DETERMINANTS OF FERTILITY AMONG MARRIED WOMEN IN SOUTH SULAWESI, INDONESIA

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ABSTRACT

This study aimed to identify fertility differentials among married women by focusing on the contribution of key determinants such as ideal family size, sex preference, child loss, contraceptive use, and duration of breastfeeding, while controlling for socio-demographic variables, for instance, age, age at first marriage, educational attainment, employment status, and place of residence. The results of this study are used to suggest policy recommendations to improve family planning in South Sulawesi province.

Secondary data from quantitative research collected by the Indonesia Demographic Health Survey (IDHS) 2007 in the South Sulawesi province included 982 selected married women aged between 15-49 years old, who ever had children born. Interestingly, this study found that most women married at an age younger than 20 years. Moreover, higher educated women use less long-term contraception methods than less educated women. Results from linear multiple regressions indicated that when other variables are added together with key independent variables, the explanatory power of the independent variables to predict the number of children ever born increased from roughly 40 percent to 51 percent. In general, child loss was the utmost determinant of fertility compared to other key determinants. Therefore, this study has highlighted one of the most important challenges for reducing infant mortality and raising the prevalence of long-term contraceptive use.

KEY WORDS: FERTILITY / MARRIED WOMEN / KEY DETERMINANTS / SOCIO-DEMOGRAPHIC FACTORS / CONTRACEPTIVE USE / SOUTH SULAWESI / INDONESIA

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LIST OF ABBREVIATIONS

CB	Census Block
CBS	Central Bureau Statistics of Indonesia
TFR	Total Fertility Rate
IDHS	Indonesia Demographic and Health Survey
IMR	Infant Mortality Rate
BKKBN	Badan Koordinasi Keluarga Berencana Nasional / National Family Planning Coordinating Board of Indonesia
WFS	World Fertility Survey
WHO	World Health Organization

CHAPTER I
INTRODUCTION

1.1 Background

Realizing that high fertility rate will become a hindrance on economic development. For that reason, many countries try many efforts to reduce it. The best of example is in Indonesia. This country has been recognized as a country showing significant progress in the area of fertility reduction. The Total Fertility Rate (TFR)[1] declined from 5.9 in 1965-70 to 2.6 in 2007, that is, more than 50% decline within a span of around 35 years (World Fertility Survey, 2007). According to McNicoll and Singarimbun (1983: 98), the Indonesian Government attributes three key factors to the reduction: (1) the development and distribution of effective contraceptive methods; (2) the dissemination of information and education to promote small and prosperous family norms; and (3) the mobilization of local governments and community groups to ensure acceptance of family planning services for eligible couples.

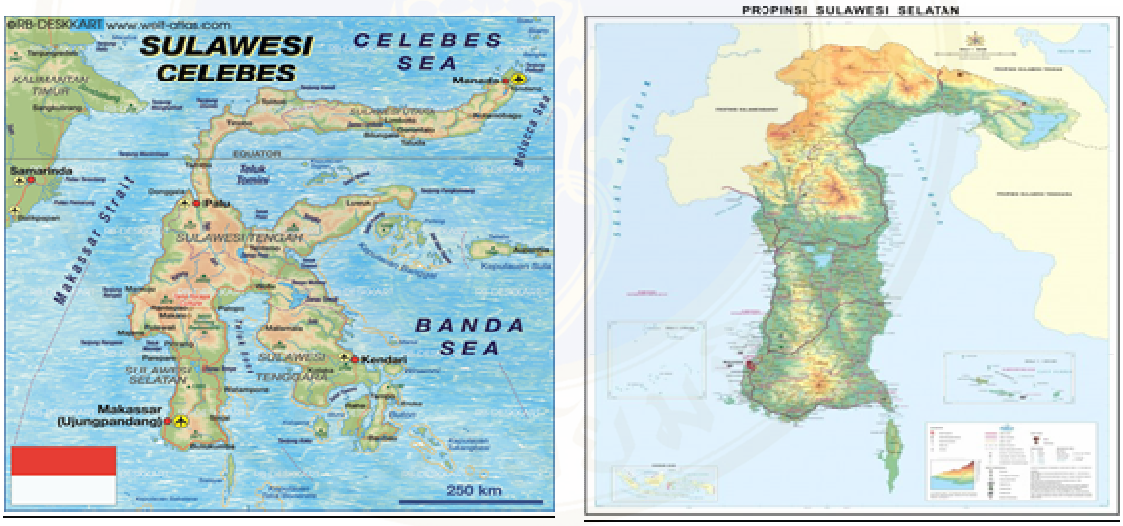
As a result, contraceptive rose rapidly with the increase in the supply of modern contraception through the family planning program. Data from Indonesian Demographic and Health Survey (IDHS) 2007 revealed that the percentage of modern contraceptive use increased from 47% in 1991 to 57.4 % in 2007 (CBS et.al, 2008). Moreover, the Indonesia Census 1971 recorded that less than 10% of married women aged between 15-49 years old used modern contraception methods. Meanwhile, the median age at first marriage also slightly amplified from 18.1 years old to 19.8 years old in 1994 and 2007, respectively (Mize & Robey, 2006).

However, at provincial level, TFRs vary to a large extent by province from 1.8 in Yogyakarta province to 4.2 in East Nusa Tenggara (IDHS, 2007). (See appendix A). Although, there were some which fertility rate had reached the replacement level

[1] *Total Fertility Rate is defined as the average number of children a woman would bear if fertility rates remained unchanged during her lifetime (United Nations 2007: 9).*

(TFR of 2.1 children per woman or below) (IDHS, 2007). On the other hand, most provinces were still above the national level. South Sulawesi is one of them.

The South Sulawesi is a province of Indonesia on the island of Sulawesi. It is lies between 0 ° 12 '- 8 ° south latitude and 116 ° 48' up to 122 ° 36' east longitude. The administrative centre is in the town of Makassar or in the past known as Ujung Pandang. This province is bounded by, the Province of Sulawesi Barat at the north side and Gulf of Bone, and the Province of South-East Sulawesi at the east side. On the western and eastern boundaries, there are Makassar Strait, and Flores Sea. Moreover, preliminary results from the 2006 economic census survey counted some 7,629,138 people. The province has an area of 45,519.24 km², and consists of 3 cities, 20 regencies, and 263 of districts (CBS et. al, 2008).



(*Source:* www.welt-atlas.com)

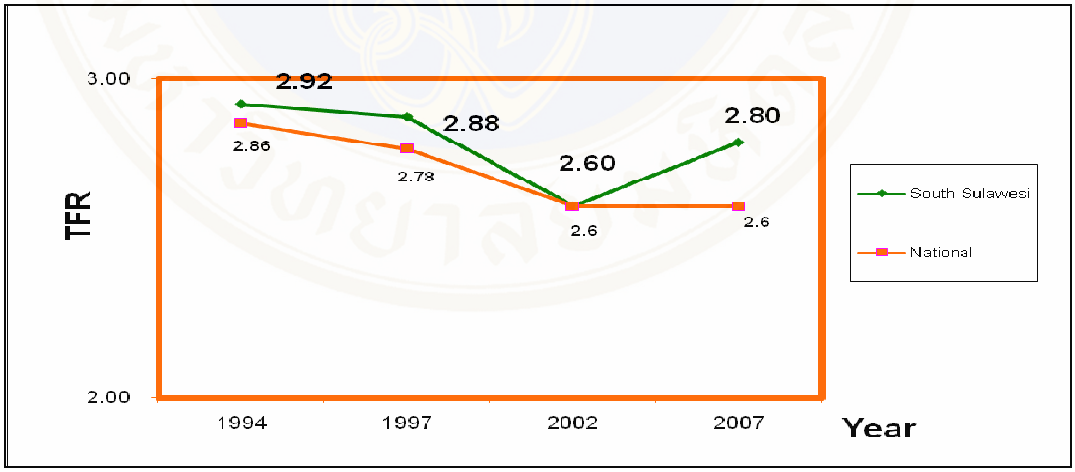
Figure 1.1 Map of South Sulawesi

In addition, majority people in Sulawesi Selatan work on agriculture sector, about 1.469.418 people or 55.76 percent of total population are working in this sector. The other sectors that also absorb a big number of employees are trading and services sectors. Concerning to the health status, it recorded as the province which Infant Mortality Rate (IMR) showing a decrease trend; in 1996, the figure stood at 55 deaths per 1,000 live births to 52 deaths per 1,000 live births in 1998, then the number respectively reduced around 4 point to 48 deaths per 1,000 live births by 2003.

Meanwhile, the number of under five (U5) mortality rate rose significantly from 23.6 deaths per 1,000 live births in 1994 became 53 deaths per 1,000 live births by 2007, or more than 50% increase. In term of fertility rate, this province was recorded as one of the provinces with relatively high fertility in 1991 (Statistics Indonesia, 1991). This trend continued until the latest IDHS in 2007 (CBS et. al, 2008).

