient care, as well as maternal care (Center for Health Market Innovations, n.d.; Harimurti, Prambudi, Pigazzini, & Tandon, 2013; International Labour Organization [ILO], 2012). In DKI Jakarta province, the SSN is known as JPK Gakin or *Jaminan Pemeliharaan Kesehatan Keluarga Miskin* (Health Safety Net for Poor Families). The program was aimed at helping poor families access health services in hospitals in DKI Jakarta area. The all three SSN schemes, health card, Jamkesmas, and JPK gakin etc provides same benefit and have the same procedure on how to use the SSN. The beneficiaries were all entitled to free healthcare services in that include maternal care

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[9] Private health insurance is not commonly used in Indonesia. IDHS 2012 shows that the percentage of women who is privately insured is just around 2.6 per cent.

such as delivery care and ANC. Beneficiaries could use the SSN in the designated place by showing the SSN cards, the identity cards, and their copies. Therefore, IDHS does not differentiate these SSN schemes in their data collection and tabulation. Furthermore, previous studies such as Brooks et al. (2017) also treat three SSN schemes all the same. Most literature call the SSN as health card (Johar, 2009; Pradhan, Saadah, & Sparrow, 2007), while some other call them with their recent name, Jamkesmas (Brooks et al., 2017).

3.3.1 *Targeting and distribution of health card*

As elaborated in the World Bank report by Harimurti et al. (2013) health card targets the poor and near-poor households, or according to IDHS, those in the two lowest wealth quintiles, the poorest and poorer category. The government identifies eligible households of health card using asset indicators and local government eligibility criteria. National statistics office of Indonesia, BPS, constructed the list of eligible households using 14 asset indicators for each district. Then, the district officials verified and validated the list of eligible households from BPS. These 14 asset indicators include floor area, floor type, wall type, sanitation facility, source of drinking water, source of electricity, type of energy for cooking, frequency of meat and dairy product consumption, frequency of daily meals, number of new clothing in a year, access to public health center, access to employment, educational attainment of the household head, and other asset ownership. In validating the list from BPS, some districts conducted further local surveys and some others sent local or village officials to go house to house for verification. The new list of identified poor households compiled by the district government is also often used for other type of SSN program such as rice for

the poor. There are at least drawbacks in the targeting mechanism of the health card. First, as the verification process is fully given to the local officials, the local criteria allow discretionary and subjective judgment. Second, as the new list compiled by the local officials is not subject to validation and verification by the central government, it is prone to miss-targeting. Third, as local criteria are constructed by each district, there could be variation criteria used across districts (Harimurti et al., 2013; Johar, 2009).

The distribution and enrollment of health card is done by district officials or local health staff. Unit of health card targeting is eligible household; however, the enrollment is individual where each member of the eligible household will be given the health card. The enrollment is free of charge. There are also some problems in the health card enrollment and distribution. For example, eligible households who are not enrolled by the local officials cannot self-enrolled and do not have clear procedure on how to enroll (Harimurti et al., 2013). Another example is that sometimes not all members of the eligible households receive the health cards due to incorrect information on household members during surveys.

The above problems in targeting, enrollment, and distribution of the health card are believed to be the cause of poor coverage and significant leakage to non-eligible beneficiaries (Harimurti et al., 2013; Pradhan, Saadah, and Sparrow, 2007; World Bank, 2012). Susenas 2010 suggest that the health card covered around 35 per cent of poor and near-poor households (Harimurti et al.; 2013). IDHS 2012 suggests that the health card covered 30 per cent of the poor or near-poor households (or IDHS categorized them as poorest and poorer households). In terms of leakage, Susenas 2010 suggests that 48 per cent of the health card holders were poor or near-poor indicating a leakage rate of 52 per

cent (Harimurti et al.; 2013). IDHS 2012 suggests 68 per cent of health card beneficiaries are poor or near-poor suggesting leakage rate at 32 per cent (author's calculation from IDHS 2012).

3.3.2   SSN and delivery care utilization

The delivery care utilization among women in the poorer and/or poorest category by the SSN coverage is given in Table 3.2, Table 3.3, and Table 3.4. Table 3.2 shows the percentage of women in the poorest category by SSN coverage and place of delivery. Among the poorest women, around 25 per cent of those who were not covered by the SSN delivered at health facility while among those who were covered by SSN, 30 per cent delivered at health facility. Table 3.3 shows the percentage of women in the poorest category by SSN coverage and assistance during delivery. Among the poorest women, around 40 per cent of those who were not covered by the SSN delivered with skilled attendants while among those who were covered by SSN, 43 per cent delivered by skilled attendants.

Table 3.4 shows that the t-test confirms that there is a difference in the two-group means of facility-based delivery between group of poorest women with SSN and poorest women without SSN at 1% significance level. The t-test also confirms that there is a difference in the two-group means of delivery by skilled attendant at 5% significance level. Similarly, the two-group mean t-test for women who are in poor/poorest category confirms that there is a difference in the two-group means of delivery at health facility between group of poor/poorest women with SSN and poor/poorest women without SSN at 5% significance level. However, the two-group mean t-test for women who are in the poor or poorest category suggests that there is not

enough evidence to reject the null that the difference of the two-group means of delivery by skilled attendant is significantly different from zero between the group of poor/poorest women with SSN and poor/poorest women without SSN. This indicates that the impact of SSN on skilled assistance during delivery is particularly prevalent in the most disadvantaged group of women, i.e. women in the poorest category.

3.4 The Latest Statistics of Delivery Care and ANC in Indonesia

3.4.1 Latest statistics on delivery care

The delivery care utilization in Indonesia is still considered low. In 2012, only 66 per cent of deliveries in Indonesia were attended by skilled attendants (Figure 3.1); and nearly half (43 per cent) of Indonesian women gave birth at home instead of having delivery at a health facility (Figure 3.2). Figure 3.3 provides detailed information of assistance during delivery. In 2012, around half of the total deliveries in Indonesia were attended by midwives or rural midwives; it accounts for around 52 per cent of the total deliveries. The second most common assistance during deliveries is from traditional birth attendant with 21 per cent. Traditional birth attendants (TBA) are regarded as unskilled attendants. The tools that they use during deliveries are often not sterile and thus their treatment methods are often unsafe (Analen, 2007).

Increasing skilled attendance in home deliveries has been particularly challenging in Indonesia (Thind & Banerjee, 2004). Most home deliveries in Indonesia (65 per cent) were not assisted by skilled attendants (Figure 3.4). And around 20 per cent of all deliveries in Indonesia in 2012 occurred at home without help from skilled attendants. This phenomenon is very worrisome because women who deliver at home

without assistance from skilled attendants might be exposed to particularly high risk of maternal death (Kosen et al., 2014; Thind & Banerjee, 2004; Titaley, Dibley, Roberts, 2011). To deliver at home without the help of skilled attendant is dangerous because first, the house may not have the necessary resources to facilitate a safe delivery, such as clean water, and second, the non-skilled attendants may not have the knowledge and skill to help a safe delivery or to carry out an emergency care when complications arise. Furthermore, non-skilled attendants may use non-sterile tools and do unsafe methods that may induce infections and endanger both the mother's and the baby's health (Analen, 2007).

Figure 3.4 presents information on assistance during delivery in home deliveries in 2012. First, 65 per cent of home deliveries were not assisted by skilled attendants. Second, the most common assistance during delivery at home is the assistance from a traditional birth attendant. Around 44 per cent of home deliveries were assisted by traditional birth attendants. Additional 19 per cent were assisted by a relative or friend. Third, home deliveries assisted by skilled attendants were mostly assisted by midwife/village midwife. The percentage of home deliveries which were assisted by midwife/village midwife is around 34 per cent of the total home deliveries. This statistics is alarming because most of maternal deaths in Indonesia occur when deliveries are assisted by traditional birth attendants instead of skilled attendants (Analen, 2007). Furthermore, as some studies argue that even midwives may not be skilled enough to handle complications during deliveries (Kosen et al., 2014; Ronsmans et al, 2009; Webster, 2012), the above statistics may be much more alarming than they

seem and might be the plausible reason behind the recent increasing trend in Indonesian MMR.

Delivery care by socioeconomic characteristics

In 2012, only slightly more than half (57 per cent) of Indonesian mothers gave birth at health facility[10] (Figure 3. 2). The descriptive statistics presented in Table 3.1 shows that living in urban area, more household wealth, higher education of the woman and her partner seem to be strongly associated with delivery at health facility while problem in accessing health facility and complications during pregnancy do not show very strong associations. Details on the percentage of delivery at health facility according to socioeconomic characteristics as presented in Table 3.1 are as follow.

Facility-based delivery: First, only around 39 per cent of women who live in rural areas gave birth at a health facility while the percentage of their urban counterparts is much higher at around 78 per cent. Second, only around 26 per cent of women who were in the poorest wealth category gave birth at health facility whereas around 87 per cent of women in the richest wealth category gave birth at a health facility. Third, only around 21 per cent of women with no education delivered at health facility while around 81 per cent of women with higher education (12 years of schooling and above) delivered at health facility. Fourth, women in younger age have lower percentage of having delivery at a health facility compared to women in older age. Fifth, while only around 20 per cent of women whose partners do not have any education delivered at health facility, nearly 80 per cent of women whose partners have higher education, delivered at health facility. Sixth, 59 per cent of women who state that they do not have

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[10] Health facility includes hospital, clinic, health center, village health post, delivery post, maternity hospital, maternity home, and health practitioner's clinic.

big problem in accessing health facility, delivered at health facility. Finally, around 65 per cent of women had complication during pregnancy delivered at health facility while 56 per cent of those who did not have any decided to deliver at health facility.

Delivery by skilled attendants: In 2012, only 66 per cent of deliveries in Indonesia were attended by skilled attendants[11]. Table 3.2 presents the percentage of delivery assisted by skilled attendant according to socioeconomic characteristics where we have the following findings: First, around 54 per cent of women who live in rural areas gave birth with assistance from skilled attendants. This is nearly 30 percentage points lower than their urban counterparts where 81 per cent of the women in urban areas gave birth assisted by skilled attendants. Second, while only around 41 per cent of women who were in the poorest wealth category gave birth with skilled attendants, the number rises in better wealth categories with 87 per cent of women in richest category gave birth assisted by skilled attendants. Third, women's education appears to be an important determinant in having delivery assisted by skilled attendants. Only around 27 per cent of women with no education had their deliveries assisted by skilled attendants while 85 per cent of women with higher education had their delivery assisted by skilled attendants. Fourth, women in younger age seem to have lower percentage of having delivery by skilled attendants compared to their older counterparts. Fifth, while only around 28 per cent of women whose partners do not have any education delivered by skilled attendants, 83 per cent of women whose partners have higher education gave birth assisted by skilled attendants. Sixth, nearly 50 per cent of women who state that they have distance problem in accessing health facility had delivery assisted by skilled

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[11] Skilled attendants during deliveries include doctor, obstetrician, midwife, and village midwife. Non-skilled attendants include traditional birth attendant, friend, and relative.

attendants while the percentage among those who do not have big problem in accessing health facility is around 69 per cent. Finally, around 67 per cent of women had complication during pregnancy delivered by skilled attendants while the percentage of those who did not have any complication was 1 percentage point lower at 66 per cent. Overall, socioeconomic characteristics affect the choice of place of delivery and skilled attendants during delivery.

3.4.2 Latest statistics on ANC

In 2012, around 95 per cent of pregnant women have at least one ANC visit (Figure 3.5). However, even though as many as 84 per cent of them have 4 or more ANC visits (Figure 3.5), the percentage of those who followed MoH recommendation of 1-1-2 ANC schedule is considerably lower at 69 per cent (Figure 3.6)[12]. Figure 3.6 shows more detail information of ANC utilization by providers. It indicates that the women who have at least one ANC visit or those who have at least 1-1-2 ANC visits mostly go to midwives or village midwives for the care. Figure 3.6 also shows that obstetrician is the second most popular ANC providers after midwife; and the other small proportions of the women go to doctors and nurses for ANC.

Figure 3.7 provides the information of where women go for the ANC. Public health facilities seem to be the first choice of Indonesian women in accessing ANC. Most of the women, around 44 per cent, go to the public health center. The second most common place to access ANC is the public health post or the public delivery post by around 26 per cent, followed private hospital (including private maternity hospital) and

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[12] ANC coverage of at least 1 visit and at least 4 visits is one of the indicators of MDG5 target 5B (UNICEF, 2008). However, WHO argues that not only the number but also the timing of the ANC is important in order to achieve optimal impact of the ANC treatments; thus, it recommended the 1-1-2 four-visit focused ANC (WHO, 2016a).

government hospital by 9 per cent and 8 per cent, respectively. The other small proportions of the women access the ANC at the private clinic or at home (around 7 and 5 per cent, respectively).

Table 3.5 shows the percentage of women by ANC utilization and socioeconomic characteristics. It suggests that women who live in urban area, those who have higher education, those whose households have more wealth, those who do not have problem in accessing health facility, and those who have complications during pregnancy are more likely to utilize ANC. The details are as follow.

Table 3.5 shows that women who live in urban area were more likely to utilize ANC compared to their rural counterparts. As many as 98 per cent of women had at least 1 ANC visit compared to 93 percent of those who live in rural area; and 78 per cent of women who live in urban area followed 1-1-2 ANC schedule compared to around 68 per cent of those who live in rural area. Table 3.5 also indicates that wealth affects the ANC utilization. Around 89 per cent of women who were in the poorest category had at least 1 ANC visit; while the percentage of those in the richest category was nearly 100 per cent. Similarly, the percentage of women in the poorest category who had at least 1-1-2 ANC is lower at around 58 per cent compared to those in the richest category with 88 per cent. Furthermore, women's education also shows a positive association with ANC utilization. While only 62 per cent of women who do not have any education had at least 1 ANC visit, as many as 85 per cent of women who have higher education had at least 1 ANC visit. Similarly, while only 47 per cent of women who have no education followed 1-1-2 ANC schedule, 84 per cent of women with higher education followed the FANC schedule. Partner's education shows similar trend.

Table 3.5 also indicates that age has inverse U-shape relationship with ANC utilization where women whose age 20-34 years old were more likely to utilize ANC compared to those who were younger (teenager) or older. Women who had big problem in accessing health facility has lower percentage of ANC utilization compared to those who think that they do not have big problem in accessing health facility. Lastly, women who experienced complications or problems during their pregnancies have higher percentage of ANC utilization compared to those without any pregnancy complications.

3.5   Estimation Strategy

3.5.1   Model for estimating the impact of SSN on delivery care

We use the latest wave of the Indonesia Demographic and Health Survey (IDHS), i.e. IDHS 2012, to investigate the impact of the SSN on delivery care utilization in Indonesia[13]. The analysis of the relationship between SSN and delivery care utilization of facility-based delivery is based on the following models:

$$fbd_{ij} = \beta_0 + \beta_1 \, card_{ij} + X_{ij}\gamma + P_j + \varepsilon_{ij} \quad \text{(Eq. 3.1a)}$$

The dependent variable fbd_{ij} is the dummy variable =1 if a women i who lives in province j delivered at health facility[14], and =0 otherwise. The variable of interest is $card_{ij}$, that takes the value =1 if the woman is covered by the SSN and =0 otherwise. X_{ij} is a vector of controls that include individual, household, and community-level characteristics that includes the woman's education and age, birth order, complication during pregnancy, partner's education, household's wealth, distance problem in

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[13] The variable that catches whether or not a woman is covered by the SSN (health card/JPK gakin/Poor card/Jamkesmas) just became available in IDHS 2012.
[14] Health facility includes hospital, clinic, health center, village health post, delivery post, maternity hospital, maternity home, and health practitioners' clinic.

accessing health facility, the availability of health facility and health personnel in the region, rural-urban classification, and east-west regional classification. P_j is the province fixed effect and ε_{ijk} is the error term that represents the unobserved characteristics of women which are assumed to be independently and identically distributed (i.i.d).

