

# The Role of Education and Government Sponsored Programs in Limiting Family Size in Pasay, Eastern Samar, and Agusan Del Sur<sup>1</sup>

**John Paolo R. Rivera, Ph.D.**

School of Economics, De La Salle University, Manila, Philippines  
john.paolo.rivera@dlsu.edu.ph / johnpaolo\_rivera@yahoo.com

**Kurt Gerrard T. See**

School of Economics, De La Salle University, Manila, Philippines  
kurt\_gerrard\_see@dlsu.edu.ph / kurtgerrardsee@yahoo.com

The socio-economic quandaries of rapid population growth and poverty have always gone hand in hand. It is evident that the poorest households are those who have a larger family size. Consequently, these households have to support more people with fewer resources. As such, one of the solutions to address the issue is the Reproductive Health (RH) Bill, which is highly condemned by the Roman Catholic Church (RCC). For this reason, this study will explore other possibilities to limit family size by highlighting whether the availability of water, electricity, decent housing, sustainable income, employment, and other welfare enhancing programs limits family size. Showing whether the provisions of these basic sustenance affects family size, using the Maximum Likelihood Estimation (MLE) procedure, it is then possible to propose an alternative solution instead of advocating the use of contraceptives. Likewise, the government can improve on its socio-economic policies so as to address the problem of a booming population. Results have shown that Pasay, Eastern Samar, and Agusan Del Sur responded differently to various stimuli such as educational attainment and government-funded programs, among others, insofar as population dynamics is concerned. This suggests a need to look into the distinction of each region's socioeconomic context and underlying psyche. The milieu within which an individual resides may greatly influence his rational calculus and decision-making process. Also, beyond tailor-fitting population control programs, there is also a need to calibrate policies based on relevant socioeconomic, political, and cultural nuances each region may possess.

**Keywords:** contraceptives, family planning, maximum likelihood estimation, population, Reproductive Health Bill, women empowerment

## INTRODUCTION

The rapid population growth in the Philippines has since been labeled as the culprit responsible for the country's state of underdevelopment, economic stagnation, resource depletion, and high

crime rate among others. According to Todaro & Smith (2006), the persistence of rapid population growth gives rise to cyclical problems such as poverty and unemployment since economic growth is unable to outpace and consequently, sustain the rate at which the population expands.

The *Central Intelligence Agency (CIA) World Factbook* (2010) indicated that as of 2010, the crude birth rate in the Philippines was estimated to be 26.01, while crude death rate was pegged at 5.1. Such information is indicative of the huge disparity between the rate at which the population replenishes and the rate at which it reduces. Population growth, on the other hand, was pegged at 1.76 percent, which is rather small in absolute terms but relatively high when compared to other developing countries. Meanwhile, total population during the same year reached a whopping 93,616,853, which is almost twice the registered number 30 years ago.

As part of its efforts to tackle the growing problem of population growth, the government has proposed the Reproductive Health and Population Development Act of 2008, also known as House Bill No. 5043 and popularly known as the RH Bill. It was designed to promote: (1) child and maternal health; as well as (2) to disseminate information on and access to both natural and modern family planning methods that are medically safe and legally permissible. Despite general acceptance of the first objective, a contentious debate surrounds the second objective.

Arguing from their avowed principles, the proponents of said bill cited the need to create an environment where women and couples have the freedom of informed choice on the mode of family planning they want to adopt based on their needs, personal convictions and religious beliefs. Taking these into consideration, the RH Bill provides access to information campaigns, sex education, family planning programs, and maternal health care services. Other supporters have emphasized the practical benefits of the bill. For instance, Pernia, et al. (2011) suggested the presence of social costs arising from unplanned and untimely pregnancies. Usually, families that unexpectedly have additional children without considering financial implications of such increased membership become dependent on public education, health care services, and other publicly-provided goods. The absence of an adequate income also decreases the overall well-

being of the rest of the family since resources are spread too thinly, thus plunging the family into a state of poverty. Providing couples a means to effectively utilize modern and artificial family planning methods allows them to achieve their desired family size. Meanwhile, natural family planning (NFP) methods were criticized by Pernia, et al. for their high failure rates.