1.2 Problem Identification

Fertility is a topic of discussion among societies particularly in the provinces where the fertility rates still high. South Sulawesi province identified as one of provinces which fertility rate has risen since the IDHS survey of 2002-2003 (CBS, et. al, 2008). Furthermore, several of these surveys reflected that the trend of the fertility rate in this province fluctuated between 2.92 children per woman in 1994, to around 2.80 children per woman in 2007, which is slightly higher than the national level of 2.60 children per woman in 2007. This shown in figure 1.2

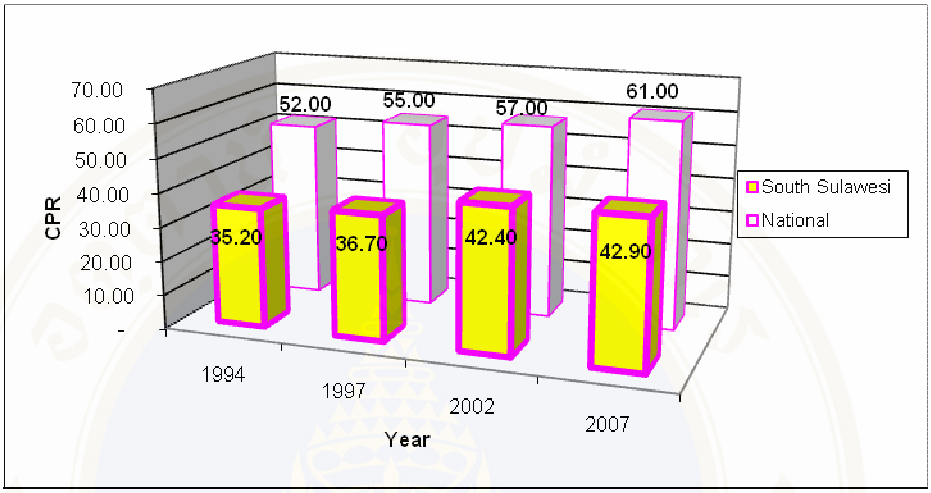


(Source: CBS et. al, 2008)

Figure 1.2 Trend of Total Fertility Rate in South Sulawesi

On the other hand, the IDHS revealed that the percentage of contraceptive use in this province rose gradually from 35.20% in 1994, to 42.90% in 2007 (CBS et al. 1994; CBS et al. 2008). This is only slightly below the national level of 61.4 %, as shown in figure 1.3 (CBS et al. 2008). Besides this, percentage of any contraceptive

use still higher compared to the other provinces, such as Yogyakarta and DKI Jakarta. These two provinces have the fertility rates of 1.8 and 2.1 respectively (CBS et al, 2008).



(Source: CBS et. al, 2008)

Figure 1.3 Trend of Contraceptive Prevalence Rate in South Sulawesi

Moreover, the median age at first marriage among women aged between 25-49 years old in this province was quite high. As reflected by the IDHS, it increased moderately from 19.6 years old in 1994 to be 20.8 years old in 2002-2003, before it slightly declined into 20.6 years old in 2007. However, it was still above the national level at 19.8 years old in 2007.

As discussion above, the apparent increase in TFR in South Sulawesi despite the increase in contraceptive prevalence and relatively high age at marriage appears to be unconventional. This is due to the fact that in demography the conventional relationship between fertility and contraception, fertility and age at marriage is found to be inversely correlated. For instance, some studies conducted in East and North Java, Indonesia, identified the strong negative relationship between children ever born (CEB)[2] and contraceptive use, and children ever born and age at first marriage (Agust, 1997; Rohani, 2004). In addition, Bongaarts proposed that fertility differential mostly affected by age at first marriage, contraceptive use, lactational infecundability through

[2] *The term of Children ever born (CEB) refers to the number of live birth to women (CBS et. al, 2008:47)*

breastfeeding, and induced abortion, which well known as proximate determinants (Bongaarts, 1982). For that reason, why the fertility rate in the South Sulawesi province remains high!

1.3 Research Questions

1.3.1. What are the significant proximate determinants[3] that determine fertility among married women in South Sulawesi?

1.3.2. What are other factors that can influence fertility among married women in South Sulawesi?

1.4 Research Objectives

1.4.1. General Objective

Finding in this study will provide the key determinants that influence fertility among married women in the South Sulawesi.

1.4.2. Specific Objectives

1.4.2.1. To identify the significant proximate determinants such as age at first marriage, contraceptive use, and duration of breastfeeding in South Sulawesi that determine fertility.

1.4.2.2. To identify the contextual variables such as age of respondent, employment status, educational attainment, ideal family size, sex preferences, child loss, place of residence in South Sulawesi that significantly affect fertility.

[3] *Proximate determinants are factors which directly influence fertility such as age at first marriage, contraceptive use, lactational infecundability, and induced abortion (Boongart, 1978)*

CHAPTER II
LITERATURE REVIEW

2.1 Demographic Transition Theory

The term of fertility in demography relates to the actual number of live birth of a woman experience. Generally, in a study it interprets as the number of children ever born of married women when observed at reproductive age from 15 to 49 years old (Boongaarts, 1982). Nowadays, when discussing about human population phenomena through the theory of demographic transition become more popular. Moreover, as we knew that the first fertility transition occurred in France in the late nineteenth century, and was followed in other European countries. The theory of demographic transition claimed that industrialization, and the improvement in health, and socio-economic circumstances in those countries led to lower fertility (Welle & Knodel, 1980; McDonald, 1993). In spite of that, global demographic trend view the fertility transition from high to low levels implicitly in most countries. This transition has occurred at different times and places, in both developed and developing countries (McDonald, 1993; Welle & Knodel, 1980).

Meanwhile, understanding the processes of relevancy of transition theory with present situation for developing countries become important, the best of example was in Indonesia. Fertility transition began around 1970s from pro-natalist to anti-natalist since the Suharto era; at these times, Indonesian government was focused on the area of fertility reduction through efforts from The National Family Planning Coordinating Board (BKKBN) to promote small and prosperous family norms to the whole country (BKKBN, 1995). In parallel, several studies explained that fertility decline in Indonesia occurred with limited developmental changes and with population whose majority were poor and live in rural area (Freedman 1979; McDonald 1993). This showed that the explanation behind fertility decline was not only a simple change in development.

2.2 Fertility Determinants

We acknowledge that, many factors that exist in society can determine fertility. Several studies found that fertility decline depend on the individual behavioral mechanism through family limitation such as contraceptive use, age at first marriage, postpartum abstinence, and induced abortion (Gertler & John, 1994). In addition, individual behavior is determined by various socio-economic factors (Bongaarts, 1978). These factors may have a different degree to influence a fertility of people in societies. For instance, Bakti's study (1997) found that the relationship between children ever born, and age at first marriage was not significant in North Sulawesi (Bakti, 1997). However, a study conducted by Rohani (2004) in East and North Java, identified the strong negative relationship between the number of child born, and the age at first marriage (Rohani 2004: 49).

The causes of fertility decline are very complex, and the explanation probably does not lie with only one aspect (Freedman, 1979). Therefore, a single theory may not be applicable to every society's setting. Some factors have identified affecting fertility level in a population. These factors can be classified into two types: those factors that have a direct affect on fertility, so-called proximate determinants; and those which not directly influence to the fertility namely indirect or contextual determinants (Jones 1977; Bongaarts, 1978).

2.2.1 Relationship of Proximate Determinants and Fertility

Davis and Blake (Bongaarts 1978: 106) initially recognized the relationships between proximate determinants and fertility. This referred to biological and behavioral factors that affected fertility directly (Bongaarts, 1978: 105)

Moreover, Bongaarts (1978) recognized that the majority of fertility variation was affected mostly by four principal proximate variables, namely: the proportion married, postpartum infecundability, contraception, and induced abortion. These four determinants were selected based on two criteria (Bongaarts 1982: 179). The first was the sensitivity of fertility to variations in the different proximate determinants, and the last was the extent of the different proximate determinant variability among populations or over time (Bongaarts, 1982: 179). The rating of proximate determinants relating to the two criteria is shown in table 2.1 below.

