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Explaining Variation in Contraceptive Prevalence Across Cambodia's Provinces

Elizabeth Bayer,
American University
School of International Service
BA, International Studies
General University Honors

Advisor:
Dr. Rachel Robinson

Abstract:

The Centers for Disease Control has declared family planning to be one of the ten greatest public health achievements in the 20th century. By reducing the number and increasing the spacing of pregnancies, family planning has led to increased infant and maternal survival. The resulting smaller family sizes have contributed to the social and economic empowerment of women. In Cambodia, the proportion of women practicing family planning has risen dramatically from just 13% in 1995 to 40% in 2005. However, contraceptive use varies greatly across Cambodia's provinces, from rates as low as 21.5% in Mondol Kiri and Rattanak Kiri to as high as 57.7% in Phnom Penh. This project seeks to explain this variation by examining the underlying determinants of contraceptive use. Using nationally-representative data from the Demographic and Health Surveys, I found that the level of unmet need for family planning and female literacy are the strongest predictors of contraceptive use. Though fear of side-effects is often cited as the main barrier to contraceptive use in Cambodia, I found that it was not a significant variable in predicting contraceptive use.

Introduction

The United States Centers for Disease Control and Prevention has declared family planning to be one of the ten greatest public health achievements of the 20th century.¹ By leading to smaller family sizes, family planning has contributed to increased child and maternal survival and the social and economic empowerment of women around the world.² The family planning program was first introduced in Cambodia in 1993, and since then, the proportion of women practicing family planning has risen dramatically from 13% in 1995 to 40% in 2005.³ However, contraceptive use varies greatly across Cambodia's twenty-four provinces, from rates as low as 21.5% in the sparsely populated, mountainous provinces of Mondol Kiri and Rattanak Kiri to as high as 57.7% in the urban Phnom Penh.⁴

This paper seeks to explain this variation by examining underlying determinants of contraceptive use. First, I examine Cambodia's background, fertility and family planning history, as well as a review of existing literature related to sexual and reproductive health in Cambodia. I use the literature on fertility decline and determinants of contraceptive use to develop a hypothesis that I test in the latter portion of this paper. To test my hypothesis, I use data from the Cambodia Demographic and Health Survey to seek an answer to the question "what explains variation in contraceptive across Cambodia's provinces?"

¹ The Centers for Disease Control and Prevention, "Achievements in Public Health, 1900-1999: Family Planning," *Morbidity and Mortality Weekly Report* 48, no. 47 (1999): 83.

² Ibid.

³ Directorate General for Health [Cambodia] and ORC Macro National Institute of Statistics (NIS), *Cambodia Demographic and Health Survey (CDHS)* (Phnom Penh, Cambodia, and Calverton, Maryland: NIS Directorate General for Health and ORC Macro, 2005), 83.

⁴ Ibid.

Background on Cambodia

From the ancient Kingdom of Angkor to their current struggles for sustainable development, Cambodia has a long and fascinating history. A small country in Southeast Asia, Cambodia is situated between Thailand, Vietnam, and Laos. Cambodia has a population of 15.1 million people,⁵ 78% of whom live in rural areas.⁶ The current annual population growth rate is about 1.6%, and projections show that there may be as many as 19 million people in 2025.⁷ Almost all Cambodians practice Buddhism, and more than 90% are ethnic Khmers, making the population religiously and ethnically homogenous.⁸

A major force in shaping Cambodia's recent history, demographics, and development has been the legacy of the Khmer Rouge. When the militant communist group took over the country in 1975, their brutal regime plunged the nation into a horrific four years that killed 1.7 million Cambodians—more than one-fifth of the entire population—and destroyed the infrastructure, government, and economy of the country.⁹ The government and the remaining Khmer Rouge rebels signed a peace agreement in 1991, and Cambodia's government and people have

⁵ "Demographic Highlights: Cambodia," Population Reference Bureau, http://www.prb.org/Datafinder/Geography/Summary.aspx?region=153®ion_type=2.

⁶ The World Bank, "Data by Country: Cambodia," The World Bank, <http://data.worldbank.org/country/cambodia>.

⁷ "Demographic Highlights: Cambodia."

⁸ The Central Intelligence Agency, "Cambodia," in *The World Factbook* (The Central Intelligence Agency, 2011).

⁹ "The Cambodian Genocide Program," Yale University, <http://www.yale.edu/cgp/index.html>.

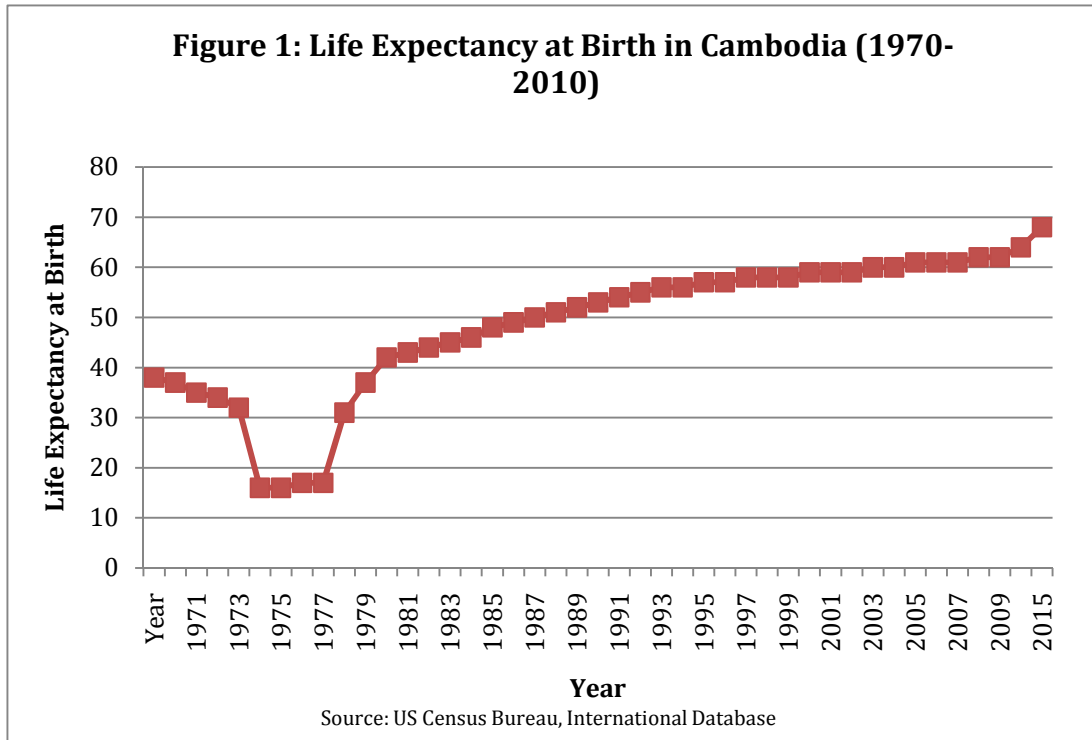
been trying to develop and move forward ever since.¹⁰ Some real progress has been made in last two decades. For example, Figure 1 illustrates the major gains in life expectancy made since the end of the Khmer Rouge regime. Right now, one of the primary goals of Cambodia's government and its foreign partners is to strengthen democracy and improve governance.¹¹

Despite government and foreign donors' efforts to rebuild and develop, Cambodia is still one of the poorest countries in the region. Cambodians still face numerous challenges: the country's Human Development Index is ranked 124 out of 169 in the world, meaning that many of the factors necessary for Cambodia's citizens to have a high quality of life are missing or deficient.¹²

¹⁰ The Central Intelligence Agency, "Cambodia."

¹¹ Ibid.

¹² Human Development Reports, "Human Development Index," (United Nations Development Programme, 2010).



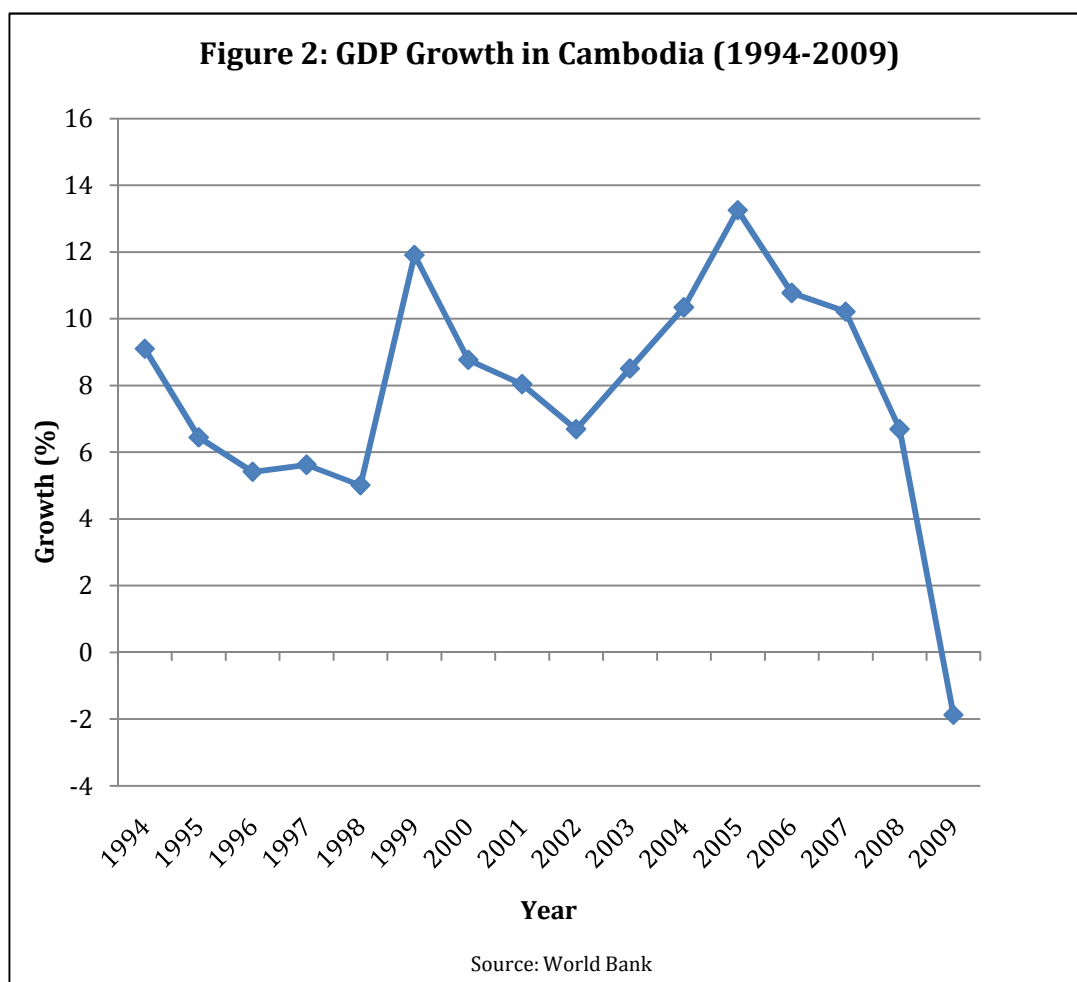
The Cambodian government is working to improve and expand economic opportunities for citizens, and, in fact, as seen in Figure 2, the economy grew rapidly during the mid-2000s, with growth rates between 5% and 10% per year.¹³ Because of the global economic downturn, growth slowed considerably in 2007 and 2008, and the country experienced negative growth of about -2% in 2009.¹⁴ It is believed that the economy did experience some positive growth in 2010, albeit at a slower pace than in previous years.¹⁵ Cambodia now has a GDP per capita of \$2000, and the government is working closely with the World Bank and other international

¹³ The, "Data by Country: Cambodia."