The analysis of the relationship between SSN and delivery care utilization is based on the following models:

$$skilled_{ij} = \beta_0 + \beta_1 \, card_{ij} + X_{ij}\gamma + P_j + \varepsilon_{ij} \quad \text{(Eq. 3.1b)}$$

where the dependent variable $skilled_{ij}$ is the dummy variable =1 if the women was assisted by a skilled attendant during delivery[15]. The above equations are estimated with OLS regressions. As the dependent variables are binary variables, we also estimate the impact of SSN on delivery care utilization using logistic regressions. We use clustered standard errors at provinces across all estimations to allow the errors to be correlated within the same province since the unobservable of women who live in the same province (e.g. cultural and traditional factor) is likely to be correlated.

To deal with an endogeneity problem that may arise in our main variable,$card$, we apply the 2SLS estimations. Our main variable may have selection bias problem since the distribution of SSN cards may not be random in the first place, as SSN intends to target poor and near-poor households. The endogeneity may come from omitted variable problem when the covariance between the unobservable and our main variable card is not equal to zero. For example, the relationship between the household head and the local or village officials that is not observable (hence omitted in the model) might

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[15] Skilled attendants include doctor, obstetrician, nurse, midwife, and village midwife.

affect the decision of the woman in the household to utilize delivery care (good relationship with local officials might lead to better exposure to government program and maternal health knowledge). At the same time, the unobservable might also have a positive relationship with the possibility of the household is enrolled in the SSN due to the good relationship between the household head and the local officials.

The proposed instruments in the 2SLS estimations are: (i) the percentage of female civil servants in non-health sector (i.e. total female civil servants minus those who work in health sector) per province and (ii) number of islands per province. These instruments should be correlated with the possibility of a women to be covered by the SSN while at the same time should not correlated with our dependent variables (whether the woman delivered at health facility and whether the woman was assisted by skilled attendant during delivery). The number of female civil servants in the province should be correlated with the possibility that a woman is covered by SSN because the health cards are distributed by the village or local officials based on certain criteria reflecting poverty (Harimurti et al., 2013; Johar, 2009); and female are argued to be more accountable (and less likely to be associated with corruption) (Hossain, Musembi, & Hughes, 2010; Swamy A. et al., 2001) and more likely to support programs that particularly useful for women (Chattopadhyay & Duflo, 2004). Hence, a larger number of female civil servants should make the distribution of the SSN meet the target population better (positive association). For the exogeneity condition, some may argue that the number of female civil servants should care more about taking care of health facility and hence in turn promote the delivery care utilization. Therefore, in our instrument, we exclude the female civil servants who work directly in health sector so

that the female civil servants that we take into account in our regressions are those whose work has nothing to do with health sector (not taking care or health facility or disseminating health care information). In this way, our instrument of percentage of female civil servants in non-health sector per province is unlikely to directly affect a woman's decision to deliver at health facility or to deliver by skilled attendant.

For second option of the instrument, number of islands per province, the relevance condition based on the rationale that the distribution of the health card program might be more challenging for a province that consists of a larger number of islands, hence in this way, the number of islands should be negatively correlated with the possibility of a woman to be covered by the SSN. Or, another theory is that greater number of island in the province could mean more isolated areas far from the main cities hence more people need health card, i.e. the quota of health card will be higher in this province. In this way, number of islands per province will be positively correlated with the possibility of being covered by the SSN. For the exogeneity condition, the number of islands in the province (which is a geographical characteristic) is intuitively has nothing to do with maternal care and hence unlikely related directly to the woman's decision to utilize delivery care.

Equation (3.2') and equation (3.2a-b) below describe our IV estimates:

The first stage of our IV estimates is

$$card_{ij} = \tilde{\beta}_0 + X_{ij}\tilde{\gamma} + \pi \tilde{Z}_j + \tilde{\varepsilon}_{ij} \qquad \text{(Eq. 3.2')}$$

where Z_j is the vector of the instrument set; and the second stage is

$$fbd_{ij} = \beta_0 + \beta_1 \widehat{card}_{ij} + X_{ij}\gamma + \varepsilon_{ij} \qquad \text{(Eq. 3.2a)}$$

$$skilled_{ij} = \beta_0 + \beta_1 \widehat{card}_{ij} + X_{ij}\gamma + \varepsilon_{ij} \qquad \text{(Eq. 3.2b)}$$

where $\widehat{card}_{ij}$ is the predicted variable of health card ownership.

Hence the above equations are trying to answer whether the following hypotheses are true:

Hypothesis 3.1a (H3.1a):   Women who are covered by the health card program are more likely to deliver at health facility; and

Hypothesis 3.1b (H3.1b):   Women who are covered by the health card program are more likely to deliver under the care of skilled attendants.

3.5.2   Model for estimating the impact of SSN on ANC

To estimate the impact of the SSN on ANC utilization, we construct the following two models:

$$ANC\_visit_{ij} = \beta_0 + \beta_1 \, card_{ij} + X_{ij}\gamma + P_j + \varepsilon_{ij} \qquad \text{(Eq. 3.3a)}$$

$$ANC112_{ij} = \beta_0 + \beta_1 \, card_{ij} + X_{ij}\gamma + P_j + \varepsilon_{ij} \qquad \text{(Eq. 3.3b)}$$

Equation 3.3a uses a binary variable of at least 1 ANC visit as the dependent variable while the dependent variable in Equation 3.3b is a binary variable of at least 1-1-2 four-visit ANC following the MoH Indonesia recommendation. The dependent variable ANC_visit takes the value of 1 if a woman had at least 1 ANC visit and 0 otherwise; while the dependent variable $ANC112$ takes the value of 1 if a woman had at least 1-1-2 ANC and 0 otherwise. As in the previous section, the variable of interest of the two equations is variable *card* which takes the value of 1 if a woman is covered by the

health card and 0 otherwise. We use clustered standard errors at provinces across all estimations to allow the errors to be correlated within the same province.

Both models take into account the same control variables of socioeconomic characteristics X and provincial fixed effect P_j. The controls in this model include the woman's (individual) characteristics such as women's education, age, the number of children ever born as a proxy for parity, and complications during pregnancy; household's characteristics such as household wealth, household assets (such as electricity, television, vehicle ownership, etc.), and partner education; and community characteristics such as rural-urban classification, western-eastern region, and distance problem in accessing health facility.

The above models aim to answer whether the following hypotheses turn out to be true:

Hypothesis 3.2a (H3.2a): Women who were covered by the health card program are more likely to have at least one ANC visit during their pregnancies.

Hypothesis 3.2b (3.2b): Women who were covered by the health card program are more likely to follow the 1-1-2 FANC schedule.

3.6   Empirical Results

3.6.1   *The impact of social safety net on delivery care*

Facility-based delivery: Table 3.6 and Table 3.7 show the impact of SSN on facility based delivery from OLS and Logistic regressions, respectively. The results also show that the impact of SSN on facility-based delivery is greater among women in the poorest category. The coefficients from the OLS and OLS-FE results imply that the

impact of SSN in promoting facility-based delivery is 2 to 3 percentage points while the impact for poorest category is greater, ranging from 4 to 5 percentage points (Table 3.6). The marginal effects of the logistic regressions suggest a similar magnitude of impact of the SSN card on facility-based delivery (Table 3.7).

The coefficients for the control variables show the expected signs. Women's education is positively associated with the choice to deliver at health facility. Women who have secondary and higher education are more likely to deliver at health facility compared to those who do not have any education. Similarly, partner's education is also positively associated with wife's choice to deliver at health facility. Furthermore, women who deliver at later age (35 years old and above) are also more likely to deliver at health facility compared to those whose age is between 20 and 34 years old. This might be driven by the awareness of higher risk involved in delivering a baby at older age. For similar reason, women who had complication during pregnancy are also found to be more likely to deliver at health facility compared to those who did not experience complication during pregnancy. In addition, birth order is found to significantly affect the choice of place for delivery where women who deliver for the first time are more likely to deliver at health facility. While distance to a health facility did not significantly affect the choice of place for delivery, living in urban area is found to be a significant determinant. Women who live in an urban area are found to be more likely to deliver at health facility than their rural counterparts. Finally, household's wealth is found to significantly affect the choice to deliver at health facility.

Utilization of skilled attendants: Table 3.8 shows the impact of SSN on assistance during delivery from OLS and logistic regressions. The OLS results suggest

that the impact of SSN on delivery by skilled attendant appears to be positive and statistically significant among poorer or poorest women after the provincial fixed effects were taken into account (Table 3.8 column 5-6). The coefficients from OLS-FE and logistic-FE estimates imply that SSN increased the probability of delivery by skilled attendant by 3 percentage points among poorer-and-poorest women while the impact on those women in the poorest category is greater, at 4 percentage points. The results for the control variables are similar with the ones in Table 3.7.

Table 3.9 panel A shows the first stage results of the 2SLS estimates. The results from the first stage suggests that the number of female civil servants in non-health sector is not significantly associated with higher probability of being enrolled in the health card program (our datasets do not have enough evidence to support our argument of positive relationship between the number of female civil servants in non-health sector and the probability of being enrolled in health card). This could be the result of the exclusion of female workers who work in the health sector. Or, the insignificant coefficient might be because there is no significant difference in the attitude towards corruption between women and men in Indonesia as argued by Alatas et al. (2009). Alatas et al. (2009) also found similar findings that there is no evidence of less corruptibility of women, in two other countries, India and Singapore. Another explanation is that women will have impact on corruption reduction only when they are in the position of those who formulate policies (i.e. those women in parliament or female politicians) while those work in non-leader positions have no significant association with accountability (Jha, C. K. & Sarangi, S., 2015).

Panel B of Table 3.9 shows the results of the second stage of the 2SLS estimates. The results indicate that the impact of SSN cards on facility-based delivery although positive, was not significantly different from zero while the impact of SSN cards on delivery assisted by skilled attendant remains consistently positive and significant across all estimations with different instrument set. Furthermore, the 2SLS estimations suggest higher magnitude of impacts of the SSN on delivery care utilization compared to the OLS and logistic estimates. The 2SLS estimates suggest that the impact of SSN on delivery by skilled attendant ranged from 19 to 24 percentage points. Furthermore, Table 3.9 also shows the results of the weak IV test and Hansen J-stat that supports the validity of our instruments. The weak IV tests show F-stats>10 suggesting that our instruments are relevant while the p-values of the Hansen J-stat are greater than 0.1 implying that we cannot reject the null that the instruments set is exogenous.

This magnitude of impacts of the SSN on delivery care utilization suggested by the OLS and Logit estimates (4-5 percentage points among poorer and poorest women) are relatively small compared to previous studies. Brooks et al. (2017) found the impact of SSN on delivery care utilization in Indonesia was 19 percentage points for facility-based delivery and 17 per cent for delivery by skilled attendant. In Rwanda, the SSN impact on facility-based delivery was around 60 percentage points while the impact of the SSN on skilled birth delivery was found to be more than 80 (logistic estimates) to 160 percentage points (IV estimates) (Lu et al., 2012). In Peru, being covered by the SSN was found to increase the probability of a woman to deliver at health facility by 100 per cent (twice more likely) (Mcquestion, M.J. & Velasquez, A., 2006). Our results from the 2SLS estimates, that suggested an impact of SSN around 19 to 24 percentage

points on the utilization of skilled birth attendant, are more similar to the study by Brooks et al. (2017). Hence, compared to other countries with similar SSN program, Indonesia's health card program seems to have not had optimal impact on delivery care utilization.

Brooks et al. (2017) found significant impact of SSN on both facility-based delivery and delivery by skilled attendant while our 2SLS findings only show significant impact of SSN on delivery by skilled attendant. One of the underlying factors behind the insignificant impact of SSN on facility-based delivery might be that the health card only covers the user fees (or direct cost) of facility-based delivery. Health card does not cover indirect costs such as the transportation cost, food cost, or any incidental cost that follow the decision to deliver at health facility. For example, when a mother delivers at a health facility, the expense will consist of transportation cost when taking the mother to hospital. Furthermore, there will be transportation cost for family member (for example the husband) who waits for and takes care of the mother during the recovery until discharge time in the following 2 or 3 days. Hence, there will be some additional transportation costs for the husband to go back and forth from home to the hospital, food costs, and maybe also some opportunity costs of leaving his job at home (if for example he works in the agricultural area near the house). These indirect costs are not covered by the health card and hence could be the impediment in utilizing facility-based delivery among poor women.

Cultural values, such as gender preference of the skilled birth attendant and privacy issue, could also affect maternal health care utilization particularly the facility-based delivery (Kosen et al., 2014). Women often have preference on female nurse,

doctor, or midwife over their male counterparts during delivery. However, the women's expectations to deliver by female skilled birth attendant often cannot be met particularly when they go to a modest local health facility where available skilled attendants are still very limited. Furthermore, women and their families expect privacy during delivery. Low-quality or modest local health facilities often cannot provide enough privacy to women and their family during delivery, for example, no curtains between beds of women while in labor. Belton, Myers, & Ngana (2014) found that lack of privacy to deliver in the local facility was one of the reasons that have discouraged local women to deliver in the sub-district clinics in eastern Indonesia. This unaddressed cultural aspect might become one of the impediments in improving utilization of facility-based delivery.

To improve health services, government has deployed some health personnel to increase the number of health personnel working in local health facilities. These health personnel are normally not from the same locality and thus may have ethno-linguistic problem with pregnant women. Local women feel more comfortable to deliver with someone who understands their traditional values and local language. Hence, the ethno-linguistic problem may hinder women to deliver at health facility.

Furthermore, perception problem might also become another factor that impedes utilization of facility-based delivery. Preference to deliver by traditional birth attendants has been a long family tradition for some local women particularly those from ethnic minority (Analen, 2007; Brooks et al., 2017). These women have inherited perception of safety and comfort as well as trust to deliver with the assistance from traditional birth attendant. Therefore, this long-inherited family perception is another impediment of improving access to facility-based delivery.

In general, the results of OLS, logistic, and 2SLS estimates indicate that the impact of access to SSN on delivery care utilization is positive, particularly consistent for delivery by skilled attendant. Hence, our result could only provide weak evidence to support *H3.1a that women who are covered by the health card program are more likely to deliver at health facility*, since we have only significant results from OLS and logistic estimates while the 2SLS estimates show insignificant results. However, our results provide strong evidence to support *H3.1b that women who are covered by the health insurance or the health card program are more likely to deliver under the care of skilled attendants.*

3.6.2 *The impact of social safety net on antenatal care*

Table 3.10 indicates that the SSN is positively associated with ANC utilization, both ANC utilization of at least 1 ANC visit and the compliance to 1-1-2 ANC. After controlling for socioeconomic characteristics of the women, the results suggest that women who were covered in the SSN scheme is around 2 to 3 percentage points more likely to do at least 1 ANC visit, and 3 percentage points more likely to comply the 1-1-2 ANC visits.

The coefficients of the control variables show expected signs, suggesting expected associations between the socioeconomic variables with ANC utilization. Women's and partners' education consistently shows positive relationships with ANC utilization. Women who were better educated, or whose partners were better educated, are more likely to have at least 1 ANC visit and to comply with 1-1-2 ANC schedule. The result also suggests that women who were older are more likely to utilize ANC compared to those in teenage age. Furthermore, women who had a larger number of

children (higher parity) are found to be less likely to utilize ANC while those who had problems (complications) during pregnancies are found to be more likely to utilize ANC. The results also suggest that women with more wealth and those who live in western regions are more likely to have at least one ANC and to follow 1-1-2 schedule. Distance problem appears to negatively affect the utilization of at least one ANC visit but not the 1-1-2 ANC utilization. In addition, living in urban area appears to be positively associated with the utilization of at least one ANC visit but not the 1-1-2 ANC.

Table 3.11 implies that the impact of the SSN on ANC utilization is the strongest among the poorest women. The result suggests that being covered in one of the SSN schemes increases the likelihood of women who were in the poorest wealth category to utilize at least one ANC by 5 percentage points (compared to 3 percentage points in the results from overall samples in Table 3.10). In addition, the result in Table 3.11 also suggests that the SSN increases the likelihood of poorest women to comply with 1-1-2 ANC schedule by 6 percentage points (compared to 3 percentage points in the results from overall samples in Table 3.10). The signs of coefficients of the control variables indicate the same direction of relationships as in Table 3.10.