Table 2.1: Rating of intermediate fertility variables with respect to sensitivity of fertility and variability among populations

Intermediate Fertility Variables	Sensitivity of fertility to Intermediate variables	Variability among populations	Overall rating
Proportion married	+++	+++	+++
Contraceptive use	+++	+++	+++
Prevalence of induced abortion	++	+++	+++
Postpartum infecundability	++	+++	+++
Fecundity	++	++	++
Spontaneous intrauterine mortality	+	+	+
Permanent sterility	++	+	+

(Source: Bongaarts 1982: 180)

Furthermore, Bongaarts (1982) explained that, the four main proximate variables were considered inhibitors of fertility. This was because fertility was lower than its maximum value as a consequence of postponed marriage, the use of contraception, induced abortion, and postpartum infecundability caused by breastfeeding (Bongaarts 1982: 180). Moreover, Bongaarts (1982) argued that the actual level of fertility in a population can be observed when all the fertility-inhibiting effects of proximate determinants are present, and are measured by the total fertility rate (TFR). If the fertility-inhibiting effect of delayed marriage is eliminated, the fertility level will rise to a level of total marital fertility rate. When the practices of contraception and induced abortion are removed as well, fertility levels will increase to the level of total natural marital fertility. If breastfeeding and postpartum abstinence are not practiced, the level of fertility will rise to the total fecundity rate. That could simply summarize the relationship between the TFR and the proximate determinants.

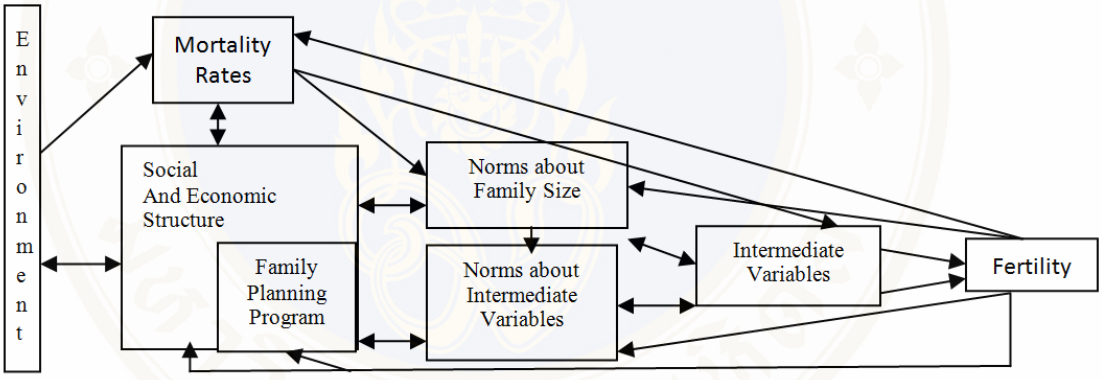
2.2.2 Relationship of Socio-demographic Factors and Fertility

Freedman (1963) recognized that the level of fertility was an essential matter for family and society. Its level was likely to be controlled by cultural norms

concerning family size and regarding matters as marriage, period of intercourse and abortion (Freedman et.al 1963: 221).

In advance, Freedman, et al identified that the reproductive decisions of individual couples were often determined by norms governing family size in their society. Commonly, these norms related to the number of children that were desirable and this was usually more than three children (Freedman et.al, 1963: 222). Freedman (1975) argued that it would be a sociological anomaly if social norms relating to family size were not addressed by societies.

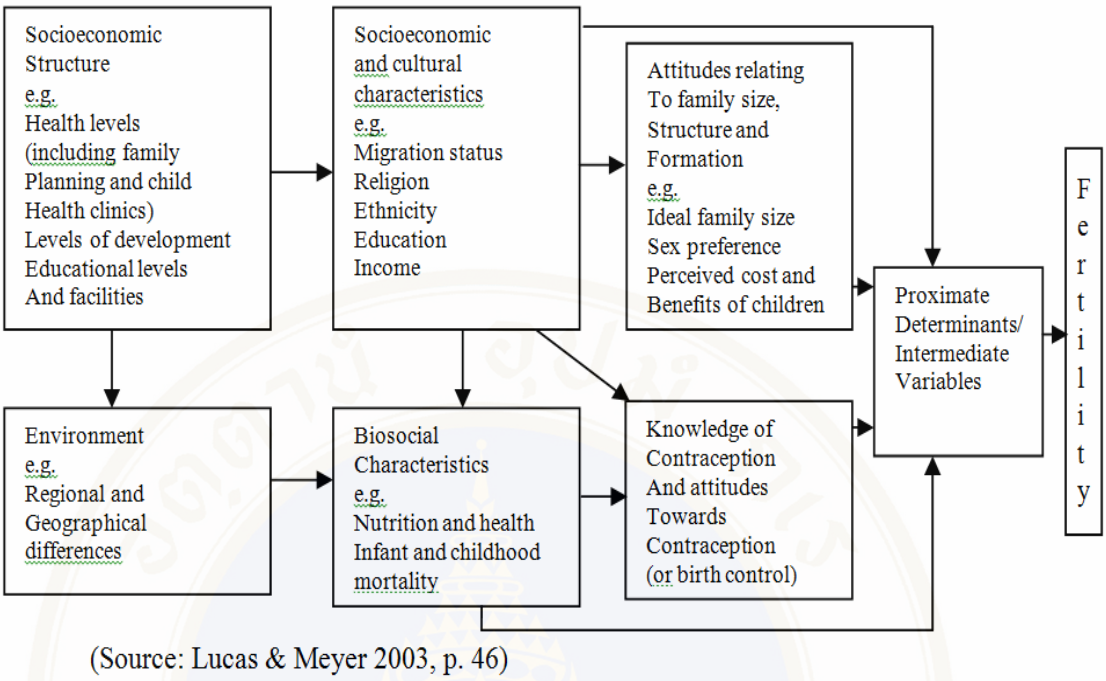
In addition, he proposed that there were several aspects in society, which supported or developed the social norms about family size and proximate determinants. These aspects were related to social and economic structure (including the family planning program), mortality and environment (Freedman, 1975: 16-18).



Source: Freedman, 1975

Figure 2.1 Freedman's Model for the Sociological Analysis of Fertility Level

A simple framework, which was adapted from Freedman's (1975) and from Jones's (1977) was later discussed by Lucas and Meyer (2003). In this framework, Lucas and Meyer explained that environmental, biosocial characteristics, socio-economic structure, socioeconomic and cultural characteristics affected views about ideal family size, knowledge, and behavior towards contraception and, then through the proximate determinants affect fertility (Lucas & Meyer 2003: 56). Figure 2.2 illustrates the relationship among these variables.



(Source: Lucas & Meyer 2003, p. 46)

Figure 2.2: Simple framework for sociological analysis of fertility level

2.3 Selected Variables of Fertility Analysis for This Proposing Study

After reviewing the theoretical frameworks a modified framework was proposed for this study. According to the study of fertility in the South Sulawesi province, this study included several variables based on Freedman and Lucas theories that consist of:

2.3.1. Age of The Respondent

Age was identified as one of the most important variables in determining fertility patterns in society since fertility is related to the life-cycle of each parent and of the family unit. He stated that age would influence the capacity of women to conceive, and the number of additional children desired due to marital status, the frequency of intercourse, the probability of conception, and menopause (Simmons, 1985: 74). A study in Nigeria conducted by Farooq found that age had a significant effect on fertility change (Farooq, 1985: 322-343). A study in West Java, Indonesia concluded that younger couples had smaller family size preferences compared to older couples (Herartri, 2004: 8). Hence, this study assumes that women's age may influence the level of fertility in the South Sulawesi province.

2.3.2. Employment Status

The significant fertility differential generally existed between occupation groups in the agriculture and non-agriculture areas. Campbell (1983) argued that fertility tended to be highest among the groups working in the agriculture sector (Campbell, 1983: 76). In Java, a study by Hull (1977) found that the desire for children among farmer was high. This was because children were viewed as a security source of support for their family and also as a means of self-fulfillment for the parent (Hull, 1977: 289).The Central Bureau of Statistics of the South Sulawesi province identified agriculture constituted the largest occupation group. In 2007 recorded that more than 55 % of the population in South Sulawesi aged 15 and over were working in the agriculture sector. Therefore, this study assumed that employment status of ever-married women may have influence to fertility.

2.3.3. Educational Attainment

Education is one of the significant variables affecting the differential of fertility. Campbell argued that education became important for several reasons. Firstly, the relationship between educational attainment and fertility was strong and consistent, where the less educated had a higher fertility rate compared to those who were better educated. Secondly, educational differences tended to persist when other controls, such as income and residence were introduced, which indicated that education was independently related to fertility. Thirdly, education was one of the few socioeconomic variables that could be used to characterize all women or never married women as easily as it could be used for married women; and lastly, education was a major index of modernization which was closely related to other aspects of the social and economic system (Campbell, 1983: 78).

Another study in Indonesia found that the increased levels of education of women and men resulted in a lower age at first marriage and a lower number of early births (Breierova & Duflo, 2002: 17). Furthermore, Hull indicated that the steady increase in the use of contraceptives over three decades in Indonesia was associated with changes in the lives of women (Hull, 2002: 412).