The impasse that persists between proponents and opponents of the RH Bill must not stymie alternative and complementary solutions that seek to control overpopulation. As long as many remain skeptical of the rather controversial policy that the RH Bill is, it is more prudent to seek a universally accepted means to restrain population growth. Given that poverty and misinformation have been shown to be the culprit behind excessive childbearing and overpopulation, it is interesting to explore the possibility of limiting family size by means of adequate provision of social welfare benefits and of economic opportunities. Doing so may render obsolete poverty-driven motivations to increase family size and increase the opportunity costs of childbearing. This will provide policymakers another perspective on the RH Bill. Hence, the following specific objectives of this study are set:

- to determine whether the provision of education and government-sponsored programs, specifically women empowerment, feeding, health, scholarships, training, housing, and credit programs, as an alternative to the RH Bill, can influence family size;
- to provide policy recommendations on how the government would be able to address population control without contradicting the moral values of the Roman Catholic Church (RCC).

Showing whether the provision of these welfare-enhancing instruments limits household size, it is then plausible to propose an alternative solution wherein, instead of advocating the use of contraceptives, the government can simply improve on its socio-economic policies. Hence,

the government would be able to formulate policies addressing the problem of a booming population that could be supported by the RCC.

## **THE ROLE OF EDUCATION AND GOVERNMENT PROGRAMS ON FAMILY SIZE**

### ***The Relationship between Poverty and Rapid Population Growth***

From a macroeconomic perspective, a large population effectively reduces per capita income and thus lowers the amount of savings available for productive investment (Asian Development Bank [ADB], 2005). This underinvestment constrains the rate at which the economy can expand to accommodate the increased population through better provision of goods and services and increased employment. Likewise, an excessive fertility rate renders industries unable to absorb an increasing oversupply of labor, thus exacerbating the problem of urban unemployment and rural underemployment.

On a household level, a larger family size has been shown to decrease household welfare. Orbeta (2005) showed that additional children in the household resulted in lower household saving rates due to increased financial costs incurred in the process of raising another child. Orbeta also indicated that a larger family size reduced work force participation and income of mothers as well as the proportion of school-age children attending school. It is also worthy to note that such negative effects were shown to be regressive - the poorer the household is, the more vulnerable it is from the negative impacts. According to Pernia, Quimbo, Abrenica, Alonzo, Arcenas, Balisacan & Tan (2011), only 4.3 percent of families with one child, experiences poverty; but the rate increases sharply to 52.3 percent for families with nine children. Large families will instinctively find it more difficult to provide for the basic needs of its members, given how income is spread too thinly across too many children. More importantly, families with a large number of children are

also unable to maximize investments in human capital, such as education and healthcare. This deprives children of vital tools that can potentially emancipate them from their current state, thus inducing intergenerational poverty.

However, the relationship between poverty and population growth has never been unidirectional in nature. According to Cuyegkeng (2006), the factors that contribute to overpopulation include, but are not limited to poverty, high incidence of hunger, lack of job opportunities, low quality of education, and others, many of these factors resulting from the others. This suggests the presence of endogeneity between both variables, that is, not only is poverty a byproduct of overpopulation but may well be its cause as well. Poverty may indeed motivate parents to bear more children in order to harness future economic benefits, which include additional labor and social security, among others.

The causal relationship between poverty and population growth has been contended to be bidirectional. Rogers (1989), as cited by McNicoll (1997), claimed that poverty is both a cause and a consequence of population growth. Todaro & Smith provided a comprehensive explanation as to how this phenomenon is indeed applicable to many low-income societies today.

The first causal relationship pertains to the idea that high population levels and growth rates are usually associated with higher levels of poverty. From the perspective of a household, an additional member that will naturally require additional expenditures effectively reduces family savings rate. Income, which would have originally been spent on other activities such as increasing the quality of life of the other household members or perhaps undertaking entrepreneurial activities, that income is instead spent to sustain the additional member. Similarly, from an aggregate perspective, a larger population may hinder the effective and efficacious provision of social services, as limited funds are spread too thinly across a large number of individuals.