The 2SLS estimates suggest that being covered by the SSN scheme does not significantly affects both the utilization of at least 1 ANC visit and the 1-1-2 ANC visits (the coefficient is positive but not significant) (Table 3.12). This finding is similar with that of a study by Smith & Sulzbach (2008) that found that the impact of SSN on ANC is not statistically significantly different from zero in Senegal. They argued that the reason behind this finding is because the ANC utilization rate in Senegal is already high (more than 90 per cent) which is similar to ANC utilization rate of Indonesia (where women who utilize at least 1 ANC visit is around 95 per cent). Overall, the regression

results provides weak support to *H3.2a* that *women who were covered by the SSN are more likely to have at least one ANC visit during their pregnancies* and *H3.2b* that *women who were covered by the SSN are more likely to follow the 1-1-2 FANC schedule* since we find significant evidence only from OLS results but not from the 2SLS estimates.

3.7 Conclusion and Policy Recommendation

This chapter investigates how the SSN coverage, i.e. the health card program, affects the delivery care and ANC utilization. The results from the OLS and logistic estimates indicate that although the impact of SSN on delivery care utilization is positive and significant, the suggested magnitude of impact is small (among the poorest women, the impact is estimated around 4-5 percentage points for facility-based delivery and 4 percentage points for delivery by skilled birth attendant). The results from the 2SLS estimates, however, only confirmed the significant and positive impact of the SSN on the utilization of skilled birth attendants (the impact was found to be not significant on facility-based delivery). The 2SLS estimates suggest that the impact of SSN on delivery by skilled attendant was around 19 to 24 percentage points. Even though the 2SLS estimates suggest a higher magnitude of impact, comparing the impact of the SSN in Indonesia and the impact of the SSN in other countries in encouraging delivery care, our results indicate that the SSN is not yet optimal in encouraging the delivery care in Indonesia. For example, in Peru, being covered by the SSN was found to increase the probability of a woman to deliver at health facility by 100 per cent (twice more likely) (Mcquestion, M.J. & Velasquez, A., 2006). In addition, in Rwanda, the impact of the SSN on facility-based delivery was around 60 percentage points while the

impact of the SSN on skilled-birth delivery was more than 80 percentage points (Lu et al., 2012).

Furthermore, the results indicate that the impact of the SSN on ANC utilization is found to be the strongest among the poorest women. We found that being covered by the SSN increases the likelihood of poorest women to have at least 1 ANC visit by 5 percentage points. In addition, the results suggest that the SSN increases the likelihood of poorest women to have at least 1-1-2 ANC visits by 6 percentage points. The results of the 2SLS estimates, however, suggest that the impact of SSN on ANC utilization is not significant. This finding is similar with the finding from a study by Smith & Sulzbach (2008) that found that the impact of SSN on ANC is not significant in Senegal due to already high level of ANC utilization in that country (ANC utilization in Senegal is more than 90 per cent which is similar to Indonesia's utilization rate).

Based on our findings, we would like to recommend the following to policies to help improve delivery care utilization. Firstly, to formulate a better benefit package that covers transportation cost that might increase the effectiveness of the SSN, i.e. health card, particularly to promote facility-based delivery as the results from the 2SLS estimates indicate that the health card improves access to skilled birth attendant, but not facility-based delivery. This can be done, for example, by providing free transportation to take the pregnant mother from the house to the hospital, or by covering transportation cost for the ambulance or any other transportation needed to take the pregnant mother to the hospital. In this way, the new benefit package will not only covers the user fees (or direct cost) of the delivery but could also reduce the indirect cost (in this case transportation cost) that incurred during delivery at health facility which is not covered

in the current health card benefit package. To mitigate impediments from cultural values and perceptions, we would like to recommend prioritizing recruitment and deployment of skilled health personnel from the same ethnic group, same locality, or health personnel that speak local language to work in the local health facilities and also to hire more female skilled personnel. To further bridge the cultural gap, non-local health personnel should be briefed with knowledge of local traditions and cultural values and also gradually be taught local-language to mitigate the communication problem. Furthermore, local health personnel should work together with the local village head and officials to continuously spread the importance of utilizing facility-based delivery to avoid maternal deaths and raise the awareness of the danger to deliver by traditional birth attendant.

Furthermore, as the finding suggests that reducing the out-of-pocket expenditure could improve access of poor women to delivery care as well as ANC; secondly, we recommend the local governments to provide its own local SSN program of maternal care (to compliment the central government's health care) that targets those poor pregnant women who currently are not covered by the national SSN (due to the current poor coverage of the health card). This local SSN program of maternal care could be carried out effectively by the district governments since they have more information about those pregnant women in the eligible households that are not yet covered by the central government program's SSN. Under this local SSN, all costs associated with maternal care should be covered, including direct cost, transportation cost, and other incidental costs conditional to utilizing delivery care and ANC services. Additionally, to improve ANC coverage, the district government could periodically conduct one-day

free ANC service program (for example once a month) that is conducted in each village hall. Pregnant mother could come and receive free ANC services from the health providers during the program. This program could encourage poor women to come for the free ANC services since this program is free of charge (hence reducing the out-of-pocket expenditure for ANC) and located nearby (in the village hall).

CHAPTER 4

SUMMARY AND POLICY IMPLICATIONS

Reducing the number of maternal deaths remains an unfinished agenda in the Millennium Declaration. The MDG5 target of "reducing the maternal mortality ratio (MMR) by three quarters between 1990 and 2015," was not achieved by the 2015 deadline. The MDG5 was replaced by SDG Target 3.1 "reducing the global MMR to less than 70 per 100,000 live births by 2030". This dissertation explores the factors affecting the uptake of reproductive health services such as family planning, antenatal care, and delivery care, which according to the WHO are strategies in decreasing maternal deaths.

The focus is Indonesia because this country has one of the highest MMR in Southeast Asia and where MMR did not decline fast enough to hit the MDG5 target for Indonesia of 102 per 100,000 live births. The latest statistics in 2012 is 359 per 100,000 live births. The decentralization of the government in 1999 and the establishment of social safety net (SSN) of health insurance for the poor, i.e. health card, that started in 1994, are two important policies believed to have had a significant impact on women's decision to adopt reproductive health practices.

This dissertation has two main chapters that explore the impacts of the two policies. Chapter 2 investigates the impact of decentralization on the uptake of contraceptives and the linkage between decentralization and the inequality in delivery care utilization between the western and the eastern regions in Indonesia. Chapter 3 investigates on the effect of enrollment on the health card program on the uptake of

delivery care (facility-based delivery and utilization of skilled birth attendants) and antenatal (ANC) visits.

4.1 Main Findings

Chapter 2 assesses whether the government decentralization, specifically the decentralization of the National Family Planning Coordinating Board (BKKBN) in 2004, has affected the effectiveness of FP program in Indonesia. Following the decentralization of the BKKBN, the authority of BKKBD (Regional Family Planning Coordinating Board) is delegated away from the central government (BKKBN) to the district government offices. The general finding is that the devolution of the authority of the BKKBD has led to the decline in the effectiveness of the two main instruments of the FP program (FP fieldworker visit and FP information, education, and communication (IEC)) in promoting contraceptive use among women. The main pathways are the absolute decline in the number of the FP fieldworkers and the decline in the coverage of their house-to-house visits as well as the decline in the intensity of the FP IEC after the decentralization. After the decentralization, the BKKBD was either abolished and merged into other units in the district government offices (such as welfare unit) and thus funds that were earlier allocated solely for the FP fieldworker visit and FP IEC were then reallocated elsewhere. With the abolition of the BKKBD, the frontline FP services (house-to-house visits of the FP fieldworkers and FP IEC) have diminished in absolute number and intensity (Hull & Mosley, 2009; Kurniawan, Pratomo, & Bachtiar, 2010; Sukamdi, 2011). The regression results show a positive but declining impact of FP fieldworkers and FP IEC on the probability of a woman using contraceptive after the decentralization. This finding supports the arguments in the

previous literature of the negative impact of government decentralization on the implementation of the FP program (Hull & Mosley, 2009; Kurniawan, Pratomo, & Bachtiar, 2010; Lakshminarayanan, 2003; National Research Council & AIPI, 2013; Sukamdi, 2011; UNFPA-Indonesia, n.d).

Chapter 2 also investigates whether the devolution of government has led to a widened inequality in delivery care utilization between the eastern and the western regions. Over the years, it is widely known that the western regions in Indonesia are generally more developed and more rapidly growing compared to the eastern regions. Expectedly, the western region has had a better provision of health care services including maternal care compared to the eastern region (Kosen et al., 2014). After the decentralization, the district governments are responsible in raising their own local revenues and allocate such revenues to finance the provision of local public services including the provision of local health facilities and personnel (Kementerian Dalam Negeri [Ministry of Home Affairs of Indonesia], 2014). Our regression results provide empirical evidence that the inequality in delivery care utilization between the western and eastern regions has widened over the years, particularly in the post decentralization period (especially in terms of facility-based delivery). Possible reason is that in the post decentralization period, the district governments with low revenues (mostly located in the eastern provinces) could have faced financial problems improving the quantity and quality of their health facilities and personnel in their local areas (Green, 2005; Mbate, 2017). Thus, it seems that the inequality in the supply of health facilities and health personnel serves as the underlying factor of the widened regional inequality in maternal health care utilization that has emerged more strongly in the post decentralization period.

Chapter 3 explores whether the health card significantly affects the utilization of delivery care (facility-based delivery and birth skilled attendants) and ANC (1 visit and 1-1-2 visits). Regression results (OLS and logistic estimates) show that the health card coverage increases the probability of a woman to obtain delivery care and ANC and the probability is higher among poor women; while the 2SLS results show that the health card improves poor women's access to skilled birth attendant, but not to facility-based delivery and ANC. A health card decreases the out-of-pocket spending of maternal health care, making it affordable to many women and especially to poor women.

4.2 Policy Implications

Based on our empirical evidence, we present three-point policy recommendations in decreasing maternal deaths. First, findings in Chapter 2 point to the need to once again revitalize FP program through a synchronized effort between the central government and the district government in boosting the contraceptive use. The regression results suggest that FP fieldworker home visits and FP IEC are effective strategies in promoting contraceptive use, but their impacts have declined in the post decentralization period. Coordinated efforts between the district government and national government should be strengthened to avoid the "stand-alone dilemma" of the district government in carrying out the FP program after the decentralization. The implementation of the FP program under the decentralized system is particularly weak in supervision on local performance in carrying out FP program and controlling quality of local FP services as well as in the intensity of FP IEC. Hence, the current implementation of FP program can be improved in several ways. First, instead of giving full discretion to local governments in carrying out FP program in their local areas,

central government should set some standard procedures and performance goals and actively monitors the performance of the local governments in carrying out the FP program. Second, training and capacity building from the central government could help to ensure the quality of the FP services at the local level. In this ways, priority difference and disjuncture on FP program between district and central government can be avoided. Lastly, the current FP campaign of "plan your pregnancy" does not necessarily encourage contraceptive use. FP IEC should be done more intensively with a stronger FP campaign such as "two children is enough" or "two children is better".

Second, the evidence of the widened inequality between the eastern and western regions in Indonesia also highlights the importance of a more inclusive national program and health sector development by building health facilities and increasing health personnel in the eastern regions. Lack of facilities and personnel is an important constraint in improving maternal health care in the eastern region. Since district government revenues are largely necessary to finance individual district health programs, a health subsidy program from the national government particularly to the poor local governments in the eastern regions is necessary. Furthermore, training and capacity building from the central government could help improve the competence of local health personnel (particularly in the eastern regions whose quality of human resources is still low). Good quality local health personnel promote good quality local health services and hence encourage local people to utilize the health care services.

Third, the health card program should be strengthened because it is a program that directly decreases the out-of-pocket spending in obtaining maternal health (i.e., it eliminates direct cost). Given that out-of-pocket expenditure is a serious impediment to

poor women in obtaining maternal health services, it is a reasonable strategy to further expand the SSN program to cover all other costs such as transportation cost and other incidental expenses (for example, through a transportation cost reimbursement) in addition to the free direct cost. An important caveat to this is a more inclusive coverage and better targeting, quality service, and ease of use to better encourage poor women to utilize delivery care and go for ANC visits. Additionally, local governments could provide its own local SSN program of maternal care that targets local poor pregnant women who currently are not covered by the national SSN. Under this local SSN, all costs associated with maternal care should be covered; including direct cost, transportation cost, and other incidental costs conditional to utilizing delivery care and ANC services. Hence, under this scheme the district-specific SSN will work in a similar way as the national SSN in reducing the out-of-pocket spending in accessing maternal care.

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TABLES

Table 1. 1. Maternal Mortality Ratio Around The World and Millennium Development Goal 5 Target

	1990	2013	Percentage Reduction	Accomplished? Y/N
World	**380**	**210**	**45%**	
Sub-Saharan Africa	990	510	49%	N
Latin America	130	74	40%	N
Oceania	390	190	51%	N
Carribean	300	190	36%	N
Asia				
South Asia	530	190	64%	N
Southeast Asia	320	140	57%	N
East Asia	95	33	65%	N
Caucusus and Central Asia	70	39	44%	N

Source: Millennium Development Goals Report 2015

Southeast Asia	1990*	MMR**	Percentage Reduction
Country (year)			
Indonesia (2012)	446	359	**20%**
Thailand (2005)	40	12	70%
Cambodia (2014)	1020	170	83%
Vietnam (2011)	139	67	52%
Philippines (2011)	152	220	**-45%**
Malaysia (2013)	79	25	68%
Lao PDR (2011-2012)	905	357	61%
Myanmar (2015-2016)	453	227	50%

* Maternal Mortality Ratio is modeled estimate from databank.worldbank.org
**National estimate from the latest Demographic and Health Surveys (DHS)
Source: DHS Program and The World Bank

Table 2. 1. Percentage of women who were visited by family planning (FP) fieldworker in the past 6 months, 1987-2012

Year	Visited by FP fieldworker in the past 6 months
1987	17.86
1991*	13.76
1994	25.71
1997	24.98
2002/2003	6.15
2007	5.27
2012	4.87

Note:
Author's calculation from Indonesia Demographic and Health Survey 1987-2012
*the figure might be underestimated because it excluded visit from midwives, BKKBN officials, and PKK (women organization) members.

Table 2. 2. Percentage of women who were exposed to family planning (FP) information, education, and communication (IEC) through mass media, 1987-2012

Mass media	1987	1994	1997	2002	2007	2012
Radio	30.0	25.8	25.3	19.7	11.4	10.0
Television	n.a.	37.9	40.5	45.7	27.0	44.6
Magazine/ newspaper	n.a.	13.7	12.5	15.3	12.4	14.9
Poster	n.a.	10.9	9.0	12.0	13.4	27.8
Pamphlet	n.a.	6.6	5.5	5.9	7.4	14.3
None of the above sources	n.a.	n.a.	57.4	48.0	66.7	45.8

Source: Central Bureau of Statistics, BKKBN, Westinghouse (1989); Central Bureau of Statistics, BKKBN, MoH, MI (1995); Statistics Indonesia, BKKBN, MoH, MI (1998); Statistics Indonesia, MI (2008); and Statistics Indonesia, BKKBN, MoH, ICF International (2013).