¹⁴ Ibid.

¹⁵ The Central Intelligence Agency, "Cambodia."

organizations to foster continued economic growth and strengthen the private sector.¹⁶

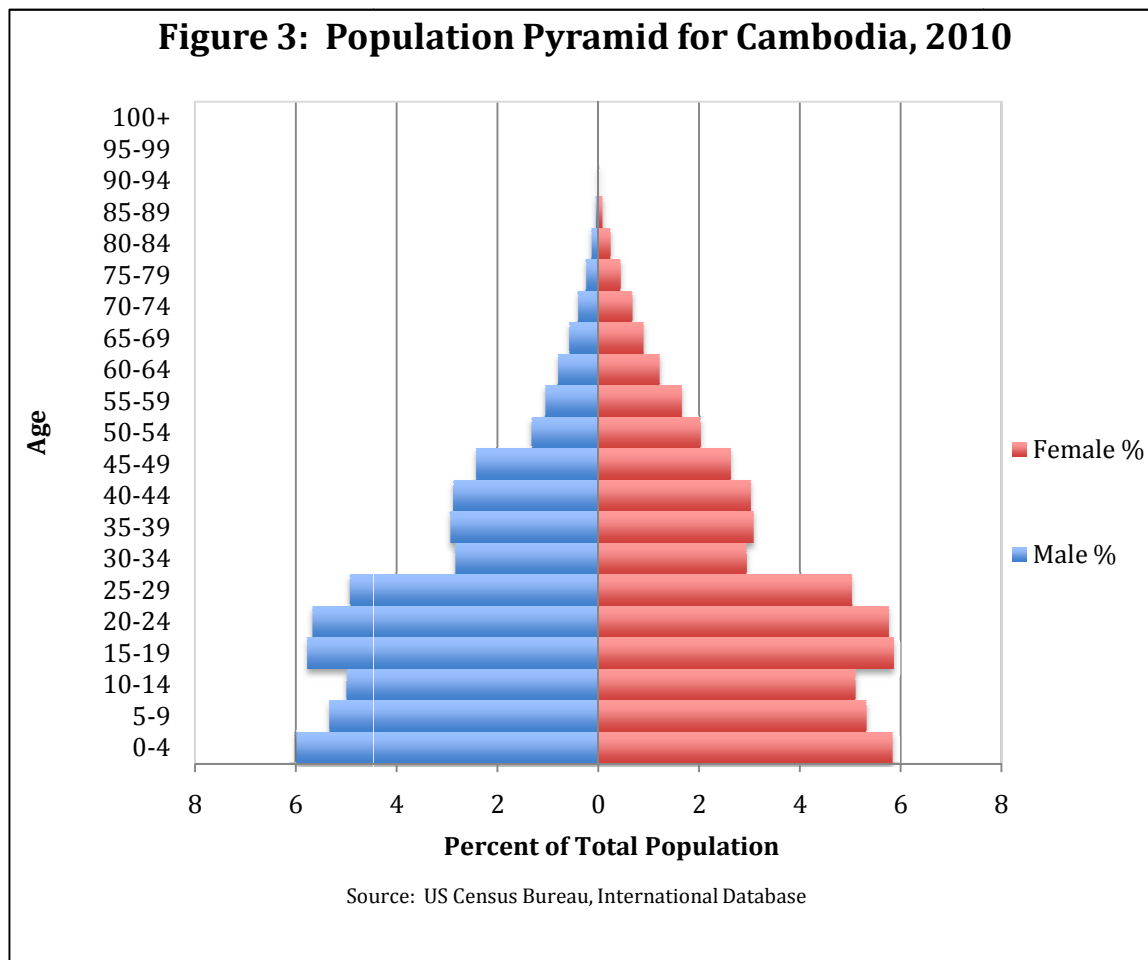


One of the most pressing economic and social issues facing Cambodia today is the country's youth bulge. As illustrated in Figure 3, more than half of the population of Cambodia is under 25 years old,¹⁷ and one-third is under 15 years

¹⁶ Ibid.

¹⁷ Ibid.

old.¹⁸ There is genuine concern among policymakers about the economy's ability to accommodate the education, employment, healthcare, and farmland needs all these young people both now and in the future.¹⁹ The Cambodian government is going to have to address the implications of the youth bulge very soon, particularly if they are hoping to find a way to effectively harness the demographic dividend to grow and expand their economy.



¹⁸ "Demographic Highlights: Cambodia."

¹⁹ The Kingdom of Cambodia, Royal Government of Cambodia, "The National Population Policy," (Phnom Penh 2003), 5-12.

Impact of the Khmer Rouge

Overcoming the legacy of the Khmer Rouge remains one of the major challenges impeding Cambodian development. Simply put, the Khmer Rouge was responsible for the deaths of millions of Cambodians; most sources estimate that approximately 1.7 million Cambodians died of execution, starvation, and disease during the Khmer Rouge's brutal regime.²⁰ The loss of more than one-fifth of the country's entire population²¹ has had long-term impacts on the country's population and development.²²

During the years of the Khmer Rouge regime, life expectancy plummeted to 16-17 years (Figure 1) and adult males, in particular, experienced extremely high mortality, seen in the steep drop in 30-24 year-old males in Figure 3. Due to hardship, disease, malnutrition, and a dearth of adult men, the total fertility rate dropped by almost two full children, which was immediately followed by a massive baby boom once the Khmer Rouge lost power in 1979, both of which are clearly visible in Figure 4.

The Khmer Rouge's destruction of the education system left a lasting mark on Cambodia. The Khmer Rouge targeted intellectuals for execution because they were perceived as a threat to the establishment of a perfect agricultural society.²³ The Khmer Rouge thus targeted policy officers, clergy, doctors, nurses, and

²⁰ "The Cambodian Genocide Program."

²¹ Ibid.

²² Damien De Walque, *The Long Term Legacy of the Khmer Rouge Period in Cambodia* (Geneva: The World Bank, 2004).

²³ Ibid., 6-8.

teachers.²⁴ During the Khmer Rouge's rule, no secondary schools operated in the entire country, and the few basic primary schools that remained open taught only agricultural skills.²⁵ By the time the Khmer Rouge were ousted in 1979, there were only a few hundred teachers left in the country, and an entire generation of young people, especially young men, were not educated.²⁶ By the time the government began to reconstruct the school system, most of these people were past school-aged and had missed their opportunity.²⁷

In addition to ups and downs in fertility rates, the Khmer Rouge also profoundly influenced population structure and marriage patterns in Cambodia.²⁸ The high levels of adult mortality coupled with the post-Khmer Rouge baby boom²⁹ and the resulting population momentum largely drive today's youth bulge.

Though they were ousted by the Vietnamese in 1979, the Khmer Rouge did not leave Cambodia, and more than a decade of instability, conflict, and civil war followed. The Khmer Rouge's destruction of the health care infrastructure combined with the instability and violence of the 1980s prevented the implementation of family planning until the early 1990s.³⁰ Even then, poor

²⁴ Ibid., 6.

²⁵ Ibid., 12.

²⁶ Ibid.

²⁷ Ibid.

²⁸ Ibid., 10-11.

²⁹ Ibid.

³⁰ Ghazaleh Samandari, Ilene S. Speizer, and Kathryn O'Connell, "The Role of Social Support and Parity on Contraceptive Use in Cambodia," *International Perspectives on Sexual and Reproductive Health* 36, no. 3 (2010): 122.

infrastructure hampered these early family planning programs³¹ and contributed to the country's high rates of maternal mortality, especially in rural areas.³²

Though they continue to grapple with the psychological, economic, social, and developmental impact of the Khmer Rouge regime, the Cambodian people and government have made considerable progress towards overcoming the Khmer Rouge's legacy. The success of the country's family planning programs is strongly tied to the government's ability to rebuild infrastructure, provide educational and economic opportunities to all Cambodian citizens, and grow the economy.

Fertility and Family Planning in Cambodia

Cambodia's past and current fertility trends, as well as its experiences with family planning programs, are an important precursor to observed provincial variation in contraceptive use. Family planning programs are relatively new to Cambodia. In 1991, after the Khmer Rouge rebels and the government of Cambodia signed a peace agreement, international non-governmental organizations made family planning services and modern contraceptive supplies available in Cambodia for the first time.³³ It wasn't until 1994 that, with the help of the United Nations Population Fund (UNFPA), the government of Cambodia launched its first family planning program.³⁴

³¹ Naomi Walston, *Country Analysis of Family Planning and HIV/AIDS Programs: Cambodia* (POLICY Project, 2005), 3.

³² Ibid.

³³ Walston, *Country Analysis of Family Planning and HIV/AIDS Programs: Cambodia*, 3.

³⁴ Ibid.

Southeast Asia has an average crude birth rate of 20 births/1,000 people and a total fertility rate (TFR) of 2.4 children per woman,³⁵ meaning that with a birth rate of 25 births/1,000 people and a total fertility rate of 3.3 children per woman, Cambodia's fertility indicators are above average for the region.³⁶ The high fertility rate has led to high levels of population growth; total population is growing at a rate of about 1.6%.³⁷ Fertility trends in Cambodia have changed dramatically in recent decades.