2.3.4. Rural-Urban Residence

Rural-urban residence is also considered as a factor influencing the fertility differential in a population. Campbell stated that commonly rural fertility was higher than urban fertility. This was due to the lesser impact of the forces of industrialization on rural families, at least until the mechanization of agriculture became widespread. In other words, rural populations tended to keep the traditional structure of the family, mainly the extended family, and maintained the division of labor between husband and wife despite the utility of children as contributors to the family-based economic enterprise (Campbell, 1983: 74-75). In advance, study in Java found that women who lived in rural areas tended to marry earlier than their urban counterparts due to levels of schooling (Malhotra, 1997: 448). Thus, this study assumes that area of residence, either rural or urban, had an effect on fertility levels in South Sulawesi.

2.3.5. Ideal Family Size

The questions addressing ideal family size were able to identify the fertility attitudes within societies and groups (Lucas & Meyer, 2003: 56). Many studies have shown that married couples in developing countries tended to have a larger ideal family size than couples in developed countries (Sastry & Mahtiah, 1977: 175). The reason for having a larger family was related to social, economic, and cultural circumstances. Lucas and Meyer found that based on the data resulting from the Demographic Health Survey (DHS) conducted in Africa. In the late 1980s the mean ideal number of children for women who had been married (including women who had been divorced, separated, or widowed) spanned from 4.4 in Kenya to 6.9 in Mali, where younger women tended to prefer having one or two children fewer compared to older women (Lucas & Meyer, 2003: 56).

A study in Java found that households in this province were more likely to have larger families due to economic activity, contribution to domestic service, security in old age, social power and prestige. However, it was also revealed that fertility patterns and the ability to control fertility varied between and within society. Moreover, it discovered that the less educated and poor had a lower fertility rate than the more educated and wealthy. This may also supported by the fact that children's worth was valued differently among the range of social groups and would have

different affected fertility levels in a population (Hull, 1977). In regard to this study, the ideal number of children may affect the level of fertility in this province.

2.3.6. Gender Preference

Preferences for having sons or daughters were related to the sex roles (Fawcett 1979: 103). The preference for a son over a daughter was commonly found in many societies for similar reasons to those governing ideal family size. For instance, research conducted by Westley and Choe (2007: 1) found that many societies in South-East Asia were likely to prefer having a son. Male children usually carried on the family name, inherited the family property, and had a particular defined role in family tradition. Therefore, in those societies, boys seemed to be more valuable than were girls. Since men in South Sulawesi had important roles in their community, boys seemed to be more valuable than girls. Moreover, this study argues that the preference for a boy could be one factor, which hindered low fertility in South Sulawesi.

2.3.7. Child Loss

Many studies have indicated the relationship between infant and child mortality and fertility. On one hand, fertility was found to have an effect on infant and child mortality in terms of the length of birth intervals and of mediating mechanisms such as breastfeeding. On the other hand, infant and child mortality was also found to have an impact on fertility (Palloni & Rafalimanana 1997; Defo 1998). According to Preston (1978) there were at least two mechanisms the effect of child death. First, the death of an infant initiate termination of breast-feeding and the period of postpartum sterility will be shorter. Second mechanism is child mortality would increase the desire of number of births a couple. This mechanism related to replacement of child who dies at an early age or the needed to insure the possibility to loss any child in the future (Preston 1978 cited in Ainsworth et. al, 1998: 140). A study of the relationship between infant and child mortality and fertility in Indonesia conducted by Frankenberg (1998) showed that infant and child mortality had an impact on fertility levels in this country. The decline in mortality appeared to have preceded the decline in fertility. The study also found that family sizes, in the terms of children born, declined regardless of increasing child survival. The decline was sharper for women whose first

two children survived their early years than it was for women whose first or second child died as an infant (Frankenberg, 1998: 335).

The IDHS 2003 identified that the infant mortality rate in the South Sulawesi province was relatively high. This province had the eighth highest rate of infant mortality among the other provinces in Indonesia (48 deaths per 1,000 live births). Hence, this study considered that the factor of child loss may have determined the fertility level in South Sulawesi.

2.4 Conceptual Framework

A conceptual framework for analyzing the determinants of fertility in South Sulawesi province in 2007 was developed. Figure 2.3 outlines the proposed framework for this study as follows:

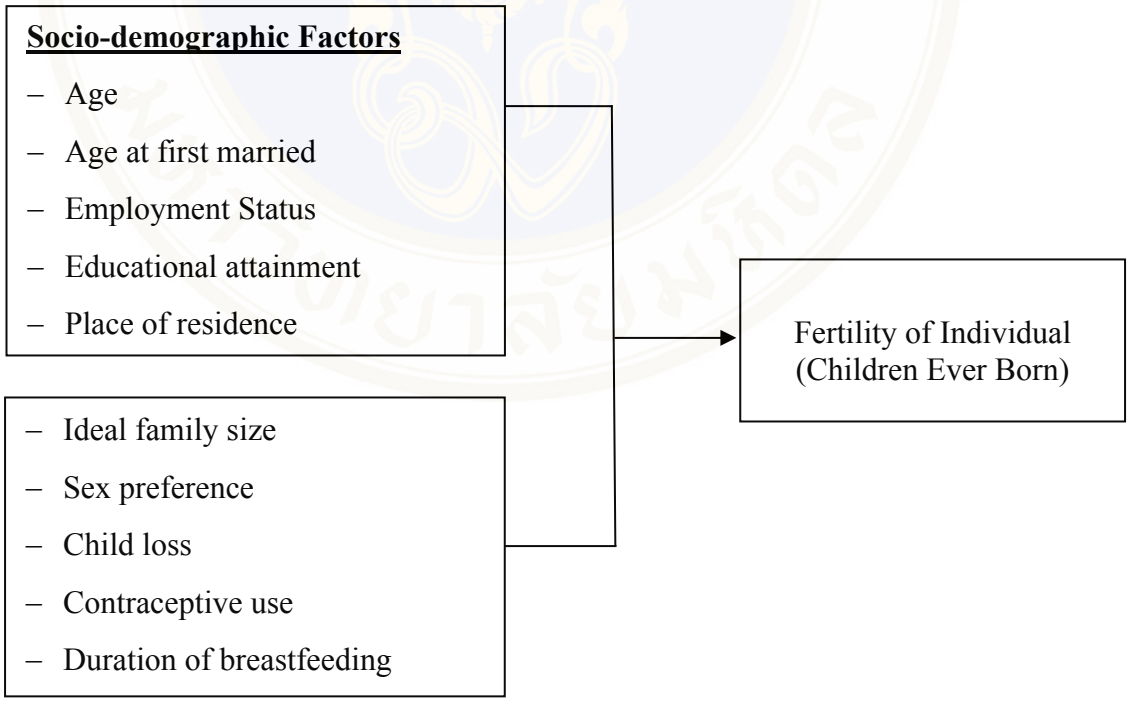


Figure 2.3 Proposed framework for this study

2.5 Research Hypotheses

After reviewing the conceptual framework, this study will address three research hypotheses, which consist of:

2.5.1. Married women who states that 2 or less children be the ideal number are more likely to have lower fertility.

2.5.2. Married women who presence the sex preferences are less likely to have higher fertility.

2.5.3. Married women who use long-term contraceptive methods are less likely to have higher fertility.

2.5.4. Married women who had experience of child loss are more likely to have higher fertility.

2.5.5. Married women who practices breastfeeding at duration more than 6 months were less likely to have higher fertility.

CHAPTER III
RESEARCH METHODOLOGY

3.1 Research Design

This study uses the secondary data from Indonesian Demographic Health Survey (IDHS) 2007. It was carried out by the Central Bureau Statistics of Indonesia and Macro International Inc. at the request of the National Family Planning Coordinating Board (BKKBN) (CBS et al., 2008).

In IDHS 2007, there were 1,694 selected census blocks (CBs), 676 in urban areas and 1,018 in rural areas. The number of selected CBs was proportional to the number of households in each district. Then, for each of selected CB, a complete household listing and mapping were used for the second-stage sampling. There were on average 25 households systematically selected from each CB. The data collection involved many interviewing teams, and was conducted from June 25 to December 31, 2007. Moreover, consents from sampled households were sought before starting the interview The interviewed households, 32,895 ever-married women were identified for an individual interview. Completed interviews were conducted with respondents, then yeilding response rate of 90 percent (CBS et. al, 2008).

However, the 2007 IDHS data have some limitations. Firstly, the 2007 IDHS only covers ever-married women in their reproductive years (between 15-49 years). The survey does not cover the information of single women in their reproductive age. Secondly, the 2007 IDHS does not collect information regarding the prevalence of induced abortion.