Table 2. 3. Percentage of currently married women by methods of contraception in Indonesia, 1987-2012

Method	1987	1991	1994	1997	2002	2007	2012
Not using	52.3	50.3	45.3	42.6	39.7	38.6	38.1
Using (any method)*	47.7	49.7	54.8	57.4	60.3	61.4	61.9
Traditional	3.7	2.6	2.7	2.7	3.6	4.0	4.0
Modern	44.0	47.1	52.1	54.7	56.7	57.4	57.9
Pill	16.1	14.8	17.1	15.4	13.2	13.2	13.6
IUD	13.2	13.3	10.3	8.1	6.2	4.9	3.9
Injectables	9.4	11.7	15.2	21.1	27.8	31.8	31.9
Implants	0.4	3.1	4.9	6.0	4.3	2.8	3.3
Condom	1.6	0.8	0.9	0.7	0.9	1.3	1.8
Female sterilization	3.1	2.7	3.1	3.0	3.7	3.0	3.2
Male sterilization	0.2	0.6	0.7	0.4	0.4	0.2	0.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Note:*this percentage is known as Contraceptive Prevalence Rate (CPR)
Source: DHS Program: Indonesia Demographic and Health Survey 1987-2012

Table 2. 4. Delivery Care Utilization by Province, 2012

Province	Delivery at health facility	Delivery assisted by skilled attendants*
Sumatera		
Aceh	54.97	82.45
North Sumatera	48.66	80.98
West Sumatera	78.73	85.52
Riau	50.63	68.49
Jambi	43.97	59.25
South Sumatera	57.61	72.01
Bengkulu	39.01	72.90
Lampung	64.88	63.00
Bangka Belitung	67.10	75.77
Riau Islands	76.15	88.83
Java		
DKI Jakarta	96.66	95.75
West Java	64.07	54.65
Central Java	76.16	78.66
DI Yogyakarta	94.78	92.02
East Java	85.62	80.54
Banten	59.91	55.00

Table 2.4. (Continued)

Province	Delivery at health facility	Delivery assisted by skilled attendants*
	2012	
Bali and Nusa Tenggara		
Bali	98.36	93.18
West Nusa Tenggara	75.79	67.58
East Nusa tenggara	47.95	50.57
Kalimantan		
West Kalimantan	44.81	62.58
Central Kalimantan	24.27	50.67
South Kalimantan	36.38	57.41
East Kalimantan	63.51	70.00
Sulawesi		
North Sulawesi	58.74	72.13
Central Sulawesi	37.40	44.27
South Sulawesi	49.54	62.04
Southeast Sulawesi	24.47	41.19
Gorontalo	44.41	47.81
West Sulawesi	21.71	31.03
Maluku and Papua		
Maluku	23.44	42.69
North Maluku	24.94	45.13
West Papua	47.31	67.96
Papua	35.82	41.57
INDONESIA	56.83	66.15

Table 2. 5. The Inequality in Delivery Care Utilization between the Eastern and Western Regions 1987-2012: Percentage of Women who Utilize Delivery Care by Region

	Delivery at health facility				
	1987	1994	2002	2007	2012
East	25.78	17.44	22.61	27.34	38.47
West	30.53	20.2	46.33	51.42	68.01
Diff (east-west)	-4.75	-2.76	-23.72	-24.08	-29.54

	Delivery by skilled attendant				
	1987	1994	2002	2007	2012
East	38.81	30.89	45.52	40.13	52.94
West	45.16	42.15	60.02	58.3	74.19
Diff (east-west)	-6.35	-11.26	-14.5	-18.17	-21.25

Table 2. 6. Summary Means and t-tests of Delivery Care by Regional Grouping

	Mean, east (1)	Mean, west (2)	Difference t-test (3)
Delivery at health facility	0.3847 (0.4866)	0.6801 (0.4665)	-0.2954*** (0.0080)
Delivery by skilled attendant	0.5294 (0.4992)	0.7419 (0.4376)	-0.2125*** (0.0080)

Note:

In cols. (1) and (2), numbers in parentheses are standard deviations. In cols. (3), number in parentheses are standard errors.

*Significant at 10%

** Significant at 5%

*** Significant at 1%

Table 2. 7. The impact of decentralization on contraceptive use

	LPM		Logit	
Variables	(1)	(2)	(3)	(4)
After decentralization (after)	0.06*** (0.019)	0.06*** (0.014)	0.07*** (0.024)	0.07*** (0.021)
High decentralized province (high)	-0.04* (0.021)	-0.03 (0.022)	-0.05** (0.020)	-0.05** (0.022)
Interaction (after*high)	-0.01 (0.026)	-0.01 (0.025)	-0.00 (0.025)	-0.01 (0.025)
Controls:				
Woman's education	Y	Y	Y	Y
Woman's age	Y	Y	Y	Y
Number of children	Y	Y	Y	Y
Partner's education	Y	Y	Y	Y
Rural-urban classification	Y	Y	Y	Y
Regional grouping	Y	Y	Y	Y
Province fixed effects (FE)	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Observations	106,702	106,702	106,702	106,702
R-squared	0.085	0.085		

Robust standard errors in parentheses are clustered at provinces

Marginal effects in (3) & (4)

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

(1) (3) highly decentralized if rate > 50%, (2) (4) highly decentralized if rate > 100%.

Table 2. 8. The effectiveness of FP fieldworker visit and FP IEC in promoting
contraceptive use before and after the decentralization.

Variables	LPM	Logit
	(1)	(2)
After decentralization (dec)	0.15***	0.16***
	(0.018)	(0.016)
Visited by FP fieldworker (visit)	0.25***	0.26***
	(0.020)	(0.017)
Interaction1: dec*visit	-0.18***	-0.19***
	(0.020)	(0.020)
Exposure to FP IEC	0.07***	0.07***
	(0.009)	(0.009)
Interaction2: dec*IEC	-0.06***	-0.06***
	(0.010)	(0.010)
Controls:		
Women's age	Y	Y
Women's education	Y	Y
Number of living children	Y	Y
Partner's education	Y	Y
Rural-urban classification	Y	Y
Regional grouping	Y	Y
Province FE	Y	Y
Year FE	Y	Y
Observations	106,702	106,702
R-squared	0.104	0.08

Notes:

Robust standard errors in parentheses are clustered at provinces.

Marginal effects in (2).

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

Table 2. 9. The impact of FP fieldworker visit and FP IEC in promoting contraceptive use (2SLS estimates)

Variables	Contraceptive use	
	(1)	(2)
Visited by FP fieldworker	0.13	
	(0.079)	
Interaction1: after *visit	-0.07	
	(0.073)	
Exposure to FP IEC		0.42
		(0.34)
Interaction2: after *IEC		-0.38
		(0.47)
Controls	Y	Y
Time FE	Y	Y
Weak IV test (F-stat)	46.305	17.504
Hansen J-stat	0.832	0.827
Observations	106,702	106,702

Robust standard errors in parentheses are clustered at provinces
*** p<0.01, ** p<0.05, * p<0.1
(1) FP fieldworker visit is instrumented by number of districts and number of villages per province
(2) FP IEC is instrumented by number of districts and number of villages per province
All estimations control for women's age and education, partner's education, birth order, rural-urban classification, and provincial fixed effects

Table 2. 10. Inequality in delivery care utilization over the years

Variables	Delivery at health facility	Delivery by skilled attendant
	(1)	(2)
East	-0.09*	-0.23***
	(0.049)	(0.049)
Year1 (1987)	(Ref.)	(Ref.)
Year2 (1994)	-0.06	-0.03
	(0.037)	(0.022)
Year3 (2002/3)	0.10***	0.06
	(0.034)	(0.039)
Year4 (2007)	0.13***	0.01
	(0.039)	(0.038)
Year5 (2012)	0.26***	0.13***
	(0.044)	(0.042)
East*year2 (1994)	-0.04	-0.08*
	(0.044)	(0.044)
East*year3 (2002)	-0.20***	-0.07
	(0.045)	(0.048)
East*year4 (2007)	-0.18***	-0.07
	(0.052)	(0.051)
East*year5 (2012)	-0.25***	-0.11**
	(0.054)	(0.052)
Observations	62,970	62,934
R-squared	0.381	0.298

Robust standard errors in parentheses are clustered at provinces

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

All estimations control for women's age and education, partner's education, birth order, rural-urban classification, and provincial fixed effects

Table 2. 11. Inequality in delivery care utilization before and after decentralization

	Dependent variable:	
	Delivery at health facility	Delivery by skilled attendant
Variables	(1)	(2)
Post decentralization (after)	0.16***	0.11***
	(0.032)	(0.039)
East (east)	-0.13***	-0.30***
	(0.038)	(0.033)
Interaction (after*east)	-0.18***	-0.02
	(0.038)	(0.033)
Controls:		
Women's education	Y	Y
Women's age	Y	Y
Birth order	Y	Y
Partner's education	Y	Y
Rural-urban classification	Y	Y
Year dummies	Y	Y
Province FE	Y	Y
Observations	62,970	62,934
R-squared	0.380	0.298

Robust standard errors in parentheses are clustered at provinces

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

Table 3. 1. Percentage of delivery care utilization according to socioeconomic characteristics, 2012

Socioeconomic characteristics	Facility-based delivery		Skilled attendant during delivery	
	Delivery at health facility	Delivery at home	Delivery by skilled attendant*	No skilled attendant**
Type of residence				
Rural	39.04	60.96	53.76	46.24
Urban	77.85	22.15	80.80	19.20
Wealth				
Poorest	26.42	73.58	40.80	59.20
Poorer	52.89	47.11	64.33	35.67
Middle	64.03	35.97	75.34	24.66
Richer	77.23	22.77	81.90	18.1
Richest	87.25	12.75	87.04	12.96
Women's Education				
No education	20.89	79.11	27.01	72.99
Primary	38.16	61.84	49.78	50.22
Secondary	63.68	36.32	73.06	26.94
Higher	80.83	19.17	84.99	15.01
Age				
15-19	45.70	54.30	52.93	47.07
20-34	56.68	43.32	65.88	34.12
35-49	58.81	41.19	68.76	31.24
Partner's education				
No education	19.74	80.26	27.69	72.31
Primary	40.38	59.62	51.00	49.00
Secondary	62.34	37.66	72.24	27.76
Higher	79.79	20.21	83.37	16.63
Distance problem in accessing health facility				
Big problem	41.96	58.04	49.87	50.13
Not big problem	59.04	40.96	68.55	31.45
Complications during pregnancy				
Yes	64.52	35.48	67.34	32.66
No	56.16	43.84	66.08	33.92

Note:
Author's calculation from Indonesia Demographic and Health Survey 2012
* Skilled attendants include doctor, obstetrician, nurse, midwife, and village midwife.
** Includes no assistance, assistance from traditional birth attendant, friend/relative, and other.

Table 3. 2. Women in poorest category by social safety net and place of delivery, 2012.

No social safety net		
	Freq.	Percent
Delivery at health facility	743	24.64
Delivery at home	2273	75.36
Total	3016	100.00
Have social safety net		
	Freq.	Percent
Delivery at health facility	409	30.39
Delivery at home	937	69.61
Total	1346	100.00

Note:

Author's calculation from Indonesia Demographic and Health Survey 2012

Table 3. 3. Women in poorest category by social safety net and assistance during delivery, 2012.

No social safety net		
	Freq.	Percent
Skilled assistance	1191	39.71
No skilled assistance	1808	60.29
Total	2999	100.00
Have social safety net		
	Freq.	Percent
Skilled assistance	579	43.14
No skilled assistance	763	56.86
Total	1342	100.00

Note:

Author's calculation from Indonesia Demographic and Health Survey 2012

Table 3. 4. Summary Means and t-tests of Delivery Care by Social Safety Net Coverage among Poor and/or Poorest Women

	Mean, covered by social safety net (1)	Mean, not covered by social safety net (2)	Difference t-test (3)
Poorest women			
Delivery at health facility	0.3039 (0.4601)	0.2464 (0.4310)	0.0575*** (0.0148)
Delivery by skilled attendant	0.4315 (0.4955)	0.3971 (0.4894)	0.0343** (0.0162)
Poor and poorest women			
Delivery at health facility	0.3954 (0.4890)	0.3650 (0.4815)	0.0304** (0.0125)
Delivery by skilled attendant	0.5083 (0.5000)	0.5040 (0.5000)	0.0043 (0.0129)

Note:

In cols. (1) and (2), numbers in parentheses are standard deviations. In cols. (3), numbers in parentheses are standard errors.

*Significant at 10%

** Significant at 5%

*** Significant at 1%

Table 3. 5. Percentage of women by ANC utilization and socioeconomic characteristics, 2012

Socioeconomic characteristics	At least 1 ANC visit	At least 1-1-2 ANC visits
Type of residence		
Rural	92.94	67.70
Urban	98.33	78.31
Wealth		
Poorest	88.47	57.75
Poorer	96.59	69.03
Middle	97.89	75.05
Richer	99.20	82.46
Richest	99.53	87.56
Women's Education		
No education	62.38	47.37
Primary	92.88	64.94
Secondary	97.59	74.87
Higher	94.84	84.21
Age		
15-19	93.36	56.88
20-34	96.03	73.75
35-49	94.00	72.19
Partner's education		
No education	62.67	48.81
Primary	93.19	65.43
Secondary	97.13	74.48
Higher	98.98	85.20
Distance problem in accessing health facility		
Big problem	87.11	64.29
Not big problem	96.61	73.86
Problems during pregnancy		
Yes	98.08	78.31
No	92.10	65.22

Table 3. 6. The impact of social safety net on facility-based delivery

	Dependent variable: delivery at health facility[1]					
	OLS			OLS-FE[2]		
	all sample	poorer & poorest	poorest sample	all sample	poorer & poorest	poorest sample
	(1)	(2)	(3)	(4)	(5)	(6)
Social safety net card	0.03***	0.05***	0.05***	0.02**	0.03**	0.04**
	(0.016)	(0.014)	(0.015)	(0.011)	(0.011)	(0.014)
Women's education						
no education	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
primary	-0.01	-0.01	-0.01	0.03	0.02	0.01
	(0.019)	(0.017)	(0.019)	(0.022)	(0.019)	(0.022)
secondary	0.08***	0.07***	0.08***	0.12***	0.11***	0.10***
	(0.023)	(0.023)	(0.022)	(0.027)	(0.024)	(0.025)
higher	0.13***	0.12***	0.11	0.17***	0.16***	0.14**
	(0.026)	(0.042)	(0.067)	(0.031)	(0.038)	(0.065)
Age						
<=19	-0.02	-0.02	-0.03	-0.02	-0.04	-0.04
	(0.018)	(0.027)	(0.029)	(0.018)	(0.024)	(0.029)
20-34	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
>=35	0.07***	0.08***	0.06***	0.06***	0.07***	0.05***
	(0.010)	(0.015)	(0.016)	(0.009)	(0.013)	(0.016)
Birth order						
1	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
2-4	-0.06***	-0.08***	-0.08***	-0.05***	-0.07***	-0.07***
	(0.009)	(0.011)	(0.016)	(0.008)	(0.010)	(0.015)
>=5	-0.17***	-0.20***	-0.17***	-0.13***	-0.16***	-0.14***
	(0.020)	(0.022)	(0.024)	(0.016)	(0.020)	(0.026)
Complication	0.06***	0.07***	0.06**	0.06***	0.06***	0.05**
	(0.017)	(0.022)	(0.024)	(0.017)	(0.023)	(0.025)
Partner's education						
no education	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
primary	0.04	0.04	0.04	0.05**	0.05**	0.05**
	(0.023)	(0.025)	(0.022)	(0.023)	(0.025)	(0.021)
secondary	0.08***	0.07***	0.06**	0.10***	0.09***	0.08***
	(0.022)	(0.022)	(0.024)	(0.021)	(0.022)	(0.023)
higher	0.10***	0.07	0.07	0.13***	0.10***	0.09**
	(0.027)	(0.043)	(0.042)	(0.024)	(0.038)	(0.039)
Distance problem	0.01	0.02	0.02	0.01	0.02	0.01
	(0.010)	(0.014)	(0.014)	(0.010)	(0.011)	(0.013)
Urban	0.22***	0.23***	0.22***	0.21***	0.21***	0.20***
	(0.008)	(0.021)	(0.031)	(0.022)	(0.021)	(0.029)

Table 3.6 (Continued)

	Dependent variable: delivery at health facility[1]					
	OLS			OLS-FE[2]		
	all sample	poorer & poorest	poorest sample	all sample	poorer & poorest	poorest sample
	(1)	(2)	(3)	(4)	(5)	(6)
West area	0.19***	0.21***	0.20***	0.19***	0.35***	0.53***
	(0.042)	(0.042)	(0.039)	(0.017)	(0.027)	(0.041)
Wealth						
poorest	(Ref.)	(Ref.)	-	(Ref.)	(Ref.)	-
poorer	0.15***	0.15***	-	0.12***	0.12***	-
	(0.017)	(0.017)		(0.013)	(0.012)	
middle	0.20***	-	-	0.17***	-	-
	(0.021)			(0.018)		
richer	0.27***	-	-	0.23***	-	-
	(0.018)			(0.013)		
richest	0.30***	-	-	0.24***	-	-
	(0.023)			(0.021)		
Constant	0.09***	0.10***	0.10***	0.11***	0.10***	0.10**
	(0.021)	(0.022)	(0.024)	(0.020)	(0.021)	(0.023)
Observations	15,162	7,412	4,329	15,162	7,412	4,329
R-squared	0.298	0.190	0.125	0.356	0.264	0.197

Robust standard errors clustered at provinces in parentheses

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

Note:

[1] Health facility includes hospital, clinic, health center, village health post, delivery post, maternity hospital, maternity home, and health practitioners' clinic.