Cambodia is a signatory to the International Conference on Population and Development (ICPD), and the government released Cambodia's National Population Policy in 2003.³⁸ When the policy was released, Hun Sen, the nation's prime minister, stated that it will be "used by the Government of Cambodia to influence population and development dynamics to be more commensurate with socio-economic development and with natural and human resources available in Cambodia."³⁹ In order to help couples meet their reproductive goals, and to check the rapid population growth, the government of Cambodia identified seven policy measures that they wished to enact, including encouraging the promotion of gender equality and strengthening reproductive health and family planning services, especially in rural areas.⁴⁰ Despite their stated, and rather neo-Malthusian, desire to curb population growth, the government also ensured that the population policy

³⁵ "Data by Geography: Southeast Asia," Population Reference Bureau, <http://www.prb.org/Datafinder/Geography/MultiCompare.aspx?variables=85,93,104®ions=151>.

³⁶ "Demographic Highlights: Cambodia."

³⁷ Ibid.

³⁸ The Kingdom of Cambodia, "The National Population Policy," 16.

³⁹ Ibid., i.

⁴⁰ Ibid., 18-20.

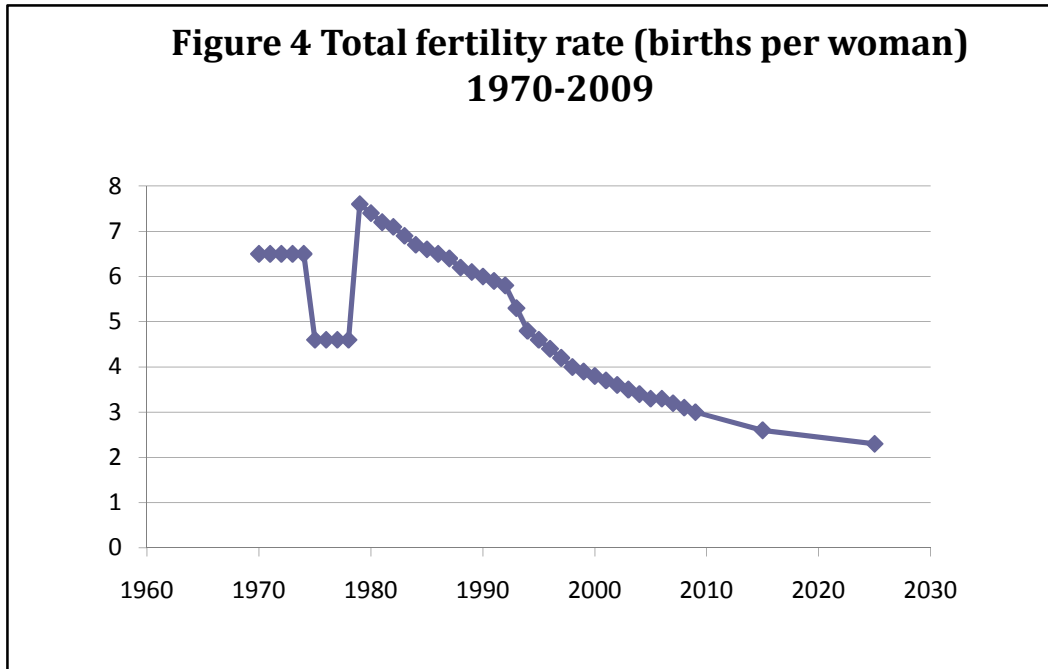
falls in line with the ICPD programme of action by reaffirming “its respect and support for the right for all couples and individuals to decide freely and responsibly on the number and spacing of their children, and to have access to the information, education, services, and means to do so.”⁴¹

Today’s total fertility rate (TFR) represents a dramatic change in Cambodia’s fertility trends. As evidenced in Figure 4, the total fertility rate has fallen considerably from 6.5 children per woman in 1970 to 3.3 children per woman today, even with a massive spike in fertility when the Khmer Rouge’s brutal regime fell in 1979. This decline in fertility is expected to continue, and with a projected total fertility rate as low as 2.3 children per woman for 2025.⁴² However, even with the country’s overall fertility decline, fertility levels vary greatly by province. While the TFR is 2.5 in the urban center of Phnom Penh, fertility has remained generally high at 5.3 children per woman in Mondol Kiri and Rattanak Kiri provinces, which are characterized by dense forest and mountains and are home to Cambodia’s few ethnic minorities.⁴³

⁴¹ Ibid., 16.

⁴² United States Census Bureau, International Database, "Cambodia," <http://www.census.gov/ipc/www/idb/country.php>.

⁴³ Ministry of Health Department of Planning and Health Information, the Reproductive Health Association of Cambodia, and Population Reference Bureau, "Recent Fertility and Family Planning Trends in Cambodia," <http://www.prb.org/Articles/2003/RecentFertilityandFamilyPlanningTrendsInCambodia.aspx>.



Source: US Census Bureau, International Database

Cambodia's fertility decline is largely due to the increased availability of contraceptives. Just 13% of married women practiced family planning in 1995,⁴⁴ but only ten years later in 2005, 40% of married women used some form of modern contraception.⁴⁵ As seen in Figure 5, daily pills and injectables are the most popular modern contraceptive methods.⁴⁶ Even with the availability of contraception, many women still turn to abortion to end unwanted pregnancies. In response to high levels of maternal mortality caused by unsafe abortion, Cambodia liberalized its abortion laws in 1997, making abortion broadly legal through the 12th week of

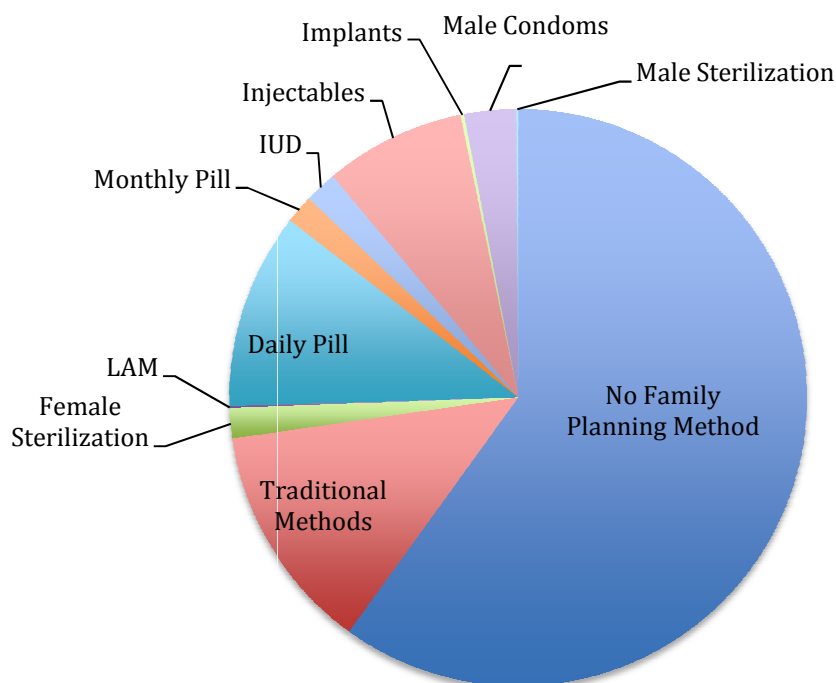
⁴⁴ Ibid.

⁴⁵ National Institute of Statistics (NIS), *Cambodia Demographic and Health Survey (CDHS)*, 83.

⁴⁶ Ibid., 83.

pregnancy, and stipulating that trained medical professionals in authorized medical facilities must perform abortions.⁴⁷

Figure 5: Methods of Contraceptive Among Married Women, Cambodia, 2005



Despite the rapid growth in contraceptive use, Cambodia still has one of the lowest contraceptive prevalence rates in Southeast Asia, where the average contraceptive prevalence rate is 60%.⁴⁸ In fact, 25.1% of women in Cambodia have expressed a desire to either limit or space their births but are not currently using family planning methods, the so-called level of unmet need for family planning.⁴⁹ If

⁴⁷Ibid., 73.

⁴⁸ "Data by Geography: Southeast Asia."

⁴⁹ National Institute of Statistics (NIS), *Cambodia Demographic and Health Survey (CDHS)*, 112.

that unmet need were filled, contraceptive use among married women would rise to an estimated 65%.⁵⁰ The lowest levels of unmet need, and the highest levels of contraceptive use, occur among women with more years of education and greater wealth.⁵¹

Although the Cambodian government has supported family planning with programs and policies,⁵² and although the National Population Policy claims that there is no organized opposition to family planning within the country, fertility is still a political issue in Cambodia. In particular, and especially because more than half of the population of is under 25 years old,⁵³ the government is very concerned about the effect of population growth on the country's economy.⁵⁴ The government is worried about the increased expenditures on education, health, and other social programs that this large youth population will require. In the country's National Population Policy, leaders expressed this concern by stating that the "high proportion of children and adolescents could slow down economic development and perpetuate low investment in education and health, which would lead to more unqualified adults and less productivity in the future."⁵⁵ Policymakers are also genuinely concern about the ability of the labor force to accommodate all these young people. In particular, the perceived connection between poverty and population size and structure has caused the national government to worry about increasing numbers of people engaged in subsistence agriculture, which they say

⁵⁰ Ibid.

⁵¹ Ibid., 83-84.

⁵² Walston, *Country Analysis of Family Planning and HIV/AIDS Programs: Cambodia*, 3.

⁵³ The Central Intelligence Agency, "Cambodia."

⁵⁴ The Kingdom of Cambodia, "The National Population Policy," 8.

⁵⁵ Ibid. 7.

does not contribute to the country's economic growth.⁵⁶ The government thus sees slowing population growth, via voluntary family planning, as an essential component to economic growth, and therefore, to the country's future prosperity.⁵⁷

In the last few decades, Cambodia has made substantial progress towards lowering fertility and increasing contraceptive use. The total fertility rate has dropped by more than three whole children since 1970,⁵⁸ and the unmet need for family planning has declined from 32.6% in 2000⁵⁹ to 25.1% in 2005.⁶⁰ And while the government's energies towards reducing fertility rates and population growth include a commitment to protecting reproductive rights, it is also apparent that the government hopes declining fertility and increasing contraceptive prevalence will continue and contribute positively to the economic growth of the country.

Theories of Fertility Transition

In order to better understand both fertility and contraceptive use in Cambodia, I will first explore the five major theories of fertility transition, as well as theories about the drivers of contraceptive use. Contraceptive use is one of the key proximate determinants of fertility,⁶¹ and has been a major driver of decline in the

⁵⁶ Ibid., iii.

