WOMEN’S EMPOWERMENT AND FERTILITY PREFERENCES IN SOUTHEAST ASIA

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Abstract

In this thesis I examine the relationship between women’s empowerment and fertility preferences of women in four Southeast Asian countries, including Cambodia; Indonesia; the Philippines and East Timor, using data from the Demographic and Health Surveys. First, micro data are utilized to create measurement models for women’s empowerment using principal axis factoring. Three factors of women’s empowerment are found, which are women’s labor force participation, women’s education and women’s household decision-making. Second, these three women’s empowerment factors are examined to see if they have any associations with women’s fertility preference, measured by the ideal number of children and the ideal number of sons. Results from OLS, Poisson and ordered logit models show that women’s empowerment has significant and negative association with the ideal number of children and the ideal number of sons in the four countries of study.

This research overcomes current obstacles in the operationalization of women’s empowerment by moving from the aggregate to the individual level using data from developing countries. The results of this study suggest that female labor force participation is the key in keeping fertility at a balanced level, and son preference is mostly associated with inside-the-household factors such as household decision-making rather than outside-the-household factors such as education and employment. All in all, the impacts of women's empowerment on fertility decision-making are more differentiated than the theoretical literature might suggest, relating specific types of empowerment to specific types of fertility preference.
Acknowledgements

It was a long journey with so many ups and downs during the last four years of my PhD, but overall it was a very self-fulfilled and rewarding experience. I would like to send my gratefulness to Salvatore Babones, my wonderful supervisor for his never-ending supports both academically and professionally. Looking back on when I just started my PhD and where I am now, I realize how much I have developed under your guidance. Your focused guidance has motivated me to improve myself by a great deal. And on top of that, I have always enjoyed our long conversations about everything in academia.

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And I would like to dedicate my deepest love and appreciation to my parents. Mom and Dad, you have been giving me endless love and support through so many difficult times in my life. Thank you for teaching me that the most important thing in life is to have a warm heart. Thank you for always being there for me. Without you, I would have never come this far.
Acronyms

CEB: Children Ever-Born

DHS: Demographic and Health Surveys

GEM: Gender Empowerment Measure

GGI: Global Gender Gap Index

GII: Gender Inequality Index

OLS: Ordinary Least Squares

SIGI: Social Institutions and Gender Index

TFR: Total Fertility Rate (s)

UN: United Nations

UNDP: United Nations Development Programme

UNFPA: United Nations Population Fund


WEAI: Women's Empowerment in Agriculture Index

WEF: World Economic Forum
TABLE OF CONTENTS

INTRODUCTION: WOMEN’S EMPOWERMENT AND WHAT IT MEANS FOR FERTILITY 8

CHAPTER 1: CONCEPTUALIZATION AND MEASUREMENTS OF WOMEN'S EMPOWERMENT 15

1.1. Definitions of women’s empowerment ................................. 15
   Definitions by Non-Governmental Organizations ....................... 15
   Definitions by Scholars .................................................. 19
1.2. Concepts Related to Women’s Empowerment .......................... 23
1.3. Current Measurements of Women’s Empowerment ..................... 26
   Measurement of Organizations ............................................ 26
   Measurements by scholars ............................................... 32

CHAPTER 2: FOUR PATHWAYS FROM WOMEN’S EMPOWERMENT TO CHANGES IN ASPECTS OF FERTILITY 36

2.1. Female Education and Fertility ........................................ 39
2.2. Labor Market Participation and Fertility ............................... 44
2.3. Women’s Participation in Household Decision-Making and Fertility ..................................................... 51
2.4. Contraception, Population Policy and Fertility ....................... 54
2.5. Cultural Factors in the Relationship between Women’s Empowerment and Fertility ............... 60

CHAPTER 3: REGION OF STUDY AND THE DATA 68

3.1. Southeast Asia as a Region to Study Women's Empowerment ............ 69
3.2. Demographic Trends in Southeast Asia ................................ 73
   Fertility Is Declining .................................................... 73
   Delayed Marriage and Childbearing .................................... 78
3.3. Women’s Empowerment In Southeast Asia in International Indexes .............. 80
   The Gender Inequality Index ............................................ 81
   The Gender Gap Index .................................................... 84
   The Social Institutions and Gender Index (SIGI) ......................... 88
3.4. The Demographic and Health Survey Data ............................... 91
   The DHS In Southeast Asian Countries ................................ 96
3.5. Background of Four Countries Of Study ............................... 98
   Cambodia ........................................................................... 98
   Indonesia ........................................................................... 100
   Philippines .......................................................................... 102
   Timor-Leste ......................................................................... 104

CHAPTER 4: MEASUREMENT MODELS AND FACTORS OF WOMEN’S EMPOWERMENT 108

4.1. Operationalization of the Variables ..................................... 109
   Indicators of labor force participation .................................. 115
CHAPTER 6: WOMEN’S EMPOWERMENT AND SON PREFERENCE IN SOUTHEAST ASIA

6.1. Review of Literature ................................................................. 207
   How Does Women’s Empowerment Affect Son Preference? .............. 207
   Son Preference in Different Regions .............................................. 210
   Consequences of Son Preference .................................................. 213
   Is There A Son Preference in Southeast Asia? ................................ 216
6.2. Data, Methods and Operationalization of Variables ....................... 221
   The Data ................................................................................. 221
   The Dependent Variable ......................................................... 222
   Key Independent Variables ...................................................... 225
   Control Variables ...................................................................... 226
   Modeling ................................................................................. 228
6.3. The Results ............................................................................. 229
   Descriptive statistics ................................................................... 229
   Son Preference at Country Level .................................................. 233
   Son Preference at Individual Level .............................................. 236
6.4. Interpretation and Discussion ................................................... 241

CHAPTER 7: CONCLUSION .................................................................. 244

REFERENCES ..................................................................................... 258
INTRODUCTION: WOMEN’S EMPOWERMENT AND WHAT IT MEANS FOR FERTILITY

Generally, a movement’s success is denoted by its achievement of the final goals. Nevertheless, the movement for women’s right, which began in the 19th century, has not yet reached its goal of equality of rights, resources and freedom between men and women. In most parts of the world, even in developed European and North American countries, women are suffering from unequal treatment at both domestic and social spheres (Sen 2001). Multiple global indexes of gender equality have never recorded a perfect equality between men and women in any country. In fact, Epstein (2007) argues that gender inequality creates the most fundamental social divide and the deepest divide in the world today.

Scholars and policy makers have converged on the notion that the empowerment of women does not only benefit women, but also benefits the development of society as a whole (Batliwala 1994, Sen 1993, Coleman 2004, Malhotra and Schuler 2005, Blumberg 2015). Improving women’s status is strongly correlated with improved both men and women’s health outcomes, such as men and women’s mortality and morbidity rates, and activity limitations (Kawachi et al. 1999). The empowerment of women not only brings benefits to themselves but also to the next generation. Studies have suggested that women who have more equality in education, employment and decision-making tend to have lower fertility, their children have lower risk of malnutrition, their daughters are able to spend a longer time in education and have equal rights to sons in inheritance (Allendorf 2012, Dixon-Mueller 1993, Bongaarts 2003, Brewster and Rindfuss 2000, Subbarao and Raney 1995, Axinn and Barber...
Higher women’s empowerment is also associated with more balanced sex ratios at births (Das Gupta 1996). For such remarkable benefits of women’s empowerment and the fact that women have not been granted the rights that they are entitled to, it is necessary to thoroughly examine women’s empowerment and its influences on aspects of fertility.

The relationship between women's empowerment and fertility and fertility-related decisions has been a major research focus in theories of fertility decline. The improved status of women is hypothesized to increase their educational attainment and economic opportunities, leading to a higher prevalence of contraceptive use and thus, declining fertility. Even though the topic has been intensively studied, just how women’s empowerment affects aspects of fertility remains a matter of debate for several reasons. The first reason is the wide variation in the conceptualizations and frameworks to measure women’s empowerment. The second reason is how women's empowerment affects fertility and fertility decisions remains inconclusive.

Some intergovernmental and non-governmental organizations define women’s empowerment as giving women choices and the ability to control every aspect of their life (UNDP, UNFPA), while others argues that women’s empowerment is not only about choices but also about what choices are being offered (SIDA). Despite the different definitions, all organizations that have intervention programs for women’s empowerment agree on the consensus that it is crucial to socio-economic development, in both rich and poor countries. It is not only NGOs that are struggling to define women's empowerment. How to define the term is equally debated among scholars. Numerous definitions of women’s empowerment have been proposed in scholarly literature. Most view women’s empowerment as a process (Bradley 1995,
Mosedale 2005, Kabeer 2005a, Lee-Rife 2010, Batliwala 1994), while others view it as a goal or both a goal and a process (Bradley 1995, Parpart, Rai, and Staudt 2002, Tengland 2008, Desai 2010). Additionally, the understanding of women’s empowerment is further complicated by the interchangeable uses of closely related terms like women’s status, women’s autonomy and gender equality.

Different global indexes (GDI, GEM, GII, GGI) have been developed and adjusted to measure women’s empowerment. Some scholars criticize these indexes that they only relate to women’s empowerment at country level, magnifying the role of economic factors, and that they only provide very limited data for low-income countries (Beteta 2006, Klasen 2006, Bardhan and Klasen 1999). In response, many researchers have proposed different refinements to the concept (Malhotra, Schulerm, and Boender 2002, Charmes and Wieringa 2003, Kabeer 2001, Desai 2010). However, there has not been a well-rounded and widely agreed-on measurement that takes into account of women’s empowerment at both country level and individual level.

Despite the variation in the conceptualization of women’s empowerment, evidence suggests that there is a causal relationship between women’s empowerment and fertility and that the reverse is also true, i.e. that lower fertility leads to higher women’s empowerment. In particular, studies have shown that fertility is negatively associated with women’s education and employment (Axinn and Barber 2001, Mason 1987). Improvement in women’s education increases their access to modern values and ideas that promote individualism and egalitarianism. Moreover, economic independence resulting from employment gives women the freedom to make decisions that affect their own lives, including decisions about their fertility, such as contraceptive use and the number of children they wish to have. Similar results have
been found in many different countries in the developing world such as India (Sarangi 1998), Tanzania (Larsen and Hollos 2003), Taiwan (Lee 2009), and Turkey (Gore 2010). In the reverse direction of the relationship, empirical results from China (Wu, Ye, and He 2012) and India (Allendorf 2012, Lee-Rife 2010) suggest that when family size is reduced, parents invest in sons and daughters more equally; which leads to more equal opportunities in education and employment for daughters.

The literature on how women's empowerment affect different aspects of fertility can be grouped into four major pathways. First, women's education is often associated with lower fertility. Second, women who have more involvement in the labor force have lower fertility than those who do not. Third, women who have more power in the household decision-making process are more likely to have lower fertility. And lastly, contraceptive use is strongly related to lower fertility.

In countries where son preference is strong, there is a strong link to the low status of women (Arnold and Liu 1986). In facts, son preference is considered a rough indicator of gender equality in the society; societies with no sex preference are more likely to be gender egalitarian (Williamson 1976b). Das Gupta et al. (2003) propose that women’s paid employment increases household decision-making, and that women’s paid employment would reduce son preference. Similarly, Li and Lavely (2003) find that women who have higher scores on the index which includes items on autonomy, power, the extent that their husband shares housework, and exposure to media, are negatively associated with son preference.

In addition, patriarchal cultural norms are important mediating factors for the relationship between women’s empowerment and women’s fertility. There are two major norms in this cultural domain that affect women’s empowerment and fertility:
first, the preference for high fertility, where children are viewed as sources of labor and a way for women to raise their status in the family, especially in patrilocal marriage where women move into their husbands’ family after marriage; and second, the preference for sons. These norms are closely related to each other. To secure their positions in the husband’s family, women may want to have more children, especially sons. And the preference for sons often leads to large number of children, since couples keep trying to have children until have a son or the desired number of sons is born. Therefore, it is important to take into account such cultural norms when studying the effects of women’s empowerment on fertility decisions and behaviors.

In this thesis, I will explore what women’s empowerment means for the fertility preferences of Southeast Asian women. Even though the literature suggest that the effects of women’s empowerment and fertility can go both ways, in this thesis I will only attempt to operationalize the one-way association between women's empowerment and fertility preferences. Specifically, I examine how women's empowerment factors are associated with the ideal number of children and the preference for sons – measured by the ideal number of sons divided by the total number of children.

The first chapter presents a background and an overview of current attempts in conceptualizing and measuring women's empowerment in the global literature. Different definitions and measurements proposed by non-governmental organizations and scholars are examined as well as their advantages and shortfalls. Distinctions between women's empowerment and common terms used equivalently are also briefly discussed.
The second chapter presents the framework, which shows four pathways from women's empowerment to changes in different aspects of fertility. Women's empowerment is believed to lead to changes in aspects of fertility including actual fertility and fertility preferences through female education, female labor force participation, women’s participation in household decision-making, and contraceptive use. The framework also specifies that even though cultural factors are not factors of women's empowerment, they mediate the relationship between women's empowerment and fertility.

Chapter 3 of the thesis lays out the reasons why Southeast Asia is selected as the study region for this research. The chapter reviews the rapid fertility decline that is happening in the region and current trends of women's empowerment in three international empowerment indexes: the Gender Inequality Index, the Gender Gap Index, and the Social Institutions and Gender Index. This chapter also introduces the data selected for the research and a brief background of the four countries selected: Cambodia, Indonesia, Philippines and Timor-Leste.

Chapter 4 of the thesis is the development of a measurement for women's empowerment at individual level. Step-by-step operationalization of the indicators is presented before factor analysis models are run using orthogonal and oblique factor models. The measurement is implemented in each of the four countries. In the end of the chapter, I also discuss the three factors of women’s empowerment based on the findings from factor analysis.

In chapter 5, I use women’s empowerment factors found in the earlier chapters to examine their associations with the ideal number of children. The chapter begins with the selection of variables and descriptive statistics then three types of regression
models are run, including OLS, Poisson and Ordered Logit regression in each country of study. At the end of the chapter is the discussion of whether women's empowerment factors are negatively associated with the ideal number of children.

In chapter 6, women's empowerment factors are used to model son preference in Southeast Asia, measured by the ideal number of sons divided by the total ideal number of children. First, I present an overview of son preference in different parts of the world and its consequences, and how women's empowerment is associated with son preference. Then, I describe the operationalization of the variables and methods used for the analysis. The results on how women's empowerment is associated with son preference at country level and individual level are presented at the end of the chapter.

Chapter 7 concludes my thesis by showing the significant findings found in this research. There is also a discussion of how women's empowerment differs from what the literature has noted, and its associations with fertility preferences of Southeast Asian women. Future research implications and applications are also proposed at the end of the chapter.
CHAPTER 1: CONCEPTUALIZATION AND MEASUREMENTS OF WOMEN'S EMPOWERMENT

1.1. Definitions of women’s empowerment

Factors that empower women such as education and labor force participation have been thoroughly studied in the literature. However, only after being defined by the United Nations in 1995 has the term “women’s empowerment” been widely used in the literature on development studies. The concept and its positive effects on social processes have been studied and discussed extensively by both scholars and non-governmental organizations. Nevertheless, there has been no consensus on how to define women's empowerment or a framework to measure the concept.

Definitions by Non-Governmental Organizations

Despite the fact that the women’s empowerment has been a major research topic for decades, there has never been a conclusive definition of the term. Different organizations have their own definition of women’s empowerment, depending on their goals and purposes. The concept also varies by type of organizations. Intergovernmental organizations such as the United Nations define women’s empowerment differently from governmental organizations like the Swedish International Development Cooperation Agency and non-governmental organizations like the World Economic Forum. Individual scholars have their suggested definitions of the concept as well. Table 1 presents a summary of definitions suggested by organizations and scholars with critical bullet points, followed by discussions of each definition.
Table 1: Summary of Definitions of Women’s Empowerment by Organizations and Scholars

<table>
<thead>
<tr>
<th>Authors</th>
<th>Summary of Definitions</th>
</tr>
</thead>
<tbody>
<tr>
<td>United Nations (1995)</td>
<td>Five components:</td>
</tr>
<tr>
<td></td>
<td>• Women's sense of self-worth,</td>
</tr>
<tr>
<td></td>
<td>• Right to have and to determine choices,</td>
</tr>
<tr>
<td></td>
<td>• Right to have access to opportunities and resources,</td>
</tr>
<tr>
<td></td>
<td>• Right to have the power to control own lives - both</td>
</tr>
<tr>
<td></td>
<td>within and outside the home,</td>
</tr>
<tr>
<td></td>
<td>• Ability to influence the direction of social change to</td>
</tr>
<tr>
<td></td>
<td>create a more just social and economic order, nationally</td>
</tr>
<tr>
<td></td>
<td>and internationally</td>
</tr>
<tr>
<td>Oxaal and Baden (1997) - Swedish International</td>
<td>• Women's empowerment is not only about choice, but</td>
</tr>
<tr>
<td>Development Agency (SIDA)</td>
<td>also about shaping what choices are being offered.</td>
</tr>
<tr>
<td></td>
<td>• Viewed as a contextual concept - what may seem</td>
</tr>
<tr>
<td></td>
<td>empowering in one context may not be in another.</td>
</tr>
<tr>
<td></td>
<td>• Viewed as a bottom-up process that cannot be</td>
</tr>
<tr>
<td></td>
<td>claimed by any agencies but only by women themselves.</td>
</tr>
<tr>
<td>Canadian International Development Agency</td>
<td>• Empowerment is about people – both women and men - taking</td>
</tr>
<tr>
<td>(CIDA) (1999)</td>
<td>control over their lives: setting their own agendas, gaining</td>
</tr>
<tr>
<td></td>
<td>skills, building self-confidence, solving problems, and</td>
</tr>
<tr>
<td></td>
<td>developing self-reliance.</td>
</tr>
<tr>
<td></td>
<td>• Not only a collective, socio-political process, but also</td>
</tr>
<tr>
<td></td>
<td>an individual one.</td>
</tr>
<tr>
<td></td>
<td>• It is not only a process but also an outcome.</td>
</tr>
<tr>
<td></td>
<td>• Only women can empower themselves to make choices or to</td>
</tr>
<tr>
<td></td>
<td>speak out on their own behalf.</td>
</tr>
<tr>
<td>Cooperative for Assistance and Relief</td>
<td>• Notions of self-worth and dignity (individual),</td>
</tr>
<tr>
<td>Everywhere (CARE) (2005)</td>
<td>• Bodily integrity; freedom from coercive forces over a</td>
</tr>
<tr>
<td></td>
<td>woman’s very body (individual and structure),</td>
</tr>
<tr>
<td></td>
<td>• Control and influence over household and public</td>
</tr>
<tr>
<td></td>
<td>resources (structure and relations),</td>
</tr>
<tr>
<td></td>
<td>• Experience with or appreciation of the value of</td>
</tr>
<tr>
<td></td>
<td>collective effort and solidarity among women (relations).</td>
</tr>
<tr>
<td>Batliwala (1994); Sen and Batliwala (1995);</td>
<td>Empowerment as a Process</td>
</tr>
<tr>
<td>Kabeer (1999); Papart et al (2002); Mosedale</td>
<td></td>
</tr>
<tr>
<td>(2005); Odutolu et al (2003); Lee-Rife (2010)</td>
<td></td>
</tr>
<tr>
<td>Batliwala (2010)</td>
<td>Empowerment as a Goal</td>
</tr>
<tr>
<td>Bradley 1995; Papart et al (2002); Tengland</td>
<td></td>
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<tr>
<td>(2008); Desai (2010), Batliwala (1994)</td>
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Development programs started to notice the role of women’s empowerment in economic development and human development since the 1990s. The term women’s empowerment was first defined by the United Nations after the 4th World Conference on Women: Action for Equality, Development and Peace in Beijing in 1995. The United Nations identified that women’s empowerment has five components: women's sense of self-worth, their right to have and to determine choices, their right to have access to opportunities and resources, their right to have the power to control their own lives - both within and outside the home, and their ability to influence the direction of social change to create a more just social and economic order, nationally and internationally (United Nations Population Information Network 1995).

In the same year, the 1995 Human Development Report was released, emphasizing on the participation aspect of empowerment: “Development must be by the people, not only for them. People must participate fully in the decisions and processes that shape their lives [12].” This quote focuses on the changes that should be initiated by women themselves; no one else can be the center part of the process. The United Nations argued that improving women’s status is not only beneficial for themselves but also for overall socio-economic development: “Investing in women’s capabilities and empowering them to exercise their choices is not only valuable in itself but is also the surest way to contribute to economic growth and overall development [2]” (United Nations 1995).

Similar to the concept identified by the Human Development Report, the United Nations Population Fund insists that women's empowerment is vital to sustainable development and the realization of human rights for all (United Nations Population Fund 2012). UNFPA mentions women’s empowerment as a critical aspect to promote
gender equality, and claims it should focus on identifying and redressing the power imbalances and giving women more autonomy to manage their own lives.

Most definitions of women’s empowerment by other organizations are derived from the core definition proposed by the United Nations, despite some minor variations. In the report prepared for the Swedish International Development Agency (SIDA), Oxaal and Baden (1997) argue that empowerment is a multi-faceted concept. The highlight of their definition is that women's empowerment is not only about choice, but also about shaping what choices are being offered. In their report, women's empowerment is viewed as a contextual concept - what may seem empowering in one context may not be in another. The authors adopt a similar approach to the Human Development Report, which suggests that women's empowerment is a bottom-up process that cannot be claimed by any agency, but only by women themselves.

The Canadian International Development Agency (CIDA) states that women’s empowerment is central to achieving gender equality (Canadian International Development Agency 1999). Empowerment is about people – both women and men - taking control over their lives: setting their own agendas, gaining skills, building self-confidence, solving problems, and developing self-reliance. It is not only a collective socio-political process, but also an individual one. Furthermore, it is not only a process but also an outcome. CIDA insists that outsiders cannot empower women; only women can empower themselves to make choices or to speak out on their own behalf. Still, CIDA also acknowledges the roles of institutions, including international agencies, in supporting the processes that increase women's self-confidence, develop their self-reliance, and help them set their own agendas. In the recognition of the ambiguity in the definition of women’s empowerment, CIDA recommends a clear
definition of the term in order to measure it, and that personal, socio-economic and political factors be included in empowerment indicators. CIDA suggests both quantitative and qualitative indicators be used in measuring empowerment.

The Cooperative for Assistance and Relief Everywhere (CARE) has a different approach to define women's empowerment to other organizations. It defines empowerment through a self-defining process done by participants of group-discussion in India, Ecuador, Bangladesh and Yemen in 2005. Similar to the definition by the United Nations, CARE suggests four common components of women’s empowerment: “(1) Notions of self-worth and dignity (individual), (2) Bodily integrity; freedom from coercive forces over a woman’s very body (individual and structure), (3) Control and influence over household and public resources (structure and relations), (4) Experience with or appreciation of the value of collective effort and solidarity among women (relations) [6]” (Cooperative for Assistance and Relief Everywhere 2012). This definition mentions women’s empowerment has to be at all three levels: individual, community, and larger collectives of women. Different from the definitions by the United Nations, this one does not emphasize the political aspect of women’s empowerment.

**Definitions by Scholars**

Attempting to define women’s empowerment does not only receive the attention of organizations that advocate for women’s rights, but also from many academic scholars. In the review of the *Human Development Report 2010* which focuses on human development and women’s empowerment, Desai (2010) thoroughly reviews the definitions and measurements of women’s empowerment by various authors. She proposes the centrality of three common aspects found in definitions of women’s
emergent. First, most definitions on women’s empowerment emphasize women’s control over resources and ideology. Second, most definitions define women’s empowerment as women’s agency, i.e. women’s ability to make the right choices for themselves and their families. And third, women’s empowerment is a process, rather than an outcome (Desai 2010).

Definitions of women’s empowerment suggested by scholars often belong to either category: empowerment as a process, or empowerment as a goal. The first viewpoint, which is shared by most scholars considers empowerment is a process. It is an ongoing process rather than a product; and there is no final goal to it. In an early examination of the term, Gutierrez (1990) argues that empowerment is the process of increasing personal, interpersonal or political power so that individuals can take action to improve their life situation. Empowerment is the process where the powerless gain control over the circumstances of their lives. It includes control over both resources and ideology (Sen and Batliwala 2000, Batliwala 1994). Kabeer (1999) emphasizes “power” as the ability to make choices, and “empowerment” as the process of acquiring the ability of make choices by those who are denied such ability. In other words, “empowerment entails a process of change” [437]. According to Kabeer (1999), the ability to make choices is made up of three elements: resources, agency and achievements. Resources are material, human and social assets ; agency is the ability to define one’s goals and act upon them; and achievements are the outcomes of the efforts.

In a later definition of the concept, Mosedale (2005) defines women’s empowerment as a process in which women redefine gender roles in ways that extend their possibilities for being and doing. She emphasizes that empowerment has to be
claimed by the group that want to be empowered, specifically, by women. Development agencies can facilitate the process or create suitable conditions for empowerment, but they cannot make it happen. Empowerment means a group can decide what is important to them and be able to carry out related actions. Mosedale’s definition is similar to one that is adopted by the Canadian International Development Agency (1999). Her definition emphasizes extending what is possible, thus focusing on women’s achievement not only for themselves but also for women in general. While Kabeer (1999)’s definition is more about individuals acquiring the ability to choose, Mosedale (2005)’s definition focuses not only on individual women, but also on women as a collective group.

The process of women’s empowerment is dynamic; it is not static over the course of life and may vary over time, subject to the accumulation of experiences, resources, and achievements as well as of time-varying characteristics like age, marital status and duration (Lee-Rife 2010). Empowerment is the transformation of power relations between men and women at four levels: household, community, market and state (Sen 1993, Odutolu et al. 2003). However, since it is a challenging task, no study to date has successfully examined women’s empowerment at all four levels as ideally proposed.

In the second viewpoint, empowerment is considered a goal. It is fundamentally about ability: women’s ability to control individual health; the ability to control their life; and the ability to change the world (Tengland 2008, Bradley 1995). For example, Bradley (1995) views empowerment as the degree to which women are social actors, and thus be able to affect their own positions. Different dimensions of empowerment also include the abilities to control their homes, work, relationships, leisure time, and
values. One can argue that this point of view is not much different from a general human rights perspective since it does not highlight the gender aspect of women’s empowerment.

Some authors view empowerment as both process and goal. As a process, it has fluidity over time; and as a goal, it can be measured against expected accomplishments (Parpart, Rai, and Staudt 2002, Desai 2010). Even though Batliwala (1994) views empowerment as a process, she also sees its goal as the “individual women’s capability to take charge of her life and her environment through her own greater sense of self-worth” [20] (Sen and Batliwala 2000). Even though some authors view women’s empowerment as an outcome or as an outcome and a process, more agree on the definition that women’s empowerment is a process. The etymology of “empower” itself indicates a process of gaining power and therefore women’s empowerment is about the self-enabling course of action by women to achieve rights that initially belongs to them.

As a process or a goal, empowerment entails certain traits, especially its relativity and contextualization. People are empowered or disempowered relative to other people or to themselves at a previous time (Mosedale 2005, Tengland 2008). The term “empowerment” may indicate a redistribution of power to the less powered group. Empowering women challenges the existing system that gives superior authorities to men. Empowerment is relative in the way that “people have more or less power depending on their specific situation and they can be relatively powerless in one situation and relatively powerful in another [251]” (Mosedale 2005). Odutolu et al. (2003) argues that empowerment is context-specific; it differs in different cultures, situations and stages of women’s life cycles. For example, contraception use was once
considered empowering, but when more than half of the married women in rural Bangladesh have used it since 1990s, it has become normative and does not necessary imply a higher level of empowerment (Malhotra, Schulerm, and Boender 2002).

1.2. Concepts Related to Women’s Empowerment

Criticisms of the concept of “women’s empowerment” often acknowledge its fuzziness in the development context. Gutierrez (1990) claims the term is often vague and can have different meanings. The word “empowerment” indicates that a lack of power belongs to women, and implies that subordination is built in (Eyben and Napier-Moore 2010). In the literature on women’s empowerment, three concepts – gender equality, women’s autonomy, and women’s status - are commonly used interchangeably with women’s empowerment. Mason (1987) notes the interchangeable and often confusing use of other terms like “gender inequality,” “status of women,” “sexual stratification,” “female autonomy,” “female dependency,” and “male dominance” [719]. She argues that the confusion makes it difficult to measure women’s status empirically.

The concept most commonly confused with women’s empowerment is gender equality. Desai (2010) acknowledges the interchangeable use of gender equality and women’s empowerment in the literature. Similar to earlier observation noted by Grown (2008), Desai (2010) agrees that even though these two terms are related, they are not the same. She argues that gender equality is about women’s status relative to men’s while women’s empowerment is about the process whereby women achieve their abilities to control, power and choice over practical and strategic decisions. In the Millennium Development Goals, established by the United Nations, both terms are used in the third goal: “Promote gender equality and empower women,” with the
implication that promoting gender equality means narrowing the gap between men and women in education and formal employment sectors, while empowering women means increasing women’s representation in politics.

Eyben and Napier-Moore (2010) note an interesting case where “gender equality” and “women’s empowerment” are used interchangeably by the United Nations. In the Beijing Platform for Action, the term “gender equality” appears 12 times, while “women’s empowerment” appears 30 times. However, when the book was published, the term “women’s empowerment” disappeared since the book targets a different audience, which is domestic and meant to be a response to the UK’s “gender equality duty” legislation. Nevertheless, not all organizations adopt the interchangeable use of these two terms. In the 2012 Global Gender Gap Report, the World Economic Forum explicitly specified its goal as measuring gender equality, not women’s empowerment, i.e. whether the gap between women and men has declined, rather than whether women are “winning” the “battle of the sexes [3]” (World Economic Forum 2012). In WEF’s view, the two terms are distinctly different and cannot be used synonymously.

The second term that is often used interchangeably with women’s empowerment is women’s autonomy. Most definitions of women’s autonomy often refer to the status or the outcome rather than an ongoing process as in definitions of empowerment. Women’s autonomy is defined as “the degree of access and control over material and social resources within the family, in the community and in the society at large [6]” (Dixon-Mueller 1978); the capacity to manipulate one’s personal environment (Dyson and Moore 1983); or the control over resources and information in order to make decisions about one’s own concerns or about close family members (Bloom, Wypij,
Women’s empowerment includes both individual and collective aspects of power, whereas women’s autonomy mostly refers to individual power.

The third term that is often conflated with women’s empowerment is women’s status, referring to the position of women in relation to men. Similar to women’s autonomy, this term is more about the outcomes rather than a process. Women’s status refers to both the respect accorded to individuals and the personal power available to them (Bloom, Wypij, and Gupta 2001). Similar to the distinction between women's empowerment and women’s autonomy, women’s empowerment is more about a process, whereas, women’s status is more about the position. While status can be measured by objective indicators such as education, occupation and income; empowerment, on the other hand, is subjective and mostly depends on the perceptions of the actors. Women’s status and women’s empowerment may be related in the way that higher status is likely to facilitate empowerment, but it does not automatically lead to actual empowerment in all cases.

Bradley (1995) unambiguously defines these three closely related terms: women’s status, women’s autonomy and women’s empowerment. She suggests that autonomy compares women’s power with men’s, usually in a single setting, while women status may be across settings. Status may be used diachronically; it is used more like a static category, like class or caste, whereas, empowerment implies agency or causal power where action is constituted [159-160].

All in all, even though gender equality, women’s autonomy and women’s status are closely related to women’s empowerment, these three terms are more about the absolute power position of women in relation to men, whereas women’s
empowerment is more about an ongoing process. This is the major distinction to identify women’s empowerment and other commonly conflated terms.

1.3. Current Measurements of Women's Empowerment

Even though women’s empowerment is universally agreed to bring enormous socio-economic and political benefits to development, measuring the concept is a challenging task. There have been numerous attempts by both organizations and scholars to capture and measure women’s empowerment.

Measurement of Organizations

International organizations have developed different indexes to measure women’s empowerment at the country level. In 1995, the United Nations developed the Gender-related Development Index (GDI) and the Gender Empowerment Measure (GEM), these two indexes were later replaced by the Gender Inequality Index (GII) in 2011.

The Gender-related Development Index (GDI) and the Gender Empowerment Measure (GEM) are the first two indexes to measure women’s empowerment. They were developed by the United Nations Development Program, following the 4th World Conference on Women: Action for Equality, Development and Peace in Beijing in 1995. These indexes were first used in the 1995 Human Development Report and were used by the United Nations Development Program until 2010.

The GDI was developed to capture gender inequalities in overall well-being of women. However, the GDI is not an independent index, it is closely related to the Human Development Index (HDI) and cannot be interpreted without the HDI. It takes the role of clarifying the HDI in aspects such as health, education and incomes, as it
records the gender inequalities in these aspects of development. Hence, the GDI has been subjected to many criticisms that it is not an appropriate independent measurement for gender inequality. For example, Bardhan and Klasen (1999) criticized the procedure for the computation of the GDI proposed by the UNDP (1995) for its inclusion of non-agricultural wage disparities. According to them, this variable does not reflect the gender disparities in overall economic opportunities in developing countries. This is because the concept of earned income excludes unremunerated work and reproductive labor, which is substantial in most parts of the developing world (Bardhan and Klasen 1999:992).

The GEM was introduced to measure women’s representation in politics, economics and decision-making power in a given country. It measures the control over economic resources by men; women’s income; women’s economic participation and decision-making; women’s share of administrative, professional, managerial and technical position; and women’s political participation and decision-making reflected in male and female shares of parliamentary seats.

Despite their efforts to objectively measure women’s empowerment or gender equality, these indexes have serious limitations that have been pointed out by researchers. The most common criticism is that they only measure the empowerment at country level but not at the individual level. Wu, Ye, and He (2012) found that, in some countries, the GEM was inconsistent with the measurement of women’s status by education and labor force participation. For example, in China, despite five decades of policies promoting gender egalitarianism, the GEM was still only 0.533 in 2006, compared to 0.726 in Taiwan, where the rate of female labor force participation was much lower. The authors also suggest that the GEM is lacking measurement at
household level and call for more attention in research on women’s relative status to their spouses within the family.

Beteta (2006) criticizes the GEM as an “incomplete” and “biased” measurement of women’s empowerment since it only measures the most educated and economically advantaged; and it fails to include non-economic dimensions of decision-making power both at household level and at individual level, specifically, decisions related to women’s own bodies and sexuality. She thoroughly reviews the drawbacks of the GEM on three levels: government, local and household. According to Beteta (2006), a country can perform quite well on the GEM but gender inequality may still prevail. For example, Barbados shows high levels of gender equality in terms of women in the parliament and decision-making positions, but women still comprise the majority of the poor, female unemployment rates are still high and there has been an increasing misogyny toward women’s advancement in education and work. In addition, the GEM does not measure women’s political participation in local government.

On the economic aspect of the GEM, Beteta (2006) argues that it lacks a uniform data base, thus cross-country comparison is problematic since different countries use different definitions about employment and labor, and there is very limited information on less developed countries. She points out that data on labor force participation is available in most developed countries but only available in 40% of the middle income countries and only 10% in low income countries. Furthermore, the GEM is based on measuring inequalities in the formal sector of the labor market as opposed to the informal sector, while in fact, the informal sector accounts for a large part of developing economies.
At household level, Beteta (2006) criticizes the GEM for a lack of information on household level decision-making, including women's decisions about their bodies and sexuality. She suggests using indicators such as the demand and use of contraception and the difference between wanted and actual fertility, which can be acquired from Demographic and Health Surveys, to measure women’s control over their bodies and sexualities.

Even though the GEM was expected to measure women’s power in relationship with men, Klasen (2006) concluded in the 10-year review of the GEM that it had not been influential in shaping gender-sensitive policies nor had it provided an easily interpretable and internationally comparable measurement.

In response to all the criticisms of the GEM and the GDI that were raised by various scholars, the United Nations Development Program discarded the use of these two indexes and introduced a new one in 2010, the Gender Inequality Index (GII). While the two earlier indexes measured the level of “empowerment” and “development” of women, the latter measures the disadvantages of women relative to men. The UNDP states that the GII reflects women’s disadvantages in three dimensions—reproductive health, empowerment and the labor market. The index aims to show the loss in human development due to inequality between male and female achievements in these dimensions. The health dimension is measured by two indicators: the maternal mortality ratio and the adolescent fertility rate. The empowerment dimension is measured by two indicators: the share of parliamentary seats held by each gender and secondary and higher education attainment. And finally, labor dimension is measured by women’s participation in the work force (United Nations Development Programme 2012). Despite the expectation that the new GII is a significantly improved index
compared to the GDI and GEM, it is still limited by similar issues, especially due to
the lack of available data. For example, there is no information on women’s
participation in local government, women’s participation and income from informal
sectors, asset ownership, gender-based violence and participation in community
decision-making.

The Global Gender Gap Index (GGI) is among the very few major indexes that is
developed by an organization that is not under the United Nations. Introduced by the
World Economic Forum in 2006, it is designed to capture the magnitude and scope of
gender-based disparities and track their progress. The GGI benchmarks national
gender gaps on economic, political, education, and health-based criteria (World
Economic Forum 2012). In the 2012 Global Gender Gap Report, the World
Economic Forum specified that the goal of their index is to capture the gaps in
outcomes variables rather than the gaps in input variables. They also emphasized that
their goal is to measure gender equality, not women’s empowerment, specifically, and
to investigate whether the gap between women and men has declined, rather than
whether women are “winning” the “battle of the sexes [3]” (World Economic Forum
2012).

The Gender Gap Index (GGI) measures five aspects of women’s empowerment:
economic participation, economic opportunity, political empowerment, education
attainment, and health and well-being. Data from different sources were compiled: the
World Development Indicators by the World Bank, the Human Development Report
by the UNDP, data from the International Labor Organization, and Executive Opinion
Survey by the World Economic Forum. Some scholars note that there is a negative
correlation between log of the country’s GDP and the gender gap rank; i.e. poor
countries tend to do worse on the gender gap index (Lopez-Claros and Zahidi 2005). Criticisms of the GGI index are that it is more about rich countries (OECD countries) while having very limited data on the developing countries, and similar to the GDI, it mainly focuses on economic aspects. It is very difficult for a low-income country to rank high on the Gender Gap Index.

The Women’s Empowerment in Agriculture Index (WEAI) is the newest index in measuring women's empowerment. It was developed by Alkire et al. (2013) for the International Food Policy Research Institute. Before the WEAI, there had been a series of proposals to measure women’s empowerment done by a group of scholars at the Oxford Poverty and Human Development Initiative (OPHI) in 2007 (Ibrahim and Alkire 2007, Lugo 2007, Diprose 2007, Zavaleta Reyles 2007). Much of the WEAI was operationalized based on the previous proposal on agency and empowerment done by Ibrahim and Alkire (2007). The WEAI index was developed as a response to the need to measure women’s empowerment in agriculture as few of the current indexes covered this topic. It uses data from both survey-based and qualitative interviews with men and women in the same households in Guatemala, Uganda and Bangladesh.

The WEAI includes two sub-indexes: the five domains of empowerment (5DE) and the Gender Parity Index. The first one reflects “the age of women who are empowered in five domains of empowerment in agriculture” or 5DE, which includes: (1) the decisions about agricultural production, (2) access to and decision-making power about productive resources, (3) control of use of income, (4) leadership in the community, and (5) time allocation. This is the first index on women’s empowerment that includes time (in terms of workload and leisure time) as a reflection of women’s
ability to enjoy outcomes from agricultural production. The second sub-index is the Gender Parity Index (GPI), which reflects the age of women who are empowered or whose empowered score meets or exceeds that of the men in their households. The focus of the index is to measure women’s empowerment in agriculture relative to men in the same household. The WEAI is a carefully constructed survey-based index, which is much more comprehensive than earlier indexes. It also collects data from developing countries, which many earlier indexes lacked. However, it only focuses on agriculture production and not on other everyday life aspects of women. Another drawback is that it is impossible to see the pattern of the level of empowerment across individual women, since their empowered status is relative to their own household standing, but not standardized across the sample group.

Measurements by scholars

The method of measuring women’s empowerment has received attention not only from international organizations but also from scholars. Scholars have suggested multiple measurements and frameworks. For example, Kabeer (2005a) suggests that three components of women’s empowerment, education, participation in paid employment and political representation, should be measured. Beteta (2006), after portraying the weaknesses of the GEM, proposes a different index named the Gender Empowerment Enabling Environment (GEEE). She suggest that the GEEE may include attitude questions about gender aspects from the World Value Survey, the number of women’s organizations in a country and the country's legal framework (ratification and signature on the Convention Eliminating all forms of Discrimination Against Women - CEDAW, respect for women’s rights, and the tolerance of government for discrimination against women).
Some scholars have suggested more elaborate measures of women’s empowerment. Malhotra, Schulerm, and Boender (2002) proposes an expansion of the term empowerment to include six dimensions: economic, socio-cultural, family/interpersonal, legal, political, and psychological. Even more complex, Charmes and Wieringa (2003) conceptualize the Women’s Empowerment Matrix with six dimensions: physical, socio-cultural, religious, economic, political, legal; and at six levels: individual, household, community, state, region and global. Charmes and Wieringa (2003)’s matrix is a bit ambitious and idealistic; other scholars recommend more feasible measurements of women’s empowerment that they should be carried out at three levels: household, community, and broader areas (national and international) (Malhotra, Schulerm, and Boender 2002, Beteta 2006, Isamail, Rasdi, and Nadriah 2011).

A summary of the indexes by international organizations and suggestions by scholars on measuring women’s empowerment is shown in table 2.
Despite numerous attempts and proposal to measure women's empowerment, their applications in empirical research is still very limited as it is not easy to measure.