[2] Provincial fixed effect.

Table 3. 7. The impact of social safety net and other socio-economic factors on facility-based delivery (Logistic regression)

	Dependent variable: delivery at health facility[1]					
	Logit			Logit-FE[2]		
	all sample	poorer & poorest	poorest sample	all sample	poorer& poorest	poorest sample
	(1)	(2)	(3)	(4)	(5)	(6)
Social safety net card[3]	0.03**	0.05***	0.05***	0.02**	0.02**	0.04***
	(0.015)	(0.015)	(0.013)	(0.054)	(0.065)	(0.087)
Women's education						
no education	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
primary	0.06	0.03	0.08	0.33**	0.33*	0.25
	(0.140)	(0.141)	(0.164)	(0.160)	(0.171)	(0.201)
secondary	0.52***	0.49***	0.55***	0.85***	0.90***	0.78***
	(0.165)	(0.159)	(0.169)	(0.162)	(0.174)	(0.207)
higher	0.82***	0.67***	0.69**	1.25***	1.25***	0.94***
	(0.200)	(0.215)	(0.350)	(0.180)	(0.228)	(0.329)
Age						
<=19	-0.11	-0.10	-0.15	-0.13	-0.19	-0.22
	(0.096)	(0.143)	(0.167)	(0.111)	(0.135)	(0.181)
20-34	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
>=35	0.41***	0.46***	0.35***	0.41***	0.45***	0.33***
	(0.057)	(0.081)	(0.102)	(0.055)	(0.077)	(0.107)
Birth order						
1	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
2-4	-0.35***	-0.41***	-0.44***	-0.31***	-0.40***	-0.42***
	(0.048)	(0.057)	(0.085)	(0.049)	(0.067)	(0.095)
>=5	-0.97***	-1.10***	-1.07***	-0.80***	-0.99***	-0.94***
	(0.116)	(0.129)	(0.185)	(0.093)	(0.119)	(0.160)
Complication	0.33***	0.34***	0.33**	0.36***	0.32***	0.27*
	(0.100)	(0.112)	(0.123)	(0.085)	(0.113)	(0.149)
Partner's education						
no education	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
primary	0.29*	0.31**	0.29	0.42**	0.49***	0.44**
	(0.164)	(0.180)	(0.189)	(0.163)	(0.183)	(0.211)
secondary	0.50***	0.46***	0.42**	0.68***	0.77***	0.62***
	(0.153)	(0.168)	(0.206)	(0.164)	(0.185)	(0.215)
higher	0.70***	0.50***	0.50**	0.93***	0.95***	0.72**
	(0.179)	(0.240)	(0.252)	(0.181)	(0.240)	(0.331)
Distance problem	0.06	0.10	0.06	0.03	0.02	0.07
	(0.083)	(0.080)	(0.086)	(0.065)	(0.077)	(0.098)
Urban	1.12***	1.08***	1.10***	1.15***	1.21***	1.14***
	(0.106)	(0.084)	(0.121)	(0.046)	(0.066)	(0.102)

Table 3. 7. Continued)

	Dependent variable: delivery at health facility[1]					
	Logit			Logit-FE[2]		
	all sample	poorer & poorest	poorest sample	all sample	poorer& poorest	poorest sample
	(1)	(2)	(3)	(4)	(5)	(6)
West area	1.02***	1.05***	1.13***	0.51***	0.60***	0.71***
	(0.229)	(0.216)	(0.212)	(0.181)	(0.202)	(0.236)
Wealth						
poorest	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)	(Ref.)
poorer	0.68***	0.70***	-	0.58***	-	-
	(0.077)	(0.076)		(0.059)		
middle	0.87***	-	-	0.77***	-	-
	(0.101)			(0.065)		
richer	1.24***	-	-	1.14***	-	-
	(0.093)			(0.073)		
richest	1.60***	-	-	1.40***	-	-
	(0.142)			(0.092)		
Constant	-2.27***	-2.23***	-2.28***	-2.20***	-2.18***	-2.18***
	(0.196)	(0.220)	(0.245)	(0.220)	(0.241)	(0.273)
Observations	15,162	7,412	4,329	15,162	7,412	4,329

Robust standard errors clustered at provinces in parentheses

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

Note:

[1] Health facility includes hospital, clinic, health center, village health post, delivery post, maternity hospital, maternity home, and health practitioners' clinic.

[2] Provincial fixed effect.

[3] Average marginal effects

Table 3. 8. The impact of social safety net and other socio-economic factors on assistance during delivery

	Dependent variable: delivery by skilled attendant[1]					
	OLS			OLS-FE[2]		
	all sample	poorer & poorest	poorest sample	all sample	poorer & poorest	poorest sample
	(1)	(2)	(3)	(4)	(5)	(6)
Social safety net card[3]	0.01	0.01	0.02	0.02	0.03*	0.04*
	(0.013)	(0.013)	(0.016)	(0.012)	(0.015)	(0.020)
Controls:						
Women's education	Y	Y	Y	Y	Y	Y
Age	Y	Y	Y	Y	Y	Y
Birth order	Y	Y	Y	Y	Y	Y
Partner's education	Y	Y	Y	Y	Y	Y
Distance problem	Y	Y	Y	Y	Y	Y
Urban	Y	Y	Y	Y	Y	Y
West area	Y	Y	Y	Y	Y	Y
Wealth	Y	N	N	Y	N	N
Observations	15,153	7,408	4,327	15,153	7,408	4,327
R-squared	0.198	0.148	0.106	0.247	0.206	0.173
	Dependent variable: delivery by skilled attendant[1]					
	Logit			Logit-FE[2]		
	all sample	poorer & poorest	poorest sample	all sample	poorer & poorest	poorest sample
	(1)	(2)	(3)	(4)	(5)	(6)
Social safety net card[3]	0.01	0.01	0.02	0.02*	0.03*	0.04**
	(0.011)	(0.013)	(0.016)	(0.011)	(0.015)	(0.020)
Controls:						
Women's education	Y	Y	Y	Y	Y	Y
Age	Y	Y	Y	Y	Y	Y
Birth order	Y	Y	Y	Y	Y	Y
Partner's education	Y	Y	Y	Y	Y	Y
Distance problem	Y	Y	Y	Y	Y	Y
Urban	Y	Y	Y	Y	Y	Y
West area	Y	Y	Y	Y	Y	Y
Wealth	Y	N	N	Y	N	N
Observations	15,153	7,408	4,327	15,153	7,408	4,327

Robust standard errors clustered at provinces in parentheses

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

[1] Skilled attendants include doctor, obstetrician, nurse, midwife, and village midwife.

[2] Provincial fixed effect.

[3] Average marginal effects

Table 3. 9. The impact of SSN on delivery care utilization among poorer and poorest women (2SLS estimations)

Panel A. First stage

	Dependent variable: SSN card			
Variables	(1)	(2)	(3)	(4)
Female civil servants	-0.46	-0.31	-0.46	-0.31
in non-health sector	(0.444)	(0.412)	(0.451)	(0.416)
Number of islands		0.00*		0.00*
		(0.00)		(0.00)
Weak IV				
[Crag-Donald Wald F-stat]	22.234	35.804	22.542	38.341
Observations	7412	7412	7408	7408

Panel B. Second Stage

	Dependent variable			
	Delivery at health facility		Delivery by skilled attendant	
Variables	(1)	(2)	(3)	(4)
Social safety net card	0.38	0.18	0.24**	0.19**
	(0.846)	(0.376)	(0.124)	(0.068)
Weak IV				
[Crag-Donald Wald F-stat]	22.234	35.804	22.542	38.341
Hansen J-stat	n.a.	0.784	n.a.	0.627
Observations	7412	7412	7408	7408

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

Robust standard errors clustered at provinces in parentheses.

All estimations control for socioeconomic variables.

(1) (3) Instruments: the percentage of female civil servants (excluding health worker) per province.

(2) (4) Instruments: the percentage of female civil servants (excluding health worker) per province and number of islands per province.

Table 3. 10. The impact of SSN on ANC utilization (all samples)

Variables	at least 1 ANC		at least 1-1-2 FANC	
	LPM	Logit	LPM	Logit
	(1)	(2)	(3)	(4)
Social safety net	0.03***	0.02***	0.03***	0.03***
	(0.006)	(0.005)	(0.010)	(0.010)
Women's education				
No education	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Primary	0.14***	0.02***	0.08**	0.06**
	(0.046)	(0.007)	(0.032)	(0.026)
Secondary	0.16***	0.03***	0.10***	0.08***
	(0.048)	(0.008)	(0.032)	(0.026)
Higher	0.16***	0.05***	0.12***	0.10***
	(0.050)	(0.015)	(0.033)	(0.029)
Women's age				
15-19	(Ref.)	(Ref.)	(Ref.)	(Ref.)
20-34	0.02*	0.01*	0.13***	0.11***
	(0.010)	(0.007)	(0.030)	(0.024)
35-49	0.03**	0.02*	0.16***	0.14***
	(0.011)	(0.009)	(0.029)	(0.023)
Complications	0.02***	0.02***	0.05***	0.05***
	(0.003)	(0.003)	(0.009)	(0.008)
Parity	-0.01***	-0.01***	-0.03***	-0.02***
	(0.002)	(0.001)	(0.003)	(0.003)
Partner's education				
No education	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Primary	0.12***	0.03***	0.10***	0.08***
	(0.025)	(0.006)	(0.035)	(0.026)
Secondary	0.13***	0.03***	0.12***	0.10***
	(0.023)	(0.006)	(0.041)	(0.031)
Higher	0.14***	0.04***	0.16***	0.15***
	(0.026)	(0.011)	(0.044)	(0.035)
Wealth				
Poorest	(Ref.)	(Ref.)	(Ref.)	(Ref.)
Poorer	0.03***	0.01**	0.05***	0.03***
	(0.006)	(0.005)	(0.013)	(0.011)
Middle	0.03***	0.02***	0.09***	0.06***
	(0.006)	(0.006)	(0.013)	(0.012)
Richer	0.04***	0.05***	0.13***	0.11***
	(0.006)	(0.009)	(0.017)	(0.016)
Richest	0.05***	0.06***	0.14***	0.14***
	(0.007)	(0.008)	(0.021)	(0.023)

Table 3.10. (Continued)

Variables	at least 1 ANC		at least 1-1-2 FANC	
	LPM	Logit	LPM	Logit
	(1)	(2)	(3)	(4)
Urban	0.01***	0.01***	-0.00	-0.00
	(0.004)	(0.004)	(0.008)	(0.010)
Distance problem	-0.03***	-0.01***	-0.02	-0.02
	(0.013)	(0.005)	(0.014)	(0.011)
Western region	0.25***	0.06***	0.19***	0.16***
	(0.025)	(0.004)	(0.008)	(0.006)
Observations	14,921	14,921	13,931	13,931
R-squared	0.176		0.114	

Robust standard errors clustered at provinces in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Marginal effects in (2) & (4)
All estimations also control for household assets such as ownership of radio, television, vehicle, and provincial fixed effects.

Table 3. 11. The impact of SSN on ANC utilization (poorer and poorest samples)

Variables	at least 1 ANC visit		at least 1-1-2 FANC	
	poorer & poorest sample	poorest sample	poorer & poorest sample	poorest sample
	(1)	(2)	(3)	(4)
Social safety net	0.03***	0.05***	0.06***	0.06***
	(0.008)	(0.011)	(0.014)	(0.018)
Controls:				
Women's education	Y	Y	Y	Y
Women's age	Y	Y	Y	Y
Complications	Y	Y	Y	Y
Parity	Y	Y	Y	Y
Partner's education	Y	Y	Y	Y
Household wealth				
Household asset				
Urban	Y	Y	Y	Y
Distance	Y	Y	Y	Y
Western region	Y	Y	Y	Y
Province FE				
Observations	7,292	4,247	6,440	3,552
R-squared	0.191	0.215	0.078	0.073

Robust standard errors clustered in province in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3. 12. The impact of SSN on ANC utilization (2SLS estimations)

Variables	at least 1 ANC visit		at least 1-1-2 FANC	
	(1)	(2)	(3)	(4)
Social safety net card	0.52	0.34	1.52	0.40
	(0.804)	(0.264)	(1.424)	(0.368)
Controls:				
Women's education	Y	Y	Y	Y
Women's age	Y	Y	Y	Y
Birth order	Y	Y	Y	Y
Number of children	Y	Y	Y	Y
Partner's education	Y	Y	Y	Y
Distance problem	Y	Y	Y	Y
Urban	Y	Y	Y	Y
Weak identification test				
Cragg-Donald Wald F- stat	22.311	36.974	23.445	38.026
Hansen J-stat	n.a.	0.713	n.a.	0.065
Observations	7354	7354	6495	6495

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

Robust standard errors clustered at provinces in parentheses

(1) (3) Instruments: the percentage of female civil servants (excluding health worker) per province.

(2) (4) Instruments: the percentage of female civil servants (excluding health worker) and number of islands per province

Figure 2. 1. Total Fertility Rate (TFR) and Contraceptive Prevalence Rate (CPR) in Indonesia before and after the decentralization
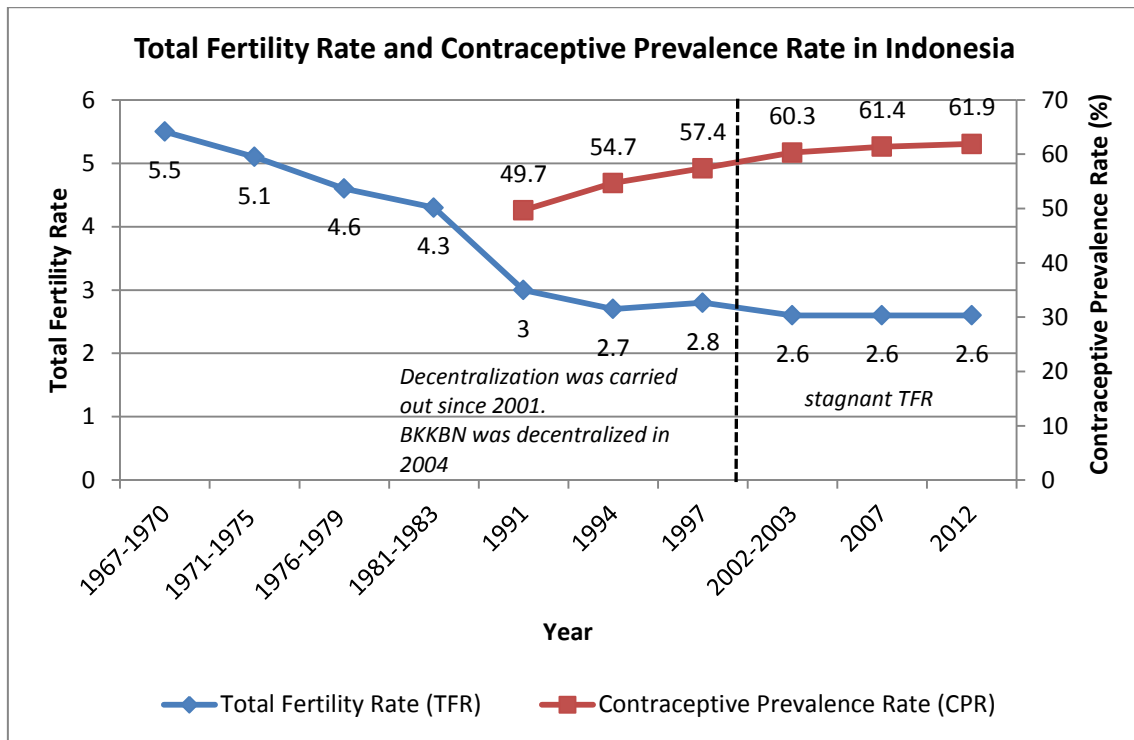
Source: Central Bureau of Statistics, BKKBN, & Westinghouse (1989); Central Bureau of Statistics, BKKBN, MoH, & MI (1992); Central Bureau of Statistics, BKKBN, MoH, & MI (1995); Statistics Indonesia, BKKBN, MoH, & MI (1998); Statistics Indonesia, BKKBN, MoH, & ORC Macro (2003); Statistics Indonesia, & MI (2008); and Statistics Indonesia, BKKBN, MoH, & ICF International (2013).