⁵⁷ Ibid., 8.

⁵⁸ United States Census Bureau, "Cambodia."

⁵⁹ Department of Planning and Health Information, "Recent Fertility and Family Planning Trends in Cambodia."

⁶⁰ National Institute of Statistics (NIS), *Cambodia Demographic and Health Survey (CDHS)*, 83-84.

⁶¹ John Bongaarts, "The Fertility-Inhibiting Effects of the Intermediate Fertility Variables," *Studies in Family Planning* 13, no. 6/7 (1982).

country's TFR.⁶² Therefore, I next highlight key factors that influence the adoption of family planning and contraceptive use, which I later use to select key variables for my data analysis.

First, there is the classic demographic transition theory. Demographic transition theory holds that industrialization and modernization lead to declines in mortality, which are then followed by declines in fertility. The demographic transition is thus the shift from high rates of births and deaths to low rates of births and deaths.⁶³ The role of infant mortality is particularly important as is the premise that individuals' and couples' fertility goals are based on the desired total number of surviving children, rather than a desired total number of births.⁶⁴ Demographic transition theory thus attributes declines in fertility to increased expectations of infant and child survival that result from decreased infant and child mortality.⁶⁵

Second is Caldwell's theory of wealth flows. Caldwell claims that nucleation of the family, resulting from changing economies and cultural norms, reverses the flow of familial wealth.⁶⁶ In pre-industrial societies, which were largely agricultural, children contributed to the wealth of the whole family, including the parents, through labor. However, as the family grows smaller due to nucleation and children become less productive in industrialized settings, the children become the

⁶² Department of Planning and Health Information, "Recent Fertility and Family Planning Trends in Cambodia."

⁶³ Karen Oppenheim Mason, "Explaining Fertility Transitions," *Demography* 34, no. 4 (1997): 444.

⁶⁴ Ronald Lee, "The Demographic Transition: Three Centuries of Fundamental Change," *The Journal of Economic Perspectives* 17, no. 4 (2003): 174.

⁶⁵ Mason, "Explaining Fertility Transitions." 444.

⁶⁶ Ibid.

beneficiaries of family wealth rather than the parents. At this point, having children is no longer profitable for parents, and so they choose to have fewer children.⁶⁷

Next, there is Becker's neoclassical theory of microeconomics and fertility. This theory focuses primarily on the opportunity costs of having children. As incomes rise, the cost of an individual's time increases, while children become less economically productive. In the face of rising opportunity costs, couples choose whether to spend their time and money on children, or whether they would rather use their time and money on other pursuits.⁶⁸ As a result, couples choose to have fewer children, and invest in ensuring the quality over those children, though health care and education.⁶⁹

Easterlin's theory of fertility transition boils down to the basic economic concept of supply and demand. The supply of children is considered to be the number of children that a couple would have without any fertility control, whereas demand is the number of surviving children that couple actually wants to have.⁷⁰ It also factors in the costs of fertility regulation that a couple must weigh when trying to meet their own fertility demand.⁷¹ Before fertility transition, demand could be met with little or no control, while during and post-transition, meeting demand requires fertility controls.⁷²

⁶⁷ Ibid.

⁶⁸ Ibid.

⁶⁹ Ibid.

⁷⁰ Ibid., 445.

⁷¹ Ibid.

⁷² Ibid.

Lastly, Cleland and Wilson's theory of fertility transition, the ideational theory, focuses on the diffusion of innovations throughout society.⁷³ In particular, it emphasizes changes in cultural attitudes towards smaller family size and birth control, as well as the availability of contraceptive supplies and information. Couples must be willing and able to adopt fertility control measures before fertility begins to decline.⁷⁴ One of the primary ways that couples become willing and able to have fewer children is through observation of neighbors, friends, and community leaders. They see the benefits of smaller family sizes; these early adopters are better able to keep their children healthy and educated, and to conserve family wealth. Through these social interactions, people also learn more about how to control fertility, where to access family planning supplies, and how to use them.⁷⁵

Although none of these theories is universally agreed upon, collectively they highlight some important variables likely to influence contraceptive prevalence. In particular, they point to the importance of infant mortality, poverty, and knowledge of and access to contraception in fertility decline.

According to John Bongaarts, one of the four major proximate determinants of fertility is contraceptive prevalence.⁷⁶ But what causes women to begin to practice family planning? Scholars have identified a number of factors that contribute to contraceptive use, including women's education, empowerment and decision-making power, and socioeconomic status.

⁷³ Ibid.

⁷⁴ Ibid.

⁷⁵ Ibid.

⁷⁶ Bongaarts, "The Fertility-Inhibiting Effects of the Intermediate Fertility Variables."

Women's education is one of the most frequently cited factors that influences contraceptive use. Numerous studies have found that women with higher levels of education are more likely to adopt family planning.⁷⁷ In particular, women with higher levels of education are also better able to access information, including resources related to family planning.⁷⁸ The ICPD programme of action identified the education of women and girls as a key strategy to reduce fertility and empower women,⁷⁹ and it is widely believed that women with higher levels of education wish to have fewer children, and are thus more likely to adopt contraceptive use as a means to achieve their reproductive goals.⁸⁰

Decision-making power, especially as it relates to family planning decisions, is another factor that is consistently cited as having a positive effect on contraceptive use. Women who are able to independently make choices about family planning and contraceptive use are also women who are more likely to use contraception.⁸¹ Additionally, women who communicated frequently with their husbands about family planning and women whose husbands did not object to

⁷⁷ Deborah S. Degraff, Richard E. Bilsborrow, and David K. Guilkey, "Community-Level Determinants of Contraceptive Use in the Philippines: A Structural Analysis," *Demography* 34, no. 3 (1997); Christina and Daniele Vignoli Giusti, "Determinants of Contraceptive Use in Egypt: A Multilevel Approach," *Statistical Methods and Applications* 15(2006).

⁷⁸ Degraff, "Community-Level Determinants of Contraceptive Use in the Philippines: A Structural Analysis."

⁷⁹ John and Gavin W. Jones Knodel, "Post-Cairo Population Policy: Does Promoting Girls' Schooling Miss the Mark?," *Population and Development Review* 22, no. 4 (1996).

⁸⁰ Degraff, "Community-Level Determinants of Contraceptive Use in the Philippines: A Structural Analysis."

⁸¹ S. J. Jejeebhoy, "Convergence and Divergence in Spouses' Perspectives on Women's Autonomy in Rural India," *Studies in Family Planning* 33, no. 4 (2002).

family planning also had higher levels of contraceptive use.⁸² A study of women participating in micro-lending programs found they had higher levels of empowerment than their peers, that this empowerment was highly correlated with contraceptive use, and that communities with micro-lending programs have higher levels of contraceptive use than those that do not.⁸³ The literature all point to higher levels of women's empowerment and more decision-making power leading to higher levels of contraceptive use.⁸⁴

Another frequently cited determinant of contraceptive use is the socioeconomic status of women. Women with higher levels of wealth⁸⁵ and those who independently earn income also have higher levels of family planning adoption.⁸⁶ Women's socioeconomic status, autonomy, empowerment, and decision-making power do relate to and influence one another, but they all seem to have a positive impact on contraceptive use.⁸⁷

Scholarship on Sexual and Reproductive Health in Cambodia

⁸² Kofi Bismark Effah, "Demographic and Socioeconomic Determinants of Contraceptive Adoption in Sub-Saharan Africa" (Texas A&M University, 1999).

⁸³ Sidney Ruth Schuler, and Syed M. Hashemi, "Credit Programs, Women's Empowerment, and Contraceptive Use in Rural Bangladesh," *Studies in Family Planning* 25, no. 2 (1994).

⁸⁴ Giusti, "Determinants of Contraceptive Use in Egypt: A Multilevel Approach."; Schuler, "Credit Programs, Women's Empowerment, and Contraceptive Use in Rural Bangladesh."; Jejeebhoy, "Convergence and Divergence in Spouses' Perspectives on Women's Autonomy in Rural India."

⁸⁵ Giusti, "Determinants of Contraceptive Use in Egypt: A Multilevel Approach."; Ghazaleh Samandari, "Contraceptive Use in Cambodia: A Multi-Method Examination of Determinants and Barriers to Modern Contraception" (University of North Carolina, 2010).

⁸⁶ Schuler, "Credit Programs, Women's Empowerment, and Contraceptive Use in Rural Bangladesh."

⁸⁷ S. J. Jejeebhoy, "Convergence and Divergence in Spouses' Perspectives on Women's Autonomy in Rural India," *ibid.* 33, no. 4 (2002); Schuler, "Credit Programs, Women's Empowerment, and Contraceptive Use in Rural Bangladesh."

No existing scholarship has specifically attempted to explain variation in contraceptive use across Cambodia's provinces. The majority of scholarly work on the sexual and reproductive health of Cambodian women has focused on variation by method choice or reasons for non-use, and not by geography.

A number of papers have attempted to explain why women in Cambodia do not use modern contraceptives.⁸⁸ Using focus groups, these studies find that women are generally knowledgeable about family planning. Specifically, almost all women are aware of at least one family planning method, and most of them know where to access contraceptives. This research also found that women have strong preferences for particular methods: the pill and injectables are the most popular,⁸⁹ whereas condoms, despite the government and Population Services International's recent efforts to popularize them, remain the least popular.⁹⁰ Because of these strong method preferences, the authors of these studies conclude that limited method mix, especially in rural areas, may inhibit contraceptive use among those women who cannot access their preferred method.⁹¹

The literature on family planning in Cambodia suggests that the major barrier to contraceptive use is not cost or access, but fear of the side-effects, which

⁸⁸ OV Vathiny and KK Hourn. Reproductive Health Association of Cambodia, *Barriers to Contraceptive Use in Cambodia* (Kuala Lumpur, Malaysia: The Asia-Pacific Resource and Research Centre for Women (ARROW), 2009); Samandari, "The Role of Social Support and Parity on Contraceptive Use in Cambodia."; Vong Sreytouch, "Knowledge, Attitude and Practice (KAP) of Family Planning among Married Women in Banteay Meanchey, Cambodia," in *Ritsumeikan Journal of Asia Pacific Studies* (Ritsumeikan Centre for Asia Pacific Studies (RCAPS). 2010); Naomi Walston, *Cambodia: Family Planning Programs and HIV/AIDS Services, Results of Focus Group Discussions* (POLICY Project, 2005).