### Table 2: Summary of Indexes and Measurements of Women’s Empowerment

<table>
<thead>
<tr>
<th>Index</th>
<th>Author</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>GEM (Gender Empowerment Measure)</td>
<td>United Nations (1995)</td>
<td>Women’s representation in politics, economics and decision-making power in a given country.</td>
</tr>
<tr>
<td>GII (Gender Inequality Index)</td>
<td>United Nations (2010)</td>
<td>The disadvantages of women relative to men in three dimensions—reproductive health, empowerment and the labor market.</td>
</tr>
<tr>
<td>GEEE (Gender Empowerment Enabling Environment) (suggestion)</td>
<td>Beteta (2006)</td>
<td>Include attitude about gender aspects from the World Value Survey, the number of women’s organizations in a country and the country's legal framework (ratification and signature on the Convention Eliminating all forms of Discrimination Against Women - CEDAW, respect for women’s rights, and the tolerance of government for discrimination against women).</td>
</tr>
<tr>
<td>WEAI (Women’s Empowerment in Agriculture Index)</td>
<td>Alkire et al (2013)</td>
<td>5DE which includes: (1) the decisions about agricultural production, (2) access to and decision-making power about productive resources, (3) control of use of income, (4) leadership in the community, and (5) time allocation. Gender Parity Index (GPI): the %age of women who are empowered or have empowered score meets or exceeds that of men in their households.</td>
</tr>
<tr>
<td></td>
<td>Kabeer (2005)</td>
<td>Female’s education, female’s participation in paid employment and political representation.</td>
</tr>
</tbody>
</table>
women’s empowerment at all three levels. Desai (2010) points out that the major challenge in measuring women’s empowerment is the lack of gender-disaggregated data for most dimensions and levels. Unlike Beteta (2006), who says that most current data lacks measurement at household level, Desai (2010) argues that most data only exist for the aggregate or household level, while data for community, state and region exist for very few countries. The second challenge that she points out is the use of universal indicators in measuring women’s empowerment, while it is, in fact, a context specific concept (Odutolu et al. 2003, Mosedale 2005). The most difficult challenge, however, is to measure process and agency with respect to women’s empowerment. Process has been measured by changes in variables such as education and employment over time, and it also depends on the changes of behaviors (in fertility or household decision-making) over time. Agency is similarly difficult to measure. Since agency implies that women’s own consciousness has been transformed, it has to be measured based on women’s own interpretations of what they perceive as changes in their own knowledge and perspectives. Measurements on agency can only be done through ethnographic studies or surveys at local level (Desai 2010).

There have been numerous proposals for a precise framework to study women’s empowerment, nonetheless, how to accurately measure the concept remains a challenge. Most measurements have only quantified the dimensions of control over resources and outcomes, while women’s agency and process remains difficult to measure. Moreover, it is challenging to measure women’s empowerment at all relevant levels – individual, household, community and nation. Therefore, there has not been a well-rounded measurement that precisely captures women’s empowerment, especially at the individual level and in developing countries.
CHAPTER 2: FOUR PATHWAYS FROM WOMEN’S EMPOWERMENT TO CHANGES IN ASPECTS OF FERTILITY

The relationship between increase in the level of women’s empowerment and decrease in fertility is commonly found in the literature. Different measurements of women’s empowerment have been operationalized to study its relationship to fertility. Macro level indexes have been using data that obtain from countries’ general statistics, for example, the country’s rate of women’s literacy, percentage of women who finish secondary education, percentage of women’s participation in the labor force, proportion of women in parliament, or the year that women were allowed to vote in that country. While the level of women's empowerment across countries is useful in appraising the country’s progression in improving women’s status over time, however, a country’s statistics may have little to do with the actual level of empowerment that an individual woman in the country is experiencing. Especially when fertility decision-making is the outcome variable, women's empowerment at the individual level is critical to the analysis.

Four commonly studied components of women’s empowerment at the individual level are women’s education, women’s participation in the labor force, women’s contraceptive use, and women’s participation in household decision-making. Furthermore, patriarchal cultural factors are important mediating factors of the relationship between women’s empowerment and women’s fertility decision-making. The inter-relationships between women’s empowerment and aspects of fertility are illustrated in Figure 1.
Four components of women’s empowerment that are often suggested in the literature include women’s education, women’s employment, women’s household decision-making power, and contraceptive use and family related policies. Aspects of fertility also include four components: actual fertility (such as the number of children), desired fertility (such as the ideal number of children), birth interval and gender preference of children. Even though patriarchal culture factors are not included as one of the dimensions of women’s empowerment, they act as important common cause factors in this two-way relationship. The cultural norms that affect women’s fertility may foster the preference for a large number of children or the preference for sons. Patriarchal norms may have direct effects on components of women’s empowerment as well as on aspects of fertility.
Previous studies often found that fertility was negatively associated with women’s education and employment (Mason 1987, Brewster and Rindfuss 2000, Axinn and Barber 2001, Larsen and Hollos 2003, Grown, Gupta, and Pande 2005). Improvements in women’s education increase the chances of women’s employment, which in turn brings them more economic independence, and initiates better access to health care and contraception use (Mason 1987, Nguyen and Dang 2002, Kabeer 2005a). A higher level of household decision-making power is also significant to women’s ability to control their fertility (Afifi 2007, Upadhyay and Karasek 2012, Shoaib, Saeed, and Cheema 2012).

Studies also find that the relationship between women's empowerment and fertility is a two-way one. Women’s empowerment result in lower fertility, and the reverse relationship is also valid; fertility decline may lead to increases in women’s empowerment. Malhotra (2012) points out that theoretical frameworks that link women’s empowerment to fertility also emphasize the reverse relationship in which fertility decline transforms gender system and empowers women. Wu, Ye, and He (2012) argues that while women’s empowerment is often hypothesized as a cause of fertility decline, the reverse relationship has been rarely studied. In their study, they examine the link between lower fertility and the empowerment of women in the next generation, i.e. the empowerment of daughters when fertility is reduced. The authors suggest that, in China, the decline in fertility actually leads to women’s empowerment in the way that smaller numbers of siblings in the family gives daughters better chances to continue their education, thus increasing their chances of having paid employment later on. Allendorf (2012) examines how fertility decline leads to a more symmetrical gender system in the family, thus empowering daughters in the natal family in India. She argues that as fertility declines, the number of families with
children of only one gender increases, thus brings more equal gender roles to sons and daughters. Consequently, daughters enjoy greater freedom and more equal opportunities to their brothers than previously.

The literature appears to confirm a reciprocal relationship between women’s empowerment and aspects of fertility. Bernhardt (1993) uses the term “circular cumulative causality” to properly describe this spiral relationship between empowerment and fertility. The magnitude of the influence varies upon socio-economic contexts and current fertility levels. For example, in societies where high fertility and high preference for sons prevail as the norms, a mother would try to bear as many sons as she could, thus women and girls would suffer even more.

Different pathways of how women's empowerment affects aspects of fertility, including both actual and desired fertility, birth intervals and gender preference, have been suggested in the literature. Four commonly found pathways are: women’s education, women’s employment, women’s household decision-making, and contraceptive use.

2.1. Female Education and Fertility

Female education is generally considered a component of women’s empowerment and it has consistently been found as an important factor affecting women’s fertility and fertility decision-making. At the individual level, most studies have found that a higher level of female education is associated with lower fertility. Lower fertility helps women spend more time in education, thus shortening their potential reproductive time. At the macro level, indicators of women’s and girls’ education are very important ones that have always been included in all global gender-related
indexes. They show the progress of a country in terms of policy, incentives and encouragements towards promoting women’s education. Nevertheless, there are a growing number of studies that suggest that education alone is not the most influential factor in lowering fertility, in fact, education combined with paid employment after schooling is the critical factor.

Dixon-Mueller (1993) suggests four ways in which education reduces fertility. First, in societies where sexual contact outside marriage is low, more time spent in education decreases the exposure time to conception through delayed marriage. Longer time spent in education may also increase the probability of non-marriage. Second, couples with higher education may have higher aspirations for their children, and thus may want to reduce their family size. Third, education enhances the chances of women having activities outside the family, especially employment. As a result, childbearing becomes a larger sacrifice for women who want to pursue a career. And fourth, education exposes women to knowledge and practices of birth control and encourages a higher level of communication with their husband about the desired family size and contraceptive use. Furthermore, women with higher education are more likely to resist subjugation and acquire more power in decision-making.

There have been quite a number of empirical studies that find higher level of women’s education is associated with lower fertility. Increases in time spent at schools are often linked to delay in women’s marriage and childbearing. In Turkey, results from the Turkish Demographic and Health Survey 2003 proposed that women’s completed education is the most important measurement that affects the risk of birth for each parity progression, especially for the transition to third birth (Gore 2010). Lee (2009) suggests that public education and higher education have
contributed to women’s development and the fertility decline in Taiwan. In Taiwan, women’s higher education leads to the decrease in marriage rates, and in some cases, results in increased rates of celibacy. The mean age at marriage in Taiwan increased significantly from 22.1 to 28.1 years for women, and from 28.2 to 33.0 years for men in the period from 1970 to 2007 (Lee 2009). In Oman, women with higher education are more likely to have longer birth intervals (Al-Riyami and Afifi 2003).

Increase in women’s education is also found to be a determinant of fertility preference for a smaller family. Bongaarts (2003) finds that fertility preference is inversely associated with education - women with higher education tend to desire a smaller number of children. Larsen and Hollos (2003), in their study in Tanzania, suggest that it is women’s education that shapes couples’ fertility preference. Surprisingly, the husbands’ education has no impact on the couples’ fertility preference. Schultz (2005), however, comes to a different conclusion, that education of both men and women is critical in demographic transition as well as changes in health and birth control practices. Women’s education increases the chance of women’s employment, and women’s employment in turn, encourages lower fertility (Mason 1987, Jejeebhoy 1995, Brewster and Rindfuss 2000, Lim 2002). Employed women are contributors to the household’s income, thus have significant input in the family’s overall decision-making process (Sarangi 1998, Al-Riyami and Afifi 2003).

Female education is positively associated with higher rates of using healthcare services and modern contraception. Subbarao and Raney (1995) find that education is a key factor in the usage of prenatal care, delivery services and postnatal care. Women with higher education are more likely to have better understanding of their health, have fewer children, and take better care of them. Female secondary education
is found to be strongly associated with lower fertility (Axinn and Barber 2001, Mason 1987, Grown, Gupta, and Pande 2005). For example, in Kenya, women with more than 4 years of education have a better understanding of the causes of diarrhoea, while those with less education only know how to use rehydrating salts without being able to explain the causes. Similar findings are found in Nigeria, where more highly educated women are more likely to know about family planning and have in-depth understandings about diseases and prevention (Kabeer 2005a). The study by Nguyen and Dang (2002) on Vietnamese women, using the data from the Vietnam Demographic and Health Survey 1997, reveals that women with higher level of education have higher odds ratios of using contraception compared to women with no schooling. Women with higher education also have higher odds of using modern methods rather than just relying on traditional methods.

Education has been consistently found to be a strong predictor in the decline of fertility at both individual and country level. Hayase (2005) studies women’s illiteracy rates and total fertility rates in 82 developing countries, using data from the World Bank 2000. The results show that, at the country/macro level, there is a positive correlation between female illiteracy and the total fertility rate of that country. Countries with higher rates of illiterate women are those with higher fertility. Subbarao and Raney (1995) study 72 low- and middle-income countries and estimate that doubling girls’ secondary education from 19% to 38%, holding all other variables constant, would have cut down the 1985 fertility rate from 5.3 to 3.9 children per woman.

Much of previous research on women’s empowerment and education has shown that higher education gives women greater control over their bodies and better access to
birth-control services, nonetheless, some authors propose that education alone may not have such an important role. There has not been a consensus in the literature about the relative importance of education and employment for fertility (Mason 1987). Some authors argue that female education and employment are irrelevant to women’s positions, while others argue that levels of schooling or rates of employment are indicators of the autonomy or dependency that women are likely to experience in relation to men (Mason 1987). Evidence can be found in developing parts of the world, for example, Grown, Gupta, and Pande (2005) found that primary education alone is usually not enough for women to overcome gender constraints. For societies with strong son preference, where girls face substantial discrimination and higher mortality risks than boys, post-primary education for women is needed to enable women to reject gender-bias norms or to find alternative opportunities. Similarly, Wu, Ye, and He (2012), in a study on fertility decline and women’s empowerment in China, concluded that the improvement of women’s social status (in education enrolment and labor force participation) was not the key factor in the fertility decline in China since 1970s. Instead, it was the result of family planning policies put in place by the Chinese government. White, Djamba, and Anh (2001) also suggest that government policies were the most influential factors in the fertility decline of Vietnam from the late 1980s to the early 2000s. Bradley (1995) claims that the mechanism through which education leads to lower fertility is often attributed to Westernization, and there is evidence that education alone may not lead to lower fertility [159].

The overall theme in the literature on women’s empowerment and education is that education is an influential factor in lowering women’s actual fertility and desired fertility. Higher education delays women’s marriage and childbearing, gives them
greater control over their economic status and better access to health care. Nevertheless, the precise mechanism through which education lowers fertility has not been conclusive. Some authors propose that education may not have such an important role after all, but female education in combination with female employment is more critical. Still, the weight of evidence suggests a significant impact of education on fertility decline.

2.2. Labor Market Participation and Fertility

To date, the percentage of women in the population who participate in the labor force has been included in all the measurements of women’s empowerment. Female labor force participation is considered a major factor that affects fertility. The relationship between female labor force participation and lower fertility is an “ecological fallacy”, which means at country level, countries with higher rates of female labor force participation are countries with higher TFRs, however, at individual level, women who have employment are ones with lower fertility.

At country level, women’s employment is found to be an important factor that lies at the heart of most explanations on fertility and fertility changes. In a comparative study of TFRs and female labor force participation rates in 21 developed countries, Brewster and Rindfuss (2000) revealed that countries with low levels of fertility are those with relatively low rates of female labor force participation, and countries with higher fertility levels tend to have relatively high rates of female labor force participation. Italy, Spain, Greece, and Japan are countries with lowest TFRs, around 1.2 to 1.3. These countries also have some of the lowest female labor force participation rates in the developed world (around 40 per cent). In other high-income
countries, TFRs vary from 1.6 to 2.0 and the female labor force participation rates range from around 60 to 80 per cent.

More interestingly, Brewster and Rindfuss (2000) show that in 1970, the relationship between female labor force participation and TFR was statistically negative, i.e. high fertility indicated low female labor force participation. However, by 1996, the relationship reversed; low fertility rates were statistically correlated with low female labor force participation. Sweden, Finland, Demark and the United States had almost no change in their TFR between 1970 and 1996, while their female labor force participation had increased by 15 percentage points. Italy, Spain and Greece experienced similar increase in female labor force participation rates, however, their fertility rates had declined by more than 1.0 child per woman in the same period. In the 1980s and early 1990s, labor force participation rates grew substantially faster for women than for men for every region of the world except for Africa, where women’s female labor force participation was high in most Sub-Saharan Africa due to their importance in horticultural production. In developed countries, increase in female labor force participation has been linked to the completion of the fertility transition.

At the individual level, most studies find that women’s participation in the labor force lowers fertility in several ways. First, women’s participation in the labor force increases the role incompatibility between being mothers and being workers. Second, having paid employment brings more economic independence to women, enhances their decision-making power, and encourages their access to healthcare and contraception. Third, increase in economic independence also leads to lower rates of remarriage and childbearing after marital dissolution. And finally, extensive labor can
deteriorate women’s health, increase their burden both at home and the workplace, thus replacing their potential for high numbers of children.

The first pathway, which specifies role incompatibility as the main determinant of fertility decline, has received much attention from scholars. When women are employed, the opportunity cost of having children is greater for them, as childbirth and maternal leave may hinder their career development and social advancement. Thus, women with employment tend to delay their childbearing and have fewer children than those who have no employment.

In their early speculation on the topic, Rindfuss and Brewster (1996) raised an interesting notion on childcare norms. According to the authors, beliefs about appropriate supervision needed for children are the underlying factor for the incompatibility between the roles of women as caregivers and as workers. The more maternal supervision the norms describe, the greater the role incompatibility. Hence the negative association between fertility and female labor force participation becomes stronger. Rindfuss and Brewster (1996) concluded that the incompatibility between work and fertility was in fact a variable in the relationship between fertility and female labor force participation [292]. Even though the “childcare norms” argument is an interesting and reasonable proposition, determining how to measure childcare norms and identifying how they vary across contexts remains a difficult task.

Previous literature has noted that as industrialization proceeds and living standards improve, children that were once viewed as a potential source of social security for parents, now are increasingly viewed as costs rather than benefits (Cain 1984, Davis 1973, Caldwell 1982, Becker 1960). Bradley (1995) hypothesizes that lower fertility
is the result of the competition under economic scarcity, especially in the competition for employment. Preference for low fertility may prevail, as children become more of a burden than a benefit. In other words, it becomes more expensive to have children. The prospect of having several unemployed children may look like a long-term cost rather than a potential benefit. Unemployed or underemployed parents may also feel reluctant to have large families.

In the second pathway, paid employment is hypothesized to bring economic independence for women, thus enhancing their decision-making power and increasing their access to health care and modern contraceptive methods. Women’s fertility is hypothesized to decline as a result of such improvements. Previous studies have found that women’s empowerment, measured by educational attainment and labor force participation, has contributed significantly to the fertility decline (Jejeebhoy 1995, Kabeer 2005a). Women’s employment is considered an important factor in improving women’s status since it facilitates their capacity to make economic contributions to the family. Blumberg (1984, 1988, 2015), in her theories on gender stratification and gender and development, emphasizes that the single most important factor – though not the only one – to the gender equality is women’s economic power. Similar results are found in other developing countries like Turkey, Oman, Kenya and India (Gore 2010, Al-Riyami and Afifi 2003, Bradley 1995, Sarangi 1998).

However, not all types of women’s labor are considered empowering. Desai (1994) explicitly identified that unpaid activities like fetching fuel, fetching water, helping in agricultural operations or raising children, are not considered economic activities by men, thus they do not enhance the women’s status in the household. And even though women have paid employment, sometimes their incomes are controlled by someone
else, not themselves, thus paid employment in this case does not really empower women in their household. The study by Batliwala (1994) found that in India, in households where wives work for money, their incomes are usually controlled by their husbands. Nevertheless, women’s paid employment is not necessarily associated with lower fertility. Lim (2002) suggests a number of important factors in female labor force participation that lead to fertility transition, including: status in employment, employment rates, informal or formal economy, sector of employment (industry/agriculture), location of employment (home/office based), occupational segregation, size of enterprise, child labor (contribution of children in family work), migration for employment, and other predictors like government regulations.

In the third pathway from female labor force participation to fertility, economic independence may encourage marital dissolution and lower rates of remarriage, both of which may reduce overall fertility (Mason 1987). While most studies examine the relationship within marriage, Mason (1987) examined the impacts of women’s economic independence to their fertility at both during and post-marriage stage. In this articulation, Mason used the term “women’s autonomy” to refer to women’s independence. She argues that women’s autonomy increases the chance of women’s employment after marital dissolution, as well as the chance of remaining single after divorce, and thus diminishing the need of more children. This argument suggests a very interesting and rarely studied topic on the demand for children after marital dissolution. Empirical evidence shows that sometimes employment actually reduces fertility by lessening marriage duration through marital delay or separation. In countries where women make up the majority of international labor migration flows, like Nicaragua, Philippines, Indonesia and Bangladesh, unmarried women may delay marriage, while married women may have lower fertility due to marital separation.
(Lim 2002). It is notable to acknowledge that the relationship between fertility and female labor force participation is not a simple one-direction; each component has its own effect on the other and in turn creates a two-way relationship. Women may decide their fertility as a result of their economic activity in the labor market, or they may choose jobs that accommodate their fertility choices.

In the fourth and also the final pathway, female labor force participation may affect the status of women’s fertility in two ways. Labor-intensive employment may increase the burden on women and lead to deterioration of women’s health. Paid employment can be exploitative to women. Studies on women working in industrial factories in China, Vietnam and Bangladesh suggest that long working hours is the major complaint among working women, which brings negative consequences to their health as well as to their family lives. Some women take up paid employment but household chores and childcare are still their responsibilities. Thus, the burden on women is even more intensified. Examples can be found in the case of most developing Asian countries and countries with high levels of gender expectation for women (McDonald 2000). Data in China show that women with more children tend to perform more housework than their husbands, with one additional child increasing the net odds by 14.1 per cent; they also have lower levels of satisfaction about their family’s status (Wu, Ye, and He 2012).

Many studies have found that women’s employment is one of the key factors in fertility transitions. However, not all types of women’s employment lead to more empowerment or lower fertility. Lim (2002) concludes that women’s employment is likely to lead to sustained declines in fertility when:
“Women’s employment is empowering or “status enhancing”, so that they have control over income and resources and a greater say in family decision-making, including in fertility decisions;

• The conflict between women’s productive and reproductive roles significantly raises the opportunity cost of having children;

• Childcare arrangements are not easily available and the time intensity and quality of childcare desired seriously constrain women’s economic activities;

• The interruption effects (of a period of labor force withdrawal to bear and raise young children) involve heavy costs;

• The returns and satisfactions women derive from participation in economic activities are substantially higher than the returns and satisfactions of having additional children;

• Women’s employment and income-earning capacity enhances their economic or financial independence and reduces the need to have children as a form of security for old age or against adverse economic conditions;

• Women’s economic role and contribution to family welfare lead to reduced sex preference for children and changing attitudes toward the value of daughters;

• Women’s increasing participation in the labor force is linked to increasing investments in girls’ education, and age at first marriage and age at first pregnancy go up; and

• Women work and build up careers before marriage, and age at first marriage and age at first pregnancy go up.” (Lim 2002) [204].
The literature seems to converge on the notion that women’s labor force participation is a critical factor that enhances women’s empowerment and also leads to lower individual fertility and fertility preference. Women’s participation in the labor force brings more economic independence to women, enhances their decision-making power, and encourages their access to healthcare and contraception. But it can also potentially make women less willing to sacrifice their career for childbearing, lower rates of remarriage after marital dissolution and women’s health can deteriorate due to extensive labor, thus reducing their potential for a high number of children.

2.3. Women’s Participation in Household Decision-Making and Fertility

Women’s participation in household decisions can be grouped into two major categories: general decisions related to the household and its members, and decisions specifically related to health, including fertility and birth control. Decisions on health and fertility decisions are considered personal and ideally should be made by the cohabiting couple. Generally, a higher level of female participation in household decision-making is linked with lower fertility. However, the level of women’s involvement in this decision is not uniform across contexts. Senarth and Gunawardena (2009) found that in South Asia most of the decisions on women’s health are made without their participation. Berer (1993) claims that “it is often men, families and society who decide how many children women have, not women themselves, while it is the women who take the responsibility.” [10] Wives’ participation in decision-making can range from a passive compliance to their husband’s decision, to a marginal contribution, or it can be an equitable participation to the decision-making process.
Women’s participation in general household decisions is usually the result of age, female education and employment. Kabeer (2005b) found that in rural Bangladesh, educated women participate in a wider range of decisions than uneducated ones. Women with no education participate in an average of 1.1 decisions. The number increases to 1.6, 2.0, and 2.3 among women who have primary, middle and secondary education, respectively. In Oman, Al-Riyami and Afifi (2003) found a relationship between education and employment with a decision-making index. Women with university education have the highest scores on this decision-making index compared to those who are illiterate or only have primary and preparatory education. In addition to education, employment is also a strong indicator in predicting women’s decision-making index. Paid employment significantly increases women’s scores in this index compared to those who have no paid employment.

Upadhyay and Karasek (2012) used DHS data for four Sub-Saharan African countries and found that greater participation in household decision-making was associated with a smaller ideal number of children in Guinea. Nevertheless, the study did not find a similar result for Zambia, Namibia, or Mali. In Egypt, a study of 3,447 women examines the link between women’s use of passive lactation amenorrhea (breastfeeding after childbirth) as a family planning method and how it relates to women’s empowerment in household decision-making. The results show that women’s empowerment in household decision-making is found to be significantly and negatively associated with the use of breastfeeding as a contraception method. This means that women who have low empowerment in household decision-making are more likely to use passive lactation amenorrhea as a contraceptive method, and lower use of modern methods (Afifi 2007). It also implies that less empowered
women may have more children since using exclusive breastfeeding as a birth control method is not as effective and reliable as modern methods.

Regarding fertility-related decisions, women who participate at higher levels in fertility decisions tend to have fewer children. Mason (1987) suggests that higher levels of women’s independence lead to better and more equal communication between wives and husbands and consequently, result in fertility regulation decision-making and higher use of contraception. Therefore, wife’s educational level and working status are important factors affecting household fertility decisions.

However, empirical research on women’s participation in fertility decision-making in the household is quite limited. Decisions on family size are made within the household, yet little research has been done in this area (Hollerbach 1980). Very few studies to date have used ethnographic/anthropological approaches. In 1996, Johansson et al. (1998) conducted in-depth interviews with 20 Vietnamese couples about fertility decision-making. The results show that both husbands and wives agree that the husband is the main decision maker regarding family size, including decision to have an abortion. Some men in the interviews held unequivocal views of supremacy in decision-making: “it is me who decides everything,” while others took a more egalitarian view to state that both husband and wife participate in the decision-making process. Regarding decisions to have an abortion, some couples said they decided together and some said they discussed the matter together, but the husbands had the final decision. Only one woman explicitly stated that the wife should have the final decision in abortion, since she has to suffer all the consequences afterward. Despite these strong opinions on the husbands’ role in abortion decisions, in fact, some women in the study had undergone an abortion without consulting their
husbands first. These women said the potential objection of their husbands prevented them from discussing it.

A study in Pakistan shows that more than half of the women in the sample (54%) said they decided about family size, and 40% said they could participate in the decision to some extent (Shoaib, Saeed, and Cheema 2012). However, the results are self-reported, it depends on how the women feel the level of autonomy they have, thus potentially is subjected to some personal bias.

Only very few studies have focused on the direct impact of women’s household decision-making on fertility. Even though the dynamics of women’s participation in decision-making are not uniform across countries, generally, women who have more power, in both fertility decisions and other household decisions, seem to have higher rates of wanting fewer children and actually have fewer children than those who do not.

2.4. Contraception, Population Policy and Fertility

In the fourth pathway from women’s empowerment to fertility, contraception and population policy are among the factors that have significant impacts on fertility. The United Nations’ Human Development Reports have emphasized women’s right to their reproductive health as a basic human right, and so do scholars. According to Dixon-Mueller (1993), reproductive freedom lies at the core of individual self-determination. It involves three components: “(1) the freedom to decide how many children to have and when (or whether) to have them; (2) the right to have the information and the means to regulate one’s fertility; (3) and the right to control one’s own body” [12].
There is a strong emphasis in the literature on the relationship between sexual/reproductive control and women’s empowerment and egalitarian gender systems (Malhotra 2012). The invention of the birth control pill in the 1960s has contributed to the independence of women as it separated sexual intercourse from childbearing (Schultz 2005). Similarly, Malhotra (2012) agrees that an important breakthrough in women’s fertility control and the fertility decline is the separation of sexuality and procreation.

Women’s empowerment, reflected through indicators such as education and employment, is positively associated with women’s use of contraception (Mason 1987, Cosio-Zavala 2002, Kabeer 2005b). Much of the fertility decline in developing countries was achieved through an increase in contraceptive use. The percentage of women of reproductive age in developing countries using contraception rose from 9% in 1960 to 61% in 2009 (Allendorf 2012). Women who have low status in the household, however, are less likely to use contraception, and even when they do they are less likely to use modern methods. Afifi (2007) shows that in Egypt less empowered women are more likely to use passive lactation amenorrhea (exclusively breastfeed their under-six-month-old infants) as a contraceptive method, and they exhibit a lower use of modern methods.

Despite the widespread use of contraception in many different parts of the world, unmet need for modern family planning methods still occurs in developing countries (Hayase 2005). Unmet need is defined as the percentage of women who do not desire pregnancy but do not use any contraception. In developing countries in the late 1980s, reports done by the Demographic and Health Surveys show that there was a high level of unwanted births and mistimed childbearing as the result of unmet needs for family
planning. More recently, the proportion of women with unmet family planning needs in selected Asian countries ranged from 39% in Yemen to 7% in Vietnam (Hayase 2005). A study by Nguyen and Dang (2002) using data from the Vietnam DHS 1997 shows that a very high number of women in Vietnam has accessibility to family planning. Specifically, 75% of women in the survey live within 1 kilometre from a facility that provides family planning services. Of the 5,310 women studied, 92.8% of women in urban areas and 91.5% of women in rural areas have met needs for contraception. Surprisingly, in Vietnam, the use of contraceptive pills is very low, only accounting for 5% of the total modern contraceptive methods use. The lack of a national promotion program on the benefits of contraceptive pills makes it less appealing to women so the most common belief among them is that the Intrauterine Device (or “copper T”) is a better method (Knodel et al. 1995). This evidence suggests the important role of national population programs in shaping the fertility control behaviors of women.

Despite strong evidence in the literature which supports the notion that fertility control empowers women and thus more empowered women have fewer children, in some cases, the relationship between women’s empowerment, contraceptive use and lower fertility may be the result of other factors such as age. Data in Kenya show that, on the surface, factors which empower women are associated with family planning, nevertheless, family planning users tend to be older women and to have more economic power (Bradley 1995). It is possible that older women want to end childbearing at the same time they start to have more control over their life. Thus, the mechanism through which contraception is a result of women’s empowerment is still unclear, and the relationship should be examined carefully.
A large number of research studies suggest that the implementation of national family planning programs in developing countries lead to substantial increases in contraceptive use and contributed considerably to the decline in average fertility rates. There are an increasing number of countries that have population-intervention policies, either to increase or decrease the growth of the population (Hayase 2005). Schultz (2005) extensively discusses the role of public population policies in fertility behaviors. For example, population policies can subsidize sex education programs, provide information regarding best practices in birth control methods, subsidize supplies and medical services and promote reproductive health programs. The first official national family planning program was launched as early as 1952 in India. Government subsidy can lower the cost of contraception, thus making them more accessible to women who want to control their family size. Moreover, population propaganda and subsidy policies can help speed the diffusion of contraceptive use.

Population policies can either change the incentives and opportunities that encourage people to voluntarily change their fertility, or they can set administrative limits on fertility (Schultz 2005). Some governments even adopt involuntary population policies such as setting birth quotas with the hope that they can significantly change fertility behaviors and quickly reduce birth rates. Two countries that adopted government restriction on the number of children per couple are China and Vietnam. In China, generally each couple is allowed to have only one child, this was changed recently, if either partner is an only child, then the couple can have two children. The number may depend on the couple’s location and social position. In Vietnam, each couple is allowed to have no more than 2 children. Some authors have raised doubts about the effectiveness of population control policies, especially on birth quotas, as
the fertility of China and Vietnam had already started to drop before the enforcement of the policies (Goodkind 1995b, Cai 2010).

A number of studies have found that even though fertility in China and Vietnam would have decreased anyway, these policies contributed significantly to the rapid decline in fertility levels. Wu, Ye, and He (2012) claim that the dramatic fertility decline in China was rather directly caused by the government’s birth control policy, and surprisingly, not the result of increase in gender equality in both women’s education and employment. In Vietnam, family size has been declining since the 1970s. By end of 1988, when the “one or two child policy” was enforced, the total fertility rate of Vietnam had already fallen to below 4 births per woman, compared to around 6 in the previous decade (Goodkind 1995b). Similar results are found in Taiwan, where the family planning program was launched in 1964 but Taiwan’s fertility already had started to decline 10 years before that (Lee 2009).

Some authors suggest that the fertility decline in developing countries was initiated mainly by social development and the diffusion of innovative ideas rather than by the effectiveness of population policies (Pritchett 1994, Cleland 2001, Montgomery and Casterline 1993). Nevertheless, Lee (2009) argues that the governments’ strong family programs and other incentives and disincentives were conducive to lower contraceptive costs and accelerated fertility decline. Government interventions indeed changed the supply of children, through which many unwanted births were prevented (Bongaarts 1994).

Population policies are intended to reduce the growth of population in developing countries. In developed countries with low fertility levels they are intended to increase the population growth rate. A review of population policies in 21 developed
countries shows that there are two types of national population policies: policies that support “nations of families” and policies that support “nations of individuals” (Brewster and Rindfuss 2000). Policies that support “nations of families” generally strongly support the model of breadwinner-father and homemaker-mother and their dependent children, so they actually make it more challenging for women who want to balance between being mothers and workers. This is the case in Italy and other Mediterranean countries, where family is viewed as a private domain immune from government intervention, and low rates of female labor force participation are accompanied by extremely low fertility (TFR of 1.2-1.3). Women in these Mediterranean countries bear the burden of taking care of extended family members, precluding labor force participation and limiting the time available for childrearing (Bettio and Villa 1998, McDonald 2000).

Policies in “nations of individuals” such as Sweden and the United Kingdom tend to be supportive of women’s rights and concerned with children’s well-being; moreover, they often recognize a diversity of family forms, not just the breadwinner-homemaker model (Brewster and Rindfuss 2000). Scandinavian countries are exemplified as those with policies that target the well-being of individuals rather than family units. In fact, TFRs of Scandinavian countries have never fallen into the lowest-low group, and in recent years, they show signs of steady increase. It seems that these policies have been keeping the TFRs of Scandinavian countries above the lowest low levels found elsewhere (Brewster and Rindfuss 2000). Boling (2008) looks at the expenditures on family programs of Japan and France to explain why the TFR of Japan is much lower than that of France. She finds that in France, the total spending on family programs accounted for 2.5% of the GDP in 1990 and steadily increased to 3.0% in 2003. At the same period, the total spending on family programs in Japan was only from 0.4% to
0.7% of the total GDP. Nevertheless, not all family-friendly policies are effective in increasing fertility in developed countries. Child-care programs and flexible workplace arrangements are found to be most significantly correlated with TFRs in 21 OECD countries, while no significance is found for maternity/childcare leave and social expenditures on families like cash benefits (Castles 2003).

2.5. Cultural Factors in the Relationship between Women’s Empowerment and Fertility

Even though the status of women has been improved significantly and fertility has been reduced as the result of the improvement, there are still barriers that both prevent women’s empowerment and foster high fertility. Patriarchal culture is an important common cause variable that affects both the status of women and fertility preferences. As Kabeer (2005a) points out, cultural perceptions play a contextual role in the empowerment process. Cultural or ideological norms may deny the inequalities, and subordinate groups may not think of inequalities as unjust. Similarly, cultural factors may shape fertility preferences, thus affecting contraceptive use and fertility behavior (Bélanger, Khuat, and Jianye 2003).

Patriarchal cultural factors usually affect both women’s empowerment and fertility. They do not encourage women’s independence from their husbands and women often rely on producing high numbers of children to improve their status in the family. There are two ways that patriarchy may influence fertility. First, it may shape the preference for high fertility, and second, the preference for sons. These two fertility preferences are often correlated with each other: to secure their position in the husband’s family, women often want to have more children, especially sons. In societies where women are dependent on their husbands and have no outside
employment, having more children, especially sons, is viewed as a way for women to raise their status, especially in patrilocal marriage where they are cut off from close family and kinship. The preference for sons often leads to a large number of children, since couples keep trying to have children until they have the desired number of sons.

For a long time, children were viewed as an important resource for the status of women as well as old age security, especially when a woman must marry into an extended household of strangers and must live without the economic or social support of her natal family or without an independent economic base. Exogamous women usually have less security or respect until they have borne at least one child or better yet, a son. Caldwell (1982)’s theory of fertility and economic perspectives is built on the notion that for a long time, children contribute labor as well as a variety of other goods and services to the household. High fertility is advantageous to peasant families as the agricultural production unit is the household in most developing countries in Asia and Africa. Children are demanded by not only women but also by their husbands. Data from Malaysia and Mexico and 18 other developing countries show that men actually want higher numbers of children than their wives (Hollerbach 1980, Bankole and Singh 1998). As a result, women have more children to please their husbands and to secure their positions in the family.

In pre-transitional societies, women are motivated to marry and have children to gain status and ensure economic survival, first through the husband and in later life through their children (Hollerbach 1980). Dixon-Mueller (1993) notes that the woman is considered “one of the family” only after bearing a child and women who have exogamous marriage (marry outside their community) tend to have higher fertility. Her explanations suggest that marriage outside the women’s community deprives
them of potential resources; thus they have only their children to rely on as sources of support and to raise their status. In societies where women’s status is low due to socio-economic and cultural factors, producing more children, especially more sons, can earn old-age security and add to the prestige of women. On top of that, as an “outsider” in the husband’s family, they are less likely to have control of their fertility, instead, it is often decided by the husbands or the in-laws.

In Vietnam, large families are considered a blessing, large families also mean stronger kinship and more support from relatives. The study by Goodkind (1995a) more than two decades ago notes the preference for a large number of children among rural Vietnamese women. He finds that some women in rural parts of Vietnam think the one- or two-child policy is out of place, and that they would want at least three children. He also suggests a “courtesy bias” in this study since the respondents know the government’s policy on family size (one- or two-child policy), so some of them tend to respond accordingly to show that their childbearing preference is in line with the government, while in fact they probably prefer higher numbers of children.

The prevalence of patriarchal cultural norms can also affect fertility by encouraging the preference for sons, and consequently further lowering the status of women and girls. Gender preference, usually for sons, is shaped by cultural traditions and community norms, and may have a significant influence on reproductive decisions (Hayase 2005). Most studies of the relationship between fertility behaviors and women’s empowerment in areas with patriarchal cultural norms have focused on the number of children or the number of sons that a woman has. They have generally found that as women have larger numbers of children or sons, their levels of empowerment tend to increase (Das Gupta 1996, Jejeebhoy and Sathar 2001,
Malhotra, Vanneman, and Kishor 1995). A strong preference for sons may be associated with low use of contraception, since couples keep trying to have children until they have the desired number of sons (Belanger 2002). In India, strong son preference is found correlated to higher girls' mortality during childhood years. For girls who survive, son preference leads to discrimination against them, such as limited access to social and economic resources (Malhotra, Vanneman, and Kishor 1995).

A comparative study of fertility patterns in North and South India finds that higher level of women’s autonomy in the South accounts for the lower fertility of the region. Son preference, as a result of patriarchy in India, is found to be the cause of the disparity in education, sex ratio at birth, age at marriage, and female labor participation (Malhotra, Vanneman, and Kishor 1995). Notably, according to the authors, patriarchy is not the only determinant of fertility in India: there is an overlap between patriarchy and other determinants such as social development and ethnic and class composition. Other researchers have found discrimination against women and son preference in different parts of the world such as Pakistan, Taiwan, Vietnam, China, Bangladesh, Kenya and indeed, Africa as a whole (Bradley 1995, Kabeer 2005a, Shoaib, Saeed, and Cheema 2012, Lee 2009, Goodkind 1995a, Bélanger, Khuat, and Jianye 2003, Wu, Ye, and He 2012, Mason and Taj 1987).

One of the countries where son preference is most prominent is China, especially under the strong influence of Confucianism. Moreover, the one-child policy makes son preference even more intense. Sex ratios at birth in China in the period 2005-2010 were about 119-120 boys to 100 girls (Blumberg 2015). Researchers have raised concern over the extreme imbalanced sex ratios in China, which is predicted to cause profound problems for the country’s future population (Johansson and Nygren 1991,
Das Gupta et al. 2003, Ebenstein 2008). Wu, Ye, and He (2012) observed that Chinese couples with more children are more likely to be constrained by family’s resources for their children; thus they tend to invest more on sons than daughters. In Vietnam, an ethnographic study by Bélanger, Khuat, and Jianye (2003) reveals that the desire for sons stands out as a crucial issue that affects gender and intergenerational relations to a great extent. They observe that having a son is a social norm that exerts an enormous pressure on everyone participating in the study, regardless of education, employment, socioeconomic status, lineage and political role.

The preference for sons is also attributed to the family and kinship systems (Skinner 1997, Dyson and Moore 1983). Skinner (1997) believes that “decisions about marriage and reproduction are, more often than not, made in the context of families and in relation to family strategies” [53]. He suggests that family systems have impacts on demographic processes, particularly, the decisions on fertility, and that couples shape their fertility decisions in accordance with the family system norms. He explicitly states that the most egalitarian gender systems are characterized by matrilineal and ambilineal (or bilateral) stem family system and matrilineal joint family systems. Skinner (1997) believes that couple’s fertility behavior depends on the norms that are prevalent. He does not believe that couples have a target family size and stop when they reach it. Couples’ behavior of stopping childbearing, according to Skinner, is not simply based on the number alone, but also based on the reference to the gender combination of the children. Dyson and Moore (1983) notice that the difference in the sex ratios between North and South India was attributed to the different family and kinship systems. In the North, the sex ratios are high, i.e. higher number of sons than the number of daughters; but in the South, the sex ratios are low. The TFR in the North was also higher than the South. Dyson and Moore
explain the difference was the result of the types of kinship systems in the North and South India. Marriage in Northern India is strictly exogamous, a large dowry is required for marriage, family lines strongly lean towards the husband’s side and women do not inherit property. Whereas, in Southern India, marriage is preferred between cross-cousins or relatives, thus women are more likely to know the husband’s family, brides’ and grooms’ family may share the expense of the marriage equally. The authors note that brides in South have more frequent contacts with their family than their counterparts in the North. The regional difference mentioned was supposed to affect the level of female autonomy in the two regions (Dyson and Moore 1983).

Nonetheless, the preference for sons may change as the preference for high fertility declines, which in turn creates a more symmetrical gender system in the family, and daughters are able to enjoy more resources. Allendorf (2012) notes that in India, as fertility declines, the number of families with children of one gender increases. She argues that the increased number of families with children of only one gender brings more equal gender roles to sons and daughters. Therefore, daughters are able to enjoy greater freedom and better opportunities. Having families with fewer children also means more resources for the children, more equal investments for both daughters and sons, and that inheritance will be passed down to daughters as well. In that same study, Allendorf (2012) observes that most of the respondents agree that daughters are equal to sons, and some even prefer daughters to son, with only one respondent who preferred sons to daughters. Though the ethnographic interviews are detailed and in-depth, the sample size is very small (it includes only 20 semi-structured interviews), yet the study infers that son preference and preference for high fertility often leads to the disempowerment of women, and vice versa.
In addition to the gradual diminishment of son preference, the preference for high fertility has also diminished. In Taiwan, the preferred number of children has declined from 4.0 in 1965 to 2.6 in 1985 to 2.0 in 2002. The number of women who think that “there is no need to have children” increases as their education level increases; while only 0.93% of the women with elementary education agree with this statement, 7.20% of the women with university education do so (Lee 2009). The major reason is found to be the economic burden associated with child rearing.

Recent studies have observed a major shift in fertility preference: in developed countries, people are wanting more children than the actual number of children they have. While in the past, it has always been the reverse: wanted fertility is lower than actual fertility regardless of the country. In Japan, Hayase (2005) found that even though the total fertility rate had decreased from 2.00 to 1.77 from the 1960s to late the 1970s, the ideal number of children increased in the same period, from 2.24 to 2.44. Bongaarts (2002) examined the desired number of children and actual completed fertility among women of the 1960 birth cohort in 21 developed countries in Europe and U.S and Canada and also found similar trends. In all countries studied, the desired fertility ranges from 2.0 in Austria and Germany to 2.5 in Sweden, while actual completed fertility ranges from 1.65 in Germany and Italy to 2.18 in Poland. Relatively advanced developing countries like Thailand and Taiwan are experiencing similar patterns, where desired fertility is close to 2.5 while actual fertility is around 1.7 to 1.9 (Bongaarts 2001). Nevertheless, in a study of 57 developing countries in Asia, Latin America, and Sub-Saharan Africa he still finds that wanted fertility is lower than actual fertility (Bongaarts 2003).
Nearly two decades after the term women’s empowerment began to be used in development reports and academic research, there is still no clear framework to understand how women’s empowerment affects different aspects of fertility. The literature has noted that the improved status of women often increases their educational attainment and employment opportunities, more decision-making power and especially more autonomy in their fertility. Population policies that subsidize contraception and give support to families with children are also significant factors that adjust fertility desire and behavior. Yet there are still substantial constraints to women’s empowerment, such as the preference for sons and the preference for large numbers of children. These patriarchal cultural factors slow down the process of empowering women, thus affecting their decisions and behaviors on fertility.

