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Socio-economic Determinants of Fertility and Female Labor Force Participation in the Philippines

- Investigating Continuities and Discontinuities Using Survey Data Between 1993 and 2008

Course: *Master Thesis - EKHR 51*

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Abstract

Socio-economic variables substantially determine fertility behavior and female labor force participation. Temporal fluctuations in socio-economic determinants of fertility and female labor force participation seem inevitable since they are subject to societal developments in the Philippines. Examining socio-economic variables over time contributes to an enhanced understanding of the current status and exerted influence by those variables, and thus provides an opportunity to intervene in fertility development. In this study a multivariate linear regression is used to analyze the socio-economic determinants of completed fertility and a binary logistic regression in order to investigate the effect of socio-economic variables on female labor force participation. Both regression analyses are based on empirical data from the Demographic and Health Surveys in 1993, 1998, 2003 and 2008 in the Philippines. Secondary and higher educational attainment of females and males is identified as main determinant for the fertility decline in the considered period. Among Philippine women with at least four children, the chances of labor participation diminished noticeably. Prospective research should have the objective to provide an adequate variable for the financial background of the analyzed individuals in order to allow for precise evaluations of its impact on fertility behavior.

Key words: Fertility , socio-economic determinants, education, place of residence, contraception, female labor force participation, Philippines

Table of Contents

List of Figures

List of Tables

1 Introduction

1.1 Research Problem

"The current estimated average increase of population, about 3.5 percent per annum, will double the population in just under 20 years. Thus, if present trends continue, the Philippines which counted with only 10 million persons in 1918, will have to provide for over 53 millions in 1980, and for about 111 millions by the year 2000"
(Concepción & Flieger 1968, 714).

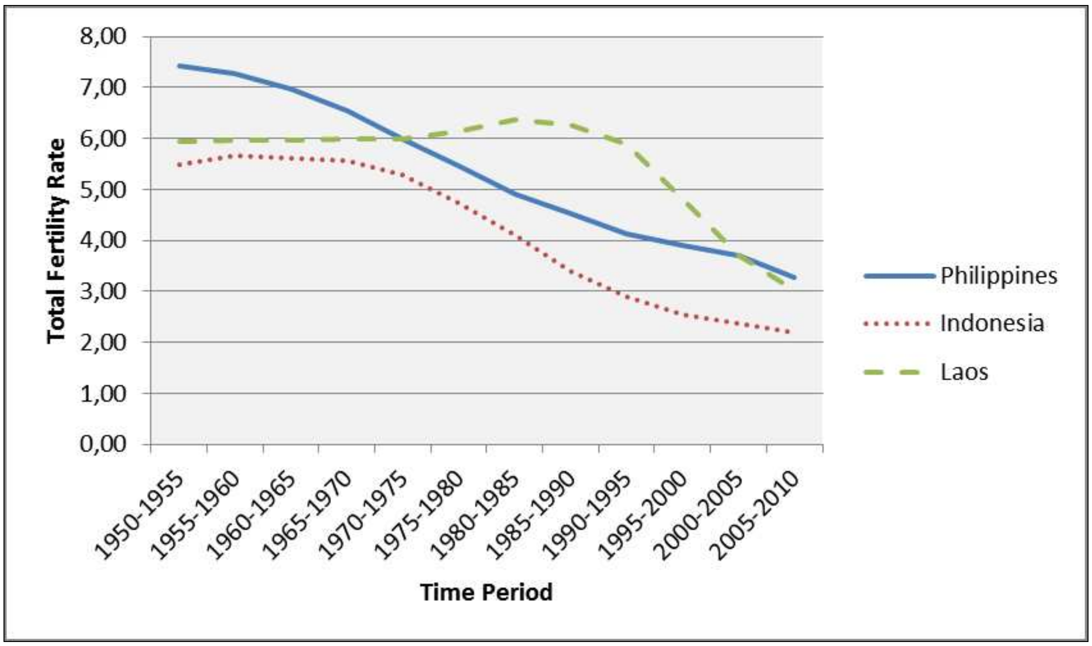
However, the Philippine population trend displayed by Concepción and Flieger in 1968 has left the path for substantial population growth. Although the total population of the Philippines in 1980 is relatively close to Concepción and Flieger's projection with slightly more than 47 million people, just twenty years later in 2000, the figures differ clearly with 77.3 million individuals. In the year 2010, the total population issued by the UN Population Division falls with 93.3 million people even distinctively below the projected 111 million in the year 2000 (UN 2012).

Apart from mortality and migration, fertility is the driving force of (national) population dynamics. Similar to other countries in South-East Asia, Philippine cohorts have experienced a continuous decline in fertility during the last decades.

According to United Nations (2011) data, the Total Fertility Rate (TFR) in the Philippines dropped remarkably from 7.27 during the period of 1955-1960 to 3.27 children per woman of childbearing age during the period of 2005-2010 – a 4.0 drop in just 50 years (see Figure 1). Due to this dramatic development, the research question of the thesis is to investigate selected socio-economic variables in their dynamic and impact on fertility behavior and female labor force participation in the period from 1993 to 2008 – the time frame the Demographic and Health Surveys (DHS) for the Philippines provide consistent data.

While the wish to exert influence on fertility behavior might be as old as fertility decline itself, the need for research on the subject is inevitable and of extreme importance considering the fact that the UN projects a TFR of 2.06 for the Philippines already in 2050-2055. Reaching the threshold value of a TFR lower than 2.1, the Philippines will be confronted with a shrinking population, and thus with serious consequences in various social spheres. With a TFR below replacement level, changes in the age structure of the Philippine population are forthcoming to increase the share of elderly individuals, most likely accompanied by negative consequences for growth processes in technology, human capital, national institutions as well as governance, among others. It would therefore only be natural to examine in detail the recent socio-economic determinants of fertility in order to have the possibility for an exertion of influence. Likewise, the short time span until reaching a TFR below 2.1 reflects the rapid changes in fertility behavior which are nowadays usually observable in developing countries (UN 2012).

Figure 1: TFR in the Philippines, Indonesia and Laos from 1950-1955 to 2005-2010



Source: UN 2012

A number of substantial arguments were presented by researchers in the past in order to depict as well as to understand important socio-economic determinants which might have contributed to the developments in fertility behavior. Among those factors frequently described are economic progress, mass communications, programs of public health and curative medicine and their consequences on social changes as well as educational attainment (e.g. Orbeta 2005, Regassa 2007, Adhikari 2010, Mekonnen et al. 2011).

In order to understand the processes of fertility transition and the underlying socio-economic determinants, it is inevitable to comprehend global transformations which evolved in the aftermath of the Industrial Revolution with its abundant technological innovations and the massive accumulation of investment capital. During a time span of 130 years (from 1820 to 1950) the global gross domestic product (GDP) increased eightfold, when extended by another 50 years, the GDP rose 54 times. Among the concomitants of rising wealth and scientific knowledge diminishing death rates emerge. Whereas Western Europe experienced a life expectancy of 50 years and an infant mortality rate of 100 per 1000 births in the early twentieth century, this took most parts of Asia at least an additional 50 years. Due to the increasing circulation of goods on the international market, the previously common subsistence production made way for a monetized economy. Henceforth, money and the earning as well as possession of the like, embodies the choice about real expenditures, and thus about raising more children or alternative consumption. Since industrial production demands additional non-agricultural workforce, the numbers of factory production workers are increased. Simultaneously, methods of industrialization conquer the farming sector which ultimately reduces the agricultural workforce. Hence, large quantities of individuals migrate to urban areas where they not only become workers in the secondary as well as tertiary sectors, but are also exposed to new social norms. Virtually universal education establishes in industrialized countries in order to supply skilled and educated workers to boost industrial development. Universal education induces the convergence of gender gaps in literacy, and additionally large numbers of women and mothers commence to participate in the workforce. Introducing educational systems implies "[...] a preparation for work outside the home, partly because attractive consumption goods were on offer on an unprecedented scale, and partly because smaller family size rendered working and child-raising more compatible" (Caldwell and Caldwell 2005, 33). Since child-raising and work participation in reality are not as compatible as assumed, family size declines further. An important contribution to fertility reductions in Asia might have also accomplished chain of consumption which began once with color TV's and ended with cars, while the real per capita earnings were substantially lower than in developed countries. Moreover, Asia was in favor of contraception methods which became established by national family planning programs, such as the Family Planning Association of the Philippines (FPAP), founded in 1965, to promote the utilization and to facilitate the supply of contraceptives. Only in the 1960s, when contraceptives such as the birth control pill or the intrauterine device (IUD) became available in large numbers, did programs exert their effect on fertility behavior on a broad scale. Due to the diffusion of education, children depart for nonfarm jobs and receive more independence than ever before. In addition, gender role models within households softened which may have had consequences on Asian family traditions substituting for the state in family care situations. Stability losses also occur in dramatic changes in female marriage ages which are frequently accompanied by reductions in age gaps between spouses. Furthermore, there seems to be empirical evidence that a significant proportion of young adult females are never going to marry (Feeney 1994, 1518-1520; Hidalgo 1999, 191; Caldwell and Caldwell 2005, 32-34).

Although the brief historical excursion above does not conform to precision standards, the social as well as economic changes in (Asian) societies and the ongoing dynamics shaping fertility developments should have become comprehensible. The deviating population projection indicated by Conceptión and Flieger (1968) confirms the importance of monitoring fertility behavior on a regular basis. In respect to a historical perspective, it is moreover of special interest to examine whether the frequently mentioned socio-economic determinants still have the power and impact they were attributed with several decades ago.

The Philippines by itself has several outstanding societal characteristics which generate a unique setting for the examination of the socio-economic determinants of fertility as well as female labor force participation. Firstly, the Philippines have a relatively highly educated population aged 25 years and older (UIS 2012, 231) compared to other developing countries in the region. Secondly, there are rather profound inequalities in the distribution of income among individuals or households within Philippine society. In the year 2009, the Gini index amounted to a value of 0.43 (World Bank 2012), with 0 indicating complete equality and 1 complete inequality. Finally, in 2009, a total of 8,579,378 Filipinos (POEA 2012) were employed as oversea contract workers which may have particular consequences on fertility development on account of remittance transfers or temporal interruptions of partnerships.

1.2 Aim and Scope

In this section the central aim of the thesis as well as the research question are presented. Furthermore, diverse limitations in terms of the considered period and area are shown.

As indicated above, continuous social and economic dynamics affect the development of fertility behavior, for the time being especially in developing countries. Within the scope of the thesis a multivariate linear as well as a logistic regression will be applied in order to demonstrate the impact of selected socio-economic determinants on the completed number of children ever born (CEB) to females in the Philippines. In addition, a logistic regression will be utilized for the aim to measure the effect of diverse socio-economic variables, in particular fertility, on female labor force participation in the Philippines.

With respect to the temporal approach, four Demographic and Health Surveys (DHS) from 1993, 1998, 2003 and 2008 will provide the essential data which serves the aim of evaluating and validating socio-economic determinants over (a relatively limited) period of time. In the past the impact of several socio-economic determinants was debated and shown empirically, e.g. by Retherford et al. (2009) for the Philippines. However, frequently a different methodological approach, a differing selection and number of socio-economic variables or merely one survey at a time were examined in particular for the Philippines.

The research questions are:

- *Is it possible to identify among the selected socio-economic variables a major driving force for the fertility decline in the Philippines within the considered period? To what extent, does the presence of children effect female labor force participation? Moreover, is the existence of the significant socio-economic variables consistent over time or more likely to fluctuate? And finally, which inferences can be made about the magnitude of the most significant socio-economic coefficients in a temporal comparison?*

1.3 Outline of the Thesis

The thesis has been organized in the following way. In chapter 2 the reader becomes familiarized with geographic, historic, demographic and economic aspects about the country, before previously performed research is presented. Furthermore, chapter 2 contains major theoretical approaches to fertility decline as well as the research hypotheses. Before providing information about the sample, chapter 3 conveys details about the source material. Chapter 4 has been divided into three sections. The first section deals with the statistical approach. The second section defines the utilized variables. The third section displays the variables introduced into econometric equations. After presenting the results of the empirical analysis for the four different surveys, chapter 5 closes with the discussion of the most important findings. The last chapter, which provides the conclusion, will be split into two parts. Part one draws general inferences of the study, while part two attempts to give an overview of the issue for further research.

2 Background

2.1 Country Profile

The intention of this section is to provide the reader with geographic, historic, demographic and economic information about the Philippines in order to convey a picture as comprehensive as possible for the ensuing analytical consideration.

With respect to geographical matters, the archipelago of the Philippines (coordinates 13 00 N, 122 00 E) is located in Southeastern Asia between the Philippine Sea and the South China Sea, east of Vietnam. Having no land boundaries, the archipelago consists of 7,107 islands with a land and water area of 298,170 sq km and 1,830 sq km, respectively. Among frequently occurring natural resources are *inter alia* timber, petroleum, nickel, silver and copper. The climate is from November to April tropical marine and monsoons are common in the northwest. Between May and October the monsoons are more frequent in the southwest of the Philippines. In 2005, arable land accounted for 19 percent and permanent crops for roughly 17 percent. Current major environmental problems comprise arbitrary deforestation particularly in watershed areas, soil erosion as well as air and water pollution in urban areas (CIA 2012).

Before being ceded to the US in 1898, the Philippine Islands were a Spanish colony since 1542. While in 1935 receiving the status of a self-governing commonwealth, World War II was associated with Japanese occupation. In 1944, Americans and Filipinos joint forces in order to combat the occupants. As a consequence, the Republic of the Philippines was declared on 4 July 1946. After ruling for more than 20 years, Ferdinand Marcos was forced into exile in 1986 and substituted by Corazon Aquino as head of state. Incapable to provide political stability and economic development for the country, Fidel Ramos followed Corazon Aquino as elected president in 1992. His period as president is accompanied by more political stability and economic progress, in general. His successor Joseph Estrada became president six years later, in 1998. Prone to corruption, his resignation is demanded and Gloria Macapagal-Arroyo, the former vice president, assumes the presidency in 2004. Although corruption allegations appear again, the absence of an economic contraction in context with the 2008 global financial crisis extends her presidency gradually. In May 2010 Benigno Aquino III is elected president for a six-year term. Continuously, the Philippine government faces threats by militant groups and insurgents, especially from the Southern Philippines. Moreover, the archipelago encounters tensions with China regarding disputed territorial claims in the South China Sea (CIA 2012).

In the period between 1980 and 2010 (merely 30 years) the total population of the Philippines nearly doubled. Table 1 gives an overview about important demographic indicators for the Philippines, based on data from the United Nations (UN) Population Division.

Table 1: Population indicators Philippines

Indicator	1980	2010
Total population	47,064,000	93, 261,000
Population density (per square km)	157 people	311 people
Age structure 0-14 years	43.3 percent	35.4 percent
Age structure 15-64 years	53.5 percent	60.9 percent
Age structure 65 years and over	3.2 percent	3.6 percent
Total median age	18.0 years	22.2 years
Life expectancy at birth both sexes	63.7 years	69.2 years
Life expectancy at birth males	61.4 years	66.0 years
Life expectancy at birth females	66.2 years	72.6 years
Population growth rate[a]	2.77 percent	1.73 percent
Women aged 15-49	10,905 thousands	23,873 thousands
Infant mortality rate (per 1,000 live births)[a, b]	45.2	23.0
Total dependency ratio	87	64

Notes: a) Indicator period average 1980-1985 and 2005-2010 respectively
b) Both sexes combined
Source: UN 2012

According to Table 1, the total dependency ratio amounted to 64 in the Philippines in 2010. The ratio represents the sum of the number of young (under 15 years) and the number of elderly people (aged 65 and over), compared to the number of people of working age (15-64 years old). Assuming that individuals below age 15 and above age 65 are in general economically inactive, then represents a higher number (to 100), that less people contribute to tax revenues and instead more people need financial support. In 2010, the urbanized population amounted 49 percent of the total population. Estimations for 2012 indicate that the net migration rate equals -1.27 per 1,000 individuals. Among the major populated cities in 2009 were: Manila (the capital) with 11.5 million inhabitants, Davao with 1.48 million people and Cebu City as well as Zamboanga with nearly 850,000 residents. While the health expenditures corresponded to 3.8 percent of GDP in 2009, the education expenditures totaled 2.8 percent of GDP in 2008. Besides, among individuals aged 15 and above, 92.6 percent of the total population can read and write. The literacy among females was 92,7 percent and 92.5 percent for males. With regard to the youth unemployment rate (ages 15-24), 17.4 percent of young adults had no employment in 2009 (CIA 2012).

During a period of less than ten years, between 2000 and 2009, the gross domestic product has more than doubled, to 160,676 million US$. Table 2 displays economic indicators for the years 2000, 2005 and 2009 in order to illustrate recent economical developments within the Philippines.

Table 2: Economic indicators Philippines

Indicator	2000	2005	2009
Gross domestic product (million current US$)	75,912	98,829	160,676
Gross domestic product per capita (current US$)	977	1156	1747
Gross national income per capita (current US$)	1039	1251	2004
Consumer price index (2000=100)	100	130	160
Unemployment (percent of labor force)	11.2	7.8[a,b]	7.4[c]
Employment in industrial sector	16.0	14.9	15.1[f]
Employment in agricultural sector	37.4	37.0	36.1[f]
Labor force participation, adult female pop. (percent)	48.6	49.4	49.2
Labor force participation, adult male pop. (percent)	81.6	79.6	78.5
Tourist arrivals at national borders (000)[h]	1,992	2,623	3,139[c]
Energy production, primary (000 mt oil equivalent)	2,377	6,577	7,861[c]
Internet users (per 100 inhabitants)	2.0	5.4	9.0

Notes: a – Data not strictly comparable; b – Definitions revised; c – 2008; d – October; e – Household or labor force survey; f – 2007; g – Excludes regular military living in barracks; h – Includes nationals residing abroad
Source: UNSD 2012

Moreover, the trade balance in 2009 amounted for exports 38,4 million US$ and for imports 45,9 million US$. In 2009, the US was the main export partner with 17.7 percent of all exports, followed by Japan with 16.2 percent and the Netherlands with 9.7 percent. In the same year, the major imports were from Japan with 12.6 percent, the United States with 12.0 percent as well as China with 8.9 percent (UNSD 2012).

2.2 Previous Research

A considerable amount of research has been published on the socio-economic determinants of fertility and female labor force participation. Within this section recent research on the above subject is presented. Besides being related to the aim and the research question of the thesis, it has been attempted to consider studies from developing countries and preferably those accomplished with DHS data in order to ensure relevance as well as comparability.

It has been demonstrated by Orbeta (2005) that the number of children ever born to a woman and the use of modern contraception are significantly influenced due to certain socio-economic determinants. Orbeta pictures the interaction between poverty, fertility preferences and family planning practice with the nationally representative Family Planning Surveys (FPS) of the year 2002 for the Philippines. Interested in solving the debate about the relationship between fertility preferences, family planning and socioeconomic status, he applies a cross tabulation method as well as a recursive qualitative response model in order to estimate the determinants of fertility in context to the socio-economic status of the parents. Statistically significant coefficients indicate that the number of children ever born increases by 1.1 descendants if the mother belongs to the poorest quintile of the wealth index, the latter used to indicate socio-economic status. With regard to education, represented by a dummy variable, merely women with college education had significantly fewer children ever born in contrast to the women with no education. However, the latter were not significantly different from those with elementary or secondary education. Examining the place of living, women that live in urban areas have a significantly lower number of children ever born compared to females inhabiting rural areas. Regarding the results of using modern contraceptives, a higher demand occurs particularly among women with higher education. This is displayed by the rise of marginal effects from 21 percent for women with elementary education to 27 percent for those with college education, choosing females with no education as reference category. Living in an urban area has no significant impact on modern contraception adoption. Instead, on average, the poorest quintile of the employed wealth index depicts a 13 percent lower prevalence of modern contraceptives than for women in the richest quintile (Orbeta 2005, 3-10).

To sum up, Orbeta obtains statistically significant differences in fertility behavior across socioeconomic classes, after controlling for individual, household and community characteristics.

Previously Regassa (2007) studies the socio-economic determinants or correlates of marital fertility among the low contraceptive communities in Southern Ethiopia. For data acquisition purposes two questionnaires, i.e. one household and one individual, were applied in order to interview 1467 ever-married women who were selected through a multistage stratified sampling technique. With the help of a Multiple Classification Analysis (MCA) model, Regassa analyzes the interrelationships between several predictor variables and the total number of children ever born. It became obvious that the four following independent variables have no significant influence on the dependent variable: standard of living index, marriage type, food intake, and access to information. In contrast to the above, son preference indicates a statistically significant coefficient. For instance, a woman that wishes to have 1-3 sons has on average 0.87 children more than a female who does not at all wish to have boys in her reproductive life. Furthermore, a woman who wishes to have 4-6 sons during the course of her reproductive period had on average 0.23 children more than a female who wishes to have 1-3 sons in her fertile period. Similarly, a woman who wishes to have 6 or more sons during the course of her reproductive life has, on average, 1.64 children more than a woman who wishes to have no boys at all. Concerning a possible age gap between partners, couples with an age difference between wife and husband of 10 years or more had, on average, 0.27 children extra than a couple without age differentials. At this point, the author does not mention if gender is decisive for the result, i.e. whether the partner more advanced in age has to be male or female. With regard to education, women having a primary level of schooling gave on average birth to 0.85 children more than a woman with secondary level education. Observing the nutritional status of women, Regassa depicts a negative association with fertility. For example, a woman with normal weight has on average 1.67 children less than a malnourished woman. Women abstaining for 1-6 months yielded on average 1.21 children more than a female with 7-12 months of abstinence. In addition, the relationship between religion and fertility results in that orthodox women experience about 1.01 children, Catholic Christians have 1.0 descendants and Protestant Christians 0.63 children more than a Muslim woman. And finally, Regassa demonstrates that the mean parity increases with the size of operational land per household. However, value of land differs from place to place mainly depending on the type of crop grown, the system of land use, and population density, among others (Regassa 2007, 205-212).

All in all, apart from the index for living standard, type of marriage, food intake, and access to information, Regassa obtains statistically significant coefficients for the relationship between socio-economic variables (e.g. educational level, nutrition or gender preference) and the total number of children ever born. Subsequently, DHS data from various developing countries are applied in order to report for the impact of socio-economic variables on the decline of fertility.

Kreider et al. (2009) investigate the fertility decline with DHS data for 47 nations in Asia, North Africa, Latin America and the Caribbean as well as Sub-Saharan Africa. With the help of multivariate analyses, their objective is the assessment of the interaction between the velocity of socio-economic progress and the respective stage of fertility transition. They are particularly interested in the contribution of modern contraceptives as well as socio-economic progress towards fertility decline and stalling. For this reason, the examination of women's educational attainment, infant and child mortality, use of modern contraceptives as well as growth in GDP per capita takes place. A more general finding is that the variation across countries concerning the pace of fertility decline is large. With regard to the actual research aim, they reveal that increasing women's educational attainment, reductions in infant and child mortality and the extended use of modern contraception have contributed to more rapid declines in fertility, while the probability of stalling diminished. Simultaneously, empirical evidence suggests that fertility reductions were smaller in magnitude over time if GDP growth is more rapid (Kreider et al. 2009, 1-2, 16-17).

In brief, investigating the contribution of socio-economic variables towards the pace in fertility decline, Kreider et al., report significant impacts on reductions in family size through use of modern contraception, mother's educational level, infant and child mortality as well as GDP per capita. Information on fertility differentials and the contributing components in Nepal follows in the next paragraph.

In his research article, Adhikari (2010) analyses 8644 ever married women of reproductive age in order to detect the demographic, socio-economic, and cultural factors which contribute to fertility differentials in Nepal, where since 1981 birth rates decreased. With DHS data from 2006 for Nepal he applies a bivariate analysis (one-way ANOVA) as well as multiple linear regressions for the purpose to report the effect of each independent variable on the dependent variable after controlling for the impact of other predictors. Among literate women, on average, the number of children ever born (CEB) is half the size of those for illiterate women (1.9 and 3.7 respectively). Besides, the age of women at first marriage seems to decrease the CEB by a statistically significant magnitude of minus 0.15. For Muslim women who were never exposed to mass media, the likelihood to have more children than Hindu women likewise without mass media experience increases by 0.066. As expected the poorest women had significantly higher CEB than the richest women with a beta coefficient of 0.12. For women experiencing a child-death was translated into an almost doubling number of CEB compared with women who did not experience such an event (beta value of 0.31). Furthermore, women less familiar with family planning methods had a significantly higher CEB than women who had knowledge of family planning approaches. However, women who had used family planning methods previously had a larger number of CEB than females who had never used them (Adhikari 2010, 1, 4).

To sum up, using DHS data for Nepal from 2006, Adhikari attributes illiteracy, unfamiliarity with family planning methods, experiencing a child-death and exposure to mass media a negative and significant effect on the amount of CEB. A case study focusing on the determinants of fertility, again in rural Ethiopia, will follow.

In contrast to other developing countries, Ethiopia has still a relatively high fertility, especially in rural areas. In order to draw inferences about existing gaps in fertility behavior between rural and urban residents, Mekonnen and Worku (2011) analyze women in their reproductive period from the Butajira Demographic Surveillance System (DSS) database. 9996 respondents out of 11133 potential database individuals were utilized to compute TFR's and Parity Progression Ratios (PPR). In the next step, Poission regression and Incidence Rate Ratios (IRR) had been applied to generate conceivable associations between the characteristics of the mother as well as the household and fertility outcome. Important results are that among women which got married in their teens, fertility was 1.38 times larger than under females who had their wedding after their 20th birthday. Furthermore, a consistent and significant relationship was found negative between educational status and the number of offspring. No formal maternal education was equivalent to 1.24 more descendants compared to females that completed secondary or higher education. When examining residential ecology (i.e. altitude and residence type), women inhabiting the rural lowlands gave birth to 1.3 more children, in comparison to urbanite females. Yet the previous result changed in case of the consideration of additional factors. In that case, rural lowland women's fertility diminished by 12 percent compared to urbanites. Interesting is that females originating from a large family, i.e. household with five or more members, had roughly two times more children than women descending from smaller sized families. With regard to household income, fertility was 14 percent less among those families with trade or service as major source of income in comparison with farming. Families whose household income originated from civil service employment had a lower reproduction rate in contrast to households with revenues from farming. Even though this relationship does disappear when controlling for further substantial variables. Instead, women from food secure households conceived 6 percent less children than their comparison group with insecure food supplies. Similar to the results from Adhikari in Nepal, women experiencing at least one child-death contributed to an increase in fertility by roughly 1.7 times in contrast to females without such an event. Furthermore, fertility rose by around 9 percent among females without knowledge about their conception period and under women with sex preferences regarding their offspring (Mekonnen and Worku 2011, 1-4).

All in all, Mekonnen and Worku confirm for instance the relationship regarding the experience of child-death as well as low age at marriage and a higher number of CEB.

To conclude this section, a diversity of socio-economic parameters and their impact on fertility behavior and female labor force participation is examined. The number of CEB on average reduced in context with a higher educational level of the mother, knowledge of family planning methods, household prosperity as well as being resident of an urban area, among others. In contrast, the number of CEB on average augmented in case of sex preference, age differentials between partners, malnutrition of women and experiencing at least one child-death, among others.