The second relationship suggests that poverty is in fact one of the main causes of high fertility

rates. According to Caldwell (1978), one of the most important determinants of the utility of fertility lay in intergenerational wealth flows. In many traditional societies, where net wealth flows from young generations to the elderly, children were perceived to be sources of future income. McNicoll (1999) added that in early stages of economic development, parents expect to benefit from having many children. In locations where child labor is prevalent, children are expected to augment income through employment at young ages. Meanwhile, some are seen as substitute parents who are tasked to care for younger siblings, while others are used as tools to procure wealth from dowries. Moreover, Todaro & Smith posited that children have also become substitutes to a formal social security system, as aging parents seek support.

An alternative explanation to the causal relationship between poverty and high fertility rates can be found in the fact that the latter is the consequence of the former. Low income societies with high rates of child mortality owing to poverty and the lack of adequate resources, have been shown to exhibit higher fertility rates. According to Schultz (1997), underpinning this positive co-variation are the “hoarding” and “replacement” motives. The first channel refers to how parents bear an excess number of children in order to hedge against the possibility of the death of an offspring. This is something which is highly likely in areas where there is restricted and limited access to basic necessities and social services. The second channel concerns the typical response of parents to replace a child when s/he dies. Although the aforementioned reasons require a more complex understanding of human behavior and psychology, both provide plausible connections between poverty, child mortality, and higher population growth. Reinforcing such ideas are empirical methods employed by Schultz who suggested that a decline in child mortality is associated with a decline in fertility rates. This behavior is attributed to the diminished need to replace dying children and the institutionalization of better social services which reduces the economic value once conferred upon children.

### *The Impact of Education on Family Size*

Various studies have explored the relationship between the level of parental education and fertility. Bautista (2007) suggested that parental education may have both a positive and a negative influence on the number of children within a household. Individuals with a higher level of education are likely to significantly encounter more income-generating opportunities than their less educated counterparts. Given these constraints, a trade-off of childcare for the exploitation of such opportunities begins to surface. The plausibility and desirability of child-making and childrearing decrease as the returns to labor-force participation increase. In the instance that parents opt to forgo more children in exchange for pursuing career opportunities, the substitution effect dominates. Turchi (1975) reinforced this idea by explaining that any activity that requires the use of market goods and services or the consumer’s time must be weighed in the context of allocating scarce resources among competing alternatives. In this particular instance, parents must be able to choose between the psychic rewards of childbearing and the rewards from other activities which would have been made possible, should they decide not to have an additional child. On the other hand, the same study indicated the possibility of a positive relationship between education and family size. The additional income made possible by higher levels of education allows parents the financial capacity to raise more children. Being able to afford more offspring is one less disincentive for parents to bear children. In such instances, the income effect dominates.

Van de Kaa (1996) related that there indeed exists a strong interaction between quality and quantity of children, although both must not be mistaken as perfect substitutes. In most cases, educated parents have been found to prioritize quality over quantity of children. This implies focusing spending on a few offspring as opposed to spreading income too thinly among many children. Meanwhile, Janowitz (1976) posited that education affects family size through both

direct and indirect channels. Direct influences include a higher degree of attitudinal maturity and exposure to vital information that pertain to the costs of childbearing and the availability of contraception. Indirect influences include labor force participation and deferred age of marriage resulting from time spent for schooling. The same study also highlighted that the educational attainment of both husband and wife do impact fertility rates.

Likewise, a significant amount of research has been conducted on the relationship between female labor force participation and fertility rates. Several studies such as that of Faria & Wang (2007) and El-Ghannam (2005) predicted a negative relationship between employment and the number of children. A plausible explanation can be found in the seminal work of Mincer (1962) and Becker (1965) which stated that an individual's limited amount of time can be allocated between work-related activities, home-related activities, and leisure. Therefore, an increased amount of time spent at work will naturally reduce the amount of time which can be spent for leisure or, of more relevance to this study, for home-related activities. Note that home-related activities include child-rearing requires a significant amount of time. Moreover, Faria & Wang cited the opportunity cost of women's time as a major determinant of the said inverse relationship. Increased wages for females make childrearing more costly as time spent caring for the child will imply forgone returns to employment. Based on this framework, women then face a trade-off between employment and childcare. Ultimately, it is assumed that the woman's decision to either seek employment or to remain at home to tend to her children will depend on the returns either course of action will provide her.