In order to understand the mechanism through which women's empowerment affects aspects of fertility, the first step is to precisely measure women's empowerment at the individual level. The gap in the literature has motivated this study to be done to validate if women’s labor force participation, women’s education, women’s household decision-making, and contraceptive use are four factors of women's empowerment as previously suggested. This study incorporates data from developing countries in Southeast Asia, which usually lack current measurements. It also measures women's empowerment at the individual level. After being able to identify women's empowerment factors, the relationship between women's empowerment and fertility preferences as aspects of fertility is analyzed.
CHAPTER 3: REGION OF STUDY AND THE DATA

There have been many studies on women’s empowerment in South Asian countries such as India, Bangladesh and Sri Lanka. Microfinance has been extensively studied as a determinant for women’s empowerment in South Asia. Similarly, the tremendously fast demographic transitions in East Asia have been thoroughly studied by various scholars. Southeast Asia is a region with great diversity and dynamics; yet, there has been little research about the region on both women’s empowerment and fertility transitions. While studies on the demographic transitions of East Asia often reveal that population policy and economic growth of this region account for its sharp decline in fertility levels, Southeast Asia has been experiencing a similar fast pace of decline in fertility levels but the determinants are diverse. Southeast Asian countries have a mix of distinctive religions, cultures, population policies and levels of development; yet, fertility decline is still observed in every country in the region. To fill the gap in the literature on women’s empowerment and fertility in an under-studied region, this study aims to examine the link between women’s empowerment and aspects of fertility in Southeast Asia, specifically the relationship between women's empowerment and women’s fertility preference.

Southeast Asia has been experiencing enormous changes in demographic, socio-economic and political aspects. It is also a region with fast growing promotion programs to empower women. It is an excellent region to study women's empowerment and how it relates to the major fertility transition happening in the region. In this chapter, first, I will present an overview on Southeast Asia as the region of study and review the current trends of demographic changes in the regions. Then I will discuss the current situation of women in Southeast Asian countries.
reflected through international indexes. And finally, an introduction of the Demographic and Health surveys as the data used in this study is presented.

3.1. Southeast Asia as a Region to Study Women's Empowerment

The concept of Southeast Asia emerged almost by accident from World War II, at the Quebec Conference in August 1943, the Western Allies decided to establish a separate Southeast Asia Command, embracing Burma (currently Myanmar), Malaya (currently Malaysia), Sumatra (currently Indonesia) and Thailand (World Economic Forum 2012). This military expedient provided a cohesive framework for a region, which had never previously been recognized as a distinct geopolitical area. In the literature, only from the 1940s that the name Southeast Asia was used in scholarly works (Turnbull 1999, Emmerson 1984). Nowadays, the region consists of 11 countries: Brunei, Cambodia, Timor-Leste, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam. Southeast Asia is a region with great diversity in socio-economic conditions, culture and religions.

Southeast Asia is currently home of nearly 600 million people – which accounts for almost one tenth of the world’s population. Since the middle of the 20th century, Southeast Asia has been experiencing very rapid population growth, much more than what scientists would have expected. Average population increase in 1960-1965 was 2.64% per annum but has been declining to 1.33% in 2000-2005 and then to 1.16% in 2005-2010.
Southeast Asian countries vary greatly in population size. Indonesia alone has nearly 240 million people, which makes it the most populous archipelago in the world and also the fourth most populous country in the world. On the other end of the spectrum, Brunei has the smallest population, approximately of 400 thousand people. There are small sized countries like Singapore, Timor-Leste, Laos and Cambodia, and medium sized countries like Malaysia, Myanmar, Philippines, Thailand and Vietnam.

Population growth rates are very different among Southeast Asian countries. In 2010, three countries, including Vietnam, Cambodia, and Indonesia, have population growth rates of 1.1% per annum. Thailand and Myanmar have population growth rates of 0.7% per annum while the rest of the region has quite high growth rates, from 1.5-3.5% per annum. The fastest population growth is observed in Singapore, at 3.5% per annum in 2010. However, as the country with the lowest rate of natural increase in the region, the population growth of Singapore is mainly attributed to immigration.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Brunei</td>
<td>399,000</td>
<td>1.9</td>
<td>17.0</td>
<td>15,533</td>
<td>13,024</td>
</tr>
<tr>
<td>Cambodia</td>
<td>14,138,000</td>
<td>1.1</td>
<td>15.1</td>
<td>11,272</td>
<td>797.3</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>1,124,000</td>
<td>2.1</td>
<td>30.7</td>
<td>794</td>
<td>706.1</td>
</tr>
<tr>
<td>Indonesia</td>
<td>239,871,000</td>
<td>1.1</td>
<td>11.9</td>
<td>707,448</td>
<td>2,949.3</td>
</tr>
<tr>
<td>Laos</td>
<td>6,201,000</td>
<td>1.5</td>
<td>17.5</td>
<td>6,496</td>
<td>1,047.6</td>
</tr>
<tr>
<td>Malaysia</td>
<td>28,401,000</td>
<td>1.7</td>
<td>16.3</td>
<td>237,797</td>
<td>8,372.8</td>
</tr>
<tr>
<td>Myanmar</td>
<td>47,963,000</td>
<td>0.7</td>
<td>9.1</td>
<td>42,027</td>
<td>876.2</td>
</tr>
<tr>
<td>Philippines</td>
<td>93,261,000</td>
<td>1.7</td>
<td>20.0</td>
<td>199,591</td>
<td>2,140.1</td>
</tr>
<tr>
<td>Singapore</td>
<td>5,086,000</td>
<td>3.5</td>
<td>4.2</td>
<td>222,699</td>
<td>43,783.1</td>
</tr>
<tr>
<td>Thailand</td>
<td>69,122,000</td>
<td>0.7</td>
<td>5.7</td>
<td>318,850</td>
<td>4,612.8</td>
</tr>
<tr>
<td>Vietnam</td>
<td>87,848,000</td>
<td>1.1</td>
<td>12.0</td>
<td>103,902</td>
<td>1,182.7</td>
</tr>
</tbody>
</table>

Timor-Leste experienced negative population growth in the period from 1995 to 2000 as the result of the war to gain independence. After claiming its independence in 2002, the country experienced a dramatic population rebound from -0.5% per annum to 4% per annum, and stayed around 2.1% in 2010. With the highest natural increase rate in the region, at 30.7 per 1000 population, Timor-Leste is the country with highest population growth rate by natural increase in the Southeast Asian region.

The 1990s witnessed the miracle growth of Asia as a whole and particularly Southeast Asia. From 1990-2000, Southeast Asian economic growth was 5.3%, compared to a 2.8% global economic growth rate. Unfortunately, the economic crisis in 2008 affected the economic growth of Southeast Asia quite severely. In this year, five out of eleven Southeast Asian countries experienced negative economic growth rates. The regional growth rate was only 1% compared to 4.3% just one year earlier (United Nations 2012). Even though exports to Europe have declined in recent years, Southeast Asian economies still manage to sustain moderate economic growth. In 2011, the annual per cent growth in the GDP of Southeast Asia was approximately 4.5% (United Nations - Economic and Social Commission for Asia and the Pacific 2011).

One of the aspects of Southeast Asia that amazes most scholars who study the region is the very fast demographic changes occurring in the region since the 1950s. Demographers refer to demographic transition as the change from a high fertility-high mortality model in the population to a low fertility-low mortality model. In Southeast Asia in the 1960s, mortality rates declined significantly while fertility rates also declined, “faster than any observer would have imagined in 1960” (International Monetary Fund 2012). The total fertility rate per women declined from 6.03 children
per woman in 1950s to 5.32 in the 1970s and further declined to 2.20 in 2010, which was 0.3 children lower than the world’s total fertility rate (Jones 1995, United Nations - Economic and Social Commission for Asia and the Pacific 2011). Despite the lower fertility rates, the region’s population will continue to grow before it really levels off. High fertility in the past decades brings a high population in the working age to the current economy. For that reason, demographic transitions in Southeast Asia have been suggested as one of the reasons for the region’s miracle economic emergence.

Southeast Asia is a region of great diversity in religions. Religion acts as a factor that influences social norms about the status of women, as well as the fertility norms in the society. Hence, it is noteworthy to take the religious diversity in Southeast Asia into consideration while studying the empowerment of women and fertility. Table 4 shows the percentage of the population by religions in Southeast Asia.

<table>
<thead>
<tr>
<th>Country</th>
<th>Islam</th>
<th>Christianity</th>
<th>Buddhism</th>
<th>Other</th>
<th>Confucianism</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brunei</td>
<td>67</td>
<td>10</td>
<td>13</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cambodia</td>
<td>2.1</td>
<td>96.4</td>
<td>1.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Timor</td>
<td>1</td>
<td>99</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>86.1</td>
<td>8.7</td>
<td>5.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laos</td>
<td>1.5</td>
<td>67</td>
<td>31.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaysia</td>
<td>60.4</td>
<td>9.1</td>
<td>19.2</td>
<td>7.8</td>
<td>2.6</td>
<td>0.8</td>
</tr>
<tr>
<td>Myanmar</td>
<td>4</td>
<td>4</td>
<td>89</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Philippines</td>
<td>5</td>
<td>92.5</td>
<td></td>
<td>2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Singapore</td>
<td>14.9</td>
<td>14.6</td>
<td>42.5</td>
<td>0.7</td>
<td>14.8</td>
<td></td>
</tr>
<tr>
<td>Thailand</td>
<td>4.6</td>
<td>0.7</td>
<td>94.6</td>
<td>0.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vietnam</td>
<td>0.1</td>
<td>7.2</td>
<td>9.3</td>
<td>2.6</td>
<td>80.8</td>
<td></td>
</tr>
</tbody>
</table>

Islam is most commonly practiced in Southeast Asia, mostly Brunei, Malaysia and Indonesia. More than 240 million people in the region are Muslim, which accounts for 16% of the world’s Muslim population. Christianity and Buddhism are also commonly observed in Southeast Asian countries. The majority of the population in Timor-Leste and Philippines are Christian of different denominations, and only a very
A small part of the population is Muslim. Five out of eleven countries have Buddhism as the majority religion, including Cambodia, Laos, Myanmar, Singapore and Thailand. Vietnam seems to be an outlier in religion with surprisingly 80.8% of the population not being associated with any religion. This is likely due to the discrimination by the Communist party in the 1960s, which associated religion with superstition and backwardness. There is likely a large number of people who are in fact Buddhist and Confucians but do not officially register their religious beliefs.

3.2. Demographic Trends in Southeast Asia

The beginning of demographic transition in Southeast Asia took place as early as in the 1960s. The region has been experiencing dramatic demographic changes, most notably the fertility decline. The decline happens even in countries with low economic development, which is in contrary to classic theories on fertility transitions, which states that fertility decline often accompanies industrialization and economic development. There is also a major delay in women’s age at marriage and childbearing, attributed to better education and employment opportunities for women, which significantly contribute to the fertility decline in the region.

Fertility Is Declining

Demographic transition describes the change from high fertility – high mortality to low fertility – low mortality. Asia’s demographic transition follow this model, but at a very rapid pace, much faster than 19th century Europe (Bloom and Williamson 1998). In the classic model of demographic transition, the decline in child mortality would lead to a decline in fertility, since couples reduce the need to have high fertility to compensate for the number of children that may die. The population growth in
Southeast Asia has slowed down due to the decline in fertility (Bloom and Williamson 1998). Table 5 shows the population growth in Southeast Asia in terms of population increase, natural increase, total fertility rates and infant mortality rates.

Table 5: Population Growth in Southeast Asia, 1950-2010

<table>
<thead>
<tr>
<th>Period</th>
<th>Population increase (% per annum)</th>
<th>Rate of natural increase (% per annum)</th>
<th>Total fertility rate (per woman)</th>
<th>Infant mortality rate (per 1000 births)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950-1955</td>
<td>2.222</td>
<td>22.2</td>
<td>6.05</td>
<td>165</td>
</tr>
<tr>
<td>1955-1960</td>
<td>2.535</td>
<td>25.2</td>
<td>6.22</td>
<td>142</td>
</tr>
<tr>
<td>1960-1965</td>
<td>2.648</td>
<td>26.5</td>
<td>6.25</td>
<td>123</td>
</tr>
<tr>
<td>1965-1970</td>
<td>2.601</td>
<td>26.2</td>
<td>6.06</td>
<td>106</td>
</tr>
<tr>
<td>1970-1975</td>
<td>2.452</td>
<td>24.7</td>
<td>5.62</td>
<td>94</td>
</tr>
<tr>
<td>1975-1980</td>
<td>2.154</td>
<td>22.6</td>
<td>4.81</td>
<td>81</td>
</tr>
<tr>
<td>1980-1985</td>
<td>2.255</td>
<td>22.5</td>
<td>4.22</td>
<td>66</td>
</tr>
<tr>
<td>1985-1990</td>
<td>2.056</td>
<td>20.4</td>
<td>3.59</td>
<td>55</td>
</tr>
<tr>
<td>1990-1995</td>
<td>1.736</td>
<td>18.3</td>
<td>3.11</td>
<td>45</td>
</tr>
<tr>
<td>1995-2000</td>
<td>1.509</td>
<td>15.4</td>
<td>2.66</td>
<td>38</td>
</tr>
<tr>
<td>2000-2005</td>
<td>1.331</td>
<td>14.1</td>
<td>2.45</td>
<td>32</td>
</tr>
<tr>
<td>2005-2010</td>
<td>1.163</td>
<td>12.5</td>
<td>2.27</td>
<td>27</td>
</tr>
</tbody>
</table>


In six decades, from the 1950s to 2010s, the population growth rate of Southeast Asia has declined by about half, from 2.2% per annum to 1.2% per annum. During that period, the natural increase rates (calculated by the crude birth rate minus the crude death rate), which represent the portion of population change due exclusively to births and deaths, declined from 22.2% per annum to 12.5% per annum. For one decade, from 1960-1970, it peaked at 26% per annum, then fell steadily ever since. The infant mortality rate in the region has declined dramatically by more than 6 times, from 165 infant deaths per 1,000 births to 27 infant deaths per 1,000 births in the period from 1950 to 2010. The decline in the region’s population growth was mainly contributed by the decline in total fertility rates. Figure 2 shows the decline in Total Fertility
Rates in 11 Southeast Asian countries and the region as a whole during the period from 1950 to 2010.

**Figure 2: Total Fertility Rate in Southeast Asia, 1950-2010**

Most countries experienced rapid fertility decline from 6-7 births per woman to around 2-3 births per woman in six decades. Compared to the East Asia, where the TFR has dropped to the lowest-low level of 1.3, the TFR of Southeast Asia is around 2.2, which is very close to the sustainable level of 2.1. One of the reasons why Southeast Asia regional fertility does not drop to the lowest-low level is because Southeast Asian women tend to get more help from their kinship system and than
women in East Asia, even though they also have high female labor force participation rates (Blumberg 2015). The rapid decline of total fertility rate in Southeast Asia together with the overall fertility decline in Asia was considered faster than Europe at the onset of demographic transition (Bloom and Williamson 1998).

Nevertheless, Singapore and Thailand are the two countries with the lowest total fertility rates in the region. These countries were also ones that first completed the fertility transition – a stage where high total fertility rate declines to around 2.1 children per woman. The TFRs of these two countries are now around 1.0 in the most recent decade. Concerns about the consequences of below replacement fertility levels in these two countries such as population aging and the feminization of the elderly population, have been raised (Gubhaju and Moriki-Durand 2003). 

Cambodia and Timor-Leste are the only two countries in the region that experienced increases in the total fertility rates during the period from 1950-2010. In the 1950s, Cambodia’s total fertility rate was close to 7.0, and later declined to about 5.0 in the beginning of 1970s, overlapping with the genocide by the Khmer Rouge in Cambodia. It was estimated that about 2.2 to 2.8 million Cambodians were killed during the Khmer Rouge regime, mainly by execution, starvation and illness (Heuveline 1998). The fertility rate was consequently lowered as the result of the massive loss in the population. After the end of the Khmer Rouge in 1979, the population of Cambodia increased dramatically; this phenomenon is often referred to as the demographic rebound. In the early 1980s, the total fertility rate of Cambodia increased from around 5.0 to 7.0. Nevertheless, the increase only lasted for one decade. Cambodia’s total fertility rate started to decline steadily since the 1990s to the present, and is currently around 3.0 children per woman.
Another country in Southeast Asia, which has a recent history of war and conflict, is Timor-Leste. The country’s total fertility rate experienced two sharp increases in the 1980s and 2000s. Both were demographic rebounds after two periods of killings and excess deaths caused by hunger and illness. The first rebound happened after the 1975 invasion by Indonesia, only 9 days after East Timor claimed independence. It was estimated that about 18,600 killings and 84,200 excess deaths resulted from this event. The 1980s fertility increase was the rebound effect of the excessive loss of the population. The sharp increase in this period boosted the total fertility rate to the level of the decade before. The second total fertility rate increase was in the 2000s, following the independence of Timor-Leste in 2002. The sudden increase in the total fertility rate was the result of reunions of couples separated during the resistance campaign for independence. It was also the result of new unions established after the independence of the country. East Timor’s fertility rate only showed signs of decline in the last decade, making it the latest country that joined the trend of fertility decline in Southeast Asia.

The total fertility rates of Vietnam, Brunei and Indonesia have declined steadily since the 1950s and currently stay around replacement level (2.1 children per woman). Among these three countries, only Brunei is considered a middle-income country with GDP per capita of US$13,000. Vietnam and Indonesia are considered low-income countries. The completion of fertility transition in Vietnam and Indonesia is remarkable and unexpected to scholars in regard to their level of socioeconomic development. Similar to Cambodia and Timor-Leste, the demographic rebound was also observed in Vietnam in the 1970s post-war period, where fertility rose for one decade and started to decline right afterward. Some scholars suggest that the government’s population policy could be one of the major factors that contribute to
the significant decline in fertility. Vietnam was the first country in Southeast Asia to adopt a policy to reduce the population growth rate, which took place in 1963. Soon after, Singapore, Indonesia, Thailand and the Philippines followed suit.

Also experiencing rapid decline in fertility from 1950 to 2010, however, the total fertility rates in Cambodia, Laos, Malaysia, and the Philippines are still currently around 3.0. Laos entered the onset of fertility transition quite late compared to other Southeast Asian countries except for Timor-Leste. The country’s fertility level did not show signs of stagnation or decline until the 1990s. Nevertheless, their rate of decline was extremely fast, at about 1.0 child fewer per woman per decade in the last three decades.

**Delayed Marriage and Childbearing**

Alongside the decline in the total fertility rate, age at marriage of Southeast Asian women is also increasing. Women’s age at marriage is a very important determinant of the decline in fertility in the region. Social and economic changes that happen rapidly in the region have created more opportunities for women in education and the job market. As women spend a longer time in education and participate in the labor force afterwards, their marriage and family patterns also have changed. Women are getting married and having their first child later than previous generations.

Delayed marriage in Western societies is often associated with the rise in the cohabitation rate, whereas in Asian culture it is uncommon for women to cohabit before marriage. Most births in Southeast Asia happen within marriage, thus marital fertility accounts for the majority of the total fertility in the region. As a result, the trend of delaying marriage by Southeast Asian women has a significant impact on the regional decline in fertility. Jones (1995, 2007) views the delay in marriage and
childbearing as one of the key factors that contributes to the fertility decline in Southeast Asia.

The average women’s age at marriage has risen all over Southeast Asia since the 1960s. The median age at marriage of Malaysian women rose by 5 years, from 17 to 22 in the period from 1957-1980 (United Nations Population Division 2010). According to the World Fertility Report 2009, the mean age at first marriage of 77 countries rose significantly from 21.8 to 24.7 during the period from 1970 to 2008. Data are not available for all countries in Southeast Asia but in countries where data are available, mean age at marriage of women has increased over the years. For example, in Indonesia, women’s age at marriage has increased from 15.9 (in 1976) to 19.2 (in 1998) and later to 20.8 (in 2007). In the Philippines, women’s age at marriage has increased from 19.6 (1978) to 22.0 (1993) and 22.2 (in 2003). In Singapore, women’s age at marriage increased from 25.7 to 27.1 in only one decade, from 1998-2008, which makes Singaporean women the latest to marry in Southeast Asia.

Concurrent with the increase in age at marriage, women’s average age at childbearing is also increasing. In all Southeast Asian countries but Thailand, women’s age at childbearing has increased, even though only slightly. According to the World Fertility Report 2009, the mean age at childbearing of Thai women has declined dramatically from 30.8 to 26.9 in the period from 1969 to 1996, while the TFR decreased from 6.1 to 2.0 in the same period.
As women delay marriage, the risk of them not getting married at all potentially increases as well. In 2000, 25.9% of Myanmar women and 16.1% of Thai women at the age of 30-34 were single. In some countries in the region, about 15% or more of women will remain single by the end of their reproductive period (Jones 2007). Other estimation shows that in 1990, in Thailand, the proportion of never-married women in the 40-44 age group was 7%, which is a 4% increase since 1970 (Ean 2002). In Vietnam, about 7% of the women aged 35-39 and 7% of women aged 40-44 were never-married (Bélanger 2004). The proportion of Singaporean women who remained single at 45-49 has increased from 1% to 13% during the period from 1970 to 2000. In the same period, the proportion of Chinese Malayan women who remained single increased from 2% to 5%, and the proportion of Thai women who remain single increased from 3% to 8%.

3.3. Women’s Empowerment In Southeast Asia in International Indexes

In recent years, improvement in the status of women has been observed in all parts of Asia, including Southeast Asia. An analysis on the trend of global indexes on gender
equality and women’s empowerment can picture the improvement of women’s status in Southeast Asia at a global scale. There are several indexes that are frequently used to measure the status of women in relation to men. The Gender Inequality Index (GII) was developed by the United Nations and is mostly used in the Human Development Report. The global Gender Gap Index (GGI), developed by the World Economic Forum, is reported annually since 2006. The Social Institutions and Gender Index (SIGI) was only recently developed by the Development Centre of the Organization for Economic Co-operation and Development (OECD) in 2009.

The Gender Inequality Index

The Gender Inequality Index (GII) was developed and was first used in the Human Development Report 2010 by the United Nations. It was developed as an improvement from the Gender Development Index and the Gender Empowerment Measure Index, which had been used since 1995 in the Human Development Report. The new GII captures the loss due to gender inequality in three dimensions: reproductive health, empowerment and labor market participation. The GII takes 0 as perfect equality and 1 as perfect inequality. A higher score implies greater gender inequality and vice versa, a smaller score implies better equality for women.

The 2012 GII includes rankings of 148 countries with data available. In Southeast Asia, Singapore is the country with the highest rank. In 2012, Singapore is remarkably ranked 13th globally in terms of gender equality. Malaysia, Vietnam, Thailand, Philippines and Myanmar are among the medium-high, with rankings ranging from 44 to 80. Cambodia, Laos and Indonesia are among the lower ranked countries, from 96 to 106, which indicate gender inequality is more prevalent in these
countries than in the rest of Southeast Asia. Their rankings are only better than those of countries in Africa and some in the Middle East.

Table 7: Ranks by the Gender Inequality Index for Southeast Asian countries, 2000-2012 (by highest ranks first in 2012, out of 148 countries)

<table>
<thead>
<tr>
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<th></th>
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</thead>
<tbody>
<tr>
<td>Singapore</td>
<td></td>
<td>13</td>
<td>7</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Malaysia</td>
<td>28</td>
<td>40</td>
<td>42</td>
<td>43</td>
<td>42</td>
</tr>
<tr>
<td>Vietnam</td>
<td>29</td>
<td>42</td>
<td>45</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Thailand</td>
<td>41</td>
<td>64</td>
<td>63</td>
<td>69</td>
<td>66</td>
</tr>
<tr>
<td>Philippines</td>
<td>43</td>
<td>69</td>
<td>70</td>
<td>75</td>
<td>77</td>
</tr>
<tr>
<td>Myanmar</td>
<td>---</td>
<td>---</td>
<td>77</td>
<td>96</td>
<td>80</td>
</tr>
<tr>
<td>Cambodia</td>
<td>62</td>
<td>96</td>
<td>85</td>
<td>99</td>
<td>96</td>
</tr>
<tr>
<td>Laos</td>
<td>57</td>
<td>95</td>
<td>93</td>
<td>107</td>
<td>100</td>
</tr>
<tr>
<td>Indonesia</td>
<td>---</td>
<td>97</td>
<td>91</td>
<td>100</td>
<td>106</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Brunei</td>
<td>---</td>
<td>---</td>
<td>---</td>
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<td>---</td>
</tr>
</tbody>
</table>

Source: Gender Inequality Index (ranks based on actual scores)
---: no data available

The country ranking in table 7 shows the trend of Southeast Asian countries’ rank from 1995-2012. The rankings may give the impression that Southeast Asian countries are doing worse in term of gender equality since the ranks have not been improved in recent years. For example, in 2011, Singapore ranked 8th, but down to 13th place in 2012. Malaysia ranked at 28 in 2000 but down to 44 in 2012. The same trend is observed in all other countries in Southeast Asia. The biggest loss in ranking is Laos, whose rank was 57 in 2000 and down almost two folds, to 101 in 2012. However, all Southeast Asian countries are getting progress in gender equality in terms of actual GII scores. The lower rankings are due to the overall progress in other countries outside of Southeast Asia.

The ranks are inversely correlated to the actual GII score, i.e. the higher the score the worse that country is in gender equality. In order to make the GII index easier to interpret and consistent with the ranks, i.e. higher ranks mean higher scores. The
actual GII score is recoded into a new score by taking 1 minus the country actual GII score, or [Recoded GII = 1 - actual GII score]. This recode runs from 0 to 1, with 0 as the lowest value, and 1 as the highest value. Figure 3 shows the recoded GII scores over time, from 1995-2012.

The recoded Gender Inequality Index from 1995-2012 reveals that more equality for women is being achieved in all Southeast Asian countries, despite the decrease in their rankings. According to the recoded GII index, from 1995 to 2012, Singapore always had the highest score, which is around 0.9, well above other countries in the region in terms of gender equality.
The second best ranked countries, Malaysia and Vietnam, stand significantly below Singapore, with the recoded GII in the 0.7s in 2012. Thailand scores around 0.6, a little above Philippines and Myanmar. Laos, Cambodia and Indonesia score the lowest, around 0.5 in the recoded index.

Overall, most countries have increased by approximately 0.1 in their scores during the period from 1995-2012. Laos had a very dramatic improvement in the index from 1995-2000. The country improved its score by almost 0.2 point in just 5 years, from 1995 to 2000, and a total improvement of 0.3 point in the period 1995-2012. The very low score in 1995 (only 0.2) suggests that Laos’s GII score might have been suffered from lack of sufficient data for calculation in 1995.

**The Gender Gap Index**

The second most frequently used index in measuring gender inequality is the global Gender Gap Index, which has been developed by the World Economic Forum since 2006. This index claims to capture national gender gaps in economic, political, education and health. The gender gap is measured by the female/male ratios in relevant aspects. For example, economic participation and opportunity are measured by the labor force participation rates of men and women, ratio of female-to-male earnings, and wage equality for similar work.

Educational attainment is measured by the ratio of women to men in primary, secondary and tertiary education; the ratio of women to men in the literacy rate is also used. Health is captured by the sex ratio at birth and the difference between women’s and men’s life expectancy. The political empowerment aspect of the index is captured by the ratio of women to men in minister-level positions and the ratio of women to men in parliamentary positions. Additionally, the ratio of women to men in terms of
years in a prime ministerial or presidential office in the last 50 years is also included.

The ranking does not include all the countries in the world due to the lack of data.

Table 8 shows the rankings of Southeast Asian countries from 2006 to 2012.

Table 8: The Global Gender Gap Index rankings for Southeast Asian countries, 2006-2012 (by highest ranks first in 2012, out of 132 countries)

<table>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Philippines</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>9</td>
<td>9</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Singapore</td>
<td>65</td>
<td>77</td>
<td>84</td>
<td>84</td>
<td>56</td>
<td>57</td>
<td>55</td>
</tr>
<tr>
<td>Thailand</td>
<td>40</td>
<td>52</td>
<td>52</td>
<td>59</td>
<td>57</td>
<td>60</td>
<td>65</td>
</tr>
<tr>
<td>Vietnam</td>
<td>---</td>
<td>42</td>
<td>68</td>
<td>71</td>
<td>72</td>
<td>79</td>
<td>66</td>
</tr>
<tr>
<td>East Timor</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>68</td>
</tr>
<tr>
<td>Brunei</td>
<td>---</td>
<td>---</td>
<td>99</td>
<td>94</td>
<td>77</td>
<td>76</td>
<td>75</td>
</tr>
<tr>
<td>Indonesia</td>
<td>68</td>
<td>81</td>
<td>93</td>
<td>92</td>
<td>87</td>
<td>90</td>
<td>97</td>
</tr>
<tr>
<td>Malaysia</td>
<td>72</td>
<td>92</td>
<td>96</td>
<td>100</td>
<td>98</td>
<td>97</td>
<td>100</td>
</tr>
<tr>
<td>Cambodia</td>
<td>89</td>
<td>98</td>
<td>94</td>
<td>104</td>
<td>97</td>
<td>102</td>
<td>103</td>
</tr>
<tr>
<td>Laos</td>
<td>---</td>
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<td>---</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

---: data are not available.

Similar to the GII, the GGI takes values from 0 to 1, but in the opposite direction, a score of 1 indicates perfect equality and 0 indicates perfect inequality. According to the Global Gender Gap Index, Cambodia is a low income country; Philippines, Vietnam, East Timor and Indonesia are lower-middle income; Thailand and Malaysia are upper-middle income countries, and Singapore and Brunei are high income countries. Despite criticism of the GGI that the country’s income is overcompensated for in the index, it does not seem that high income countries are more likely to score higher in this index.

Southeast Asian countries can be divided into three groups depending on their 2012 rankings in the index: high ranking – includes the Philippines (8); middle ranking - includes Singapore (55), Thailand (65), Vietnam (66), East Timor (68), Brunei (75); and low ranking – includes Indonesia (97), Malaysia (100) and Cambodia (103). The
trends from 2006 to 2012 show that all Southeast Asian countries except for Singapore have been moving downward in their rankings in this index. For example, the Philippines, ranked number 8th globally, which is a very remarkable ranking for a lower-middle income country. Nevertheless, it is 2 positions downward compared to its 2006 ranking. Thailand was ranked 40 in 2006 but moved down to 65 in 2012, making it the country with the largest drop among all Southeast Asian countries. Singapore moved up from 65 in 2006 to 55 in 2012.

The rankings of Southeast Asian countries in the GGI by the World Economic Forum are comparable to the rankings in the GII by the United Nations, except for the dramatic difference between the rankings of Philippines, Singapore and Malaysia. In 2012, the GGI ranks Philippines number 8th globally and the best in the region, while the GII ranks it 77. The difference between the two indexes seems to be too dramatic for the same country. In the same year, the GGI ranks Singapore 55th globally, and the GII ranks Singapore 13th, also the best in the region in terms of gender equality. Such striking difference between the rankings of the two countries in the two indexes raises the question why such difference exists.

The GGI measures the gender gap without taking the level of development into consideration, while the GII does consider this indicator. This may explain why Singapore, as a developed country with high GDP and high GDP per capita is ranked very high in the GII index. The same explanation can be applied to Malaysia, which is ranked 44 in the GII while only ranked at the 100th place in the GGI. Malaysia has the third highest GDP per capita in the region, thus the country ranks higher in the GII, whereas the country’s level of development is not accounted for in the GGI. On the other hand, in the sub-index of representation of women in political participation, the
GGI accounts for the number of years that the country is led by a female head of state or a female president in the last 50 years, while the GII does not include this variable. In the last 50 years Philippines has had 2 female presidents, who served for a total of 15 years while Singapore has never had a female president. This may contribute to the fact that Philippines is ranked very high in the GGI while Singapore is only ranked at the medium range.

The GGI rankings over the years may give the impression that Southeast Asian countries are losing in their gender gap index, however, the actual scores of the GGI indicate otherwise. Most countries have shown increases in the actual scores during the period from 2006 to 2012, implying that the status of women is getting better in all countries in Southeast Asia.

![Figure 4: Gender Gap Index of Southeast Asian countries, 2006-2012](image-url)
Figure 4 shows the trends in GGI scores of Southeast Asian countries (where data are available) over time. While some countries like Cambodia, Malaysia, Indonesia, Vietnam and Thailand showed only a slight increase in the GGI scores, countries like Philippines, Singapore and Brunei improved their score quite significantly. From 2006 to 2012, Singapore increased its score by 0.04, and Brunei and Philippines increased their score by 0.03 and 0.02, respectively. As the Index breaks down to the ratios between women and men in economic, health, education, and politics, the increase in this index of the region implies that more Southeast Asian women are participating in to these four major social aspects.

**The Social Institutions and Gender Index (SIGI)**

The Social Institutions and Gender index was developed by the Development Centre of the Organization for Economic Co-operation and Development (OECD) in 2009. There have been three SIGI reports, released in 2009, 2012 and 2014. The SIGI aims to “capture, quantify and measure social institutions that discriminate against women and girls”. The SIGI claims its difference to other indexes is that it tries to capture the underlying social institutions that influence gender roles and provides insights into the causes of gender inequality, while other indexes only capture the outcomes. Similar to the GII and the GGI, the SIGI takes values from 0 to 1, where 0 means a perfect score of gender equality.

There are five sub-indexes in the SIGI, including: discriminatory family code, restricted physical integrity, son bias, restricted resources and entitlements, restricted civil liberties. Each sub-index includes detailed variables that measure the availability of laws that protect the rights of women, and the prevalence of discrimination against women. For example, the discriminatory family code sub-index includes variables on
legal age of marriage, early marriage prevalence, parental authority, and inheritance. The restricted physical integrity sub-index includes variables on violence against women, female genital mutilation, and reproductive integrity (unmet need for contraception). The sub-index of son bias includes variables that show the missing women issue, and fertility preferences. The restricted resources and entitlements sub-index includes variables on women’s access to land, other property and credit. The last sub-index, restricted civil liberties, includes variables on access to public places and ability to raise a political voice.

Table 9 shows the SIGI scores and rankings of Southeast Asian countries (where data is available) for the years 2009, 2012 and 2014. The 2009 and 2012 reports put countries in a global ranking, however, the 2014 reports only gives actual scores and put countries in groups based on the level of gender discrimination in social institution. There are four groups: low (0.04 < SIGI < 0.12), medium (0.12 < SIGI < 0.22), high (0.22 < SIGI < 0.35), and very high (SIGI > 0.35).

Table 9: The Social Institutions and Gender Index Rankings and Scores for Southeast Asian countries, 2009-2014 (by highest score in 2014 first)

<table>
<thead>
<tr>
<th>Countries</th>
<th>2009 Rankings</th>
<th>2012 Rankings</th>
<th>2014 Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Singapore</td>
<td>21</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Malaysia</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Brunei</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Cambodia</td>
<td>27</td>
<td>13</td>
<td>0.0477</td>
</tr>
<tr>
<td>Thailand</td>
<td>16</td>
<td>25</td>
<td>0.1056</td>
</tr>
<tr>
<td>Laos</td>
<td>38</td>
<td>49</td>
<td>0.1445</td>
</tr>
<tr>
<td>Indonesia</td>
<td>55</td>
<td>32</td>
<td>0.1532</td>
</tr>
<tr>
<td>Philippines</td>
<td>7</td>
<td>12</td>
<td>0.1765</td>
</tr>
<tr>
<td>Vietnam</td>
<td>31</td>
<td>42</td>
<td>0.1865</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>---</td>
<td>---</td>
<td>0.2550</td>
</tr>
<tr>
<td>Myanmar</td>
<td>41</td>
<td>44</td>
<td>0.2935</td>
</tr>
</tbody>
</table>

Source: Social Institution and Gender Index, OECD, 2013, 2014

---: Data not available

According to the 2014 SIGI index, Cambodia is the country that has the lowest gender discrimination of the eight Southeast Asian countries where data are available.
Categorization based on 2014 data puts Cambodia, Thailand, Laos, Indonesia, Philippines and Vietnam as countries with low gender discrimination, whereas Timor-Leste and Myanmar are countries with high gender discrimination. The 2012 SIGI ranks Philippines in 12th place, highest among all Southeast Asian countries. Other countries in the region are placed in the medium range among 86 countries that were ranked in the SIGI. Cambodia is surprisingly ranked 13, despite it never having ranked that high in the GGI or GII.

In all three indexes, the GII, the GGI and the SIGI, Southeast Asian countries are currently at the medium ranks, with some even at high ranks, implying that gender inequality in Southeast Asia is better than African and some Middle Eastern countries, especially those with current conflicts, but not as good as European, North and South American countries. Nevertheless, there is an inconsistency among the highest rankings countries in the three indexes. Philippines, Singapore, Malaysia and Cambodia are ranked at high places in one index but not in the other. The inconsistency may be due to the difference in the variables and calculation of each index.

How to precisely measure women's empowerment has always been a challenging task, especially in the case of Southeast Asia, a region with great diversity. Southeast Asia is generally considered the “historically more gender egalitarian” region of Asia (Blumberg 2015), however, with different socio-political and culture aspects at play, the situation of women’s empowerment varies greatly across countries.

Examples from the current indexes that measure women’s empowerment in Southeast Asia have already shown different rankings and interpretations on gender equality in these countries. On the other hand, Southeast Asia has been undergoing enormous
demographic changes in fertility and fertility preference, and progressive improvement of women’s participation in education and labor force. Southeast Asia is indeed the perfect region to examine the relationship between women’s empowerment and fertility preferences.

Even though at the macro level, some components of women’s empowerment, such as women’s education and women’s labor force participation, have been suggested as the determinants of the fertility transition, very few studies actually mention individual women’s empowerment as a factor of the demographic transition in Southeast Asia. The case of Southeast Asia challenges classical demographic transition theories, which state that socioeconomic development is the key factor to fertility decline. This research looks for evidence that shows it could be possible that women’s empowerment at the individual level is the driver for changes in fertility preference and actual fertility, well before socioeconomic development takes place.

3.4. The Demographic and Health Survey Data

Frequently mentioned as a multifaceted term, good measurements of women’s empowerment requires detailed information on various aspects of women’s lives and their decisions. Appropriate data should include details on four women’s empowerment components: female labor force participation, women’s education, household decision-making, and contraceptive use. Since it is hypothesized that women’s empowerment is one of the determinants that affect fertility preferences, data about fertility history and fertility related decisions like the number of sons and daughters born and the ideal number of children are also necessary. It also requires data sets to be comparable across countries for the purpose of the analysis.
One of the major challenges is the selection of quality data on Southeast Asia, since the region is much under-studied in terms of quantitative large-scale surveys. The Demographic and Health Surveys (DHS) provides the most appropriate data sets for this analysis on women’s empowerment and fertility preferences. The surveys contain standardized core questionnaires that are comparable across countries, yet still take into account country-specific questions. They usually have large and nationally representative samples. Even though DHS surveys are not implemented in all countries in Southeast Asia, half of the countries in the region have had DHS implemented and high quality data have been obtained over the years.

Data used in this study are from the countries’ Demographic and Health Surveys, a project established and funded by the U.S Agency for International Development (USAID). The DHS program, started in 1984, has provided technical assistance to 344 surveys in over 90 countries, with a special focus on population health and development in developing countries. Countries that participate in the DHS surveys are primarily countries that receive USAID assistance with a few exceptions where countries receive support from non-USAID sources, but from other United Nations donors like UNICEF, UNFPA or the World Bank.

The focus on developing countries of the DHS is also the reason why its data are chosen for the purpose of this research. The detailed survey questionnaires are mostly standardized across countries, making it particularly effective for cross-countries comparison. There have been six phases of the DHS surveys implemented since 1984 to date. Each DHS survey takes on average from 18 to 20 months to finish from start to complete, which is executed in four phases.
DHS surveys are implemented by a national agency of the country, usually the National Statistical Office, Ministry of Health, a family planning organization, a university, a government or private research group. In most countries, National Statistical Offices are often selected because they usually are the sources of the necessary sampling procedures and they frequently are the organizations that have the most experience in the execution of surveys that are national in scope. Family planning organizations and Ministries of Health are usually the primary users of the information gathered through the surveys. Involvement of Ministries of Health are common because of the increase in health content of the DHS surveys and the need to have access to specialized staff that can collect biological specimens such as blood samples (Demographic and Health Surveys Program 2016).

Technical support is provided by the DHS program staff at critical stages of the survey implementation in order to ensure that the survey procedures are consistent with technical standards set by DHS and to ensure that survey activities are progressing at a reasonable pace. Assistance is provided during visits to the country and throughout the whole survey process. Local staff are the ones who actually carry

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**Box 1: Four Phases of DHS surveys**

1. **Survey Preparation and Questionnaire Design:** The first step involves preparatory activities, including designing the sample and developing the survey questionnaires to meet specific host-country needs.

2. **Training and Fieldwork:** The second stage involves training field staff and conducting fieldwork. Eligible households and individual respondents are identified and interviewed. Fieldwork is carried out by a number of teams composed of female (and male) interviewers, female field editors and team leaders.

3. **Data Processing:** The third stage involves data processing, including editing, coding, and entering and verifying the data as well as checking them for consistency. Data entry and editing take place simultaneously with data collection, allowing for quality control of the data collected and for the provision of preliminary results one month after the end of data collection.

4. **Final Report, Data Preparation and Dissemination:** The final stage involves analyzing the data, preparing the final report, and disseminating the survey results in country. This stage usually begins following the completion of fieldwork (Demographic and Health Surveys Program, 2010)
out all the survey activities, and in-country visits by DHS Program staff are only meant to provide technical back-up for local staff. The first one or two visits to a country by DHS Program staff are usually for the purpose of assessing the feasibility of conducting a DHS survey (Demographic and Health Surveys Program 2016).

There are two types of Survey in the DHS, the Standard DHS Surveys and the Interim DHS or the Special Surveys. The Standard DHS surveys usually consist of large sample sizes (from 5,000 to 30,000 households), which are conducted about every 5 years for comparison over time. The Interim DHS Surveys or Special Surveys often focus on special indicators but may not include all the data in the Standard surveys. Examples of these special surveys are the AIDS Indicator Survey, Malaria Indicator Survey or Anemia Indicator Survey. In this study, countries where standard DHS surveys were conducted are used since they include the most detailed questionnaires and the set of questions are almost similar across countries, which make cross-countries comparison possible.