2.3 Theoretical Background

This section presents eight theories concerning the fertility transition. Indeed, there can be no entitlement to completeness. However, this limitation has two purposes. Firstly, to stay focused on fewer theories will allow more in-depth consideration of each single theory, bearing in mind the limited size of the master thesis. Secondly, the selected diversification will be sufficient to familiarize the reader with the main concepts of fertility transition, considering the core of the thesis being beyond theoretical matters. In order to facilitate to follow the theoretical development over time, a chronological presentation of the theories is chosen.

Initial ideas regarding the fertility transition originate from Thompson's book titled "Population Problems" originally published in 1930 where he points out that "[…] if the very rapid growth of population during the last century has helped to create interest in population, the even more abrupt decline in the birth rate […] is attracting still more attention to population questions because the consequences of these changes in rate of growth are likely to affect seriously both the internal economy of nations and the international relations arising from differential rates of national expansion" (Thompson 1942, 3).

According to Thompson fertility decline is caused by two main changes in society. On the one hand, large numbers of individuals move from the countryside into the cities. Those individuals represent the rural surplus population which relocates in order to find employment in town. In the course of this process, referred to as urbanization, the traditional way of life undergoes massive alterations. While struggling to acquire or to enhance their status within the new urban environment, a large number of children seem obstructive, and thus not desirable. In contrast to rural areas, urban life includes a different mode of living, another quality of incomes and types of work, other occupational positions along with exercise of power as well as a variety of opportunities for leisure activities. Therefore, townspeople experience a serious conflict between establishing a large family and the achievement of their ambitious objectives. Moreover, urban labor requires a relatively time consuming period of vigorous training, by which the postponement of children becomes a natural side effect. As a consequence, either a low number of children are born to urban couples' or prospective parents might already be to too old to have offspring at all. Furthermore, in comparison to a rural farmer that has to be to the farm 365 days per year in order to care for the cattle, for urbanites rearing children is connected with immobility while they have the desire to travel (Thompson 1942, 207-210).

On the other hand, major contributions toward decreasing fertility are caused by declining mortality, especially infant mortality. For a considerable period of time a relatively high amount of infants and children died before experiencing age one or even age ten. Four main causes of the negative development in (infant) mortality have emerged. Firstly, enhancements in children's care at home by applying innovative and more hygienic methods in feeding. That is, mothers' are appealed in free instructions by community organizations to nurse their offspring and to take care of clean dishes as well as food. As a result, deaths due to gastric and intestinal problems reduce. Moreover, in case children show signs of malnutrition, women are advised to visit a hospital or specially trained nurses are sent out to provide appropriate diets. Secondly, since a high share of mother's receive a regressive number of children, the capacity to care for the remaining offspring intensifies. Logically, a mother with lesser children can provide better care for her offspring compared to a mother of a large family. Thirdly, the expansion of medical expertise and available care towards children which inter alia contains innovative treatments for smallpox, diphtheria or scarlet fever. Finally, favorably changing economic conditions in life for the majority of people in the days of Thompson compared to previous generations. Serious economic situations within families undoubtedly have negative consequences for the development of their youngsters, and thus increase children's mortality (Thompson 1942, 220-224).

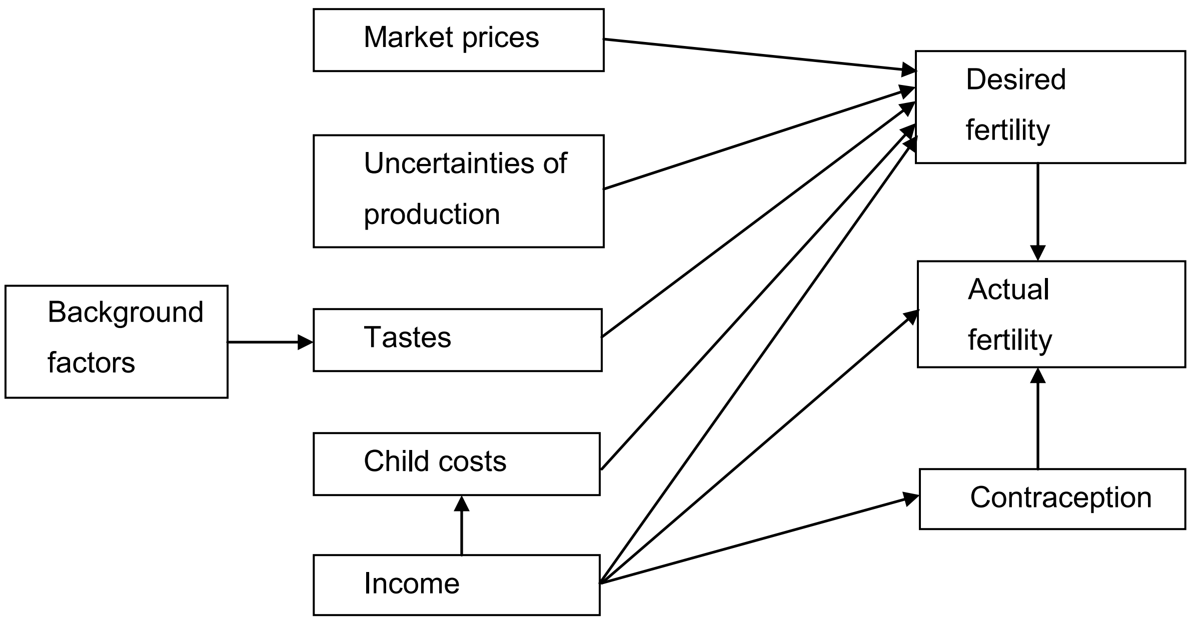
All in all, Thompson demonstrates rural-urban differences in the mode of living as well as downward shifts in (infant and children) mortality due to modernization processes which contribute to a decline in fertility. A rather similar view regarding the fertility decline is represented by Notestein in the next theoretical approach.

Notestein (1948) summarizes important factors contributing towards the fertility decline, particularly in undeveloped areas. According to him, substantial restrictions in fertility "depend on the social organization, customs, and beliefs from which arise the aspirations [...] with respect to family size" (Notestein 1948, 250-251). The impact of urbanization had obviously the power to trigger significant changes in social organization, customs and beliefs. While urban living allowed for personal advancement, the subsequent individualistic life collided with the idea of a large family. Thus, besides the mere extension of birth control, potential parents advance also to a more effective application of the latter. Furthermore, economic and sanitary progress can have a notable effect on fertility reductions via the improvement of living standards. However, in order to increase the living standards economic progress has to have a certain pace in order to preponderance population growth. In case economic production cannot outweigh population growth, large parts of the population merely exist on subsistence level, and thus are sensitive to severe shocks in the economy and in politics that prevent low fertility levels (Notestein 1948, 249-252).

To conclude, Notestein suggests that individualization processes in society as well as the increase in living standards diminished the incentive for children, and thus reduced fertility rates. The subsequently displayed theory has a strong focus on economic considerations.

In his paper "An Economic Analysis of Fertility" in 1960, Becker concentrates on a microeconomic approach in order to show "[...] the interrelationship between socio-economic variables and fertility" (Becker 1960, 209) since previous predictions of fertility developments failed to provide reasonable results. In an initial step, Becker equates children to consumer durables whose demand depends on five categories (see Figure 2). Firstly, on *tastes* which represent the preferences for children according to their utility in contrast to other durable goods. Influential determinants of utility are family's religion, race and age, among others. Secondly, the *quality of children* which plays an essential role apart from the question about the final amount of offspring a family intends to have. A higher quality of children is primarily acquired by greater investments in their education. In case parents voluntarily deliver more resources to one child in comparison to another, the underlying incentive for such a behavior is an additional utility received from that child. Thirdly, enumerates Becker *income* as an indicator of the demand for children. Since he assumes that children are not an inferior good, that is, their demand decreases when consumer income rises, this has two consequences in the long-term. On the one hand, the amount spent on children increases, and thus their quality improves. On the other hand, a higher income implies increases in terms of quantity. However, economic theory assumes a rather limited elasticity, that is, how changes in a good's price impact the durables demand in quantity, compared to a relatively high elasticity in the quality of children. Fourthly, the demand for offspring depends on net *cost* of children which is calculated by the estimated pecuniary and temporal expenditures of the parents minus the expected financial revenues and provided services of their offspring. While positive net costs reflect children that generate a psychic benefit or utility, negative net costs signalize pecuniary transfers towards the parents. Nevertheless, the entanglement between price and demand for children remains largely not understood. The reason is that in situations of constant income and declining costs for offspring, the driving impulse for increasing numbers of youngsters is not entirely clear. An expansion in family size could originate from increases in quantity, quality or both. And finally, the *supply* side of children which focuses on the important issue that offspring cannot be procured from the market. Instead children must be "produced" at home. Concerning the "production" several uncertainties exist, such as sex, intelligence or height of the prospective children which can affect the consumption patterns of the couple. For instance, a couple has with so far only males might continue to "produce" children until they receive a female. Moreover, it is important in this context to consider the fundamental ability to receive children at all, beyond the relationship towards income and prices. The natural desire to have three children does not imply that the couple will be able to receive more than two. In sharp contrast are couples that desire three children and will ultimately have five youngsters (Becker 1960, 209-217).

Figure 2: Schematic diagram of Becker's model



Source: Namboodiri 1972, p. 186

In short, Becker provides in 1960 a substantial micro-economic framework which basically entangles *tastes*, *income* and *prices* in order to explain negative fertility developments. The following theory swaps economical thoughts with a sociological point of view.

In 1966, Carlsson presents his paper “The Decline of Fertility: Innovation or Adjustment Process” which discusses two types of fertility transition theory. Before elaborating more on the innovation and the adjustment approach, Carlsson enumerates already acquainted ideas from above which are connected to the fertility decline. These comprise the process of industrialization, agricultural evaporation, educational expansion, changing status of women in society as well as secularization and a general modernization of humanity. The concept of *innovation theory* reflects on the more intense application of birth control methods, in particular contraception. In a subsequent step the theory describes two essential 'trickle down' effects in the diffusion of knowledge about contraception. Firstly on the regional level, where a spread of information takes place from metropolitan, via urban to rural places. Secondly, on the class level exist differentials in the acceptance of birth control. To be precise, manual and rural workers lag behind the middle-class. *Adjustment theory* embodies a structural concept which in contrast to the *innovation theory* does not consider birth control as a new achievement of humanity. Instead, it seems that a status quo exists in large parts of society concerning birth control. Fertility reductions demonstrate merely an adjustment towards 'modern' fertility and thus a different equilibrium. In *adjustment theory*, control is exercised by human motivation based on individual desires and values. Those desires and values might be shaped by knowledge about infant and child mortality received from governments and organizations via, for example, newspapers as well as through individual information mechanisms in form of friends and neighbors. However, Carlsson concludes that neither solely regional nor merely class differences in fertility behavior can be accepted without certain additional considerations, and more importantly that the entanglement of both is key for further understanding of fertility dynamics (Carlsson 1966, 149-174).

To sum up briefly, Carlsson considers with increasing birth control in form of contraceptives as well as a manifestation of individual desires and values two conceivable factors for downward changes in fertility. In the following attempt at an explanation of the fertility transition the concentration might be even more clearly than before on the methods and intention of fertility control.

According to Coale (1967), particularly developed and modern societies have evolved controls for fertility. Apart from widespread literacy among adults, modern societies are characterized by their pervasive communication networks as well as high attendance rates in primary education. Besides, the employment sectors are rather industrial than agricultural. In defining modern societies four more profound hypotheses crystallize. Firstly, reductions in death rates raise the survival chances of children, and thus decrease the amount of births necessary in order to acquire the desired number of youngsters per family. Secondly, the economic value of children in an urban context diminishes compared to a rural setting. This is more intensified due to the restriction of child labor by law as well as the introduction of mandatory education. Thirdly, the role of women in society is more pronounced on account of increasing educational attainment, by which the incentive of employment beyond the household is elevated. Enhancing opportunities for self-realization strongly contrast with the maintenance of uncontrolled fertility. Finally, assuming rural populations relatively uneducated their fertility conduct seems to be driven by customs and traditions while in an urban context tradition vanishes and rationality dominates. Basically, this is expressed by urban couples that perceive their sexual outcome as influenceable. Controlled fertility is, as indicated in previous theories, depending on attitudes and motivations of potential parents. While the successful utilization of withdrawal (or coitus interruptus) reflects an attitude which is highly related to responsible and aware human beings, a technical innovation like the intra-uterine device (IUD) releases individuals of their attentive behavior. A relatively new explanatory factor mentioned in relation to fertility transitions is the interest of governments (or international organizations) to limit their population. Several (less-developed) countries start to introduce official programs in order to arouse the awareness of their citizens regarding fertility control methods. This might echo the results of surveys which indicate that a high proportion of families would prefer a lower number of children than in fact achieved. In the construction of official programs recent knowledge about contraceptive techniques as well as methods of public education are thus taken into account (Coale 1967, 164-169).

All in all, Coale examines the incentives for utilizing contraceptives in the context of societal transformations. In the following explanatory approach of fertility behavior Becker and Lewis formalize neoclassical economic theory.

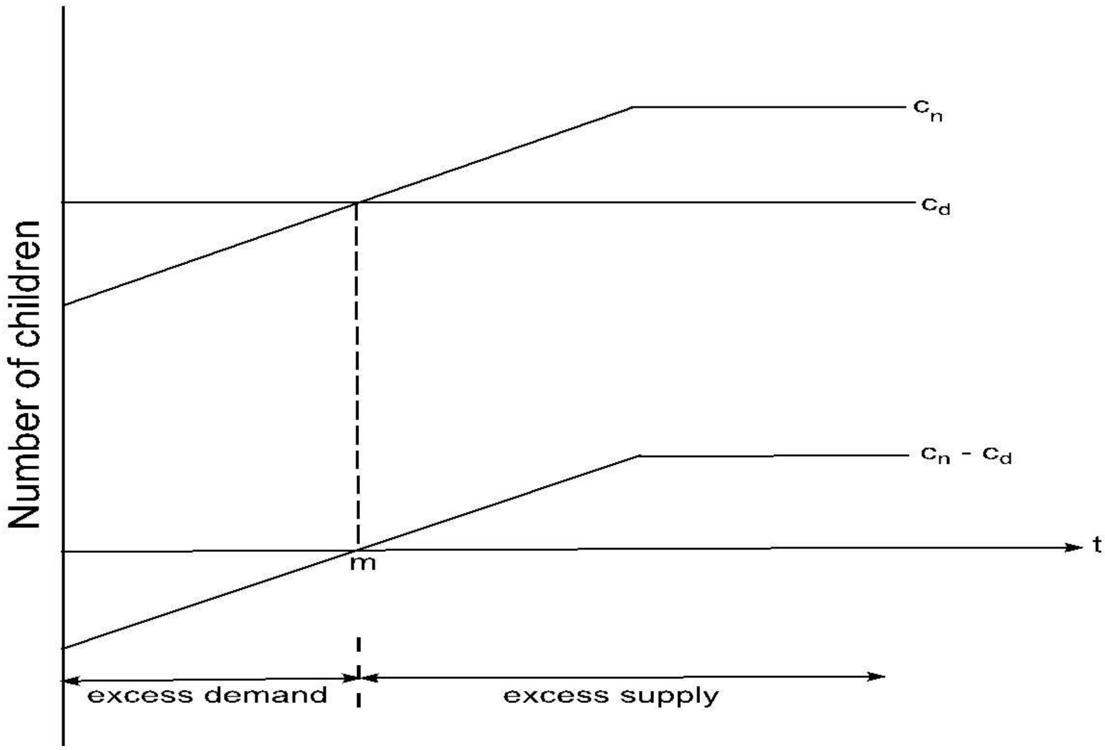
In order to evaluate the impact of financial changes in the household budget on the demanded number of children, Becker and Lewis (1974) refine the economic framework for fertility analysis. In contrast to Becker's model introduced in 1960 (described above), the focus is now on the Quantity-Quality-Trade-Off (QQTO) of children. The refined model is based on a utility function, including the number of children, their quality as well as the consumption rate of all other commodities in the household. Besides, the concept assumes constant preferences, financial and temporal restraints as well as an insatiability of the household regarding the quantity and quality of their children. Becker and Lewis operationalize the quality of children (e.g. their education or health) via the accompanying costs which are, at least for theoretical purposes, equally distributed among the offspring in the household. Larger investments into the children correspond with higher quality youngsters. An important specification contributes the differentiation of the potential costs into three groups. Firstly, costs which increase with the quantity as well as the quality of children (e.g. education or health expenses). Secondly, costs which increase with quantity but are independent of the quality of children since the upbringing of offspring is assumed incompatible with other activities. Thirdly, there are costs which depend on the quality but are independent of the quantity of children (e.g. a library in the parental household). Each increase in an unit of children's quantity raises the costs for quality and vice versa. Consequently an additional unit of quality is more expensive if the household has more children (e.g. since for each child university fees need to be paid applying the assumption of equally equipped children within the household). In the model decreasing fertility is explained due to two developments. On the one hand, the *income effect* assumes constantly increasing budget revenues which lead to a larger income elasticity for the quality compared to the quantity of children. Thus, parents prefer to invest extra income into the education of their children instead of additional offspring. Due to the interaction between costs per unit quality and per unit quantity the costs for children rise. As a consequence, an increase in income would allow more children but the increasing costs per child lead to lower numbers of children which instead receive a superior education. On the other hand, fertility might decline on account of the interdependency displayed by the *price effect* which accounts for costs dependent on the quantity or quality of children. This includes for instance opportunity costs, i.e. the cost of an alternative that must be forgone in order to pursue a certain action, which could equal in this case the loss of earnings on account of an absence in taking up work as well as the interruption or termination of employment. Since to a large extent women stop their employment in order to provide care for the children, not the household income is of direct interest, but the income of the women. While absent wages represent a direct disadvantage, indirectly women will encounter a lower wage level when returning into employment on account of missed learning-by-doing effects (i.e. workers' improvements in productivity by regularly repeating the same type of action). The previous costs are closely linked to the wage level of women, which suggests that women with a high wage level have a decreasing or low fertility (Becker and Lewis 1974, 81-86; Tivig et al. 2011, 56-58).

To conclude, for Becker and Lewis interrelationship between the quantity and quality of children is reflected in income and price effects. In order to explain human fertility, Easterlin sketches a broader economic approach.

To be precise, Easterlin (1975) pursues the intention to unite economic views with principal demographic and sociological concepts. In implementing the previous, his objective is to illustrate the potential output of children per family in context with the demand for children and the costs of fertility control. To solve the question concerning the determinants for a decrement in fertility in the course of modernization, Easterlin utilizes a strategy which gives the same weight on *demand* and *output* of children as well as on *fertility control*. Important theoretical assumptions for the analysis are that both parents survive the reproductive period of the wife as well as that the total amount of surviving children is preferred to the number of births as explained variable, since the latter does not represent the originally desired quantity for offspring. Indicated above, central impacts on fertility are associated with the *demand* for (surviving) children which parents would intend to have if fertility adjustment is free of charge. In addition, fertility obtains regulation by the prospective *output* of (surviving) children in case fertility would not intentionally be restricted. And finally, fertility is affected by the costs of *fertility restriction*. The latter can be further specified into subjective costs, i.e. psychic expenses, and objective costs represented by the time and money spent in order to acquire knowledge about control techniques. Considering the *demand* for children from a household perspective, it depends primarily on income, prices and tastes, the latter commonly neglected in economic approach. In detail, the household has to offset tastes for competing durables with those for children in relation to existing prices and dispensable income with the maximization of needs. Thus, fluctuations in *demand* are determined by tastes, prices and income at a certain time or over time. Keeping other factors constant, the quantity of desired children is assumed to oscillate with household revenues, prices for durables in proportion to children as well as the dominance of tastes for children in relation to other consumption goods. Taste, in turn, has strong interrelatedness to societal norms concerning the family size as well as to the quality of children (i.e. via forms of child care and parenting). In context to the *demand* for children, Easterlin in addition points out the mechanisms which are responsible for the regulation of the quality of children. Since those mechanisms became already discussed in the theoretical approach by Becker and Lewis (1974), they are omitted at this point. Instead, the potential *output* of children will be considered in more detail. That is, examining the determinants of the number of surviving children in a household without deliberate restrictions towards fertility. In order to accomplish that, the major interest is on the likelihood of infants reaching adulthood as well as on natural fertility, i.e. procreation without any intentional limitation. Since detached from procreation frequencies and fetal mortality, natural fertility is rather dependent on physiological, biological as well as cultural factors. Among the physiological factors is the temporal separation of partners, civil strife or war.

Biological factors might include genetic defects which prevent the carry out of a child. Finally, cultural terms in form of social norms and customs as well as advertent attitudes towards coital frequency, among others. Hence, in case of reductions in family size below the physical maximum, techniques regarding fertility control are accustomed. However, here exists a subtle distinction. While couples applying abstinence in order to limit the number of offspring act intentionally, intercourse stopped for the purpose of nursing mother's represents no deliberate limitation. With respect to the above mentioned, an important question is concerning the motivation for fertility limitations, and thus the downsizing of the potential *output*. At this point, undesired children as well as an excess supply of youngsters should generate the motivation for a limitation in family size. Therefore, it is highly important to consider the costs of *fertility control*. Besides the motivation for *fertility control*, the costs of the latter are essentially. As a corollary, high costs of regulation would increase the number of actual children, and thus resemble the potential *output*. In this context, family planning programs are assumed to diminish market costs (i.e. time and pecuniary expenses to receive information or services). Either by distributing information and services costless or via legitimization of birth regulation practices. In the subsequent figure a conceivable situation within a secular decline in fertility is depicted. Figure 3 represents a hypothetical trend in fertility associated with economic and social modernization as likely to occur during the demographic transition. Within the concept of the demographic transition, modernizing societies experience initially a drop in mortality rates and subsequently a lagged decrease in reproduction towards low fertility rates. In the diagram, economic and social progress relating to time which is displayed by the horizontal axis. While until point *m* no incentive for fertility regulation exists (indicated by excess *demand*), the situation might change against the background of societal advancement which leads to an excess supply, and thus an emerging motivation for birth control in order to accomplish the desired family size (Easterlin 1975, 54-63).

Figure 3: Hypothetical trend in fertility according to Easterlin



Legend: c_n – number of surviving children parents would have in an unregulated fertility regime

c_d – desired number of surviving children in a perfect contraceptive society

t – time

m – point signalizing change between excess demand and excess supply

Source: Easterlin 1975, p. 60.

In conclusion, Easterlin attempts an interdisciplinary approach which evenly distributes conceivable components to fertility decline. The next and final theory in the theoretical background section deals in detail with the role of mass education as a possible determinant of the onset of the fertility decline by changes on the micro and macro level.

John C. Caldwell (1980) suggests that mass education has a decisive impact on the family economy, and thus stimulates reductions in fertility. Due to schooling, the direction of wealth flows within families reverse from the parents to their children. While traditionally family morality determines the familial production process, with the spread of mass education this condition erodes gradually. Family morality is part of a framework "[…] which enjoins children to work hard, demand little, and respect the authority of the old" (Caldwell 1980, 226). Educational attainment allows access towards an unprecedented world which discharges the old patterns of high fertility unambiguously linked with traditional family production. The latter is substituted by a capitalistic mode of production, characterized by low fertility, where wages are earned outside the close family circle. Obsolete is the patriarchic hierarchy where children add value towards the work force from early ages. Although the framework of family morality can sustain for a certain period, particularly in case of primarily domestic subsistence turnout achieved by children and wives, in the long term community morality is advantaged. This is caused by the national educational system which teaches to a major extent the latter. Highly interesting are the three reasons which evoke universal schooling. First, the expansion of social justice in form of possible upward mobility within society. Second, the emergence of democracy depends on a fully educated electorate. Third, in order to achieve national prosperity, societies cannot afford to neglect disadvantaged, but innovative minds. Therefore, it is not surprising that universal schooling in relation to the developing world is marked as act of humanity and justice for the underprivileged. In the subsequent step, Caldwell points out five educational factors which influence the direction of the net resource flow within family economies, and thus shaping fertility. Firstly, the diminishing potential of children working within and outside the household. Children are detached from traditional household duties, since school attendance goes along with the idea of a prospective employment beyond the patriarchic structures. Likewise, parents comprehend this development and concede their children the necessary liberties in order to be successful in school. Secondly, the increasing cost of having children. Certainly there are expenses for school fees, uniforms, etc. Moreover, the attendance in school is indirectly linked to an enhanced appearance (e.g. nutrition and clothes) of the children in order to compete with other classmates. Over time, children and parents similarly perceive school as a new morality system which gains advantage against family morality. Thirdly, schooling establishes new dependency patterns within the family as well as the society. During the inexistence of schooling all available family members contributed to family production for the purpose of familial survival. Until then, the return from their work contribution is relatively small, but they have to compensate their parents, both the parental security as well as “gift” of existence. With the onset of mass education the children’s role as a producer is shifted into the future, to a period after schooling. Implicitly is a contract present between society and families that assigns priority to the investment into children through schooling. Families have to reduce their claims and adjust to this implicit contract. This is supported by societal changes like legislations in order to provide protection for children. In the familial context, children turn out to be more costly since no longer contributing to the family’s survival. In the societal context, children are more costly by the expenditures for education. Fourth, schooling is accompanied by the acceleration of cultural change, and thus creates avant-garde cultures. Based on schooling, changes are experienced in all societal classes. A final factor establishing the direction of wealth flows within the family is the diffusion of Western middle class values in the developing world via schooling. School curriculums neglect family morality and are affirmative towards Western middle class ideas. Involuntarily, developing countries import a new foreign culture during a period of increasing egalitarianism in family structures accompanied by adoption to low fertility (Caldwell 1980, 225-227).

Essential lessons from Caldwell are that mass schooling contributed to crucial and permanent changes in the direction of intergenerational net wealth flows. Moreover, the timing of mass education and the onset of fertility decline do not seem to be arbitrarily, explained by ample processes between education and family economics.

To conclude this section, a variety of primarily economic and sociological theories undertakes the attempt to provide information about the fertility transition over time. While none of these theories seems to have the ultimate key to explain the latter phenomenon completely, all deliver conceivable parts of an explanation.

2.4 Research Hypotheses

In this section the research hypotheses are presented. These were derived from the previously presented literature as well as from the conveyed theoretical underpinnings regarding fertility decline. Empirical analysis will be driven by the following four main research hypotheses:

1 – *In temporal comparison (1993 to 2008), the educational level of women and men has expanded. As a consequence, individuals are enabled to improve their economic circumstances through professional careers and especially maternal education has benefited child health which in turn diminished infant mortality rates. In addition, marriages, frequently a precondition for children, are encouraged at a later age (Hannum and Buchmann 2003, 14-15), and thus the previously mentioned contributes to a tightened negative effect on the completed fertility in the Philippines.*

2 – *In temporal comparison (1993 to 2008), rural-to-urban migration has increased. Urbanites tend to give birth at a higher age, have exposure to new (social) norms as well as access to medical services which reduce child mortality (White et al. 2008, 804), and thus living in an urban area contributes to a decline in completed fertility in the Philippines.*

3 – *In temporal comparison (1993 to 2008), traditional as well as modern methods of contraception gained further diffusion. A higher contraception prevalence rate is strongly and inversely related to completed fertility in the Philippines.*

4 – *In temporal comparison (1993 to 2008), female labor force participation has increased generally, but decrements among mothers with a large number of children. This is expected due to the expansion of non-familial employment and industrialization which complicate the combination of work and family responsibilities, in particular with a progressing number of children (Bloom et al. 2007, 2).*

With the aid of a multivariate and a logistic regression, the above depicted research hypotheses will be investigated. It is of special interest, whether or not the obtained empirical results can conform to the formulated hypotheses.