Despite the vast amount of literature which seeks to explain and validate the inverse relationship between female employment and fertility, there is a dearth of research that delves into employment choices of the husband. Employing a differential game framework, Faria & Wang concluded that the employment choices of the husband holds

as much weight as the employment choices of the wife, inasmuch as fertility is concerned. Hence, it is interesting to verify whether or not the same opportunity cost framework applies to the relationship between the employment of the household head, which is often the husband, and family size.

However, it must be noted that various factors other than opportunity cost may also affect the type of correlation between female labor force participation and fertility rates. Faria & Wang suggested the existence of multiple equilibriums across different countries, implying a non-homogenous relationship between the two relevant variables. Rindfuss & Brewster (1996) categorize such factors into two major categories, namely social structural factors and attitudinal or ideational factors. The first deals with policies that aim to reduce the conflict that exists between employment and childrearing. The institutionalization of tax relief, parental leaves, flexible work hours, and access to childcare alternatives such as daycare centers and nannies allow women to simultaneously carry out both work-related and home-related responsibilities. Rindfuss & Brewster have shown that such mechanisms assuage the mother-worker conflict. The second set of factors is more concerned with the role of culture and gender perceptions in determining the relationship between labor force participation and household size. The rigidity of gender roles and societal perceptions on working mothers do indeed play a role in the ability of engage in work-related activities. The proper apportioning of home-related responsibilities and appropriate childbearing practices do vary across societies.

### ***The Role of Government Programs on Family Size***

According to Todaro & Smith, increasing women's access to opportunities may reduce fertility rates. Hence, it is believed that the prevalence of women empowerment programs may create channels for women to be aware of

potential lifestyle alternatives to motherhood and childrearing. The facilitation of such access via awareness campaigns, livelihood programs, and ultimately, the reduction of gender prejudices create avenues by which women need not remain in the household to perform childcare duties. Moreover, as women begin to gain access to the same economic returns which were previously exclusive to males in patriarchal societies, the viability to excessive childbearing may become less tenable due to increased opportunity costs.

Similarly, Davis, Bernstam & Ricardo-Campbell (1986) and Garcia (2000) defined empowerment of women as providing women with access to employment, access to education, and access to reproductive health care that are free from discrimination, compulsion, and aggression. According to Chavkin (n.d.), these same factors are correlated with declines in fertility, which has become a global occurrence that causes growing concern for state planning for future workforce and social security needs.

However, Castles (2003) argued that public policy strategies to empower women may advance the decline in fertility. However, it is also likely that policies supporting women in working and raising children are most likely to sustain fertility. According to Chavkin, “while demographers had anticipated that fertility decline would follow the mortality decline attendant upon improved living conditions and medical advances, they had expected fertility to level off at replacement rates.” (2) Furthermore, Chavkin emphasized that “the decline in birth rates has led to a host of positive changes on both the societal and individual levels – economic growth resulting from women’s increased employment, improved health and education of children, benefits for women’s health and life opportunities.” (2)

While a number of theorists hold opposing views regarding the attributable contribution of specific factors to fertility, Sorrentino (1990) and Oppenheim & Jensen (1995), generally agreed with the fact that the decline in fertility is associated with mortality decline, increased longevity, urbanization, increased female education and employment,

changes in family formation such as delayed marriage and first birth, increases in divorce and out of wedlock childbearing, technological advances in contraception, increased costs of childrearing, opportunity costs for women, increased secularity and individualism, and changes in economic and cultural aspirations.

## OPERATIONAL FRAMEWORK AND METHODOLOGY

### *Maximum Likelihood Estimation (MLE): The Binary Logistic Regression*

Qualitative Response Model (QRM) involves a dependent variable that indicates in which one of  $m$  mutually exclusive categories the outcome of interest belongs in which no ordering is required for the categories (Gujarati & Porter, 2009). For this study, categorization is done on the number of children a typical Filipino household has. Each household is classified according to whether or not it has a relatively acceptable number of children. This study specifies that the acceptable number of children for a typical Filipino household is 4<sup>2</sup>, based on statistics from the National Statistics Office (NSO) which show that the average number of children per woman in 2006 is 3.2. Hence, it can also be construed that the average household size in the Philippines is six.