Figure 2. 2. Delivery Care at Health Facility by Regions, 1987-2012

Delivery at Health Facility in Indonesia by Regions, 1987-2012
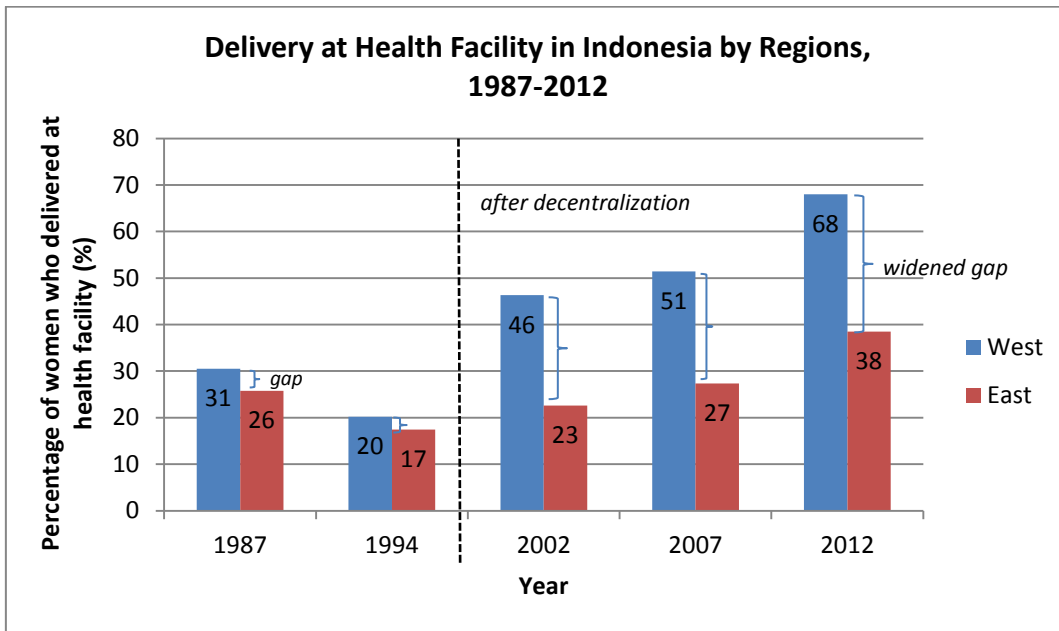
Figure 2. 3. Delivery Care by Skilled Attendants by Regions, 1987-2012

Delivery by Skilled Attendants by Regions, 1987-2012
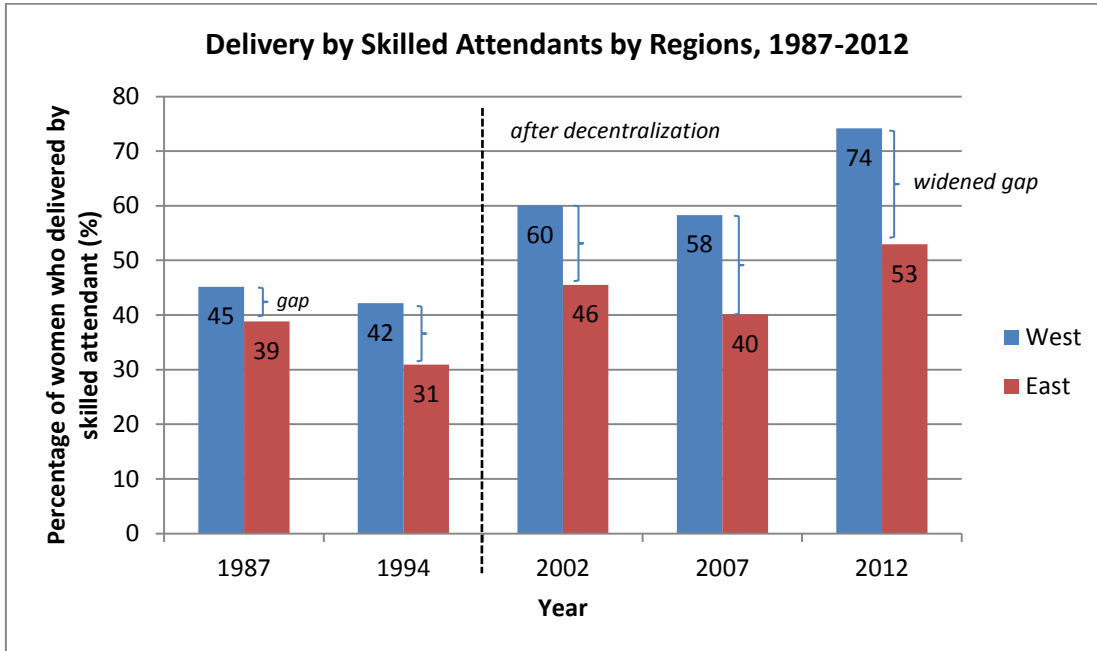
Figure 3. 1. Delivery by skilled attendant, 2012
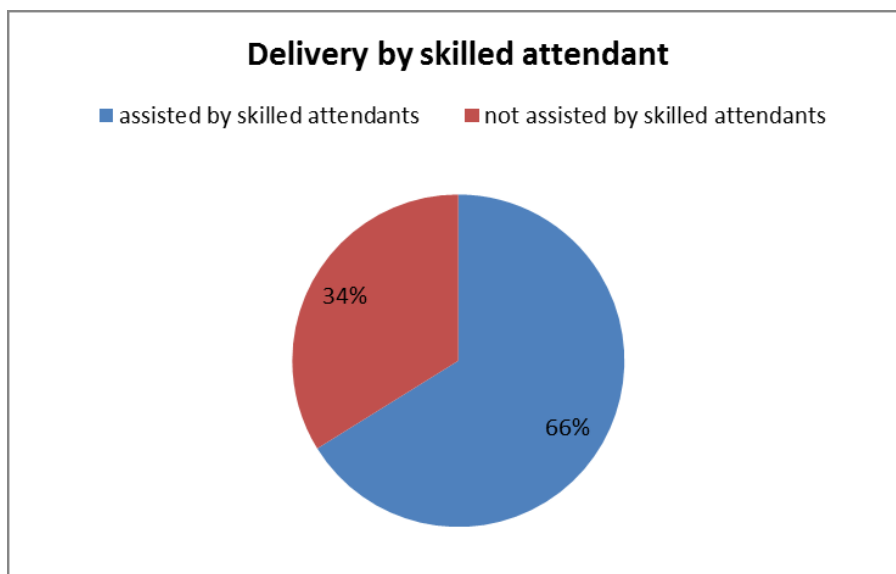
Note: Author's calculation from Indonesia Demographic and Health Survey 2012

Figure 3. 2. Place of delivery, 2012
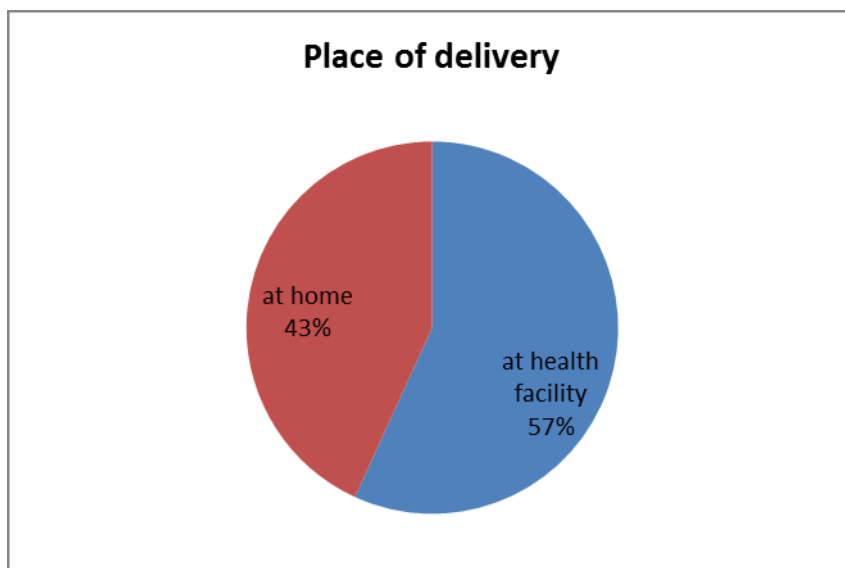
Note: Author's calculation from Indonesia Demographic and Health Survey 2012

Figure 3. 3. Assistance during delivery, 2012
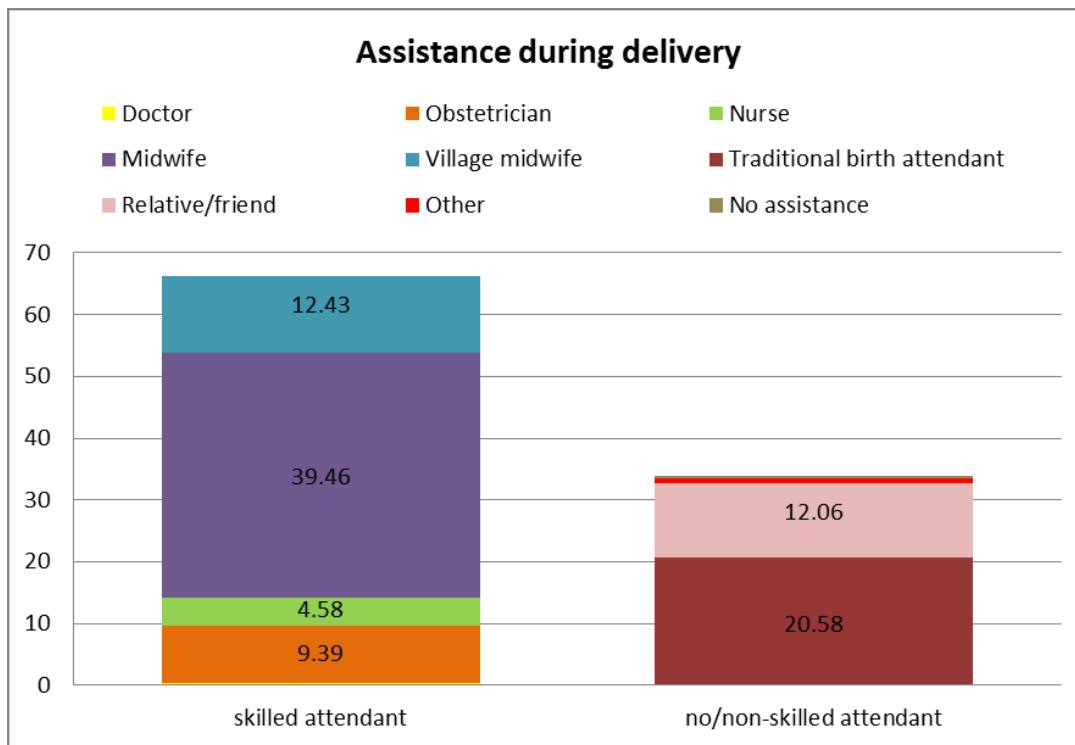
Note: Author's calculation from Indonesia Demographic and Health Survey 2012

Figure 3. 4 Home delivery by assistance during delivery, 2012
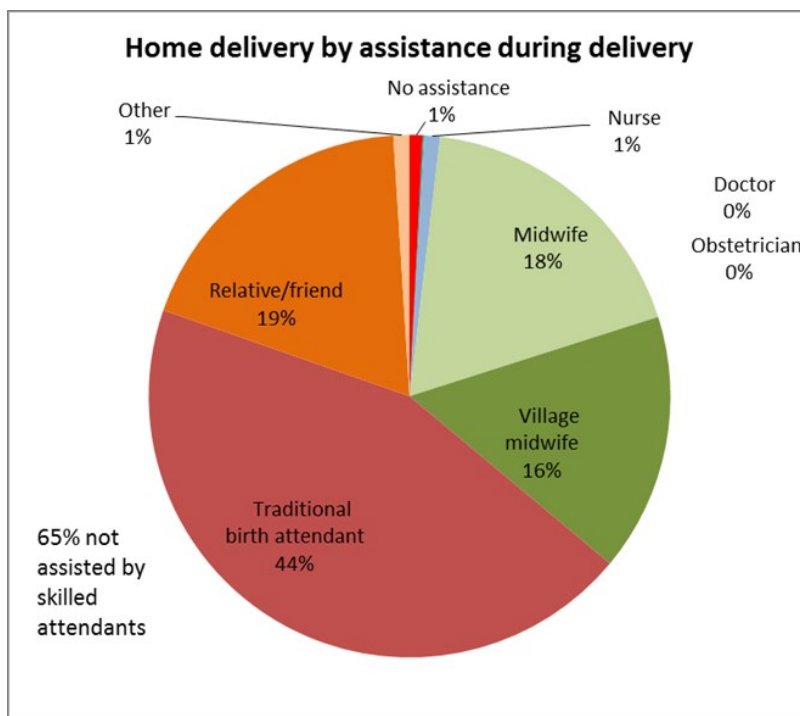
Note: Author's calculation from Indonesia Demographic and Health Survey 2012

Figure 3. 5. Antenatal Care by Number of Visits, 2012
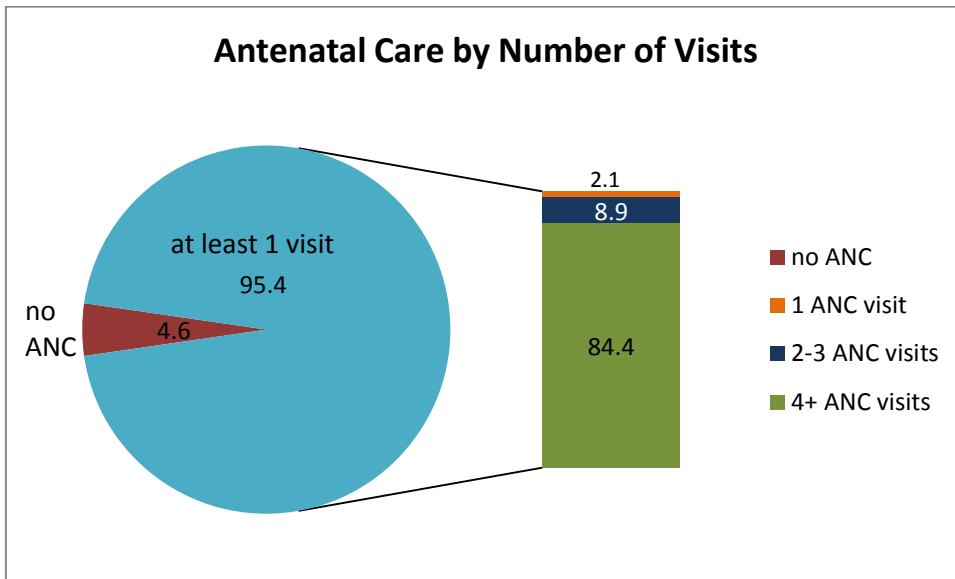
Note: Author's calculation from Indonesia Demographic and Health Survey 2012