3 Data

3.1 Source Material

This section presents in its core information about the used type of data source as well as necessary source criticism.

In order to analyze the socio-economic determinants of completed fertility and female labor force participation in the Philippines a cross-sectional approach utilized survey data from the national Demographic and Health Survey (DHS) for the years 1993, 1998, 2003 and 2008. In general, the Measure DHS project is conducted since 1984 in over 90 developing countries in Sub-Saharan Africa, Central Asia, North Africa, South- and Southeast Asia as well as Australasia, among others. A main objective of Measure DHS is to monitor important indicators on fertility, family planning, infant-, child-, adult-, and maternal mortality, among others, for the purpose of understanding global trends in health and population issues. Especially policymakers and planners are furnished by the Measure DHS project with information on evaluated households, and in this way derive knowledge about the progress of developmental programs (Measure DHS 2012).

In order to gather comparable data across countries, the Measure DHS project utilizes standard model questionnaires, with attached written descriptions. The mentioned questionnaires run through several reviewing phases in the DHS program, by which necessary modifications can be perceived. Besides this basic questionnaire, participating nations are allowed to add relevant questions of particular interest (Measure DHS 2012).

The DHS is characterized by its nationally representative surveys which include sample sizes between 5,000 and 30,000 households. Eligible participants within households are women aged 15-49 and men aged 15-54. DHS surveys consist of three core questionnaires: A household questionnaire, a women’s questionnaire, and a men's questionnaire. Furthermore, varying standardized modules exist (e.g. alcohol consumption or full pregnancy history) for countries with special interest in those topics. Since DHS questionnaires have altered substantially between the different phases, various recode definitions can be found in each DHS phase. Variables that occur in several of the phases keep the same meaning, and merely if questions are omitted from one phase to the next, variables are not reused. Moreover, variables will not be present in the recode definition of the phase where they became dropped. In case of a new question added to the core questionnaire a new variable will appear in the recode definition (Measure DHS 2012).

With respect to source criticism it is inevitable to consider reliability and validity. Basically, reliability is reflected by survey instruments that provide consistent measures in comparable situations. Since perfect measures do not exist in practice, dealing with measurement error is an absolutely essential issue. Causes for measurement error are commonly linked to the survey instrument. Either the latter is difficult to understand or the administration lacks precision. Problems of understanding the questions might occur in case the required reading level is too sophisticated, for instance if teenage mothers are the potential respondents. In addition, the surveyor may mark answers wrongly on the questionnaire or transfers received responses falsely into electronic data processing, by which reliability suffers remarkable losses (Fink 2003, 48).

With respect to validity, the "answers correspond to what they are intended to measure" (Fowler 1999, 69). Due to four dominant error sources respondents may report less accurate answers. Firstly, they do not understand the question at all or the direction is misinterpreted. In this case, respondents might have a different perception of what the question asks explicitly for. In this connection, ambiguous terms generate perhaps distorted data since the respondents are rather unlikely to ask for clarification if they have trouble to understand the meaning of the question properly. Secondly, respondents do not know how to answer. Since respondents perceive questions about themselves that they are unable to answer, the question design might be problematic. Thirdly, respondents are unable to recall the answer even so they do know it. Instead of recalling information, frequently respondents do estimate the answer to the question. For instance, examinees cannot recall the expenses of medical care that is disbursed by the insurance. Finally, they might not want to respond to the question in the given interview context. Certain facts or events are avoided to report precisely in an interview. Among them, health conditions which reflect a level of social undesirability, like mental illness. Furthermore, underreporting is common in context with alcohol consumption since difficulties in memory or social norms create negative concerns. Illegal or very embarrassing information might also be complicated to obtain (Fowler 1999, 86-89).

In practice, Ibisomi (2007) reports problems with data quality from the DHS for Nigeria in 1999. Within the 1999 DHS household sample for Nigeria a relatively large number of women is reported as being aged 9. Ibisomi assumes that surveyors deliberately displaced females aged 10,11,12 to younger ages for the purpose to make them ineligible for the individual interview since merely women aged 10-49 were entitled for individual interviews in the survey (Ibisomi 2007, 73).

3.2 Samples

The section presents an overview about the distribution of selected descriptive statistics of the pertinent variables in the survey samples for the years 1993, 1998, 2003 and 2008.

The indicated statistics in Table 3 comprise the number of observations, mean and standard deviation value as well as the minimum and maximum of all considered variables. Subsequently, a concise comparison points out main variations between the four survey samples.

Table 3: Selected descriptive statistics - surveys 1993 to 2008

Variable	Survey	Obs.	Mean	Std. Dev.	Min.	Max.
Total number of children ever born to females aged 45-49	1993	1144	5.388	3.238	0	16
	1998	1215	5.042	3.097	0	14
	2003	1343	4.691	2.886	0	18
	2008	1445	4.350	2.865	0	16
Age at first marriage of females aged 45-49	1993	1078	21.169	5.145	12	45
	1998	1146	21.491	5.284	10	46
	2003	1289	21.828	5.429	8	48
	2008	1378	22.168	5.767	10	46
Age at first childbirth of females aged 45-49	1993	1052	22.235	4.834	10	44
	1998	1119	22.757	5.028	11	43
	2003	1262	22.828	5.025	12	42
	2008	1340	23.043	5.304	10	47
Respondents employment status	1993	15029	0.503	0.500	0	1
	1998	13983	0.523	0.499	0	1
	2003	13633	0.517	0.499	0	1
	2008	13594	0.564	0.495	0	1
Primary educational attainment of females aged 45-49	1993	15029	0.023	0.152	0	1
	1998	13983	0.227	0.149	0	1
	2003	13633	0.023	0.152	0	1
	2008	13594	0.021	0.146	0	1
Secondary educational attainment of females aged 45-49	1993	15029	0.007	0.085	0	1
	1998	13983	0.010	0.101	0	1
	2003	13633	0.015	0.124	0	1

	2008	13594	0.020	0.140	0	1
Higher educational attainment of females aged 45-49	1993	15029	0.014	0.119	0	1
	1998	13983	0.020	0.140	0	1
	2003	13633	0.023	0.152	0	1
	2008	13594	0.032	0.176	0	1
Place of residence of females aged 45-49	1993	15029	0.038	0.191	0	1
	1998	13983	0.396	0.195	0	1
	2003	13633	0.052	0.222	0	1
	2008	13594	0.049	0.216	0	1
Partner education: primary	1993	15029	0.141	0.348	0	1
	1998	13983	0.117	0.322	0	1
	2003	13633	0.112	0.316	0	1
	2008	13594	0.094	0.292	0	1
Partner education: secondary	1993	15029	0.123	0.329	0	1
	1998	13983	0.124	0.329	0	1
	2003	13633	0.143	0.350	0	1
	2008	13594	0.169	0.375	0	1
Partner education: higher	1993	15029	0.139	0.346	0	1
	1998	13983	0.171	0.377	0	1
	2003	13633	0.194	0.395	0	1
	2008	13594	0.194	0.395	0	1
Traditional contraceptive method of females aged 45-49	1993	15029	0.005	0.069	0	1
	1998	13983	0.009	0.095	0	1
	2003	13633	0.008	0.093	0	1
	2008	13594	0.012	0.109	0	1
Modern contraceptive method of females aged 45-49	1993	15029	0.012	0.111	0	1
	1998	13983	0.014	0.120	0	1
	2003	13633	0.023	0.150	0	1
	2008	13594	0.020	0.143	0	1
Marital status of females aged 45-49	1993	1115	0.800	0.399	0	1
	1998	1172	0.823	0.381	0	1
	2003	1294	0.827	0.377	0	1
	2008	1373	0.821	0.383	0	1

Age at first marriage	1993	9686	20.461	4.284	8	45
	1998	9161	20.598	4.444	7	46
	2003	9324	20.862	4.552	5	48
	2008	9194	20.949	4.642	10	48
Primary educational attainment of females	1993	15029	0.194	0.395	0	1
	1998	13983	0.168	0.374	0	1
	2003	13633	0.134	0.340	0	1
	2008	13594	0.119	0.323	0	1
Secondary educational attainment of females	1993	15029	0.203	0.402	0	1
	1998	13983	0.195	0.396	0	1
	2003	13633	0.241	0.427	0	1
	2008	13594	0.269	0.443	0	1
Higher educational attainment of females	1993	15029	0.260	0.438	0	1
	1998	13983	0.278	0.448	0	1
	2003	13633	0.302	0.459	0	1
	2008	13594	0.313	0.464	0	1
Place of residence	1993	15029	0.526	0.499	0	1
	1998	13983	0.481	0.499	0	1
	2003	13633	0.545	0.497	0	1
	2008	13594	0.497	0.500	0	1
Traditional contraceptive method	1993	15029	0.090	0.286	0	1
	1998	13983	0.112	0.316	0	1
	2003	13633	0.094	0.293	0	1
	2008	13594	0.100	0.300	0	1
Modern contraceptive method	1993	15029	0.152	0.359	0	1
	1998	13983	0.174	0.379	0	1
	2003	13633	0.215	0.411	0	1
	2008	13594	0.223	0.416	0	1
Marital status	1993	15029	0.565	0.495	0	1
	1998	13983	0.570	0.494	0	1
	2003	13633	0.577	0.493	0	1
	2008	13594	0.535	0.498	0	1

Number of children <=3	1993	15029	0.319	0.466	0	1
	1998	13983	0.338	0.473	0	1
	2003	13633	0.383	0.486	0	1
	2008	13594	0.404	0.490	0	1
Number of children >=4	1993	15029	0.292	0.455	0	1
	1998	13983	0.281	0.449	0	1
	2003	13633	0.258	0.437	0	1
	2008	13594	0.231	0.421	0	1
Primary educational attainment of females and <=3 children	1993	15029	0.061	0.239	0	1
	1998	13983	0.053	0.225	0	1
	2003	13633	0.048	0.215	0	1
	2008	13594	0.045	0.207	0	1
Secondary educational attainment of females and <=3 children	1993	15029	0.068	0.252	0	1
	1998	13983	0.072	0.259	0	1
	2003	13633	0.104	0.305	0	1
	2008	13594	0.124	0.330	0	1
Higher educational attainment of females and <=3 children	1993	15029	0.098	0.297	0	1
	1998	13983	0.116	0.320	0	1
	2003	13633	0.136	0.343	0	1
	2008	13594	0.144	0.352	0	1
Primary educational attainment of females and >=4 children	1993	15029	0.090	0.287	0	1
	1998	13983	0.076	0.266	0	1
	2003	13633	0.061	0.240	0	1
	2008	13594	0.051	0.221	0	1
Secondary educational attainment of females and >=4 children	1993	15029	0.040	0.197	0	1
	1998	13983	0.041	0.200	0	1
	2003	13633	0.045	0.208	0	1
	2008	13594	0.048	0.213	0	1
Higher educational attainment of females and >=4 children	1993	15029	0.037	0.189	0	1
	1998	13983	0.040	0.196	0	1
	2003	13633	0.038	0.191	0	1
	2008	13594	0.035	0.183	0	1

Source: DHS 1993, 1998, 2003 and 2008 sample

A concise temporal comparison of the four surveys shows that the number of observations declined from 15029, in 1993, to 13594 in the latest evaluated survey in 2008. The *first age at marriage* among *mothers* displayed a rather constant value around the age of 20.7. Instead, the *age at first childbirth among females aged 45-49*, increased continuously to 23.04 years, a rise of 0.81 between 1993 and 2008. The number of CEB varied between 14 and 18. With regard to the dummy variables it is necessary to examine the even split (0.5) in order to control for a maximized variability. While the variability for female labor force participation was nearly maximized in 1993, particular in 2008, diversity declined with a mean value of 0.56. When the dummy *place of residence* was close to maximized variability in 2008 (mean value 0.49), in 2003 the figure amounted to 0.54. The dummy representing *primary educational attainment of females* dropped from 0.19 in 1993 to 0.12 in 2008. However, *secondary educational attainment of females* increased from 0.20 in 1993 to roughly 0.27 in 2008, a gain of 0.07. The share of *females with higher educational attainment* increased from 0.26 to 0.31. Similar developments apply to the educational level of the partner. In 1993, the mean for the dummy of *primary educated partners* equaled 0.14, but in 2008 the figure declined to 0.09. Instead, the mean of the dummy *partners with a secondary level of education* grew by 0.05, to nearly 0.17. Considering *partners with a higher level of education*, a positive progress is noticeable. While in 1993 the mean value of the dummy was almost 0.14, in 2008 the figure indicated approximately 0.19. With regard to *marital status*, the mean of the dummy approached even split in 2008 (value of 0.53) after a mean value of 0.57 in 1993. The mean score for a traditional method of contraception remained rather constant around 0.10 in all four surveys. However, the use of modern contraception rose to 0.22 in 2008 from 0.15 in 1993, a significant increase by 0.07

To sum up, while the mean value of *primary education*, both for males and females, is decreasing, *secondary and higher educational attainment* had a larger presence in the sample over time. When *place of residence* approached even split (0.5), and therefore maximum variability, *traditional methods of contraception* remained constant, while the mean value for *modern contraception* grew.

4 Methodology

4.1 Statistical Approach

A variety of methods was used by different authors to assess the socio-economic determinants of fertility and female labor force participation. Each has its advantages and drawbacks. In order to diminish the drawbacks a twofold way, in form of a multivariate linear and a logistic regression, is chosen to investigate the research questions of the thesis.

A multivariate linear regression has a number of attractive features useful for part of the analysis: The method allows the combination of several independent variables to generate optimal predictions of the explained variable. Moreover, regarding root causal analysis, multiple regression separates the effects of explanatory variables and explained variable. As a consequence, examining the unique contribution of each explanatory variable is possible (Allison 1999, 1-3).

The applied multivariate regression will be based on a linear equation, like the following:

$$y = a + b_1x_1 + b_2x_2 \tag{1}$$

In the equation above, y represents the explained variable. The intercept, i.e. the value if all explanatory variables are zero, is indicated by a, while $b_{1/2}$ display the slope coefficients, i.e. the impact value of $x_{1/2}$ on y, all other things kept equal or *ceteris paribus* (Allison 1999, 5-6).

Ordinary least squares (OLS) method underlies the estimation of the regression coefficients (i.e. the slopes and the intercept). Since the true values of the coefficients are unknown, the OLS-estimators represent the “best” predicted values. Initially, a prediction is calculated for each case within the sample. Subsequently, a prediction error is computed which consists of the predicted value subtracted from the observed value. Some errors might be positive, others negative, most likely unequal to zero. The objective is to receive the errors as small as possible. However, within the sample some individuals end up with larger errors while some individuals get smaller ones. In order to balance one error against another, the criterion of the method of least squares is used, by which those coefficients are chosen that make the sum of the squared prediction errors as small as possible. In addition, important questions consider the content of the model, essential control variables and the measuring of causal effects and their understanding as directed from the explanatory variable(s) towards the explained variable (Allison 1999, 10-13).

In another context of the study a logistic regression was more appropriate. To be precise, the OLS regression is inappropriate since the dependent variable becomes restricted to a range between 0 and 1. Since the error term is subject to Y-values which either equal 0 or 1 and to continuously varying X, the disturbance term is excluded from being normally distributed. Thus, an important assumption in OLS estimation is violated. Furthermore, the predicted value of the dependent variable might exceed or undercut the restriction value of 0 or 1. In this context, the homoscedasticity assumption of the error term is most likely to be violated. The latter appears frequently if the proportions in the sample are near to the value 0 or 1. Interested in a propensity or probability that influences the outcome of the binary dependent variable, individuals are aggregated and ascribed similar probability levels. Restricting the dependent variable to 0 or 1, allows a functional form “that whenever Y is approaching either its upper or lower limit, it becomes increasingly difficult to produce a change of a given magnitude in Y” (Blalock 1979, 542). In case the latter assumption holds, the following transformation is reasonable. Each change in X is multiplied with a factor which deflates as Y moves closer to 0 or 1. The above expressed in equation notation:

$$\Delta Y = \beta Y(1-Y)\,\Delta X \quad \text{for } 0 \leq Y \leq 1 \tag{2}$$

Imposing symmetry within the model, an approach of Y to unity induces the coefficient of ΔX to advance towards zero, and vice versa. Mathematical methods can proof that rates of variation in Y are depicted by the equation:

$$\log [Y/(1-Y)] = \alpha + \beta X \tag{3}$$

where the logarithm is to the base *e,* and thus equation (3) presents a log-linear equation (Blalock 1979, 541-542).

4.2 Definition Of Variables

Within this section the variables used in analysis are introduced. To a large extent, the selection of the following variables is based on previous research (see section 2.2).

As pointed out in the section on *Statistical Approach*, analysis takes place in a twofold way. However, Table 4 lists all utilized variables in one table and does not separate them according to their methodological deployment, i.e. either appearing in the multivariate linear or logistic regression. Apart from the descriptive variable name and the variable definition, Table 4 contains the dataset name which is helpful in the subsequent section where the variables are introduced into econometric models as well as to deal with the applied coding in the statistical software package Stata, provided in the *Appendix*.

The examination of *completed fertility* is achieved by restricting the analysis to mothers aged 45-49, while the investigation of the socio-economic determinants of female labor force participation relinquishes this restriction.

Table 4: Definition of dependent and independent variables

Dependent variable	Dataset name	Variable definition
Total number of children ever born	ceb45	Total number of children ever born to others aged 45-49 (considered as completed fertility)
Respondents employment status	d_flfp	Dummy for current female labor force participation[b] - reference category not working
Independent variables	**Dataset name**	**Variable definition**
Age at first childbirth	fstbirage/ fstbirage45	Age at first childbirth (for mothers aged 45-49)
Age at first marriage	fstmarage/ fstmarage45	Age at start of first marriage (for mothers aged 45-49)
Traditional contraceptive method	d_conttra/ d_conttra45	Dummy for contraceptive method traditional, i.e. periodic abstinence (for mothers age 45-49) - reference category no method
Modern contraceptive method	d_contmod/ d_contmod45	Dummy for contraceptive method modern, i.e. condom or pill (for mothers aged 45-49) - reference category no method
Primary educational attainment partner	d_pripart	Dummy for completed primary[a] education of partner - reference category no education
Secondary educational attainment partner	d_secpart	Dummy for completed secondary[a] education of partner - reference category no education

Higher educational attainment partner	d_highpart	Dummy for higher[a] education of partner - reference category no education
Primary educational attainment woman	d_primoth/ d_primoth45	Dummy for completed primary[a] education (of mothers aged 45-49) - reference category no education
Secondary educational attainment woman	d_secmoth/ d_secmoth45	Dummy for completed secondary[a] education (of mothers aged 45-49) - reference category no education
Higher educational attainment woman	d_highmoth/ d_highmoth45	Dummy for higher[a] education (of mothers aged 45-49) - reference category no education
Marital status	d_marstat/ d_marstat45	Dummy for current marital status (of the respondent) - reference category never married
Place of residence	d_urban/ d_urban45	Dummy for living in urban area (for mothers aged 45-49) created based on cluster or sample point number - reference category rural area
Number of children <= 3	d_chithr	Dummy if female has a maximum number of three children - reference category no children
Number of children >= 4	d_chifou	Dummy if female has at least four or more children (limited up to 18 children) - reference category no children
Primary educational attainment woman with less than three children	primoth_chithr	Interaction dummy between women with primary educational attainment and up to three children – reference category women with primary educational attainment and no children
Secondary educational attainment woman with less than three children	secmoth_chithr	Interaction dummy between women with secondary educational attainment and up to three children – reference category women with secondary educational attainment and no children
Higher educational attainment woman with less than three children	highmoth_chithr	Interaction dummy between women with higher educational attainment and up to three children – reference category women with higher educational attainment and no children
Primary educational attainment woman with four and more children	primoth_chifou	Interaction dummy between women with primary educational attainment and at least four children – reference category women with primary educational attainment and no children
Secondary educational attainment woman with four and more children	secmoth_chifou	Interaction dummy between women with secondary educational attainment and at least four children – reference category women with secondary educational attainment and no children

Higher educational attainment woman with four and more children	highmoth_chifou	Interaction dummy between women with higher educational attainment and at least four children – reference category women with higher educational attainment and no children

Notes: a) No information in the Measure DHS manuals in given about the periodic length in school years.
b) No information is provided in the Measure DHS manuals about the actual labor force participation, i.e. whether full-time or part-time employment.

In order to report for categorical effects qualitative representative variables (or dummies) are incorporated into the regression equations. In case the category of the dummy variable occurs, it assumes value 1, and value 0 otherwise. Selecting the various educational degrees (no education, primary-, secondary-, higher education) for the mother and her partner, instead of single years of education which would have been also available in the DHS variable list is preferably since the interval between the latter is less clearly interpretable. That is, for instance to avoid the assumption that the transition from year 1 to year 2 is similar as the transition from year 10 to year 11. However, the peculiarity is that certain school years end with an official qualification. Thus, a completion of such years demonstrates a specific value and depicts, in theory, the acquirement of certain skills. The consideration of variable *age of respondent at 1st birth* limited for mothers aged 45-49 seems valuable, since the higher the level of educational attainment the higher the probability for the postponement of the first birth. It suggests itself that the window for fertility narrows down and accordingly the total number of children ever born diminishes with a higher age at 1st birth. Similarly, variable *age at start of first marriage* for mothers aged 45-49 seems a rather good additional control variable for affects between education and fertility behavior, remembering that the majority of births takes place within the institution of marriage. The type of method of contraception is taken into consideration since assuming that it reflects at least two things. First, the knowledge about contraception in general. Second, an entanglement with the socio-economic background of the females. Furthermore, a 36 year old program expired in 2003, by which USAID provided free contraceptives to the Philippines. Until then, USAID bore 80 percent of the annual total expenses concerning family planning commodities in the Philippines. All in all, the expenditures amounted to US$ 3 million per annum. As a consequence of the financial cutbacks, donor support for sexual as well as reproductive health services fell short, and the Philippine government faced a challenge to fund their reproductive health programs (Senate of the Philippines 2009).

The indicator *place of residence* might contribute worthwhile knowledge about the influence and magnitude of differently developed rural as well as urban lifestyles. According to the displayed theoretical underpinnings in section 2.3, living in an urban area should have a pronounced negative impact on the number of CEB. Instead, in the context of female labor force participation, inhabiting an urban area may have a positive influence on employment since the density of work opportunities could be larger.

A number of endogenous variables were incorporated into the econometric equations, among them *age at first childbirth*, *age at first marriage* and *marital status*. While a low *age at first childbirth* and *age at first marriage* are assumed to stimulate a higher completed fertility since constituting an expanded time frame for potential fertility, being married may provide in a predominantly catholic country the correct setting for children.

The two dummies reporting for *females with either below 4 or at least 4 children* are especially generated for the binary logistic regression on *female labor force participation*. An obvious relationship might be that with a larger number of children, the likelihood to be active in the workforce decreases. In a subsequent step, interaction dummy variables were generated in order to report for impacts on independent variables which might be conditional on the level of another independent variable. In this case the main emphasis is on being in the workforce conditional on educational level of the mother and the number of children.

While the variable *total number of children ever born* will be used as dependent variable in the multivariate linear regression, the variable *respondents employment status* will be utilized in the logistic regression as binary dependent variable.

4.3 Econometric Equations

Based on the previous section, the defined variables are introduced into the utilized econometric models in this part of the thesis.

While for the identification of the socio-economic determinants on completed fertility a multivariate linear regression equation was applied, the impacts of socio-economic factors on female labor force participation were estimated with the help of a logistic regression.

The multivariate linear regression equation to estimate the socio-economic impact on completed fertility is:

$$\begin{aligned} ceb45_i = {} & \beta_0 + \beta_1{*}firstmarriageage45_i + \beta_2{*}firstbirthage45_i + \\ & \beta_3{*}d\_primaryeducationmother45_i + \beta_4{*}d\_secondaryeducationmother45_i + \\ & \beta_5{*}d\_highereducationmother45_i + \beta_6{*}d\_urban45_i + \beta_7{*}d\_primaryeducationpartner_i \\ & + \beta_8{*}d\_secondaryeducationpartner_i + \beta_9{*}d\_highereducationpartner_i + \\ & \beta_{10}{*}d\_contraceptiontraditional45_i + \beta_{11}{*}d\_contraceptionmodern45_i + \\ & \beta_{12}{*}d\_maritalstatus45_i + \varepsilon_i \\ & \text{with } i = 1,\ldots,n. \end{aligned} \tag{4}$$

In equation (4) β_0 displays the intercept, i.e. the value of the dependent variable (ceb45) in case all independent variables assume value zero. The Greek letter ε represents the disturbance term, i.e. it gathers all influences on the dependent variable which are not caused by the independent variables.

To establish a connection between selected socio-economic variables on female labor force participation the following logistic regression was utilized:

$$\begin{aligned} Pr(d\_flfp = 1) = {} & F(\beta_0 + \beta_1{*}firstmarriageage + \beta_2{*}d\_primaryeducationmother + \\ & \beta_3{*}d\_secondaryeducationmother + \beta_4{*}d\_highereducationmother + \\ & \beta_5{*}d\_urban + \beta_6{*}d\_primaryeducationparter + \\ & \beta_7{*}d\_secondaryeducationpartner + \beta_8{*}d\_highereducationpartner + \\ & \beta_9{*}d\_contraceptiontraditional + \beta_{10}{*}d\_contraceptionmodern + \\ & \beta_{11}{*}d\_maritalstatus + \beta_{12}{*}primaryeducationmother\_threechildren + \\ & \beta_{13}{*}secondaryeducationmother\_threechildren + \\ & \beta_{14}{*}highereducationmother\_threechildren + \\ & \beta_{15}{*}primaryeducationmother\_fourchildren + \\ & \beta_{16}{*}secondaryeducationmother\_fourchildren + \\ & \beta_{17}{*}highereducationmother\_fourchildren) \end{aligned} \tag{5}$$

The fitted model in equation (5) estimates the probability of Y=1, given the values of the β's in parentheses, where *F* displays a cumulative standard logistic regression.

5 Analysis

5.1 Statistical Results Multiple Linear Regression – Survey 1993 to 2008

From now on the theoretical discussion in the thesis is superseded by the empirical results obtained with a version of the statistical software package Stata/SE 11.2 for Windows.

At the beginning of the section important statistical (test)-values of the multivariate linear regression are depicted for the respective survey year in order to provide valid and unbiased estimates. Afterwards relevant correlations between the dependent and independent variables are pointed out for each single survey.

For the 1993 survey, the number of observations comprised 1019 individuals. The F-statistic (12, 1006) which operates on the residual sum of squares of the whole regression, obtained a value of 55.14 with an associated p-value of 0.0000, by which a statistically significant model can be assumed. A kernel density estimation (KDE) concerning the normal distribution of the residuals indicated no particular deviations from the normal bell shaped curve. Stata output reported that 33 percent of the proportion of variance in the dependent variable was explained by the predictors. Since an applied Breusch-Pagan test indicated heteroscedasticity, recognizable by a p-value smaller than 0.05, the final estimation used robust standard errors which allow a fitted model with heteroscedastic residuals. Controlling for multicollinearity within the model by using the variance inflation factor (VIF), the largest value was obtained by the variable *age at first marriage* with 4.77. In theory, values beyond ten are commonly considered as displaying severe multicollinearity among the independent variables.