3.2 Sampling Method

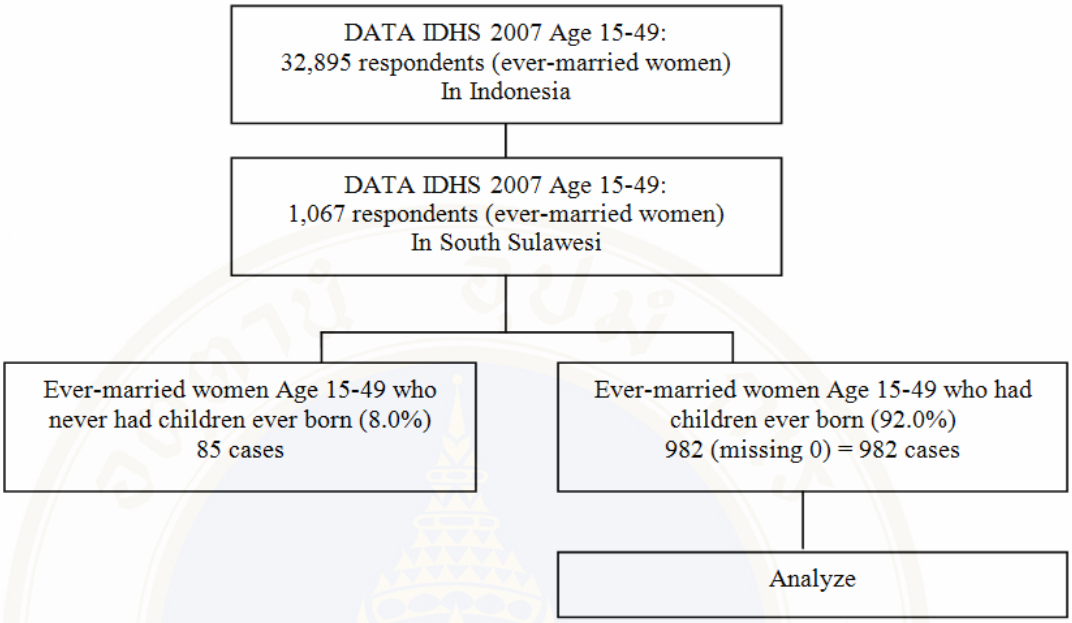


Figure 3.1 Selection of samples women who had children ever born (15-49 years old).

Due to many variables used in this analysis are linked with women who had children ever born, only ever married women who had experience with child birth are selected as samples in this study. There were 982 sampled women from total 1,067 ever-married women in this province recorded in IDHS 2007. The samples cover women who lived in both, urban and rural areas. In addition, samples also included women who had different levels of education.

3.3 Operational Definition and Scale of Measurement

3.3.1 Operational Definition

a. Long-term contraceptives refer to many kinds of modern contraception such as Norplant, Intra Uterine Device (IUD), and sterilization which are effective and efficient for fertility reduction (WHO, 2009).

b. Temporary contraceptives refer to many kinds of modern contraception such as pills, injectable, and condom.

c. Other methods refer to traditional methods (such as lactational amenorrhea, rhythm methods, and withdrawal) and emergency contraceptive method.

d. Dependent Variable

The dependent variable is individual fertility, identified as total number of children ever born of respondents. The variable is measured in ratio scale within a real number of children as the minimum value is 1 child to the maximum value of 14 children.

e. Independent Variables

- Ideal family size refers to opinion of respondents about the number ideal of children, and it measures by nominal scale. It is under 3 categories; 1) 2 or fewer, 2) 3 or more, and 3) No numeric answer. It is viewed by samples women up to the god.
- Sex preferences index. This variable is the index for specific desire of sons over daughter's and measure by score in nominal scale with 2 categories; 0) no sex preferences, and 1) presence of sex preferences.
- Child loss refers to experience of the respondents, whether they had children died. Assessing into 2 categories; 0) not having experience of child loss, and 1) having experience of child loss.
- Contraceptive use is the variable assesses whether a respondent currently using of any methods. This variable is categorized into 4 categories in nominal scale; 0) not use any method, 1) use long- term method, 2) use temporary method, and 3) use other method.
- Duration of breastfeeding. This variable assesses time of respondents gave for breastfeeding in months and scaled in ratio level. Then, in bivariate-analysis it recodes into 3 categories in a nominal scale; 0) No answer, 1) 6 months or less, and 3) More than 6) months.

f. Control variables

- Age is defined as current age of respondents when the survey was held in 2007 and measure by a ratio scale from 15-49 years.
- Age at first marriage which refers to first age when marry of respondents. The variable is scaled in ratio level. In the bivariate-analysis, then, it recodes into 4 groups in a nominal scale; 0) under 15 years, 1) 15-19 years, 2) 20-24 years, and 3) 25 and over.

- Employment status. This variable assesses whether respondent currently working since last 12 months when the survey was held in 2007. It is categorized into 2 groups; 0) working and 2) not working.

- Education refers to the highest level of the formal school that sample women gained. It is categorized into 3 groups as an ordinal scale; 0) No education, 1) Primary or lower and 3) Secondary or higher.

- Place of residence refers the geographical area wherein the respondent lived at the time of IDHS survey in 2007 and is divided into 2 groups in a nominal scale; 0) Urban and 1) Rural.

3.3.2. Description of Variables and Scale of Measurement

Group categories and scale of measurement are shown in table 3.1 as follow:

Table 3.1 Descriptions of variables and scales of measurement

Variables	Definition	Scale
DEPENDENT VARIABLE		
Individual Fertility	Refers to total number of children ever born from ever married women aged 15-49 years	Ratio
INDEPENDENT VARIABLES		
Ideal family size	Ideal number of children	Ordinal 0= 2 or less 1= 3 or more 2= No numeric answer
Sex preferences index	Desire for sons over daughters	Nominal 0= No 1= Yes
Child loss	Ever given birth experience but later the children dying	Nominal 0= No 1= Yes
Contraceptive use	Current using of contraception by methods	Nominal 0=Not using any methods 1=Use long-term methods 2=Use temporary methods 3=Use other methods
Duration of breastfeeding	Time of breastfeed in months	Ratio

CONTROL VARIABLES		
Socio-demographic factors		
Age	Current age of sample	Ratio
Age at first marriage	The age at which sample firstly marry	Ratio
Employment status	The employment status of sample	0= Not working 1= Working
Educational attainment	The highest educational achievement of schooling attaint	Nominal 0= No education 1= Primary or lower 2= Junior or higher
Place of residence	The residential of sample	Nominal 0= Urban 1= Rural

3.4 Method of Analysis

Three methods of analysis are employed in this study.

- Firstly, descriptive analysis describes respondent's characteristics through univariate analysis
- Secondly, measures the correlation between proximate determinants and socio-demographic factors on individual fertility and finds mean value of it by using bivariate techniques.
- Thirdly, the multivariate analysis focuses on examining the effect of independent variables on the dependent variable while controlling for other variables. The major approach for multivariate analysis in this thesis is identifying differential in various estimators using multiple linear regression models. It is followed by providing explanatory power between them.

CHAPTER IV
RESULTS AND DISCUSSIONS

It derived from the explanation of the theoretical framework. This section presents the results of the analysis of the relationship between ideal family size, sex preferences, child loss, duration of breastfeeding, and any of contraception methods used with fertility while controlling with selected demographic, economic, and social factors of respondents such as current age, age at first marriage, employment status, educational attainment, and place of residence.

Results of this study are presented in three sections, the first deals with univariate analysis on characteristics of the respondent. Second section is the bivariate analysis, which consists of the comparison of mean of individual fertility from several independent key variables by using ANOVA test, and then the third section is the presentation of multivariate analysis by using a multiple linear regression model to test the effect of independent variables, and other variables on children ever born.

4.1. Univariate Analysis

4.1.1 General Characteristics of Sample Women

The sample in this study consisted of 982 ever married women respondents in reproductive age (15- 49 years old) from the 2007 IDHS survey in South Sulawesi who had children ever born. Sample characteristics revealed that the average number of children ever born in this province was about 3children. More than half of respondents were in the younger age or at age group 15-34 years (50.9%) while mean age at marriage was under 20 years (mean is 19 years). Almost of sample women (70%) came from rural areas, and less than half (42.4%) were working, but nearly half of them had junior or higher education. However, the percentage of sample respondent women who had primary and lower education (44.5%) was not much lower from those who have junior or higher education (48.1%). Regarding to ideal of

family size, almost half of respondents (48.6%) preferred to have three or more children and number depend on god's wish were not figure out the number (18.5%), whereas only one-third (32.9 %) preferred to have two or fewer children. In addition, the data showed that more than half of the respondents did not have any sex preferences (54.7%), while 45.3 % of respondents tended to have sex preferences. For the child loss experience, data showed that 82.7 % of respondents never experienced the loss of a child and most of the respondents. Moreover, contraceptive use among women varied from the lowest proportion of using the modern long-term methods (5.0 %) to the highest proportion of respondents who used temporary methods (41.6 %), and surprisingly nearly, two-fifth (38.0 %) of samples did not use any methods. While majority of samples (81.9%) revealed that, they practiced duration of breastfeeding for more than 6 months (Table 4.1).