The DHS surveys use comparable questionnaires to collect data across countries and in one country over time. The model questionnaires include core questions that are similar in most countries. Nevertheless, there are country-specific questions and answers. Depending on the context of the country, some questions may be dropped or added and answering options be modified to match with the context of specific country. Moreover, the questionnaires also change over time in each of its phases. The DHS includes three core questionnaires: the household questionnaire, the women’s questionnaire and the men’s questionnaire. First, the household questionnaire is used to collect information of the study unit, then eligible individuals in each household will be interviewed using the women’s questionnaire, and in some
cases, the men’s questionnaire. Eligible women often include women from 15 to 49, who are in reproductive age, and men from 15 to 59, or in some cases 15 to 54. In this study, only data from the women’s questionnaire are used for analysis on women’s empowerment and their decisions on fertility.

The women’s questionnaire includes various topics regarding women’s and their children’s life. Topics include:

**Box 2: Topics of the DHS surveys - Women's questionnaire**

- **Background characteristics:** Questions on age, marital status, education, employment, and place of residence provide information on characteristics likely to influence demographic and health behavior.
- **Reproductive behavior and intentions:** Questions cover dates and survival status of all births, pregnancies that did not end in a live birth, current pregnancy status, fertility preferences, and future childbearing intentions of each woman.
- **Contraception:** Questions cover knowledge and use of specific contraceptive methods, source of contraceptive methods, exposure to family planning messages, informed choice, and unmet needs for family planning. For women not using contraception, questions are included on knowledge of a source of contraception and intentions about future use.
- **Antenatal, delivery, and postpartum care:** The questionnaire collects information on antenatal and postpartum care, place of delivery, who attended the delivery, birth weight, and the nature of complications during pregnancy for recent births.
- **Breastfeeding and nutrition:** Questions cover feeding practices, the length of breastfeeding, and children's consumption of liquids and solid food.
- **Children's health:** Questions examine immunization coverage, vitamin A supplementation, recent occurrences of diarrhea, fever, and cough for young children and treatment of childhood diseases.
- **Status of women:** The questionnaire asks about various aspects of women's empowerment, including decision making and autonomy, and about attitudes towards domestic violence. **AIDS and other sexually transmitted infections:** Questions assess women's knowledge of AIDS and other sexually transmitted infections, the sources of their knowledge about AIDS, knowledge about ways to avoid getting AIDS, and high-risk sexual behavior.
- **Husband's background:** Currently married women are asked about the age, education, and occupation of their husbands.
- **Other topics:** Questions examine behavior related to environmental health and the use of tobacco.

(Demographic and Health Surveys Program 2016)
The DHS In Southeast Asian Countries

The DHS surveys have long been implemented in Southeast Asia, with the first DHS surveys carried out in 1987. To date, six countries in Southeast Asia have had DHS surveys conducted. The first two countries that participated in DHS survey were Indonesia and Thailand. Indonesia has been consistently carrying on with the surveys every 5 years in all 6 phases of the DHS worldwide. On the contrary, Thailand only participated in the DHS survey once in 1987 and has been carrying out its own national census on various topics. Philippines participated in phase 2 of the DHS and continued for the next 4 surveys (1993, 1998, 2003, 2008, 2013). Vietnam participated in phase 3 of the survey (1997, 2002, 2005); Cambodia came in the last three phases (2000, 2005, 2010) and Timor-Leste participated in the latest phase 6 (2010). Table 10 shows the surveys available for Southeast Asia.

Table 10: DHS phases and years of survey in Southeast Asia:

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</thead>
<tbody>
<tr>
<td>Laos</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2012 (S)</td>
</tr>
<tr>
<td>Myanmar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2015 (N/A)</td>
</tr>
<tr>
<td>Thailand</td>
<td>1987</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Timor- Leste</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2010</td>
</tr>
<tr>
<td>Vietnam</td>
<td></td>
<td>1997</td>
<td>2002</td>
<td>2005 (AIS)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

S: Special survey
AIS: AIDS Indicators Survey
N/A: Data not yet available

Among 11 Southeast Asian countries, there are 6 countries where DHS data are available, including Cambodia, Indonesia, Philippines, Thailand, Timor-Leste and Vietnam. All these data sets have large sample sizes, are nationally representative, and all include women’s questionnaires and in some cases, men’s questionnaires. In
Cambodia, Indonesia, and Vietnam, Special Surveys were also conducted in some phases. Table 11 shows the detailed sample sizes for each survey by countries.

Table 11: DHS Surveys and Sample Sizes of 6 Southeast Asia countries

<table>
<thead>
<tr>
<th>Countries/Surveys</th>
<th>Households</th>
<th>Women</th>
<th>Men</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cambodia</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>5,931</td>
<td>7,630</td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>12,236</td>
<td>15,351</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>14,243</td>
<td>16,823</td>
<td>6,731</td>
</tr>
<tr>
<td>2010</td>
<td>15,667</td>
<td>18,754</td>
<td>8,239</td>
</tr>
<tr>
<td><strong>Indonesia</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1987</td>
<td>14,142</td>
<td>11,884*</td>
<td></td>
</tr>
<tr>
<td>1991</td>
<td>25,858</td>
<td>22,909*</td>
<td></td>
</tr>
<tr>
<td>1994</td>
<td>33,738</td>
<td>28,168*</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>34,255</td>
<td>28,810*</td>
<td></td>
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<tr>
<td>2002</td>
<td>33,088</td>
<td>29,483*</td>
<td>8,310**</td>
</tr>
<tr>
<td>2007</td>
<td>40,701</td>
<td>32,895*</td>
<td>8,758**</td>
</tr>
<tr>
<td>2012</td>
<td>43,852</td>
<td>45,607</td>
<td>9,306*</td>
</tr>
<tr>
<td><strong>Philippines</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1993</td>
<td>12,995</td>
<td>15,029</td>
<td>744</td>
</tr>
<tr>
<td>1998</td>
<td>12,407</td>
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<td>2003</td>
<td>12,586</td>
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<tr>
<td>2008</td>
<td>12,469</td>
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<td></td>
</tr>
<tr>
<td><strong>Thailand</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1987</td>
<td>9,045</td>
<td>6,775*</td>
<td></td>
</tr>
<tr>
<td><strong>Timor-Leste</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>11,463</td>
<td>13,137</td>
<td>4,076</td>
</tr>
<tr>
<td><strong>Vietnam</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>7,001</td>
<td>5,664*</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td>7,048</td>
<td>5,665*</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>6,337</td>
<td>7,289</td>
<td>6,707</td>
</tr>
</tbody>
</table>

(no asterisk: All women aged 15-49/ All men aged 15-54 or 15-59)
*: ever-married
**: currently married

Out of 11 Southeast Asian countries, only four countries with the latest data available (Phase 5 and 6 of the survey) are selected for the purpose of this study. The samples include DHS Indonesia 2012, DHS Cambodia 2010, DHS Philippines 2008 and DHS Timor-Leste 2010. Other countries either have no data available (Singapore, Brunei, Malaysia), or the latest survey was too long ago (Thailand 1987); or the latest survey
is not a standard survey (Vietnam 2005 AIDS Indicator Survey; Laos Special Survey 2011-12, Myanmar Special Survey 2015–ongoing). At the time this study was completed, data from the DHS Cambodia 2014 and DHS Philippines 2013 became available, unfortunately they were not available soon enough for the analysis done in this study.

Even though DHS surveys often include the household questionnaire, the women’s questionnaire and in some cases the men’s questionnaire, this study uses only data from the women’s questionnaire since the focus is on women’s empowerment and their fertility preferences. Access to the data sets was officially granted by the Demographic and Health Survey program after request for accessing data for research purpose was submitted.

3.5. Background of Four Countries Of Study

Cambodia

Cambodia’s population in 2010 was 14,138,000, with an annual population increase of 1.1% per annum. The country has low GDP per capita, which is only 797.3 USD (2010). The majority of the population is Buddhist, which accounts for 94.6% of the population. Cambodia became a protectorate of France in 1863, and later gained independence in 1953. The 1970s were marked as a dark period in the history of Cambodia by the Khmer Rouge’s genocide. It was estimated that from 2.2 to 2.8 million Cambodians were killed during the Khmer Rouge regime, mainly by execution, starvation and illness (Heuveline 1998). Cambodia has been independent since the end of the Khmer Rouge era in 1979.
The Cambodia Demographic and Health Survey 2010 (CDHS 2010) is the standard survey in Phase VI of the Demographic and Health Survey questionnaires. Data were collected from June 2010 to January 2011 in 14 individual provinces and 5 grouped provinces with stratification based on urban and rural areas. The survey was conducted by the National Institute of Statistics (under The Ministry of Planning), and the Directorate for General Health (under the Ministry of Health). It is funded by various international organizations including USAID, United Nations Population Fund (UNFPA), United Nations Children’s Fund (UNICEF), Japan International Cooperation Agency (JICA) and the Cambodian Health Sector Program – Second phase (HSSP-2), with technical support from ICF Macro. The total sample includes 15,667 households, 18,754 women aged 15-49 and 8,239 men aged 15-49 (National Institute of Statistics, Directorate General for Health, and and ICF Macro 2011).

For the purpose of this study, only data from the Cambodia women’s questionnaire is used for analysis. The Cambodia DHS 2010 questionnaire is the Phase VI of the DHS and the third of its kind implemented in Cambodia. Women respondents aged 15-49 were asked questions on their socioeconomic background, reproduction and family planning, pregnancy history and postnatal care, immunization, health and children’s nutrition, marriage and sexual activity, fertility preferences, husband’s background and women’s work, HIV/AIDS and other sexually transmitted infections, other health problems and adult and maternal mortality. According to the final report, the response rate was reported at 98% (National Institute of Statistics, Directorate General for Health, and and ICF Macro 2011).

Descriptive statistics from the DHS Cambodia 2010 show that only one third of the sample are living in urban areas, whereas in most other countries’ surveys, half of the
sample are living in urban areas. The sample includes Cambodian women from 15-49, and one third have never been married, the rest are ever-married women. The women in this sample have an average of 5.1 years of education. 17% of the women have no education, 47% have some primary education, 33% have some secondary education and only 3.3% have higher education. About 71% of the women are currently participating in the labor force and 60% of them are earning either cash or cash and in-kind; 15% are receiving earnings in in-kind only. There is a small number of women (4.8%) working in unpaid jobs, almost half of them are working in agriculture for themselves.

The involvement of women in household decision-making is measured by the decisions made by themselves alone or together with their husband. About half of the women have involvement in the decision about their own health care, 60% have involvement in decisions on large household purchases and visiting family or relatives. 69% of Cambodian women in this sample (all women including married and unmarried) are not using any type of family planning methods and 21% are using modern methods. Among currently married women, 50.5% are using a method of contraception. The average number of children ever born per woman is 2.0. However, among ever-married women, the average number of children ever born is 2.92.

**Indonesia**

Indonesia is the largest country is Southeast Asia in terms of both size and population. Indonesia’s population in 2010 was 239,871,000 (Central Intelligence Agency 2013), making it one of the most populated countries, with an annual population increase of 1.1% per annum. Indonesia’s GDP per capita is among middle-income countries, which was 2,949 USD in 2010. 86.1% of the population is Muslim,
which makes it the one with the largest Muslim population outside the Arabic world. Indonesia was once a Dutch colony and then a Japanese’s colony for a brief period of time during the Second World War. The country gained full independence in 1949.

The Indonesia Demographic and Health Survey 2012 (IDHS 2012) is the standard survey in the Phase VI of the Demographic and Health Surveys. It was conducted in 33 provinces of Indonesia, which means every single province in Indonesia was surveyed. The survey was conducted by Statistics Indonesia in collaboration with the National Population and Family Planning Board and the Ministry of Health. It is funded by the Indonesian government with technical support from the Demographic and Health Survey program (Measure DHS and later renamed DHS programs). Data were collected between May and July of 2012. The survey includes the household questionnaire, the women’s questionnaire and the men’s questionnaire. The Indonesia DHS 2012 surveyed 43,852 households, 45,607 women aged 15-49 and 9,306 married men aged 15-54 (Statistics Indonesia (Badan Pusat Statistik—BPS) et al. 2013).

In this research, only data from the women’s questionnaire are used for the analysis. The women’s questionnaire is largely based on the standard DHS phase VI questionnaires and it is the seventh survey of this kind implemented in Indonesia. Women respondents from 15-49 answered questions related to their socioeconomic background, reproduction, contraception, pregnancy and postnatal care, maternal and child health, marriage and sexual activity, fertility preferences, women’s work, childhood and adult mortality including maternal mortality, awareness, attitude and behaviors regarding HIV-AIDS and other sexually transmitted infections. According to the final report, the response rate is 96% of the women respondents.
In the DHS Indonesia 2012, half of the sample was living in urban areas and half in rural areas. The data include all women both never married and ever married; among those, 23% have never been married. In this sample, women have an average of 9.1 years of education, which much higher than the average of 5.1 in Cambodian’s sample. Only 3% of the women have no education, 30% have some primary education, 52% have some secondary education and 14% have higher education. About 55% of the women are currently participating in the labor force and 44% of them are earning either cash or cash and in-kind; quite a number of women (16%) have unpaid jobs, and a very small number of women (0.7%) have earnings in-kind only.

The most common jobs are in sales, agriculture, and skilled manual labor. About 60% of the women have some involvement in the decisions about their own health care, large household purchases and visiting family or relatives. 57% of Indonesian women in this sample are not using any type of family planning methods and 40% use modern methods. The average number of children ever born for all women in this sample is 1.83. This number is higher among ever-married women, which is around 2.40.

**Philippines**

Philippines’s population in 2010 was 93,261,000, with a relatively high annual population increase of 1.7% per annum. The GDP per capita is also in the middle range, which was 2,140 USD in 2010. The majority of the population is Catholic (92.5%), which makes it the country with the largest Catholic population in Southeast Asia. Philippines was a Spanish colony from the 16th through most of the 19th
century and later occupied by the Americans since 1898 until its independence in 1945.

The Philippines Demographic and Health Survey 2008 (FDHS 2008) is a standard survey of Phase V of the Demographic and Health Surveys. It was implemented in each of the 17 administrative regions of Philippines. The survey was conducted by the National Statistics Office and funded by the Philippines government and USAID, with technical support from ICF Macro. Data were collected from August to September 2008. A total number of 12,469 households, and 13,594 women aged 15-49 were interviewed (National Statistics Office (NSO) [Philippines] and ICF Macro 2009).

Data from the women’s questionnaire are used for analysis of this thesis. The questionnaire is largely based on the Phase V of the Demographic and Health Survey, and is the 9th of its kind. DHS surveys have been implemented every 5 years in Philippines since 1968. Female respondents answers questions on their socioeconomic background, reproductive history, knowledge and use of family planning, pregnancy, postnatal care and breastfeeding, child immunization and mother’s and children’s nutrition and health, marriage and sexual activity, fertility preferences, women’s work and husband’s characteristics, awareness and behaviors regarding HIV/AIDS and other health issues. Additionally, the Philippines DHS 2008 also includes a Women’s Safety Module, which asks special questions related to violence against women. The total response rate of the women’s questionnaire is 99%.

In the DHS Philippines 2008 data, half of the sample is living in urban areas and half is living in rural areas. The data include never married and ever married women; of
those, 32% of the women have never been married. In this sample, the women have an average of 10.5 years of education, the highest in all four countries selected. Only 1.6% of the women have no education, 21% have some primary education, 46% have some secondary education and 31% have higher education. The Philippines sample has the highest women’s educational attainment compared to three other countries (Cambodia, Indonesia, and Timor-Leste).

In contrast, only 47% of the women are currently participating in the labor force, much lower than the three other countries; and 43.6% are not currently working or have not in the past 12 months. 51% of the respondents are earning either cash or cash and in-kind; 3.6% are having unpaid jobs, and a small number of women (0.9%) have earnings in-kind only. The most common jobs are in professional/technical/managerial, sales and agriculture. About 59% of the women have some involvement in the decision about their own health care, 54% have some involvement in decisions on large household purchases and 58% have involvement in decisions on visiting family or relatives. 67% of Filipino women in this sample are not using any types of family planning methods, 10% are using traditional methods and 22% are using modern methods. The average number of children ever born for all women in this sample is 2.10. It is much higher among ever-married women, which is 3.08.

**Timor-Leste**

Timor-Leste is the smallest country in Southeast Asia in terms of both size and population among the four countries of study. Its population in 2010 was only 1,124,000, but the country has the highest annual population increase in Southeast Asia, which is 2.1% per annum. The country’s GDP per capita is in the low range,
which was 706 USD (2010), the lowest GDP per capita in Southeast Asia. 99% of the population is Christian, which makes it the country the most homogenous in terms of religion in Southeast Asia. Like Cambodia, Timor-Leste has a recent history of war. Timor-Leste was dependent on Indonesia until 1975, when the country claimed independence but lost to Indonesia only 9 days later. Timor-Leste claimed full independence in 2002.

The Timor-Leste Demographic and Health Survey 2009-10 (TLDHS) is the first DHS survey in the country that was conducted under the standard survey of DHS worldwide. The survey was done in all 13 districts of the country. It was carried out by the National Statistics Directorate of the Ministry of Finance with financial support from USAID, the Government of Australia (AusAID), the Government of Ireland (Irish AID), the United Nations Population Fund (UNFPA), the United Nations Children’s Fund (UNICEF), the United Nations Development Fund (UNDP) and the World Health Organization (WHO). Technical support was provided by ICF Macro and UNFPA. Data were collected from August 2009 to February 2010. A total sample of 11,463 households, 13,137 women aged 15-49 and 4,076 men aged 15-49 were interviewed (National Statistics Directorate (NSD) [Timor-Leste], Ministry of Finance [Timor-Leste], and and ICF Macro 2010).

For the purpose of this research, only data from the women’s questionnaire are used. Female respondents answered questions related to their socioeconomic background, birth history and childhood mortality, knowledge and use of family planning methods, fertility preferences, pregnancy and postnatal care, breastfeeding and infant feeding practices and children’s health, marriage and sexual activity, women’s work and husband’s characteristics, awareness of AIDS and other sexually transmitted
infections, maternal mortality and domestic violence. Also, one third of the household with eligible women aged 15-49 and children aged 6-59 months were tested for anaemia (through blood testing) with respondents’ consent. However, this information is not used in my analysis since it does not fit the purpose of the research. The total response rate of the women’s questionnaire is 95%.

In the DHS Timor-Leste 2010, only a quarter of the sample is living in urban areas. The data include never married and ever-married women; of those, 36% of the women have never been married. In this sample, women have an average of 6.5 years of education. A large proportion of women have no education (30%), 24% have some primary education, 35% have some secondary education and only 2.3% have higher education.

Timor-Leste has quite low female labor force participation compared to other countries, with only 41% of women participating in the labor force; this number is the lowest among four countries selected. 59% of the women are not currently working or in the past 12 months. Only 7% of them are earning either cash or cash and in-kind; a striking 34% have unpaid jobs, and a small number of women (0.5%) have in-kind earnings only. Among four countries of analysis, Timor-Leste has the highest percentage of women who are having unpaid jobs. The most common job for women is in agriculture.

About 53% of the women have some involvement in the decisions about their own health care, 51% have some involvement in decision on large household purchases, and 55% have involvement in decision on visiting family or relatives. 86% of women in this Timor-Leste sample do not use any type of family planning methods, and only 13% are using modern methods. These statistics make Timor-Leste the country with
the lowest number of women using contraception. The average number of children ever born for all women in this sample is 2.74. The number is strikingly higher among ever-married women, which is 4.27. Timor-Leste is the country with the highest average number of children ever-born among the four countries in the analysis.

In conclusion, Southeast Asia is a very interesting region to study women's empowerment and the association between women's empowerment and fertility preferences. The four data sets selected, DHS Cambodia 2010, DHS Indonesia 2012, DHS Philippines 2008 and DHS Timor 2010, are the most appropriate to be used in this analysis of women’s empowerment and fertility preferences. The data sets include recent data and large, representative samples. They also include appropriate sets of variables for each of the components of women’s empowerment and women’s fertility related decisions.

The questionnaires are almost comparable in all four countries, which make it possible for cross-country comparison. The four countries also have very diverse socioeconomic and cultural contexts. They have a great diversity in religion, which includes three major religions: Buddhism, Christianity and Islam. Two countries are low-income (Cambodia and Timor-Leste), and two are middle-income (Indonesia and Philippines). The country-specific socioeconomic characteristics also allow relevant contextual analysis which makes it possible to see how women’s empowerment varies across countries depending on these factors.
CHAPTER 4: MEASUREMENT MODELS AND FACTORS OF WOMEN’S EMPOWERMENT

The literature on women’s empowerment suggests that it depends on the variation of four identified components: women’s labor force participation, education, household decision-making, and contraceptive use. However, measuring all these four components of women’s empowerment has never been an easy task, it requires a coherent measurement scale to account for all the variation in the components. Furthermore, consistency in measurement while working with multiple countries is also a challenge. This chapter firstly presents the operationlization process of the four components of women’s empowerment using the DHS data from Cambodia, Indonesia, Philippines, and Timor-Leste. And after that a measurement of women's empowerment factors is proposed using principal axis factoring with orthogonal and oblique rotation.

Principal axis factoring is an estimation method in exploratory factor analysis to identify the latent variable, which cannot be measured directly. Principal axis factoring is chosen over entering the variables directly in the model because women’s empowerment is proposed to be the latent variable that affects aspects of fertility. This latent variable can only be measured through the component variables on education, employment, household decision-making and contraceptive use. In this study, individual variables on education, employment, household decision-making and contraceptive use are not of particular interest. In fact, these four components are considered factors of the latent variable women's empowerment.
4.1. Operationalization of the Variables

Downloaded data sets are in SPSS (Statistical Package for the Social Sciences) data files. They include a fairly large number of variables. Depending on the questionnaire and optional modules, each data set may include from 3,500 variables to 4,500 variables. To make these data sets more manageable, a subset of variables for each country is created. These subsets include only women’s demographic variables and variables related to four aspects of women’s empowerment that are theorized to have associations with fertility preferences including labor force participation, education, household decision-making, and family planning. The new data sets include from 70 to 90 variables, depending on the country. All four data sets from the four countries selected have similar set of variables, or in some cases, the variable names may be different but still have the same information.

In chapter 2, the framework on how women’s empowerment affects fertility identified four components of women’s empowerment, including women’s labor force participation, women’s education, women’s household decision-making, and women’s contraceptive use. For each of these components, a specific set of variables that are available in the DHS survey data is identified for measurement.

*Women’s labor force participation*

The proportion of women who participate in the labor force has been included in all the measurements of women’s empowerment. Female labor force participation is considered a major factor that affects fertility. At country level, countries with higher rates of female labor force participation are often ones with higher fertility. However, at individual level, women who have employment are ones with lower fertility than
women who do not. The DHS women’s questionnaire includes a section on women’s work, which makes a good selection of variables for measuring women’s labor force participation.

The first aspect of measuring women’s labor force participation includes questions on the women’s engagement in the cash economy. The questions ask if the women have been working in the past 12 months, and the types of payment that they receive. Other indicators include types of occupation, if the women work full time or part time and their earnings compared to the husbands. The DHS questionnaires of all four countries include appropriate variables for measuring these three aspects of women’s labor force participation.

**Household Decision-Making**

It has been theorized that women who have more power, in both general household decisions and especially fertility decisions, also have higher rates of using fertility control and have fewer children than those who do not. Ideally, household decision-making indicators should include both domestic-related decisions and fertility decisions. Women were asked who make decisions in their household, in matters related to their own health, spending for the household and visiting family and relatives. These variables are used for measuring household-related decisions. Unfortunately, in the DHS questionnaire, questions on fertility decisions are not exactly a good fit for measurement since there are not enough data related to the fertility decision-making process. The number of unwanted pregnancies could possibly be used as an indicator in the way that the higher the number of unwanted pregnancies, the lower decision-making power. However, this number is highly correlated with the number of children ever-born, which means women who have a higher number of children tend to report a higher number of unwanted pregnancies.
The issue is, that it is highly subjective for a woman to report her pregnancy history retrospectively as wanted or unwanted, it could change the meaning depending on the woman’s view at the time. Therefore, household decision-making indicators are mainly operationalized from domestic related decisions, but not from fertility decisions.

**Contraceptive use**

Contraceptive use is one of the key pathways from women’s empowerment to their fertility preferences. Higher level of women’s empowerment is usually associated with higher use of contraception and thus, lower fertility. For an ideal measurement of family planning, indicators are included on family planning use, having met need for family planning and exposure to family planning messages through the media.

Even though some literature suggests that contraceptive use is one of the indicators for measuring empowerment, this analysis does not take this variable into consideration. The reason is that women interviewed for these surveys are from 15-49, which means they are in their reproductive ages. For many of those who do not use contraceptives, it is simply because they are not sexually active so there is no need for contraception, or they want to have more children or have not reached their desired number of children. Therefore, there is no clear logic to determine if using contraceptives is more empowering than not or vice versa. As a result, the variable on current contraceptives use is excluded from this factor analysis.

This analysis uses met need for family planning, exposure to family planning messages on the media and knowledge about family planning methods as the three indicators. All three of these indicators are available in the questionnaire. Met need is operationalized by the unmet need variable. Media exposure is the combination of
three variables on whether the women have heard about family planning on TV/radio/newspaper. Knowledge of the types of contraception is also available in detail in the questionnaire.

**Education**

Female education is generally considered a key component of women’s empowerment. At the individual level, most studies have found that a higher level of female education is associated with lower fertility. It has been widely agreed that women with a higher level of education often have a higher level of empowerment. Indicators of education are readily available in the data sets. Variables on literacy and the level of education attainment will be used for operationalization of the measurement. Figure 5 visualizes the schematic measurement model of four pathways of women’s empowerment to fertility decision, with indicators for each pathway.
Figure 5: Schematic Measurement Model
114


Table 12 shows the operationalization map of how women’s empowerment factor scores are operationalized based on 12 indicators, which are operationalized from 19 variables in the questionnaire.

Previous studies have suggested four aspects of women’s empowerment. In this study, each of these aspects will be measured and later a women’s empowerment factor score will be assigned to each woman. Factor analysis is a statistical technique that assigns values to the variables, and then ranks them in the order that higher scores mean higher power. The logic of ranking is referenced from the previous literature with consideration of actual country-specific circumstantial factors. However, the variables in these data sets are not ready to be used for this analysis. First, variables in the new subsets of variables will be operationalized to make them eligible for factor analysis. Operationalized variables will then be used to create four separate sets of indicators: indicators of labor force participation, indicators of household decision-making, indicators of family planning and indicators of education. Finally, an individual woman’s empowerment factor score is calculated based on these four separate indicators mentioned. Existing literature on factors of women’s empowerment will be used to determine high or low scores that should be assigned to each woman.

**Indicators of labor force participation**

The first factor, women’s labor force participation, includes four indicators which take into account the engagement of the woman in the cash economy through types of employment and types of payment that she receives; her occupation; her continuity of employment throughout the year (full time or part time); and her earnings compared to her husband’s earnings. The first and very important question, which acts as the
filter for this factor is, if she had done any work in the past 12 months prior to the time of survey, which only takes yes/no values. If her response was no, she is considered not working and given a score of 0 in employment status. If her response was yes, she is given a score of 1. As previous studies have suggested, women who have jobs are generally considered more empowered than those who do not.

Who the woman works for is also an important indicator in her labor force participation factor score. The question asks if the woman has been working for a family member, someone else or for herself. Women who work for a family member are given the lowest empowerment score, women who work for someone else or for the government are given a higher score, and women who are self-employed are given the highest score since it indicates a high level of independence.

Not only who does the woman works for but the types of payment that she earns is also given a score. The types of payment indicate how important her job is and how her employer values her as an employee. There are four kinds of payment options listed in the questionnaire: cash only, cash and in-kind, in-kind only, and not paid. Women who receive cash payment are given the highest score, women who receive cash and in-kind payment are given middle range scores, women who receive in-kind payment only have a bit lower score and those who are not paid are given a zero score.

A new variable indicating women’s engagement in the cash economy through women’s employment and payment is created after combining the three question above on work status, working for whom and types of payment. This new variables, LFP1-Engagement include 13 categories with 13 ranked scores given to each woman depending on her scores on each of the questions above.
0: If she does not work or has not worked in the past 12 months
1: If she works for a family member but is not paid
2: If she works for someone else but is paid
3: If she is self-employed but not paid
4: If she works for a family member and gets paid in-kind only
5: If she works for someone else and gets paid in-kind only
6: If she is self-employed and gets paid in-kind only
7: If she works for a family member and gets paid in cash and in-kind
8: If she works for someone else and gets paid in cash and in-kind
9: If she is self-employed and gets paid in cash and in-kind
10: If she works for a family member and gets paid in cash
11: If she works for someone else and gets paid in cash
12: If she is self-employed and gets paid in cash

The second indicator in labor force participation is occupation. The original variable includes 10 categories of the types of occupation: did not work; professional; clerical; sales; agricultural – self employed; agricultural – employee; household and domestic; services; skilled manual; and unskilled manual.

To simplify the occupation variable, these 9 categories are recoded into 4 distinctive categories: people who do not work, people who have unskilled jobs, people who are professionals, and the rest. Seven categories, including clerical, sales, agricultural self-employed, agricultural-employee, household and domestic, services, and skilled
manual are grouped in “Other types of jobs”. This new variable, LFP2-OccStat, with four categories, are given scores based on the occupational rank.

0: Not working
1: Unskilled jobs
2: Other types of jobs
3: Professionals

Generally, permanent jobs are treated as more stable and thus more empowering than seasonal jobs. Question on the continuity of her job throughout the year (V732: “Do you work throughout the year, part of the year or only once in a while?”) is combined with employment status (V731: working or have worked in the past 12 months) to create a new variable with lowest score for women who do not work, and highest score for who work throughout the year. The operationalized variable, LFP3-ContEmp, takes the following values:

0: Do not work
1: Once in a while
2: Seasonally/part of the year
3: Throughout the year

The fourth and final indicator of the factor score of labor force participation is if the woman earns more or less than her husband. The original variable, V746: “Would you say that the money you earn is more than what your husband/partner earns, less than what he earns, or about the same?” has 5 answering options: more than him; less than him; about the same; husband/partner has no earnings; don’t know

Since this question only asks women who earn cash for their joba, only women who received cash payment should be included in this variable. Three variables (V731,
V741, V746) are used to create this new LFP4-Earnings, which has 6 values (but only has 4 scores):

0: If not working or not worked in past 12 months
0: If working but not paid
0: If working but paid in kind only
1: If earning less than husband
2: If earning equally to husband
3: If earning more than husband

Women who are working but not paid and women who are working but paid in-kind only are both treated as not working in this new variable since the focus of this variable is to measure women’s earning relative to their husband’s, not the types of payment since there is already a separate variable to measure types of payment. If the woman does not create any kind of income, thus she is at the lowest score on the scale of earning compared to her husband. And women who earn more than their husband/partner receive the highest score on this variable.

**Indicators of household decision-making**

The second factor score needed to measure women’s empowerment is women’s factor scores on household decision-making. This factor includes women’s power in three indicators: decisions related to health, decisions related to spending and decisions related to visiting family and relatives. Previous studies have consistently emphasized the role of women in making decisions related to their own health as one of the basic rights. Autonomy in spending decisions indicates her involvement in the household in economic responsibilities. More autonomy in spending decisions means a higher level of empowerment. And finally, autonomy in decisions on paying visits to family and
relatives indicates if the woman is restricted in her movements. More freedom of mobility without restrictions means a higher level of empowerment.

Decisions related to health are operationalized by four variables: if it is difficult for the woman to get permission to get help for herself, if it is difficult to get money for the treatment, if not wanting to go alone is a problem, and finally, the person who usually decides her health care.

The first set of three questions is based on the question:

“When you are sick and want to get medical advice or treatment, is each of the following a big problem or not?

• Getting permission to go to the doctor?
• Getting money needed for treatment?
• The distance to the health facility?
• Not wanting to go alone?”

The answer is dichotomous: big problem; or, not a big problem. Even though the question above is split into four smaller variables with dichotomous answers, the third one, “distance to the health facility” does not actually fit in the empowerment of women since it is more an environmental factor which the women does not have the power to change herself. Thus, this question is removed and the other three questions are combined into one variable with values that are the averages of the three component variables. If the answer is big problem, a score of 0 is given, and if the answer is not a big problem, a score of 1 is given. As the new variables HDM1-Health takes values of an average of the three variables mentioned, it includes the values listed below (higher scores indicate higher level of empowerment):
0: Big problems for all three questions
1: Not a big problem for one of three questions
2: Not a big problem for two of three questions
3: Not a big problem for all three questions

The fourth variable in the indicators of decision related to health is the person who decides the women’s health care: “Who usually makes decisions about health care for yourself?” (Respondent; Husband/partner; Respondent and husband/partner jointly; Someone else; Other). This question is operationalized into a new variable with only three categories with the logic that if the woman has all independent power to decide her own health care by herself, she has the highest empowerment score. And the score declines when the decision is made jointly with her husband and the lowest score is when she has no involvement in decisions about her own health. HDM2-Spending has three values:

0: Decided by husband/partner alone or someone else or other
1: Decided jointly by respondent and husband/partner
2: Decided by respondent alone

The second indicator in household decision-making factor is women’s autonomy in decisions related to household spending. This indicator is considered empowering since economic decisions are one of the most important aspects of household decisions. Freedom of women in decisions related to controlling income and spending strongly indicates that the level of power they have in the family. In this indicator, two variables are used: the first one asks about the person who usually decides on large household purchases and the second asks about the person who usually decides
what to do with the money that her husband earns. Even though one may suggest that the person who decides women’s earnings is also an important proxy for measuring women’s empowerment, this variable is not used for analysis in this study. In the setting of developing countries like the four countries studied, Cambodia, Indonesia, Philippines and Timor-Leste, many women actually work but do not receive cash incomes. Their labor may be unpaid, or paid in-kind only or a mix of both cash and in-kind. The question on who decides the spending of the money that respondents earn only asks women who received cash income, thus a large number of women who work but do not have income will be excluded in the analysis. Meanwhile, this study aims to specifically take into consideration all types of employment and payment to measure individual woman’s empowerment factor, especially in developing societies. The context-specific of women’s empowerment has been emphasized by Malhotra, Schulerm, and Boender (2002) in their paper on measuring women’s empowerment as a variable in international development. There have been a number of other criticisms about how current measurements of women’s empowerment are not suitable for measurements in developing countries in practice and this research is trying to avoid such problems. Thus, it is reasonable to say that the use of this variable may be more applicable in countries where most labor market participation activities are paid, however, it is less relevant in this specific study.

Two questions used for this indicator have similar answering options: “Who usually decides how your husband/partner’s earning will be used?”; and “Who usually makes decisions about major household purchases?” . Answer options include: Respondent; Husband/partner; Respondent and husband/partner jointly; Someone else; and Other. The same logic used in previous questions is also applied in these two questions. Women who can decide their husband’s earning and making major household
purchases are considered the most empowered, women who can decide jointly with their husband are considered having middle range empowerment, and women who have no involvement (decisions made by their husband, someone else or other) in these decision-making processes are considered having no empowerment. The new values for this variable HDM2-Spending are:

0: Decided by husband/partner alone or someone else or other

1: Decided jointly by respondent and husband/partner

2: Decided by respondent alone

The third indicator in household decision-making is decisions about visiting family or relatives, which indicates women’s freedom of mobility with no restriction. This third indicator is mainly based on the question: “Who usually makes decisions about visits to your family or relatives?” Answer options include: Respondent; Husband/partner; Respondent and husband/partner jointly; Someone else; and Other. The values of this variable, HDM3-Visiting, is later recoded into three answering options with scores given accordingly:

0: Decided by husband/partner alone or someone else or other

1: Decided jointly by respondent and husband/partner

2: Decided by respondent alone

**Indicators of contraceptive use**

Contraceptive use is the third factor in the pathways of how women’s empowerment affect fertility. Previous studies have strongly emphasized on the role of contraceptive use in fertility changes, especially in developing countries. Contraceptives are
considered empowering since they enable women to control their own body and fertility. With contraceptives, women can make the decision when to have children and how many they want to have. The contraceptive use factor includes three indicators: if the woman has met need for family planning, if she has heard about family planning in the media and if she has knowledge about using contraception. As mentioned earlier, even though some literature suggests that contraceptive use is one of the indicators for measuring empowerment, this analysis does not take this variable into consideration for a major logical flaw. Women who were interviewed for these surveys are in their reproductive ages, from 15-49. But many of them do not use contraceptives simply because they are not sexually active so there is no need for contraception, or they are wanting to have children or have not reached their desired number of children. Therefore, there is no clear logic to determine if using contraceptives is more empowering than not using or vice versa. Thus, the variable on contraceptive use is excluded from this factor analysis.

The first indicator in the contraceptive factor, met need, is operationalized based on the questions about women’s fecundity, their contraceptive use and unwanted pregnancy history in the questionnaire. According to the Guide to DHS Statistics, there are two kinds of unmet need for contraception:
Using the definition above, a variable “unmet need” was calculated in the data sets with answering options: 0: never had sex; 1: Unmet need for spacing; 2: Unmet need for limiting; 3: Using for spacing; 4: Using for limiting; 7: No unmet need; 8: Not married and no sex in the last 30 days; 9: Infecund, menopausal. A met need variable is operationalized based on this unmet need variable. FP1-Metneed is a dichotomous variable which:

0: If the woman has unmet need either for spacing for limiting

1: If the woman is using contraception or having no unmet need

It is noteworthy to keep in mind that women who never had sex, not sexually active and infecund (values 0, 8 and 9 in the original unmet need variable) are treated as missing values.

The second indicator of family planning is if the woman has heard about family planning in either type of media in the past 6 months: “In the last 6 months have you:
Heard about family planning on the radio?” (Yes/No). “Seen anything about family planning on the television?” (Yes/No). “Read about family planning in a newspaper/poster/pamphlet?” (Yes/No). All these three questions are then operationalized into one variable, FP2-Media, with values are the combinations of all the answers. This FP2-Media variable includes 4 options below:

0: Has not heard about family planning through any type of media

1: Has heard about family planning though 1 type of media

2: Has heard about family planning though 2 types of media

3: Has heard about family planning though 3 types of media

Higher scores are given to women who have heard about family planning through more types of media with the logic that hearing the messages about family planning on a more frequent basis will lead to higher knowledge about family planning and awareness about the right to have fertility choice. Women who have not heard about family planning in any of those three types of media are given zero scores. No exposure to media messages indicates the lack of access to mass media, lesser knowledge about family planning and lesser awareness about fertility choice than those who have better access.

The third and last indicator in the contraceptive use factor analysis is knowledge of contraception. In the questionnaire, women are asked if they have heard about any of the 13 methods of contraception listed, with yes/no answer options: 1. Female sterilization; 2. Male sterilization; 3. Intrauterine Contraceptive Device (IUD); 4. Injectables; 5. Implants; 6. Pill; 7. Condom; 8. Intravag/Diaphragm; 9. Lactation

Data from this question later is recoded as one variable in the data set with four groups of methods: respondent who knows no method, who knows at least one of the modern methods, who knows at least one of the traditional methods, and who knows at least one of the folkloric methods. Modern methods include: Female sterilization, male sterilization, Intrauterine Contraceptive Device (IUD), injectables, implants, pill, condom (male/female), intravag/diaphragm, and emergency contraception. Traditional methods include: rhythm or periodic abstinence, withdrawal, lactation amenorrhea method (LAM) or any country-specific traditional method of proven effectiveness. Folkloric methods include locally prescribed methods or spiritual methods such as herbs, amulets, etc. For measurement of empowerment scale, traditional methods and folkloric methods are treated the same, women who know either or both methods are given the same scores. Women who know no method are given zeros on the scale, and women who know modern methods are given the highest scores. The variable used for analysis after operationalization is named FP3-Knowledge:

Have you heard of any family planning method?

0: Knows no method

1: Knows traditional/Folkloric methods

2: Knows modern methods
Indicators of education

Education has been consistently viewed as one of the most influential factors in empowering women. Education for women and girls has been the main target of the United Nation’s Millennium Development Goals No. 3: Promote gender equality and empower women. It is both an outcome and a measurement of women’s empowerment. The factor score of education is calculated by two variables, women’s literacy and women’s completeness of level of education. Women’s literacy acts as the basic measurement in the empowerment of women and more educated women are considered more empowered than less educated women. These indicators have been agreed universally in previous studies. One might argue that years of education may be a better proxy for measuring education, however, even though this variable does exist in the data, it is not used for analysis for a number of reasons. First, years of education is a calculated variable based on two questions in the questionnaire: the highest level of school that the respondent attended, and the highest grade that the respondent completed at that level, then these two numbers are added to calculate the number of years of education. Thus, years of education and highest level of education completed are highly correlated. Including both of these variables in the analysis will create a correlation which makes the factor analysis give imprecise scores. Second, even if years of education is not a calculated variable, in the case of developing countries, the number of years staying at school does not necessarily mean a higher level of knowledge. If a person spent 2 years in each grade that he/she ever attended, he or she can have significantly higher years of education than someone who pass the grade in just one year, but the amount of knowledge that the two people receive are the same. In some cases, the person who spends more years at school but is slow at moving up to higher levels may receive less knowledge since it takes them more time
than those who are on time and are able to attend higher levels. Thus, it is notable to keep in mind that the respondents are from poor countries, and many live in rural areas, thus years of education may not have the same meaning as in richer countries. For such reasons, completeness of level of education is used for analysis in this study.

The question on literacy is very straightforward. Interviewer shows a reading card written in the local language and ask the respondent to read the sentence on the card. Options to the answer include: 1: Can not read at all; 2: Able to read only parts of the sentence; 3: Able to read whole sentence; 4: Blind/visually impaired.

For the ranking of scores, women who can read the whole sentence are given the highest scores, women who can read parts of the sentence are given middle scores and those who can not read at all are given zero scores. Blind or visually impaired people are coded as missing since these cases are rare and not applicable in terms of women’s empowerment measurement. The newly recoded variable ED1-Literacy, takes values as below:

0: Cannot read at all

1: Able to read only parts of the sentence

2: Able to read whole sentence.

The second indicator for factor scores of education is the completeness of level of education. This indicator uses information from the question: “What is the highest level of school you attended?” (1: Primary; 2: Secondary; 3: Higher). An important note should be made is that the answer for this question depends on the actual education scheme of the specific country. For example, in the Indonesia DHS 2012 questionnaire, levels of education include: 1: Primary; 2: Junior high school; 3: Senior

Despite the difference in the questionnaires across countries, the data include a standardized variable which is a combined variable involving the level of education, and if the person has completed or not completed the level. The new variable, ED2-Level, which is the same in all four data set, takes values:

0: No education
1: Incomplete primary
2: Complete primary
3: Incomplete secondary
4: Complete secondary
5: Higher

The higher the level of education that a woman has, the more empowered she is compared to those with lower education. Women who have no education are given zero scores on this measurement scale. Since this variable in the data sets is already an ordinal variable, no change was necessary.