Regarding the number of observations for the 1998 survey, 1074 females were considered in the analysis. The value of the F-statistic (12, 1061) amounted to 54.35 (p-value 0.0000) indicating a statistically significant model. The share of variance in the dependent variable explained by the independent variables accounted for 33.4 percent. Since the Breusch-Pagan test indicated a p-value of 0.0000, robust standard errors were applied in order to correct for heteroscedasticity. In the graphical display of the KDE no serious deviation of the normal distribution of the residuals was detectable. Concerning multicollinearity among the independent variables, a value of 6.22 for first age at marriage was indicated. Thus, the latter showing no major problem with multicollinearity among the independent variables in the 1998 survey.

Important statistical values regarding the multivariate linear regression for the survey in 2003 display 1211 observations and a statistically significant model with a F-statistic (12, 1198) of 45.70 and according p-value of 0.0000. The R-squared is 0.2929, meaning that approximately 29.3 percent of the variability of *ceb45* is accounted for by the independent variables in the model. A visual examination of the KDE indicated no particular difference from the normal distribution estimate of the residuals. An applied test controlling for homoscedasticity yielded a p-value of 0.0000. Since the p-value is smaller than 0.05, heteroscedasticity can be assumed, and thus a robust estimation was implemented. According to the estimation of the VIF, multicollinearity did not seem to be of major concern with a maximum value of 4.06 for age at first marriage.

With regard to the statistical quality of the multivariate linear regression of the survey 2008, the number of observations comprised 1261 individuals. The F-statistic (12, 1248) showed a value of 58.62 with an associated p-value of 0.0000, suggesting statistical significance of the model. To 33.2 percent explained the independent variables the variation within the dependent variable. Due to a p-value of 0.0000 in the Breusch-Pagan test for heteroscedasticity, robust standard errors were utilized in the estimation. Since the KDE did not yield a non-normal distribution, residuals were assumed to be normally distributed. The highest VIF value was indicated by the variable age at first marriage with 4.01. Thus, the issue of multicollinearity should not be of concern in the model.

Table 5: Socio-economic determinants of CEB to women aged 45-49 from 1993 to 2008

Variable	Coeff. 1993	Coeff. 1998	Coeff. 2003	Coeff. 2008
Age at first marriage females aged 45-49	0.08**	0.04	0.01	-0.02
Age at first birth females aged 45-49	-0.03***	-0.27***	-0.22***	-0.17***
Reference category no education				
Primary education females aged 45-49	-0.27	-0.44**	-0.14	-0.46**
Secondary education females aged 45-49	-1.16***	-0.82***	-0.36*	-0.56**
Higher education females aged 45-49	-1.23***	-0.80**	-0.72***	-0.89***
Reference category rural area				
Living urban area females aged 45-49	-0.46**	-0.71***	-0.49**	-0.36**

Reference category no education				
Partner education: primary	-0.22	0.05	-0.10	-0.35*
Partner education: secondary	-0.38	-0.40*	-0.72***	-0.85***
Partner education: higher	-0.80**	-0.71**	-0.59**	-1.07***
Reference category no contraception				
Traditional contraception females aged 45-49	0.34	0.31	-0.34*	-0.70
Modern contraception females aged 45-49	-0.51**	-0.57**	-0.69***	-0.63***
Reference category not married				
Marital status females aged 45-49	0.34	0.67**	0.40**	0.69***
Intercept	12.00***	11.35***	10.69	9.98***

Legend: Level of significance *p<0.1; **p<0.05; ***p<0.001
Source: DHS 1993, 1998, 2003 and 2008 sample

Concerning the multiple linear regression on the number of CEB it has to be pointed out that the analysis does include women with at least one child as could be misunderstood by the variable *age at first birth females aged 45-49*. It is apparent from Table 5 that in the survey for 1993 highly significant coefficients of the multivariate linear regression on CEB to females aged 45-49 years are mother's with secondary or higher education and age at first birth. For females with a higher educational background, holding other things equal the CEB diminished by approximately 1.24 children compared to mother's with no educational attainment. In contrast the education of the partner became merely meaningful at a 95 percent level of significance for higher educated men. With the same level of significance, *ceteris paribus*, the variable living in an urban area displayed a reduction in the number of CEB to mother's aged between 45 and 49 years by 0.46, in contrast to inhabiting a rural area. What is interesting beyond in this estimation is that solely the dummy reporting modern contraception was statistically significant, while this result is absent for traditional method of contraception.

In the results of the multivariate linear regression for the 1998 survey shown in Table 5 particularly significant coefficients (p-value <0.001) yielded age at first birth, mother's with secondary educational level and living in an urban area. For instance, *ceteris paribus*, females holding a secondary school degree had roughly 0.8 children less than mother's with no graduation at all. A negative and meaningful relationship on a 95 percent level of significance, other things being equal, indicated mother's using modern contraceptives with approximately 0.6 less children in comparison to females not utilizing contraceptives. Instead, all other things being equal a significant positive correlation (0.67) on a 95 percent level of significance occurred between CEB and being married, compared to having no husband.

From the data in Table 5, it is apparent that the most significant variables (p-value smaller than 0.001) in the 2003 survey are age at first birth, mother's with a level of higher education, partner with a level of secondary education and use of modern contraception. Other things being equal, partner's with a level of secondary education decreased the CEB by approximately 0.72 children, compared to females with a partner that had no formal educational degree. All other things being equal, females utilizing modern contraceptives had almost 0.7 children less than women using no contraceptives at all. On a 90 percent level of significance, other things being equal, women using traditional contraceptives received roughly 0.35 children less in comparison to females utilizing no contraceptives.

From the data in Table 5 can be seen that in the survey 2008 age at first birth, higher educational level of women, secondary as well as higher educational level of the partner, use of modern contraceptives and marital status were particularly significant (p-value lower than 0.001). While women with a partner having secondary educational attainment, all other things being equal, had less than about 0.86 children, those with a partner having a higher educational attainment had even 1.08 children less in comparison to a female with a partner having no formal educational degree. In opposite, *ceteris paribus*, married women indicated to have roughly 0.7 children more than unmarried females.

5.2 Statistical Results Logistic Regression – Survey 1993 to 2008

In this section the evaluation of the outcomes of the logistic regression takes place. Before reporting the impact of the independent variables on the binary dependent variable, post estimation tests are discussed in relation to each logistic regression for the purpose of valid and unbiased estimates.

Subsequently, the logistic regression for the 1993 survey is assessed. The log likelihood value of the final model accounted for -6321.02. The latter value has no meaning for the quality of the estimation in and of itself. In nested models the log likelihood value might be helpful to compare one model to another. While the number of observations comprised 9452, the likelihood ratio chi square test displayed a figure of 403.52 with 19 degrees of freedom. According to the significant p-value (0.0000), the null hypothesis has to be rejected, since there is a effect of the independent variables on the dependent variable, and thus the overall model is statistically significant. With regard to post estimation tests, an ocular inspection of the residuals indicated no particular outliers, thus assuming valid and consistent estimates. Controlling for multicollinearity utilizing the VIF, the largest yielded figure was 5.42, and thus the model does not seem suspicious regarding multicollinearity. However, in order to receive the results of the final statistical model, the variable *age at first childbirth* had to be omitted from the logistic regression on account of multicollinearity.

The logistic regression results for the 1998 survey comprised the following statistical values regarding the quality of the estimation. 8884 cases were observed and the log likelihood indicated a score of -5951.44. In the likelihood ratio chi square test the value yielded was 328.02 with a p-value of 0.0000. Thus, indicating a logistic model which is highly statistically influential on a 99 percent level of significance. During a graphical display of the residuals, no major outliers could be recognized, by which valid and consistent estimates are assumed. Since the largest figure yielded from the VIF was 5.00, multicollinearity is considered as no major problem among the independent variables. However, repeatedly the variable *age at first childbirth* had to be omitted from the econometric equation in order to receive results for all included variables on account of multicollinearity.

The logistic regression representing the survey of 2003 obtained the following statistical figures. On the whole, 8972 individuals entered the analysis. A log likelihood score of -6052.47 was received. The likelihood ratio chi square test displayed a value of 255.62 with 19 degrees of freedom. Due to an associated p-value of 0.0000, the logistic model suggests statistical significance. Regarding multicollinearity among the independent variables, the VIF indicated a maximum value of 4.40, and thus showed no multicollinearity. Nevertheless, likewise to the previous models, the variable *age at first childbirth* had to be left out from the estimation model in order to receive results without multicollinearity. Performing an ocular inspection of the residuals, could not reveal any abnormalities, by which consistent and valid figures are assumed.

In the 2008 survey, the logistic regression included 8803 observations and the log likelihood value accounted for -5727.37. Since the likelihood ratio chi square test (307.36) was associated by a p-value of 0.0000, the estimated model is assumed to be statistically significant. For the purpose of assessing the validity and consistency of the estimates, the residuals were graphically controlled for outliers. The result indicates no important irregularities. Likewise, the largest VIF value of 4.20 does not depict any problems with multicollinearity. However, in order to perform the estimation of the statistical model without multicollinearity, the variable *age at first childbirth* was omitted.

Table 6: Socio-economic determinants of female labor force participation from 1993 to 2008

Variable	Odds ratio 1993	Odds ratio 1998	Odds ratio 2003	Odds ratio 2008
Age at first marriage	1.03***	1.02***	1.01**	1.01**
Reference category no education				
Primary education females	1.36	1.24	0.84	1.39
Secondary education females	1.35	1.73	1.30	1.27
Higher education females	1.94**	2.27***	2.08**	2.08**
Reference category rural area				
Living urban area	1.09**	1.28***	1.01	1.23***
Reference category no education				
Partner education: primary	0.82***	1.02	0.97	1.24**
Partner education: secondary	0.87**	0.93	0.86**	0.86**
Partner education: higher	1.10	1.09	0.88*	0.87*
Reference category no contraception				
Traditional contraception	1.35***	1.15**	1.10	1.23**
Modern contraception	1.26***	1.21***	1.17**	1.39***

Reference category not married				
Marital status	0.63***	0.74***	0.95	1.20**
Reference category no children				
Females with maximum number of three children	0.80	0.76	0.74*	0.70**
Females with at least four children	1.05	1.23	1.30	1.17
Reference category no education and no children				
Primary education and maximum three children	0.83	0.99	1.13	0.72
Secondary education and maximum three children	0.82	0.65	0.73	0.80
Higher education and maximum three children	1.08	0.86	0.92	0.92
Primary education and at least four children	0.61*	0.85	1.03	0.74
Secondary education and at least four children	0.58**	0.48**	0.55*	0.64*
Higher education and at least four children	0.74	0.68	0.67	0.66*

Legend: Level of significance *p<0.1; **p<0.05; ***p<0.001
Source: DHS 1993, 1998, 2003 and 2008 sample

To assess the socio-economic determinants of female labor force participation in the Philippines, 6 dummy variables and two control variables were examined. Subsequently, the most significant results in the 1993 survey depicted in Table 6 are pointed out in more detail. Before proceeding to the evaluation of the results, it has to be indicated that the interpretation comprises odds ratios. While odds ratios equal to 1 denounce no relationship, values greater than 1 display positive relationships and values below 1 reflect a negative relationship. According to the results in Table 6, a rather strong positive link exists between pursuing an employment and *woman with a higher educational attainment*. Belonging to the latter category increases the odds of working by massive 94 percent (table value 1.94) compared to women without education. In case the female lives in an *urban area* the odds *participating in the workforce* rises by approximately 9.6 percent in contrast to women living in a *rural area*. Instead, having a *partner with primary or secondary education* decreases the odds of occupation of the females by more than 17 percent (value calculated by subtracting 0.83 from 1), 12.9 percent respectively, compared to woman with a *partner without education.* The level of significance was particularly high (p-value < 0.001) for both, traditional and modern method of contraception. *Traditional type of contraception* increased the odds of following a profession by more than 35 percent, and more than 26 percent for females using *modern contraceptives*, in contrast to women utilizing *no contraceptives*. Interestingly, the odds of participating in the workforce decreased by 38.6 percent for females with primary education and at least four children compared to women without education and no children. Similarly the odds having an employment declined by more than 41.2 percent for women with a secondary level of education and at least four children, in contrast to females without education and no children.

With regard to the logistic regression of the 1998 survey, a highly statistically significant correlation is indicated between female labor force participation and women with a higher educational level. The odds of employment increase by extraordinary 127.4 percent, compared to females with no education. By 28.2 percent the odds of pursuing an employment intensified, by contrast with females inhabiting a rural area. Traditional as well as modern methods of contraception showed positive odds. While females utilizing traditional contraception increased their odds by almost 16 percent, women using modern contraceptives gain their odds by 21.1 percent in comparison with women that avail no contraceptives. Finally, on a 95 percent level of significance the odds of participating in the labor force diminished by 51.3 percent for females with secondary education and at least four children, compared to women without education and no children.

The logistic regression of the socio-economic determinants of female labor force participation for the survey 2003 yielded the following results shown in Table 6. Having a higher level of education extended the odds by more than 108 percent for being employed, compared with women without education. Instead, the odds for working diminished by almost 14 percent if the partner possessed a secondary educational attainment, in contrast with partners having no education. On a 95 level of significance, the odds being active in the workforce increased by 17.7 percent for women using modern contraception, by comparison with females availing no contraception. It is apparent from Table 6 that the odds for women with secondary education and at least four children decreased by 44.8 percent of belonging to the active workforce.

Logistic regression analysis in the survey 2008 indicated the following results, depicted in Table 6, concerning the socio-economic determinants of female labor force participation in the Philippines. Women having a high level of education showed increased odds for being active in the labor force. Nearly 108.4 percent increases the chance having a job, compared with females having no education at all. Being an inhabitant of an urban area enlarged the probability of working by 23.3 percent, in contrast to living in the countryside. While females having a partner with primary educational attainment had odds which indicated almost 25 percent larger chances of employment, females with a partner having secondary educational attainment depicted nearly 14 percent lower workforce participation, in contrast to women with a partner having no education at all. Females using traditional as well as modern contraception increased the likelihood of belonging to the workforce by 23.5 percent and almost 40 percent respectively. Up to now non-significant, females with a maximum number of three children had in the 2008 survey a 29.3 percent lower chance of practicing a profession, compared with women having no children. Merely slightly significant (p-value < 0.1) women with a secondary educational attainment and at least four children as well as females with a higher educational level and at least four children had both lower odds of being in the workforce, by contrast with females having no education and no children. 35.7 percent lower for women with a secondary educational level and almost 34 percent lower for females with a higher educational background.

5.3 Discussion

Before entering the actual discussion about the empirical results of the multivariate linear as well as the logistic regression in this section, a short explanation considers theoretically important, but omitted variables. At the end of this section, relevant methodological restraints for the interpretation of the results are pointed out.

While theoretical considerations strongly suggested the introduction of the variable *wealth index* into both econometric equations, the statistical results showed without exception non-significant p-values. Basically, the *wealth index* was invented in order to substitute for missed information on socio-economic status within the households in the DHS surveys. However, the indicator is accused of being too urban and "[…] does not distinguish the poorest of the poor from other poor households" (Rutstein 2008, 4). Due to the non-significant p-values and the discussion about the actual measurement quality of the wealth quintile indicator the decision was taken to exclude the variable from the whole analysis process. As indicated earlier, the control variable *age at first childbirth* was omitted in the logistic regression since it caused multicollinearity problems among the independent variables. Omitting the variable was the only possible way to obtain figures on other analytically important variables in the logistic regression.

With respect to the question of the most important determinant of a reduction in the number of *CEB* to *females aged 45-49* in the Philippines, the response has to be *educational level of the mother as well as the educational level of the partner*. Prior studies (e.g. Caldwell 1908, Regassa 2007, Kreider et al. 2009, Adhikari 2010) have noted the importance of *educational attainment* with regard to the impact on *CEB*, and thus confirm the results. However, while *educational attainment* was most frequently significant in all four investigated periods, the appearance of the different *educational levels for females and the educational level for partners* fluctuate over time. Interestingly, the dummy indicating *mothers with a higher level of education* has an u-shaped form over time. That is, the coefficients for 1993 (-1.23) and 2008 (-0.9) represent a peak. A slightly similar result is to report for the dummy that reports for *partner with a higher educational level*, which in analogy to the female dummy depicts a negative and u-shaped relationship (-0.8 in 1993 and -1.08 in 2008). Contrary to expectations, the dummy *partner with a higher level of education* contributes the largest impact on fertility decline in the last investigated survey. When comparing women and men regarding *higher educational level*, it can be seen that the general trend on the number of *CEB* was more negative for males than for females. This discrepancy could be due to increasingly tougher conditions men facing in higher employment levels and their struggle for a career which might constitute an obstacle concerning the desired number of *CEB*. At this point the mechanisms of the QQTO should be evoked. While the QQTO applies to both genders, women might get used to the situation, and thus developed better strategies than men to unify career and offspring over time. Moreover, *women with a higher educational attainment* could experience an even more enhanced status in society than men that serves as an incentive to perceive more children in order to encounter the limitations of previous Philippine cohorts. Simultaneously, in contrast to men, *women* achieving a *higher educational level* might have a more pronounced desire to pass on and to share their acquired knowledge with a larger succeeding generation.

In the current study, comparing *females and males with a secondary level of education* and their impact on *CEB* showed that the general negative trend among *mothers* is declining (-1.16 to -0.57). At the same time, the negative trend among *partners* has more than doubled between the surveys of 1998 and 2008 (-0.41 and -0.86). Thus, indicating a possible regime change between men and women in the determination of the number of *CEB*. There are several possible explanations for this result. Similar to the paragraph above, men might be victim of more vigorous work in order to stand competition on the job market. Moreover, assuming men as the main bread winner in the Philippines, they have to bear the major burden to enhance living standards in a more and more consumerist society. It was hypothesized that the *educational level of women and men* expanded over time, and thus contributes to a decline in *completed fertility*. While *educational attainment* increased among *women and men* with a *secondary or higher level of education*, individuals with a *primary educational degree* were represented less in the examined samples over time. With regard to the educational parameters, all coefficients (statistically significant or non-significant) possessed negative algebraic signs, and thus demonstrate a negative impact on *completed fertility* in the Philippines. However, the most negatively pronounced results on completed fertility yielded particularly *women and men* with a *secondary or higher educational attainment*.

With regard to the indicator *place of residence* no particular pattern is attributable. The results of the descriptive statistics show that urbanization intensified in temporal comparison which is in accordance with the expectations in the formulated hypothesis. The overall development of the coefficient was less negative with an increase by 0.09, from -0.46 in 1993 to -0.37 in 2008. This study produced results which corroborate the findings of a great deal of the previous work in this field. In contrast to earlier findings (e.g. Orbeta 2005), however, merely a rather weak impact of *living in an urban area* was detected. It is somewhat surprising that *living in an urban area* has a rather low significant magnitude and a less negative trend with respect to urbanization processes in general. These finding suggests that the theoretical background which assumes major differences between the *rural and urban area* concerning *CEB* is not applicable to a large extent of the examined surveys. While the amount of urbanites increased in the samples over time (from 0.038 to 0.049), once having migrated to the city the temporal comparison shows a downswing in the contribution to the decline (-0.46 in 1993 versus -0.36 in the 2008 survey) in completed fertility so that the formulated hypothesis is conformed. It is difficult to explain the decline of the coefficient, but it might be that the temptations of town life which compete with parenthood are decreasing.

The present study shows that the use of a *modern type of contraception* has a relatively strong negative impact on the number of *CEB*. While the effect rose until the survey in 2003 (-0.7), it reduced slightly, to -0.64, in the 2008 survey. The findings of the current study are consistent with those of Kreider et al. (2009) who found that *modern contraception* contributed towards a more rapid decline in fertility. A possible explanation for the weaker impact in the 2008 survey might be attributable to the phase out of a free provision of *modern contraceptives* by USAID in 2003 and the accompanied lack of funds in the Philippine budget to continue the distribution of free of charge contraceptives. With regard to a *traditional method of contraception* the coefficient was in three out of four surveys non-significant. Contrary to Regassa (2007), this study has been unable to demonstrate that a *traditional method of contraception* has an impact on the number of *CEB*. In this context one should recollect the formulated hypothesis. Since *traditional and modern methods of contraception* expanded, they contributed perceivably to the decline in *completed fertility* in the Philippines. Both, *traditional and modern contraception* were more pronounced in the sample over time. However, merely *modern contraception* provides persistent and statistically significant coefficients which indicate a slightly increased negative contribution to *completed fertility* in the Philippines, by which the hypothesis is confirmed for a *modern method of contraception*, but not for a *traditional method of contraception*. Simultaneously, the question has to be asked which women in the age 45 to 49 would use contraception. Above all, those women who have completed desired fertility. In addition, wealth- as well as education-related issues should, as already depicted earlier in the thesis, drive fertility intentions, and thus be concordant with the use of contraception. According to Creanga et al. (2011), such concordance might reflect a woman's familiarity with various methods of contraception and their time frame regarding the protection against pregnancy. Moreover, it may show the larger availability, affordability and acceptability of a contraception method or just female's preferences (Creanga et al 2011).

An additional question in this study considered the relationship between socio-economic variables (e.g. fertility) and female labor force participation in the Philippines. A binary dependent variable approach in a logistic regression yielded that particularly for *females with a higher level of education* the odds ratios were far above a value of one, signaling a very positive impact on *being active in the labor force*, in contrast to *females without education*. After a peak in the 1998 survey (with an odds ratio of 2.27) the odds ratio value decreased in 2008 to 2.08. Slightly less pronounced, but still positive odds ratios for *being employed* were received in case females lived in an *urban area*, compared to inhabiting a *rural region*. The odds ratios of this variable increased over time from 1.09 in 1993 to 1.23 in 2008, which might prove that the opportunity finding a job position is easier in *urban areas* or that living in a city, in general, has not lost its attraction in the evaluated data sets. With respect to the relationship between *modern contraception* and *female labor force participation*, positive and increasing odds ratios were obtained, and thus chances of having an employment were larger among females applying this method of *contraception*. This finding is in agreement with Adhikari's (2010) findings which showed that women with less familiarity of *contraception* knowledge had a higher number of children, suggesting simultaneously more difficulties in obtaining an employment. Surprisingly, the generated dummies and interaction variables on *number of children* as well as *number of children and female educational attainment* were less significant than expected. Nevertheless, in case of significance all figures report odds ratios below one, by which a negative link between the *existence of children* and *female labor force participation* in the Philippines is established. At least on a 90 percent level of significance, having a *primary, secondary or higher educational level and not less than four children* yielded results indicating declining chances of *belonging to the active workforce* which were between 33 and 45 percent, compared to *females with no education and no children* at all. Accordingly the associated hypothesis is confirmed which assumed that with a larger *number of children* the probability of *being active in the workforce* diminishes, while the amount of *female labor force participation* increased in the considered period. A possible explanation for this might be that women have difficulties in providing child care to a larger *number of offspring* or that compared with other candidates who have the same *educational background* and *no children* the access to the labor market is less complicated. That is, employers might assume *females with no children* more career orientated or possessing greater personal energy resources and being less vulnerable to stress or distractions from work by their children.

Finally, some important remarks on the quality of the results. Regassa (2007) provides two apparently logic reasons why he excluded female labor force participation from his multivariate regression analysis. On the one hand, he claims that the study population is too homogeneous and therefore nearly all respondents are solely unpaid family workers. Thus, the hypothesis concerning the role of incompatibility and opportunity cost is not applicable. On the other hand, and more important for the present study, the absence of detailed work histories undermines the estimation of the effects in which work within a certain period relates to the quantity of births or the probability of receiving a child in that or a later period (Regassa 2007, 208). While the study population does not seem too homogeneous in this study, DHS data does not provide detailed work histories. Thus, it is daring to establish a direct relationship between the *existence of children* and the associated *labor force participation* of the mother. Moreover, DHS data analysis for the 2000 survey for Sri Lanka revealed that the island was the first country among all developing countries in South Asia to reach below replacement level fertility. This result seems to be rather contradictory with theory on fertility decline (e.g. Notestein 1948) considering the country's per capita GDP amounted to merely 1,990 US$, compared to 1747 US$ (in 2009) and a TFR of approximately 3.27 in the Philippines.

Despite the application of post estimation tests, the results must be interpreted with caution since both econometric models could still suffer from endogeneity, i.e. the value of one independent variable is dependent on the value of other predictor variables. Endogeneity is provoked by reverse causality, simultaneity, missing variables or measurement error. As a consequence, a bias might occur that reports coefficients and odds ratios either too high or too low. The above mentioned problems might have a not negligible impact on the statistical results, and thus should be born in mind while drawing conclusions from the presented figures.

6 Conclusion

6.1 General Inferences

In this part of the thesis, the main areas covered in the study are summarized in order to provide a retrospective review of the achieved work.

This master thesis has investigated the socio-economic determinants of fertility behavior and female labor force participation in the Philippines, using DHS survey data of the years 1993, 1998, 2003 and 2008. In this investigation, the aim was to identify the driving force for the decline in *completed fertility* as well as to examine the link between *number of children* and *female labor force participation* in the Philippines. Besides, the study intended to evaluate whether or not significant socio-economic variables were consistent over time and if there were perceptible changes in the magnitude of those significant socio-economic coefficients.

For the period of time considered, this study has shown that the *educational level of females and males* was the driving force of the fertility decline in the Philippines. One of the more significant findings to emerge from this study is that the contribution to the reduction in *completed fertility* through *educational attainment* is downward for females, but upward for males. The present study confirms the postulated hypothesis and previous findings regarding the link between *educational diffusion* and reductions in *completed fertility*. Moreover, the study contributes additional evidence which suggests that the *educational background* of the partner has an important and growing impact on *fertility behavior*. It was also shown that the presence of children, peculiarly more than three, diminished noticeably the chances of *female labor force participation* which is in accordance with the postulated hypothesis.

The second major finding was that, among the coefficients with a persistently significant p-value in all four surveys, no straight increase or decrease could be detected. This result supports the idea that in each considered year sometimes the one, sometimes the other factor plays a larger role in the determination of the *completed fertility*. Similar fluctuating results yielded the distribution of the odds ratios representing *presence of children* in regard to *female labor force participation*. While the magnitude of the *presence of children* on *female labor force participation* reduced, utilizing a *modern method of contraception* and having a *partner with a higher educational level* could intensify their contribution towards reductions in *completed fertility* over time.

6.2 Outlook

This section gives a final judgment and considers suggestions for improvement in further research within the field due to limitations and caveats in the present study.

A major point for prospective consideration might be the inclusion of a variable reporting whether females or their partners were oversea contract workers, a not to negligible phenomenon in the Philippines. In this context, it is important to mention that oversea contract workers might provide substantial remittances that could have severe consequences on the development of fertility behavior of the prospective families in the Philippines. Besides, the distance, and thus (temporal) disruption of partnerships could be conceived as obstacle in fertility planning as well as on the "implementation" of fertility in practice. To ensure a meaningful contribution to the analysis, a possible variable reporting for oversea contract work should contain a work history which can be linked to the birth history of the respective woman or man in order to draw conclusions about the interrelationship between working abroad and parenthood.

A second main point capable of improvement is an adequate variable reporting for the wealth or financial background (desirably entangled with the remittances from abroad) of the females and their partners. While the section on theoretical background displays several theories (e.g. Becker 1960; Easterlin 1975) about the correlation between household income and educational attainment, desired family size as well as the effectiveness of contraceptive use, the present study misses to address and evaluate this issue with decently generated variables.