Table 4.1 Percentage or mean of samples by characteristic calculated from IDHS 2007

Variables	Number	%
Children ever born©		
1	227	23.1
2	237	24.1
3-4	340	34.6
5+	178	18.1
© N= 982 Mean = 3.0 Median= 3.0 S.D= 1.9 Min-Max values= 1-14		
Marital status		
Currently married	900	91.7
Divorced	39	4.0
Widowed	43	4.3
N= 982		
Age group®		
15-24	149	15.2
25-34	351	35.7
35-49	482	49.1
® N= 982 Mean = 34.2 Median= 34.0 S.D= 8.3 Min-Max values= 15-49		

Age at first marriage¶		
Under 15 years	135	13.7
15-19 years	431	43.9
20-24 years	306	31.2
25 and over	110	11.2
¶ N= 982 Mean =19.1 Median= 19.0 S.D= 4.4 Min-Max values= 10-40		
Place of residence		
Urban	294	30.0
Rural	688	70.0
N= 982		
Employment status		
Not working	566	57.6
Working	416	42.4
N= 982		
Education		
No education	72	7.4
Primary or below	437	44.5
Junior or higher	473	48.1
N= 982		
Ideal Number of children		
2 or fewer	322	32.9
3 or more	478	48.6
No numeric answer	182	18.5
N= 982		
Sex preferences index□		
No sex preferences	537	54.7
Presence of sex preferences	445	45.3
N= 982		
Child loss		
Not having experience of child loss	812	82.7
Having experience of child loss	170	17.3
N= 982		
Contraceptive use		
Not use any method	254	38.0
Use long-term methods	33	5.0

Use temporary methods	278	41.6
Use other methods	103	15.4
N= 668		
Duration of breastfeeding		
No answer	6	2.2
6 months or less	44	15.9
More than 6 months	226	81.9
N = 276 Mean =17.8 Median= 16.2 Min-Max values= 1-48		

Note: □ *see appendix B*

4.1.2 Married Women by Education and Contraceptive Methods

Table 4.2 presents the proportion of respondents by education and contraceptive methods. Among no educated respondents, current contraceptive method used ranges from 8.6% for long-term methods to 42.9% for not use any methods, which was the highest among other education levels. In primary education, the highest proportion of respondents who were not using contraception about 40.1%, while only 5.0% of women used long-term methods. Surprisingly, women who had higher education; their proportion was very small for using long-term methods (only 4.6%). On the other hand, the highest proportion of women with Junior or higher education is found to use temporary methods, which was 44.4%. According to the result, it has been observed that proportion of women with no education is large either to use long-term methods or not use any methods compared to the women with primary and higher education. In other words, the higher education, the more of using temporary methods, while the less education, the more of using long-term methods and not using any methods (Table 4.2).

Table 4.2 Percentage of samples from 2007 IDHS who are currently use contraceptive methods classified by educational level

Formal Educational Level	Current contraceptive methods				Total
	Not use any methods	Long-term methods	Temporary methods	Other methods	
No education	42.9	8.6	31.4	17.1	100.0
					(35)
Primary or lower	40.1	5.0	39.7	15.3	100.0
					(282)
Junior or higher	35.6	4.6	44.4	15.4	100.0
					(351)
Total	37.9	4.9	41.8	15.4	100.0
	(253)	(33)	(279)	(103)	(668)

4.2. Bivariate Analysis

In order to investigative the relationship between independent variables and dependent variable, the one-way ANOVA test was carried out to examine the level of significance of correlation between them. This study used the one-way ANOVA test because the data included continuous variables (Agresti & Finlay, 1999: 438). Correlation between independent variables and dependent variable in the bivariate analysis were found to have a statistical significant, except place of resident and employment status. Then, multiple regression was used to explore the association between them simultaneously. This method was applied because the dependent variable in this study was continuous variable measured in terms of real number of children ever born of samples women.

Furthermore, the bivariate technique by using One-way ANOVA test in this study showed that variable age at first married, contraceptive use, ideal family size, educational level, child loss, sex preference, duration of breastfeeding, and current age of respondents were found to be statistically related to children ever born in South Sulawesi province. While, the employment status and place of residence were not significantly correlated with children ever born (at $p \leq 0.001$ and 0.05 level). (Table 4.3)

Table 4.3 Mean number of children ever born (dependent variable) and F-test of children ever born and characteristics of married women (independent variables) from 2007 IDHS.

Independent Variable	Mean	F
Age		**165.857*** **
15-24	1.44	
25-34	2.42	
35-49	3.93	
Age at first married		**18.388*** **
Under 15 years	3.59	
15-19 years	3.29	
20-24 years	2.67	
25 and over	2.18	

Employment status		**2.495**
Not working	3.12	
Working	2.93	
Educational attainment		**31.004*** **
No education	4.24	
Primary or below	3.25	
Junior or higher	2.60	
Place of Residence		**2.521**
Urban	2.86	
Rural	3.07	
Ideal Number of children		**80.925*** **
2 or fewer	2.00	
3 or more	3.44	
No numeric answer	3.69	
Sex preferences index□		**26.613*** **
No sex preferences	2.73	
Presence of sex preferences	3.35	
Child loss		**186.102*** **
Not having experience of child loss	2.66	
Having experience of child loss	4.67	
Contraceptive use		**5.820*** **
Not use any methods	3.05	
Use long-term methods	3.52	
Use temporary methods	2.67	
Use other methods	3.39	
Duration of breastfeeding		**3.097** **
No answer	2.04	
6 months or less	2.24	
More than 6 months	2.94	
N= 982		

*Note: *** P≤0.001 ** P≤0.05, □ See appendix B*

4.3 Multivariate Analysis

The multivariate analysis estimates effects of each independent variable on the dependent variable by taking into account of other independent variables simultaneously. Two models are applied in this study. The first model contains demo-socioeconomic variables: age, employment status, ideal number of children, sex preferences, child loss, place of resident, and education as independent variables, and children ever born as the dependent variable. The second model describes the relationship between age at first married, contraceptive use, and duration of breastfeeding as independent variables and children ever born with the controlling of socio-demographic factors.

Table presents the result of multivariate analysis of formal education's effects on cumulative fertility with having other demographic, economic, and social characteristics of women as controlling variables. R-square represents the variation of all independent variables and control variables in the model or on the cumulative fertility. R-square for the entire model is significant at 0.001. This method was used in order to observe simultaneously the relationship between those variables and individual fertility. In advance, the first model includes the other variables, while the independent variables are taken into account in the second model.

4.3.1 Socio-demographic Factors and Fertility

The first model examines effects of socio-demographic factors as independent variables on individual fertility as the dependent variable by using multiple regression analysis, which reveals a significant correlation between them ($p \leq 0.001$). The result shows that among those variables; age and age at first marriage are significantly associated with individual fertility, while other variables have not significant with it (Table 4.4).

Moreover, two significant variables give different result. For instance, age of women has a positive relationship with individual fertility or children ever born. The results indicated that when age increase 1 year, then children ever born increase 0.133 children with statistically significant at 0.001 level. On the other hand, variable age at first married reveals negative relationship with children ever born (-0.135). It

describes that when age at first marriage increase 1 year, and then the effect will reduce individual fertility about 0.135 children (Table 4.4).

In addition, derived from the multivariate result, it pointed out that the R-square value of demo-socioeconomic variables was 0.403. It means that individual fertility or children ever- born has been influenced by those variables about 40.3 percent while the other explanatory power about 59.7 percent is from the other factors (Table 4.4).

4.3.2 Key Determinants and Individual Fertility Controlling for Socio-demographic Factors.

The result from model two demonstrates that when we add the key determinants: ideal family size, sex preferences index, child loss, contraceptive use, and duration of breastfeeding in the analysis, the result still showing a significant association with children ever born. Furthermore, the R-square value had been improved from 0.446 (Model 1) to be 0.512. It means that proximate determinants has explanatory power on individual fertility about 51.2% when control for demo-socioeconomic factors. When other variables are controlled, age at first marriage has significantly negative relationship with individual fertility with β value about -0.115. It means that when age at first marriage increase 1 year then the number of children ever born will decrease about 0.115 children. Regarding the contraceptive use shows that temporary methods has positive significantly associated with individual fertility. It means that women who use temporary methods had more children compared to those who use long-term methods about 0.505 children. Unfortunately, the duration of breastfeeding is not significant with children ever born (See table 4.4)

In this second model, the effects from other factors are also remarkable and important to be clarified. It has been observed that women who have had experience of child loss are affecting fertility comparing to those who have not, the reason to support this finding may be related to the infant mortality rate. The result present that when respondent have experience of child loss, then the number of children ever born will increase about 1.191 children compares to those who have not. Moreover, this study confirm that age of women supporting the individual fertility since it has a positive relationship with individual fertility. In observation from this

study the age of the women have a significant positive association with their individual fertility (Table 4.4).