Figure 3. 6. Antenatal Care by Providers, 2012
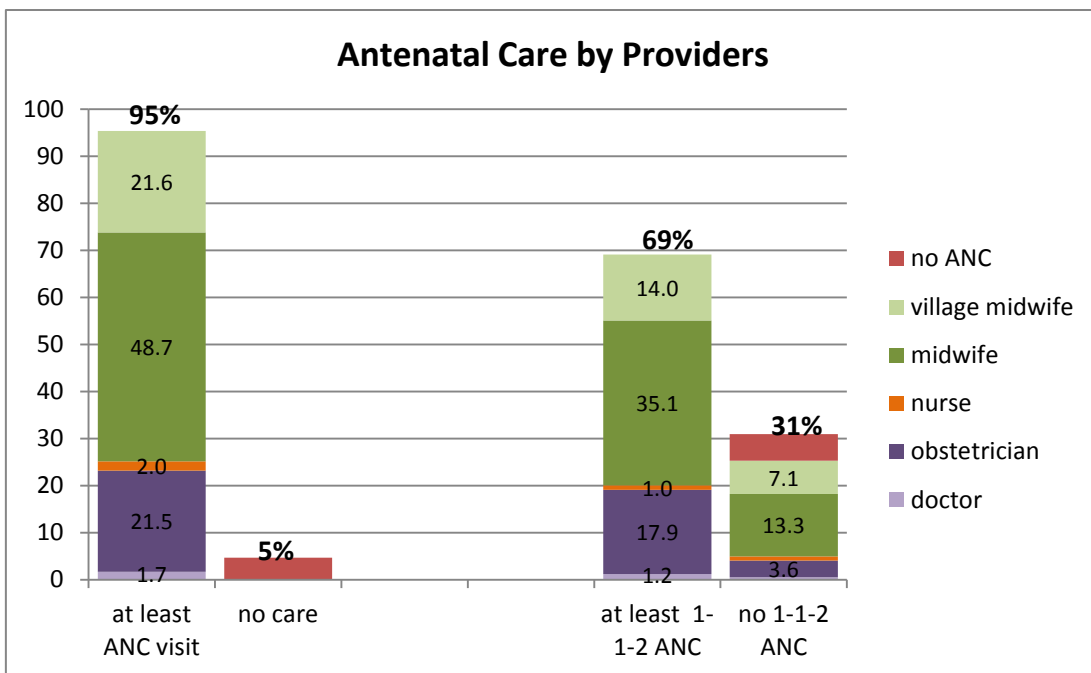
Note: Author's calculation from Indonesia Demographic and Health Survey 2012

Figure 3. 7. Antenatal Care by Place, 2012

Antenatal Care by Place

- private clinic/practitioner
- private maternity home 1%
- 7%
- home 5%
- gov hospital 8%
- private hospital 9%
- public health/ delivery post 26%
- public health center 44%
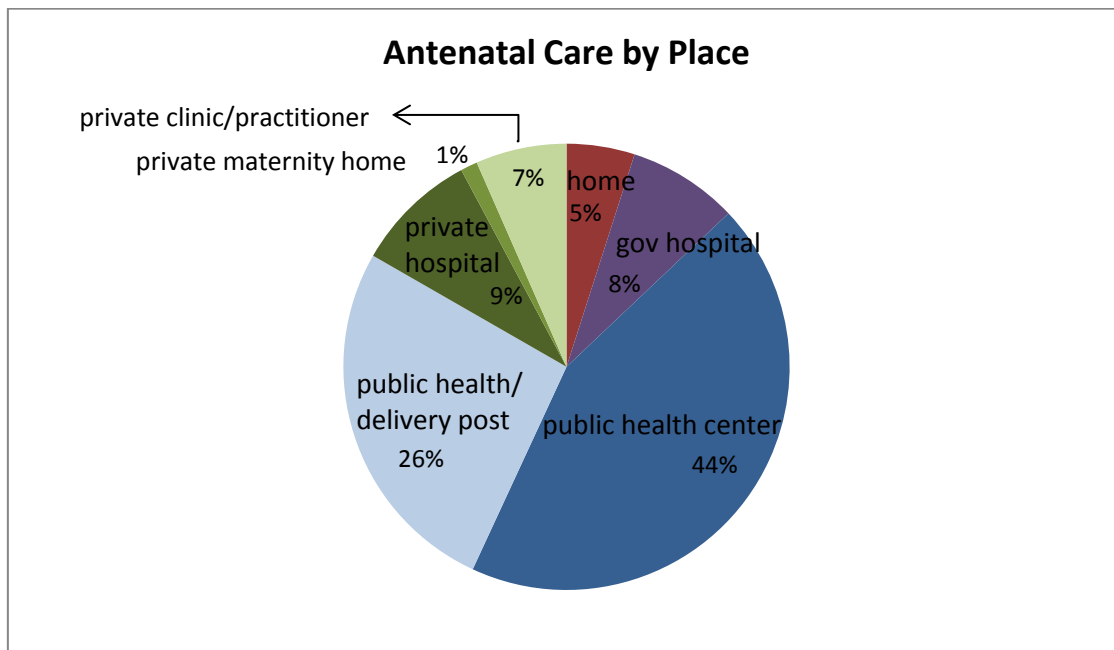
Note: Author's calculation from Indonesia Demographic and Health Survey 2012

APPENDICES

Appendix Table A2. 1. Difference in Difference Illustration

	Before decentralization	After decentralization	After-Before
Highly decentralized	$\beta_0 + \beta_2$	$\beta_0 + \beta_1 + \beta_2 + \delta_1$	$\beta_1 + \delta_1$
Lowly decentralized	β_0	$\beta_0 + \beta_1$	β_1
H-L	β_2 β_2 is the difference in the likelihood of using contraceptives between those who live in highly and lowly decentralized provinces before decentralization.	$\beta_2 + \delta_1$ $\beta_2 + \delta_1$ is the difference in the likelihood of using contraceptives between those who live in highly and lowly decentralized provinces after decentralization.	δ_1 Hence, δ_1 will catch the difference between those who live in highly and lowly decentralized provinces over time.

Recall Eq. 2.1

$$usecont_{ijt} = \beta_0 + \beta_1\, d_t + \beta_2\, highdec_j + \delta_1 \left(d_t * highdec_j\right) + X_{ijt}\gamma + P_j + \varepsilon_{ijt}$$

Appendix Table A2. 2. Factors affecting contraceptive use in 1987, 1994, 2007, and 2012 (Results from Logistic Regression)

	Odds ratio			
Variables	1987	1994	2007	2012
	(1)	(2)	(3)	(4)
FP IEC through mass media				
Heard FP message	1.37***	n.a.	n.a.	n.a.
	(6.695)			
FP IEC in radio	n.a.	1.04	0.92**	0.96
		(1.233)	(-2.117)	(-0.923)
FP IEC in TV	n.a.	1.33***	1.16***	1.03
		(8.521)	(4.658)	(1.078)
FP IEC in newspaper/ magazine	n.a.	0.98	1.03	0.93**
		(-0.468)	(0.749)	(-2.005)
Visited by FP fieldworker				
FP fieldworker visit	1.63***	4.49***	1.40***	1.32***
	(8.907)	(45.398)	(6.257)	(5.718)
Controls:				
Individual characteristics				
Age				
age 15-29 (ref.)	1.00	1.00	1.00	1.00
age 30-39	0.93	1.22***	1.03	1.05*
	(-1.345)	(5.776)	(1.099)	(1.729)
age 40-49	0.35***	0.65***	0.51***	0.55***
	(-16.644)	(-10.388)	(-19.410)	(-18.242)
Women's education				
no education (ref.)	1.00	1.00	1.00	1.00
primary	1.60***	1.49***	1.45***	1.68***
	(8.214)	(9.373)	(7.030)	(8.350)
secondary	2.45***	1.89***	1.71***	1.98***
	(10.887)	(11.623)	(9.256)	(10.520)
higher	2.44***	1.70***	1.42***	1.68***
	(5.371)	(5.047)	(4.530)	(6.709)
Number of living children				
0-2 (ref.)	1.00	1.00	1.00	1.00
3-4	2.79***	2.06***	1.89***	2.10***
	(20.321)	(21.436)	(21.766)	(25.724)
>4	2.93***	1.59***	1.16***	1.37***
	(16.628)	(10.986)	(3.354)	(6.756)

Appendix Table A2.2. (Continued)

Variables	Odds ratio			
	1987	1994	2007	2012
	(1)	(2)	(3)	(4)
Religion				
Muslim (ref.)	1.00	1.00	1.00	1.00
Christian	1.38***	1.22***	0.89***	n.a.
	(3.192)	(4.054)	(-2.991)	
Catholic	1.29	0.77***	0.97	n.a.
	(1.559)	(-4.330)	(-0.585)	
Hindu	2.57***	1.72***	1.54***	n.a.
	(10.522)	(7.305)	(6.130)	
Buddha	1.52**	1.48***	1.09	n.a.
	(2.487)	(2.855)	(0.642)	
other religion	1.18	0.98	0.69*	n.a.
	(0.458)	(-0.087)	(-2.338)	
Household's characteristics				
Husband's education				
no education (ref.)	1.00	1.00	1.00	1.00
primary	1.37***	1.30***	1.54***	1.86***
	(4.610)	(5.158)	(7.146)	(8.659)
secondary	1.59***	1.56***	1.47***	1.76***
	(5.604)	(7.546)	(6.112)	(7.682)
higher	1.92***	1.65***	1.58***	1.69***
	(5.058)	(5.595)	(5.793)	(6.217)
Household's wealth				
poorest (ref.)	n.a.	n.a.	1.00	1.00
poorer	n.a.	n.a.	1.32***	1.21***
			(7.877)	(5.493)
middle	n.a.	n.a.	1.27***	1.22***
			(6.270)	(5.309)
richer	n.a.	n.a.	1.31***	1.19***
			(6.336)	(4.229)
richest	n.a.	n.a.	1.36***	1.17***
			(6.264)	(3.498)
Community characteristics				
Regional groupings				
Java-Bali (ref.)	1.00	1.00	1.00	1.00
Outer Java-Bali I	0.51***	0.61***	1.01	0.86***
	(-10.065)	(-12.624)	(0.197)	(-3.674)
Outer Java-Bali II	0.28***	0.46***	0.85***	0.77***
	(-11.713)	(-13.192)	(-3.299)	(-5.056)

Appendix Table A2.2. (Continued)

Variables	Odds ratio			
	1987	1994	2007	2012
	(1)	(2)	(3)	(4)
Residential area				
urban	0.86***	1.01	0.88***	0.84***
	(-2.895)	(0.282)	(-4.420)	(-6.740)
Constant	0.19***	0.25***	0.46***	0.51***
	(-14.528)	(-18.922)	(-9.810)	(-7.600)
Observations	11,876	28,072	32,895	34,746

Robust z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix Table A2. 3. Factors affecting choice of contraceptive methods, prior to decentralization, 1987 and 1994 (Results from Multinomial Logit Regression).

	Not Using (ref.)	Relative Risk Ratios									
		1987					1994				
Variables		Pills	Injections	IUD	Other Modern Methods	Traditional	Pills	Injections	IUD	Other Modern Methods	Traditional
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Individual characteristics											
Age											
15-29 (ref.)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30-39		0.87*	0.50***	1.21***	1.71***	1.05	1.16***	0.74***	2.04***	1.36***	2.02***
		(-1.956)	(-7.688)	(2.673)	(4.375)	(0.377)	(3.068)	(-5.963)	(12.076)	(4.607)	(7.565)
40-49		0.24***	0.09***	0.57***	0.81	0.59***	0.51***	0.22***	1.60***	0.79***	1.44***
		(-13.533)	(-16.138)	(-6.151)	(-1.405)	(-3.519)	(-10.553)	(-19.881)	(6.686)	(-3.071)	(3.304)
Women's education											
no education (ref.)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
primary		1.35***	1.70***	1.55***	2.07***	2.18***	1.42***	1.59***	1.51***	1.57***	1.25*
		(3.616)	(4.540)	(5.386)	(4.643)	(4.595)	(5.629)	(6.299)	(5.307)	(5.696)	(1.786)
secondary		1.40***	2.58***	2.65***	4.11***	4.23***	1.51***	2.19***	2.33***	1.75***	1.85***
		(2.659)	(6.269)	(8.310)	(7.502)	(7.024)	(5.229)	(8.895)	(8.775)	(5.473)	(4.101)
higher		0.85	2.28***	3.03***	4.73***	4.98***	0.80	1.49**	2.64***	1.70***	2.13***
		(-0.463)	(2.584)	(4.973)	(5.197)	(5.039)	(-1.225)	(2.361)	(6.413)	(2.944)	(3.503)
Number of living children											
0-2 (ref.)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
3-4		2.21***	3.20***	2.64***	5.71***	2.65***	1.69***	2.16***	1.80***	3.80***	1.69***
		(10.814)	(13.284)	(13.654)	(14.270)	(8.189)	(11.011)	(14.772)	(10.736)	(20.966)	(6.134)
>4		2.08***	4.74***	2.16***	9.06***	3.04***	1.21***	2.12***	1.00	3.73***	1.37***
		(7.278)	(12.654)	(8.133)	(15.379)	(7.343)	(2.960)	(10.657)	(0.065)	(16.942)	(2.919)

Appendix Table A2.3 (Continued)

Variables	Not Using (ref.)	1987					1994				
		Pills	Injections	IUD	Other Modern Methods	Traditional	Pills	Injections	IUD	Other Modern Methods	Traditional
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Religion											
Muslim (ref.)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Christian		0.93	1.06	1.76***	2.11***	1.26	0.74***	1.04	1.79***	1.70***	1.57***
		(-0.383)	(0.288)	(3.956)	(4.433)	(1.182)	(-3.791)	(0.504)	(7.274)	(6.260)	(4.309)
Catholic		0.76	0.44*	1.61**	2.04***	1.71**	0.39***	0.81**	0.99	0.96	0.94
		(-0.886)	(-1.898)	(2.265)	(2.831)	(1.997)	(-8.595)	(-2.260)	(-0.045)	(-0.362)	(-0.457)
Hindu		0.74*	1.01	5.40***	2.42***	0.87	0.60***	1.03	3.63***	1.68***	0.64*
		(-1.782)	(0.047)	(15.210)	(4.534)	(-0.504)	(-3.725)	(0.268)	(13.447)	(4.093)	(-1.776)
Buddha		1.31	0.45*	1.19	2.31***	2.78***	0.75	0.65	2.44***	2.44***	2.51***
		(1.062)	(-1.838)	(0.655)	(3.345)	(4.062)	(-1.214)	(-1.511)	(4.495)	(4.323)	(3.783)
other religion		0.91	0.45	1.38	5.19***	0.00	0.37*	0.70	2.05	0.91	2.74**
		(-0.145)	(-0.759)	(0.481)	(2.915)	(-0.029)	(-1.843)	(-0.768)	(1.554)	(-0.185)	(2.090)
Household characteristics											
Husband's education											
no education (ref.)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
primary		1.20*	1.84***	1.35***	1.91***	1.28	1.40***	1.46***	1.37***	1.22**	0.78*
		(1.856)	(3.894)	(3.015)	(2.882)	(1.188)	(4.411)	(4.146)	(3.211)	(2.067)	(-1.782)
secondary		1.04	2.22***	1.54***	3.76***	1.76**	1.48***	1.79***	1.79***	1.49***	1.16
		(0.348)	(4.619)	(3.616)	(5.521)	(2.504)	(4.497)	(5.873)	(5.331)	(3.673)	(0.970)
higher		0.87	1.44	2.19***	4.94***	2.63***	1.06	1.29*	2.32***	1.94***	1.85***
		(-0.604)	(1.421)	(4.453)	(5.629)	(3.456)	(0.420)	(1.798)	(5.937)	(4.306)	(3.137)

Appendix Table A2.3 (Continued)

Variables	Not Using (ref.)	Relative Risk Ratios									
		1987					1994				
		Pills	Injections	IUD	Other Modern Methods	Traditional	Pills	Injections	IUD	Other Modern Methods	Traditional
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Household's wealth											
poorest (ref.)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
poorer		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
middle		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
richer		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
richest		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Community characteristics											
Regional groupings											
Java-Bali (ref.)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
outer Java-Bali I		0.90	0.45***	0.25***	0.38***	0.71**	1.04	0.58***	0.38***	0.46***	0.84
		(-1.121)	(-6.606)	(-12.258)	(-6.494)	(-2.343)	(0.700)	(-9.128)	(-14.701)	(-11.259)	(-1.624)
outer Java-Bali II		0.86	0.29***	0.09***	0.14***	0.26***	0.70***	0.57***	0.21***	0.39***	0.65***
		(-0.978)	(-5.967)	(-13.102)	(-6.653)	(-5.700)	(-4.110)	(-6.316)	(-13.307)	(-8.512)	(-2.789)
Residential type											
urban		0.86**	1.16*	0.59***	1.31**	1.19	1.08*	1.01	0.85***	0.98	1.22**
		(-1.986)	(1.656)	(-6.937)	(2.512)	(1.536)	(1.674)	(0.141)	(-2.761)	(-0.297)	(2.290)
Health facilities (provincial, per 100,000 people)											
hospital		0.83***	0.93	1.35***	0.93	1.37***	0.72***	1.16	1.10	0.63***	3.48***
		(-2.712)	(-0.986)	(4.448)	(-0.783)	(3.060)	(-3.819)	(1.631)	(0.965)	(-4.251)	(7.835)