⁸⁹ Sreytouch, "Knowledge, Attitude and Practice (KAP) of Family Planning among Married Women in Banteay Meanchey, Cambodia," 108.

⁹⁰ Walston, *Cambodia: Family Planning Programs and HIV/AIDS Services, Results of Focus Group Discussions*, 2.

⁹¹ Walston, *Country Analysis of Family Planning and HIV/AIDS Programs: Cambodia*, 8.

many believe may include infertility.⁹² In particular, many women are misinformed about the effects of family planning on long-term fertility and overall health.⁹³ Husbands, family elders, and other women in their lives share stories about women who have had extreme reactions to different types of family planning, including infertility.⁹⁴ According to these studies, this misinformation and the fear it induces has become the greatest barrier to contraceptive use.

A number of these studies also focused on decision-making power regarding contraception.⁹⁵ In many cases, women themselves are not the decision-makers, but husbands, mothers-in-law, and other influential elders.⁹⁶ For example, one study found that women whose husbands had final decision-making power about contraception were less likely to use contraception than peers with greater levels of decision-making power.⁹⁷

Much of the other research about sexual and reproductive health in Cambodia has centered on HIV/AIDS or sex work. Many researchers have focused on lowering HIV transmission in the country, a problem largely concentrated in urban centers.⁹⁸ A study completed using data from the 2000 and 2005 Cambodia Demographic and Health Surveys found that HIV-related knowledge and behavior

⁹² Vathiny, *Barriers to Contraceptive Use in Cambodia*, 31; Sreytouch, "Knowledge, Attitude and Practice (KAP) of Family Planning among Married Women in Bantey Meanchey, Cambodia," 113; Samandari, "The Role of Social Support and Parity on Contraceptive Use in Cambodia," 123.

⁹³ Vathiny, *Barriers to Contraceptive Use in Cambodia*, 23-27.

⁹⁴ *Ibid.*, 26-27.

⁹⁵ Samandari, "The Role of Social Support and Parity on Contraceptive Use in Cambodia."

⁹⁶ Vathiny, *Barriers to Contraceptive Use in Cambodia*, 26-27.

⁹⁷ Samandari, "The Role of Social Support and Parity on Contraceptive Use in Cambodia," 125-82.

⁹⁸ Rathavuth and Vathany Chhea Hong, "Changes in HIV-Related Knowledge, Behaviors, and Sexual Practices among Cambodian Women from 2000 to 2005," *Journal of Women's Health* 18, no. 8 (2009).

improved over the five year period.⁹⁹ Between 2000 and 2005, knowledge of HIV transmission and prevention methods increased, as did the number of women who were tested for HIV, while negative attitudes towards people living with HIV declined,¹⁰⁰ suggesting that HIV outreach efforts are having some success with the general population.

There are also a number of studies focusing on the sexual and reproductive health needs Cambodian of sex workers.¹⁰¹ One of these studies found that while female sex workers in Cambodia are frequently targeted for prevention, treatment, and management of sexually transmitted infections, they often do not receive information or services related to other family planning needs.¹⁰² The study also found that female sex workers were less likely to visit family planning clinics or use contraceptive methods than their peers, despite having a clear need for family planning.¹⁰³

Much of the research on low contraceptive use among Cambodian women has used small focus groups and focused on limited geographic areas.¹⁰⁴ As a result, the needs and considerations of many different women, from different locations,

⁹⁹ Ibid.

¹⁰⁰ Ibid., 1282-1284.

¹⁰¹ Therese Delvaux, Francois Crabbe, Sopheap Seng, and Marie Laga, "The Need for Family Planning and Safe Abortion Services among Women Sex Workers Seeking STI Care in Cambodia," *Reproductive Health Matters* 11, no. 21 (2003); H. Sopheab, PH Gorbach, S Gloyd, and HB Leng, "Rural Sex Work in Cambodia: Work Characteristics, Risk Behaviors, HIV, and Syphilis," *Sexually Transmitted Infections* 79, no. 4 (2003).

¹⁰² Delvaux, "The Need for Family Planning and Safe Abortion Services among Women Sex Workers Seeking STI Care in Cambodia.", 89-93.

¹⁰³ Ibid., 91-93.

¹⁰⁴ Vathiny, *Barriers to Contraceptive Use in Cambodia*; Samandari, "The Role of Social Support and Parity on Contraceptive Use in Cambodia."; Sreytouch, "Knowledge, Attitude and Practice (KAP) of Family Planning among Married Women in Bantey Meanchey, Cambodia."; Walston, *Cambodia: Family Planning Programs and HIV/AIDS Services, Results of Focus Group Discussions*.

education levels, and socioeconomic statuses, haven't been accounted for.¹⁰⁵ Much of the other scholarship around sexual and reproductive health in Cambodia has concerned HIV/AIDS or sex workers, and while this is certainly valuable research, the average Cambodian woman doesn't have the same sexual and reproductive health needs as Cambodia's sex workers. Explaining why there is such variation in the contraceptive prevalence rate across Cambodia's provinces is important in order to develop policies and programs that better target women's family planning needs, so in the second half of this paper, I analyze provincial variation in contraceptive prevalence using the 2005 Cambodia Demographic and Health Survey.

Data Analysis

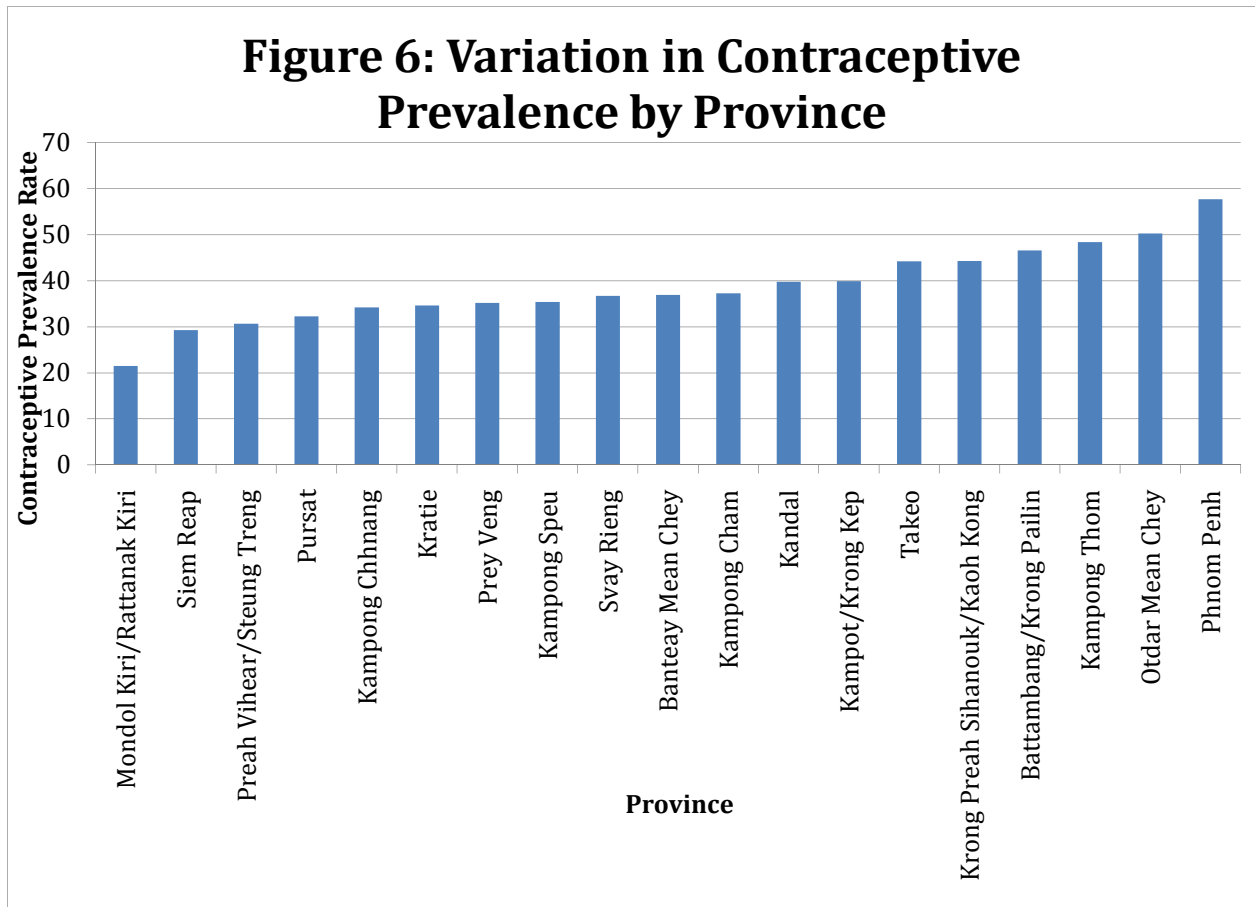
The positive impact of family planning on women's empowerment, child survival, family wealth, and national development are well documented.¹⁰⁶ Family planning programs have made significant progress in Cambodia over the last two decades, but that progress has been uneven, with contraceptive use varying greatly across Cambodia's provinces, as seen in Figure 6.

In order to explain this variation, I examined a number of key variables, including unmet need for contraception, knowledge of family planning, female literacy, media exposure, fear of side-effects, women's empowerment, infant

¹⁰⁵ G et al. Sedgh, "Women with an Unmet Need for Contraception in Developing Countries and Their Reasons for Not Using a Method," in *Occasional Report* (New York: Guttmacher Institute, 2007).

¹⁰⁶ John Cleland, et al., "Family Planning: The Unfinished Agenda," *The Lancet* 368(2006).

mortality, and poverty. I hypothesize that fear of side-effects will be strongly and negatively correlated with contraceptive prevalence. I also expect to find a strong negative correlation between unmet need for family planning and contraceptive prevalence.



Methodology

To test my hypothesis, I used data from the 2005 Cambodia Demographic and Health Survey (CDHS), the most recently available DHS survey for the country. The CDHS is a nationally representative household survey, containing data on population, family planning, nutrition, and other health indicators in Cambodia.