Concerning the ideal number of children, compared with those women who considered two or fewer children, those who considered three or more, or left their numeric answer up to outside forces or to the God's will ideal children had higher number of children (0.797 and 0.895 respectively) and significant at 0.001 level. Meanwhile, the results revealed that variable women education not significant with children ever born. Surprisingly, the result presents that married woman who presence of sex preferences of their children has no correlation with children ever born (Table 4.4).

By residence, it reveals that even though in a literature was explained that place of residence as another factor that predicted had an effect on individual fertility. Generally, women in urban area are found to have fewer children than those who not reside in it (Rutherfrod & Thapa, 2003). However, this study confirmed that it is not give significant effect on children ever born because p value of it was greater than 0.05 (α). The reason that supports this finding is that, most women both in the urban and rural area of South Sulawesi province can easily access to health service as well as family planning facility. They are more likely to be exposed to modernization and information that makes them consider cost and benefit of having more children. In parallel, employment status variable is found not have significant relationship on individual fertility in South Sulawesi province (Table 4.4).

Table 4.4 Coefficient of key determinants and socio-demographic factors on children ever born

Variables	Model 1		Model 2	
Age	0.133	(0.006)***	0.121	(0.006)***
Age at first married	-0.135	(0.012)***	-0.115	(0.011)***
Place of residence				
Urban **(ref.)**				
Rural	-0.079	(0.108)	-0.018	(0.099)
Employment status				
Not working **(ref.)**				
Working	-0.011	(0.097)	-0.018	(0.089)

Education				
No education **(ref.)**				
Primary or below	-0.278	(0.191)	-0.211	(0.174)
Junior or higher	-0.278	(0.200)	-0.098	(0.183)
Ideal family size				
2 or fewer **(ref.)**				
3 or more			0.797	(0.101)***
No numeric answer			0.895	(0.129)***
Sex preferences index				
No sex preferences **(ref.)**				
Presence of sex preferences			-0.026	(0.192)
Child loss				
No (ref.)				
Yes			1.191	(0.119)***
Contraceptive use				
Long term methods **(ref.)**				
Temporary methods			0.505	(0.114)***
Other methods			0.098	(0.152)
Not use any methods			0.036	(0.112)
Duration of breastfeeding			0.002	(0.006)
R^2	0.403***		0.512***	
N	982			

*Note: *p ≤ 0.0 **p ≤ 0.01 ***p ≤ 0.001, Standard error in parentheses, See appendix B*

4.4 Discussions

According to the relationship between fertility and its determinants, the present study concerning on the three interesting finding from the multiple regression models to examine the relationship of individual fertility and its proximate determinants. Among four major proximate determinants, only duration of breastfeeding is found not significantly correlated with individual fertility.

4.4.1 Relationship between Fertility and Child Loss

Regarding to this study, the most important finding is about child loss. Respondent who had experienced of child loss have the greater effect to increase the

individual fertility. This study revealed that women who had experienced of child loss had more children about 1.19 times than those who had not. In fact, South Sulawesi recorded as the province which the rate of infant mortality showing a decrease trend from 55 deaths per 1,000 livebirths in 1996 to 52 deaths per 1,000 livebirths in 1998, then the number respectively reduced around 4 points to 48 deaths per 1,000 livebirths in 2003. Meanwhile, we should recognize that the number of under five (U5) mortality rate rose significantly from 23.6 deaths per 1,000 livebirths in 1994 to 53 deaths per 1,000 livebirths by 2007 or more than 50% increase (CBS et. al, 2008). A study conducted by Frankenberg in Indonesia found that infant and child mortality had an impact on fertility levels in this country. In addition, he mentioned that family sizes, in the terms of children born, declined regardless of increasing child survival. The decline was sharper for women whose first two children survived their early years than it was for women whose first or second child died as an infant (Frankenberg, 1998: 335). In other words, the decline in mortality appeared to have preceded the decline in fertility. Thus, this probably explains the correlation between child loss and higher fertility in the South Sulawesi.

4.4.2 Relationship between Fertility and Age At First Marriage and Education

Previous study found that the age at first marriage has a significant relationship with the individual fertility, and this study found as well. In advance, this study shows that the proportion of sample women, who firstly marry at a younger age is quite high. More than half of respondents married at age 19 years old or below (57.59 percent). Interestingly, the proportion of those who married under 15 years old is high about 13.71% from total 982 respondents (See table 4.1). Many literatures support that higher education of women can delay marriage, since they spent more time studying and they are more likely to work after that (Mahadevan & Sumangala 1987; Mason 1989; VandenHeuvel & McDonald 1994). However, age at first marriage and level of education of ever-married women in South Sulawesi are found significantly correlated with fertility in bivariate-analysis, while for the multivariate-analysis which controls other independent variables, only age at first marriage is statistically significant.

4.4.3 Relationship between Fertility and Contraceptive Use

The multivariate results captured that the respondents' contraceptive use had a statistically significant positive correlation with individual fertility. This result illustrated that women who used temporary methods had greater individual fertility than those who used long-term methods about 0.505 children (Table 4.4). In contrast, the frequency distribution of the respondents based on the use of contraceptive methods showed that about 4 in 10 (38.0%) of respondents were not currently use any kind of methods, and about some used temporary methods (41.8%), and other methods (15.4%), while for long-term methods was just only about 5% (Table 4.1). Therefore, it is necessary to pay more attention to promote the long-term contraception methods use.

According to Mason (2001: 169), women with high autonomy were more capable of learning and adopting family limitation methods. He also proposed that women with high autonomy were more likely to have a high level of education, and better educated women were more knowledgeable about contraceptive methods (Mason 1989: 117). Interestingly, this study showed that the highest percentage women using long-term methods use were found among those who had no education (8.6%) compared to educated women in junior or higher (4.6%)(Table 4.2), whilst, the percentage of other methods (which included traditional methods and emergency contraception) were also high (15.4%). This probably explained that even though the percentage of contraceptive prevalence rate in the South Sulawesi had increased from 42.40 % in 2002 to 42.90 % in 2007 (CBS et. al, 2003; CBS et. al, 2008), on the other hand, the fertility in South Sulawesi remained increased because of women who used long-term methods was much less than temporary methods and still had a high percentage of women who were not used any methods, and use traditional methods or emergency contraceptives. For that reason, this study accept the hypotheses which states that married women who use long-term contraceptive methods are less likely to have higher fertility.

4.4.4 Relationship between Fertility and Ideal Family Size

Concerning the ideal family size the result showed that women who stated their ideal number of children had a statistically positive relationship with individual

fertility. It confirmed that women who viewed that three or more children as the ideal number of children had more about 0.797 children compare to those who said their ideal number of children were 2 or fewer about 0.797 children. In parallel, sample women who have a thought that ideal number of children was up to God or gave some other non- numeric answer had more children than those who said 2 or fewer were the ideal number of children about 0.895 children (Table 4.4). This result was also illustrated in the frequency of the respondents regarding the ideal number of children. It demonstrated that the percentage of women who gave a non-numeric answer, such as it being dependent on God was about 18.5 % and those who have an ideal of three or more childs was about 48.6 %. By contrast, respondents who desired two or fewer children as their ideal number accounted for only one-third (33%) (See table 4.1). To what extent, this study accept hypotheses which mention that married women who stated that 2 or less children be the ideal number are more likely to have lower fertility.

As stated by Knodel and Prachuabmoh (1973) women who had already attained their desired number of offspring would be more likely to be indicated that they wished no additional children. They also tended to be currently practicing birth control compared with women who had not yet attained their ideal number of children (Knodel & Prachuabmoh 1973: 621). Hence, in this province, the high percentage of women (about two-third) who viewed three or more children as the ideal number of children and those said an ideal number of children was up to the God need to put more attention.

CHAPTER V
CONCLUSION AND RECOMMENDATION

5.1 Major Findings

This study aimed to identify fertility differentials among those who had been married, by focusing on the contribution of each proximate determinant while controlling for demographic and socio-economic variables in South Sulawesi province (this study used data from 2007 IDHS). Hence, the various methods of analysis used different techniques to examine the objectives. Firstly, the study used the Anova Test and multiple regression analysis to examine the association between the independent variables and the dependent variables.

Concerning the relationship between fertility and its determinants, it identified that several key factors had a significant influence on fertility level in South Sulawesi such as age, age at first marriage, contraceptive use, ideal family size, and child loss. Moreover, age at first marriage is one of determinants that have significantly effect on fertility reduction. Bongaarts stated that it was one of the determinants, which had the greatest effect on the fertility level (Bongaarts 1982: 180). Data in this study showed that most of them married at age less than 20 years. In parallel, the sample women who finished junior or higher education still had low fertility compared to the other education level such as no education and primary or below.