Appendix Table A2.3 (Continued)

Variables	Not Using (ref.)	Relative Risk Ratios									
		1987					1994				
		Pills	Injections	IUD	Other Modern Methods	Traditional	Pills	Injections	IUD	Other Modern Methods	Traditional
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
public health center		1.03	1.08	1.38***	0.99	1.43***	0.95***	0.98	0.90***	0.95**	1.04
		(0.570)	(1.375)	(6.544)	(-0.168)	(5.437)	(-2.862)	(-1.314)	(-4.568)	(-2.228)	(1.316)
FP clinic		0.96	1.02	1.02	1.16***	0.99	1.08***	1.02	1.12***	1.06***	0.98
		(-1.229)	(0.475)	(0.503)	(2.824)	(-0.137)	(8.905)	(1.562)	(9.412)	(4.940)	(-0.881)
FP IEC through mass media											
heard FP message		1.32***	1.28***	1.43***	1.63***	1.12	n.a.	n.a.	n.a.	n.a.	n.a.
		(4.072)	(3.088)	(5.465)	(5.254)	(1.121)					
heard FP in radio		n.a.	n.a.	n.a.	n.a.	n.a.	0.98	1.01	1.07	1.19***	1.06
							(-0.493)	(0.279)	(1.240)	(2.868)	(0.692)
heard FP in TV		n.a.	n.a.	n.a.	n.a.	n.a.	1.32***	1.34***	1.27***	1.34***	1.40***
							(6.112)	(5.948)	(4.287)	(4.938)	(3.840)
heard FP in newspaper/ magazine		n.a.	n.a.	n.a.	n.a.	n.a.	0.79***	0.84***	1.25***	1.14*	1.13
							(-3.668)	(-2.614)	(3.197)	(1.668)	(1.208)
FP IEC											
FP fieldworker visit		1.69***	1.52***	1.65***	1.80***	1.40***	6.06***	7.82***	2.38***	2.19***	1.39***
		(6.957)	(4.638)	(6.769)	(5.426)	(2.732)	(43.540)	(47.309)	(15.739)	(13.550)	(3.538)
Constant		0.20***	0.04***	0.03***	0.00***	0.00***	0.08***	0.07***	0.03***	0.04***	0.01***
		(-9.803)	(-13.661)	(-20.150)	(-18.675)	(-18.388)	(-23.729)	(-21.922)	(-24.628)	(-22.915)	(-22.591)
Observations		11,876	11,876	11,876	11,876	11,876	28,072	28,072	28,072	28,072	28,072

z-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix Table A2. 4. Factors affecting choice of contraceptive methods, after decentralization, 2007 and 2012 (Results from Multinomial Logit Regression).

Variables	Not Using (ref)	Relative Risk Ratios									
		2007					2012				
		Pills	Injections	IUD	Other Modern Methods	Traditional	Pills	Injections	IUD	Other Modern Methods	Traditional
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Individual characteristics											
Age											
15-29		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
30-39		1.19***	0.81***	2.44***	1.71***	1.57***	1.26***	0.83***	1.70***	1.42***	2.00***
		(3.964)	(-6.178)	(9.769)	(7.778)	(5.716)	(5.228)	(-5.643)	(6.135)	(5.708)	(8.678)
40-49		0.56***	0.25***	3.01***	1.28***	1.14	0.67***	0.31***	1.56***	0.96	1.64***
		(-10.445)	(-30.197)	(11.285)	(3.234)	(1.407)	(-7.696)	(-28.012)	(4.769)	(-0.596)	(5.547)
Women's education											
no education (ref.)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
primary		1.63***	1.47***	1.19	1.29**	1.03	1.52***	1.75***	1.35	1.78***	1.42*
		(5.259)	(5.689)	(1.154)	(2.287)	(0.217)	(4.125)	(7.025)	(1.351)	(4.237)	(1.672)
secondary		1.88***	1.61***	2.06***	1.63***	1.49***	1.70***	1.90***	1.90***	2.38***	2.68***
		(6.349)	(6.442)	(4.433)	(4.031)	(2.761)	(5.047)	(7.726)	(2.782)	(6.137)	(4.608)
higher		1.23	1.07	2.32***	1.73***	1.71***	1.03	1.22**	2.56***	2.81***	3.72***
		(1.586)	(0.643)	(4.445)	(3.638)	(3.035)	(0.262)	(1.964)	(3.811)	(6.543)	(5.728)
Number of living children											
0-2 (ref.)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
3-4		1.65***	1.87***	1.51***	2.84***	2.11***	1.75***	1.97***	1.93***	3.84***	1.88***
		(11.350)	(17.436)	(5.890)	(18.311)	(10.665)	(12.891)	(19.193)	(9.150)	(25.986)	(9.439)
>4		0.82***	1.18***	0.75**	2.19***	1.66***	0.93	1.24***	1.00	3.44***	1.63***
		(-2.590)	(2.913)	(-2.167)	(9.429)	(4.877)	(-0.944)	(3.574)	(-0.022)	(15.667)	(4.378)

Appendix Table A2.4 (Continued)

Variables	Not Using (ref)	Relative Risk Ratios									
		2007					2012				
		Pills	Injections	IUD	Other Modern Methods	Traditional	Pills	Injections	IUD	Other Modern Methods	Traditional
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Religion											
Muslim (ref.)		1.00	1.00	1.00	1.00	1.00	n.a.	n.a.	n.a.	n.a.	n.a.
Christian		0.73***	0.71***	1.45***	1.29***	1.32***	n.a.	n.a.	n.a.	n.a.	n.a.
		(-4.832)	(-6.563)	(3.470)	(3.359)	(3.178)					
Catholic		0.65***	0.81***	1.36*	1.19	2.08***	n.a.	n.a.	n.a.	n.a.	n.a.
		(-4.036)	(-2.714)	(1.872)	(1.400)	(6.619)					
Hindu		0.89	1.22**	5.49***	1.30*	0.92	n.a.	n.a.	n.a.	n.a.	n.a.
		(-0.957)	(2.279)	(14.252)	(1.877)	(-0.499)					
Buddha		0.86	0.58***	2.10***	2.22***	1.81**	n.a.	n.a.	n.a.	n.a.	n.a.
		(-0.737)	(-2.747)	(2.923)	(4.065)	(2.220)					
other religion		1.00	0.46***	0.86	0.84	0.86	n.a.	n.a.	n.a.	n.a.	n.a.
		(-0.015)	(-3.298)	(-0.254)	(-0.475)	(-0.351)					
Household characteristics											
Husband's education											
no education (ref.)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
primary		1.83***	1.48***	1.60**	1.57***	1.12	1.82***	1.88***	1.16	2.16***	1.87**
		(5.605)	(5.101)	(2.381)	(3.220)	(0.731)	(5.098)	(6.949)	(0.597)	(4.499)	(2.388)
secondary		1.66***	1.37***	1.54**	1.63***	1.46**	1.59***	1.72***	1.48	2.19***	2.23***
		(4.495)	(3.978)	(2.080)	(3.365)	(2.340)	(3.838)	(5.784)	(1.550)	(4.496)	(3.018)
higher		1.37**	1.18*	2.73***	2.20***	1.85***	1.20	1.37***	2.35***	2.34***	2.49***
		(2.301)	(1.665)	(4.500)	(4.744)	(3.287)	(1.286)	(2.932)	(3.214)	(4.556)	(3.287)

Appendix Table A2.4 (Continued)

Variables	Not Using (ref)	Relative Risk Ratios									
		2007					2012				
		Pills	Injections	IUD	Other Modern Methods	Traditional	Pills	Injections	IUD	Other Modern Methods	Traditional
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Household's wealth											
poorest (ref.)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
poorer		1.23***	1.37***	2.00***	1.46***	1.07	1.25***	1.28***	1.33**	1.21***	0.91
		(3.723)	(7.487)	(5.238)	(4.757)	(0.685)	(4.166)	(6.048)	(2.237)	(2.747)	(-0.900)
middle		1.23***	1.31***	1.86***	1.43***	1.12	1.30***	1.28***	1.29**	1.28***	0.96
		(3.445)	(5.838)	(4.608)	(4.268)	(1.084)	(4.544)	(5.635)	(1.966)	(3.382)	(-0.445)
richer		1.28***	1.31***	2.16***	1.47***	1.23*	1.28***	1.19***	1.63***	1.21**	1.10
		(3.772)	(5.304)	(5.624)	(4.295)	(1.883)	(3.960)	(3.576)	(3.791)	(2.470)	(0.949)
richest		1.21**	1.24***	2.44***	1.82***	1.31**	1.27***	1.00	2.02***	1.34***	0.99
		(2.519)	(3.556)	(6.121)	(6.004)	(2.221)	(3.387)	(-0.025)	(5.208)	(3.456)	(-0.087)
Community characteristics											
Regional groupings											
Java-Bali (ref.)		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
outer Java-Bali I		1.36***	0.96	0.57***	1.02	1.25**	0.77***	0.84***	0.43***	0.87*	2.41***
		(5.267)	(-0.988)	(-5.374)	(0.214)	(2.333)	(-4.009)	(-3.590)	(-6.630)	(-1.729)	(8.175)
outer Java-Bali II		1.09	0.85***	0.30***	0.82**	1.53***	0.64***	0.73***	0.45***	0.85*	3.06***
		(1.187)	(-2.748)	(-8.235)	(-2.083)	(3.461)	(-5.405)	(-4.987)	(-5.146)	(-1.659)	(8.920)
Residential type											
urban		1.04	0.78***	1.11	0.95	1.16**	0.93*	0.77***	0.91	0.95	1.22***
		(0.843)	(-7.139)	(1.389)	(-0.872)	(2.037)	(-1.740)	(-8.459)	(-1.257)	(-1.140)	(3.106)

Appendix Table A2.4 (Continued)

Variables	Not Using (ref)	Relative Risk Ratios									
		2007					2012				
		Pills	Injections	IUD	Other Modern Methods	Traditional	Pills	Injections	IUD	Other Modern Methods	Traditional
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Health facilities (provincial, per 100,000 people)											
hospital		0.85**	0.65***	0.84	0.95	3.34***	0.59***	0.73***	1.84***	1.20**	3.05***
		(-2.568)	(-8.472)	(-1.448)	(-0.656)	(10.194)	(-7.210)	(-5.618)	(5.311)	(2.171)	(9.986)
public health center		0.97***	1.01*	0.97**	0.98**	0.82***	0.94***	0.95***	0.86***	1.00	0.90***
		(-4.492)	(1.878)	(-2.189)	(-2.085)	(-9.567)	(-6.078)	(-6.376)	(-5.861)	(0.148)	(-5.702)
FP clinic		n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Health personnel (provincial, per 10,000 people)											
doctor		2.22***	1.74***	3.28***	3.26***	0.96	2.40***	1.12*	1.85***	1.45***	0.78**
		(7.543)	(6.374)	(5.445)	(8.233)	(-0.241)	(12.165)	(1.869)	(3.943)	(4.292)	(-2.031)
nurse		1.01	0.85***	0.96	0.84***	1.09*	1.02***	1.02***	0.93***	0.95***	0.92***
		(0.458)	(-7.207)	(-0.670)	(-4.249)	(1.871)	(2.830)	(4.025)	(-3.713)	(-5.935)	(-6.599)
midwife		0.89***	1.07***	0.89***	1.00	0.97	0.94***	0.98***	1.01	0.96***	1.02
		(-6.442)	(5.246)	(-3.226)	(0.164)	(-1.002)	(-8.252)	(-3.678)	(0.831)	(-3.947)	(1.582)
FP fieldworker		1.19***	1.04	1.33***	1.11*	2.11***	1.31***	0.98	1.59***	1.07*	1.03
		(3.730)	(1.104)	(3.526)	(1.679)	(9.319)	(8.509)	(-0.898)	(6.546)	(1.836)	(0.479)

Appendix Table A2.4 (Continued)

Variables	Not Using (ref)	Relative Risk Ratios									
		2007					2012				
		Pills	Injections	IUD	Other Modern Methods	Traditional	Pills	Injections	IUD	Other Modern Methods	Traditional
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
FP IEC through mass media											
heard FP in radio		0.86**	0.89**	1.07	0.97	0.93	0.84***	0.89**	1.31***	1.11	1.04
		(-2.284)	(-2.297)	(0.746)	(-0.362)	(-0.754)	(-2.651)	(-2.277)	(3.019)	(1.446)	(0.406)
heard FP in TV		1.24***	1.15***	1.05	1.21***	1.03	1.06	1.06*	1.01	0.97	1.00
		(4.607)	(3.658)	(0.580)	(3.089)	(0.400)	(1.530)	(1.808)	(0.123)	(-0.731)	(0.000)
heard FP in newspaper/		1.00	0.96	1.28***	1.16*	1.07	0.89*	0.82***	1.08	1.21***	1.02
magazine		(-0.038)	(-0.841)	(2.773)	(1.879)	(0.697)	(-1.896)	(-4.212)	(0.905)	(2.944)	(0.240)
FP IEC											
FP fieldworker visit		1.45***	1.43***	1.46***	1.45***	1.00	1.32***	1.31***	1.41***	1.48***	1.14
		(4.815)	(5.780)	(2.943)	(3.677)	(0.018)	(3.752)	(4.636)	(2.780)	(4.607)	(1.080)
Constant		0.07***	0.48***	0.01***	0.02***	0.01***	0.12***	0.52***	0.01***	0.02***	0.00***
		(-19.506)	(-7.445)	(-19.915)	(-22.751)	(-23.026)	(-14.752)	(-5.886)	(-14.816)	(-20.059)	(-17.296)
Observations		32,895	32,895	32,895	32,895	32,895	34,746	34,746	34,746	34,746	34,746

z-statistics in parentheses

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

Appendix Table A2. 5. Modern contraceptive use by source

Panel A: before decentralization	1987				1994			
	Modern	Pill	IUD	Injectibles	Modern	Pill	IUD	Injectibles
Gov clinic/pharmacy	64.81	43.49	77.86	68.3	49.8	37.7	58.8	50.2
Gov home/community delivery	15.79	37.11	8.96	4.1	3.0	2.2	4.0	1.0
Private clinic/delivery	11.76	4.43	12.44	26.6	24.1	11.6	29.2	39.9
Private pharmacy	3.09	2.01	0	0.0	2.1	3.3	0.0	0.0
Shop, church, friend	n.a	n.a.	n.a.	n.a.	18.6	39.4	7.3	8.7
Other	4.49	12.95	0.74	1.0	2.4	5.7	0.8	0.2
N=	5078	1490	1897	996	12754	4254	2700	3651

Panel B: after decentralization	2007				2012			
	Modern	Pill	IUD	Injectibles	Modern	Pill	IUD	Injectibles
Gov clinic/pharmacy	24.3	15.4	38.6	21.0	21.4	11.1	35.9	18.0
Gov home/community delivery	1.4	2.1	1.1	0.8	6.2	8.8	2.5	5.1
Private clinic/delivery	57.3	36.5	57.4	73.5	56.9	30.4	60.7	76.1
Private pharmacy	8.5	26.1	0.1	0.2	11.5	36.4	0.1	0.4
Shop, church, friend	3.0	10.4	0.2	0.3	3.3	11.4	0.4	0.3
Other	5.3	9.3	2.4	4.0	0.8	1.9	0.4	0.1
N=	16856	4233	1374	9091	18169	4478	1273	9654

Appendix Table A2. 6. The impact of decentralization on FP fieldworker visit and FP IEC (reduced form)

Variables	FP fieldworker visit		FP IEC	
	(1)	(2)	(3)	(4)
After decentralization	-0.18**		-0.10***	
	(0.028)		(0.025)	
High decentralized province	0.02	0.01	0.01	-0.03
	(0.029)	(0.025)	(0.025)	(0.025)
Interaction after*highdec	-0.02	-0.00	-0.06**	-0.03
	(0.029)	(0.025)	(0.009)	(0.027)
Controls	Y	Y	Y	Y
Year FE	N	Y	N	Y
Observations	106,702	106,702	106,702	106,702
R-squared	0.079	0.083	0.115	0.132

Robust standard errors in parentheses are clustered at provinces

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

Highly decentralized if rate of change in the number of districts > 50%,

All estimations control for woman's education, woman's age, number of children, partner's education, and rural urban classification