Finally, in future investigations it might be interesting to analyze the *number of living children*, instead of *children ever born to females aged 45-49* in order to compare the yielded estimates to the presently acquired ones. Moreover, the incorporation of a macro-perspective in form of family policies might be informative regarding fertility behavior as well as female labor force participation in the Philippines.

The issue of *socio-economic determinants* on *fertility and female labor force participation* in the Philippines is an intriguing one which could be usefully explored in further research. Continuing analysis is essential in order to observe future direction of changes in fertility, while current trends indicate a progressive decline in *completed fertility* in the Philippines.

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Appendix

In order to support the scientific gold standard, the appendix includes the *do*- as well as the *log-file* from the accomplished analysis in Stata.

Since the analysis in Stata included the merging of files, the attached Stata *log-files* are based on the dataset *Mergedfile1993.dta* for the 1993 survey, and *Mergedfile1998.dta* for the 1998 survey. With regard to the survey in 2003 and 2008 the *log-files* are based on *Keepfile2003.DTA* and *Keepfile2008.DTA*, respectively. All the above mentioned Stata files can be made available by the author.

```
*************************************************************************
*Master Thesis Socio-Economic Determinants of Fertility      *
*In The Philippines -- Survey 1993/Survey 1998               *
*************************************************************************
clear
set mem 100m
set more off
cd "H:\Master thesis USB\Stata_Do_files"

***survey 1993***
log using masterthesis1993.log,replace

use "\Master thesis USB\Stata_files_1993\PHIR31FL.DTA", clear
use "\Master thesis USB\Stata_files_1993\PHWI31FL.DTA", clear
use "\Master thesis USB\Stata_files_1993\Keepfile1993.DTA", clear
use "\Master thesis USB\Stata_files_1993\wealthindex1993.DTA", clear
use "\Master thesis USB\Stata_files_1993\Mergedfile1993.dta", clear
use "\Master thesis USB\Stata_files_1993\Analysisfile1993.dta", clear

***survey 1998***
log using masterthesis1998.log,replace

use "\Master thesis USB\Stata_files_1998\PHIndividualRecode3AFL.DTA", clear
use "\Master thesis USB\Stata_files_1998\PHWealthIndex3AFL.DTA", clear
use "\Master thesis USB\Stata_files_1998\Keepfile1998.DTA", clear
use "\Master thesis USB\Stata_files_1998\Mergedfile1998.DTA", clear
use "\Master thesis USB\Stata_files_1998\Analysisfile1998.DTA", clear
```

```
*basic variable overview
desc
sum
codebook
*keep essential variables for analysis
keep  caseid v001-v003 v010-v012 v102 v149 v201 v212 v312 v313 v501 v511 v716 v717 v729

*merge individual dataset with wealth index dataset
merge m:1 v002 using Windex_1993.DTA
*omit cases "using only (2)"
drop if _merge==2

***generationg dummies - only for mothers age 45 and beyond***
*generate total children ever born by mothers equal or above age 45
gen ceb45 = v201 if v012>=45

*generate dummy if urban (reference category rural area)
gen d_urban45=0
replace d_urban45=1 if v102==1 & v012>=45

*generate dummy if maternal primary education complete (reference category no education)
gen d_primoth45=0
replace d_primoth45=1 if v149==2 & v012>=45

*generate dummy if maternal secondary education complete (reference category no education)
gen d_secmoth45=0
replace d_secmoth45=1 if v149==4 & v012>=45

*generate dummy if mother completed higher education (reference category no education)
gen d_highmoth45=0
replace d_highmoth45=1 if v149==5 & v012>=45

*generate dummy if partner's primary education complete (reference category no education)
gen d_pripart=0
replace d_pripart=1 if v729==2
*generate dummy if partner's secondary education complete (reference category no education)
gen d_secpart=0
replace d_secpart=1 if v729==4
```

```
*generate dummy if partner completed higher education (reference category no education)
gen d_highpart=0
replace d_highpart=1 if v729==5

*generate age at 1st birth if mother aged 45 or above
gen fstbirage45= v212 if v012>=45

*generate age at first marriage if mother aged 45 or above
gen fstmarage45= v511 if v012>=45

*dummy current marital status if mother aged 45 or above (reference category never married)
gen d_marstat45=.
replace d_marstat45=1 if v501==1 & v012>=45
replace d_marstat45=0 if v501==0 & v012>=45 | v501==2 & v012>=45 | v501==3 & v012>=45 |
v501==4 & v012>=45

*dummy contraceptive method traditional for mother aged 45 or above(reference category no method)
gen d_conttra45=0
replace d_conttra45=1 if v313==2 & v012>=45

*dummy contraceptive method modern for mother aged 45 or above (reference category no method)
gen d_contmod45=0
replace d_contmod45=1 if v313==3 & v012>=45

*multiple regression equation
reg ceb45 fstmarage45 fstbirage45 d_primoth45 d_secmoth45 d_highmoth45 ///
    d_urban45  d_pripart d_secpart d_highpart ///
    d_conttra45 d_contmod45 d_marstat45

***post estimation tests***
predict res,r
*Breusch-Pagan test*
estat hettest

*checking for multicollinearity (value greater than 10 needs further investigation)
estat vif
```

```
*normality of the residuals
kdensity res,normal

*multiple regression equation - robust
reg ceb45 fstmarage45 fstbirage45 d_primoth45 d_secmoth45 d_highmoth45 ///
    d_urban45  d_pripart d_secpart d_highpart ///
    d_conttra45 d_contmod45 d_marstat45, robust
*********************************************************************************************************
***logistic regression***
*dummy binary dependent variable flfp
gen d_flfp=0
replace d_flfp=1 if v716>0

*generate dummy no of children maximum three (reference category no children)
gen d_chithr = v201>=1 & v201<4

*generate dummy no of children four plus (reference category no children)
gen d_chifou = v201>=4 & v201<17

*generate dummy if urban (reference category rural area)
gen d_urban=0
replace d_urban=1 if v102==1

*generate dummy if maternal primary education complete (reference category no education)
gen d_primoth=0
replace d_primoth=1 if v149==2
*generate dummy if maternal secondary education complete (reference category no education)
gen d_secmoth=0
replace d_secmoth=1 if v149==4
*generate dummy if mother completed higher education (reference category no education)
gen d_highmoth=0
replace d_highmoth=1 if v149==5

*generate age at 1st birth if mother aged 45 or above
gen fstbirage= v212

*generate age at first marriage if mother aged 45 or above
gen fstmarage= v511
```

```
*dummy current marital status if mother aged 45 or above (reference category never married)
gen d_marstat=.
replace d_marstat=1 if v501==1
replace d_marstat=0 if v501==0 | v501==2 | v501==3 | v501==4

*dummy contraceptive method traditional for mother aged 45 or above(reference category no method)
gen d_conttra=0
replace d_conttra=1 if v313==2

*dummy contraceptive method modern for mother aged 45 or above (reference category no method)
gen d_contmod=0
replace d_contmod=1 if v313==3

***creation of interaction variables***
*interaction term primery/secondery/higher edu. mother max. three children
gen primoth_chithr = d_primoth*d_chithr
gen secmoth_chithr = d_secmoth*d_chithr
gen highmoth_chithr = d_highmoth*d_chithr

*interaction term primery/secondery/higher edu. mother four children plus
gen primoth_chifou = d_primoth*d_chifou
gen secmoth_chifou = d_secmoth*d_chifou
gen highmoth_chifou = d_highmoth*d_chifou

***summary of (all) descriptive statistics***
sum ceb45 fstmarage45 fstbirage45 d_flfp d_primoth45 d_secmoth45 d_highmoth45 ///
    d_urban45  d_pripart d_secpart d_highpart d_conttra45 d_contmod45 d_marstat45 ///
    fstmarage fstbirage d_primoth d_secmoth d_highmoth ///
    d_urban d_conttra d_contmod d_marstat d_chithr d_chifou ///
    primoth_chithr secmoth_chithr highmoth_chithr       ///
    primoth_chifou secmoth_chifou highmoth_chifou

***logistic regression & post estimation***
*logistic regression equation
logistic d_flfp fstmarage d_primoth d_secmoth d_highmoth ///
    d_urban  d_pripart d_secpart d_highpart ///
    d_conttra d_contmod d_marstat d_chithr d_chifou   ///
    primoth_chithr secmoth_chithr highmoth_chithr       ///
```

```
    primoth_chifou secmoth_chifou highmoth_chifou, nolog

*post estimation analyses residuals
predict res_log, residuals
graph twoway scatter res_log d_flfp

*test significant effect (multiple) independent on dependent variable
test fstmarage d_primoth d_secmoth d_highmoth ///
    d_urban  d_pripart d_secpart d_highpart ///
    d_conttra d_contmod d_marstat d_chithr d_chifou   ///
    primoth_chithr secmoth_chithr highmoth_chithr       ///
    primoth_chifou secmoth_chifou highmoth_chifou

*multicollinearity test via correlation matrix/regression plus vif
corr d_flfp fstmarage d_primoth d_secmoth d_highmoth ///
    d_urban  d_pripart d_secpart d_highpart ///
    d_conttra d_contmod d_marstat d_chithr d_chifou   ///
    primoth_chithr secmoth_chithr highmoth_chithr       ///
    primoth_chifou secmoth_chifou highmoth_chifou

*multicollinearity via OLS plus vif
reg d_flfp fstmarage d_primoth d_secmoth d_highmoth ///
    d_urban  d_pripart d_secpart d_highpart ///
    d_conttra d_contmod d_marstat d_chithr d_chifou   ///

estat vif

*normality of the residuals
kdensity res_log,normal
log close

*************************************************************************
*Master Thesis Socio-Economic Determinants of Fertility      *
*In The Philippines -- Survey 2003/2008                       *
*************************************************************************
clear
set mem 100m
set more off
cd "H:\Master thesis USB\Stata_Do_files"
```

```
***survey 2003***
log using masterthesis2003.log,replace

use "\Master thesis USB\Stata_files_2003\PHIR41FL.DTA", clear
use "\Master thesis USB\Stata_files_2003\Keepfile2003.DTA", clear
use "\Master thesis USB\Stata_files_2003\Analysisfile2003.DTA", clear

***survey 2008***
log using masterthesis2008.log,replace

use "\Master thesis USB\Stata_files_2008\PHIR52FL.DTA", clear
use "\Master thesis USB\Stata_files_2008\Keepfile2008.DTA", clear
use "\Master thesis USB\Stata_files_2008\Analysisfile2008.DTA", clear

*basic variable overview
desc
sum
codebook
*keep essential variables for analysis
keep  caseid v001-v003 v010-v012 v102 v149 v190 v191 v201 v212 v313 v501 v511 v716 v717 v729

***generationg dummies - only for mothers age 45 and beyond***
*generate total children ever born by mothers equal or above age 45
gen ceb45 = v201 if v012>=45

*generate dummy if urban (reference category rural area)
gen d_urban45=0
replace d_urban45=1 if v102==1 & v012>=45

*generate dummy if maternal primary education complete (reference category no education)
gen d_primoth45=0
replace d_primoth45=1 if v149==2 & v012>=45

*generate dummy if maternal secondary education complete (reference category no education)
gen d_secmoth45=0
replace d_secmoth45=1 if v149==4 & v012>=45
*generate dummy if mother completed higher education (reference category no education)
gen d_highmoth45=0
```

```
replace d_highmoth45=1 if v149==5 & v012>=45

*generate dummy if partner's primary education complete (reference category no education)
gen d_pripart=0
replace d_pripart=1 if v729==2
*generate dummy if partner's secondary education complete (reference category no education)
gen d_secpart=0
replace d_secpart=1 if v729==4
*generate dummy if partner completed higher education (reference category no education)
gen d_highpart=0
replace d_highpart=1 if v729==5

*generate age at 1st birth if mother aged 45 or above
gen fstbirage45= v212 if v012>=45

*generate age at first marriage if mother aged 45 or above
gen fstmarage45= v511 if v012>=45

*dummy current marital status if mother aged 45 or above (reference category never married)
gen d_marstat45=.
replace d_marstat45=1 if v501==1 & v012>=45
replace d_marstat45=0 if v501==0 & v012>=45 | v501==2 & v012>=45 | v501==3 & v012>=45 |
v501==4 & v012>=45

*dummy contraceptive method traditional for mother aged 45 or above(reference category no method)
gen d_conttra45=0
replace d_conttra45=1 if v313==2 & v012>=45

*dummy contraceptive method modern for mother aged 45 or above (reference category no method)
gen d_contmod45=0
replace d_contmod45=1 if v313==3 & v012>=45

*multiple regression equation
reg ceb45 fstmarage45 fstbirage45 d_primoth45 d_secmoth45 d_highmoth45 ///
    d_urban45  d_pripart d_secpart d_highpart ///
    d_conttra45 d_contmod45 d_marstat45
```

```
*post estimation tests
predict res,r
*Breusch-Pagan test
estat hettest

*multiple regression equation
reg ceb45 fstmarage45 fstbirage45 d_primoth45 d_secmoth45 d_highmoth45 ///
    d_urban45  d_pripart d_secpart d_highpart ///
    d_conttra45 d_contmod45 d_marstat45,robust

*checking for multicollinearity (value greater than 10 needs further investigation)
estat vif

*normality of the residuals
kdensity res,normal
*************************************************************************************************************
***logistic regression***
*dummy binary dependent variable flfp
gen d_flfp=0
replace d_flfp=1 if v716>0

*generate dummy no of children maximum three (reference category no children)
gen d_chithr = v201>=1 & v201<4

*generate dummy no of children four plus (reference category no children)
gen d_chifou = v201>=4 & v201<17

*generate dummy if urban (reference category rural area)
gen d_urban=0
replace d_urban=1 if v102==1

*generate dummy if maternal primary education complete (reference category no education)
gen d_primoth=0
replace d_primoth=1 if v149==2
*generate dummy if maternal secondary education complete (reference category no education)
gen d_secmoth=0
replace d_secmoth=1 if v149==4
*generate dummy if mother completed higher education (reference category no education)
```

```
gen d_highmoth=0
replace d_highmoth=1 if v149==5

*generate age at 1st birth if mother aged 45 or above
gen fstbirage= v212

*generate age at first marriage if mother aged 45 or above
gen fstmarage= v511

*dummy current marital status if mother aged 45 or above (reference category never married)
gen d_marstat=.
replace d_marstat=1 if v501==1
replace d_marstat=0 if v501==0 | v501==2 | v501==3 | v501==4

*dummy contraceptive method traditional for mother aged 45 or above(reference category no method)
gen d_conttra=0
replace d_conttra=1 if v313==2

*dummy contraceptive method modern for mother aged 45 or above (reference category no method)
gen d_contmod=0
replace d_contmod=1 if v313==3

***creation of interaction variables***
*interaction term primery/secondery/higher edu. mother max. three children
gen primoth_chithr = d_primoth*d_chithr
gen secmoth_chithr = d_secmoth*d_chithr
gen highmoth_chithr = d_highmoth*d_chithr

*interaction term primery/secondery/higher edu. mother four children plus
gen primoth_chifou = d_primoth*d_chifou
gen secmoth_chifou = d_secmoth*d_chifou
gen highmoth_chifou = d_highmoth*d_chifou

*summary of (all) descriptive statistics
sum ceb45 fstmarage45 fstbirage45 d_flfp d_primoth45 d_secmoth45 d_highmoth45 ///
    d_urban45  d_pripart d_secpart d_highpart d_conttra45 d_contmod45 d_marstat45 ///
    fstmarage fstbirage d_primoth d_secmoth d_highmoth ///
    d_urban d_conttra d_contmod d_marstat d_chithr d_chifou ///
```

```
    primoth_chithr secmoth_chithr highmoth_chithr      ///
    primoth_chifou secmoth_chifou highmoth_chifou

***logistic regression & post estimation***
*logistic regression equation
logistic d_flfp fstmarage d_primoth d_secmoth d_highmoth ///
    d_urban  d_pripart d_secpart d_highpart ///
    d_conttra d_contmod d_marstat d_chithr d_chifou  ///
    primoth_chithr secmoth_chithr highmoth_chithr      ///
    primoth_chifou secmoth_chifou highmoth_chifou, nolog

*post estimation analyses
predict resid, residual
graph twoway scatter resid d_flfp

*test significant effect (multiple) independent on dependent variable
test fstmarage d_primoth d_secmoth d_highmoth ///
    d_urban  d_pripart d_secpart d_highpart ///
    d_conttra d_contmod d_marstat

*multicollinearity test via correlation matrix/regression plus vif
corr d_flfp fstmarage d_primoth d_secmoth d_highmoth ///
    d_urban  d_pripart d_secpart d_highpart ///
    d_conttra d_contmod d_marstat

*multicollinearity via OLS plus vif
reg d_flfp fstmarage d_primoth d_secmoth d_highmoth ///
    d_urban  d_pripart d_secpart d_highpart ///
    d_conttra d_contmod d_marstat d_chithr d_chifou

estat vif

*normality of the residuals
kdensity res,normal
log close
```

```
-------------------------------------------------------------------------------------
------------
      name:  <unnamed>
       log:  H:\Master thesis USB\Stata_Do_files\masterthesis1993.log
  log type:  text
 opened on:  10 May 2012, 09:52:51

.
end of do-file

. do "C:\Users\Gerolf\AppData\Local\Temp\STD05000000.tmp"

. use "\Master thesis USB\Stata_files_1993\Mergedfile1993.dta", clear

.
end of do-file

. do "C:\Users\Gerolf\AppData\Local\Temp\STD05000000.tmp"

. ********************************************************
. *Master Thesis Socio-Economic Determinants of Fertility*
. *In The Philippines -- Survey 1993                     *
. ********************************************************
.
. ***generationg dummies - only for mothers age 45 and beyond***
. *generate total children ever born by mothers equal or above age 45
. gen ceb45 = v201 if v012>=45
(13885 missing values generated)

.
. *generate dummy if urban (reference category rural area)
. gen d_urban45=0

. replace d_urban45=1 if v102==1 & v012>=45
(574 real changes made)

.
. *generate dummy if maternal primary education complete (reference category no
education)
. gen d_primoth45=0

. replace d_primoth45=1 if v149==2 & v012>=45
(356 real changes made)

.
. *generate dummy if maternal secondary education complete (reference category
no education)
. gen d_secmoth45=0

. replace d_secmoth45=1 if v149==4 & v012>=45
(111 real changes made)

.
. *generate dummy if mother completed higher education (reference category no
education)
. gen d_highmoth45=0

. replace d_highmoth45=1 if v149==5 & v012>=45
(216 real changes made)

.
. *generate dummy if partner's primary education complete (reference category no
education)
. gen d_pripart=0

. replace d_pripart=1 if v729==2
(2126 real changes made)
```

```
. *generate dummy if partner's secondary education complete (reference category
no education
> )
. gen d_secpart=0

. replace d_secpart=1 if v729==4
(1859 real changes made)

. *generate dummy if partner completed higher education (reference category no
education)
. gen d_highpart=0

. replace d_highpart=1 if v729==5
(2102 real changes made)

.
. *generate age at 1st birth if mother aged 45 or above
. gen fstbirage45= v212 if v012>=45
(13977 missing values generated)

.
. *generate age at first marriage if mother aged 45 or above
. gen fstmarage45= v511 if v012>=45
(13951 missing values generated)

.
. *dummy current marital status if mother aged 45 or above (reference category
never married
> )
. gen d_marstat45=.
(15029 missing values generated)

. replace d_marstat45=1 if v501==1 & v012>=45
(893 real changes made)

. replace d_marstat45=0 if v501==0 & v012>=45 | v501==2 & v012>=45 | v501==3 &
v012>=45 | v5
> 01==4 & v012>=45
(222 real changes made)

.
. *dummy contraceptive method traditional for mother aged 45 or above(reference
category no
> method)
. gen d_conttra45=0

. replace d_conttra45=1 if v313==2 & v012>=45
(74 real changes made)

.
. *dummy contraceptive method modern for mother aged 45 or above (reference
category no meth
> od)
. gen d_contmod45=0

. replace d_contmod45=1 if v313==3 & v012>=45
(190 real changes made)

.
. *multiple regression equation
. reg ceb45 fstmarage45 fstbirage45 d_primoth45 d_secmoth45 d_highmoth45 ///
>         d_urban45  d_pripart d_secpart d_highpart ///
>         d_conttra45 d_contmod45 d_marstat45

      Source |       SS       df       MS              Number of obs =    1019
-------------+------------------------------           F( 12,  1006) =   41.29
       Model |  2890.21844    12  240.851537           Prob > F      =  0.0000
    Residual |  5868.52346  1006  5.83352233           R-squared     =  0.3300
```

```
-------------+------------------------------           Adj R-squared =  0.3220
       Total |  8758.7419  1018  8.6038722           Root MSE      =  2.4153

------------------------------------------------------------------------------
       ceb45 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 fstmarage45 |   .0872797   .0357303     2.44   0.015     .0171654    .1573941
 fstbirage45 |  -.3255438   .0337112    -9.66   0.000    -.3916962   -.2593915
 d_primoth45 |  -.2709737   .1867615    -1.45   0.147    -.6374605    .0955131
 d_secmoth45 |  -1.163086    .294204    -3.95   0.000     -1.74041   -.5857624
d_highmoth45 |  -1.236134   .2929592    -4.22   0.000    -1.811015   -.6612528
   d_urban45 |  -.4619345   .1617688    -2.86   0.004    -.7793775   -.1444915
   d_pripart |  -.2230845   .1923076    -1.16   0.246    -.6004545    .1542855
   d_secpart |  -.3809751    .265595    -1.43   0.152    -.9021587    .1402086
  d_highpart |   -.805433   .2854741    -2.82   0.005    -1.365626     -.24524
 d_conttra45 |   .3496914   .2989282     1.17   0.242    -.2369028    .9362856
 d_contmod45 |  -.5111161    .203025    -2.52   0.012    -.9095171   -.1127151
 d_marstat45 |    .343346   .2136174     1.61   0.108    -.0758407    .7625326
       _cons |   12.00411   .4155784    28.89   0.000     11.18861    12.81961
------------------------------------------------------------------------------

.
. ***post estimation tests***
. predict res,r
(14010 missing values generated)

. *Breusch-Pagan test*
. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of ceb45

         chi2(1)      =    58.49
         Prob > chi2  =   0.0000

.
. *checking for multicollinearity (value greater than 10 needs further
investigation)
. estat vif

    Variable |       VIF       1/VIF
-------------+----------------------
 fstmarage45 |      4.77    0.209681
 fstbirage45 |      4.58    0.218371
d_highmoth45 |      2.17    0.460636
  d_highpart |      2.09    0.478823
   d_secpart |      1.35    0.738886
 d_secmoth45 |      1.33    0.754024
 d_primoth45 |      1.33    0.754361
   d_pripart |      1.32    0.755628
   d_urban45 |      1.14    0.875565
 d_contmod45 |      1.08    0.923097
 d_conttra45 |      1.05    0.951279
 d_marstat45 |      1.03    0.972717
-------------+----------------------
    Mean VIF |      1.94

.
. *normality of the residuals
. kdensity res,normal

.
. *multiple regression equation - robust
. reg ceb45 fstmarage45 fstbirage45 d_primoth45 d_secmoth45 d_highmoth45 ///
>          d_urban45  d_pripart d_secpart d_highpart ///
>          d_conttra45 d_contmod45 d_marstat45, robust
```

```
Linear regression                                      Number of obs =    1019
                                                       F( 12,  1006) =   55.14
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.3300
                                                       Root MSE      =  2.4153

------------------------------------------------------------------------------
             |               Robust
       ceb45 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 fstmarage45 |   .0872797   .0344765     2.53   0.012     .0196257    .1549338
 fstbirage45 |  -.3255438   .0309004   -10.54   0.000    -.3861805   -.2649072
 d_primoth45 |  -.2709737   .1975865    -1.37   0.171    -.6587026    .1167553
  d_secmoth45 |  -1.163086   .2807347    -4.14   0.000    -1.713979   -.6121935
d_highmoth45 |  -1.236134   .2635116    -4.69   0.000    -1.753229   -.7190387
   d_urban45 |  -.4619345   .1680413    -2.75   0.006    -.7916861   -.1321829
   d_pripart |  -.2230845   .2004015    -1.11   0.266    -.6163375    .1701684
   d_secpart |  -.3809751   .2645271    -1.44   0.150    -.9000631     .138113
  d_highpart |   -.805433   .2752771    -2.93   0.004    -1.345616   -.2652499
 d_conttra45 |   .3496914   .2640915     1.32   0.186    -.1685419    .8679247
 d_contmod45 |  -.5111161   .1724359    -2.96   0.003    -.8494913   -.1727409
 d_marstat45 |    .343346   .2269133     1.51   0.131    -.1019317    .7886237
       _cons |   12.00411   .4127717    29.08   0.000     11.19412     12.8141
------------------------------------------------------------------------------

.
. ********************************************************************************
******
. ***logistic regression***
. *dummy binary dependent variable flfp
. gen d_flfp=0

. replace d_flfp=1 if v716>0
(7565 real changes made)

.
. *generate dummy no of children maximum three (reference category no children)
. gen d_chithr = v201>=1 & v201<4

.
. *generate dummy no of children four plus (reference category no children)
. gen d_chifou = v201>=4 & v201<17

.
. *generate dummy if urban (reference category rural area)
. gen d_urban=0

. replace d_urban=1 if v102==1
(7908 real changes made)

.
. *generate dummy if maternal primary education complete (reference category no
education)
. gen d_primoth=0

. replace d_primoth=1 if v149==2
(2923 real changes made)

. *generate dummy if maternal secondary education complete (reference category
no education)
. gen d_secmoth=0

. replace d_secmoth=1 if v149==4
(3052 real changes made)

. *generate dummy if mother completed higher education (reference category no
education)
```

```
. gen d_highmoth=0

. replace d_highmoth=1 if v149==5
(3913 real changes made)

.
. *generate age at 1st birth if mother aged 45 or above
. gen fstbirage= v212
(5832 missing values generated)

.
. *generate age at first marriage if mother aged 45 or above
. gen fstmarage= v511
(5343 missing values generated)

.
. *dummy current marital status if mother aged 45 or above (reference category never married
> )
. gen d_marstat=.
(15029 missing values generated)

. replace d_marstat=1 if v501==1
(8372 real changes made)

. replace d_marstat=0 if v501==0 | v501==2 | v501==3 | v501==4
(6423 real changes made)

.
. *dummy contraceptive method traditional for mother aged 45 or above(reference category no
> method)
. gen d_conttra=0

. replace d_conttra=1 if v313==2
(1356 real changes made)

.
. *dummy contraceptive method modern for mother aged 45 or above (reference category no meth
> od)
. gen d_contmod=0