Based on the literature about determinants of contraceptive use and research on family planning in Cambodia, I chose to study the relationship of eight independent variables with contraceptive use. Generally, these variables measure women's education, women's empowerment, exposure to accurate information about family planning, infant mortality, and poverty. Specifically, these variables are: the percentage of women with an unmet need for family planning, the percentage of women not using contraception because they fear the side-effects or have health concerns, the percentage of women who are literate, the percentage of women who do not agree with any of four given reasons for a husband to beat his wife, the percentage of women who alone or jointly with their husband have final say in decisions about contraceptive use, the percentage of the population exposed to family planning messages through at least one media source, the infant mortality rate (which arguably influences fertility preferences), and the percentage of the population living in the country's lowest wealth quintile. Women's education is measured by literacy, while empowerment is measured by both opposition to wife beating and decision-making power. Exposure to accurate family planning information is measured by the percentage of women exposed to family planning messages in the media. Infant mortality and poverty are measured by the infant mortality rate and the percentage of the province's population in the country's lowest wealth quintile, respectively. The contraceptive prevalence rate among married women 15-49 years old served as my dependent variable to measure contraceptive use. In addition to my stated hypothesis, I also expect that I will find a positive relationship between contraceptive use and education, empowerment, and

knowledge of family planning, while I will find an inverse relationship between contraceptive use and infant mortality and poverty.

Unfortunately, I was not able to include several key variables I would have liked to analyze. In particular, the literature suggested that women have strong preferences when it comes to where they access health care, including family planning programs.¹⁰⁷ Many women have expressed a preference for private or NGO-operated clinics over the public clinics run by the government.¹⁰⁸ Had I been able to access comprehensive data about NGO projects, programs, and reach in each province, I would have been eager to see if, as I suspect, provinces with high concentrations of NGO clinics and programs are positively and strongly correlated with contraceptive use.

The second variable I would have included, were I able, is the variety of contraceptive methods available. As stated earlier, many women have expressed strong preferences for certain forms of contraception, and they particularly favor pills and injectables.¹⁰⁹ However HIV/AIDS programs have ensured that large numbers of male condoms are also available. Had I been able to find data about types of contraceptive supplies available at the provincial level, I would have liked to include this in my analysis. I am interested to know if different provinces have

¹⁰⁷ Sreytouch, "Knowledge, Attitude and Practice (KAP) of Family Planning among Married Women in Bantey Meanchey, Cambodia," 112; Walston, *Cambodia: Family Planning Programs and HIV/AIDS Services, Results of Focus Group Discussions*, 3.

¹⁰⁸ Walston, *Country Analysis of Family Planning and HIV/AIDS Programs: Cambodia*, 9.

¹⁰⁹ Walston, *Cambodia: Family Planning Programs and HIV/AIDS Services, Results of Focus Group Discussions*, 2; Sreytouch, "Knowledge, Attitude and Practice (KAP) of Family Planning among Married Women in Bantey Meanchey, Cambodia," 108.

higher concentrations of these desirable supplies, and if so, if these are also the provinces with the higher levels of contraceptive use.

The data used in this paper come from the CHDS and are measured at the level of the 24 provinces and municipalities that make up Cambodia. The final sample size is 19, because the CDHS combined the following provinces in their report: Battambang and Krong Pailin, Kampot and Krong Kep, Krong Preah Sihanouk and Kaoh Kong, Mondol Kiri and Rattanak Kiri, and Preah Vihear and Steung Treng. All the remaining provinces and the Phnom Penh municipality have individual data points for each variable used in this analysis

The data analysis methods used in this paper include univariate statistics for each variable, followed by bivariate correlations between the variables. Because I have a limited number of observations, I chose to select only a few independent variables so as to reduce high colinearity between independent variables. I created four models, which I then tested through multivariate linear regression.

This study does have a number of limitations. First, because the level of focus for this paper was provincial, there were a limited number of data points available, making the sample quite small. Having only 19 data points for each variable means that the results are easily influenced by outliers and that significant relationships may not be identified as such. Given that scatterplots indicate the absence of extreme outliers and that a number of variables remained significant in the multivariate regression, it seems unlikely that either of these drawbacks played a role. Additionally, the study relied heavily on data from the 2005 CDHS, and the

results of the 2010 CDHS may show a very different picture of contraception in Cambodia.

Results and Analysis

Cambodia's provinces show high levels of variation in all of the variables used in this paper. Some provinces have very high rates of female literacy, while some are extreme low; some provinces are wealthy, while others disproportionately consist of people from the poorest wealthy quintile. This variation is clearly illustrated in Table 1, which contains the univariate statistics for the variables used in this paper.

Table 1: Descriptive Statistics for Determinants of Contraceptive Use in Cambodia				
	Minimum	Maximum	Mean	Std. Deviation
Contraceptive prevalence rate (% of married women using contraception)	21.5	57.7	38.7	8.4
% of women with an unmet need for family planning	16.1	33.4	25.5	4.8
% of women not using contraception because they fear side-effects or have health concerns	13.1	43.5	26.5	9.4
% of women who are literate	33.0	87.0	65.2	12.8
% of women who do not agree with any of four reasons to justify a husband beating his wife	14.9	81.3	43.0	16.1
% of women who alone or jointly with husband have final say in decisions about contraceptive use	28.4	67.4	48.3	9.5
% of population exposed to family planning messages through at least one media source	28.7	93.7	71.4	18.4
Infant mortality rate (deaths to infants per 1000 live births)	42	122	89.4	18.9
% of the province's population in lowest wealth quintile	0.10	43.5	23.1	11.6
Valid N	19			

In order to better understand the relationship between these independent variables and contraceptive use, I first present bivariate correlations. Table 2 shows the correlation matrix for these variables. As I hypothesized, there is a strong negative relationship between the unmet need for family planning and the contraceptive prevalence rate. In other words, high levels of unmet need are associated with low levels of contraceptive use. This relationship can also be seen in Figure 7, a scatterplot showing the relationship between unmet need and contraceptive prevalence. The other variable most strongly correlated with contraceptive use is female literacy. There is a strong, positive relationship between the percentage of women who are literate and the contraceptive prevalence rate, as shown in Figure 8. Surprisingly, the other variable I predicted to have a strong, negative relationship with contraceptive use, fear of side-effects, does not have a statistically significant relationship with contraceptive use, although the relationship does have the predicted direction, as depicted in Figure 9.

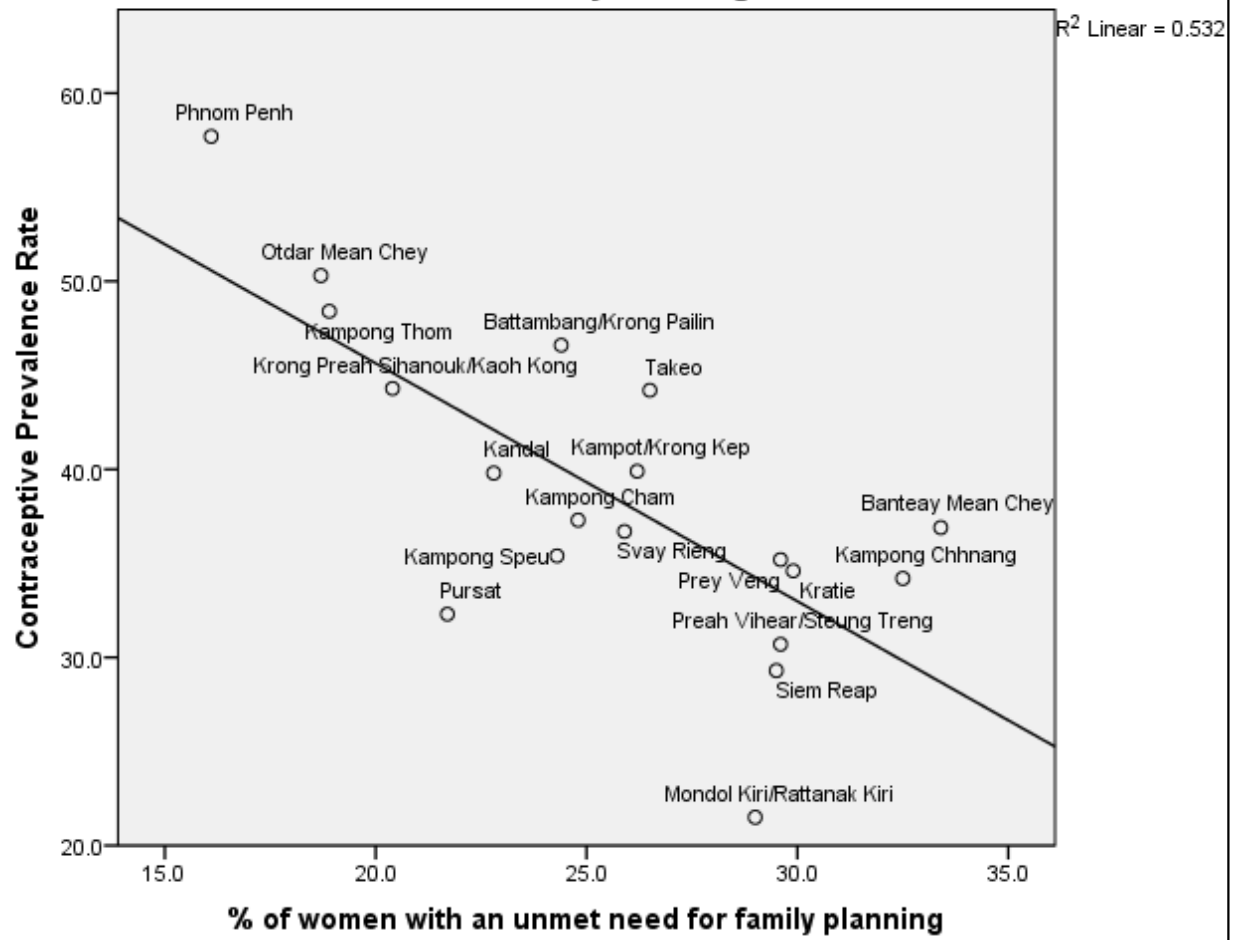
Table 2: Correlation Matrix for Determinants of Contraceptive Use									
	1	2	3	4	5	6	7	8	9
(1) Contraceptive Prevalence Rate	1								
(2) % of women with an unmet need for family planning	-0.73**	1							
(3) % of women not using contraception because they fear side-effects or have health concerns	-0.37	0.42	1						
(4) % of women who are literate	0.71**	-0.35	-0.06	1					
(5) % of women who do not agree with any of four reasons to justify a husband beating his wife	0.55*	-0.43	-0.31	0.30	1				
(6) % of women who alone or jointly with husband have final say in decisions about contraceptive use	0.55*	-0.54*	-0.65**	0.33	0.50*	1			
(7) % of population exposed to family planning messages through at least one media source	0.41	-0.27	-0.04	0.73**	-0.08	0.07	1		
(8) Infant Mortality Rate	-0.52*	0.33	0.13	-0.52*	-0.05	-0.23	-0.42	1	
(9) % of the province's population in lowest wealth quintile	-0.54*	0.41	0.30	-0.69**	-0.01	-0.40	-0.59**	0.55*	1