After calculating factor scores of the four factors, only women who have scores in all four factors are included in the factor analysis of women’s empowerment. The new sub-samples are smaller than the original samples since they only include eligible women for this specific purpose of calculating factor scores of four components of
women’s empowerment. If a woman is missing one or more of the four scores, the analysis will be not meaningful if she is also included. Only women with scores on all four factors are included in the analysis. Table 13 below gives the original sample sizes and the sample sizes after calculating the factor scores that are being used for this analysis.

Table 13: New sample sizes after operationalization of variables

<table>
<thead>
<tr>
<th>Country/ Survey</th>
<th>Total women sample (15-49)</th>
<th>Target sample by design*</th>
<th>Selected women sample</th>
<th>Questions response rates (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia 2010</td>
<td>18,753</td>
<td>6,637</td>
<td>6,622</td>
<td>99.7</td>
</tr>
<tr>
<td>Indonesia 2012</td>
<td>45,607</td>
<td>27,225</td>
<td>26,883</td>
<td>98.7</td>
</tr>
<tr>
<td>Philippines 2008</td>
<td>13,594</td>
<td>7,217</td>
<td>7,186</td>
<td>99.5</td>
</tr>
<tr>
<td>Timor-Leste 2010</td>
<td>13,137</td>
<td>3,747</td>
<td>3,741</td>
<td>99.8</td>
</tr>
<tr>
<td>All four countries</td>
<td>91,092</td>
<td>44,826</td>
<td>44,544</td>
<td>99.3</td>
</tr>
</tbody>
</table>

*: Target sample by design: women aged 15-49, currently married, currently working or worked in the past 12 months, earn cash or cash and kind, sexually active and fecund.

4.2. Orthogonal and Oblique Factor Models

Factor scores of women’s empowerment are calculated scores based on 12 operationalized variables on four aspects of women’s empowerment. First, the scores are calculated by orthogonal factoring with the assumption that there is no correlation among the four factors. Second, the scores are calculated by oblique factoring, which allows the factors to be correlated to each other.

Orthogonal factoring is based on the assumption that the factors are independent and not correlated to each other. The axes are set at an angle of 90 degree to each other and principal axis factoring is used with no factor rotation. Orthogonal rotation factor analysis gives easily interpretable results but it may not truly reflect how the data behave in real life since it does not allow correlation between the factors. In social sciences, generally there are some correlations among factors since the data are rarely neatly packed into clear-cut factors. Therefore, oblique rotation is a better technique.
in factor analysis, which allows the axes to rotate freely and the factors are allowed to correlate with each other, which makes much more sense in reality. Examples can be drawn from these data, in which, orthogonal rotation assumes that education and labor force participation have their own impacts on women’s empowerment and are independent from each other, while oblique rotation allows education and labor force participation to correlate with each other. It makes a lot more sense if these two factors are correlated since the data are real-life data, which means women who have high education are more likely to participate in the labor market and have paid jobs. Results from principal axis factoring analysis with both orthogonal and oblique rotation are reported in factor models of women’s empowerment in the four countries. It is notable that if there is truly no correlation among factors, orthogonal and oblique rotation will give nearly identical results (Constello and Osborne 2005).

In this chapter, operationalized indicators using DHS data from four countries, Cambodia, Indonesia, Philippines and Timor-Leste, are analyzed using principal axis factoring, first with orthogonal factor rotation and then with oblique factor rotation. The analysis will identify women’s empowerment factors in these four countries of study.

Cambodia

Frist, twelve operationalized indicators of women’s empowerment are plotted using scree plots to conduct a visual test of the number of factors in women’s empowerment. Then the factor loadings are extracted using principal axis factoring with unrotated axis and rotated axis (orthogonal and oblique extraction). Finally, a factor correlation matrix is presented to determine if the factors are correlated with each other.
The scree plot in Figure 6 shows the fraction of total variance in the data. It is also a useful initial tool to decide how many factors should be included in the analysis. The first factor is the most significant and subsequent factors have lower impacts on the scores. Conventionally, the default cut-off is any value that is larger than or equal to 1.0 initial eigenvalue to be considered meaningful enough. The sharp drop in the plot signifies that subsequent factors are not important to the analysis. In the scree plot in figure 6, the first three empowerment indicators have meaningful initial eigenvalues for the solution while there is not much difference among factors from the 4th factor onward even though it is barely over 1.0 eigenvalue.

Using principal axis factoring, the eigenvalues after extraction show that the first factor has an eigenvalue of 3.18, which accounts for 26.5% of the total variance of women’s empowerment. The second factor has eigenvalue of 1.31, which explains 10.9% of the total variance. The third and fourth factor have 0.87 and 0.25
eigenvalues and only account for 7.2% and 2.1% of the total variance, respectively.

These eigenvalues after extraction are much smaller than the initial eigenvalues, even though all four factors are higher than 1.0. These first four factors after extraction cumulatively account for 46.9% of the total variance of the scores of women’s empowerment.

Table 14: Factor loadings of women’s empowerment indicators in Cambodia

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Orthogonal</th>
<th>Oblique</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFP1-Engagement</td>
<td>.973</td>
<td>.977</td>
</tr>
<tr>
<td>LFP2-OccStat</td>
<td>.896</td>
<td>.637</td>
</tr>
<tr>
<td>LFP3-ContEmp</td>
<td>.926</td>
<td>.803</td>
</tr>
<tr>
<td>LFP4-Earnings</td>
<td>.706</td>
<td>.802</td>
</tr>
<tr>
<td>HDM1-Health</td>
<td>.047</td>
<td>.035</td>
</tr>
<tr>
<td>HDM2-Spending</td>
<td>.090</td>
<td>.026</td>
</tr>
<tr>
<td>HDM3-Visiting</td>
<td>.107</td>
<td>.056</td>
</tr>
<tr>
<td>FP1-Metneed</td>
<td>.042</td>
<td>.027</td>
</tr>
<tr>
<td>FP2-Media</td>
<td>.100</td>
<td>.060</td>
</tr>
<tr>
<td>FP3-Knowledge</td>
<td>-0.09</td>
<td>-0.03</td>
</tr>
<tr>
<td>ED1-Literacy</td>
<td>.111</td>
<td>-.069</td>
</tr>
<tr>
<td>ED2-Level</td>
<td>.183</td>
<td>-.119</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>LFP1-Engagement</td>
<td>.973</td>
<td>-.101</td>
<td>-.001</td>
<td>.157</td>
</tr>
<tr>
<td>LFP2-OccStat</td>
<td>.896</td>
<td>-.130</td>
<td>-.072</td>
<td>-.339</td>
</tr>
<tr>
<td>LFP3-ContEmp</td>
<td>.926</td>
<td>-.076</td>
<td>-.055</td>
<td>-.065</td>
</tr>
<tr>
<td>LFP4-Earnings</td>
<td>.706</td>
<td>-.011</td>
<td>.088</td>
<td>.307</td>
</tr>
<tr>
<td>HDM1-Health</td>
<td>.047</td>
<td>.162</td>
<td>.687</td>
<td>-.067</td>
</tr>
<tr>
<td>HDM2-Spending</td>
<td>.090</td>
<td>.061</td>
<td>.434</td>
<td>-.071</td>
</tr>
<tr>
<td>HDM3-Visiting</td>
<td>.107</td>
<td>.255</td>
<td>.372</td>
<td>.054</td>
</tr>
<tr>
<td>FP1-Metneed</td>
<td>.042</td>
<td>.084</td>
<td>-.046</td>
<td>.025</td>
</tr>
<tr>
<td>FP2-Media</td>
<td>.100</td>
<td>.226</td>
<td>-.108</td>
<td>.066</td>
</tr>
<tr>
<td>FP3-Knowledge</td>
<td>-.099</td>
<td>.023</td>
<td>-.006</td>
<td>.021</td>
</tr>
<tr>
<td>ED1-Literacy</td>
<td>.111</td>
<td>.578</td>
<td>-.070</td>
<td>-.007</td>
</tr>
<tr>
<td>ED2-Level</td>
<td>.183</td>
<td>.893</td>
<td>-.197</td>
<td>-.047</td>
</tr>
</tbody>
</table>

**Boldface numbers indicate statistically significant factor loadings.**

Table 14 shows the unrotated (orthogonal) and rotated (oblique) factor loadings in the factor matrix and factor pattern matrix tables. The numbers represent both how the variables are weighted for each factor, and the correlations between the variables and the factor. The results are discussed first in orthogonal rotation (left-hand side of the table), and then in oblique rotation (right-hand side of the table). Both rotation and nonrotation analysis clearly produce four-factor tables.

In orthogonal rotation, the first factor, which includes four variables on women’s labor force participation, show up as the highest factor loading. All the correlations of four variables indicate women’s engagement in the labor force, occupation’s status, continuity of employment and earnings compared to her husband. They have factor loadings above 0.7, with highest loadings in LFP1-Engagement (0.97). The second
factor shows up as education items, ED1-Literacy and ED2-Level with factor loadings of 0.57 and 0.89 accordingly. It shows that literacy and women’s level of education are the second factor that explains women’s empowerment scores. The third factor includes three household decision-making items (HDM1-Health, HDM2-Spending, HDM3-Visiting) with factor loadings from 0.37 to 0.68. The fourth factor shows up a little bit tricky, which makes it difficult to identify the most influential items in the 4th one. Generally, it can be said that the 4th factor loads on labor force participation items, but the correlation are dispersed with no clear tendency. This cross-loading issue of the fourth factor, plus the borderline initial eigenvalue from the scree plot visual test suggests that the fourth factor may not be a good measure for this factor analysis.

Similar trends are observed in the factor loadings results of oblique rotation on the right hand side of Table 14. The first factor strongly loads on the four labor force participation items, lowest loading is 0.63 (LFP2-OccStat), and highest loading is 0.97 (LFP1-Engagement). The second factor in oblique rotation still heavily loads on education items (0.59 and 0.97). Similarly, the third factor also loads on household decision-making items, ranging from 0.43 to 0.71. In the second and third factor, the loadings are slightly higher than in orthogonal rotation. The fourth factor does not really show significant items loading on itself, except for the cross loadings on labor force participation items, with overall negative loadings. The low factor loading and the issue of cross loading in factor 4 suggests that even though it meets the initial criteria of larger than 1.0 eigenvalue, factor 4 may not be a good measurement factor in this analysis compared to the three other ones. After examining both orthogonal and oblique rotation factor extractions, it can be determined that there are three
factors in this analysis and items on family planning do not show up as one of the factors in either analysis.

Table 15: Factor Correlation Matrix of Oblique Rotation (Cambodia)

<table>
<thead>
<tr>
<th>Factor Correlation Matrix</th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
<th>Factor 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1</td>
<td>1.000</td>
<td>.211</td>
<td>.071</td>
<td>-.247</td>
</tr>
<tr>
<td>Factor 2</td>
<td>.211</td>
<td>1.000</td>
<td>.026</td>
<td>.292</td>
</tr>
<tr>
<td>Factor 3</td>
<td>.071</td>
<td>.026</td>
<td>1.000</td>
<td>-.019</td>
</tr>
<tr>
<td>Factor 4</td>
<td>-.247</td>
<td>.292</td>
<td>-.019</td>
<td>1.000</td>
</tr>
</tbody>
</table>

The factor correlation matrix table shows how each of the four factors correlates with each other. The diagonal of the table always include 1.0s, which indicates the correlation of one factor with itself, and the correlations among other variables are mirrored across the diagonal line. The table shows that the second factor is positively correlated with the first factor (r=0.211), which can be interpreted that labor force participation factor is positively correlated with education factor, higher involvement in the labor force indicates a higher level education and vice versa. The third factor is slightly correlated with the first factor (r=0.071) and the second factor (r=0.026), which implies that labor force participation and education only slightly correlate with higher household decision-making and vice versa. The 4th factor seems to have negative correlations with the first and the third factor, however, the negative correlations have to be interpreted in accordance with the negative coefficients in the oblique factor loadings table above, which makes the correlations become positive. Since the fourth factor is also heavily loaded on labor force participation factor, the correlation with the first factor is trivial since it is also labor force participation factor. Its correlation on the third factor can be interpreted that there is a correlation between labor force participation and household decision-making.
The relatively similar factor loadings of orthogonal and oblique rotation in table 14 and the low correlation factor matrix suggest that there might be very little correlations between the factors. In other words, in the case of Cambodia DHS 2005, even though labor force participation, education and household decision-making are factors of women’s empowerment, they are relatively independent to each other.

**Indonesia**

Similar to the steps done in Cambodian data, first, twelve operationalized indicators of women’s empowerment are plotted using a scree plot to conduct a visual test for the number of factors in women’s empowerment. Then the factor loadings are extracted using principal axis factoring with unrorated and rotated axis factoring (orthogonal and oblique extraction). And finally, a factor correlation matrix is presented to determine if the factors are correlated with each other.

Figure 7: Scree plot of women’s empowerment factors in Indonesia
The scree plot shows the initial eigenvalues of the factors, and it is used as the initial criterion to determine the number of factors to extract in factor analysis. The scree plot shows that there are three factors with eigenvalues significantly above 1.0, and the fourth one is only barely above 1.0. From the 5th factor onward, the eigenvalues are not large enough to meet the criterion. The first factor has an eigenvalue of 3.16 after the extraction, which explains 26.39% of the variance. It is also the most influential one. The second factor has an eigenvalue of 1.15, which explains 9.58% of the variance. The third and fourth factor only explain 7.19% and 3.36% of the variance, respectively. Cumulatively, all four factors explain 46.5% of the variance.

<table>
<thead>
<tr>
<th>Table 16: Factor Loadings of Women’s Empowerment Indicators in Indonesia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Orthogonal</strong></td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>LFP1-Engagement</td>
</tr>
<tr>
<td>LFP2-OccStat</td>
</tr>
<tr>
<td>LFP3-ContEmp</td>
</tr>
<tr>
<td>LFP4-Earnings</td>
</tr>
<tr>
<td>HDM1-Health</td>
</tr>
<tr>
<td>HDM2-Spending</td>
</tr>
<tr>
<td>HDM3-Visiting</td>
</tr>
<tr>
<td>FP1-Medmed</td>
</tr>
<tr>
<td>FP2-Media</td>
</tr>
<tr>
<td>FP3-Knowledge</td>
</tr>
<tr>
<td>ED1-Literacy</td>
</tr>
<tr>
<td>ED2-Level</td>
</tr>
</tbody>
</table>

*Boldface numbers indicate statistically significant factor loadings.*

Results from the factor analysis with orthogonal (nonrotated) rotation show very similar trends to the results found in Cambodia. The first three factors neatly loaded on items of labor force participation, education and household decision-making. In the first group of indicators on labor force participation, all of the factor loadings except for LFP4-Earnings are higher than 0.9. The second factor mainly loads on education items ED1-Literacy and ED2-Level with factor loadings of 0.46 and 0.80 accordingly. The third factor shows up as loading positively on household decision-making items, HDM1-Health (0.59), HDM2-Spending (0.49) and HDM3-Visiting (0.39). However,
there is also a cross-loading issue in the fourth factor, which loads both positively and negatively on labor force participation items. This cross-loading issue of the fourth factor, plus the borderline initial eigenvalue from the scree plot visual test suggests that the fourth factor may not be a good measure for this orthogonal factor analysis.

In oblique rotation, when the axes are allowed to rotate and the factors are assumed to correlate with each other, different results were found compared to the ones found in orthogonal rotation. In the labor force participation factor, LFP1-Engagement shows up very strongly in orthogonal rotation (0.91), now only has a loading of 0.28 in oblique rotation. The loadings of items LFP2-OcStat and LFP3-ContEmp stay relatively the same as in orthogonal results. Surprisingly, LFP4-Earnings shows up with high factor loadings in orthogonal rotation (0.78), but only has minimal loadings in oblique rotation (0.08). The second factor still loads mainly on education items. The factor loadings of the two items, ED1-Literacy and ED2-Level, remain relatively unchanged in both nonrotation and rotation. The third factor is most strongly loaded on household decision-making items, and the factor loadings are relatively the same in both analyses. Again, in oblique rotation, the fourth factor appears to be negatively cross-loaded with item LFP1-Engagement and has negative loading on LFP4-Earnings. The unclear pattern and the cross-loadings issue of the fourth factor suggest that this factor is not a reliable measure and should be dropped from analysis.

<p>| Table 17: Factor Correlation Matrix of Oblique Rotation (Indonesia) |
| Factor Correlation Matrix |</p>
<table>
<thead>
<tr>
<th>Factor</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.000</td>
<td>-.014</td>
<td>.006</td>
<td>-.577</td>
</tr>
<tr>
<td>2</td>
<td>-.014</td>
<td>1.000</td>
<td>.013</td>
<td>-.199</td>
</tr>
<tr>
<td>3</td>
<td>.006</td>
<td>.013</td>
<td>1.000</td>
<td>-.153</td>
</tr>
<tr>
<td>4</td>
<td>-.577</td>
<td>-.199</td>
<td>-.153</td>
<td>1.000</td>
</tr>
</tbody>
</table>
Table 17 shows the factor correlation matrix of the four factors extracted, it displays how the four factors are correlated to each other. The results from orthogonal and oblique rotation factor analysis both implies that the fourth factor is not a reliable measurement thus should not be included in the analysis, so only the first three factors in the table of correlation matrix are analysis-worthy. The table shows that factors 1 and 2 are only slightly negatively correlated with each other; however, the correlation is very small, almost non-existent ($r=-0.014$). Factor 1 also has very marginal correlation with factor 3 ($r=0.006$). Similarly, factor 2 and factor 3 are only slightly positively correlated to each other ($r=0.013$). Overall, the matrix table indicates that the three factors have very marginal correlations with each other. The correlation matrix infers that in Indonesia, three women's empowerment factors, female labor force participation, education and household decision-making have little correlations to each other.

Factor analysis of both orthogonal and oblique rotation produce three factors that have the most impacts on women’s empowerment in the Indonesia DHS 2012 data. Labor force participation, education and household decision-making are found to be the three factors in both analyses, while family planning items do not show significance in either one.

**Philippines**

In this section, twelve operationalized indicators of women’s empowerment are plotted using a scree plot to conduct a visual test for the number of factors in women’s empowerment. Later, the factor loadings are extracted using principal axis factoring with unrotated and rotated axis factoring (orthogonal and oblique
extraction). And finally, a factor correlation matrix is presented to determine if the factors are correlated with each other.

Figure 8: Scree Plot of Women’s Empowerment Factors In Philippines

![Scree Plot](image)

Figure 8 shows the scree plot of the extracted factors of women’s empowerment in the Philippines 2008 data. The plot pictures two sharp drops in the data, which indicates that there are only three factors in women’s empowerment in the Philippines. After the third factor, there was no other significant drop. Initial eigenvalues also shows that there are three factors with eigenvalue above 1.0. After extraction, the first factor has eigenvalues of 3.41, which explains 28.47% of the total variance, makes it the factor with most impacts. The second factor has eigenvalues of 1.14, which explains 9.55% of the total variance and other factors only explain insignificant amount of the total variance (less than 4.6%).
Table 18: Factor Loadings of Women’s Empowerment Indicator In Philippines

<table>
<thead>
<tr>
<th></th>
<th>Orthogonal</th>
<th>Oblique</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>LFP1-Engagement</td>
<td>.934</td>
<td>-.107</td>
</tr>
<tr>
<td>LFP2-OccStat</td>
<td>.947</td>
<td>-.105</td>
</tr>
<tr>
<td>LFP3-ContEmp</td>
<td>.909</td>
<td>-.120</td>
</tr>
<tr>
<td>LFP4-Earnings</td>
<td>.828</td>
<td>-.062</td>
</tr>
<tr>
<td>HDM1-Health</td>
<td>.056</td>
<td>.085</td>
</tr>
<tr>
<td>HDM2-Spending</td>
<td>.019</td>
<td>.118</td>
</tr>
<tr>
<td>HDM3-Visiting</td>
<td>.122</td>
<td>.308</td>
</tr>
<tr>
<td>FP1-Metneed</td>
<td>.096</td>
<td>.070</td>
</tr>
<tr>
<td>FP2-Media</td>
<td>.187</td>
<td>.353</td>
</tr>
<tr>
<td>FP3-Knowledge</td>
<td>.092</td>
<td>.215</td>
</tr>
<tr>
<td>ED1-Literacy</td>
<td>.122</td>
<td>.557</td>
</tr>
<tr>
<td>ED2-Level</td>
<td>.218</td>
<td>.709</td>
</tr>
</tbody>
</table>

**Boldface numbers indicate statistically significant factor loadings.**

Table 18 shows the orthogonal factor loadings (in the left-hand side) and oblique factor loadings (in the right-hand side) of the factor analysis for Philippines DHS 2008 data. Even though the scree plot only shows three factors and the eigenvalues only show three factors that make the 1.0 cut-off, the fourth factor (in grey columns) is still extracted to make cross comparisons with data from other countries.

In orthogonal extraction, all the labor force participation items cluster in the first factor, which is similar to what was observed in Cambodia and Indonesia. LFP2-OccStat shows the highest factor loading of 0.947. LFP1-Engagement, LFP3-ContEmp and LFP4-Earnings have high factor loadings, all above 0.84. The second factor is loaded heavily on the two education items, ED1-Literacy (0.55) and ED2-Level (0.70), which means that this factor is mainly loaded on education items. This tendency is also found in both Cambodia and Indonesia. The third factor, even though the factor loadings are smaller than the loadings of items in the first and second factor, still appears to be a cluster of household decision-making items. The fourth factor was extracted (in the grey shaded column) for cross-country comparison, even though it does not appear as a significant factor both in the scree plot visual test and in
the eigenvalue test using a cut-off point of 1.0. This factor appears to be cross-loaded on the first factor by labor force participation items.

Oblique rotation results on the right hand-side of Table 18 show quite a significant difference in the factor loadings, especially of the first factor. Orthogonal results show relatively similar factor loadings of labor force participation items on the first factor with an average of 0.90 eigenvalues. Meanwhile in oblique rotation, the factor loadings of the first factor vary quite widely, from 0.12 in LFP4-Earnings item to 1.00 in LFP2-OccStat item. The large range of factor loadings indicates that when the factors are allowed to correlate with each other instead of being affixed to a 90 degree angle, the factor loadings show more clearly how the factor is loaded on each item. In the case of the labor force participation items, the first factor is very highly loaded on LFP2-OccStat (factor loadings is equal to 1.00), highly loaded on LFP1-Engagement and LFP3-ContEmp, and not much so much on LFP4-Earnings (factor loadings is only 0.12, but still higher than other items on the table). The big difference in the factor loadings of the items after allowing the factors to correlate with each other indicates that there is a correlation and therefore, oblique rotation is a more appropriate technique for the analysis.

However, not all the factors experience changes in the loadings when switching from orthogonal to oblique rotation; the factor loadings of factor 2 and 3 are quite similar in both rotations. Factor 2 is still loaded on education items, and factor 3 is still loaded on household decision-making items. Once again, the fourth factor show cross-loadings results with the first factor on labor force items, which indicates the last one is not qualified as a good measurement.
The factor correlation matrix shows a slight correlation between factor one and factor two (r=0.27) and almost no correlation between factor one and three (r=0.02) and factor two and factor three (0.12). The correlation matrix also implies that there is a small correlation between labor force participation and education while there is little correlation between labor force participation and household decision-making. The strong negative correlation between factor one and factor four basically shows that it is correlating with itself, since both factors are cross-loaded on labor force participation items, which makes the correlation not really meaningful.

Results from principal axis factoring using Philippines DHS 2008 data shows that there are 3 factors extracted, in both orthogonal and oblique rotations. Labor force participation is the strongest factor, education and household decision-making line up as the second and third factor. In this analysis, family planning items again do not appear as a factor of women's empowerment.

**Timor-Leste**

In this section, twelve operationalized indicators of women’s empowerment are plotted using a scree plot to conduct a visual test of the number of factors in women’s empowerment. Later, the factor loadings are extracted using principal analysis factoring with nonrotated and rotated axis factoring (orthogonal and oblique
And finally, a factor correlation matrix is presented to determine if the factors are correlated with each other.

Figure 9: Scree Plot of Women’s Empowerment Factors in Timor-Leste

The scree plot in Figure 9 shows there are three sharp drops, which indicates four factors in the 12 items of the factor analysis. The initial eigenvalues show that there are four factors that make the 1.0 cut-off, even though the last factor is only barely over 1.0. The first factor after extraction has eigenvalues of 2.99, which accounts for 24.98% of the variance. The second factor after extraction has eigenvalues of 1.53, which explains 12.74% of the variance. Each of the third and fourth factor only explains 4-5% of the variance. Factors 5th onward only have minimal explaining power of the total variance. All together, the first four factors explain 47.37% of the total variance of women’s empowerment.
Table 20: Factor Loadings of Women’s Empowerment Indicators in Timor-Leste

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Orthogonal</th>
<th>Oblique</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>LFP1-Engagement</td>
<td>.947</td>
<td>.029</td>
</tr>
<tr>
<td>LFP2-OccStat</td>
<td>.880</td>
<td>-.288</td>
</tr>
<tr>
<td>LFP3-ContEmp</td>
<td>.855</td>
<td>-.249</td>
</tr>
<tr>
<td>LFP4-Earnings</td>
<td>.713</td>
<td>.204</td>
</tr>
<tr>
<td>HDM1-Health</td>
<td>-.033</td>
<td>.104</td>
</tr>
<tr>
<td>HDM2-Spending</td>
<td>.022</td>
<td>.023</td>
</tr>
<tr>
<td>HDM3-Visiting</td>
<td>.041</td>
<td>.085</td>
</tr>
<tr>
<td>FP1-Medned</td>
<td>-.006</td>
<td>.024</td>
</tr>
<tr>
<td>FP2-Media</td>
<td>.131</td>
<td>.348</td>
</tr>
<tr>
<td>FP3-Knowledge</td>
<td>.150</td>
<td>.127</td>
</tr>
<tr>
<td>ED1-Literacy</td>
<td>.075</td>
<td>.600</td>
</tr>
<tr>
<td>ED2-Level</td>
<td>.201</td>
<td>.909</td>
</tr>
</tbody>
</table>

Boldface numbers indicate statistically significant factor loadings.

Table 20 shows the results from orthogonal and oblique rotations. In orthogonal rotation, the first factor is heavily loaded on four items of labor force participation with factor loadings all above 0.71 and the highest is 0.95. Education items line up as the second factor, with high factor loadings, from 0.60 for ED1-Literacy to 0.91 for ED2-Level. The results presented previously in the other three countries all show that the third factor is household decision-making, but in the Timor-Leste data, the third factor shows cross-loading with the first factor on labor force participation items while household decision-making items clustered in the fourth factor. The results are mixed with both positive and negative factor loadings. The cross-loading issue in the third factor is indeed unexpected. In other three countries, cross-loading issue often happens with the weakest factor that explains the least percentage of the total variance. The fourth factor is clearly loaded on household decision-making items, ranging from 0.30 to 0.48 factor loadings.

Results from factor analysis with oblique rotation show similar overall trends with some difference in the factor loadings of individual items. The first factor only loads on three labor force participation items compared to four items in orthogonal rotation. LFP1-Engagement factor loading drops from 0.94 (in orthogonal rotation) to 0.41 in
oblique rotation. LFP2-OccStat and LFP3-ContEmp are relatively similar as in orthogonal rotation, and LFP4-Earnings is no longer an item in this factor loading. The second factor mostly loads on education items, which show similar pattern in orthogonal rotation. In the third factor, once again the issue of cross-loading is observed in the items of labor force participation: LFP1-Engagement and LFP4-Earnings show up as the strongest negative factor loadings. Note that even though this is the third strongest factor, the cross-loading issue makes the results not meaningful for interpretation. The fourth factor is loaded on all three household decision-making items, with factor loadings from 0.34 to 0.52, which is quite similar to the results in orthogonal rotation.

Table 21: Factor Correlation Matrix of Oblique Rotation (Timor-Leste)

<table>
<thead>
<tr>
<th>Factor Correlation Matrix</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor</td>
</tr>
<tr>
<td>---------------</td>
</tr>
<tr>
<td>Factor 1</td>
</tr>
<tr>
<td>Factor 2</td>
</tr>
<tr>
<td>Factor 3</td>
</tr>
<tr>
<td>Factor 4</td>
</tr>
</tbody>
</table>

Table 21 shows the factor correlation matrix of the four factors extracted. Since factor 3 is cross-loaded on factor 1, it does not result in meaningful correlations. The factor correlation matrix shows almost no correlation between factor 1 and factor 2 (r=0.008), and factor 1 and factor 4 (r=-0.041), which implies that factor 1 is independent from factor 2 and 4. It also means that female labor force participation has very little correlation with education and household decision-making. There is a slight positive correlation between factor 2 and factor 4 (r=0.212). The correlation matrix shows that, in Timor-Leste, higher education may be slightly correlated with higher level of household decision-making.
The results from East Timor DHS 2012 data shows that there are 3 factors extracted from both orthogonal and oblique rotations. Labor force participation is the strongest factor, then education appears as the second factor, the third factor suffers from cross-loading issue and should be dropped from analysis, therefore household decision-making is the third factor in this analysis. Family planning items again do not appear as a factor in this analysis.

4.3. Summary and Interpretations of the Results

The results from factor analysis of four countries consistently show that labor force participation is the strongest factor in both orthogonal and oblique rotations. All the four items in labor force participation factor including LFP1-Engagement, LFP2-OccStat, LFP3-ContEmp, LFP4-Earnings, consistently show up as the first factor. Nevertheless, individual factor loadings are often higher (in the high 0.80s to 0.90s) in orthogonal rotation and varied more greatly in oblique rotation (from 0.40s-0.90s). The reason for the difference is that orthogonal rotation assumes that there is no correlation among the factors while oblique rotation allows the correlations to exist.

Similarly, in all four countries, education items (ED1-Literacy and ED2-Level) consistently show up as the second most influential factor in both rotated and non-rotated analyses. Factor loadings are also more consistent in both orthogonal and oblique rotations; around 0.60 for ED1-Literacy, and around 0.90 for ED2-Level. Apparently, level of education shows higher factor loadings than literacy alone. The third factor in Cambodia, Indonesia and Philippines include of three items in household decision-making, which are HDM1-Health, HDM1-Spending, and HDM3-Visiting. These items also show up as a factor in the results from Timor-Leste,
however, as the fourth factor. The average factor loadings of the three items in all four countries are around 0.30-0.50.

The fourth factor shows very interesting results, it is cross-loaded with labor force participation items in the first factor with negative factor loadings in all four countries. The cross-loading issue is experienced in both orthogonal and oblique rotations. In addition to the cross-loading issue, the fourth factor is barely over the 1.0 eigenvalue cut-off, and does not even meet the cut-off in the Philippines’ results. The cross-loading issue and the low eigenvalues suggest that there may not be a fourth factor in this analysis since there is too much noise in the results.

Despite the initial expectation that family planning is one of the four factors in women’s empowerment, it does not appear to be one in this study. None of the items in the list, including having met need, heard about messages of family planning on the media and knowledge about family planning, shows up as a factor in any country. The results are consistent in both orthogonal and oblique rotations. There are two reasons that may explain why family planning items are not a factor in the analysis. First, it may be data insufficiency; the analysis may not have enough data for proper measurement of the factor. The family planning factor at the individual level in this study used met need, access to media messages about family planning, and knowledge about family planning. Other variables, including contraceptive use and the types of contraceptives are not suitable for this analysis. As explained earlier, the reason is that women interviewed for these surveys are in their reproductive ages (from 15-49), and many of them do not use contraceptives simply because they are not sexually active so there is no need for contraception, or they want to have children or have not reached their desired number of children. Therefore, there is no clear logic
to determine if using contraceptives is more empowering than not or vice versa. As a result, a variable on contraceptive use is excluded from this factor analysis.

The second reason why family planning may not show up as a factor in women’s empowerment of this analysis could be the context of family planning usage. Some previous studies have suggested that family planning should be examined more carefully as a component of women’s empowerment to fertility. Results in Kenya show that, on the surface, the factors which empower women are associated with family planning. Nevertheless, Bradley (1995) points out that family planning users also tend to be older women and have more economic power. It is possible that older women want to end childbearing at the same time that they start to have more control over their life. Thus, the mechanism through which contraception is a result of women’s empowerment is still unclear. Contraceptive use can be empowering in countries where the prevalence of usage is low, but it may not as empowering in countries where there is a high prevalence of family planning usage. The case of Bangladesh suggests that the use of contraception was once considered empowering, but when more than half of the married women in rural Bangladesh have used it since the 1990s, it has become normative and does not necessarily imply a higher level of empowerment (Malhotra, Schulerm, and Boender 2002).

It might that the percentage of ever-married women currently using some methods of contraception or having intentions to use is relatively high in all four countries of analysis. There are 41% of ever-married women in Cambodia who are currently using contraceptives. Including women who have intentions to use brings the number to 70%. In Indonesia, 56% are using and 78% of women are using or having intention to use. In Philippines, 50% of ever-married women are currently using some method,
and 73% ever married are using or having intention to use. Timor-Leste, being the country with lowest contraceptive use prevalence, has 21% ever-married women using contraceptives and 37% using or having intention to use. The high prevalence of contraceptive use may suggest that it is not necessarily an empowering factor anymore. Instead, it is becoming more of a norm. Evidence found in this study, that contraceptive use once considered an empowering factor but no long the case, supports the notion that women's empowerment is contextual; what is considered empowering may not be in other contexts (Malhotra, Schulerm, and Boender 2002).

In this study, principal axis factoring was able to identify three major factors of women’s empowerment in Cambodia, Indonesia, Philippines and Timor-Leste. Labor force participation appears to be the strongest factor, and then come education and household decision-making. Despite the initial expectation, family planning does not show up as a factor in women’s empowerment in the analysis of the data in any of these four countries. Higher education of women often coincides with higher chances of involvement of women in the labor force, which in turn, leads to higher economic independence and more involvement in household decision-making. All these factors increase the level of empowerment of individual women. However, the mechanism is undetermined in terms of women’s use of contraceptive and empowerment.

Previous studies on women’s empowerment have suggested women’s use of contraception as a factor of women’s empowerment. However, evidence found in this study using recent data from Southeast Asia does not provide support for such conclusion. As discussed earlier, women’s use of contraception probably used to be a factor in women’s empowerment, when contraceptive use was limited to only a small group of innovative women who could afford it. With time, as contraceptives have
become more readily available even in developing countries, using contraception may not necessarily mean a higher level of empowerment. A woman may choose not to use contraceptive or choose to have a higher number of children based on her preference and her decision, it does not necessarily mean she has no or less control over her fertility.

This study has overcome the shortcomings of current indexes, which mainly focus on developed countries where the perceptions of employment and labor can be very different than in less developed ones. The measurement of women’s empowerment using micro data also provides a solution for the problem of lacking household level data in current indexes (Beteta 2006). Furthermore, the construction of the measurement is practically applicable in more than 90 developing countries where the Demographic and Health Surveys are available. Most current indexes have been measuring women’s empowerment using the contraceptive use as one proxy to measure women’s empowerment, nonetheless, new measurements should be more cautious about treating this variable as a component of empowerment.
CHAPTER 5: USING WOMEN'S EMPOWERMENT TO MODEL IDEAL NUMBER OF CHILDREN

Previous studies have suggested different pathways through which women’s empowerment affects different aspects of fertility such as the preference for high fertility or preference for specific gender of the children. This chapter examines the associations between women's empowerment and fertility preference in terms of the preference for large family size, which is operationalized by the women's ideal number of children. Three women’s empowerment factors which have been extracted from principal axis factoring in the previous chapter, including women’s labor force participation, women’s education and household decision-making, are examined in four countries of study: Cambodia, Indonesia, Philippines and Timor-Leste. Three types of regression models (OLS, Poisson and Ordered Logit) are used to find out if there are significant association between the three women’s empowerment factors and fertility preference, measured by the ideal number of children, after controlling for a woman’s and her husband’s characteristics.

5.1. Selected Variables and Descriptive statistics

This section describes how the variables, including the dependent, independent and control variables for the regression models, are selected and operationalized. Later the descriptive statistics of the variables are presented and discussed.

*The Dependent Variable*

Fertility preferences are the desire expressed by the couples about their childbearing, for example, the preference for high fertility or the preference for sons. The term *fertility preference* is often used interchangeably with ideal/ desired/ preferred/
intended number of children or desired family size (Oxaal and Baden 1997). Since fertility preference is closely related to actual fertility, changes in fertility preference are often accompanied by changes in fertility behaviors (Pritchett 1994, Bankole 1995, Freedman 1997, Bongaarts 1990, Freedman, Hermalin, and Chang 1975). In this study, data on women’s fertility preferences were collected through the Demographic and Health Surveys in four countries: Cambodia, Indonesia, Philippines and Timor-Leste. The surveys use large and nationally representative samples with detailed questions on demographic background, fertility preferences and birth histories of all eligible women age 15-49 (more detailed description of the surveys is introduced previously in Chapter 3). The Demographic and Health Surveys have detailed sections on fertility preferences of the respondents, including questions on the respondents’ desire to have another child, the desired length of time before having another child, the ideal number of children, and the ideal number of sons and daughters.

In the question on the ideal number of children, the women were asked if they could go back to before they had had any children, how many children would they ideally have. This question is standard in all DHS questionnaires in all the countries. The ideal number of children is a good measure for women’s fertility preference since it assumes that no birth is unintended, and all births are “wanted”.

Even though fertility preferences may change over time and depend on different life stages of the respondents, this issue can be controlled for by adding variables on women’s age to the regression models. An advantage of using fertility preference as the dependent variable is that it is not much affected by whether the women have completed their childbearing or not. In contrast, using actual fertility such as the
number of children ever born would be greatly affected by this fact. Therefore, in this chapter, the ideal number of children is used as the dependent variable.

One of the limitations of using the ideal number of children as the dependent variable is the issue of non-numerical responses such as “up to God” or “as many as God wants”, which DHS questionnaires encounter in some responses, especially in the Indonesia sample. One way to correct this problem is to use the average of the ideal number of children of all women in the sample to replace non-numerical responses. Nevertheless, women who responded “up to God” instead of numerical answers had a vague idea about their desired family size; they tend to prefer higher ideal numbers of children and tend not to try to limit their number of children. In this study, non-numerical answers in the selected data sets are recoded as missing so only numerical answers are eligible for analysis.

The second limitation with using the ideal number of children that Bongaarts (2001) points out, is that women with a high actual number of children might adjust their ideal number of children to rationalize their existing conditions. Unfortunately it is not possible to determine if their responses were affected by the rationalization issue. However, since the ideal number of children expressed by women in all four countries is higher than the current number of children ever born, it is reasonable to expect that the majority of births are wanted - some births may be mistimed but still fit in the desired family size.

Key Independent Variables

The three key independent variables are factor scores of women’s participation in the labor force, women’s education and women’s involvement in household decision-making, which are extracted through principal axis factoring (as described in Chapter
4). The scores are actual individual scores based on how the women answered the questions regarding these three aspects of women’s empowerment. The fourth concept explored in chapter 4, women’s use of contraception, it did not show up as an identifiable factor in principal axis factoring. Therefore, it is not used as one of the key independent variables in this chapter.

The women’s labor force participation factor is measured by four indicators which take into account the engagement of the woman in the cash economy through types of employment (if she works for herself, family members or someone else) and types of payment that she receives; her occupation; her continuity of employment throughout the year (full time or part time); and her earnings compared to her husband’s earnings. The education factor is measured by two indicators: women’s literacy and women’s level of education completed. The household decision-making factor is measured by three indicators: decisions related to health (issues when seeking medical help), decisions related to household spending (who controls how to spend the money) and decisions related to visiting relatives (who decides). The detailed operationalization of these factors is described in chapter 4.

It is expected that increase in factor scores of all three women’s empowerment factors is associated with a lower ideal number of children. At the individual level, women’s participation in paid employment is associated with lower actual fertility and lower fertility preference (Mason 1987, Jejeebhoy 1995, Rindfuss and Brewster 1996, Kabeer 2001, 2005a). Previous studies have found that a higher level of women’s household decision-making is associated with a preference for lower fertility (Afifi 2007, Upadhyay and Karasek 2012, Shoaib, Saeed, and Cheema 2012). Increase in women’s level of education has been universally found to be associated with a

**Control Variables**

Fertility preferences are influenced by different socio-economic and demographic background characteristics of the respondents and their partners; thus, it is important to include a set of control variables in the regression models. In this study, the relationship between women’s empowerment and the ideal number of children is examined after controlling for age, residence, religion, the number of children ever born, husband’s education and husband’s occupation. The ideal number of children may change with women’s age and the number of children they have had. The location of women’s current residence (in urban or rural areas) may be associated with their preference for children as well. And, this number may also be associated with having certain religious values. Generally, both partners contribute to the couple’s fertility preferences and behaviors. Thus, the background characteristics of the respondents’ husband such as occupation and education, may have some associations with the woman’s ideal number of children, hence these variables are also included.

Women’s age also is expected to be associated with their ideal number of children, thus it is included in the regression models. Even though the ideal number of children is sensitive to age and different stages in the life course, it may not necessarily show a linear relationship; thus, a variable age-squared is added to the models to examine if there is a curvilinear association of women’s age with their ideal number of children. Older women are expected to have a higher ideal number of children but the difference is more visible in younger age groups and will diminish once the women
reach a certain age. Therefore, the ideal number of children is expected to rise with age and then flatten out. Respondents’ current age is included in all DHS questionnaires. The variable is numeric and continuous so no further operationalization is needed.

Urban residence has been consistently found to associate with lower actual fertility and the ideal number of children (Singh and Casterline 1985, Phan 2014, Cochrane 1983, Duncan 1965). In this study, the effects of urban residence is controlled for by adding a dichotomous variable on current residence of the respondents, which has been recoded into a dummy variable with urban residence as the reference category.

Linear correlation between fertility preference and actual fertility has been found in the literature (Bongaarts 1990), thus, a higher ideal number of children may indicate a higher average number of children ever born and vice versa. In this study, the number of children ever born (CEB) is controlled for in all models regressing the ideal number of children on women's empowerment factors. The number of children ever born is available in the DHS questionnaire as a numeric continuous variable; hence, the original variable is used with no modification. It is also expected that the relationship between the ideal number of children and the number of children ever born is moderated by age, which means the association between the number of children ever born and the ideal number of children changes as age changes. Thus an interaction between age and number of children ever born is controlled for in the regression models.