. replace d_contmod=1 if v313==3
(2291 real changes made)

.
. ***creation of interaction variables***
. *interaction term primery/secondery/higher edu. mother max. three children
. gen primoth_chithr = d_primoth*d_chithr

. gen secmoth_chithr = d_secmoth*d_chithr

. gen highmoth_chithr = d_highmoth*d_chithr

.
. *interaction term primery/secondery/higher edu. mother four children plus
. gen primoth_chifou = d_primoth*d_chifou

. gen secmoth_chifou = d_secmoth*d_chifou

. gen highmoth_chifou = d_highmoth*d_chifou

.
. ***summary of (all) descriptive statistics***
. sum ceb45 fstmarage45 fstbirage45 d_flfp d_primoth45 d_secmoth45 d_highmoth45 ///
>          d_urban45  d_pripart d_secpart d_highpart d_conttra45 d_contmod45
```

```
d_marstat45 ///
>         fstmarage fstbirage d_primoth d_secmoth d_highmoth ///
>         d_urban d_conttra d_contmod d_marstat d_chithr d_chifou ///
>         primoth_chithr secmoth_chithr highmoth_chithr   ///
>         primoth_chifou secmoth_chifou highmoth_chifou

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
       ceb45 |      1144    5.388112    3.238504          0         16
 fstmarage45 |      1078    21.16976    5.145599         12         45
 fstbirage45 |      1052    22.23574    4.834023         10         44
      d_flfp |     15029    .5033602    .5000053          0          1
 d_primoth45 |     15029    .0236875    .1520789          0          1
-------------+--------------------------------------------------------
 d_secmoth45 |     15029    .0073857    .0856251          0          1
d_highmoth45 |     15029    .0143722    .1190235          0          1
   d_urban45 |     15029    .0381928    .1916679          0          1
   d_pripart |     15029    .1414598    .3485069          0          1
   d_secpart |     15029    .1236942    .3292433          0          1
-------------+--------------------------------------------------------
  d_highpart |     15029    .1398629    .3468563          0          1
 d_conttra45 |     15029    .0049238    .0699993          0          1
 d_contmod45 |     15029    .0126422    .1117284          0          1
 d_marstat45 |      1115    .8008969     .399505          0          1
   fstmarage |      9686     20.4618    4.284095          8         45
-------------+--------------------------------------------------------
   fstbirage |      9197    21.48799    4.174816         10         44
   d_primoth |     15029    .1944907    .3958213          0          1
   d_secmoth |     15029    .2030741    .4023006          0          1
  d_highmoth |     15029    .2603633    .4388474          0          1
     d_urban |     15029    .5261827    .4993306          0          1
-------------+--------------------------------------------------------
   d_conttra |     15029    .0902256    .2865142          0          1
   d_contmod |     15029    .1524386    .3594575          0          1
   d_marstat |     14795    .5658668    .4956593          0          1
    d_chithr |     15029    .3192495    .4662014          0          1
    d_chifou |     15029    .2927008    .4550174          0          1
-------------+--------------------------------------------------------
primoth_ch~r |     15029    .0611484    .2396104          0          1
secmoth_ch~r |     15029    .0682015    .2520997          0          1
highmoth_c~r |     15029    .0980105    .2973388          0          1
primoth_ch~u |     15029    .0906913    .2871792          0          1
secmoth_ch~u |     15029    .0405217    .1971858          0          1
-------------+--------------------------------------------------------
highmoth_c~u |     15029    .0373278    .1895702          0          1

.
. ***logistic regression & post estimation***
. *logistic regression equation
. logistic d_flfp fstmarage d_primoth d_secmoth d_highmoth ///
>         d_urban  d_pripart d_secpart d_highpart ///
>         d_conttra d_contmod d_marstat d_chithr d_chifou ///
>         primoth_chithr secmoth_chithr highmoth_chithr   ///
>         primoth_chifou secmoth_chifou highmoth_chifou, nolog

Logistic regression                               Number of obs   =       9452
                                                  LR chi2(19)     =     403.52
                                                  Prob > chi2     =     0.0000
Log likelihood =  -6321.028                       Pseudo R2       =     0.0309

------------------------------------------------------------------------------
      d_flfp | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   fstmarage |   1.031671   .0057427     5.60   0.000     1.020477    1.042989
   d_primoth |   1.367269   .3807641     1.12   0.261     .7921492     2.35994
   d_secmoth |     1.3588   .3321347     1.25   0.210     .8415778    2.193899
  d_highmoth |   1.940702    .459404     2.80   0.005     1.220287    3.086425
     d_urban |    1.09607   .0482892     2.08   0.037     1.005396    1.194922
```

```
   d_pripart |   .8297755     .04768    -3.25   0.001     .7413947    .9286921
   d_secpart |   .8710437   .0554654    -2.17   0.030     .7688436     .986829
  d_highpart |    1.10564   .0796253     1.39   0.163     .9600916    1.273254
   d_conttra |   1.353444   .0860546     4.76   0.000     1.194866    1.533068
   d_contmod |   1.262369   .0659381     4.46   0.000     1.139528    1.398452
   d_marstat |   .6361274   .0434171    -6.63   0.000     .5564776    .7271775
    d_chithr |   .8080843   .1350725    -1.27   0.202     .5823405    1.121337
    d_chifou |   1.050026    .173214     0.30   0.767     .7599493    1.450827
primoth_ch~r |   .8328297   .2430431    -0.63   0.531     .4700582    1.475573
secmoth_ch~r |   .8217953   .2119134    -0.76   0.447     .4957554     1.36226
highmoth_c~r |   1.080969   .2661428     0.32   0.752     .6671765      1.7514
primoth_ch~u |    .613826   .1764314    -1.70   0.090     .3494502    1.078215
secmoth_ch~u |   .5875934   .1534942    -2.04   0.042     .3521451    .9804654
highmoth_c~u |    .749085   .1904677    -1.14   0.256     .4550913    1.233002
------------------------------------------------------------------------------

.
. *post estimation analyses residuals
. predict res_log, residuals
(5577 missing values generated)

. graph twoway scatter res_log d_flfp

.
. *test significant effect (multiple) independent on dependent variable
. test fstmarage d_primoth d_secmoth d_highmoth ///
>         d_urban  d_pripart d_secpart d_highpart ///
>         d_conttra d_contmod d_marstat d_chithr d_chifou ///
>         primoth_chithr secmoth_chithr highmoth_chithr   ///
>         primoth_chifou secmoth_chifou highmoth_chifou

 ( 1)  [d_flfp]fstmarage = 0
 ( 2)  [d_flfp]d_primoth = 0
 ( 3)  [d_flfp]d_secmoth = 0
 ( 4)  [d_flfp]d_highmoth = 0
 ( 5)  [d_flfp]d_urban = 0
 ( 6)  [d_flfp]d_pripart = 0
 ( 7)  [d_flfp]d_secpart = 0
 ( 8)  [d_flfp]d_highpart = 0
 ( 9)  [d_flfp]d_conttra = 0
 (10)  [d_flfp]d_contmod = 0
 (11)  [d_flfp]d_marstat = 0
 (12)  [d_flfp]d_chithr = 0
 (13)  [d_flfp]d_chifou = 0
 (14)  [d_flfp]primoth_chithr = 0
 (15)  [d_flfp]secmoth_chithr = 0
 (16)  [d_flfp]highmoth_chithr = 0
 (17)  [d_flfp]primoth_chifou = 0
 (18)  [d_flfp]secmoth_chifou = 0
 (19)  [d_flfp]highmoth_chifou = 0

           chi2( 19) =  378.16
         Prob > chi2 =    0.0000

.
. *multicollinearity test via correlation matrix/regression plus vif
. corr d_flfp fstmarage d_primoth d_secmoth d_highmoth ///
>         d_urban  d_pripart d_secpart d_highpart ///
>         d_conttra d_contmod d_marstat d_chithr d_chifou ///
>         primoth_chithr secmoth_chithr highmoth_chithr   ///
>         primoth_chifou secmoth_chifou highmoth_chifou
(obs=9452)

             |   d_flfp fstmar~e d_prim~h d_secm~h d_high~h  d_urban d_prip~t 
d_secp~t
-------------+----------------------------------------------------------------
------
      d_flfp |   1.0000
```

```
   fstmarage |   0.1101   1.0000
   d_primoth |  -0.0637  -0.1045   1.0000
   d_secmoth |  -0.0314   0.0342  -0.2672   1.0000
  d_highmoth |   0.1611   0.3524  -0.3058  -0.2535   1.0000
     d_urban |   0.0611   0.1182  -0.1008   0.0815   0.1970   1.0000
   d_pripart |  -0.0712  -0.0782   0.2941  -0.0755  -0.2236  -0.1047   1.0000
   d_secpart |  -0.0141   0.0537  -0.0763   0.2294   0.0104   0.1075  -0.2609
1.0000
  d_highpart |   0.1183   0.2415  -0.2339   0.0012   0.5497   0.2110  -0.2807
-0.2569
   d_conttra |   0.0416   0.0453  -0.0090   0.0256   0.0620   0.0161  -0.0009
0.0063
   d_contmod |   0.0304  -0.0463  -0.0114   0.0387   0.0534   0.0629  -0.0143
0.0447
   d_marstat |  -0.0479   0.0617   0.0025   0.0232   0.0812  -0.0150  -0.0083
0.0002
    d_chithr |   0.0226   0.1726  -0.1185   0.0862   0.1926   0.0791  -0.0918
0.0975
    d_chifou |  -0.0401  -0.2504   0.1436  -0.1004  -0.2165  -0.0939   0.1055
-0.1044
primoth_ch~r |  -0.0290  -0.0103   0.5619  -0.1501  -0.1718  -0.0472   0.1427
-0.0058
secmoth_ch~r |  -0.0229   0.0368  -0.1936   0.7247  -0.1837   0.0578  -0.0638
0.1801
highmoth_c~r |   0.1303   0.3001  -0.2374  -0.1968   0.7763   0.1592  -0.1832
0.0089
primoth_ch~u |  -0.0574  -0.1373   0.7190  -0.1921  -0.2199  -0.0846   0.2347
-0.0914
secmoth_ch~u |  -0.0283  -0.0270  -0.1486   0.5561  -0.1410   0.0505  -0.0285
0.1130
highmoth_c~u |   0.0629   0.0884  -0.1414  -0.1172   0.4623   0.0808  -0.0906
0.0041

             | d_high~t d_cont~a d_cont~d d_mars~t d_chithr d_chifou primot~r
secmot~r
-------------+----------------------------------------------------------------
------
  d_highpart |   1.0000
   d_conttra |   0.0433   1.0000
   d_contmod |   0.0451  -0.2302   1.0000
   d_marstat |   0.0677   0.0756   0.0910   1.0000
    d_chithr |   0.1778   0.0231   0.0100  -0.0068   1.0000
    d_chifou |  -0.1991   0.0199   0.0528   0.0372  -0.8922   1.0000
primoth_ch~r |  -0.1207  -0.0198  -0.0079  -0.0313   0.3299  -0.2944   1.0000
secmoth_ch~r |   0.0207   0.0218   0.0185   0.0245   0.3528  -0.3147  -0.1088
1.0000
highmoth_c~r |   0.4425   0.0531   0.0370   0.0642   0.4325  -0.3859  -0.1334
-0.1426
primoth_ch~u |  -0.1801   0.0153   0.0056   0.0383  -0.3947   0.4424  -0.1302
-0.1392
secmoth_ch~u |  -0.0265   0.0336   0.0667   0.0221  -0.2531   0.2836  -0.0835
-0.0893
highmoth_c~u |   0.2294   0.0567   0.0813   0.0469  -0.2408   0.2699  -0.0794
-0.0849

             | highmo~r primot~u secmot~u highmo~u
-------------+------------------------------------
highmoth_c~r |   1.0000
primoth_ch~u |  -0.1707   1.0000
secmoth_ch~u |  -0.1095  -0.1068   1.0000
highmoth_c~u |  -0.1041  -0.1017  -0.0652   1.0000


.
. *multicollinearity via OLS plus vif
. reg d_flfp fstmarage d_primoth d_secmoth d_highmoth ///
>         d_urban  d_pripart d_secpart d_highpart ///
>         d_conttra d_contmod d_marstat d_chithr d_chifou ///
```

```
>

      Source |       SS       df       MS              Number of obs =    9452
-------------+------------------------------           F( 13,  9438) =   30.18
       Model |  93.7362011    13  7.21047701           Prob > F      =  0.0000
    Residual |  2254.85828  9438  .238912723           R-squared     =  0.0399
-------------+------------------------------           Adj R-squared =  0.0386
       Total |  2348.59448  9451   .24850222           Root MSE      =  .48879

------------------------------------------------------------------------------
      d_flfp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   fstmarage |   .0074688   .0013104     5.70   0.000     .0049002    .0100374
   d_primoth |  -.0085093   .0136588    -0.62   0.533    -.0352834    .0182648
   d_secmoth |  -.0079218   .0157438    -0.50   0.615    -.0387831    .0229395
  d_highmoth |   .1358523   .0175638     7.73   0.000     .1014234    .1702812
     d_urban |   .0214871   .0105295     2.04   0.041     .0008469    .0421273
   d_pripart |  -.0472001   .0138734    -3.40   0.001     -.074395   -.0200053
   d_secpart |  -.0343707   .0152808    -2.25   0.025    -.0643244    -.004417
  d_highpart |   .0216304     .01703     1.27   0.204     -.011752    .0550128
   d_conttra |   .0697888   .0150356     4.64   0.000     .0403158    .0992618
   d_contmod |   .0542469   .0124433     4.36   0.000     .0298553    .0786384
   d_marstat |  -.1077307   .0160873    -6.70   0.000    -.1392652   -.0761962
    d_chithr |  -.0605318    .022835    -2.65   0.008    -.1052933   -.0157703
    d_chifou |  -.0471887   .0234894    -2.01   0.045    -.0932331   -.0011444
       _cons |   .4846927   .0380728    12.73   0.000     .4100619    .5593235
------------------------------------------------------------------------------

. estat vif

    Variable |       VIF       1/VIF
-------------+----------------------
    d_chifou |      5.42    0.184430
    d_chithr |      5.15    0.194118
  d_highmoth |      2.13    0.469996
  d_highpart |      1.95    0.513679
   d_secmoth |      1.46    0.686915
   d_secpart |      1.44    0.695661
   d_primoth |      1.36    0.734977
   d_pripart |      1.31    0.760706
   fstmarage |      1.23    0.810743
   d_contmod |      1.12    0.892971
   d_conttra |      1.10    0.911576
     d_urban |      1.10    0.912992
   d_marstat |      1.04    0.965040
-------------+----------------------
    Mean VIF |      1.98

.
. *normality of the residuals
. kdensity res_log,normal

.
.
. log close
      name:  <unnamed>
       log:  H:\Master thesis USB\Stata_Do_files\masterthesis1993.log
  log type:  text
 closed on:  10 May 2012, 09:53:38
--------------------------------------------------------------------------------
------------
```

```
------------------------------------------------------------------------------------------------
      name:  <unnamed>
       log:  H:\Master thesis USB\Stata_Do_files\masterthesis1998.log
  log type:  text
 opened on:  10 May 2012, 09:54:08

.
end of do-file

. do "C:\Users\Gerolf\AppData\Local\Temp\STD05000000.tmp"

. use "\Master thesis USB\Stata_files_1998\Mergedfile1998.DTA", clear

.
end of do-file

. do "C:\Users\Gerolf\AppData\Local\Temp\STD05000000.tmp"

. *********************************************************
. *Master Thesis Socio-Economic Determinants of Fertility*
. *In The Philippines -- Survey 1998                    *
. *********************************************************
.
. ***generationg dummies - only for mothers age 45 and beyond***
. *generate total children ever born by mothers equal or above age 45
. gen ceb45 = v201 if v012>=45
(12768 missing values generated)

.
. *generate dummy if urban (reference category rural area)
. gen d_urban45=0

. replace d_urban45=1 if v102==1 & v012>=45
(554 real changes made)

.
. *generate dummy if maternal primary education complete (reference category no
education)
. gen d_primoth45=0

. replace d_primoth45=1 if v149==2 & v012>=45
(318 real changes made)

.
. *generate dummy if maternal secondary education complete (reference category
no education)
. gen d_secmoth45=0

. replace d_secmoth45=1 if v149==4 & v012>=45
(146 real changes made)

.
. *generate dummy if mother completed higher education (reference category no
education)
. gen d_highmoth45=0

. replace d_highmoth45=1 if v149==5 & v012>=45
(280 real changes made)

.
. *generate dummy if partner's primary education complete (reference category no
education)
. gen d_pripart=0

. replace d_pripart=1 if v729==2
(1643 real changes made)
```

```
. *generate dummy if partner's secondary education complete (reference category
no education
> )
. gen d_secpart=0

. replace d_secpart=1 if v729==4
(1736 real changes made)

. *generate dummy if partner completed higher education (reference category no
education)
. gen d_highpart=0

. replace d_highpart=1 if v729==5
(2399 real changes made)

.
. *generate age at 1st birth if mother aged 45 or above
. gen fstbirage45= v212 if v012>=45
(12864 missing values generated)

.
. *generate age at first marriage if mother aged 45 or above
. gen fstmarage45= v511 if v012>=45
(12837 missing values generated)

.
. *dummy current marital status if mother aged 45 or above (reference category
never married
> )
. gen d_marstat45=.
(13983 missing values generated)

. replace d_marstat45=1 if v501==1 & v012>=45
(965 real changes made)

. replace d_marstat45=0 if v501==0 & v012>=45 | v501==2 & v012>=45 | v501==3 &
v012>=45 | v5
> 01==4 & v012>=45
(207 real changes made)

.
. *dummy contraceptive method traditional for mother aged 45 or above(reference
category no
> method)
. gen d_conttra45=0

. replace d_conttra45=1 if v313==2 & v012>=45
(129 real changes made)

.
. *dummy contraceptive method modern for mother aged 45 or above (reference
category no meth
> od)
. gen d_contmod45=0

. replace d_contmod45=1 if v313==3 & v012>=45
(206 real changes made)

.
. *multiple regression equation
. reg ceb45 fstmarage45 fstbirage45 d_primoth45 d_secmoth45 d_highmoth45 ///
>         d_urban45  d_pripart d_secpart d_highpart ///
>         d_conttra45 d_contmod45 d_marstat45

      Source |       SS       df       MS              Number of obs =    1074
-------------+------------------------------           F( 12,  1061) =   44.29
       Model |  2845.19963    12  237.099969           Prob > F      =  0.0000
    Residual |  5679.88417  1061  5.35333098           R-squared     =  0.3337
```

```
-------------+------------------------------           Adj R-squared =  0.3262
       Total |  8525.0838  1073  7.94509208           Root MSE      =  2.3137

------------------------------------------------------------------------------
       ceb45 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 fstmarage45 |   .0409446   .0356865     1.15   0.251    -.0290795    .1109687
 fstbirage45 |  -.2777264   .0352107    -7.89   0.000     -.346817   -.2086358
 d_primoth45 |  -.4497932   .1864374    -2.41   0.016    -.8156212   -.0839653
 d_secmoth45 |  -.8239401   .2545313    -3.24   0.001    -1.323382   -.3244982
d_highmoth45 |  -.8073669   .2595599    -3.11   0.002    -1.316676   -.2980579
   d_urban45 |  -.7178687   .1548146    -4.64   0.000    -1.021646   -.4140912
   d_pripart |   .0599557    .192981     0.31   0.756     -.318712    .4386235
   d_secpart |  -.4085558    .241103    -1.69   0.090    -.8816486    .0645371
  d_highpart |  -.7155858   .2548152    -2.81   0.005    -1.215585   -.2155867
 d_conttra45 |   .3168301   .2244278     1.41   0.158    -.1235427    .7572028
 d_contmod45 |  -.5747763   .1885555    -3.05   0.002    -.9447603   -.2047923
 d_marstat45 |   .6713843   .2196719     3.06   0.002     .2403436    1.102425
       _cons |   11.35538   .3899553    29.12   0.000     10.59021    12.12056
------------------------------------------------------------------------------

.
. ***post estimation tests***
. predict res,r
(12909 missing values generated)

. *Breusch-Pagan test*
. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of ceb45

         chi2(1)      =    66.71
         Prob > chi2  =   0.0000

.
. *checking for multicollinearity (value greater than 10 needs further
investigation)
. estat vif

    Variable |       VIF       1/VIF
-------------+----------------------
 fstmarage45 |      6.22    0.160805
 fstbirage45 |      6.15    0.162570
d_highmoth45 |      2.30    0.434168
  d_highpart |      2.19    0.457599
   d_secpart |      1.38    0.725815
 d_primoth45 |      1.37    0.732328
 d_secmoth45 |      1.36    0.737891
   d_pripart |      1.32    0.755782
   d_urban45 |      1.19    0.841350
 d_contmod45 |      1.09    0.914610
 d_conttra45 |      1.07    0.936383
 d_marstat45 |      1.05    0.952003
-------------+----------------------
    Mean VIF |      2.22

.
. *normality of the residuals
. kdensity res,normal

.
. *multiple regression equation - robust
. reg ceb45 fstmarage45 fstbirage45 d_primoth45 d_secmoth45 d_highmoth45 ///
>         d_urban45  d_pripart d_secpart d_highpart ///
>         d_conttra45 d_contmod45 d_marstat45, robust
```

```
Linear regression                                      Number of obs =    1074
                                                       F( 12,  1061) =   54.35
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.3337
                                                       Root MSE      =  2.3137

------------------------------------------------------------------------------
             |               Robust
       ceb45 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
  fstmarage45 |   .0409446   .0326325     1.25   0.210     -.023087    .1049761
  fstbirage45 |  -.2777264   .0325971    -8.52   0.000    -.3416886   -.2137642
  d_primoth45 |  -.4497932   .1993738    -2.26   0.024     -.841005   -.0585814
   d_secmoth45 |  -.8239401   .2329595    -3.54   0.000    -1.281054   -.3668265
d_highmoth45 |  -.8073669   .2331842    -3.46   0.001    -1.264921   -.3498123
    d_urban45 |  -.7178687   .1520328    -4.72   0.000    -1.016188   -.4195495
    d_pripart |   .0599557   .2091936     0.29   0.774    -.3505244    .4704359
    d_secpart |  -.4085558   .2270457    -1.80   0.072    -.8540653    .0369538
   d_highpart |  -.7155858   .2119444    -3.38   0.001    -1.131464    -.299708
  d_conttra45 |   .3168301   .2115265     1.50   0.134    -.0982277    .7318878
  d_contmod45 |  -.5747763   .1676616    -3.43   0.001    -.9037622   -.2457904
  d_marstat45 |   .6713843   .2303137     2.92   0.004     .2194621    1.123306
        _cons |   11.35538   .3693765    30.74   0.000     10.63059    12.08018
------------------------------------------------------------------------------

.
. ********************************************************************************
******
. ***logistic regression***
. *dummy binary dependent variable flfp
. gen d_flfp=0

. replace d_flfp=1 if v716>0
(7320 real changes made)

.
. *generate dummy no of children maximum three (reference category no children)
. gen d_chithr = v201>=1 & v201<4

.
. *generate dummy no of children four plus (reference category no children)
. gen d_chifou = v201>=4 & v201<17

.
. *generate dummy if urban (reference category rural area)
. gen d_urban=0

. replace d_urban=1 if v102==1
(6730 real changes made)

.
. *generate dummy if maternal primary education complete (reference category no
education)
. gen d_primoth=0

. replace d_primoth=1 if v149==2
(2354 real changes made)

. *generate dummy if maternal secondary education complete (reference category
no education)
. gen d_secmoth=0

. replace d_secmoth=1 if v149==4
(2733 real changes made)

. *generate dummy if mother completed higher education (reference category no
education)
```

```
. gen d_highmoth=0

. replace d_highmoth=1 if v149==5
(3889 real changes made)

.
. *generate age at 1st birth if mother aged 45 or above
. gen fstbirage= v212
(5321 missing values generated)

.
. *generate age at first marriage if mother aged 45 or above
. gen fstmarage= v511
(4822 missing values generated)

.
. *dummy current marital status if mother aged 45 or above (reference category
never married
> )
. gen d_marstat=.
(13983 missing values generated)

. replace d_marstat=1 if v501==1
(7824 real changes made)

. replace d_marstat=0 if v501==0 | v501==2 | v501==3 | v501==4
(5882 real changes made)

.
. *dummy contraceptive method traditional for mother aged 45 or above(reference
category no
> method)
. gen d_conttra=0

. replace d_conttra=1 if v313==2
(1580 real changes made)

.
. *dummy contraceptive method modern for mother aged 45 or above (reference
category no meth
> od)
. gen d_contmod=0

. replace d_contmod=1 if v313==3
(2439 real changes made)

.
. ***creation of interaction variables***
. *interaction term primery/secondery/higher edu. mother max. three children
. gen primoth_chithr = d_primoth*d_chithr

. gen secmoth_chithr = d_secmoth*d_chithr

. gen highmoth_chithr = d_highmoth*d_chithr

.
. *interaction term primery/secondery/higher edu. mother four children plus
. gen primoth_chifou = d_primoth*d_chifou

. gen secmoth_chifou = d_secmoth*d_chifou

. gen highmoth_chifou = d_highmoth*d_chifou

.
. ***summary of (all) descriptive statistics***
. sum ceb45 fstmarage45 fstbirage45 d_flfp d_primoth45 d_secmoth45 d_highmoth45
///
>         d_urban45  d_pripart d_secpart d_highpart d_conttra45 d_contmod45
```

```
d_marstat45 ///
>         fstmarage fstbirage d_primoth d_secmoth d_highmoth ///
>         d_urban d_conttra d_contmod d_marstat d_chithr d_chifou ///
>         primoth_chithr secmoth_chithr highmoth_chithr   ///
>         primoth_chifou secmoth_chifou highmoth_chifou

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
       ceb45 |      1215    5.042798    3.097506          0         14
 fstmarage45 |      1146    21.49127     5.28427         10         46
 fstbirage45 |      1119    22.75782    5.028663         11         43
      d_flfp |     13983    .5234928    .4994656          0          1
 d_primoth45 |     13983    .0227419    .1490849          0          1
-------------+--------------------------------------------------------
  d_secmoth45 |     13983    .0104413    .1016512          0          1
d_highmoth45 |     13983    .0200243    .1400883          0          1
   d_urban45 |     13983    .0396195    .1950706          0          1
   d_pripart |     13983    .1174998    .3220264          0          1
   d_secpart |     13983    .1241508    .3297653          0          1
-------------+--------------------------------------------------------
  d_highpart |     13983    .1715655    .3770158          0          1
 d_conttra45 |     13983    .0092255    .0956087          0          1
 d_contmod45 |     13983    .0147322    .1204831          0          1
 d_marstat45 |      1172    .8233788    .3815106          0          1
   fstmarage |      9161     20.5983    4.444683          7         46
-------------+--------------------------------------------------------
   fstbirage |      8662    21.70342    4.293836         10         43
   d_primoth |     13983    .1683473    .3741878          0          1
   d_secmoth |     13983    .1954516    .3965621          0          1
  d_highmoth |     13983    .2781234    .4480906          0          1
     d_urban |     13983    .4812987     .499668          0          1
-------------+--------------------------------------------------------
   d_conttra |     13983    .1129944    .3165972          0          1
   d_contmod |     13983    .1744261     .379489          0          1
   d_marstat |     13706    .5708449    .4949736          0          1
    d_chithr |     13983    .3382679    .4731371          0          1