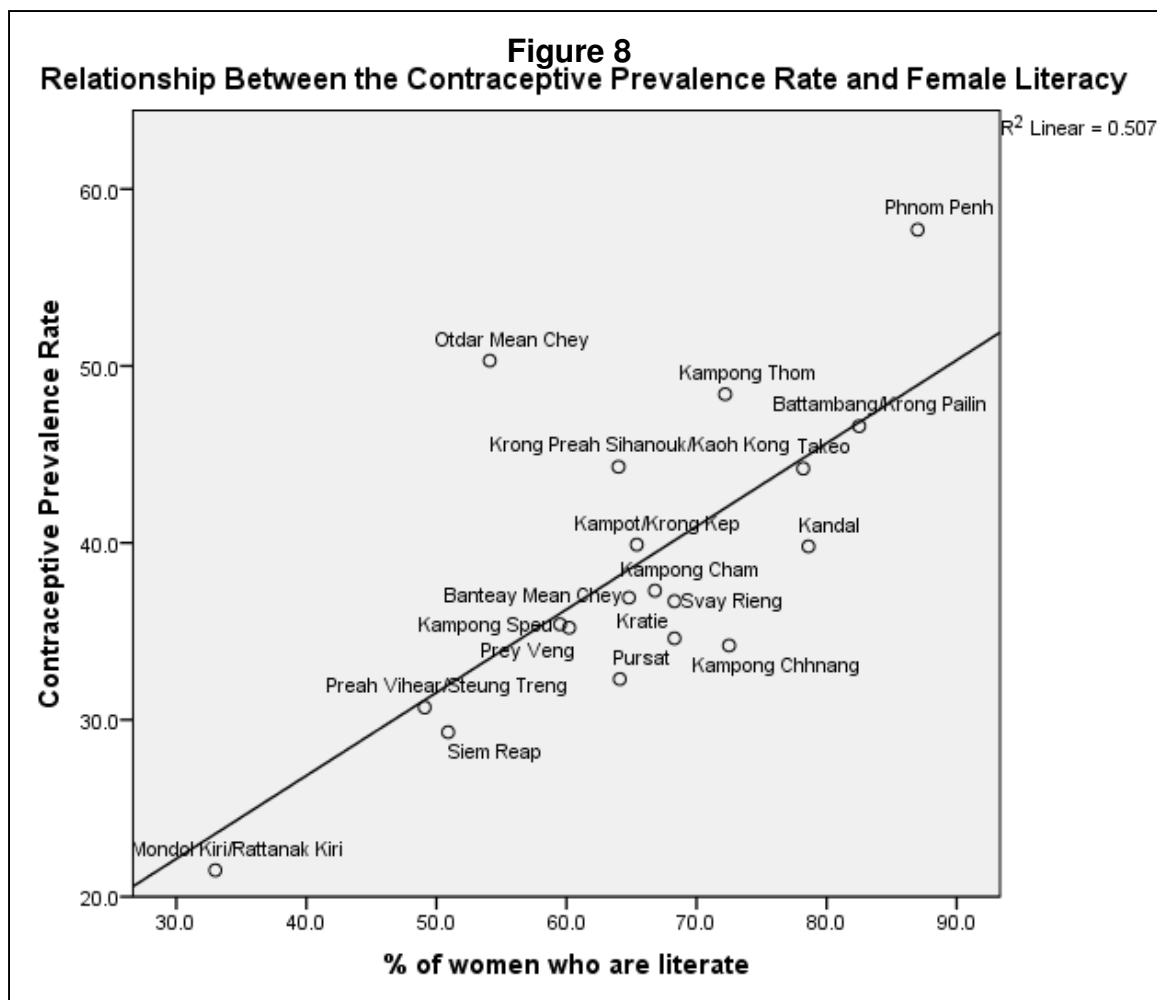
Note: *** = significance at $p < 0.001$ level

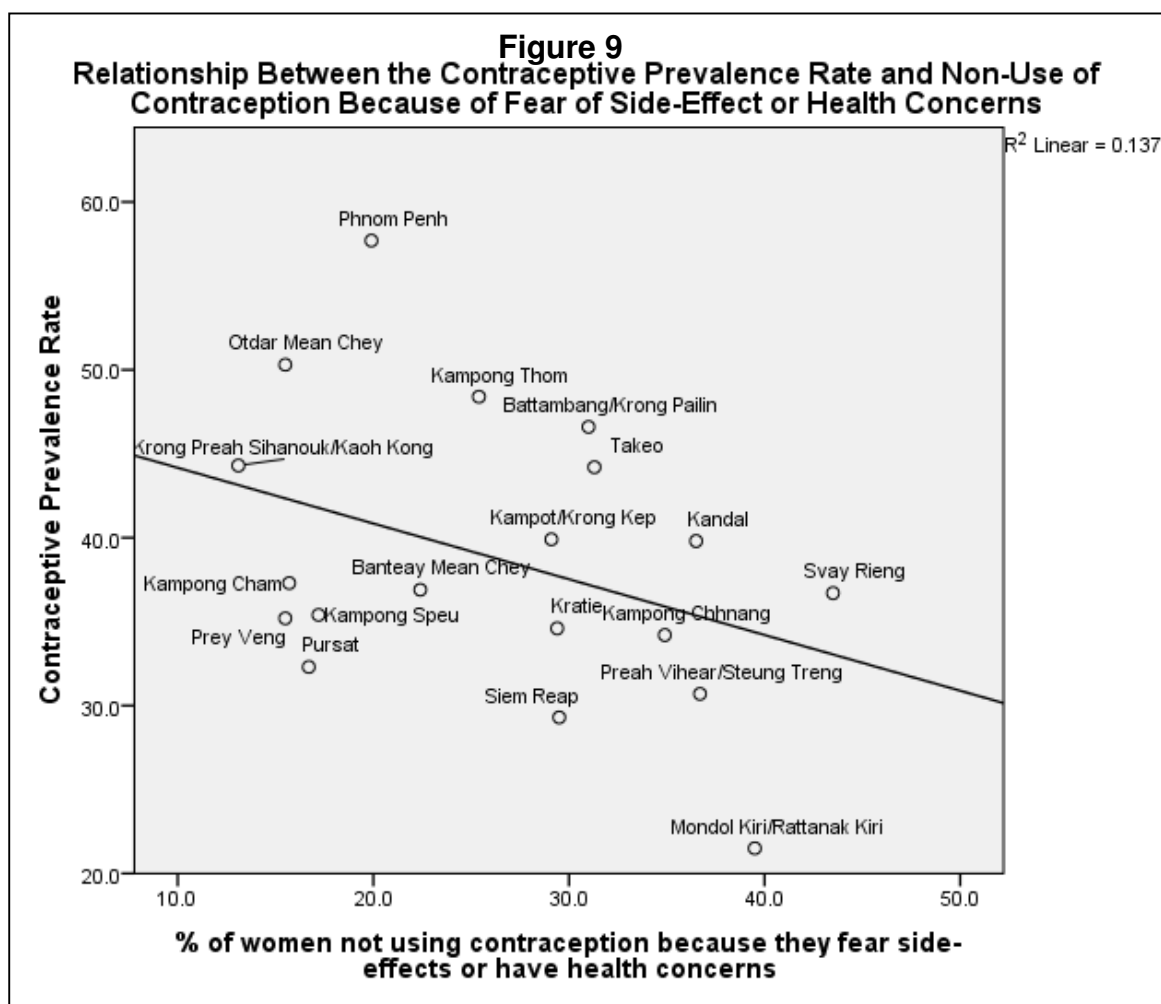
** = significance at $p < 0.01$ level

* = significance at $p < 0.05$ level

Figure 7
Relationship Between the Contraceptive Prevalence Rate and the Unmet Need for Family Planning







While unmet need for family planning and female literacy are the independent variables most strongly correlated with contraceptive use, the contraceptive prevalence rate also has significant correlations with empowerment, the infant mortality rate, and poverty. While still significant, these relationships are not as strong as the relationship between contraceptive use and unmet need for family planning or female literacy.

Using the results of the bivariate analysis, I identified independent variables that were strongly correlated with one another to leave out from the multivariate

linear regression models. As a result, I chose to use the percentage of women who do not agree with any of the four reasons for a husband to beat his wife as the variable that represented women's empowerment, rather than the percentage of women who alone or jointly had final say in decisions about contraceptive use, which was correlated with a number of other independent variables. I also eliminated the percentage of women who were exposed to family planning messages through at least one media source, because it was, perhaps unsurprisingly, very highly correlated with female literacy.

Female literacy was also moderately correlated with the infant mortality rate and poverty. However, because women's education, infant mortality, and poverty are all key variables in different theories of fertility decline, I decided to run different multivariate linear regression models including each variable separately so as to still be able to include these variables in the analysis.

All of the models included the unmet need for contraception and fear of side-effects because they are the variables I hypothesized would have the strongest relationship with contraceptive prevalence. All models also include the empowerment measure of opposition to wife beating, a variable with a moderately strong correlation with contraceptive use and no significant relationship with the other independent variables. Model 1 also includes literacy, the infant mortality rate, and poverty. Though these three variables are correlated with one another, I included them all in Model 1 to see how all the variables interact together. However, Models 2, 3, and 4 each only include one of those three variables. The results of these four models can be seen in Table 3.