Religion has been one of the major focuses in studies of fertility rates across populations (Morgan et al. 2002, McQuillan 2004, Heaton 2011). Heaton (2011),
while studying 30 developing countries using DHS data, finds that Muslim women have substantially higher fertility than Christian women, while there is not much difference between Catholics and Protestant women. Religion is significant to fertility in both developing and developed countries. In a study of 15 European countries using the European Values Study (1990, 1999 and 2008), Guetto, Luijkx, and Scherer (2015) find that religion is statistically associated with fertility in 10 out of 15 countries. In this study, the effect of religion on the ideal number of children is also examined.

The DHS religion variables are not uniformly coded in all four countries of study; thus an operationalization of the variables is necessary. The DHS question on religion is not available in Indonesia, in the Demographic and Health Survey 2012 questionnaire there was no question on religion, though it was available in the other three countries. This might come from the assumption that almost the whole country’s population is Muslim, while in fact, the CIA World Fact Book reports that 87.4% of the population is Muslim (Central Intelligence Agency 2013). The reason for the omission of the religion question in the Indonesian questionnaire is unclear since it is not mentioned anywhere in the final DHS report. Therefore, in the results section reporting regression models for Indonesia, religion is not included in the models.

In the three countries where the religion variable is available, each country has different response categories depending on the actual religions being practiced in the country. In Cambodia, response options of the religion question include: Buddhism, Islam, Christianity and Others, which is quite standard in capturing the major religions of the region; thus these options are used to standardize religion variables in other countries. The religion variable in the Philippines has different options for
Christian denominations. The majority of the population is Roman Catholic, however, there are also Protestant, Iglesia Ni Kristo and Aglipay, of which the latter two are Christian denominations that originated in the Philippines. None (no religion) and Others are combined into one category “Others” and Islam remain unchanged. Similarly, in the Timor-Leste questionnaire, there are 5 response options for the question on religion: Catholic, Protestant, Islam, Hindu, and Others. The new recoded religion variable combines Catholic and Protestant into “Christianity”, combines Hindu and Others into “Others”, and leaves Islam unchanged.

Fertility decisions are usually jointly decided by the couples; therefore it is important to also include the socio-economic background of the husband in the regression models. In this study, husband’s education and occupation are controlled for. Husband’s years of education is a numeric standard variable in all four questionnaires so no recoding is necessary. The DHS variable on the occupation of the husband has 10 categories, which have been recoded into a set of 4 variables: (1) husband works in agriculture (agriculture self-employed and agriculture employee) – treated as reference variable; (2) husband does not work (no transformation needed); (3) husband works in non-manual jobs (a combination of 5 categories in the original variable: professional/ technical/ managerial, clerical, sales, household and domestic, services); and (4) husband works in manual jobs (a combination of two categories in the original variable: skilled manual and unskilled manual). There are a very small number of men whose jobs are unknown to their wife (Don’t know); these cases are treated as missing.
<table>
<thead>
<tr>
<th></th>
<th>Cambodia</th>
<th>Indonesia</th>
<th>Philippines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean(SD) / Percent</td>
<td>Mean(SD) / Percent</td>
<td>Mean(SD) / Percent</td>
<td></td>
</tr>
<tr>
<td>Time/Life expectancy</td>
<td>39.0 (2.78)</td>
<td>32.0 (3.5)</td>
<td>31.5 (2.58)</td>
</tr>
<tr>
<td>Literacy Rate (%)</td>
<td>96.0 (4.05)</td>
<td>90.0 (5.7)</td>
<td>84.0 (4.05)</td>
</tr>
<tr>
<td>Occupational status</td>
<td>8.3 (2.4)</td>
<td>4.3 (2.4)</td>
<td>1.8 (1.4)</td>
</tr>
<tr>
<td>Husband's education (years)</td>
<td>3.0 (1.8)</td>
<td>3.0 (1.8)</td>
<td>3.0 (1.8)</td>
</tr>
<tr>
<td>Head number of children</td>
<td>3.2 (1.5)</td>
<td>3.2 (1.5)</td>
<td>3.2 (1.5)</td>
</tr>
<tr>
<td>Religion</td>
<td>Buddhist</td>
<td>Christian</td>
<td>Buddhist</td>
</tr>
<tr>
<td>Military service</td>
<td>9.7 (4.0)</td>
<td>10.0 (4.0)</td>
<td>10.0 (4.0)</td>
</tr>
<tr>
<td>Does not work</td>
<td>0.0 (0.0)</td>
<td>0.0 (0.0)</td>
<td>0.0 (0.0)</td>
</tr>
<tr>
<td>Election participation</td>
<td>4.3 (2.4)</td>
<td>4.3 (2.4)</td>
<td>4.3 (2.4)</td>
</tr>
<tr>
<td>Interview скончарся</td>
<td>18.7 (4.5)</td>
<td>18.7 (4.5)</td>
<td>18.7 (4.5)</td>
</tr>
<tr>
<td>Total cases</td>
<td>18,733</td>
<td>18,733</td>
<td>18,733</td>
</tr>
<tr>
<td>Missing</td>
<td>2,436</td>
<td>2,436</td>
<td>2,436</td>
</tr>
<tr>
<td>Fraud sample by design</td>
<td>6,966</td>
<td>6,966</td>
<td>6,966</td>
</tr>
<tr>
<td>N</td>
<td>13,187</td>
<td>13,187</td>
<td>13,187</td>
</tr>
</tbody>
</table>
Table 22 shows the descriptive statistics of the final eligible samples in four countries. Descriptive statistics of the three independent variables and 6 control variables that are used in the regression models on the relationship between women’s empowerment and the ideal number of children are presented.

The average age of Cambodian women in the sample is 31.3; of Indonesian and Filipino women is 32.9 and 32.7 respectively, and of Timor-Leste women is 30.4. The proportion of women who live in urban residence varies among the four countries from one third to nearly half of the samples. Timor-Leste has the lowest proportion of women who live in urban areas (31%) while Indonesia has the highest number (48%).

Despite the geographical closeness, the four countries studied have a great diversity in religions. 97% of the sample in Cambodia is Buddhist, and only a very small number is Muslim or Christian. The most dominant religion in Indonesia is Islam, nonetheless, there are no data available on religion in the Indonesia DHS survey. In the Philippines, 86% of the sample is Christian (including Catholic and other Christian denominations); a small proportion is Muslim and other religions; and 0% Buddhist. In Timor-Leste, the homogeneity in terms of religion is extremely high, 99.6% of the sample is Catholic and only four-tenths of a per cent of the sample practices Islam and other religions. The four countries of study have very different major religions. The major religion in Cambodia is Buddhism, in Indonesia, it is Islam, in the Philippines and Timor-Leste, it is Roman Catholic. In the regression models for each country presented in later sections, the religion that is the dominant one in the country is treated as the reference group.

The average ideal number of children, i.e. the dependent variable in this study, is lowest in Indonesia (2.69), and strikingly high in Timor-Leste (5.41). As a relatively
newly independent country, Timor-Leste is still at the beginning of the demographic transition, which displays in the high number of children ever born. The country’s TFR only started to show some signs of decline in the period from 2005-2010 and would be expected to further decline following other countries in Southeast Asia. The ideal number of children expressed by Filipino women is just above 3 (3.09), only slightly lower than Cambodian women’s ideal of 3.21. In all of the countries, the average ideal number of children is higher than the average number of children ever born (CEB). The difference ranges from a low of 0.4 children in Indonesia, to 0.7-0.8 children in Cambodia and Philippines, and to an excessively high 1.58 children in Timor-Leste.

Control variables for husband’s characteristics include husband’s years of education and husband’s occupation. The average years of husband’s education is lowest in Cambodia (7.12), then Timor-Leste (8.09), and Philippines (9.18). The Indonesian sample has highest average years of husband’s education (9.35).

_Husband’s occupation_ is recoded into four categories (from 10 original categories): _husbands who work in agriculture_ (treated as the reference category), _husbands who do not work_, _husbands who work in non-manual jobs_, and _husbands who work in manual jobs_. In Cambodia, 41% of the women in the sample have husbands who work in agriculture jobs (which is the highest proportion out of all the job categories), 31% of the women have husbands who work in non-manual jobs, and 25% have husbands who work in manual jobs. Only half a percent of the sample have husbands who do not work. In Indonesia, a quarter of the women in the sample have husbands who work in agriculture, 35% have husbands who work in non-manual jobs and 38% have husbands who work in manual jobs; only less than 1% of the women in the
sample have husbands who do not work. In the Philippines sample, 28% of the women have husbands who work in agriculture, 25% have husbands who work in non-manual jobs, a very high proportion (43%) of the women have husbands who work in manual jobs. In Timor-Leste, the distribution of the husbands’ occupation is quite different; 43% of the women have husbands working in agriculture, 47% have husbands who work in non-manual jobs, only 8% have husbands who work in manual jobs and none have husbands who do not work.

Table 22 also shows the three key independent variables, which are the average scores of individual women’s empowerment factors in labor force participation, education and household decision-making. By construction, the means of all the factor scores are 0 since the variables are all standardized with average values centered at 0.

The number of missing cases is relatively small in Cambodia, Philippines and Timor-Leste. The number of missing cases in Indonesia is quite high due to the large number of missing data in the dependent variable (Ideal number of children). There are 2,282 women in the four countries who had non-numeric responses such as “up to God” or “as many as God wants” when they were asked about their ideal number of children. Most of the missing cases (2,404) occur in the Indonesian sample. These answers are coded as missing since numeric answers are required to run the regression models. Nevertheless, since the selected samples for all four countries are quite large, the missing values still represent less than 10% of the total target sample by design for Indonesia (and much less for the other countries).

5.2. Regression models

Since the dependent variable is the ideal number of children, which is a count variable, ordinary least squares regression is not the most appropriate approach even
though it produces easy to interpret results. Poisson regression would ordinarily be the preferred approach for a count outcome variable that follows a Poisson distribution. One of the properties of the Poisson distribution is that the mean equals the variance and this characteristic is commonly used to test if the data follow the Poisson distribution. However, the mean and variance tests in each sample suggest that none of them follows the Poisson distribution. Another reason that Poisson regression is not perfectly suitable for analysis is that the ideal number of children stated by a woman is not a number that was actually counted, it is an imaginary number instead of a real number of births that have occurred.

Ordered logit models can be used to model the ideal number of children if the dependent variable is treated as a categorical variable which follows ordered numbers starting from 0; and the distances between one category to the next are not equal. Specifically, the odds of increasing in one number of ideal of children increases with lower ordered number and decreases as the number goes up, since many women prefer to have 1-2 or 3 children but fewer would choose a higher number. Therefore, ordered logit regression is an acceptable approach.

Nonetheless, all three types of regression have their significant benefits. Ordinary least squares regression makes it easy to interpret the results, which gives initial impressions on how the variables behave; Poisson regression is appropriate for a count outcome dependent variable; and ordered logit regression is appropriate for ordered outcomes. In this section, three types of regressions, OLS, Poisson and ordered logit, are run for each of the four countries to examine the association between women’s empowerment and the ideal number of children after controlling
for other variables. First, baseline models with only control variables are run, later the three women’s empowerment factors will be added to the full models.

**Cambodia**

The Cambodia 2010 sample includes 6,496 women who have data available for all selected variables for the ideal number of children regression models. The baseline models include a set of control variables: age and age squared to examine the life cycle effect on the ideal number of children, current residence of the women (which takes rural residence as the reference category), religion (in which Buddhism is the reference category since it is the most dominant religion in Cambodia), CEB (number of children ever born as a continuous variable), an interaction between age and CEB (age*CEB), husband’s years of education, and husband’s occupation (which takes agriculture as the reference category). The full models include all the control variables plus the labor force participation, education and household decision-making factor scores. A total of six regression models are run. Results for three types of regression: OLS (models M1, M2), Poisson (models M3, M4) and Ordered Logit (models M5, M6) are reported in table 23.
Age and age-squared only show significant associations with the dependent variable in ordered logit models, which suggests a curvilinear association of women’s age and the ideal number of children that they want. Theoretically, the negative coefficients of age and slightly positive coefficients of age-squared suggest a slight U shaped curve of age on the ideal number of children: older women have lower ideal number of children compared to those who are in younger ages. However, the coefficients of age and age-squared are not significant in OLS and Poisson models and in ordered logit...
regression the coefficient of \textit{age-squared} is only slightly above 1, which makes the line appear almost linear (see Figure 10). If the age range was infinite then the curve would appear more evident. But in the age range of the sample, 15-49, it appears that women’s ideal number of children follows a roughly linear downward line as they get older.

Figure 10: Effects of \textit{Age} and \textit{Age-Squared} on the Ideal Number of Children in Cambodia

![Graph showing the relationship between age and ideal number of children.](image)

Lower ideal number of children seems to be associated with urban residence, yet, the relationship is only significant in the baseline models estimated using OLS and ordered logit regression (M.1 and M.5), and is not significant when the labor force participation, education and household decision-making factors are added into the models.

Religion (where Buddhism is the reference category) shows a significant association with the ideal number of children; there is a significantly higher odds of preferring a
higher ideal number of children among Muslim women. In numerical terms, being Muslim in Cambodia increases the odds of preferring one higher ideal number of children by 1.8 times compared to being Buddhist. However, being Christian or Others show no significant difference in the ideal number of children compared to the reference category. The association is consistently significant in all three types of regression and in both baseline and full models.

CEB (children ever born) has a very strong and consistent relationship with ideal number of children across all models. The statistically significant coefficients indicate that a higher number of CEB is positively associated with a higher ideal number of children. In ordered logit models, higher number of CEB increases the odds of preferring one number higher in the ideal number of children by 78%. The interaction between age and CEB is controlled for but does not show any significant coefficients in the models.

It is surprising to find that husband’s characteristics on education and occupation show no association with their wife’s ideal number of children across all six models. Years of husband’s education tend to associate with a lower ideal number of children, yet the coefficients are not statistically significant across all models. Husband’s occupation also shows no significant association with fertility: all job categories including not working, works in non-manual jobs and works in manual jobs, show no significant difference to those who work in agriculture (reference category).

In the case of Cambodia, of all the three women’s empowerment factors included in the full models (M2, M4, M6), only the coefficients of the education factor show up significant, while the coefficients of the other two factors are not. The results show that education factor scores are negatively associated with the ideal number of
children in OLS and ordered logit regressions. The relationship between the education factor and fertility preference (operationalized as the ideal number of children) is significant at p-value < 0.01. The result is consistent with the literature on the relationship between women’s education and their actual fertility and fertility preference. Higher scores of the labor force participation factor tend to be associated with higher ideal number of children, yet the coefficient is not statistically significant. A similar trend is observed in the coefficients of factor scores on household decision-making, where higher scores in household decision-making tend to be associated with higher ideal number of children, but again, the coefficient is not significant.

In OLS models, the R-squared statistic shows that the models explain about 25% of the variation in the ideal number of children of women in Cambodia. Nonetheless, the F-test for the OLS models and Chi-squared test based on the -2 Log likelihood statistic for the Poisson models do not suggest an improvement of the baseline model after adding three women’s empowerment factor scores. Nevertheless, the Chi-squared test based on the -2Log likelihood statistic for the ordered logit models suggests that the baseline model is significantly improved after adding the three women's empowerment factor scores at p-value=0.01.

The results from all 6 models suggest that in this sample of DHS Cambodia 2010, only the education factor shows a significant negative coefficient on fertility preference, while labor force participation and household decision-making factors do not have significant associations with the ideal number of children. Control variables for women's characteristics such as age, age-squared, CEB, and religion are significant, whereas control variables on the husband’s characteristics such as
husband’s years of education and husband’s occupation show no significant association.

**Indonesia**

The DHS Indonesia 2012 sample includes 24,479 women who have data available for all selected variables for the fertility preference regression models. This is also the largest sample size of the four countries studied. A similar model design as that presented earlier for Cambodia is used. The baseline models include a set of control variables: age and age squared to examine the life cycle effect on the ideal number of children, current residence of the women (which takes rural residence as the reference category), CEB (number of children ever born) as a continuous variable, an interaction between age and CEB (age*CEB), husband’s years of education, and husband’s occupation (which takes agriculture as the reference category). Religion was not included in the Indonesia DHS questionnaire so the religion variable is omitted in the regression models. The full models include all the control variables plus the three women's empowerment factors: labor force participation, education and household decision-making. A total of six regression models are run. Results for three types of regression: OLS (models M1, M2), Poisson (models M3, M4) and Ordered Logit (models M5, M6) are reported in table 24.
OLS and ordered logit regression results show that age is negatively associated with the ideal number of children in models M1, M2 and M5, M6. Nonetheless, age does not show up significant in Poisson regression models (M3, M4) in this sample. Age-squared is also statistically significant across all six models. Theoretically, the positive coefficients of age and slightly negative coefficients of age-squared suggest a slightly downward curved trend line of age on the ideal number of children, which indicates that women at their middle ages prefer slightly higher ideal number of children compared to women at younger or older age groups. In the age range of the sample (15-49), the ideal number of children follows a curvilinear downward line (as
shown in Figure 11), women prefer a higher ideal number of children when they are younger but the older they get, the lower the ideal number of children they prefer.

Figure 11: Effects of Age and Age-Squared on the Ideal Number of Children in Indonesia

*Residence* has a very consistent association with the ideal number of children across all six models. Urban residence is significantly associated with lower ideal number of children at p-value < 0.01 in all models. Model M6 shows that living in urban areas decreases the odds of the women to prefer one number higher in the ideal number of children by 19%, compared to those who live in rural areas.

*CEB* also shows a positive association with *ideal number of children* in Poisson and ordered logit models; one number higher in the number of children ever born significantly increases the odds of one number higher in the ideal number of children among Indonesian women. There is a significant interaction between *age* and *CEB* in all models, which indicates that the relationship between the ideal number of children and the number of children ever born is moderated by age, i.e. the relationship between the number of children ever born and the ideal number of children changes as age changes. This result is different from previous results found in the analysis of
Cambodia, which shows no interaction between the two variables. Figure 12 shows the predicted margins effect of the interaction of *age* *CEB* on the ideal number of children in model M2 of OLS regression. Clearly, at the same predicted ideal number of children, women at the youngest age group (20 year-old) have the lowest number of children ever born compared to two older age groups (30 and 40). Women at age 40 have the highest number of children-ever-born at the same predicted ideal number of children.

Figure 12: Predictive Margin Effects of the Interaction between Age and CEB on Ideal Number of Children – Indonesia 2012

Similar to the results found in the Cambodian sample, *husband’s years of education* does not have any associations with the *ideal number of children* in this sample. The coefficients are negative in the three baseline models, and positive in the three full models, yet, none of them is significant.

*Husband’s occupation* has some significant associations with the *ideal number of children*. Women whose husbands work in agriculture are considered the reference category. The results show that this reference group has the highest ideal number of children compared to all three other groups: not working, work in non-manual jobs...
and work in manual jobs. The relationship is almost consistent in all OLS, Poisson and order logit regression models. The exception is the group of women whose husbands are not working, which does not show significantly lower ideal number of children compared to those who work in agriculture in the two Poisson regression models (M3, M4) and in the full model estimated using ordered logit regression (M6).

All the three women’s empowerment factors have significant associations with fertility preference in the Indonesian sample with only one exception of household decision-making factor in model M4. Labor force participation factor is associated with higher ideal number of children. In ordered logit model (M6), it increases the odds of preferring one number higher in the ideal number of children by 8.3%. The coefficients are significant at p-value < 0.01 in all three models. The results are quite unexpected and strikingly in contrary to the initial expectation that higher level of engagement of the women into the labor market would lower their actual fertility and their ideal number of children.

Education factor is negatively associated with the ideal number of children in both OLS and ordered logit regression models. OLS results show that women who have higher scores in the education factor prefer a lower ideal number of children. Ordered logit regression results show that higher scores in the education factor lowers the odds of preferring one number higher of ideal number of children by 7.5% (model M6). The association between women’s education and the ideal number of children is significant at p-value < 0.01. The result is expected and consistent with earlier results found in the analysis of Cambodia.

Household decision-making factor scores are associated with a lower ideal number of children, which indicates that women who have more involvement in the household
decision-making process tend to have a lower ideal number of children. In other words, one unit increase in the household decision-making factor scores lowers the odds of preferring one number higher of ideal number of children by 4% (model M6). The coefficients are significant in both OLS and ordered logit regressions. This finding can be interpreted that a woman who has more power in deciding her health, her mobility and household spending would prefer a lower ideal number of children compared to those who has less power in the household.

Despite the fact that most variables are significant in the two OLS regression models of the Indonesian sample, yet, the R-squares are not very high; around 13% of the variation in ideal number of children can be explained by three women’s empowerment factors and the control variables in the OLS models. The F-test based on the R-squared of OLS models does not show a significant improvement of the full model after adding three women’s empowerment factors. However, Chi-squared tests based on the \(-2\text{Log Likelihood}\) of Poisson and ordered logit models show that the baseline models are significantly improved after adding the three key independent variables of women’s empowerment factors at p-value = 0.001.

Results from all 6 regression models suggest that all three women’s empowerment factors including labor force participation, education and household decision-making have significant associations with the ideal number of children of Indonesian women. While it is unexpected that higher scores of labor force participation are associated with higher odds of preferring higher ideal number of children, higher education and household decision-making factor scores are associated with lower odds, as expected. Not all the control variables in the Indonesia sample are statistically significant, specifically, \textit{husband’s years of education} has no association with their wives’ ideal
number of children. Women’s *age* and *age-squared* show an association with the *ideal number of children*, which suggests a curvilinear line, and the coefficients are statistically significant. Other control variables including *residence*, *CEB*, the interaction term *age*\(^*\)CEB, and *husband’s occupation* show significant coefficients on the ideal number of children.

**Philippines**

The Philippines 2008 sample includes 7,113 women who have data available for all selected variables for the fertility preference regression models. The baseline models include a set of control variables: *age* and *age-squared* to examine the life cycle effect of women’s age on the ideal number of children, *current residence* of the women (which takes rural residence as the reference category), *religion* (in which Catholic is the reference category since it is the most dominant religion in the Philippines), *CEB* (number of children ever born, as a continuous variable), *husband’s years of education*, and *husband’s occupation* (which takes agriculture as the reference category). The full models include all the control variables plus the labor force participation, education and household decision-making factor scores. A total of six regression models are run. Results from three types of regression: OLS (models M1, M2), Poisson (models M3, M4) and Ordered Logit (models M5, M6) are reported in table 25.
The results in Table 25 show that women’s age is positively associated with their fertility preference operationalized by the ideal number of children in OLS models.
(M1, M2) and model M6 in ordered logit regressions, which indicates that older women tend to prefer higher ideal number of children. The coefficients of age-squared are very small and none of them is significant. For women from 15-49 in the sample, the trend line is a straight upward line with almost no curvilinear effect, which suggests that women prefer lower ideal numbers of children when they there younger but as they get older they prefer higher numbers. If age was an infinite number, the trend line would have shown more of the curvilinear effects.

Figure 13: Effects of Age and Age-Squared on the Ideal Number of Children in Philippines

Similar to previous results found in Cambodia and Indonesia, residence has a very consistent association with ideal number of children across all six models. Urban residence is significantly associated with a lower ideal number of children. The coefficient is significant at p-value < 0.01 in OLS and order logit models and p-value < 0.05 in Poisson models.

As the majority of the Filipino population is Catholic, this category is treated as the reference group in religion variable. Other denominations of Christianity including Protestant, Iglesia Ni Kristo and Aglipay, of which the latter two are local churches originated from the Philippines, are kept unchanged to examine if there is a difference
among women belonging to different Christian denominations. Islam, which is the religion of only a little more than 5% of the population, is one category for the religion variable. There is only a small proportion of the sample that has no religion (None) or follows other religions (Others). The results show that there is no significant difference in the ideal number of children among Christian women, regardless of the denominations. There is no significant difference in the ideal number of children of women who have no religion or have other religions to Catholics as well. Nevertheless, similar to the results found in Cambodia, Muslim women in the Philippines have significantly higher ideal numbers of children. In the ordered logit regression results, the odds of Muslim women preferring higher ideal numbers of children are strikingly high, almost 10.6 times higher than Catholic women at the 99% confidence interval (model M6).

Table 25 also shows that the number of children ever born is closely associated with the ideal number of children. In this sample, one number higher in CEB statistically increases the odds of the women to prefer one number higher in the ideal number of children by almost twice (model M5, M6). This result is expected since when the majority of women have met needs for family planning (around 80%) so most births are assumed to be intended, therefore it is not surprising that women who already have a high current number of children prefer a higher ideal number as well. This strong correlation is similar to previous ones found in Cambodian and Indonesian data.

The coefficient of the interaction term age*CEB is statistically significant, which indicates that the relationship between the ideal number of children and the number of children ever born is moderated by age, i.e. the relationship between the number of
children ever born and the ideal number of children changes as age changes. The coefficient displays a negative association between $age \times CEB$ and ideal number of children. Figure 14 shows the predictive margins effect of the interaction between age and CEB on the ideal number of children of women at age 20, 30 and 40. It shows that at the same predicted ideal number of children, 40 year-old women have the lowest CEB and 20 year-old women have the highest CEB. The effect of the interaction term $age \times CEB$ on ideal number of children is quite interesting and contrary to the $age \times CEB$ interaction found in Indonesia and Timor-Leste.

Figure 14: Predictive Margin Effects of the Interaction Between Age and CEB on the Ideal Number of Children – Philippines 2008

Similar to previous results found in Cambodia and Indonesia, in this sample, the coefficients of husband’s years of education are not significant in all six models. The results suggest that husband’s education has no association with the wife’s ideal number of children.
*Husband’s occupation* shows an interesting picture. Only women whose husbands work in manual jobs prefer significantly lower ideal numbers of children, whereas other groups (husbands not working, and husbands works in non-manual job) show no significant difference to the reference group. Low income and the lack of job stability, which is often found associated with manual jobs, can be the explanation to the relationship between husband’s occupation and their partner’s preference for children. In model M6, women whose husbands work in manual jobs have 16.3% lower odds of preferring the same number of children as those whose husbands work in agricultural jobs. The coefficients are significant at p-value < 0.01 in OLS and order logit models and p-value < 0.05 in Poisson models.

Out of three women’s empowerment factors, only the education factor shows statistically significant associations with the ideal number of children in all six models. OLS and Poisson regression results illustrate that an increase in the education factor score is associated with a lower ideal number of children. Results from ordered logit regression also display similar findings: one higher score in education factor lowers the odds of the women to prefer one number higher in the ideal number of children by 13% (model M6). Even though labor force participation factor seems to be associated with higher ideal number of children, yet the coefficients are not significant. Household decision-making factor also does not show significant coefficients in all three full regression models.

In the two OLS models, the R-squareds show that the models explain about 27% of the variation in the ideal number of children of Filipino women. Nevertheless, the F-test based on the R-squared of OLS models does not show a significant improvement of the full model after adding three women’s empowerment factors. The Chi-squared
test based on -2Log Likelihood of the two Poisson models indicates that the full model is significantly improved after adding the three key independent variables of women’s empowerment factors into the baseline model at p-value = 0.1. The Chi-squared test based on -2Log Likelihood of the two ordered logit models also suggests that the full model is significantly improved after adding the three key independent variables of women’s empowerment factors into the baseline model at p-value = 0.001.

The results from 6 models suggest that in this DHS Philippines 2008 sample, only the education factor shows significant a negative association with the ideal number of children, while the coefficients of labor force participation factor and household decision-making factor are not significant. Control variables on women’s characteristics including residence, CEB, the interaction term age*CEB, and religion are significant in predicting the ideal number of children. Control variable husband’s years of education does not show any significant association with women’s ideal number of children, however, husband’s occupation shows that women whose husbands work in manual jobs statistically prefer lower ideal numbers of children compared to those have husbands work in agriculture.

**Timor-Leste**

The Timor-Leste 2010 sample includes 3,598 women who have the data available for all selected variables. This is the smallest sample size among the four countries of study. The baseline models include a set of control variables: age and age-squared to examine the relationship between women’s age and their ideal number of children, current residence of the women (which takes rural residence as the reference category), religion (which takes Christianity as the reference category since it is the
major religion in Timor-Leste), $CEB$ (the number of children ever born), an interaction term between $age$ and $CEB$ ($age*CEB$), $husband's$ $years$ $of$ $education$, and $husband's$ $occupation$ (which takes agriculture as the reference category). The full models include all the control variables plus the three women's empowerment factors - labor force participation, education and household decision-making factor scores. A total of six regression models are run. Results for three types of regression: OLS (models M1, M2), Poisson (models M3, M4) and Ordered Logit (models M5, M6) are reported in table 26.

Table 26: Regression Results of The Ideal Number of Children on Women’s Empowerment Factors – Timor-Leste 2010

<table>
<thead>
<tr>
<th>Variables</th>
<th>OLS</th>
<th>Poisson</th>
<th>Ordered Logit (Odds ratio)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M1</td>
<td>M2</td>
<td>M3</td>
</tr>
<tr>
<td>Intercept</td>
<td>4.416</td>
<td>4.137</td>
<td>1.544</td>
</tr>
<tr>
<td>Age</td>
<td>.044</td>
<td>.059</td>
<td>.001</td>
</tr>
<tr>
<td>Age*^2</td>
<td>-.002*</td>
<td>-.001**</td>
<td>-.000</td>
</tr>
<tr>
<td>Residence (ref.=rural)</td>
<td>-.422**</td>
<td>-.406**</td>
<td>-.082**</td>
</tr>
<tr>
<td>Religion (ref.=Christian)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muslim (n=8)</td>
<td>-.542</td>
<td>-.601</td>
<td>-.113</td>
</tr>
<tr>
<td>Protestant</td>
<td>-.400*</td>
<td>-.397*</td>
<td>-.075</td>
</tr>
<tr>
<td>Hindu (n=8)</td>
<td>-.530</td>
<td>-.593</td>
<td>-.094</td>
</tr>
<tr>
<td>$CEB$</td>
<td>.162</td>
<td>.145</td>
<td>.063**</td>
</tr>
<tr>
<td>$Age*CEB$</td>
<td>.009**</td>
<td>.009**</td>
<td>.001</td>
</tr>
<tr>
<td>Husband’s education (years)</td>
<td>-.007</td>
<td>-.004</td>
<td>-.001</td>
</tr>
<tr>
<td>Husband’s occupation (ref.=agriculture)</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Husband does not work (n=0)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Husband works in non-manual job</td>
<td>-3.12**</td>
<td>-2.92**</td>
<td>-0.57**</td>
</tr>
<tr>
<td>Husband works in manual job</td>
<td>-.162</td>
<td>-.149</td>
<td>-.028</td>
</tr>
<tr>
<td>Labor force participation factor score</td>
<td>-.059*</td>
<td>.011</td>
<td></td>
</tr>
<tr>
<td>Education factor score</td>
<td>-.051</td>
<td>-.009</td>
<td></td>
</tr>
<tr>
<td>HH decision making factor score</td>
<td>-.081</td>
<td>-.015</td>
<td></td>
</tr>
<tr>
<td>$N$</td>
<td>3.598</td>
<td>3.598</td>
<td>3.598</td>
</tr>
<tr>
<td>R-squared/ Pseudo R-squared</td>
<td>.294</td>
<td>.296</td>
<td>.045</td>
</tr>
<tr>
<td>-2Log Likelihood</td>
<td>14338.655</td>
<td>14332.859</td>
<td>12370.376</td>
</tr>
</tbody>
</table>

*: p-value <0.05
**: p-value <0.01
Table 26 shows the regression results of six models in OLS, Poisson and ordered logit regressions. *Age-squared* coefficients are significant in OLS and ordered logit models, while *age* coefficients are not significant in any models in this Timor-Leste sample. The coefficients of *age* are positive while the coefficients of *age-squared* are negative, which suggests a curvilinear relationship of age on the ideal number of children. The relationship between *age* and *age-squared* and the ideal number of children follows an up-side-down U shaped line, which peaks at 29. The curve suggests that Timor-Lestee women prefer a lower ideal number of children when they are younger, then the ideal number increases as they get to middle age, and declines afterward. The ideal number of children continues to decline until it gets to even lower than when they were at the beginning of their childbearing age.

Figure 15: Effects of *Age* And *Age-Squared* on the Ideal Number of Children in Timor-Leste

*Residence* consistently shows significant coefficients across all six models in Timor-Leste sample, which is similar to previous results found in the other three countries. Urban residence is significantly associated with lower ideal numbers of children. The negative coefficients of urban residence are significant at p-value < 0.01 in all six
models in OLS, Poisson and order logit regression. In the full ordered logit model (M6), urban women have 0.62 times lower odds of having the higher ideal number of children than that of rural women.

There is a high level of homogeneity in terms of religion in Timor-Leste, which the descriptive statistics show that 99.57% of the sample is Roman Catholic. This may be the reason why the dummy variables of religion do not show any significant coefficients. There are very few people in the sample who are practicing Hindu and Islam (n = 8), thus the results are neither statistically significant nor meaningful. Even though the coefficients of the dummy variable Protestant are negative, the numbers are only significant in two OLS models, but not in the other four. Therefore, it seems that religion has no significant association with the ideal number of children in the Timor-Leste data.

Quite unexpectedly, CEB shows a weak and inconsistent relationship with the ideal number of children in this sample, whereas a very consistent association is found in other three countries. In OLS models M1, M2, one number increase in the number of children ever born is associated with 16% increase in the ideal number of children after controlling for other factors. Ordered logit regression results show that one number increase in the number of CEB increases the odds of preferring one number higher in the ideal number of children by more than 19%. However, the coefficients are not significant in the two OLS and the full ordered logit models (M1, M2, and M6). The coefficients are statistically significant in two Poisson models (M3, M4) at p-value < 0.01, and in the baseline model of ordered logit model (M5) at p-value < 0.05.
The coefficient of the interaction term $age \times CEB$ is statistically significant, which indicates the relationship between the ideal number of children and the number of children ever born is moderated by age, i.e. the relationship between the number of children ever born and the ideal number of children changes as age changes. The coefficient displays a positive association between $age \times CEB$ and ideal number of children. Figure 16 shows the margin effect of the interaction between $age \times CEB$ on ideal number of children. For the same predicted ideal number of children, women at age 20 have lowest number of CEB and women at age 40 have highest CEB. The slope is steeper for older women.

Figure 16: Predictive Margins Effect of the Interaction between Age and CEB on Ideal Number of Children – Timor-Leste 2010

Again, husband’s education is found to have no significant association with wife’s ideal number of children. The coefficients show that higher years of husband’s education may associate with lower ideal number of children expressed by their wife, nevertheless, the numbers are not statistically significant across all six models.
In the regression results of the Indonesia sample presented earlier, women whose husbands work in manual jobs have a significantly lower ideal number of children than those whose husbands work in agriculture. In this Timor-Leste sample, husband’s occupation shows a different picture. Women whose husbands have non-manual jobs are found to have significantly lower ideal number of children compared to women whose husbands have agricultural jobs. Women whose husbands have non-manual jobs have about 0.3 (in OLS regression results) to 0.05 (in Poisson regression) lower ideal number of children compared to the reference group (agriculture). Ordered logit regression models show that women whose husbands work in non-manual jobs have 30% lower odds of preferring higher ideal number of children compared to those whose husbands work in agriculture. All the coefficients are significant at p-value < 0.01 in the six models, suggesting that the association between husband’s occupation and wife’s ideal number of children is consistent.

It can be inferred from this result that men who have non-manual jobs (including professional, managers, clerical, sales and services), tend to be more modernized and they also have higher aspiration for their children’s future, which make them prefer lower numbers of children. These men tend to couple with women who have similar mindsets and preference for the number of children, which may explain the relationship between husband’s occupation and women’s ideal number of children. On the other hand, men who work in agriculture prefer higher numbers of children due to the labor intensive nature of their jobs and lack of retirement security. Thus, they see having children as a resource for labor and old age security that may have some associations with their wives’ preference for a higher ideal number of children. There are no women whose husbands do not work in this Timor-Leste sample, thus the dummy variable has n = 0 and is automatically dropped out of the analysis.
Women whose husbands work in manual jobs show a tendency of preferring a lower ideal number of children compared to women whose husbands work in agriculture, yet, the coefficients are not statistically significant.

Out of the three women’s empowerment factors, only the labor force participation factor is found significant to the ideal number of children in the Timor-Leste sample. The coefficients are significant at p-value < 0.05 in OLS and ordered logit models, but not significant in Poisson regression models. A higher labor force participation factor score is associated with a lower ideal number of children, or in ordered logit models, it slightly lowers the odds of preferring one number higher in the ideal number of children by 5.9%. A higher household decision-making factor score, which indicates that women have more involvement in the household decision-making process, tends to associate with a lower ideal number of children, yet, the coefficients are not statistically significant. The coefficients of the education factor are negative, but surprisingly not significant in any of the Timor-Leste models. This is contrary to the results found in the other three countries.

In OLS models, the R-squareds show that the models explain more than 29% of the variation in the ideal number of children of women in Timor-Leste. Nevertheless, the F-test based on the R-squareds of OLS models does not show a significant improvement of the full model after adding the three women’s empowerment factors. The Chi-squared test based on -2Log Likelihood of the two Poisson models indicates that the full model is significantly improved after adding the three key independent variables of women’s empowerment factors into the baseline model at p-value = 0.1. The Chi-squared test based on -2Log Likelihood of the two ordered logit models suggests that the full models are also significantly improved after adding the three key
independent variables of women’s empowerment factors into the baseline model at p-value = 0.005.

The results from 6 models suggest that in this sample of Timor-Leste 2010, the labor force participation factor is significantly linked to the ideal number of children, while education and household decision-making factors are not significant. Control variables on women’s characteristics, including urban residence, CEB, and the interaction term age*CEB, are significant, while age and religion are not. Husband’s years of education does not show any significant coefficients on wife’s ideal number of children. However, husband’s occupation shows that women whose husbands work in non-manual jobs prefer significantly lower ideal numbers of children compared to those whose husbands work in agriculture.

5.3. Summary and Interpretation of the Results

The results from OLS, Poisson and ordered logit regressions show that women’s empowerment factors and background control variables do not have uniform associations with the ideal number of children in Cambodia, Indonesia, Philippines and Timor-Leste. Certain women’s empowerment factors are significant in some countries but not others. Likewise, only some of the control variables are significant but they vary across countries. In this section I will first summarize the coefficients and discuss the relationships between the control variables of women’s background and the ideal number of children, then I will discuss more extensively the associations between women’s empowerment and the ideal number of children.
Women’s background and the ideal number of children

Women’s background characteristics are controlled for in the regression models of the ideal number of children by including a set of control variables on women’s age, residence, religion, the number of children ever born, and the husband’s characteristics including education and occupation.

As the most frequently used control variables in fertility analysis, age and age-squared are significantly related to women’s fertility preference in terms of the ideal number of children in Cambodia and Philippines but not in Indonesia and Timor-Leste.

The interaction term age*CEB shows how the relationship between age and the ideal number of children changes as CEB changes. The interaction does not show any effects on the dependent variable in Cambodia. In Indonesia and Timor-Leste, it shows the expected association between age and CEB on the ideal number of children: at the same predicted ideal number of children, older women have higher CEB than younger women. The interaction means older women have higher number of children ever born than younger ones. The interaction is interestingly opposite in Philippines, where younger women actually have higher CEB compared to older ones, provided that they all have the same predicted ideal number of children. The result in Philippines is interesting and unexpected; it may signal an increase in the country’s total fertility rate in the future.

The four countries selected in this study provide appropriate data to examine the relationship between religion and fertility preference in different countries. The most dominant religion in Cambodia is Buddhism, in Indonesia it is Islam, and in Philippines and Timor-Leste it is Roman Catholic. The regression results from
Cambodia and Philippines show that women who practice Islam seem to prefer a higher ideal number of children compared to women who practice the dominant religion (in Cambodia it is Buddhism and in Philippines it is Catholicism). Results from the ordered logit regression shows that being Muslim is associated with 80% higher odds of preferring one number higher in the ideal number of children compared to being Buddhist in Cambodia, and a shocking 10.5 times higher odds compared to Catholics in the Philippines. The literature has consistently found an association between religion and actual fertility and fertility preference. Similar results which suggest the preference for high fertility among Muslims are found by Morgan et al. (2002), while studying 30 developing countries using DHS data. In another study, Heaton (2011) found that Muslims in Thailand, where Buddhism is the major religion, also exhibit higher fertility preference. As the number of women who do not practice Catholicism in Timor-Leste is very small (less than 1%), the homogeneity in religion means no significant relationship between religion and fertility preference in this country. In Indonesia, there are no data on religion, thus this variable is omitted from the regression models.

In the case of Cambodia and Philippines, being Muslim in countries where Buddhism and Catholicism are the major religions is significantly associated with higher odds of preferring a higher ideal number of children. Interestingly, Muslim women living in Indonesia, a Muslim-dominant country, actually have the lowest average number of CEB (2.30) compared to the remaining three countries (2.54 in Cambodia, 3.01 in Philippines and 3.83 in Timor-Leste). It would be useful to look at the relationship between religion and fertility preference in Indonesia to see if similar patterns could be found. Unfortunately the lack of data on religion in Indonesia data does not allow such analysis.
The lowest average number of CEB in Indonesia may be attributed by the effective family planning program, which was introduced in 1970. The family planning program had successfully decreased Indonesia’s TFR from 5.6 in 1965-70 to 2.2 in 2005-2010 (Knodel et al. 1999), which also implies a decline in the number of children ever born. In Cambodia, the TFR has been slowly declining since the 1960s but the country’s National Family Planning program only started in 1994. In Philippines, even though the family planning program started in the 1970s, it was seen as unsuccessful and in constant debate with the Roman Catholic Church on contraceptive use. Timor-Leste, a newly independent country which is still in the beginning of its demographic transition, started to have a National Family Planning program in 2004, 2 years after the country’s independence. Timor-Leste’s total fertility rate only began to decline in the period from 2005-2010.

The associations between urban residence and fertility preference have been consistently found in this study, as expected from the literature. Regression results from the four countries suggest that urban residence is associated with a lower ideal number of children. Even though Table 22 shows that the proportions of women living in urban areas vary greatly in the four countries, from 30% (in Timor-Leste) to 48% (in Indonesia), living in urban areas lowers the odds of the women preferring the same number of ideal number of children by 10% in Cambodia, 19% in Indonesia, 15% in Philippines, and 39% in Timor-Leste, in comparison to their counterparts who live in rural areas.