Therefore, the study will utilize a binary logistic regression model. For a binary outcome data, the dependent variable,  $y$ , takes one of two values as shown by Equation 1.

$$y = \begin{cases} 1 & \text{with probability } p \\ 0 & \text{with probability } 1 - p \end{cases}$$

From Equation 1, the dependent variable assumes a value of 1 if the number of children in the household is at most 4, and assumes a value of zero if the number of children in the household is greater than 4. According to Cameron & Trivedi (2005), there is no loss of generality in setting the values to 1 and 0 if all that is being modeled is  $p$ , which determines the probability of the outcome.

Adapting the derivation of Cameron & Trivedi, a regression model is formed by allowing the probability  $p$  to depend on a regressor vector  $\mathbf{x}$  and a  $K \times 1$  parameter vector  $\beta$  via a parametric technique. The model is of single-index form with conditional probability given by Equation 2

$$p_i = \Pr[y_i = 1 | \mathbf{x}_i] = F(\mathbf{x}_i' \beta) \quad (2)$$

where  $F(\cdot)$  is a specified function. To guarantee that  $0 \leq p \leq 1$ , it is natural to specify  $F(\cdot)$  to be cumulative distribution function (CDF). The logistic model arises if  $F(\cdot)$  is the CDF of the logistic distribution. Note that if  $F(\cdot)$  is a CDF, then this CDF is only being used to model the parameter  $p$  and does not denote the CDF of  $y$  itself (Cameron & Trivedi).

Particular concentration lies in determining the marginal effect of change in a regressor on the conditional probability that  $y = 1$ . For any probability model, given by Equation 2, and change in the  $j^{\text{th}}$  regressor assumed to be continuous, this is shown by Equation 3

$$\frac{\partial \Pr[y_i = 1 | x_i]}{\partial x_j} = F'(\mathbf{x}_i' \beta) \beta_j \quad (3)$$

where  $F'(z) = \partial F(z) / \partial z$ . The marginal effects differ with the point of evaluation  $x_j$ , as for any nonlinear model, and differ with different choices of  $F(\cdot)$ .

Considering an estimation given a sample  $(y_i, x_i)$  for  $i = 1, \dots, N$ , where independence over  $i$  is assumed. The outcome is Bernoulli distributed for the binomial distribution with one trial. A compact notation for the density of  $y_i$  is its probability mass function given by Equation 4

$$f(y_i | x_i) = (1 - p_i)^{1 - y_i} \text{ for } y_i = 0, 1 \quad (4)$$

where  $p_i = F(\mathbf{x}_i' \beta)$ . This yields probabilities  $p_i$  and  $(1 - p_i)$  since  $f(1) = p^1(1 - p)^0 = p$  and  $f(0) = p^0(1 - p)^1 = 1 - p$ . The density shown in Equation 3 shows log density  $\ln f(y_i) = y_i \ln p_i + (1 - y_i) \ln(1 - p_i)$ . Given independence over  $i$  and

Equation 2 for  $p_i$ , the log-likelihood function is given by Equation 5.

$$L_N(\beta) = \sum_{i=1}^N \{y_i \ln F(\mathbf{x}_i' \beta) + (1 - y_i) \ln(1 - F(\mathbf{x}_i' \beta))\} \quad (5)$$

Differentiating with respect to  $\beta$ , the MLE  $\hat{\beta}_{ML}$  solves Equation 6

$$\sum_{i=1}^N \left\{ \frac{y_i}{F_i} F_i' x_i - \frac{1 - y_i}{1 - F_i} F_i' x_i \right\} = 0 \quad (6)$$

where  $F_i = F(\mathbf{x}_i' \beta)$ ,  $F_i' = F'(\mathbf{x}_i' \beta)$ , and  $F'(z) = \partial F(z) / \partial z$ . Converting to fractions with common denominator  $F_i(1 - F_i)$  and simplifying yields the ML first order condition in Equation 7.

$$\sum_{i=1}^N \frac{y_i - F(\mathbf{x}_i' \beta)}{F(\mathbf{x}_i' \beta)(1 - F(\mathbf{x}_i' \beta))} F'(\mathbf{x}_i' \beta) x_i = 0 \quad (7)$$

Cameron & Trivedi highlighted that the MLE is consistent if the conditional density of  $y$  given  $\mathbf{x}$  is correctly specified. Since the density is Bernoulli, the only possible misspecification is that the Bernoulli probability is incorrectly specified. Therefore, the MLE is only consistent if  $p_i = F(\mathbf{x}_i' \beta)$ .