Table 3: Multivariate Linear Regression Models Explaining Variation in Contraceptive Use Across Cambodia's Provinces				
Variable	Standardized Coefficients			
	Model 1	Model 2	Model 3	Model 4
% of women with an unmet need for family planning	-0.41*	-0.43**	-0.46*	-0.43*
% of women who are literate	0.46*	0.50**	----	----
% of women not using contraception because they fear side-effects or have health concerns	-0.10	-0.10	-0.03	0.04
% of women who do not agree with any of four reasons to justify a husband beating his wife	0.20	0.19	0.33	0.38*
Infant Mortality Rate	-0.16	----	-0.35*	----
% of the province's population in lowest wealth quintile	0.06	----	----	-0.36*
N	19	19	19	19
R ²	.825	.809	.710	.713
Adjusted R ²	.737	.755	.627	.632

Note: *** = significant at $p < 0.001$ level

** = significance at $p < 0.01$ level

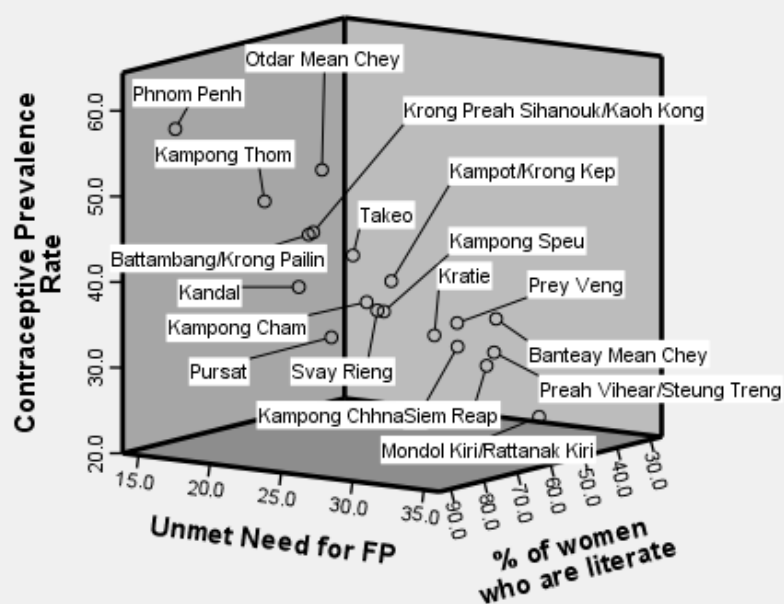
* = significance at $p < 0.05$ level

In all four models, the unmet need for family planning is significant, and the percentage of women who are literate is significant in both of the two models in which it is included. In none of the models does fear of side-effects become significant. Both the infant mortality rate and poverty only become significant in the

absence of female literacy, suggesting that women's literacy is also an underlying factor in infant mortality and poverty in Cambodia. And although it is moderately correlated with contraceptive use, opposition to wife beating only gained significance in the absence of both female literacy and infant mortality. I conclude that Model 2 is the best fit for this data, because infant mortality and poverty can be explained by literacy, and the adjusted r-square value of .755, which explains the greatest percentage of variation in the dependent variable.

The strong relationship between the contraceptive prevalence rate, the unmet need for family planning, and female literacy is clearly shown in the three-dimensional scatterplot in Figure 10. There data points show a clear pattern; as literacy increases and unmet need for family planning decreases, the contraceptive prevalence goes up. Illustrating the relationship between these variables, we see Mondol Kiri/Rattanak Kiri provinces, which have the lowest levels of literacy and contraceptive use, as well as the highest levels of unmet need, in the lower right-hand corner of the graph, while Phnom Penh, with the highest levels of literacy and contraceptive use and the lowest levels of unmet need for family planning rests in the upper left-hand corner of the graph.

Figure 10
Relationship Between Contraceptive Prevalence Rate, Unmet Need for Family Planning, and Female Literacy



Conclusion

Cambodia has made remarkable progress in family planning over the last two decades. Nation-wide, the contraceptive prevalence rate jumped from 13% in 1995¹¹⁰ to 40% in 2005.¹¹¹ However, contraceptive use is not uniform across the country. Using data from the Cambodia Demographic and Health Survey of 2005, I

¹¹⁰ Walston, *Country Analysis of Family Planning and HIV/AIDS Programs: Cambodia*, 3; *ibid.*

¹¹¹ National Institute of Statistics (NIS), *Cambodia Demographic and Health Survey (CDHS)*, 83.

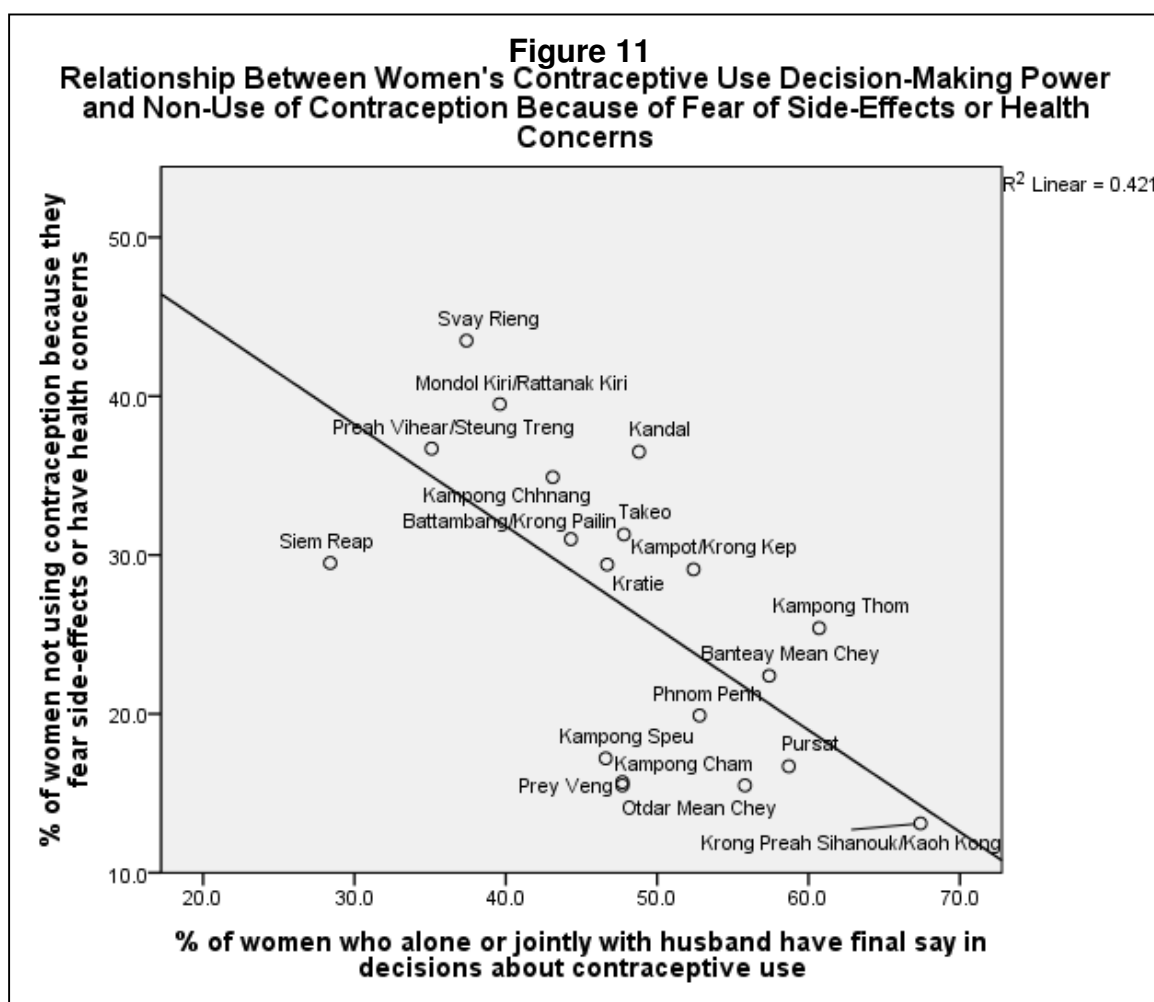
found that two variables—unmet need and female literacy—explain the majority of the variation in contraceptive use across provinces.

In addition I found that fear of side-effects was not significantly correlated with contraceptive use, and showed only a weak relationship. In none of the four multivariate regression models did this variable ever become significant. This was surprising because other research on family planning has consistently shown that misinformation about side-effects,¹¹² rumors of family planning causing infertility, and widespread fear of contraceptive methods' side effects are the main barrier to contraceptive use in Cambodia.¹¹³ Therefore, I had expected to find that high proportions of nonuse due to fear of side-effects would have a much stronger relationship with overall contraceptive prevalence.

While I did not find the relationship I had predicted with the contraceptive prevalence rate, fear of side-effects was strongly correlated with empowerment, which can be seen in the correlation matrix in Table 2, as well as in Figure 11.

¹¹² Sreytouch, "Knowledge, Attitude and Practice (KAP) of Family Planning among Married Women in Bantey Meanchey, Cambodia," 113.

¹¹³ Vathiny, *Barriers to Contraceptive Use in Cambodia*, 31.



As Figure 11 clearly illustrates, there is a strong negative relationship between these two variables: in provinces where high percentages of women have decision-making power over their contraceptive use, there are also a smaller proportion of women who are not using contraception because they are afraid of side-effects or have health concerns. This finding suggests that it is not the women themselves who are as afraid of side-effects or have health concerns, but rather the

other decision-makers in their lives. If this is the case, then there is a real need to target family planning education not only at married women of childbearing age, but also at her family members and important community figures.

Similarly, the results of this project also suggest a continued need to expand access to education for women across the country, particularly in rural areas. Because of the strong negative relationship between the contraceptive prevalence rate and the unmet need for family planning, further study is needed to understand what is preventing women with a need for family planning from accessing contraceptive supplies and commodities. Previous research suggests that knowledge about family planning is almost universal in Cambodia (with the exception of Mondol Kiri and Rattanak Kiri provinces).¹¹⁴ So if women know about family planning, it's important to identify what the barriers are that keep women from accessing family planning. Is it cost, misinformation about side-effects, lack of access to preferred family planning methods, family members' opposition, or lack of knowledge about family planning? The answers may differ from province to province, as this study has shown that there is a diverse range of family planning experiences across the country, but identifying and addressing these barriers will help to increase contraceptive use across the country through tailored programs that meet the needs of individual provinces, especially those that currently have low contraceptive prevalence rates.

This study draws attention to several key issues that policy-makers and family planning program implementers can address. In particular, the relationship

¹¹⁴ National Institute of Statistics (NIS), *Cambodia Demographic and Health Survey (CDHS)*, 80.

between female literacy and contraceptive use highlights the importance of expanding educational opportunities for women in Cambodia. It also brings to light the need to better understand and eliminate the barriers that keep women who wish to delay or prevent childbearing from using family planning.

Hopefully, with the release of the 2010 CDHS we will see that contraceptive use has increased across many provinces of Cambodia, but in the meantime, this paper has identified a number of steps that the government of Cambodia, NGOs, and other family planning programmers can take to work towards increasing the practice of family planning.

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