The number of children ever born also consistently shows positive coefficients in all countries across six regression models. Women who currently have higher numbers of children ever born also prefer higher ideal numbers of children. One number higher in
CEB increases the odds of one number higher in the ideal number of children by 96% in Philippines, 78% in Cambodia, 23% in Indonesia and 19% in Timor-Leste. The strong relationship shows that women who already have higher numbers of children are the ones who prefer a higher ideal number of children. On the other hand, it is possible that they might have adjusted their ideal number of children to justify their currently high number of children ever born. Since the proportions of met need for contraception are relatively high in all four countries, it is expected that most births are wanted. Moreover, the ideal number of children expressed by women in all four countries is higher than the current number of children ever born, thus, it is reasonable to assume that most births are wanted. In low fertility societies, CEB may potentially enhance the effects of labor force participation, since some women may delay childbearing while participating in the labor force. As a robustness check, regression models without CEB were run for all four countries and the results were nearly identical.

It is important to take into account the husband’s characteristics while studying the ideal number of children as the decision about children is usually a joint decision of both husband and wife. Thus, all the regression models control for the husband’s education and occupation. Some studies on fertility in developing countries such as Tanzania and Indonesia suggest that wife’s education is more a significant factor in the couple’s fertility than husband’s education (Larsen and Hollos 2003, Schultz 2005, Breierova and Duflo 2004). This study also implies that, in all four countries, the husband’s education is not at all significant to his wife’s ideal number of children. Nonetheless, husband’s occupation shows some association with his wife’s ideal number of children, yet the association is not uniform across countries. In Indonesia,
women whose husbands work in any types of jobs but agriculture have a significantly lower ideal number of children. It seems that agricultural work, which requires intensive labor, is quite strongly associated with the couple’s preference for high fertility driven by the demand for labor. In the Philippines, only women whose husbands work in manual jobs have a significantly lower ideal number of children compared to the reference group (women with husbands who work in agriculture). The financial hardship and low job stability which is often associated with manual jobs may shape the couple’s preference for lower ideal numbers of children, since they do not have enough resources to raise a big family. In Cambodia, different husband’s job categories seem to have no difference on wife’s ideal number of children compared to the reference group. Even though the relationship between husband’s job categories and wife’s ideal number of children vary depending on the country, all job dummies show negative coefficients compared to the reference group (jobs in agriculture). Agriculture jobs are labor intensive, which may encourage couples to have more children as a potential source of labor and old age security. This tendency has long been observed in transitional societies, thus it is not surprising to observe a similar trend in this study.

Table 27 shows a summary of the coefficients and their significance in the regression models of the 4 countries.
The summary table shows that most of the control variables of the women’s characteristics are statistically significant across all four countries, however, control variables on the husband’s characteristics such as types of occupation only show some associations in Indonesia but are not consistent across four countries, whereas husband’s education is not significant in any of the countries.

**Women’s empowerment factors and the ideal number of children**

The relationships between each of the three women’s empowerment factors and the ideal number of children are examined after controlling for the women’s and their husband’s background characteristics. Results from three types of regression show that fertility preference in terms of the ideal number of children is associated with different factors of women’s empowerment in different countries. Three types of regression: OLS, Poisson and ordered logit are used in the models, however, since the condition of Poisson regression (the variance does not equal the mean) is violated in all four samples, a summary of the directions of the associations between women’s

<table>
<thead>
<tr>
<th></th>
<th>Cambodia</th>
<th>Indonesia</th>
<th>Philippines</th>
<th>Timor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>- (*)</td>
<td>+ (***)</td>
<td>+ (*)</td>
<td>+</td>
</tr>
<tr>
<td>Age²</td>
<td>+ (*)²</td>
<td>- (***)</td>
<td>-</td>
<td>- (***)²</td>
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<tr>
<td>Residence (Urban)</td>
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<td>- (***)</td>
<td>- (***)</td>
<td>- (***)</td>
</tr>
<tr>
<td>Religion (major)</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>Islam</td>
<td>+ (***)</td>
<td>n/a</td>
<td>+ (***)</td>
<td>-</td>
</tr>
<tr>
<td>CEB</td>
<td>+ (***)</td>
<td>+ (***)</td>
<td>+ (***)</td>
<td>+</td>
</tr>
<tr>
<td>Age*CEB</td>
<td>-</td>
<td>+ (***)</td>
<td>- (***)²</td>
<td>+ (***)</td>
</tr>
<tr>
<td>Husband’s education</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Husband Occupation (Agriculture)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Husband does not work</td>
<td>-</td>
<td>- (*)</td>
<td>-</td>
<td>n/a</td>
</tr>
<tr>
<td>Husband works in non-manual jobs</td>
<td>-</td>
<td>- (***)</td>
<td>-</td>
<td>- (***)</td>
</tr>
<tr>
<td>Husband works in manual jobs</td>
<td>-</td>
<td>- (***)</td>
<td>- (***)</td>
<td>-</td>
</tr>
</tbody>
</table>

*: significant at p-value <0.05  
**: significant at p-value <0.01  
1: OLS regression model  
2: Ordered logit regression model

Table 27: Summary of the Effects of Control Variables on the Ideal Number of Children (4 Countries)
empowerment factors and the ideal number of children is reported for only OLS and
ordered logit regression in Table 28.

<table>
<thead>
<tr>
<th>Table 28: Summary of the Effects of Women’s Empowerment Factors on the Ideal Number of Children (Based On OLS And Ordered Logit Regression Results)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor force participation</td>
</tr>
<tr>
<td>factor</td>
</tr>
<tr>
<td>Education factor</td>
</tr>
<tr>
<td>HH decision-making factor</td>
</tr>
</tbody>
</table>

*: significant at p-value <0.05
**: significant at p-value <0.01
1: OLS regression model
2: Ordered logit regression model

Labor force participation tends to be associated with a higher ideal number of children in Cambodia, Indonesia and Philippines and a lower ideal number of children in Timor-Leste. However, the coefficients are only statistically significant in Indonesia and Timor-Leste. Theories on demographic transitions consider female labor force participation at the beginning of the industrialization process one of the causes for actual fertility and fertility preference to decline as the role incompatibility between being mother and worker increased. Yet, in the case of three Southeast Asian countries, Cambodia, Indonesia, and Philippines, women’s involvement in the labor market shows a tendency of higher ideal number of children. Higher scores in the labor force participation factor indicate a higher level of involvement in the labor market; the scores account for the seasonality of the job (full time/part time), paid/unpaid jobs, self-employed or employee, and women’s earnings compared to their husband. This positive relationship of female labor force participation and the ideal number of children is statistically significant in Indonesia, where the current average CEB and the average ideal number of children is at the lowest compared to the other three countries (2.30 and 2.69 respectively).
Female labor force participation tends to be associated with higher ideal number of children in Cambodia and Philippines; however, the coefficients are not statistically significant in these countries. The positive relationship may imply that participating in paid employment means that women can financially afford childcare and childrearing, and having more children does not put them under financial hardship, which resulted in the higher ideal number of children. Childcare in Indonesia at preschool ages largely depends on nannies and extended family members, while formal education for schoolchildren costs money and only elementary education is free, thus it is quite a financial commitment for Indonesian parents to bring up children. Bradley (1995) hypothesizes that lower fertility is partly the result of the competition under economic scarcity, especially in the competition for employment. Preference for low fertility may prevail as children become more of a burden than a benefit. The prospect of having several unemployed children may look like a long-term cost rather than a potential benefit. Unemployed or underemployed parents may also feel reluctant to have large families. From Bradley’s point of view, it actually makes sense for women who have higher scores in labor force participation in a country with already declining fertility like Indonesia to express a higher ideal number of children since they can financially afford a larger family.

On the contrary, labor force participation factor is statistically associated with lower ideal number of children in Timor-Leste, where the average CEB (3.83) and the average ideal number of children (5.41) are the highest in the four countries of study. This relationship is more in line with previous literature on the fertility transitions in countries at the beginning of the industrialization process, which suggests the incompatibility between work and family, and children is considered a cost instead of a benefit are major causes for couples to prefer lower numbers of children (Mason
Lestee women who have higher scores in the labor force participation factor are more
involved in the labor market, and they are found to prefer a lower ideal number of
children.

The results bring an interesting observation of the opposite directions of the
relationship between the labor force participation factor and the ideal number of
children. The involvement of women in the labor market seems to be associated with
a higher ideal number of children in the country with the lowest CEB (Indonesia), and
a lower ideal number of children in the country with the highest CEB (Timor-Leste).
These results imply that female labor force participation may have a balancing effect
on the ideal number of children depending on current fertility. At the country level,
female labor force participation has long been cited as one of the determinants in the
decline of women’s fertility since the beginning of the industrialization process.
Nonetheless, recent studies have shifted to the notion that female labor force
participation also has positive effects in countries with low fertility levels, which
keeps them around the replacement level and not to further decline to very-low
fertility levels.

In a review of developed countries with low fertility levels, McDonald (2000)
proposes that gender equality, or in his words, “gender equity”, (in both family and
public domains) is the key to keep fertility level at a balanced level, i.e. it decreases
fertility in high-fertility societies, and increases fertility in low-fertility societies to
keep them from falling to very-low-fertility levels. Similarly, other studies have
found a positive relationship between female labor force participation and the total
fertility rates at country level in developed countries in recent years (Billari and
Kohler 2004, Myrskylä, Kohler, and Billari 2011, Myrskylä, Kohler, and Billari 2009, Rindfuss, Guzzo, and Morgan 2003). These studies were done at the country level and are not comparable to this study, which looks at the individual level. However, results from this study have found evidence that female labor force participation at individual level exhibits a two-way association with women’s fertility preference in these four developing countries in Southeast Asia. My analysis has found support for the notion that women’s empowerment factors at individual level, specifically through female labor force participation, seems to balance out the ideal number of children: it is associated with a lower ideal number of children in the country where women have the highest average number of children ever born – Timor Leste; and in contrary, it is associated with a higher ideal number of children in the country where women have the lowest average number of children ever born – Indonesia. This finding suggests that the mechanism through which gender equality keeps fertility levels neither too high nor too low may lie on the involvement of women into the labor force.

The education factor has a universally negative association with the ideal number of children in all four countries. The coefficients are statistically significant in Cambodia, Indonesia, and Philippines but not in Timor-Leste, where there is a tendency observed. In this study, the education factor is measured by women’s literacy and highest level of education studied or completed. Women’s education is often associated with better occupation options after finishing school, better access to knowledge about reproductive health, and higher aspiration for their children, all of which may lead to the preference of a smaller family size. This finding in the sample of four Southeast Asian countries is consistent with the large body of literature that has been suggesting education is associated with lower fertility and aspects of fertility including fertility preference (Cochrane 1983, Bongaarts 2003, Dixon-Mueller 1993).
Studies of women’s empowerment in other developing countries such as Turkey, Taiwan and Tanzania also found similar results (Gore 2010, Lee 2009, Larsen and Hollos 2003).

The relationship between the household decision-making factor and the ideal number of children is only statistically significant in Indonesia. It shows tendencies of negative associations in Philippines and Timor-Leste and positive association in Cambodia. The household decision-making factor measures different aspects in the women’s family life, such as: who makes decisions related to her health, household spending and visiting relatives. Only the results in Indonesia show a significant and negative association between the household decision-making factor and the ideal number of children, while it is not significant in Cambodia, Philippines and Timor-Leste. Out of the four countries studied, Indonesia is the only country with Islam as the dominant religion. This finding suggests that higher levels of household decision-making are associated with lower ideal numbers of children despite the potential gender segregation influence of Islam. A similar result was found in Guinea in a study of four Sub-Saharan countries on women’s empowerment and ideal family size (Lee 2009). The authors find that women who have higher level of empowerment in the household tend to prefer lower ideal number of children. The tendencies of the negative association between household decision-making and the ideal number of children are observed in Philippines and Timor-Leste and the association is confirmed in Indonesia. This result further emphasizes that higher level of women’s autonomy is associated with a preference for a lower ideal number of children and the association is strongest in Indonesia. Previous studies found that Indonesia is quite gender egalitarian in Southeast Asia.
In conclusion, all of the three women’s empowerment factors extracted through principal axis factoring (in chapter 4) show significant associations with women’s fertility preference measured by the ideal number of children. The education factor shows the most uniform and consistent negative relationship with the ideal number of children across all four countries. Higher scores on the education factor are associated with lower ideal numbers of children. The labor force participation factor shows mixed relationships with the ideal number of children. A higher level of labor force participation is associated with a lower ideal number of children in the country with the highest average CEB and average ideal number of children (Timor-Leste); and vice versa, it is associated with a higher ideal number of children in the country with the lowest average current CEB and ideal number of children (Indonesia). The household decision-making factor is negatively associated with the ideal number of children in Indonesia, where female autonomy in the family may be more restricted due to religious beliefs.

Previous studies have found that different aspects of women’s empowerment play a role in the decline of women’s fertility in developing countries. The results from this study support the notion that women’s empowerment which includes labor force participation, education and household decision-making are found to have significant impacts on women’s ideal number of children in the four Southeast Asian countries studied. Nevertheless, the relationship between women’s empowerment and fertility preference is not a simple negative linear one but it varies depending on the context of the country. Evidence from this study proposes that female labor force participation may have the balancing effect on the ideal number of children, which is associated with lower individual fertility preference in high fertility countries and higher individual fertility preference in low fertility countries. It may indeed be a factor that
keeps fertility at a balanced level. Recent studies on upward fertility trends, which are found associated with gender equality, have been found in developed countries. However, there have not been any studies that look into developing countries with declining fertility levels. Perhaps future study could see this as a potential missing gap in the literature.

Household decision-making also behaves differently than expectation; it is expected that higher levels of household decision-making are universally associated with lower fertility preference, yet, the relationship is significant only in Indonesia. There may be some distinctive characteristic of Indonesia that makes it stand out, or it could be a measurement issue, for example, the kind of decisions made in the household in Indonesia are different to those in other three countries, thus not as well measured. Or it could be the effects of religious and cultural norms that prevail in the country. However, this is primarily the author’s speculation.

Education appears to have the most consistent and negative relationship with fertility preference, which is well documented in the literature. Nonetheless, it does not imply that education is the strongest women’s empowerment factor in lowering fertility preference. The consistent relationship might be attributed to the straightforward measurement of education (women’s literacy and the highest level of education studied or completed) which is relatively well-measured across the data sets with almost no margin for biased interpretation.
CHAPTER 6: WOMEN’S EMPOWERMENT AND SON PREFERENCE IN SOUTHEAST ASIA

International non-governmental organizations working in developing countries have long recognized the importance of empowering women in demographic transitions and socio-economic development. The World Bank recognizes that the relationship between gender equality and development goes both ways: better nutritional status, education and income of mothers are associated with better child health outcomes – from immunization rates to nutrition and child mortality, and also children’s education (The World Bank 2012). The United Nations have been emphasizing the role of women in demographic processes since the Beijing Fourth World Conference on Women in 1995. In their most recent report, *Gender Equality and Sustainable Development*, the UN put a strong emphasis on the role of women’s education and employment in fertility and mortality decline, the improvement of “missing girls” problem in societies with son-preference, and promotion of sustainable development (UN Women 2014).

Women’s empowerment is found to be one of the driving factors of socioeconomic development, especially in developing countries. Marginal status of the women has been argued as the cause of poverty and rapid population growth (Jacobson 1992). Low status of the women in the family in both decision-making and economic power are strong incentives for women to have more children, especially sons, to increase their status in the household as well as for economic survival. Gender inequality is also the major cause for high female mortality and female infanticide and limited access to education and the labor market for girls and women.
In societies where the status of women is low, son preference may exist as a result. Son preference has been found in various studies on fertility preference and behaviors in East Asia and South Asia, where strongly subordinate gender roles are also imposed on women (Repetto 1972, Larsen, Chung, and Gupta 1998, Brunson 2010). The topic of son preference is important in research on fertility since it is strongly correlated with completed fertility where the phenomenon is widespread. It also affects the equal treatment of girls and women in the family as well as the society. The degree of son preference in a society can be considered a rough indicator of the status of women (Williamson 1976a, Arnold and Liu 1986)

Williamson (1976b) observed that son preference had existed in different parts of the world, including the United States and Europe since the 1930s. Other studies also find evidence of son preference in parts of Asia. In East Asia, son preference has been observed in countries including China, Hong Kong SAR, Korea and Taiwan (Park and Cho 1995, Coombs and Sun 1978, Das Gupta et al. 2003). Similarly, son preference has been found in South Asian countries such as India, Bangladesh and Sri Lanka (Das Gupta et al. 2003). In the modest number of studies that look at son preference in Southeast Asia, evidence of son preference has not been found at similar magnitudes as in East and South Asia (Das Gupta et al. 2003). It is most notably found in Vietnam, where Confucian values are more prevalent, but not so prevailing in other Southeast Asian countries (Goodkind 1995b).

Understanding son preference is important for a few reasons including the fact that it affects family size, since couples will keep trying to have children until they reach their desired number of sons. Population policy should understand the underlying reason for high fertility in societies where son preference is prevalent. A second
reason is to evaluate the implication of using technology for sex selection. And third, son preference is considered a rough indicator for gender equality (Williamson 1976a). Societies with no sex preference are more likely to be gender egalitarian. The research questions that I would like to examine in this chapter are: (1) Is there a son preference in Southeast Asia? And (2) What is the relationship between women’s empowerment and son preference?

Son preference has not been an intensive topic of study in Southeast Asia as the magnitude of the phenomenon is not believed to be as prevalent as in East and South Asian countries. Nevertheless, the question if there is son preference among women in Southeast Asia has never been explicitly answered in a cross-country study with large-scale and nationally representative data. In this chapter I will attempt to explicitly answer the question if son preference exists in Southeast Asia.

If there is a preference for sons among Southeast Asian women, I want to look into the relationship between women’s empowerment factors and son preference. How is such preference associated with factors such as female labor force participation, female education and female household decision-making? Are there patterns that can be found in how women score in their empowerment factors and their preference for specific sex of their children?

In this chapter, I review the relationship between women’s empowerment and son preference in the literature, the prevalence of son preference in different regions in Asia and its consequences for women’s empowerment and overall socioeconomic development. In a later section of this chapter, micro data on four Southeast Asian countries, Cambodia, Indonesia, Philippines, and Timor-Leste, are used to examine if there is son preference among the women of these countries. Finally, regression
analysis is applied to find the relationship between women’s empowerment factors and son preference.

6.1. Review of Literature

*How Does Women’s Empowerment Affect Son Preference?*

In countries where son preference is strong, there is a strong link to the low status of women (Arnold and Liu 1986). Williamson (1976b) considers son preference is a rough indicator of gender equality in the society; societies with no sex preference are more likely to be gender egalitarian. Therefore, studying son preference is essential to understand the social factors in promoting gender equality.

Das Gupta et al. (2003) suggest that women’s status changes dramatically over the life-cycle in most of the countries in East and South Asia, where the kin/property and normative systems favor males. Young girls and young mothers in the family usually have very limited autonomy, and their access to the household resources only increase in later stages in their life cycles, especially when younger women come into the family through marriage with their sons and take over the daily jobs that they had to do before, which are often considered marginalized.

In a study of 1,062 women on son preference and their status in the family, measured by the wife’s decision-making power, autonomy, and the extent to which the husband shares housework in the family in southwest China, Li and Lavely (2003) find that 85% of the respondents said that it was important to have at least one son and 75% expected a son to provide financial resources in their old age. The two most cited reasons for why sons are important are cultural and economic, and given the persistence of the familial institution of patrilocal residence and male inheritance,
they expect that son preference in China is going to change very slowly. Indeed, the study finds that women’s status is negatively associated with the perception about the importance of having a son. Specifically, women who have higher scores on the index which includes items on autonomy, power, the extent that their husband shares housework, and exposure to media, are negatively associated with son preference.

Das Gupta et al. (2003) propose that women’s paid employment increases household decision-making, and that women’s paid employment would reduce son preference. However, how rapid the process is going to be depends on the mediation of public policy. They claim that female education and employment can change the preference for sons and that would lead to more gender equality for the next generation so that sons and daughters would be able to receive equal treatment.

A study that compares fertility patterns in North and South India finds that the higher level of autonomy of women in the South accounts for the lower fertility of the region. Son preference resulting from patriarchy in India is found to be the cause of the disparity in education, sex ratio at birth, age at marriage, and female labor participation (Malhotra, Vanneman, and Kishor 1995). Other researchers have found discrimination against women and son preference in different parts of the world including Pakistan, Taiwan, Vietnam, China, Bangladesh, Kenya and Africa as a whole (Bradley 1995, Kabeer 2005a, Shoaib, Saeed, and Cheema 2012, Lee 2009, Goodkind 1995a, Bélanger, Khuat, and Jianye 2003, Wu, Ye, and He 2012, Mason and Taj 1987, Rossi and Rouanet 2015).

The relationship between fertility and women’s empowerment is a reciprocal one. When fertility declines, it brings more symmetrical gender systems into the family, thus empowering daughters in the natal family. In India, as fertility declines, the
number of families with children of one gender increases. Allendorf (2012) argues that the increase in the number of families with children of only one gender brings more equal gender roles to sons and daughters. In that way, daughters enjoy greater freedom and better opportunities. Having families with fewer children also means more resources for the children, more equal investments for both daughters and sons, and inheritance will also be passed down to daughters as well. Allendorf (2012)’s study implies that son preference and the cultural preference for large families often leads to the disempowerment of women, while the decline in fertility brings greater equality to sons and daughters and empowers women.

Previous studies on women’s empowerment often look at women’s empowerment in two domains: inside-the-household and outside-the-household. Inside-the-household factors include indicators such as women’s household decision-making, autonomy, or the extent that the husband shares housework. Outside-the-household factors include indicators such as women’s education and employment. All the studies seem to converge on the notion that as women’s empowerment improves, the preference for sons will decline, and the decline of son preference together with the decline in fertility will lead to more gender equality for the children. Therefore, it is important to examine if there is a son preference in Southeast Asia and the relationship between women’s empowerment and son preference. Nonetheless, there has not yet been a conclusive study on the topic, which integrates cross-country quantitative data for precise measurement of women’s empowerment and son preference. This study aims to fill this gap in the literature.
Son Preference in Different Regions

Preference for male children has long been a topic of research in population and fertility preference. According to Williamson (1976a), sex preference favoring boys has been found in many different parts of the world, including the United States, different parts of Europe, Asia, Latin America and Africa.

Repetto (1972) looks at son preference in developing countries in Asia and Africa including India, Bangladesh and Morocco and proposes two hypotheses: If son preference exists, there should be a negative correlation between the sex ratio of children and total fertility; and that birth intervals should be longer following a male live birth than a female live birth. He uses the sex ratios of numbers of surviving sons in the total number of living children (%) of the first three surviving children; and also the percentage of living male children among total children born alive. He found that families with a higher proportion of sons tend to have higher fertility, which is opposite to the expectation that they have reached their desired number of sons and then limit their total fertility. He suggested that if sons contribute more to the household income, then the couples that have higher proportion sons would not feel the pressure of population and then would not try to limit their family size, which leads to having higher total fertility than those with a higher proportion of daughters.

The issue of son preference in Asia has been a focus of research on fertility preference in the context of fertility transitions, especially in China, Taiwan and Korea. In Asia, Das Gupta et al. (2003) suggest that son preference is often strongest in countries with strong Confucian values, including East Asian countries like Taiwan, Korea, Japan, China and Vietnam. Various studies have found that son preference is substantial in China (Arnold and Liu 1986, Arnold 1992). Arnold and Liu (1986) analyzed
interview data from more than 1 million respondents in 1982, in the early years of China’s one-child policy, and found that son preference was prevalent in most parts of China at the time. The authors claimed that the prevalence of son preference in China is a reflection of women’s status. According to them, gender equality was guaranteed in the constitution but in practices and family life, preference for sons was still significant. Couples whose first child was a son were more likely to use contraception than those whose first child was a daughter. In the one-child policy promotion campaign of China, couples with daughters were less likely to hold the one-child certificate, which gave significant benefits to the family and to the children’s education and job assignment later on, thus daughters of these families grew up facing significant disadvantages compared to others’. The authors also observed that son preference often existed side by side with the desire of having at least one child of each sex (Arnold and Liu 1986). In the period from 1989-1990, Das Gupta et al. (2003) estimated that the number of girls missing in China in 1000 female live births ranged from 61 to 94.

Researchers have also found evidence of son preference in Korea in the 1990s (Larsen, Chung, and Gupta 1998). In Korea in 1992, the number of girls missing in 1000 female live births was 70 (Das Gupta et al. 2003). Taiwan, a country with strong Confucian values, also has a long history of son preference (Lin 2009, Coombs and Sun 1978). Yet, in recent years, son preference has been declining in both Korea and Taiwan (Lin 2009, Chung and Gupta 2007). In Taiwan, Lin (2009) suggests that son preference is gradually being replaced by “gender indifference”. In addition to the gradual diminishment of son preference, the preference for high fertility has also diminished. In Taiwan, the preferred number of children has decreased from 4.0 in 1965 to 2.6 in 1985, and to 2.0 in 2002. The percentage of women who think “there is
no need to have children” increases with their education levels. Only 0.93% of women with elementary education agree with this statement, but the number increases considerably to 7.20% among women with university educations (Lee 2009). The major reason for this is the economic burden associated with child rearing.

Son preference is found not only in countries with Confucian values, but is also found to be widespread in South Asian countries. Arnold and Liu (1986) find extremely strong evidence of son preference in South Asian countries such as Bangladesh, Nepal, and Pakistan. Amin and Mariam (1987)’s study in Bangladesh in 1969 and 1979 suggests that son preference has been rooted in the agriculture practices (rice cultivation) which is very labor demanding, thus men’s labor is favoured. They found that son preference has a negative association with contraceptive use and a positive association with the desire for additional children, regardless of socioeconomic and demographic characteristics. Dyson and Moore (1983) found that higher fertility and son preference was more pronounced in Northern India where there was more female subjugation.

Ethnographic study by Brunson (2010) in Nepal points out that cultural values play an important role in how son preference is prevalent in the society. Brunson (2010) interviewed Nepalese Hindu women about their perception concerning the importance of having a son, and found that for them, having at least one son is important for funeral rites, which a daughter cannot perform. The woman herself would feel bad if she gave birth to a girl. Another reason why the women thought sons were important is that they bring daughters-in-law into the family while their own daughters are considered lost to other families after marriage given the practice of the bride going to live in the village of the of the groom’s male kin. Sons and their wives will stay with
the parents and take care of them when they age (Brunson 2010). Das Gupta et al. (2003) suggest that patrilineality is very important to son preference since daughters are not usually allowed to inherit land. It is also important to have sons to maintain the family lineage and ancestor worship. They also suggest that the position of the mother in the family only became stable after she gave birth to a son, and then her position improved when the sons brought in daughters-in-law.

Nonetheless, a preference for sons does not mean daughters are completely undesirable. Even in countries where son preference is more dominant, a gender composition which include at least a daughter and two sons are favored. For example, in Korea in 1971 the most preferred gender composition of offspring was two males and two females; and in rural India in 1961-62, was two males and one female. Marrying a daughter into a high-status family can potentially enhance the family’s status within the family. Where brideprice exists, marrying daughters can help parents to pay for brideprice for their sons (Skinner 1997).

Consequences of Son Preference

As mentioned earlier, son preference is a result of gender inequality and it can make it even more intensified. Son preference can lead to preference for high fertility and an imbalanced sex ratio in the population due to sex-selective abortions.

Son preference had been viewed as a cause for high fertility since couples would try until they have a son, which is a cause for slowing down the demographic transition (Brunson 2010, Larsen, Chung, and Gupta 1998, Chowdhury and Bairagi 1990). A study in 1979-1980 in Pakistan found that son preference was very strong in the country and it significantly affected the desire for more children (Ali 1989).
Nevertheless, the relationship between son preference and high fertility in fact has recently been proven otherwise in China (probably due to the one child policy), Japan, Korea, Taiwan and Vietnam. All these countries still have a preference for sons but the total fertility rates have been declining significantly. The common assumption is that when gender preference diminishes, parents no longer desire children of one gender over the other, and this may in turn influence fertility. However, Mason (1987) claims that the impact of gender preference on fertility is unclear. She argues that, if that principle was valid, the fertility of Korea and Taiwan would be higher than replacement level, since there is still a strong preference for boys in these countries. In fact, the fertility in these two countries is well below replacement level.

Similarly, in Bangladesh, son preference and larger family preference are still strong, but these preferences seem to have little impact on fertility. In Bangladesh, son preference is suggested to be the factor that drives women to stop wanting more children (Chowdhury, Bairagi, and Koenig 1993). Low total fertility while the preference for sons still exists causes even more gender imbalances at lower birth parity, which is referred to as the “intensification association” (Brunson 2010). This is where couples intentionally use technology, including sex-selective abortion, to manipulate the outcome of the pregnancies.

When son preference is still prevalent while the desire for high fertility diminishes, couples may use sex-selective abortion to make sure they have a son. In the study of sex-selective abortion in three countries, China, India and South Korea, Das Gupta et al. (2003) found that Korea had the highest rate of sex-selective abortion, which was 70 excess abortions per 1000 female live births in 1992. The high rate was believed to be the result of the accessibility in Korea to technology, compared to China and India.
at the time. In China, the stringent population policy that only allows urban couples only allowed to have one child, together with son preference, led couples to use advanced technologies to induce sex-selective abortion (Das Gupta et al. 2003, Goodkind 1996). Miller (2001) claims that female-selective abortion is practiced predominantly in China, Taiwan, Korea, Pakistan and India, and even in Asian immigrant populations in the United States and Canada.

Together with sex-selective abortion, or pre-natal sex selection, female infanticide, or post-natal sex selection has long been observed in China and India (Das Gupta et al. 2003). The main cause of female infanticide is believed to be the need to pay dowries for daughters in India and the one-child policy under the pressure of maintaining the paternal family line in China.

Son preference has demographic consequences that have been pointed out in the literature, one of which is the extreme imbalanced sex ratio at birth. Chowdhury and Bairagi (1990) proposed that sex preference would result in an imbalanced sex ratio at birth. Studies in Taiwan and Korea have found evidence for such a phenomenon (Park and Cho 1995, Coombs and Sun 1978). Sex ratio at birth in China, Hong Kong, Taiwan and Korea in 1990 ranged from 109 to 112 boys to 100 girls. Sex ratio at birth in China in the period 2005-2010 was about 119-120 boys to 100 girls (Guilmoto 2012). Biologically, the sex ratio at birth ranges around 105 boys to 100 girls, but more boys die in infancy, so the sex ratio is about equal at age one. According to Das Gupta et al. (2003), the sex ratio at birth in China and Korea started to rise sharply around 1985, when sex selection technology became more wide-spread. However, it is important to note that fertility decline and technology are not causes of son
preference; rather, they “intensify the manifestation of gender bias where bias is already strong” [159].

Researchers have raised concerns over the extreme imbalanced sex ratios in China, which are predicted to cause profound impacts on the country’s future population (Johansson and Nygren 1991, Das Gupta et al. 2003, Ebenstein 2008). Son preference in combination with declining fertility has been predicted to cause a marriage squeeze since the 1990s. As the total number of births gets smaller every year and men are seeking younger women for marriage, the surplus of men in each birth cohort increases. The excess of men in society has raised concerns about an increase in violence among a large and growing cohort of single men, the expansion of sex industry, and the worsening of the problem of women trafficking for the sex industry (Hesketh and Zhu 2006).

The skewed sex ratio may give women more benefits in inheritance and can advantage positions in the marriage market. In turn, this could lead to more equal social gender structure (Park and Cho 1995, Hesketh and Zhu 2006). However, other authors are skeptical about such notions. The marriage squeeze would result in early marriage for girls, which in turn could lowers girls’ education and paid employment potential due to early marriage. Therefore, a skewed sex ratio at birth as a result of son preference might be worse for women’s empowerment, not better, which is contrary to common expectations.

Is There A Son Preference in Southeast Asia?

Southeast Asia has been suggested to be traditionally one of the most “gender-equal” regions, where people maintain a bilateral kinship system on both their mother’s and father’s side (Blumberg 2015, Hirschman and Teerawichitchainan 2003, Hirschman
and Guest 1990). Blumberg (2015) proposes that in Southeast Asia, or a “wet” region, the method of agricultural production relies on irrigated rice fields. Agricultural production is so labor intensive that both genders are producers. As a result, the kinship system in Southeast Asia is bilateral or matrifocal, which gives women almost equal inheritance and relatively equal position.

Son preference has not been found as a striking issue in Southeast Asia, except Vietnam (Fuse 2010). Arnold and Liu (1986) use results from the World Fertility Survey to reveal that son preference is weak among women from Indonesia (except for the first child). In the Philippines, sons were preferred for the first child, but daughters were preferred slightly more at every other parity. A mild to moderate degree of son preference was found in Malaysia, Thailand, and Sri Lanka, and extremely strong evidence of son preference was found in Bangladesh, Nepal, and Pakistan (Arnold and Liu 1986).

Using DHS data, Arnold (1992) reviewed 26 countries in Africa, Latin America and Asia from 1986-1989 and found that the most common fertility preference is a combination of at least one child of each sex. Unfortunately, the data for Asia include only Indonesia, Sri Lanka and Thailand, and did not include China, India and Bangladesh, where evidence of son preference is most prevalent. Nevertheless, he also found that son preference is more prevalent in North Africa and Sri Lanka, but not consistently strong. Arnold suggested that evidence from his earlier studies and others’ did not really show a strong relationship between sex preference and fertility since parents usually reached their minimum desired number of sons and daughters earlier in their childbearing career by mere chance, so there was only a small proportion of parents who would have a higher number of children than they would
have had without son preference. Arnold (1992) also claimed that the accurate measurement of parental preference of children’s sex can be difficult to be “articulated or candidly expressed” [93]. He found that women were less likely to have more children once they had at least one child of each sex. The tendency for a specific sex of the children is not really pronounced in Indonesia, with the proportion of women currently using contraception being similar in all sex compositions of living children in birth order from 1 to 3. And the proportion of women who wanted to have another child was lower when they already had at least one child of each sex.

Das Gupta et al. (2003) suggest that son preference is not detected in Southeast Asia thanks to the prevailing bilateral kinship system in Southeast Asia, in which relationships in both male and female lines are recognized and actively used. They also suggest, rather optimistically, that there is little evidence of gender discrimination in this region. Skinner (1997) states that matrilineal family systems, where the preferred sex of single heir is female, and marital residence is uxorilocal (the groom moves to the bride’s household after marriage) are found in some parts of mainland and insular Southeast Asia. As a result, gender neutral heirship is also the norm in areas of Southeast Asia. The senior woman in the family in Southeast Asia usually controls the household budget, and women vendors predominated in local markets.

In a study in Malaysia in 1988 using the Malaysian Family Life Survey data, Pong (1994) found a strong son preference among ethnic Chinese. They prefer having all sons or a combination of sons and daughters, preferably with more sons than daughters or at least an equal number of them. The other two major ethnic groups in Malaysia, Malay and Indian, did not show a consistent son preference.

Results from small sample interviews with Singaporean women reveal that son
preference is still strong among the older generation women but is changing toward the tendency of preferring a combination of both sexes in the younger generation women (Teo et al. 2003).

In Vietnam, the ethnographic study by Bélanger, Khuat, and Jianye (2003) finds that the desire for sons stands out as a crucial issue that affects gender and intergenerational relations to a great extent. They observe that having a son is a social norm that exerts an enormous pressure on everyone participating in the study, regardless of education, employment, socioeconomic status, lineage or political role.

The most recent study by Fuse (2010) used DHS data from 50 developing countries to explore sex preferences of women. Four Southeast Asian countries are included in the study: Cambodia, Indonesia, Philippines and Vietnam. Using the proportion of the ideal number of sons over the ideal number of daughters to measure sex preference of children, Fuse suggests that in Cambodia, Indonesia and Philippines, women prefer to have more daughters than sons, while Vietnamese women still have a higher preference for sons than daughters. This study is mainly a cross-national descriptive analysis and the author did not further analyze factors that affect such preference. Fuse (2010) suggests that future research which looks into country-level analysis will be worthwhile.

Table 29 shows the sex ratios at birth (boys/ girls) of 10 Southeast Asia and developing countries in East Asia and the Pacific using data from the World Development Indicators in 2011, 2012 and 2013 (the latest data available) (The World Bank 2016).
Macro data from the World Development Indicators show that except for Vietnam, all Southeast Asian countries have sex ratio at births from 1.03-1.07, which are very close to the biological norm of 1.05 boys/1 girl. In Vietnam, the sex ratios at birth for three years are around 1.11 – 1.12, which are the highest in all Southeast Asian countries. The higher sex ratio at birth in Vietnam is attributed to son preference under the strong Confucian values which prevail in the country. The data from the World Bank are consistent with the previous ethnographic literature on son preference in Southeast Asia.

An overview of the literature reveals that there have not been many studies on gender preference in Southeast Asia. Most of the research about son preference in Southeast Asia are either based on qualitative interviews with small sample sizes or merely descriptive. This study aims to carefully examine if son preference is found in Southeast Asia using quantitative data at country level. It even goes even further to examine the relationship between women's empowerment factors and son preference in Southeast Asia.

<table>
<thead>
<tr>
<th>Country</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>1.052</td>
<td>1.049</td>
<td>1.049</td>
</tr>
<tr>
<td>Indonesia</td>
<td>1.050</td>
<td>1.050</td>
<td>1.050</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>1.050</td>
<td>1.050</td>
<td>1.050</td>
</tr>
<tr>
<td>Malaysia</td>
<td>1.060</td>
<td>1.060</td>
<td>1.060</td>
</tr>
<tr>
<td>Myanmar</td>
<td>1.030</td>
<td>1.030</td>
<td>1.030</td>
</tr>
<tr>
<td>Philippines</td>
<td>1.060</td>
<td>1.060</td>
<td>1.060</td>
</tr>
<tr>
<td>Singapore</td>
<td>1.073</td>
<td>1.073</td>
<td>1.073</td>
</tr>
<tr>
<td>Thailand</td>
<td>1.062</td>
<td>1.062</td>
<td>1.062</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>1.050</td>
<td>1.050</td>
<td>1.050</td>
</tr>
<tr>
<td>Vietnam</td>
<td>1.117</td>
<td>1.120</td>
<td>1.115</td>
</tr>
</tbody>
</table>

Source: World Development Indicators (World Bank, 2016)
6.2. Data, Methods and Operationalization of Variables

The Data

Data used in this study are from the countries’ Demographic and Health Surveys (DHS), which are implemented by the U.S Agency for International Development (USAID). Access to the data was granted by the Demographic and Health Survey program after a formal request for accessing data for research purpose was submitted. Out of six Southeast Asian countries with DHS data available, only four which had the latest data available (Phase 5 and 6 of the survey) were selected for this study; they are DHS Indonesia 2012, DHS Cambodia 2010, DHS Philippines 2008 and DHS Timor-Leste 2010. Other countries either have no data available (Singapore, Brunei, Malaysia), the latest survey was too long ago (Thailand 1987), or the latest survey is not a standard survey (Vietnam 2005 AIDS Indicator Survey; Laos Special Survey 2011-12, Myanmar Special Survey 2015 – ongoing). At the time this study was completed, data from the DHS Cambodia 2014 and DHS Philippines 2013 became available, unfortunately they were not available soon enough to be included in the analysis done in this study. This study uses data from the women’s questionnaire, since the focus is on women’s empowerment and their fertility preference. All these data sets have large and nationally representative sample sizes, detailed questions on different aspects of women’s empowerment as well as their fertility preference.

The original DHS samples include all women aged 15-49, however, in this study, the target sample only includes women who have valid women’s empowerment scores. For the regression analysis, only women who have no missing values in all the variables are included. Table 30 shows the original sample sizes and selected samples that are being used for this analysis.
Different measures of son preference have been proposed in the literature. At country level, son preference can be validated by the total number of missing girls in 1000 female live births, or the total number of female abortions in 1000 female live births (Das Gupta et al. 2003). Another way to look at sex preference is to examine sex ratio at birth. Dalla Zuanna and Leone (2001) use sex ratio at last birth (M/F) multiplied by 100; the expectation is that natural sex ratio at birth fluctuates around 105, and if son preference exists, the couple might stop bearing children after birth of a son, so this ratio will be higher than 105. Similarly, Clark (2000) uses the actual sex composition of the total number of children ever born (transferred to sex ratio) to determine if the proportion is normal. For example, Clark (2000) finds that the average CEB of the women in the Indian sample is 3.5, with 1.8 sons, which yields a proportion of 0.514, which is equivalent to a sex ratio of 1.06 (0.514/0.486 = 1.057), which is pretty close to the biological norm of 1.05. This simple calculation is useful in looking at sex ratios at country level, thus a similar application is used in this study.

**The Dependent Variable**

Table 30: Original and Selected Sample Sizes

<table>
<thead>
<tr>
<th>Country/ Survey</th>
<th>Original total sample (15-49)</th>
<th>Target sample by design(a)</th>
<th>Selected sample(a)</th>
<th>Questions response rates (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia 2010</td>
<td>18,753</td>
<td>6,637</td>
<td>6,622</td>
<td>99.7</td>
</tr>
<tr>
<td>Indonesia 2012</td>
<td>45,607</td>
<td>27,225</td>
<td>26,883</td>
<td>98.7</td>
</tr>
<tr>
<td>Philippines 2008</td>
<td>13,594</td>
<td>7,217</td>
<td>7,186</td>
<td>99.5</td>
</tr>
<tr>
<td>Timor-Leste 2010</td>
<td>13,137</td>
<td>3,747</td>
<td>3,741</td>
<td>99.8</td>
</tr>
<tr>
<td><strong>All four countries</strong></td>
<td><strong>91,092</strong></td>
<td><strong>44,826</strong></td>
<td><strong>44,544</strong></td>
<td><strong>99.3</strong></td>
</tr>
</tbody>
</table>

\(\text{Target sample by design: women aged 15-49, currently married, currently working or worked in the past 12 months, earn cash or cash and kind, sexually active and fecund.}\)

\(\text{**Selected sample:** a subset of target sample, which includes women with no missing data.}\)
Various suggestions for measuring son preference at individual level have been proposed. Repetto (1972) uses two ratios to represent son preference; the first one is the ratio of the numbers of surviving sons over the total number of living children (in per cent) of the first three surviving children, and the second one is the ratio of living male children among total children born alive.

Amin and Mariam (1987) use the desire for additional children (as a dichotomous variable) and sex composition of existing children as a control variable to measure for son preference. The authors expected that if there was a higher proportion of daughters to sons in the sex composition of current number of children, married women would express their desire to have more children. This measurement of son preference is similar to what Ali (1989) did in the study in Pakistan by measuring the desire for more children after controlling for the presence of at least a son in the existing children (dichotomous).

Rossi and Rouanet (2015), in a study of fertility behavior in Africa, use birth spacing as a measurement of son preference. The authors suggest that, if the couple have son preference, the birth spacing may be shorter following the birth of a girl than a boy. However, this measurement could be biased if they already have boys before the girls.