Given this backdrop on QRM, the logistic regression model is specified in Equation 8. According to Gujarati & Porter, the binary logistic model is the simplest unordered model that allows regressors to differ between two alternatives. Moreover, according to Cameron & Trivedi, the marginal effect for binomial data is computed as a separate marginal effect on the probability of each outcome, and these marginal effects sum to zero since probabilities sum to one.

$$p = \Lambda(\mathbf{x}' \beta) = \frac{\exp(\mathbf{x}' \beta)}{1 + \exp(\mathbf{x}' \beta)} \quad (8)$$

where  $\Lambda(\cdot)$  is the logistic CDF, with  $\Lambda(z) = e^z / (1 + e^z) = 1 / (1 + e^{-z})$ . Moreover, the logistic MLE

first order condition, as seen in Equation 9, simplifies to

$$\sum_{i=1}^N \left( y_i - \Lambda(x_i' \beta) \right) x_i = 0 \quad (9)$$

since  $\Lambda'(z) = \Lambda(z)[1 - \Lambda(z)]$ . Thus, the raw residual,  $y_i - \Lambda(x_i' \beta)$ , is orthogonal to the regressors, similar to the Ordinary Least Squares (OLS) regression. Meanwhile, if the regressors  $x_i$  include an intercept, then Equation 9 implies that

$\sum_i \left( y_i - \Lambda(x_i' \hat{\beta}) \right) = 0$ , so the logistic residuals sum to zero (Cameron and Trivedi). This implies that the average in-sample predicted probability  $N^{-1} \sum_i \Lambda(x_i' \hat{\beta})$  necessarily equals the sample frequency  $\bar{y}$ .

The marginal effects for the logistic regression model can be obtained from the coefficients, since  $\partial p_i / \partial x_{ij} = p_i(1 - p_i)\beta_j$ , where  $p_i = \Lambda_i = \Lambda(x_i' \beta)$ . Evaluating at  $p_i = \bar{y}$  yields a crude estimated marginal effect of  $\bar{y}(1 - \bar{y})\hat{\beta}_j$ . As such, the interpretation of the coefficients is in terms of marginal effects on the odds ratio, rather than on the probability (Cameron & Trivedi). For the logistic regression model, the model specification is shown by Equation 10

$$\ln \left( \frac{p_i}{1 - p_i} \right) = x' \beta + \varepsilon \quad (10)$$

where  $p_i/(1 - p_i)$  measures the probability that  $y = 1$  relative to the probability that  $y = 0$ , which is called the odds ratio (Gujarati & Porter, 2009). For the logistic regression model, the log-odds ratio is linear in the regressors (Cameron & Trivedi).

### Model Specification

In tracing the influence of availability of water, electricity, housing, education, food, and

employment status on the probability that a household will maintain a relatively acceptable number of children, the data on household characteristics and demographics was sourced from the Community Based Monitoring Survey (CBMS) for Pasay City in 2005, Eastern Samar in 2005, and Agusan Del Sur in 2006. These provinces were selected to capture the entire Philippine behavior, with ample representatives from Luzon, Visayas, and Mindanao. The logistic specification of the variables influencing the probability that the household will maintain the acceptable or optimal family size is given by Equation 11. As mentioned above, this study specifies that the acceptable number of children for a typical Filipino household is 4, based on the statistics from NSO.

$$\ln \left( \frac{p_i}{1 - p_i} \right) = f \text{ WATERNEAR}_p, \text{ ELECT}_p, \quad (11)$$