    d_chifou |     13983    .2811986    .4496003          0          1
-------------+--------------------------------------------------------
primoth_ch~r |     13983    .0538511    .2257317          0          1
secmoth_ch~r |     13983    .0723736    .2591148          0          1
highmoth_c~r |     13983    .1160695    .3203197          0          1
primoth_ch~u |     13983    .0766645    .2660679          0          1
secmoth_ch~u |     13983     .041908    .2003862          0          1
-------------+--------------------------------------------------------
highmoth_c~u |     13983    .0402632    .1965829          0          1

.
. ***logistic regression & post estimation***
. *logistic regression equation
. logistic d_flfp fstmarage d_primoth d_secmoth d_highmoth ///
>         d_urban  d_pripart d_secpart d_highpart ///
>         d_conttra d_contmod d_marstat d_chithr d_chifou ///
>         primoth_chithr secmoth_chithr highmoth_chithr   ///
>         primoth_chifou secmoth_chifou highmoth_chifou, nolog

Logistic regression                               Number of obs   =       8884
                                                  LR chi2(19)     =     328.02
                                                  Prob > chi2     =     0.0000
Log likelihood = -5951.4401                       Pseudo R2       =     0.0268

------------------------------------------------------------------------------
      d_flfp | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   fstmarage |   1.024265   .0056999     4.31   0.000     1.013154    1.035497
   d_primoth |   1.242288   .3400066     0.79   0.428     .7265303    2.124178
   d_secmoth |   1.734575   .4390703     2.18   0.030      1.05616    2.848764
  d_highmoth |   2.274446   .5260036     3.55   0.000      1.44551    3.578741
     d_urban |   1.282102   .0598799     5.32   0.000     1.169951    1.405004
```

```
    d_pripart |   1.025747   .0645835     0.40   0.686     .9066646     1.16047
    d_secpart |   .9362986   .0627213    -0.98   0.326     .8210955    1.067665
   d_highpart |   1.092474   .0781854     1.24   0.217     .9494955    1.256982
    d_conttra |   1.159671    .070388     2.44   0.015    1.029603     1.30617
    d_contmod |   1.211265   .0638841     3.63   0.000    1.092309    1.343176
    d_marstat |   .7471122   .0514785    -4.23   0.000     .6527324    .8551386
     d_chithr |   .7628212   .1312457    -1.57   0.116     .5444663    1.068746
     d_chifou |   1.238689   .2107667     1.26   0.208     .8874169    1.729007
primoth_ch~r |   .9920558   .2872833    -0.03   0.978     .5623956    1.749969
secmoth_ch~r |   .6573847   .1752014    -1.57   0.115     .3899092    1.108347
highmoth_c~r |   .8633979   .2075437    -0.61   0.541     .5390128    1.383002
primoth_ch~u |   .8519348   .2427394    -0.56   0.574     .4873891    1.489144
secmoth_ch~u |   .4874059   .1317891    -2.66   0.008     .2869033      .82803
highmoth_c~u |   .6875245   .1723551    -1.49   0.135     .4206307    1.123765
------------------------------------------------------------------------------

.
. *post estimation analyses residuals
. predict res_log, residuals
(5099 missing values generated)

. graph twoway scatter res_log d_flfp

.
. *test significant effect (multiple) independent on dependent variable
. test fstmarage d_primoth d_secmoth d_highmoth ///
>         d_urban  d_pripart d_secpart d_highpart ///
>         d_conttra d_contmod d_marstat d_chithr d_chifou ///
>         primoth_chithr secmoth_chithr highmoth_chithr   ///
>         primoth_chifou secmoth_chifou highmoth_chifou

 ( 1)  [d_flfp]fstmarage = 0
 ( 2)  [d_flfp]d_primoth = 0
 ( 3)  [d_flfp]d_secmoth = 0
 ( 4)  [d_flfp]d_highmoth = 0
 ( 5)  [d_flfp]d_urban = 0
 ( 6)  [d_flfp]d_pripart = 0
 ( 7)  [d_flfp]d_secpart = 0
 ( 8)  [d_flfp]d_highpart = 0
 ( 9)  [d_flfp]d_conttra = 0
 (10)  [d_flfp]d_contmod = 0
 (11)  [d_flfp]d_marstat = 0
 (12)  [d_flfp]d_chithr = 0
 (13)  [d_flfp]d_chifou = 0
 (14)  [d_flfp]primoth_chithr = 0
 (15)  [d_flfp]secmoth_chithr = 0
 (16)  [d_flfp]highmoth_chithr = 0
 (17)  [d_flfp]primoth_chifou = 0
 (18)  [d_flfp]secmoth_chifou = 0
 (19)  [d_flfp]highmoth_chifou = 0

           chi2( 19) =  311.25
         Prob > chi2 =    0.0000

.
. *multicollinearity test via correlation matrix/regression plus vif
. corr d_flfp fstmarage d_primoth d_secmoth d_highmoth ///
>         d_urban  d_pripart d_secpart d_highpart ///
>         d_conttra d_contmod d_marstat d_chithr d_chifou ///
>         primoth_chithr secmoth_chithr highmoth_chithr   ///
>         primoth_chifou secmoth_chifou highmoth_chifou
(obs=8884)

             |   d_flfp fstmar~e d_prim~h d_secm~h d_high~h  d_urban d_prip~t
d_secp~t
-------------+----------------------------------------------------------------
------
      d_flfp |   1.0000
```

```
   fstmarage |   0.0846   1.0000
   d_primoth |  -0.0189  -0.1204   1.0000
   d_secmoth |  -0.0376   0.0368  -0.2427   1.0000
  d_highmoth |   0.1400   0.3702  -0.3026  -0.2812   1.0000
     d_urban |   0.0915   0.1394  -0.1248   0.0749   0.2481   1.0000
   d_pripart |  -0.0218  -0.0863   0.2706  -0.0479  -0.2134  -0.1270   1.0000
   d_secpart |  -0.0180   0.0436  -0.0897   0.2701  -0.0217   0.0892  -0.2256
1.0000
  d_highpart |   0.0994   0.2664  -0.2320  -0.0273   0.5748   0.2574  -0.2795
-0.2847
   d_conttra |   0.0165   0.0391  -0.0134   0.0334   0.0385   0.0250   0.0131
0.0079
   d_contmod |   0.0308  -0.0519  -0.0011   0.0326   0.0414   0.0712  -0.0089
0.0358
   d_marstat |  -0.0281   0.0778   0.0073   0.0153   0.0690  -0.0294  -0.0115
0.0001
    d_chithr |  -0.0418   0.2067  -0.1243   0.0734   0.2017   0.1197  -0.0845
0.0582
    d_chifou |   0.0242  -0.2785   0.1424  -0.0825  -0.2316  -0.1227   0.1005
-0.0668
primoth_ch~r |  -0.0355  -0.0118   0.5731  -0.1391  -0.1734  -0.0554   0.1340
-0.0205
secmoth_ch~r |  -0.0431   0.0607  -0.1767   0.7282  -0.2048   0.0695  -0.0417
0.1932
highmoth_c~r |   0.0921   0.3166  -0.2352  -0.2186   0.7774   0.2076  -0.1735
-0.0146
primoth_ch~u |   0.0049  -0.1575   0.7175  -0.1742  -0.2171  -0.1028   0.2197
-0.0873
secmoth_ch~u |  -0.0151  -0.0382  -0.1337   0.5508  -0.1549   0.0281  -0.0133
0.1506
highmoth_c~u |   0.0757   0.0713  -0.1318  -0.1225   0.4356   0.0947  -0.0875
-0.0102

             | d_high~t d_cont~a d_cont~d d_mars~t d_chithr d_chifou primot~r
secmot~r
-------------+------------------------------------------------------------------
------
  d_highpart |   1.0000
   d_conttra |   0.0272   1.0000
   d_contmod |   0.0346  -0.2830   1.0000
   d_marstat |   0.0438   0.0659   0.0905   1.0000
    d_chithr |   0.1752   0.0428   0.0374  -0.0053   1.0000
    d_chifou |  -0.2030   0.0107   0.0375   0.0478  -0.8815   1.0000
primoth_ch~r |  -0.1217  -0.0089   0.0228  -0.0003   0.2911  -0.2566   1.0000
secmoth_ch~r |  -0.0037   0.0260   0.0215  -0.0031   0.3437  -0.3029  -0.1013
1.0000
highmoth_c~r |   0.4551   0.0554   0.0354   0.0588   0.4574  -0.4032  -0.1348
-0.1592
primoth_ch~u |  -0.1821   0.0044  -0.0024   0.0254  -0.3690   0.4186  -0.1074
-0.1268
secmoth_ch~u |  -0.0412   0.0426   0.0563   0.0466  -0.2632   0.2986  -0.0766
-0.0905
highmoth_c~u |   0.2445   0.0183   0.0738   0.0432  -0.2595   0.2944  -0.0755
-0.0892

             | highmo~r primot~u secmot~u highmo~u
-------------+------------------------------------
highmoth_c~r |   1.0000
primoth_ch~u |  -0.1688   1.0000
secmoth_ch~u |  -0.1204  -0.0959   1.0000
highmoth_c~u |  -0.1187  -0.0946  -0.0675   1.0000


.
. *multicollinearity via OLS plus vif
. reg d_flfp fstmarage d_primoth d_secmoth d_highmoth ///
>         d_urban  d_pripart d_secpart d_highpart ///
>         d_conttra d_contmod d_marstat d_chithr d_chifou ///
```

```
>

      Source |       SS       df       MS              Number of obs =    8884
-------------+------------------------------           F( 13,  8870) =   24.65
       Model |  76.7109753    13  5.90084426           Prob > F      =  0.0000
    Residual |  2123.08731  8870  .239355954           R-squared     =  0.0349
-------------+------------------------------           Adj R-squared =  0.0335
       Total |  2199.79829  8883   .24764137           Root MSE      =  .48924

------------------------------------------------------------------------------
      d_flfp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   fstmarage |    .005731   .0013173     4.35   0.000     .0031489    .0083131
   d_primoth |   .0314242   .0147446     2.13   0.033     .0025214    .0603269
   d_secmoth |   .0077472   .0164532     0.47   0.638    -.024505     .0399993
  d_highmoth |   .1405357   .0178656     7.87   0.000     .105515     .1755563
     d_urban |   .0592456   .0111718     5.30   0.000     .0373463    .0811448
   d_pripart |   .0055293   .0152087     0.36   0.716    -.0242833    .0353418
   d_secpart |  -.0165306   .0161101    -1.03   0.305    -.04811      .0150489
  d_highpart |   .0199481   .0170392     1.17   0.242    -.0134525    .0533488
   d_conttra |   .0342307   .0145027     2.36   0.018     .0058019    .0626594
   d_contmod |   .0440348   .0125879     3.50   0.000     .0193597    .0687099
   d_marstat |  -.0693167   .0163388    -4.24   0.000    -.1013445   -.0372888
    d_chithr |  -.0950587   .0226613    -4.19   0.000    -.1394801   -.0506372
    d_chifou |  -.0103533   .0234264    -0.44   0.659    -.0562746    .0355679
       _cons |   .4534061   .0372159    12.18   0.000     .3804542     .526358
------------------------------------------------------------------------------

. estat vif

    Variable |       VIF       1/VIF  
-------------+----------------------
    d_chifou |      5.00    0.199840
    d_chithr |      4.76    0.209866
  d_highmoth |      2.28    0.439204
  d_highpart |      2.08    0.481487
   d_secmoth |      1.51    0.662757
   d_secpart |      1.46    0.683238
   d_primoth |      1.33    0.754662
   d_pripart |      1.27    0.784622
   fstmarage |      1.26    0.790869
   d_contmod |      1.16    0.859450
   d_conttra |      1.14    0.879996
     d_urban |      1.13    0.881551
   d_marstat |      1.04    0.960456
-------------+----------------------
    Mean VIF |      1.96

.
. *normality of the residuals
. kdensity res_log,normal

.
.
. log close
      name:  <unnamed>
       log:  H:\Master thesis USB\Stata_Do_files\masterthesis1998.log
  log type:  text
 closed on:  10 May 2012, 09:54:56
--------------------------------------------------------------------------------
------------
```

```
------------------------------------------------------------------------------------
------------
      name:  <unnamed>
       log:  H:\Master thesis USB\Stata_Do_files\masterthesis2003.log
  log type:  text
 opened on:  10 May 2012, 09:51:10

.
end of do-file

. do "C:\Users\Gerolf\AppData\Local\Temp\STD05000000.tmp"

. use "\Master thesis USB\Stata_files_2003\Keepfile2003.DTA", clear

.
end of do-file

. do "C:\Users\Gerolf\AppData\Local\Temp\STD05000000.tmp"

. *******************************************************
. *Master Thesis Socio-Economic Determinants of Fertility*
. *In The Philippines -- Survey 2003                     *
. *******************************************************
.
. ***generationg dummies - only for mothers age 45 and beyond***
. *generate total children ever born by mothers equal or above age 45
. gen ceb45 = v201 if v012>=45
(12290 missing values generated)

.
. *generate dummy if urban (reference category rural area)
. gen d_urban45=0

. replace d_urban45=1 if v102==1 & v012>=45
(711 real changes made)

.
. *generate dummy if maternal primary education complete (reference category no
education)
. gen d_primoth45=0

. replace d_primoth45=1 if v149==2 & v012>=45
(323 real changes made)

.
. *generate dummy if maternal secondary education complete (reference category
no education)
. gen d_secmoth45=0

. replace d_secmoth45=1 if v149==4 & v012>=45
(213 real changes made)

.
. *generate dummy if mother completed higher education (reference category no
education)
. gen d_highmoth45=0

. replace d_highmoth45=1 if v149==5 & v012>=45
(323 real changes made)

.
. *generate dummy if partner's primary education complete (reference category no
education)
. gen d_pripart=0

. replace d_pripart=1 if v729==2
(1537 real changes made)
```

```
. *generate dummy if partner's secondary education complete (reference category
no education
> )
. gen d_secpart=0

. replace d_secpart=1 if v729==4
(1958 real changes made)

. *generate dummy if partner completed higher education (reference category no
education)
. gen d_highpart=0

. replace d_highpart=1 if v729==5
(2650 real changes made)

.
. *generate age at 1st birth if mother aged 45 or above
. gen fstbirage45= v212 if v012>=45
(12371 missing values generated)

.
. *generate age at first marriage if mother aged 45 or above
. gen fstmarage45= v511 if v012>=45
(12344 missing values generated)

.
. *dummy current marital status if mother aged 45 or above (reference category
never married
> )
. gen d_marstat45=.
(13633 missing values generated)

. replace d_marstat45=1 if v501==1 & v012>=45
(1071 real changes made)

. replace d_marstat45=0 if v501==0 & v012>=45 | v501==2 & v012>=45 | v501==3 &
v012>=45 | v5
> 01==4 & v012>=45
(223 real changes made)

.
. *dummy contraceptive method traditional for mother aged 45 or above(reference
category no
> method)
. gen d_conttra45=0

. replace d_conttra45=1 if v313==2 & v012>=45
(120 real changes made)

.
. *dummy contraceptive method modern for mother aged 45 or above (reference
category no meth
> od)
. gen d_contmod45=0

. replace d_contmod45=1 if v313==3 & v012>=45
(315 real changes made)

.
. *multiple regression equation
. reg ceb45 fstmarage45 fstbirage45 d_primoth45 d_secmoth45 d_highmoth45 ///
>         d_urban45  d_pripart d_secpart d_highpart ///
>         d_conttra45 d_contmod45 d_marstat45

      Source |       SS       df       MS              Number of obs =    1211
-------------+------------------------------           F( 12,  1198) =   41.36
       Model |  2615.31633    12  217.943027           Prob > F      =  0.0000
    Residual |  6313.50944  1198  5.27004127           R-squared     =  0.2929
```

```
-------------+------------------------------           Adj R-squared =  0.2858
       Total |  8928.82576  1210  7.37919485           Root MSE      =  2.2957

------------------------------------------------------------------------------
       ceb45 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 fstmarage45 |   .0111777   .0264769     0.42   0.673    -.0407685    .0631239
 fstbirage45 |  -.2293959   .0261198    -8.78   0.000    -.2806416   -.1781502
 d_primoth45 |  -.1438607   .1762095    -0.82   0.414    -.4895744    .2018529
 d_secmoth45 |  -.3621644   .2182759    -1.66   0.097    -.7904101    .0660812
d_highmoth45 |  -.7221651   .2288455    -3.16   0.002    -1.171148   -.2731826
   d_urban45 |  -.4979762   .1432211    -3.48   0.001    -.7789683   -.2169841
   d_pripart |  -.1082117   .1799173    -0.60   0.548    -.4611998    .2447764
   d_secpart |  -.7239559   .2102893    -3.44   0.001    -1.136532   -.3113796
  d_highpart |  -.5986183   .2200768    -2.72   0.007    -1.030397   -.1668395
 d_conttra45 |  -.3468496   .2261883    -1.53   0.125    -.7906188    .0969197
 d_contmod45 |  -.6977719   .1568564    -4.45   0.000    -1.005516   -.3900281
 d_marstat45 |   .4046433   .1961676     2.06   0.039     .0197729    .7895136
       _cons |   10.69714   .3724255    28.72   0.000      9.96646    11.42782
------------------------------------------------------------------------------

.
. *post estimation tests
. predict res,r
(12422 missing values generated)

. *Breusch-Pagan test
. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of ceb45

         chi2(1)      =   135.67
         Prob > chi2  =   0.0000

.
. *multiple regression equation
. reg ceb45 fstmarage45 fstbirage45 d_primoth45 d_secmoth45 d_highmoth45 ///
>          d_urban45  d_pripart d_secpart d_highpart ///
>          d_conttra45 d_contmod45 d_marstat45,robust

Linear regression                                      Number of obs =    1211
                                                       F( 12,  1198) =   45.70
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.2929
                                                       Root MSE      =  2.2957

------------------------------------------------------------------------------
             |               Robust
       ceb45 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 fstmarage45 |   .0111777   .0253723     0.44   0.660    -.0386014    .0609568
 fstbirage45 |  -.2293959   .0243817    -9.41   0.000    -.2772314   -.1815604
 d_primoth45 |  -.1438607   .1874702    -0.77   0.443    -.5116672    .2239457
 d_secmoth45 |  -.3621644   .2061395    -1.76   0.079    -.7665991    .0422702
d_highmoth45 |  -.7221651   .1914581    -3.77   0.000    -1.097796   -.3465347
   d_urban45 |  -.4979762   .1458581    -3.41   0.001    -.7841419   -.2118105
   d_pripart |  -.1082117   .1924758    -0.56   0.574    -.4858389    .2694155
   d_secpart |  -.7239559   .2013009    -3.60   0.000    -1.118897   -.3290144
  d_highpart |  -.5986183    .190461    -3.14   0.002    -.9722925    -.224944
 d_conttra45 |  -.3468496   .2082627    -1.67   0.096    -.7554498    .0617507
 d_contmod45 |  -.6977719   .1457643    -4.79   0.000    -.9837535   -.4117902
 d_marstat45 |   .4046433   .2015087     2.01   0.045      .009294    .7999926
       _cons |   10.69714   .3923874    27.26   0.000     9.927296    11.46698
------------------------------------------------------------------------------

.
```

```
. *checking for multicollinearity (value greater than 10 needs further
investigation)
. estat vif

    Variable |       VIF       1/VIF  
-------------+----------------------
 fstmarage45 |      4.06    0.246064
 fstbirage45 |      3.96    0.252507
d_highmoth45 |      2.11    0.473440
  d_highpart |      1.97    0.506745
 d_secmoth45 |      1.43    0.699528
   d_secpart |      1.41    0.710897
 d_primoth45 |      1.31    0.760645
   d_pripart |      1.30    0.769922
   d_urban45 |      1.18    0.849696
 d_contmod45 |      1.07    0.932643
 d_conttra45 |      1.05    0.952822
 d_marstat45 |      1.03    0.970855
-------------+----------------------
    Mean VIF |      1.82

.
. *normality of the residuals
. kdensity res,normal

.
.
********************************************************************************
******
. ***logistic regression***
. *dummy binary dependent variable flfp
. gen d_flfp=0

. replace d_flfp=1 if v716>0
(7055 real changes made)

.
. *generate dummy no of children maximum three (reference category no children)
. gen d_chithr = v201>=1 & v201<4

.
. *generate dummy no of children four plus (reference category no children)
. gen d_chifou = v201>=4 & v201<17

.
. *generate dummy if urban (reference category rural area)
. gen d_urban=0

. replace d_urban=1 if v102==1
(7436 real changes made)

.
. *generate dummy if maternal primary education complete (reference category no
education)
. gen d_primoth=0

. replace d_primoth=1 if v149==2
(1828 real changes made)

. *generate dummy if maternal secondary education complete (reference category
no education)
. gen d_secmoth=0

. replace d_secmoth=1 if v149==4
(3289 real changes made)

. *generate dummy if mother completed higher education (reference category no
education)
```

```
. gen d_highmoth=0

. replace d_highmoth=1 if v149==5
(4126 real changes made)

.
. *generate age at 1st birth if mother aged 45 or above
. gen fstbirage= v212
(4883 missing values generated)

.
. *generate age at first marriage if mother aged 45 or above
. gen fstmarage= v511
(4309 missing values generated)

.
. *dummy current marital status if mother aged 45 or above (reference category
never married
> )
. gen d_marstat=.
(13633 missing values generated)

. replace d_marstat=1 if v501==1
(7673 real changes made)

. replace d_marstat=0 if v501==0 | v501==2 | v501==3 | v501==4
(5608 real changes made)

.
. *dummy contraceptive method traditional for mother aged 45 or above(reference
category no
> method)
. gen d_conttra=0

. replace d_conttra=1 if v313==2
(1294 real changes made)

.
. *dummy contraceptive method modern for mother aged 45 or above (reference
category no meth
> od)
. gen d_contmod=0

. replace d_contmod=1 if v313==3
(2941 real changes made)

.
. ***creation of interaction variables***
. *interaction term primery/secondery/higher edu. mother max. three children
. gen primoth_chithr = d_primoth*d_chithr

. gen secmoth_chithr = d_secmoth*d_chithr

. gen highmoth_chithr = d_highmoth*d_chithr

.
. *interaction term primery/secondery/higher edu. mother four children plus
. gen primoth_chifou = d_primoth*d_chifou

. gen secmoth_chifou = d_secmoth*d_chifou

. gen highmoth_chifou = d_highmoth*d_chifou

.
. *summary of (all) descriptive statistics
. sum ceb45 fstmarage45 fstbirage45 d_flfp d_primoth45 d_secmoth45 d_highmoth45
///
>          d_urban45  d_pripart d_secpart d_highpart d_conttra45 d_contmod45
```

```
d_marstat45 ///
>         fstmarage fstbirage d_primoth d_secmoth d_highmoth ///
>         d_urban d_conttra d_contmod d_marstat d_chithr d_chifou ///
>         primoth_chithr secmoth_chithr highmoth_chithr   ///
>         primoth_chifou secmoth_chifou highmoth_chifou

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
       ceb45 |      1343    4.691735    2.886628          0         18
 fstmarage45 |      1289    21.82855    5.429039          8         48
 fstbirage45 |      1262    22.82805    5.025682         12         42
      d_flfp |     13633    .5174943    .4997122          0          1
 d_primoth45 |     13633    .0236925    .1520949          0          1
-------------+--------------------------------------------------------
 d_secmoth45 |     13633    .0156239    .1240197          0          1
d_highmoth45 |     13633    .0236925    .1520949          0          1
   d_urban45 |     13633    .0521529    .2223434          0          1
   d_pripart |     13633    .1127411    .3162877          0          1
   d_secpart |     13633    .1436221     .350719          0          1
-------------+--------------------------------------------------------
  d_highpart |     13633    .1943813    .3957382          0          1
 d_conttra45 |     13633    .0088022    .0934095          0          1
 d_contmod45 |     13633    .0231057    .1502447          0          1
 d_marstat45 |      1294    .8276662    .3778164          0          1
   fstmarage |      9324    20.86272    4.552768          5         48
-------------+--------------------------------------------------------
   fstbirage |      8750    21.85794    4.343524         11         42
   d_primoth |     13633    .1340864    .3407576          0          1
   d_secmoth |     13633    .2412528     .427859          0          1
  d_highmoth |     13633     .302648     .459421          0          1
     d_urban |     13633    .5454412    .4979491          0          1
-------------+--------------------------------------------------------
   d_conttra |     13633    .0949167    .2931107          0          1
   d_contmod |     13633    .2157265    .4113405          0          1
   d_marstat |     13281    .5777426    .4939377          0          1
    d_chithr |     13633    .3830412     .486146          0          1
    d_chifou |     13633    .2587105    .4379423          0          1
-------------+--------------------------------------------------------
primoth_ch~r |     13633     .048632    .2151054          0          1
secmoth_ch~r |     13633    .1040857    .3053829          0          1
highmoth_c~r |     13633    .1369471    .3438041          0          1
primoth_ch~u |     13633    .0613951    .2400625          0          1
secmoth_ch~u |     13633    .0456246    .2086772          0          1
-------------+--------------------------------------------------------
highmoth_c~u |     13633    .0381427    .1915478          0          1

.
. ***logistic regression & post estimation***
. *logistic regression equation
. logistic d_flfp fstmarage d_primoth d_secmoth d_highmoth ///
>         d_urban  d_pripart d_secpart d_highpart ///
>         d_conttra d_contmod d_marstat d_chithr d_chifou ///
>         primoth_chithr secmoth_chithr highmoth_chithr   ///
>         primoth_chifou secmoth_chifou highmoth_chifou, nolog

Logistic regression                               Number of obs   =       8972
                                                  LR chi2(19)     =     255.62
                                                  Prob > chi2     =     0.0000
Log likelihood = -6052.4756                       Pseudo R2       =     0.0207

------------------------------------------------------------------------------
      d_flfp | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   fstmarage |   1.016565   .0054481     3.07   0.002     1.005943      1.0273
   d_primoth |   .8486333   .2380432    -0.59   0.558     .4897298    1.470563
   d_secmoth |   1.300299   .2858654     1.19   0.232     .8451042    2.000675
  d_highmoth |   2.083778   .4691403     3.26   0.001     1.340333    3.239593
     d_urban |   1.015279   .0464156     0.33   0.740     .9282628    1.110452
```

```
   d_pripart |    .977758   .0635183    -0.35   0.729      .860864    1.110525
   d_secpart |   .8606209    .055126    -2.34   0.019      .759083    .9757409
  d_highpart |       .887    .060698    -1.75   0.080     .7756671    1.014313
   d_conttra |   1.100891   .0717368     1.48   0.140     .9688971    1.250865
   d_contmod |   1.177089   .0585804     3.28   0.001     1.067695    1.297691
   d_marstat |   .9539527   .0601536    -0.75   0.455     .8430482    1.079447
    d_chithr |   .7404106   .1302657    -1.71   0.088     .5244629    1.045275
    d_chifou |   1.300871   .2270037     1.51   0.132     .9240567    1.831345
primoth_ch~r |    1.13486   .3372858     0.43   0.670     .6338134    2.031999
secmoth_ch~r |   .7373537   .1714554    -1.31   0.190     .4674634    1.163065
highmoth_c~r |   .9273525   .2151737    -0.33   0.745     .5884919    1.461333
primoth_ch~u |     1.0337   .3034674     0.11   0.910     .5814391    1.837745
secmoth_ch~u |   .5516624   .1317189    -2.49   0.013     .3454891    .8808712
highmoth_c~u |   .6787852    .166187    -1.58   0.114     .4200806    1.096812
------------------------------------------------------------------------------

.
. *post estimation analyses
. predict resid, residual