In this study, son preference is measured by the ideal number of sons divided by the ideal number of children. This approach is similar to Clark (2000) in his study of son preference in India. The ideal number of sons is a good measure for women’s preference for children since it assumes that no birth is unintended, and all births are “wanted”, and the ideal number indicates the perfect hypothetical number of children a woman wants regardless of any constraints such as biological, health or economic concerns. Most studies use actual fertility to look at son preference, but not the ideal
number of sons divided by the ideal number of children. Even though son preference, in terms of the ideal number of sons, does change depending on different the life stages of the respondents, this issue can be controlled for by adding variables on women’s age into the regression models. An advantage of using the ideal number of sons to operationalize the dependent variable instead of actual number of sons is that it is not affected very much by whether or not the women have completed their childbearing, whereas using the number of sons ever born would be greatly affected by this fact. Actual fertility where women have not reached completed fertility could yield a different ratio and may indicate a different interpretation about the preference for gender of children.

The Demographic and Health Surveys used in this study have detailed sections on fertility preference of the respondents, including questions on the respondents’ desire to have another child, desired length of time before having another child, the ideal number of children, and the ideal number of sons and daughters. Women with living children were asked: “If you could go back to before you have had any children, and could choose exactly the number of children to have in your whole life, how many children would that be?” Women with no living children were asked: “If you could choose exactly the number of children to have in your whole life, how many children would that be?” Then they were asked a question about gender preference of the children: “Out of such, how many of these children would you like to be boys, and how many would you like to be girls and for how many would the sex not matter?”

At country level, i.e. in all eligible samples of women in each country, if there were truly no preference for any gender, the ideal number of sons divided by the ideal number of children would equal 0.5. The ideal number of children is expressed in
whole numbers such as 1, 2, or 3 etc; it is unlikely that they would use decimal numbers to express the ideal number of sons and the ideal number of children. If there is a preference for sons, the number is statistically larger than 0.5. This measurement is meant to measure the preference for the ideal ratio, not actual fertility.

*At the individual level, the ideal number of sons* divided by *the ideal number of children* is regressed on three women’s empowerment factors to examine which of those factors have an association with this ratio. Specifically, which type of empowerment and which level (high/low) would be associated with a preference for sons?

**Key Independent Variables**

The three key independent variables are the factor scores of women’s participation in the labor force, women’s education and women’s involvement in household decision-making, which are extracted through principal axis factoring (as described in Chapter 4). The scores are actual individual scores based on how the women answered the questionnaires regarding these three aspects of women’s empowerment. The fourth concept explored in chapter 4, women’s use of contraception, is not used as one of the key independent variables in this chapter since it did not show up as an identifiable factor in principal axis factoring.

Women’s labor force participation factor is dominated by four indicators which take into account the engagement of the woman in the cash economy through types of employment (if she works for herself, family members or someone else) and types of payment that she receives; occupation; continuity of employment throughout the year (full time or part time); and earnings compared to the husband’s earning. The education factor is dominated by two indicators: women’s literacy and women’s
highest level of education studied or completed. The household decision-making factor is dominated by three indicators: decisions related to health (issues when seeking medical help), decisions related to household spending (who controls how to spend the money) and decisions related to visiting relatives (who decides). The detailed operationalization of these factors is described in chapter 4.

It is expected that an increase in factor scores of all three women’s empowerment factors is associated with a lower ideal number of sons and vice versa, i.e. women who have lower empowerment scores would prefer a higher number of sons.

**Control Variables**

Women’s son preference is hypothesized to result from their background characteristics, thus, a set of control variables including age, urban residence, religion, children ever-born (CEB), and proportion of surviving sons in the total number of CEB. Husband’s education and husband’s occupation are also controlled for.

Women’s age may be associated with a preference for sons; some studies imply that older women may prefer more sons than daughters (Amin and Mariam 1987). But to the contrary, Clark (2000) found that age has no effect on son preference. Women’s education and urban residence is negatively associated with high son preference (Arnold and Liu 1986, Ali 1989, Repetto 1972, Amin and Mariam 1987). In China, Li and Lavely (2003) suggest that women’s education is a strong indicator, and husband’s literacy may have effects on son preference in the way the literate men are more likely to adopt a more gender egalitarian view in the family. Their results confirm the expectation, however, husband’s literacy is no longer significant when controlling for women’s status in the family.
Heaton (2011) studied 30 developing countries using DHS data and finds that religion has an effect on fertility preference, including a stronger son preference. He also points out that Muslim women have substantially higher fertility than Christian women, while there is not much difference between Catholic and Protestant women. Being Muslim and Hindu is found significantly associated with a preference for sons in India (Clark 2000). In this study religion is accounted for to examine its effects on son preference.

Repetto (1972) includes a set of control variables in his study in Morocco, including duration of marriage, current or past use of contraceptives, education, and mother’s participation in the labor force prior to marriage. He uses mother’s participation in the labor force prior to marriage instead of current employment in order to “eliminate the confusion between the high opportunity costs and the work-inhibitory effects of a young family” [74]. Basically, it means women’s employment status may change after marriage especially among young women of childbearing age. Thus, taking employment prior to marriage into account may reduce the difference between younger mothers and older ones. He also uses the proportion of living children currently enrolled at school to capture the socioeconomic aspiration of the family, the average education costs of children and the income forgone from child labor, as well as type of family: nuclear or extended.

The current number of children ever born (CEB) is controlled for to examine its relationship with the preference for sons. Larger family size, or a higher number of CEB is found significantly associated with a higher actual proportion of sons and a higher ideal proportion of sons (Clark 2000).
The gender composition of existing children ever born is used as a control variable as suggested in the study by Clark (2000) in India. It is expected that a composition of existing children which includes more sons than daughter will be negatively associated with son preference since the couple already have more sons than daughters. Only a few studies have used the sex composition of children ever born to control for the desire for more children (Clark 2000, Ali 1989, Amin and Mariam 1987). In this study, the number of sons ever born divided by the total number of children ever born is included in the regression models. Using this sex composition of existing children is more well-fitted than using of a dummy variable that represents the presence of at least one son, as suggested by Ali (1989).

Since women’s preference for sons may be influenced by their husband’s preference, control variables on the husbands’ background including education and occupation are also taken into account.

**Modeling**

Since the dependent variable is the ideal number of sons divided by the ideal number of children, ordinary least squares (OLS) regression is used to run the analysis since the dependent variable is normally distributed, with most values clustering at the center; and the error terms are also normally distributed. The most significant advantage of OLS regression is that it produces easy to interpret results. Therefore, in this study, OLS regression models are run to examine the associations between women’s empowerment and son preference in the four countries of study.
6.3. The Results

This section presents the results from descriptive statistics and the tests for son preference at the country level. Later, the results from regression models of son preference on women’s empowerment factors are discussed. Ordinary Least Squared regression models are run for each of the four countries to examine the associations between women’s empowerment and the ideal number of sons divided by the ideal number of children after controlling for other variables.

Descriptive statistics

Table 31 shows the descriptive statistics of the dependent variables and control variables used in this son preference analysis. The samples for this analysis include women who have all valid factor scores (see Chapter 4), and have no missing values in any of the selected variables (the Final eligible N).
The average age of the women in the four samples ranges from 30 to 33; women in Timor-Leste are a bit younger and women in Indonesia are a bit older than average. About a third to half of the women in each country sample are residing in urban areas. The Indonesia and Philippines samples have higher proportions of women living in urban areas than the other two countries. The religion variable is grouped into four major groups for easier description, including Buddhist, Muslim, Christian, and
Others. The major religion in Cambodia is Buddhism, in Indonesia is Islam, and in Philippines and Timor-Leste is Catholicism.

The average number of children ever-born or CEB ranges from the lowest, 2.3 in Indonesia, to the highest, 3.8 in Timor-Leste. The average number of surviving sons and daughters are the sum of the number of son or daughters either living in the household or living elsewhere. The number of children ever-born may be higher than the number of surviving sons and daughters since some births may not results in surviving children. In all four countries, on average, each woman has about one living daughter and one living son, even though these numbers are highest in Timor-Leste, around 1.7 sons and 1.7 daughters per woman.

The ideal number of children in each country is higher than the actual CEB in that country. It ranges from 2.69 in Indonesia to a strikingly high 5.41 in Timor-Leste, and around 3.1 to 3.2 in Philippines and Cambodia. On average, women in all four countries express a higher ideal number of daughters than ideal number of sons. The pattern is also similar to the ideal number of children. The lowest numbers are expressed in Indonesia – around 1.1 children of each sex; and highest are in Timor-Leste – around 2.5 children of each sex.

The average years of education vary quite significantly among women in the four countries. Cambodian women only have a modest 6.1 years of education. Indonesian and Timor-Leste women have around 9 years of education. Filipino women have the highest average years of education, around 10.5 years. Compared to their husbands, Cambodian women have about one year less in education; Indonesian women have only slightly less education than their husbands. Surprisingly, women in Philippines
and Timor-Leste even have an average of one year more education than their husbands.

*Occupation* of the women is operationalized from 7 jobs categories in the questionnaire into 4 categories: *does not work, agricultural jobs, manual jobs* and *non-manual jobs*. The dynamic of women’s jobs vary greatly among the four countries. In Cambodia, only 17% of the women do not work, while in Indonesia and Philippines this number is more than twice as much (31% and 41% accordingly), and in Timor-Leste it is more than three times (61%). The majority of women in Cambodia work in either agricultural jobs (38%) or non-manual jobs (33%). In Indonesia, the most popular type of jobs that women hold is non-manual, and only 13-14% works in each category of labor demanding jobs such as agricultural and manual jobs. The distribution of occupation of Filipino women is very diverse, 41% do not work, while another 41% work in manual jobs, and only a little more than 1% work in agricultural jobs. In Timor, the majority of women do not hold employment; 61% of them have not worked in the past 12 months. The majority of women who work have manual jobs, only a few of them have agricultural or non-manual jobs.

Looking at the husband’s occupation, almost all women’s husbands have jobs, only roughly 1% were not working at the time of survey. The most popular types of jobs for the husbands are agricultural, manual and non-manual jobs. In Cambodia, the numbers of men who work in those three types of jobs are quite similar, with slightly more men working in agricultural jobs. In Indonesia, more men work in manual and non-manual jobs. In the Philippines, the majority of men work in manual jobs. And in Timor, men mainly work in either agricultural or non-manual jobs, very few men
work in manual jobs compared to the other three countries (8%). But, except for Timor-Leste, the majority of the women also work.

**Son Preference at Country Level**

The descriptive statistics in Table 30 shows a tendency of a higher ideal number of daughters than the ideal number of sons. Previous studies have suggested various methods to measure son preference at macro level. This study uses the *ideal sex ratio*, which is measured in two ways, first, by the ratio of the *ideal number of sons* and the *ideal number of daughters*; and second, by the *ideal number of sons* divided by the *ideal number of children*. These numbers are examined to make this study of son preference in Southeast Asia comparable with previous literature.

Table 32 presents the actual sex ratio and the ideal sex ratio of children expressed by the selected women sample women in the four countries and the results from a t-test to see if the proportion of the ideal number of sons over the ideal number of children is statistically less than 0.5, with the assumption that if the woman did not have any gender preference, she would state the ideal number of sons to be half of the total ideal number of children.

The actual sex ratio and ideal sex ratio is calculated by the formulas below:

\[
\text{Actual sex ratio} = \frac{\text{Number of surviving sons}}{\text{Number of surviving daughters}}
\]

\[
\text{Ideal sex ratio} = \frac{\text{Ideal number of sons}}{\text{Ideal number of daughters}}
\]
Table 32 also shows the significance test of son preference at the individual level. Since it is measured at individual level, the answers are whole numbers such as 1, 2, or 3 etc. It is unlikely that they would use decimal numbers to express the ideal number of sons and the ideal number of children. If there was no gender preference, individual women would express the ideal number of sons to equal half the ideal number of children. Therefore if there is no gender preference, the proportion of sons in the ideal number of children should be 0.5.

Table 32: Actual and Ideal Sex Ratios of Children in Four Countries (Selected Women Samples)

<table>
<thead>
<tr>
<th></th>
<th>Sex ratios (Sons/Daughters)</th>
<th>t-test (Ideal # sons / Ideal # of children &lt; 0.5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual</td>
<td>1.034</td>
<td>--</td>
</tr>
<tr>
<td>Ideal</td>
<td>0.868</td>
<td>0.453***</td>
</tr>
<tr>
<td>Indonesia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual</td>
<td>1.076</td>
<td>--</td>
</tr>
<tr>
<td>Ideal</td>
<td>0.982</td>
<td>0.421***</td>
</tr>
<tr>
<td>Philippines</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual</td>
<td>1.079</td>
<td>--</td>
</tr>
<tr>
<td>Ideal</td>
<td>0.952</td>
<td>0.442***</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual</td>
<td>1.059</td>
<td>--</td>
</tr>
<tr>
<td>Ideal</td>
<td>0.988</td>
<td>0.464***</td>
</tr>
</tbody>
</table>

***: t-test; the ideal number of sons divided by the total ideal number of children is less than 0.5, statistically significant at p-value<0.001

Since the natural sex ratio at birth in the population is 1.05 (or 105 boys for every 100 girls), the actual sex ratios of sons/daughters in these four countries are pretty close to the natural rate, ranging from 1.03 to 1.07. These ratios imply that women may not have chosen sex selective technology to have more children of a specific sex. The ideal sex ratios of sons over daughters in the four countries are all under 1.0, which means women prefer to have a higher proportion of daughters than sons in the ideal
combination of their children. The ratio is lowest in Cambodia (0.86) and highest in Timor-Leste (0.98).

Another way to look at the combination of sex of the children is by looking at the *ideal number of sons* divided by the *total ideal number of children*. If the number is less than 0.5, it means the ideal combination includes fewer sons than daughters. On the other hand, if this ratio is larger than 0.5, there is a preference for more sons than daughters, if it equals to 0.5, there is no preference for either sex. Results from t-tests show that the ideal number of sons divided by the ideal number of children is significantly less than 0.5 in all four countries. The tests have shown that, on average, there is no evidence that women in Southeast Asia prefer a higher ideal number of sons in the total ideal number of children. This is true in a Muslim country, a Buddhist country and two Roman Catholic countries: Indonesia, Cambodia, Philippines and Timor-Leste respectively.

This result has revealed that the pattern of sex preference of the children in Southeast Asia is very different from other parts of Asia. Son preference has been found prevalent in East and South Asia. Even though recent studies point out some signs that such preference is diminishing in Taiwan and Japan, it remains pretty strong in other countries in the region, including China, Korea, India and Bangladesh. Southeast Asian women, on the contrary, tend to prefer a combination of more daughters than sons. Southeast Asia has been found to maintain a bilateral kinship system (Hirschman and Guest 1990, Hirschman and Teerawichitchainan 2003), which mean people maintain relationships with both mother’s and father’s side after marriage, thus women posses a relatively high status in comparison to their counterparts in other countries where a patrilineal kinship system is dominant.
Southeast Asia is believed to be traditionally the most “gender-equal” region (Blumberg 2015). Analysis from this study has confirmed that at country level, there is no evidence that son preference exists in Southeast Asia.

**Son Preference at Individual Level**

Descriptive results and t-tests have shown that at country level, on average, there is no evidence for son preference among Southeast Asian women. In fact, there may even be a preference for daughters. Nevertheless, it does not preclude the possibility that less empowered women want more sons, if in general, the sample of women has a slight daughter preference. In this section, the relationship between women’s empowerment factors and son preference are examined at the individual level. Son preference at the individual level is measured by the *ideal number of sons* divided by the *ideal number of children*. Higher proportions signal stronger preferences for sons. It is expected that women’s higher scores in the labor force participation factor, the education factor, and the household decision-making factor are associated with lower son preference.

Table 33 shows the correlations of son preference and three women's empowerment factors (labor force participation, education and household decision-making) without any of the control variables.
The correlations show that, without controlling for any other variables, in all four countries, three women's empowerment factors are negatively associated with son preference (second column of each country table). The only exception is employment factor in Timor-Leste, which shows a small positive correlation. In Cambodia, there is a strong correlation (.21) between education and employment, which indicates women who have higher education tend to have higher involvement in the labor force as well. In Philippines, education is moderately correlated with employment (.32) and household decision-making (.20), Filipino women who have higher education tend to be more involved in employment and have more power in household decisions. In Timor-Leste, there is also a moderate correlation between education and household decision-making (.26). None of the three women's empowerment factors in Indonesia seem to correlate with each other.

Regression models are analyzed to examine the associations of the three women's empowerment factors on son preference. Table 34 shows the OLS regression results of son preference on three women’s empowerment factors including female labor force participation, education and household decision making, after controlling for the
women’s and their husband’s characteristics. Control variables on women’s characteristics include women’s age, residence in urban or rural areas, the number of children ever born (CEB), the proportion of the number of surviving sons in the total number of children ever born, and the main religion practiced in each country (country-specific religion dummy variables). Additionally, the regressions include a set of control variables for the husband’s characteristics, including husband’s education in years, and a set of husband’s occupations which take agricultural jobs as the reference category.

Table 34: OLS Regression of Son Preference on Women’s Empowerment Factors in Four Countries, Metric Coefficients

<table>
<thead>
<tr>
<th></th>
<th>Cambodia</th>
<th>Indonesia</th>
<th>Philippines</th>
<th>Timor-Leste</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>.452</td>
<td>.482</td>
<td>.379</td>
<td>.452</td>
</tr>
<tr>
<td>Age</td>
<td>-.002</td>
<td>-.002</td>
<td>.002</td>
<td>-.001</td>
</tr>
<tr>
<td>Age-squared</td>
<td>.000</td>
<td>-.000</td>
<td>-.000</td>
<td>.000</td>
</tr>
<tr>
<td>Age*CEB</td>
<td>.000</td>
<td>.0004*</td>
<td>.000</td>
<td>-.000</td>
</tr>
<tr>
<td>Urban residence</td>
<td>-.012**</td>
<td>-.003</td>
<td>-.005</td>
<td>.010*</td>
</tr>
<tr>
<td>CEB</td>
<td>-.006</td>
<td>-.014*</td>
<td>-.010</td>
<td>.003</td>
</tr>
<tr>
<td>Number surviving sons divided by CEB</td>
<td>.105**</td>
<td>.073**</td>
<td>.117**</td>
<td>.047**</td>
</tr>
</tbody>
</table>

Religion (%)

- Buddhist: (Ref.)
- Muslim: -.009
- Catholic: -.009
- Protestant: --
- Iglesia Ni Kristo: --
- Alipay: --
- None: --
- Hindu: --
- Others: .021

Husband’s education (years)

- .000

Husband’s occupation

- Agricultural: (Ref.)
- Does not work: -.027
- Manual job: -.012*
- Non-manual job: -.010
- Education factor score: .001
- Labor force participation score: -.000
- HH decision-making score: -.008**

R-squared: .063
N: 6,543

*: significant at p-value<0.05
**: significant at p-value<0.01
It seems that the preference for sons does not change with women’s age since age and age-squared show no significant association with the preference for sons in all four countries. The interaction between age and CEB also are not significant in Cambodia, Philippines and Timor-Leste, and only significant in Indonesia. Residence in the urban area is significantly associated with lower preference for sons in Cambodia, but is associated with higher preference for sons in Timor-Leste, and not significant in Indonesia and Philippines.

The number of children ever born (CEB) is only significant in Indonesia, while not significant in any of the other countries. Control variable the number of surviving sons divided by CEB shows positive and statistically significant associations in all four countries. The association could imply that women who had already given birth to more sons tend to state their preference for a higher number of sons. This could be a genuine preference, or it could be a rationalization for the existing higher proportion of sons as suggested by Bongaarts (1990). The results suggest that religion is not strongly associated with son preference, except for the case of the small Muslim minority in the Philippines, where being Muslim is significantly associated with higher level of son preference. Husband’s characteristics including education and occupation have almost no significant association with wife’s fertility preference including the ideal number of children and the preference for sons.

Education, as one of the women’s empowerment factors, does not seem to have any significant association with son preference in all four countries. The small and positive coefficients suggest that higher education level tends to be slightly correlated with higher son preference, but none of the coefficients is statistically significant. This result is very much different from the earlier analysis on the ideal number of
children where higher education is strongly associated with the preference for a smaller ideal number of children. It is also different from the previous study by Das Gupta et al. (2003) in East and South Asia. It seems that the pattern of son preference in Southeast Asia is different from other previously studied regions in Asia: it is non-existent in these four countries.

Labor force participation factor is only statistically significant in the Philippines, where one higher score in labor force participation factor is associated with 0.007 lower deal number of sons divided by the ideal number of children. It seems that Filipino women who are more involved in the labor force are a little more likely to prefer a lower number of sons compared to those who have less involvement in the labor force. Even though the coefficients suggest a negative relationship, labor force participation is not statistically significant in the other three countries.

Household decision-making is consistently and statistically significantly associated with lower son preference in three countries: Cambodia, Indonesia and Philippines. In this study, the household decision-making factor is measured by women’s involvement in decisions related to health, mobility and spending. Women who have higher scores in the household decision-making factor tend to have a weaker son preference, i.e. they prefer a lower ideal number of sons in the total ideal number of children. One score higher in household decision-making factor is associated with 0.008 points lower in son preference in Cambodia, 0.005 in Indonesia, and 0.007 in Philippines. The results are all statistically significant. In Timor-Leste, one score higher in household decision-making is associated with 0.004 points lower in son preference, however the coefficient is not statistically significant. This result is consistent with previous studies on household decision-making and son preference in
East and South Asian countries which also find that higher level of women's empowerment is often associated with lower son preference and vice versa (Das Gupta et al. 2003, Li and Lavely 2003). What we see here is closer to daughter preferences than son preferences in keeping with the higher traditional levels of gender equality in Southeast Asia.

Regression results show that women’s son preference, measured by the ideal number of sons divided by the total ideal number of children, is more associated with household decision-making than with the education or labor force participation. The results suggest that in Southeast Asia, the relationship between women's empowerment and the preference for sons depends more on the “inside the household” factors (i.e. household decision-making) rather than “outside the household” factors (i.e. education and employment).

**6.4. Interpretation and Discussion**

Son preference can cause seriously imbalanced sex ratios at birth, female infanticide, and a marriage squeeze due to a large number of men who cannot find their partners. It also causes unequal treatment of girls and women in education and employment opportunities. Southeast Asia has been suggested to be traditionally the most “gender-equal” region, where people maintain a bilateral kinship system on both their mother’s and father’s side (Blumberg 2015, Hirschman and Teerawichitchainan 2003). Therefore, the issue of son preference has not been historically noted as a serious problem that reduces gender equality, as in East and South Asia countries such as China, Korea, India or Bangladesh. Since it is not viewed as an alarming issue, few studies have systematically looked at the presence or absence of son preference in Southeast Asia with high quality quantitative data. This study has
offered a piece of evidence to fill in the missing gap in the literature on son preference in Southeast Asia: it does not exist.

Actual sex ratios of surviving sons to daughters in Southeast Asia are very close to the natural sex ratio at birth, which is about 105 boys for every 100 girl. Thus, it can be inferred that sex selective technology is not or rarely used to achieve a preferred gender combination of children. Analysis using data from four countries has revealed that at country level, there is no evidence of a preference for sons among Southeast Asian women. In fact, there is even a preference for a higher number of daughters than sons. The ideal combination of gender of the children is often one with more daughters than sons. This notion is consistently expressed by women in all four countries. This finding is consistent with earlier studies on Southeast Asia by Fuse (2010) and Das Gupta et al. (2003).

Daughter preference was historically found in previous studies, usually among the minorities, some of them include the Mundugumor of New Guinea (Mead 1935), the Tiwi of North Australia (Hart, Pilling, and Goodale 1966), or the matrilineal tribal societies in Meghalaya, India (Narzary and Sharma 2013). Daughters were considered assets in these societies and the control of women brought power and alliance, and more offspring. Women are considered economically productive to the households. The Minangkabau in Indonesia is considered the world’s largest matrilineal group. Despite the fact that Islam arrived since the 1200s to 1300s in the country, it has not changed the pre-Islam kinship system of the region, which allows women to inherit equally (Blumberg 2015). Evidence of the preference for daughters in modern societies in Southeast Asia shows that the pattern of preference for sex composition of
the children of the region is very much different from the rest of Asia where son preference is more prevalent and women have far less gender equality.

Nonetheless, no evidence of son preference at country level does not necessarily infer that son preference does not exist among some groups of women. Some women may prefer more sons but their preference is averaged out in the samples. Therefore, an analysis at individual level was done to examine which background characteristics and women’s empowerment factors are associated with son preference. The most significant finding from this analysis is that household decision-making is the key determinant to women’s preference for sons. Women who have lower scores in household decision-making power tend to prefer more sons than daughters. Female labor force participation and education does not show much of an impact on son preference, which is very different to previous findings on the ideal number of children. Education and employment are not associated with women’s preference for sons; the level of decision-making power in the family is the critical factor.
CHAPTER 7: CONCLUSION

Decades of research on women’s empowerment have broadened our knowledge on the concept and the tremendously influential effects that it brings to women themselves and to overall socioeconomic development (Batliwala 1994, Sen 1993, Coleman 2004, Malhotra and Schuler 2005). Improvement in aspects of women’s empowerment such as education and employment and household decision-making have been found significant in lowering the fertility rate, reducing child mortality, improving children’s health, reducing the preference for sons and improving girls’ education (Dixon-Mueller 1993, Lee 2009, Bongaarts 2003, Mason 1987, Jejeebhoy 1995, Brewster and Rindfuss 2000, Subbarao and Raney 1995, Axinn and Barber 2001).

Nevertheless, conceptualizing and measuring women’s empowerment has been a subject of debate among scholars and international non-governmental organizations alike. Scholars often conceptualize women’s empowerment either as a process or a goal. As a process, women’s empowerment is an ongoing process with no final goal, through which women’s actively gain more power for themselves, gaining control of both resources and ideology to improve their lives (Sen and Batliwala 2000, Kabeer 1999, Mosedale 2005, Lee-Rife 2010, Batliwala 1994). As a goal, women’s empowerment is about the ability to control their life and can be measured by the accomplishments of women in different aspects of their life (Tengland 2008, Bradley 1995, Parpart, Rai, and Staudt 2002, Desai 2010). Not only the conceptualization of women’s empowerment is a matter of debate but measuring the concept has been a challenge as well.
In this research, I was able to measure women’s empowerment at the individual level in the context of developing countries. I also found that fertility preferences, including the ideal number of children and son preference, are associated with women's empowerment factors in four countries of study.

*Measuring Women's Empowerment: Contraceptive Use is No Longer a Factor of Women's Empowerment*

Numerous ways of measuring women’s empowerment have been suggested, mostly at country level. Nonetheless, the lack of micro data in developing countries and the paucity of comparable data have been repeatedly mentioned as major issues in the measurements (Beteta 2006, Wu, Ye, and He 2012, Desai 2010). To date, measurements of women's empowerment have usually been done at country level and focused on ranking the countries on a global scale. While country’s indexes may be useful in having an overall perception about the situation of women in different countries, they can be very different from the actual situation of individual woman in each country, since women’s empowerment is a context-specific concept (Mosedale 2005, Odutolu et al. 2003). Previous literature has proposed that empowerment is relative and contextual (Mosedale 2005,Tengland 2008). It is relative in the sense that “people have more or less power depending on their specific situation and they can be relatively powerless in one situation and relatively powerful in another” (Mosedale 2005)[251]. Odutolu et al. (2003) insists that empowerment is context-specific; it differs in different cultures, situations and stages of the lifecourse. Malhotra, Schulerm, and Boender (2002) in a study in Bangladesh find that contraceptive use was once considered empowering, but when more than half of the married women in
rural areas have used it since 1990s, it has become normative and does not necessary imply a higher level of women’s empowerment.

While ranking countries in terms of the empowerment level of the women is useful and significant on a global scale, scholars have questioned the common element of current indexes of women's empowerment which includes a country’s income as part of the measurement, since it is much harder for a poor country to perform well in terms of women's empowerment on such indexes (Lopez-Claros and Zahidi 2005). Similarly, while it is important to measure the representation of women in politics, women’s representation in the national political domain, such as the number of seats in the parliament, is not necessarily proportional with the level of empowerment that an individual woman experiences.

Therefore, it is crucial to measure women’s empowerment in a context-specific manner, at individual level, especially in the context of developing countries, where the concept of empowerment can be measured very differently. This study is one of a few that have looked at measuring women's empowerment at individual level, and more importantly, using data from four developing countries in Southeast Asia. It has filled a significant gap in the literature on measurement indexes of women's empowerment.

Theories on women's empowerment at the individual level have suggested four main components of the concept, including women’s labor force participation, education, household decision-making and contraceptive use. Results from developing countries in Southeast Asia, including Cambodia, Indonesia, Philippines and Timor-Leste, suggest that the components of women's empowerment are different than previously suggested in the literature. This study has found that women's empowerment factors
in developing countries include women’s labor force participation, education and household decision-making – but not contraceptive knowledge and use.

One of the problems with various current indexes on measuring women's empowerment is that they are mainly based on data in developed countries, where more data are available, while in fact women in developing countries are facing much more challenging obstacles in their quest of empowering themselves. Empowering women may have very different meanings in developed and developing countries. For example, female labour force participation in developed countries almost always means paid employment with employer’s benefits. Therefore, measuring women’s employment can be straightforward, based on their salary and full time/part time status. Whereas, participating in the labor force in poor countries does not necessarily mean paid employment. Working women in poor countries may get unpaid jobs, for example, when they work for family members and are paid in-kind in return for the labor. This research has overcome such discrepancies between measuring women's empowerment in rich and poor countries by creating an index that specifically takes into account different indicators of female labor force participation, such as their work status (currently working or not), full time or part time, type of job, employers, and cash or in-kind payment. Significantly, it also measures the women’s income in relation to their husband’s. High-income or low-income women can be viewed differently when their husband’s earnings are taken into account.

While women’s education is most consistently measured by the level of women’s literacy and the level of education studied or completed in both developed and developing countries, measuring household decision-making is very context-specific. The type of decisions made at household level in rich and poor countries can vary
greatly. Decisions that may be unequivocally made by women themselves in developed countries, such as those related to their health and their freedom to visit family and friends, may, in the context of poor countries where women still have limited access to resources, mean a difficult negotiation process for their own empowerment. Household spending decisions are usually jointly made by the couples, and in poor countries, the level of involvement of the women in such decisions means a higher level of equality with their husband.

There is a strong emphasis in the literature on the relationship between reproductive and sexual control and women’s empowerment and egalitarian gender systems (Malhotra 2012). Much of the fertility decline in developing countries was achieved through an increase in contraceptive use. Allendorf (2012) points out that the percentage of women of reproductive age in developing countries using contraception rose from 9% in 1960 to 61% in 2009. Measurements of women's empowerment to date have considered contraceptive use one of the empowering factors to women. Surprisingly, it is not found to be one of the components of women's empowerment in Southeast Asia. The reason might lie in the availability of contraceptive use through government subsidy in developing countries. Government-subsidized family planning programs and lowered prices on contraceptives have made contraception much more accessible even in developing countries. All the four countries of study have National Family Planning Programs, which started in the 1970s in Indonesia and Philippines, in 1994 in Cambodia, and Timor-Leste, a newly founded country, the National Family Planning program only started in 2004. In Cambodia, 70% of ever-married women are currently using contraceptives or intend to use them. In Indonesia, this number is 78% and in Philippines, it is 73%. Although it is the country with the lowest contraceptive use prevalence, Timor-Leste has 37% of ever-married women using
contraceptive or intending to use them. The high prevalence of contraceptive use may suggest that it is not necessarily an empowering factor since it is becoming a norm.

In the four countries of study, it seems that contraceptives are no longer only accessible to a small group of women privileged enough to afford them, even in poorer countries. Contraceptive use can be empowering in countries where the prevalence of usage is low, but it is not very empowering in countries where there is a high prevalence of family planning usage. The case of Bangladesh suggests that the use of contraception was once considered empowering, but when more than half of the married women in rural Bangladesh have used it since the 1990s, it has become normative and does not necessarily imply a higher level of empowerment (Malhotra, Schulerm, and Boender 2002). On the other hand, couples no longer desire to have large numbers of children, which makes using contraception a sensible choice. Therefore, although contraceptive use was once considered an empowering factor for women, it is no longer so since it has become a popular norm even in developing countries in Southeast Asia. The finding that contraceptive use was once considered an empowering factor but no long the case once again strengthens the notion that women's empowerment is a contextual: what is considered empowering in one situation may not be in another context (Oxaal and Baden 1997). Future research should be more watchful when considering contraceptive use as one of the empowerment factors for women in countries where contraception is readily accessible.

*The Relationship between Women's Empowerment and the Ideal Number of Children*
Earlier research looked at female education, employment and household decision-making independently and their effects on fertility and fertility preference, yet, few have looked at all the aspects of women's empowerment as a fully conceptualized notion. To date, previous studies have proposed a negative relationship between each women’s empowerment factors and fertility preference, i.e. women with higher education, higher employment status and higher household decision-making tend to prefer lower number of children. This research has found that the ideal number of children is significantly associated with three factors of women’s empowerment in the four countries of study. However, the associations are not simply negative as previously suggested, most notably, the relationship between female labor force participation factor and fertility preferences. The association between labor force participation and fertility preference is not uniform across countries: higher levels of involvement in the labor force are associated with lower ideal numbers of children among Timor-Leste women, who currently have 5.3 children on average, whereas higher levels of involvement in the labor force are associated with higher ideal numbers of children among Indonesian women, who have 2.2 children on average.

Female labor force participation since the beginning of industrialization has been considered a major factor in theories on the fertility transitions. Previous studies suggest that higher level of involvement of women in the labor force is often associated with lower fertility preference and actual fertility (Mason 1987, Jejeebhoy 1995, Rindfuss and Brewster 1996, Kabeer 2001, 2005a). In this study, it is interesting to find that female labor force participation has the tendency to be associated with higher ideal number of children in Cambodia and Philippines and to be positively significant in Indonesia. The positive association may lie in the financial aspect of female labor force participation and fertility preference.
At the macro level, economic depression has been found as one of the explanations for fertility decline in different parts of the world (Lesthaeghe and Surkyn 1988, Sobotka, Skirbekk, and Philipov 2011). At the individual level, Bradley (1995) hypothesizes that lower fertility is partly the result of competition under economic scarcity, especially in the competition for employment. Preference for low fertility may prevail, as children become more of a burden than a benefit; it becomes more expensive to have children. The prospect of having several unemployed children may look like a long-term cost rather than a potential benefit. Unemployed or underemployed parents may also feel reluctant to have large families. From the economic point of view, it actually makes sense for women who have higher levels of labor force participation in a country with already declining fertility like Indonesia to express a higher ideal number of children since they can financially afford a larger family.

Results from this study suggest that women's empowerment has a balancing effect on fertility; where women in high fertility country express lower ideal numbers of children and women in lower fertility country express higher ideal numbers of children than their actual fertility. It also implies that the mechanism through which women’s empowerment keeps fertility at replacement level may be women’s labor force participation. Similar findings, though very limited, were recently found in developed countries where a positive relationship between female labor force participation and the total fertility rates is found at country level (Billari and Kohler 2004, Brewster and Rindfuss 2000, Myrskylä, Kohler, and Billari 2009, Rindfuss, Guzzo, and Morgan 2003). Nonetheless, no similar results have been found in developing countries. Results from this research indicate that the involvement of women in the labor force is important in reversing the drastically declining fertility,
which already happened rapidly in some developing countries, especially in East Asia, where the total fertility rate averages a very low 1.3 children per woman. Blumberg (2015) suggests that the total fertility rates in Southeast Asia is not as low as in East Asia since Southeast Asian women tend to get more help as the result of their economic independence.

Education and household decision-making are found to have consistent and negative relationships with the ideal number of children after controlling for background characteristics of the woman and her husband, i.e. women with higher education and a higher level of household decision-making tend to prefer a lower ideal number of children.

*The Relationship between Women’s Empowerment and Son Preference*

Son preference is another important aspect of fertility preference. It also implies a lower level of gender equality and a high level of fertility in countries where access to sex selective abortion is limited and/or expensive, since couples keep trying to have children until they reach the desired number of sons. Women try to bear more sons to improve their status in the family as well as to ensure a means of economic survival and old age security. Son preference is shaped by cultural traditions and community norms such as the expectation of the elderly couple to live with the oldest or youngest son when they no longer have income. Son preference often exists in societies with a high prevalence of patriarchy and it may have a significant influence on reproductive decisions (Hayase 2005). A strong preference for sons may be associated with a low prevalence of contraceptive use, since couples keep trying to have children until they have the desired number of sons (Bélanger, Khuat, and Jianye 2003).
Strong son preference leads to serious disadvantages and discrimination for women and girls, such as higher girls' mortality and limited access to social and economic resources in India (Malhotra, Vanneman, and Kishor 1995). Researchers have found a correlation between discrimination against women and strong son preference in different parts of the world (Bradley 1995, Kabeer 2005a, Shoaib, Saeed, and Cheema 2012, Malhotra, Vanneman, and Kishor 1995, Lee 2009, Goodkind 1995a, Wu, Ye, and He 2012). Son preference has not been a focus of study on Southeast Asia, partly because the issue has not been considered as pronounced as in East and South Asia, such as in China, Korea, India or Sri Lanka. Previously, some studies on gender preference in Southeast Asia were done in small sample size case studies and were mainly qualitative. This research on how son preference proves absent in Southeast Asia, where women’s empowerment is greater than East and South Asia, is the first one on the topic that uses micro data with a quantitative methodology.

This regression study has found that at country level, there is no evidence of son preference in these four countries in Southeast Asia. Actual fertility date shows that the sex composition of children is very close to the natural sex ratio of 1.05 boys to 1.0 girls, which indicates that prenatal sex selection and sex selective abortion are not at play. The ideal sex ratios expressed by women in the four countries suggest that, on average, women generally prefer to have more daughters than sons (.86 boys/1.0 girl in Cambodia; .95 boys/1.0 girl in Philippines; .98 boys/1.0 girl in Indonesia and Timor-Leste). This result is similar to the study done by Fuse (2010) which suggests that in Cambodia, Indonesia, and Philippines, women prefer to have more daughters than sons. It is also consistent with the literature that Southeast Asia is “historically considered gender egalitarian”, which makes gender preference in the region very different than in Eastern and Southern Asia, where greater gender inequality and
strong son preference are found. In recent years, however, economically successful
East Asian countries like Korea and Japan and Taiwan are witnessing the change
toward no gender preference of children by prospective parents.

Even though the country level data show that son preference does not prevail in the
four Southeast Asian countries of study, at the individual level, women who have
lower power in the household decision-making process tend to prefer a higher number
of sons; in this study, the household decision-making factor is measured by the
women’s involvement in decisions related to health, mobility and spending. The
relationship is statistically significant in Cambodia, Indonesia and Philippines, and
shows a negative but not significant association in Timor-Leste. This result is
consistent with previous studies on household decision-making and son preference in
East and South Asian countries which also found that higher level of women's
empowerment is often associated with lower son preference and vice versa (Das
Gupta et al. 2003, Li and Lavely 2003). The results suggest that in Southeast Asia,
women who have stronger son preference are often ones with lower power in the
household decision-making process. Surprisingly, son preference is not at all
associated with the education factor in any of the four countries. The labor force
participation factor is only significant in Philippines, where higher scores of labor
force participation are associated with lower son preference.

The interpretation that can be made from the results is that in Southeast Asia, son
preference is mostly associated with inside-the-household factors such as household
decision-making, rather than outside-the-household factors such as women’s
education and employment. Since the samples include only ever-married women, this
result suggests that son preference seems to depend on the actual power relation
between the woman and her partner in making decisions related to the household. The level of involvement of women in education and labor force does not necessarily comprise a direct power negotiation between the two sexes, while inside the household, if the woman does not have much power in the household decision-making process, it is likely that their partner is the one who makes most decisions in the process. When essential decisions such as the ability to decide to seek for health when sick, decisions on daily family spending, and decisions on when to visit family or relatives are made by the husband, the woman may feel like they have very little control over her life and realize that sons will have more power and freedom when they grow up while girls would end up powerless like her in her own household, which may explain a stronger preference for sons. Additionally, the socio-cultural context also plays a role in the women’s preference for sons. Women who are embedded in the patriarchal ideology that devalues girls would be more likely to prefer sons to daughters.

Previous studies have found that the bilateral and gender-equal family and kinship systems in Southeast Asia are closely associated with the more equal treatment of women (Skinner 1997, Blumberg 2015, Blumberg and Mee-Udon 2002). Even though this study mainly focuses on women's empowerment and how its factors affect the lack of son preference in Southeast Asia, it does not undermine the family and kinship systems that shape the daughter preference in the region.

In conclusion, my research on women’s empowerment in Southeast Asia has overcome the measurement and contextual obstacles that have often been cited in the literature. The index on women's empowerment has captured the actual level of empowerment of individual women efficiently, utilizing data from developing
countries, which is usually lack in current international indexes. It has also have a very broad application in more than 90 developing countries where data are available. My research has also found that women's empowerment factors are one of the keys in women’s fertility preference including the ideal number of children and their preference for sons. Most significantly, the results signifies that female labor force participation is the key in keeping fertility preference at a balanced level in the future, especially when rapid fertility decline happen even in developing countries. The study also finds that son preference among Southeast Asian women is more the result of the lower decision-making power inside the household rather than the results of outside-the-household factors such as women’s education and employment. Overall, women’s empowerment factors are influential in the fertility preferences of Southeast Asian women.

The issue of comparable data for measuring women’s empowerment in developing countries is frequently cited. Future studies, which apply the measurements developed in this study, can be a potential solution, using Demographic and Health Surveys Data in more than 90 developing countries where data are available. It is possible to have an internationally comparable index of women's empowerment at the individual level. Comparable research in developing countries should investigate if contraceptive use is still one of the factors which empowers women, or if it is no longer the case as usage is now much more widespread.

Future research can also look more closely at how female labor force participation is changing women’s fertility preference and actual fertility, especially in developing countries where female labor force participation can have very different meaning than in developed countries. Does female labor force participation moderate the correlation
between fertility preference and actual fertility? And as developing countries have been joining the global trend in fertility decline, will female labor force participation, as an aspect of women's empowerment, help prevent low and lowest-low fertility? Comparable data in South Asian countries, where the issue of son preference is currently most pressing, can also be used to examine if the level of power of the woman in the household is the most influential factor in the issue.

The literature suggests that the relationship between women's empowerment and fertility can go both ways. It means that higher level of women's empowerment can affect changes in fertility, but the decline in the preference for high fertility and son preference also leads to higher levels of women's empowerment. This research has only examined the one-way relationship from women's empowerment to fertility. Future research can definitely look into the reverse relationship, specifically, to what extent fertility impacts women's empowerment, to further postulate the two-way relationship.
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