*WALLSTRONG*<sub>p</sub>, *ROOFSTRONG*<sub>p</sub>,  
*PERMANENT*<sub>p</sub>, *SEASONAL*<sub>p</sub>, *TEMPORARY*<sub>p</sub>,  
*HHINCOME*<sub>p</sub>, *ELEMGRAD*<sub>p</sub>, *HSUNDR*<sub>p</sub>,  
*HSGRAD*<sub>p</sub>, *PSUNDR*<sub>p</sub>, *PSGRAD*<sub>p</sub>, *COLUNDR*<sub>p</sub>,  
*COLGRAD*<sub>p</sub>, *WMSPHD*<sub>p</sub>, *WOMEN*<sub>p</sub>, *HEALTH*<sub>p</sub>,  
*SCHOLAR*<sub>p</sub>, *TRAINING*<sub>p</sub>, *HOUSING*<sub>p</sub>,  
*CREDIT*<sub>p</sub>) +  $\varepsilon$

where

$p_i$  is the probability that a household has 4 children, at the most; while  $(1 - p_i)$  is the probability that a household with the number of children greater than 4. This is an indicator of whether or not a family has a desired number of children below or beyond the usual number of children.

*WATERNEAR*<sub>p</sub> is a dummy variable indicating whether a household is near the source of water. It assumes a value of 1 if the distance of the household from the source of water is near, and 0 otherwise. Note that when the water source is within the fenced-off household area or yard and/or outside it, but by less than 250 meters, it is deemed to be near. On the other



hand, when the water source is more than 250 meters away, and/or the distance is undetermined, it is deemed to be far.

$ELECT_i$  is a dummy variable to indicate the presence of electricity in the household. It assumes a value of 1 if the household has electricity, and 0 otherwise.

$WALLSTRONG_i$  and  $ROOFSTRONG_i$  are dummy variables indicating the strength and type of building materials used in the construction of walls and roofs of houses respectively. It assumes a value of 1 if walls and/or roofs are made of strong materials, and 0 if these are made of light materials, salvaged materials, or a mixture of strong, light, and/or salvaged materials.

$WATERNEAR_p$ ,  $ELECT_p$ ,  $WALLSTRONG_i$  and  $ROOFSTRONG_i$  are indicators of poverty and poor living conditions. Todaro & Smith defined poverty as the incidence of not being able to afford basic needs and wants, which includes food, clothing, housing, medicine, education, and other necessary social services. Insufficiency of these elements in the household indicates that the household is enduring poverty, which then influences the decision to increase the number of children in the household, as elucidated by the studies of Caldwell, Rogers, McNicoll, Schultz, and Todaro & Smith. Hence, based on the definition of these dummy variables, all are expected to have a positive impact on the probability that the household will have at most 4 children.

$PERMANENT_i$ ,  $SEASONAL_i$ , and  $TEMPORARY_i$  are dummy variables indicating the employment status of the household head, namely permanent employment, seasonal employment, and temporary employment, respectively. Categories assume a value of 1 if the

household head is permanent, seasonal, temporary, and 0 otherwise. It is expected that this variable will have a positive impact on the probability that a household has a number of children less than or equal to 4, in reference to the studies of Mincer, Becker, Rindfuss & Brewster, El-Ghannam, and Faria & Wang. However, the magnitude of each type of employment might differ.

$HHINCOME_i$  measures the total household income. It is the summation of all sources of household income from domestic and international sources. Based on the Microeconomic Theory of Fertility cited by Todaro & Smith, this variable will have an ambiguous effect on the probability that a household will have an optimal number of children. Higher income does not necessarily imply that households will have more children because of the tendency of parents to prioritize quality of children over quantity.

$ELEMGRAD_p$ ,  $HSUNDR_p$ ,  $HSGRAD_p$ ,  $PSUNDR_p$ ,  $PSGRAD_p$ ,  $COLUNDR_p$ ,  $COLGRAD_p$  and  $WMSPHD_i$  are dummy variables indicating the highest educational attainment of the household head, namely elementary graduate, high school undergraduate, high school graduate, post secondary undergraduate, post secondary graduate, college undergraduate, college graduate, and with graduate studies respectively. The category elementary undergraduate was dropped to avoid the dummy variable trap. It is expected that this variable will have an ambiguous impact on the probability that a household has a number of children less than or equal to 4, in reference to the studies of Turchi, Janowitz, Van de Kaa, and Bautista.