(4661 missing values generated)

. graph twoway scatter resid d_flfp

.
. *test significant effect (multiple) independent on dependent variable
. test fstmarage d_primoth d_secmoth d_highmoth ///
>         d_urban  d_pripart d_secpart d_highpart ///
>         d_conttra d_contmod d_marstat

 ( 1)  [d_flfp]fstmarage = 0
 ( 2)  [d_flfp]d_primoth = 0
 ( 3)  [d_flfp]d_secmoth = 0
 ( 4)  [d_flfp]d_highmoth = 0
 ( 5)  [d_flfp]d_urban = 0
 ( 6)  [d_flfp]d_pripart = 0
 ( 7)  [d_flfp]d_secpart = 0
 ( 8)  [d_flfp]d_highpart = 0
 ( 9)  [d_flfp]d_conttra = 0
 (10)  [d_flfp]d_contmod = 0
 (11)  [d_flfp]d_marstat = 0

           chi2( 11) =   40.91
         Prob > chi2 =    0.0000

.
. *multicollinearity test via correlation matrix/regression plus vif
. corr d_flfp fstmarage d_primoth d_secmoth d_highmoth ///
>         d_urban  d_pripart d_secpart d_highpart ///
>         d_conttra d_contmod d_marstat
(obs=8972)

             |   d_flfp fstmar~e d_prim~h d_secm~h d_high~h  d_urban d_prip~t
d_secp~t
-------------+----------------------------------------------------------------
------
      d_flfp |   1.0000
   fstmarage |   0.0527   1.0000
   d_primoth |  -0.0291  -0.1116   1.0000
   d_secmoth |  -0.0767   0.0384  -0.2529   1.0000
  d_highmoth |   0.1152   0.3573  -0.2786  -0.3437   1.0000
     d_urban |   0.0138   0.1419  -0.1034   0.0890   0.2095   1.0000
   d_pripart |  -0.0130  -0.0869   0.2268  -0.0371  -0.2127  -0.1371   1.0000
   d_secpart |  -0.0333   0.0494  -0.0651   0.2134  -0.0261   0.0969  -0.2284
1.0000
  d_highpart |   0.0462   0.2549  -0.2117  -0.0426   0.5372   0.2459  -0.2782
-0.3222
   d_conttra |   0.0063   0.0476  -0.0072   0.0242   0.0400   0.0322  -0.0006
0.0095
```

```
   d_contmod |   0.0202  -0.0945  -0.0147   0.0228   0.0181   0.0147  -0.0095
0.0311
   d_marstat |   0.0113   0.0841  -0.0253   0.0067   0.1091  -0.0333  -0.0137
0.0029

             | d_high~t d_cont~a d_cont~d d_mars~t
-------------+------------------------------------
  d_highpart |   1.0000
   d_conttra |   0.0367   1.0000
   d_contmod |   0.0012  -0.2830   1.0000
   d_marstat |   0.0697   0.0516   0.0939   1.0000


. 
. *multicollinearity via OLS plus vif
. reg d_flfp fstmarage d_primoth d_secmoth d_highmoth ///
>         d_urban  d_pripart d_secpart d_highpart ///
>         d_conttra d_contmod d_marstat d_chithr d_chifou

      Source |       SS       df       MS              Number of obs =    8972
-------------+------------------------------           F( 13,  8958) =   18.86
       Model |  59.2314388    13  4.55626453           Prob > F      =  0.0000
    Residual |  2164.48011  8958  .241625375           R-squared     =  0.0266
-------------+------------------------------           Adj R-squared =  0.0252
       Total |  2223.71155  8971  .247877778           Root MSE      =  .49155

------------------------------------------------------------------------------
      d_flfp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   fstmarage |   .0040606   .0012837     3.16   0.002     .0015442     .006577
   d_primoth |  -.0227821   .0158291    -1.44   0.150    -.0538107    .0082465
   d_secmoth |  -.0334323   .0154039    -2.17   0.030    -.0636274   -.0032372
  d_highmoth |   .1325319   .0175765     7.54   0.000      .098078    .1669859
     d_urban |   .0035976   .0110328     0.33   0.744    -.0180292    .0252244
   d_pripart |  -.0057612    .015757    -0.37   0.715    -.0366485     .025126
   d_secpart |  -.0378948   .0155014    -2.44   0.015    -.0682811   -.0075084
  d_highpart |  -.0293433   .0164582    -1.78   0.075    -.0616051    .0029185
   d_conttra |   .0220964   .0157115     1.41   0.160    -.0087019    .0528946
   d_contmod |   .0370571   .0119837     3.09   0.002     .0135663    .0605479
   d_marstat |  -.0086369    .015206    -0.57   0.570    -.0384441    .0211702
    d_chithr |  -.0971427   .0212601    -4.57   0.000    -.1388174   -.0554681
    d_chifou |   .0051876    .022379     0.23   0.817    -.0386804    .0490556
       _cons |   .4953703   .0355591    13.93   0.000     .4256664    .5650742
------------------------------------------------------------------------------


. 
. estat vif

    Variable |       VIF       1/VIF  
-------------+----------------------
    d_chifou |      4.40    0.227263
    d_chithr |      4.17    0.240045
  d_highmoth |      2.29    0.437602
  d_highpart |      2.04    0.491287
   d_secmoth |      1.60    0.626106
   d_secpart |      1.48    0.677441
   d_primoth |      1.31    0.761455
   d_pripart |      1.27    0.788312
   fstmarage |      1.26    0.792852
   d_contmod |      1.17    0.856353
     d_urban |      1.13    0.885004
   d_conttra |      1.12    0.889066
   d_marstat |      1.06    0.940655
-------------+----------------------
    Mean VIF |      1.87

. 
. *normality of the residuals
```

```
. kdensity res,normal

.
.
. log close
      name:  <unnamed>
       log:  H:\Master thesis USB\Stata_Do_files\masterthesis2003.log
  log type:  text
 closed on:  10 May 2012, 09:51:48
--------------------------------------------------------------------------------
------------
```

```
------------------------------------------------------------------------------------
------------
      name:  <unnamed>
       log:  H:\Master thesis USB\Stata_Do_files\masterthesis2008.log
  log type:  text
 opened on:  10 May 2012, 09:49:46

.
end of do-file

. do "C:\Users\Gerolf\AppData\Local\Temp\STD05000000.tmp"

. use "\Master thesis USB\Stata_files_2008\Keepfile2008.DTA", clear

.
end of do-file

. do "C:\Users\Gerolf\AppData\Local\Temp\STD05000000.tmp"

. *********************************************************
. *Master Thesis Socio-Economic Determinants of Fertility*
. *In The Philippines -- Survey 2008                     *
. *********************************************************
.
. ***generationg dummies - only for mothers age 45 and beyond***
. *generate total children ever born by mothers equal or above age 45
. gen ceb45 = v201 if v012>=45
(12149 missing values generated)

.
. *generate dummy if urban (reference category rural area)
. gen d_urban45=0

. replace d_urban45=1 if v102==1 & v012>=45
(673 real changes made)

.
. *generate dummy if maternal primary education complete (reference category no
education)
. gen d_primoth45=0

. replace d_primoth45=1 if v149==2 & v012>=45
(297 real changes made)

.
. *generate dummy if maternal secondary education complete (reference category
no education)
. gen d_secmoth45=0

. replace d_secmoth45=1 if v149==4 & v012>=45
(274 real changes made)

.
. *generate dummy if mother completed higher education (reference category no
education)
. gen d_highmoth45=0

. replace d_highmoth45=1 if v149==5 & v012>=45
(438 real changes made)

.
. *generate dummy if partner's primary education complete (reference category no
education)
. gen d_pripart=0

. replace d_pripart=1 if v729==2
(1280 real changes made)
```

```
. *generate dummy if partner's secondary education complete (reference category
no education
> )
. gen d_secpart=0

. replace d_secpart=1 if v729==4
(2303 real changes made)

. *generate dummy if partner completed higher education (reference category no
education)
. gen d_highpart=0

. replace d_highpart=1 if v729==5
(2639 real changes made)

.
. *generate age at 1st birth if mother aged 45 or above
. gen fstbirage45= v212 if v012>=45
(12254 missing values generated)

.
. *generate age at first marriage if mother aged 45 or above
. gen fstmarage45= v511 if v012>=45
(12216 missing values generated)

.
. *dummy current marital status if mother aged 45 or above (reference category
never married
> )
. gen d_marstat45=.
(13594 missing values generated)

. replace d_marstat45=1 if v501==1 & v012>=45
(1128 real changes made)

. replace d_marstat45=0 if v501==0 & v012>=45 | v501==2 & v012>=45 | v501==3 &
v012>=45 | v5
> 01==4 & v012>=45
(245 real changes made)

.
. *dummy contraceptive method traditional for mother aged 45 or above(reference
category no
> method)
. gen d_conttra45=0

. replace d_conttra45=1 if v313==2 & v012>=45
(164 real changes made)

.
. *dummy contraceptive method modern for mother aged 45 or above (reference
category no meth
> od)
. gen d_contmod45=0

. replace d_contmod45=1 if v313==3 & v012>=45
(284 real changes made)

.
. *multiple regression equation
. reg ceb45 fstmarage45 fstbirage45 d_primoth45 d_secmoth45 d_highmoth45 ///
>         d_urban45  d_pripart d_secpart d_highpart ///
>         d_conttra45 d_contmod45 d_marstat45

      Source |       SS       df       MS              Number of obs =    1261
-------------+------------------------------           F( 12,  1248) =   51.59
       Model |  3021.19493    12  251.766244           Prob > F      =  0.0000
    Residual |  6090.11514  1248  4.87989995           R-squared     =  0.3316
```

```
-------------+------------------------------           Adj R-squared =  0.3252
       Total |  9111.31007  1260  7.23119847           Root MSE      =   2.209

------------------------------------------------------------------------------
       ceb45 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 fstmarage45 |  -.0213587   .0236959    -0.90   0.368    -.0678468    .0251295
 fstbirage45 |  -.1756615   .0236095    -7.44   0.000    -.2219802   -.1293428
 d_primoth45 |  -.4679105   .1801582    -2.60   0.010    -.8213569   -.1144641
 d_secmoth45 |  -.5682392   .2032439    -2.80   0.005    -.9669767   -.1695017
d_highmoth45 |  -.8995606   .2201462    -4.09   0.000    -1.331458   -.4676631
   d_urban45 |  -.3658733   .1377171    -2.66   0.008    -.6360558   -.0956907
   d_pripart |  -.3542448   .1804986    -1.96   0.050    -.7083591   -.0001306
   d_secpart |  -.8584229   .1986965    -4.32   0.000    -1.248239   -.4686069
  d_highpart |  -1.075901    .217983    -4.94   0.000    -1.503554   -.6482473
 d_conttra45 |   -.070225   .1930672    -0.36   0.716     -.448997     .308547
 d_contmod45 |  -.6366988   .1552173    -4.10   0.000    -.9412144   -.3321833
 d_marstat45 |   .6926572   .1887917     3.67   0.000      .322273    1.063041
       _cons |   9.984995   .3360088    29.72   0.000      9.32579     10.6442
------------------------------------------------------------------------------

.
. *post estimation tests
. predict res,r
(12333 missing values generated)

. *Breusch-Pagan test
. estat hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of ceb45

         chi2(1)      =   140.40
         Prob > chi2  =   0.0000

.
. *multiple regression equation
. reg ceb45 fstmarage45 fstbirage45 d_primoth45 d_secmoth45 d_highmoth45 ///
>          d_urban45  d_pripart d_secpart d_highpart ///
>          d_conttra45 d_contmod45 d_marstat45,robust

Linear regression                                      Number of obs =    1261
                                                       F( 12,  1248) =   58.62
                                                       Prob > F      =  0.0000
                                                       R-squared     =  0.3316
                                                       Root MSE      =   2.209

------------------------------------------------------------------------------
             |               Robust
       ceb45 |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
 fstmarage45 |  -.0213587    .023496    -0.91   0.364    -.0674547    .0247374
 fstbirage45 |  -.1756615    .022629    -7.76   0.000    -.2200566   -.1312664
 d_primoth45 |  -.4679105   .1985747    -2.36   0.019    -.8574876   -.0783333
 d_secmoth45 |  -.5682392   .1994614    -2.85   0.004    -.9595558   -.1769225
d_highmoth45 |  -.8995606   .2052965    -4.38   0.000    -1.302325   -.4967963
   d_urban45 |  -.3658733   .1363056    -2.68   0.007    -.6332867   -.0984598
   d_pripart |  -.3542448   .2009025    -1.76   0.078    -.7483888    .0398991
   d_secpart |  -.8584229   .1940591    -4.42   0.000    -1.239141   -.4777047
  d_highpart |  -1.075901   .1986163    -5.42   0.000     -1.46556   -.6862421
 d_conttra45 |   -.070225    .173522    -0.40   0.686    -.4106521    .2702021
 d_contmod45 |  -.6366988   .1435965    -4.43   0.000    -.9184161   -.3549816
 d_marstat45 |   .6926572    .190985     3.63   0.000     .3179702    1.067344
       _cons |   9.984995   .3443326    29.00   0.000      9.30946    10.66053
------------------------------------------------------------------------------

.
```

```
. *checking for multicollinearity (value greater than 10 needs further
investigation)
. estat vif

    Variable |       VIF       1/VIF  
-------------+----------------------
 fstbirage45 |      4.01    0.249401
 fstmarage45 |      3.97    0.251782
d_highmoth45 |      2.57    0.388875
  d_highpart |      2.39    0.418268
 d_secmoth45 |      1.63    0.611840
   d_secpart |      1.55    0.644332
 d_primoth45 |      1.39    0.718311
   d_pripart |      1.31    0.763527
   d_urban45 |      1.21    0.825073
 d_contmod45 |      1.08    0.925154
 d_conttra45 |      1.08    0.927249
 d_marstat45 |      1.06    0.944988
-------------+----------------------
    Mean VIF |      1.94

.
. *normality of the residuals
. kdensity res,normal

.
. 
********************************************************************************
******
. ***logistic regression***
. *dummy binary dependent variable flfp
. gen d_flfp=0

. replace d_flfp=1 if v716>0
(7668 real changes made)

.
. *generate dummy no of children maximum three (reference category no children)
. gen d_chithr = v201>=1 & v201<4

.
. *generate dummy no of children four plus (reference category no children)
. gen d_chifou = v201>=4 & v201<17

.
. *generate dummy if urban (reference category rural area)
. gen d_urban=0

. replace d_urban=1 if v102==1
(6762 real changes made)

.
. *generate dummy if maternal primary education complete (reference category no
education)
. gen d_primoth=0

. replace d_primoth=1 if v149==2
(1619 real changes made)

. *generate dummy if maternal secondary education complete (reference category
no education)
. gen d_secmoth=0

. replace d_secmoth=1 if v149==4
(3669 real changes made)

. *generate dummy if mother completed higher education (reference category no
education)
```

```
. gen d_highmoth=0

. replace d_highmoth=1 if v149==5
(4269 real changes made)

.
. *generate age at 1st birth if mother aged 45 or above
. gen fstbirage= v212
(4955 missing values generated)

.
. *generate age at first marriage if mother aged 45 or above
. gen fstmarage= v511
(4400 missing values generated)

.
. *dummy current marital status if mother aged 45 or above (reference category
never married
> )
. gen d_marstat=.
(13594 missing values generated)

. replace d_marstat=1 if v501==1
(7071 real changes made)

. replace d_marstat=0 if v501==0 | v501==2 | v501==3 | v501==4
(6132 real changes made)

.
. *dummy contraceptive method traditional for mother aged 45 or above(reference
category no
> method)
. gen d_conttra=0

. replace d_conttra=1 if v313==2
(1367 real changes made)

.
. *dummy contraceptive method modern for mother aged 45 or above (reference
category no meth
> od)
. gen d_contmod=0

. replace d_contmod=1 if v313==3
(3038 real changes made)

.
. ***creation of interaction variables***
. *interaction term primery/secondery/higher edu. mother max. three children
. gen primoth_chithr = d_primoth*d_chithr

. gen secmoth_chithr = d_secmoth*d_chithr

. gen highmoth_chithr = d_highmoth*d_chithr

.
. *interaction term primery/secondery/higher edu. mother four children plus
. gen primoth_chifou = d_primoth*d_chifou

. gen secmoth_chifou = d_secmoth*d_chifou

. gen highmoth_chifou = d_highmoth*d_chifou

.
. *summary of (all) descriptive statistics
. sum ceb45 fstmarage45 fstbirage45 d_flfp d_primoth45 d_secmoth45 d_highmoth45
///
>         d_urban45  d_pripart d_secpart d_highpart d_conttra45 d_contmod45
```

```
d_marstat45 ///
>         fstmarage fstbirage d_primoth d_secmoth d_highmoth ///
>         d_urban d_conttra d_contmod d_marstat d_chithr d_chifou ///
>         primoth_chithr secmoth_chithr highmoth_chithr   ///
>         primoth_chifou secmoth_chifou highmoth_chifou

    Variable |       Obs        Mean    Std. Dev.       Min        Max
-------------+--------------------------------------------------------
       ceb45 |      1445    4.350173    2.865741          0         16
 fstmarage45 |      1378    22.16836    5.767521         10         46
 fstbirage45 |      1340    23.04328    5.304717         10         47
      d_flfp |     13594    .5640724     .495896          0          1
 d_primoth45 |     13594    .0218479    .1461921          0          1
-------------+--------------------------------------------------------
 d_secmoth45 |     13594     .020156    .1405388          0          1
d_highmoth45 |     13594    .0322201    .1765906          0          1
   d_urban45 |     13594    .0495071    .2169323          0          1
   d_pripart |     13594    .0941592    .2920608          0          1
   d_secpart |     13594     .169413    .3751301          0          1
-------------+--------------------------------------------------------
  d_highpart |     13594    .1941298    .3955438          0          1
 d_conttra45 |     13594    .0120641    .1091764          0          1
 d_contmod45 |     13594    .0208916    .1430266          0          1
 d_marstat45 |      1373    .8215586    .3830234          0          1
   fstmarage |      9194     20.9491    4.642397         10         46
-------------+--------------------------------------------------------
   fstbirage |      8639     21.8758    4.391415         10         47
   d_primoth |     13594    .1190967    .3239141          0          1
   d_secmoth |     13594    .2698985    .4439232          0          1
  d_highmoth |     13594    .3140356    .4641477          0          1
     d_urban |     13594    .4974253    .5000118          0          1
-------------+--------------------------------------------------------
   d_conttra |     13594    .1005591     .300755          0          1
   d_contmod |     13594    .2234809    .4165933          0          1
   d_marstat |     13203    .5355601    .4987528          0          1
    d_chithr |     13594    .4040018    .4907159          0          1
    d_chifou |     13594    .2314992    .4218061          0          1
-------------+--------------------------------------------------------
primoth_ch~r |     13594    .0450934    .2075167          0          1
secmoth_ch~r |     13594     .124908    .3306268          0          1
highmoth_c~r |     13594    .1449904    .3521041          0          1
primoth_ch~u |     13594    .0515669     .221159          0          1
secmoth_ch~u |     13594    .0479623    .2136944          0          1
-------------+--------------------------------------------------------
highmoth_c~u |     13594    .0350154    .1838256          0          1

.
. ***logistic regression & post estimation***
. *logistic regression equation
. logistic d_flfp fstmarage d_primoth d_secmoth d_highmoth ///
>         d_urban  d_pripart d_secpart d_highpart ///
>         d_conttra d_contmod d_marstat d_chithr d_chifou ///
>         primoth_chithr secmoth_chithr highmoth_chithr   ///
>         primoth_chifou secmoth_chifou highmoth_chifou, nolog

Logistic regression                               Number of obs   =       8803
                                                  LR chi2(19)     =     307.36
                                                  Prob > chi2     =     0.0000
Log likelihood = -5727.3747                       Pseudo R2       =     0.0261

------------------------------------------------------------------------------
      d_flfp | Odds Ratio   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   fstmarage |   1.014603   .0055148     2.67   0.008     1.003852     1.02547
   d_primoth |   1.391248   .4568747     1.01   0.315      .730932    2.648088
   d_secmoth |   1.279728   .2756763     1.14   0.252     .8389839    1.952009
  d_highmoth |   2.083788   .4629462     3.30   0.001     1.348174    3.220782
     d_urban |   1.233022   .0586922     4.40   0.000      1.12319    1.353593
```

```
   d_pripart |   1.249836   .0906695     3.07   0.002     1.084183      1.4408
   d_secpart |   .8646705    .055683    -2.26   0.024     .7621405    .9809937
  d_highpart |   .8739926   .0627679    -1.88   0.061     .7592358    1.006095
   d_conttra |   1.235159   .0822043     3.17   0.002     1.084107    1.407257
   d_contmod |   1.398852   .0721851     6.50   0.000     1.264292    1.547735
   d_marstat |   1.201882   .0693014     3.19   0.001     1.073448    1.345683
    d_chithr |    .706887   .1228651    -2.00   0.046      .502807    .9937993
    d_chifou |   1.175243   .2045694     0.93   0.354     .8355311    1.653075
primoth_ch~r |   .7208765   .2480632    -0.95   0.342     .3672409    1.415046
secmoth_ch~r |   .8083703   .1845676    -0.93   0.351     .5167298    1.264612
highmoth_c~r |   .9220865    .212855    -0.35   0.725     .5865158    1.449651
primoth_ch~u |   .7411623   .2544066    -0.87   0.383      .378212    1.452417
secmoth_ch~u |   .6429089   .1521483    -1.87   0.062     .4043035    1.022331
highmoth_c~u |   .6616124   .1638605    -1.67   0.095     .4071813    1.075027
------------------------------------------------------------------------------

.
. *post estimation analyses
. predict resid, residual
(4791 missing values generated)

. graph twoway scatter resid d_flfp

.
. *test significant effect (multiple) independent on dependent variable
. test fstmarage d_primoth d_secmoth d_highmoth ///
>         d_urban  d_pripart d_secpart d_highpart ///
>         d_conttra d_contmod d_marstat

 ( 1)  [d_flfp]fstmarage = 0
 ( 2)  [d_flfp]d_primoth = 0
 ( 3)  [d_flfp]d_secmoth = 0
 ( 4)  [d_flfp]d_highmoth = 0
 ( 5)  [d_flfp]d_urban = 0
 ( 6)  [d_flfp]d_pripart = 0
 ( 7)  [d_flfp]d_secpart = 0
 ( 8)  [d_flfp]d_highpart = 0
 ( 9)  [d_flfp]d_conttra = 0
 (10)  [d_flfp]d_contmod = 0
 (11)  [d_flfp]d_marstat = 0

           chi2( 11) =  119.33
         Prob > chi2 =    0.0000

.
. *multicollinearity test via correlation matrix/regression plus vif
. corr d_flfp fstmarage d_primoth d_secmoth d_highmoth ///
>         d_urban  d_pripart d_secpart d_highpart ///
>         d_conttra d_contmod d_marstat
(obs=8803)

             |   d_flfp fstmar~e d_prim~h d_secm~h d_high~h  d_urban d_prip~t
d_secp~t
-------------+---------------------------------------------------------------
------
      d_flfp |   1.0000
   fstmarage |   0.0542   1.0000
   d_primoth |  -0.0066  -0.1091   1.0000
   d_secmoth |  -0.0671   0.0176  -0.2568   1.0000
  d_highmoth |   0.1119   0.3535  -0.2656  -0.3901   1.0000
     d_urban |   0.0574   0.1501  -0.1196   0.0518   0.2200   1.0000
   d_pripart |   0.0317  -0.0847   0.2325  -0.0466  -0.1968  -0.1026   1.0000
   d_secpart |  -0.0367   0.0350  -0.0831   0.2419  -0.0412   0.0822  -0.2319
1.0000
  d_highpart |   0.0427   0.2555  -0.2177  -0.0511   0.5241   0.2370  -0.2555
-0.3627
   d_conttra |   0.0160   0.0304  -0.0093   0.0452   0.0137   0.0273   0.0088
0.0201
```

```
   d_contmod |   0.0598  -0.0739  -0.0129   0.0163   0.0408   0.0419  -0.0008
0.0235
   d_marstat |   0.0575   0.0827   0.0070  -0.0382   0.0903  -0.0800   0.0059
-0.0537

             | d_high~t d_cont~a d_cont~d d_mars~t
-------------+------------------------------------
  d_highpart |   1.0000
   d_conttra |   0.0274   1.0000
   d_contmod |   0.0157  -0.3007   1.0000
   d_marstat |   0.0466   0.0528   0.0976   1.0000


.
. *multicollinearity via OLS plus vif
. reg d_flfp fstmarage d_primoth d_secmoth d_highmoth ///
>         d_urban  d_pripart d_secpart d_highpart ///
>         d_conttra d_contmod d_marstat d_chithr d_chifou

      Source |       SS       df       MS              Number of obs =    8803
-------------+------------------------------           F( 13,  8789) =   23.19
       Model |  69.3612339    13  5.33547953           Prob > F      =  0.0000
    Residual |  2021.95536  8789  .230055224           R-squared     =  0.0332
-------------+------------------------------           Adj R-squared =  0.0317
       Total |   2091.3166  8802  .237595614           Root MSE      =  .47964

------------------------------------------------------------------------------
      d_flfp |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
   fstmarage |   .0033044    .001236     2.67   0.008     .0008816    .0057272
   d_primoth |   .0082192   .0165513     0.50   0.619    -.0242251    .0406635
   d_secmoth |   -.008488   .0150873    -0.56   0.574    -.0380626    .0210866
  d_highmoth |    .127868   .0174745     7.32   0.000     .0936139    .1621221
     d_urban |    .048493    .010916     4.44   0.000      .027095    .0698909
   d_pripart |   .0514224   .0165465     3.11   0.002     .0189875    .0838573
   d_secpart |  -.0353404   .0149645    -2.36   0.018    -.0646742   -.0060065
  d_highpart |  -.0310996   .0164854    -1.89   0.059    -.0634149    .0012156
   d_conttra |   .0487592   .0152732     3.19   0.001     .0188201    .0786982
   d_contmod |   .0759938   .0118149     6.43   0.000     .0528339    .0991537
   d_marstat |   .0448302    .013434     3.34   0.001     .0184964     .071164
    d_chithr |  -.1087997   .0204539    -5.32   0.000    -.1488941   -.0687053
    d_chifou |  -.0183308   .0220127    -0.83   0.405    -.0614808    .0248192
       _cons |   .4951063   .0335566    14.75   0.000     .4293276     .560885
------------------------------------------------------------------------------

.
. estat vif

    Variable |       VIF       1/VIF
-------------+----------------------
    d_chifou |      4.20    0.237825
    d_chithr |      3.91    0.255606
  d_highmoth |      2.39    0.417788
  d_highpart |      2.12    0.471321
   d_secmoth |      1.73    0.577308
   d_secpart |      1.60    0.626368
   d_primoth |      1.33    0.753137
   d_pripart |      1.26    0.790880
   fstmarage |      1.26    0.795776
   d_contmod |      1.19    0.837307
   d_conttra |      1.14    0.875107
     d_urban |      1.13    0.885862
   d_marstat |      1.09    0.916267
-------------+----------------------
    Mean VIF |      1.87

.
. *normality of the residuals
```

```
. kdensity res,normal

.
.
. log close
      name:  <unnamed>
       log:  H:\Master thesis USB\Stata_Do_files\masterthesis2008.log
  log type:  text
 closed on:  10 May 2012, 09:50:50
--------------------------------------------------------------------------------
------------
```