With regard to the correlation between fertility and its proximate determinants, the study also demonstrated that when women increase their age at marriage, then the number of individual fertility would decrease. Moreover, the ideal of family size of those women who viewed two or fewer children had lower fertility than those who had three or more children and non-numerically. In addition, it revealed that percentage of women who used long-term contraceptive methods had lower fertility compared to those who used other methods.

We acknowledge that the modern long-term contraceptives have a lot of benefits such as safety, simplicity, low cost, and effectiveness on fertility reduction

(WHO, 2009). Then, what should be noticed from these findings is the low level of long-term contraceptive methods prevalence among married women should have more attention from the government. This study reveals that the use of long-term contraception methods decreases with increasing education of women. Therefore, the low level of contraceptive prevalence among them resulted in a high fertility level. This finding probably explains why, in spite of the fact that the percentage of contraceptive use increased from 2002 to 2007 (52.9% to 59.9% respectively) (CBS et.al 2008), because of the contribution of long-term contraception to fertility reduction was still low.

To what extent, child loss factor had the greatest effect on fertility compared to other proximate determinants. The government should draw attention to this issue because the data from IDHS 2003 (CBS et al. 2003) showed that the infant mortality rate in the South Sulawesi province was quite high. This province had 48 deaths per 1,000 live births in 2003 compared to the national level (IMR=28 deaths per 1,000 live births). Indeed, Frankenberg (1998) found that infant and child mortality had an impact on fertility levels in Indonesia. In other words, the decline in mortality appeared to have preceded the decline in fertility compares to the other proximate determinants in South Sulawesi. As mortality declines, the need for high fertility lessens, and so birth rates go down (Weeks, 2005).

5.2. Research Implications

Based on the findings of this study, several future directions with related research on fertility can be identified generally, or more specifically, such as child loss. This factor identified as the utmost determinant on fertility. Since, the infant morality rate still high in South Sulawesi, then the government must put more attention to combat this problem through giving health access available for pregnancy and delivery services at health care facilities. Another effort, to deal with high rate of infant mortality, is to encourage women to prolong breastfeeding in order to solve this problem as natural. Even though, the women's practice of breastfeeding duration did not show a significant relationship with individual fertility several study found that breastfeeding was one of the significant factors in terms of its effect on influencing

infant's health (Bongaarts 1982; Shah & Khanna 1990). A follow up study concerning the impact of infant formula advertising on breastfeeding practice would also be critical because this study had excluded several respondents who reported missing values in the analysis of duration of breastfeeding determinants. These missing values could perhaps make the result of the analysis less valid. Hence, it is advisable that a further study be conducted with more appropriate data in order to obtain a more valid analysis.

Moreover, the Indonesia Demographic and Health Survey (IDHS) data used in this study had several weaknesses. In regard to the proximate determinants of fertility, this study could not cover induced abortion due to the unavailability of information. Additionally, the sampling of IDHS data only covers information of women who have been married. Indeed, it is not only ever-married women, who contribute to the level of fertility in a population but also single women, although they may be a relatively smaller group. To get the actual estimates of these demographic groups, data regarding induced abortion and single women needs to be included in the next Indonesia Demographic Health and Survey.

5.3 Policy Recommendations

To point out of its findings, this study makes several recommendations, which have implications for policy. In regard to age at first marriage, the findings show that the younger generation of women tends to get married at an earlier age. In other words, the women's age at first marriage is dropping. The increase in the proportion of married women at a young age may affect on levels of fertility. Therefore, the government should implement a range of strategies in order to encourage marriage at a later age in South Sulawesi. This approach adopted should focus on the effort to increase educational achievement on women, as it has been demonstrated in this study that educated women tend to marry at an older age compared to women with relatively less or no education.

Related to contraceptive use, we should concern about married women who not use any contraception methods and use long-term contraceptives. Concerning to the South Sulawesi province, in particular, it can be related to the unexpected correlation between education and contraceptive use where women with higher level

of education tend to use temporary methods than uses long-term methods. Frankenberg proposed that autonomy to decide about the means of making available methods of contraception must be based upon rationale effectiveness and efficiency of use, since not all family planning methods are suitable to individuals (Frankenberg, et.al, 2003). We acknowledge that education is a factor for a woman which influence on their choice of contraception methods. They will prefer methods with satisfactory information. Therefore, efforts should be directed towards this area. Policy makers would need to improve the various Information, Education and Communication (IEC) programs in order to dissipate the knowledge about the family planning program which is also expected to increase the use of long term contraceptives. For example, in family planning field worker program should be accompanied by training the field worker in counseling and follow up techniques. As well as, increase training for the health provider to increase their ability to give service of long term contraceptives.

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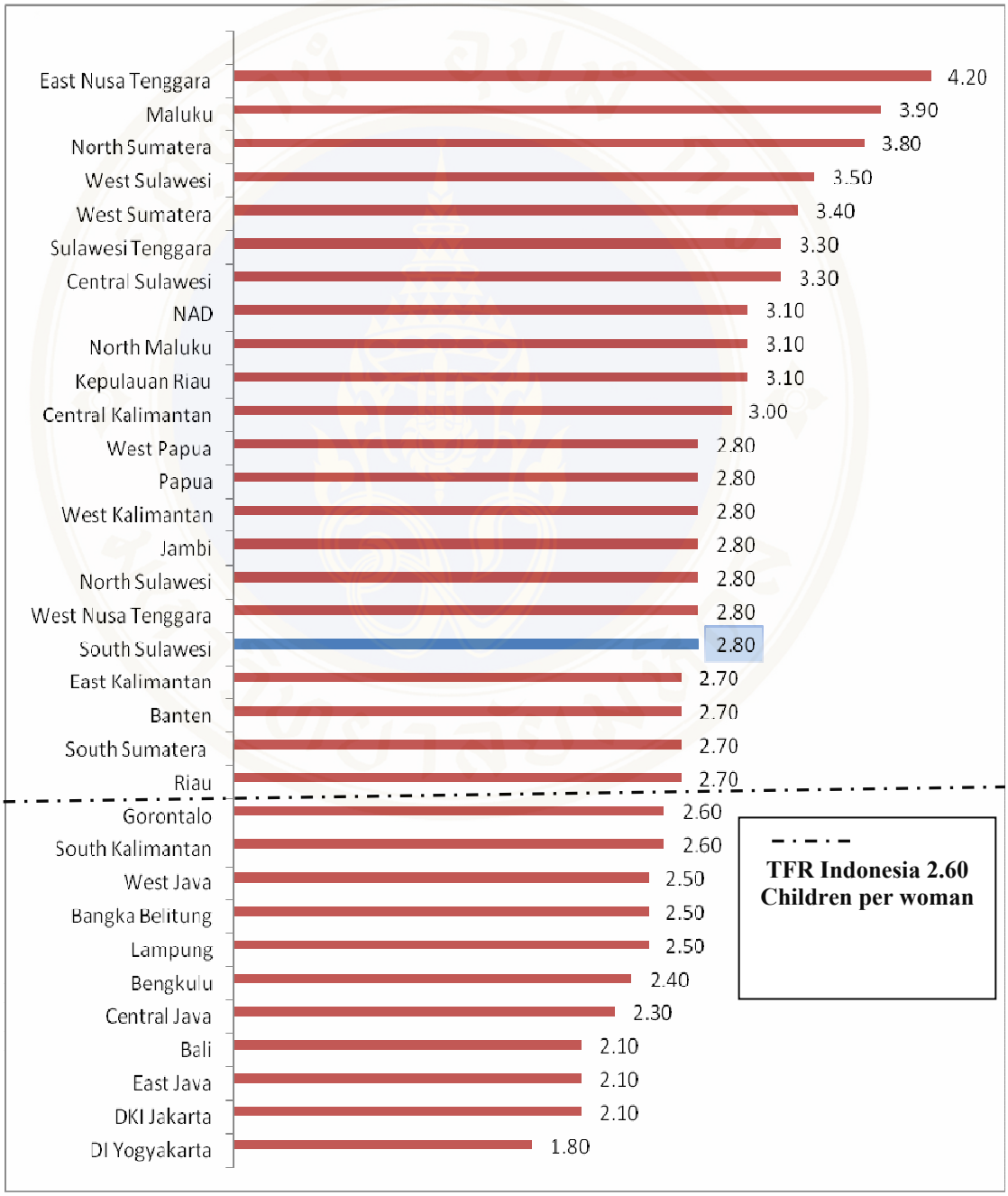
APPENDICES

APPENDIX A

Total Fertility Rate (TFR) in Indonesia, 2007



APPENDIX B

Sex Preferences Index (SPI):

$$SPI = \frac{(\text{Ideal number of boys} - \text{Ideal number of girls})}{\text{Ideal number of children}}$$

If SPI = 0, it means no sex preferences

If SPI > or < 0, it means the presence of sex preferences

(Source: Saikia, U.S, 2005)

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