$WOMAN_i$  is an indicator of whether the woman in the household, specifically

the mother, has attended women empowerment programs and positively benefited from it. Women empowerment programs aim: to improve the living conditions of women by allowing them access to information on opportunities outside the household; and to participate in the formulation and implementation of policies. Likewise, these programs enhance women's involvement at all levels of management, including policy-making and decision-making; and they increase women's control over decisions that affect their lives both within and outside the household. It assumes a value of 1 if the woman attended such programs which had positive effects to the household. Note that in the CBMS dataset, the effect of the program is categorized as negative effect, no effect, or positive effect. This is different from the highest grade completed because women empowerment programs are considered to be ad-hoc programs that are forced on, arranged or done for women for a particular purpose, which is to promote their welfare alone; which is unlike formal and technical education, the purpose of which is skill-building. It is expected that this variable will have a positive impact on the probability that a household has a number of children less than or equal to 4, in reference to Sorrentino, Oppenheim & Jensen, Castles, Todaro & Smith, and Chavkin.

$HEALTH_i$ ,  $SCHOLAR_i$ ,  $TRAINING_i$ ,  $HOUSING_i$ , and  $CREDIT_i$  are dummy variables indicating whether a household received health programs, scholarship programs, training programs for vocational purposes, housing programs, and credit programs respectively. These variables represent the provision of government subsidies that augment the lack of capacity of households to acquire such services from the private sector. It is expected that

these variables will have various impacts on the probability that a household will have the optimal number of children. For instance, scholarship programs have the tendency to increase the probability that a household will have more than 4 children, because the burden of sending their children to school will be lower.

## RESULTS AND DISCUSSION

### *Pasay*

The marginal effects for Pasay are shown on Table 1. Note that the violation of heteroscedasticity was already addressed. Also, there is tolerable multicollinearity among the explanatory variables. The marginal effects for Pasay show that the educational attainment of the household head serves as a significant determinant of the probability that a household will have at most 4 children. Generally, it can be noticed from the results that the higher the household head's educational attainment, the higher the probability is of obtaining the optimal household size. On the other hand, it can be observed that when the household head has is an elementary graduate or high school undergraduate, the probability of having only 4 children in the household decreases primarily because of lack of schooling. Note that sufficient schooling provides the knowledge, information, training, and guidance necessary to build and maintain a decent home and sustainable family. Low educational attainment implies the lack of essential parental planning. Moreover, the incapacity to attain a higher level of schooling can be ascribed to poverty. Hence it can be construed that from the psychological perspective of Filipino parents, an additional child is an additional source of income in the long run that will allow a household to escape poverty. Furthermore, in the case of household heads being post secondary school graduates, college undergraduates, or college graduates, the probability of having only 4 children in the household increases. As opposed to the perspective

of parents who may have stopped schooling in their earlier years, these household heads are of the opinion that bearing children has certain direct, indirect, and opportunity costs; which may or may not be more than their capacity to mold a larger family. A higher educational attainment means that the household heads have prepared themselves to raise the quality and quantity of children they want. Moreover, most often than not, these parents are the ones who get employed, considering that education serves as a prerequisite to obtaining a stable job. Hence, bearing more children may also serve as an opportunity cost because, despite financial concerns, they would have to forego their time and careers. On the contrary, household heads that are obtaining and have obtained a masters or doctoral degree have the tendency to have more than 4 children. A practical notion is that most often than not, these people also have high-paying jobs, or are at least are well compensated in their profession. Again, it boils down to pecuniary conditions, where a household heads believes that they have already accumulated enough resources to bear a large family.

The varying impacts of educational attainment on the probability of having an optimal family size can be explained by the popular belief that education has the capacity to change the way household members think. Education can promote an improvement on how households decide on their family size, subject to financial constraints and other microeconomic considerations. However, it must be noted that having less education is not a sufficient factor to explain the way people think of family size, as seen by the negative and statistically significant impact of attending and finishing elementary and high school. This is practically discerning because having low educational attainment might not result in lucrative job opportunities that in turn will raise the cost of increasing family size or give households the financial capacity to do so. Instead, having a low educational attainment redirects the perspective of the household towards expectations that an additional member of the family will provide another source of income (Todaro & Smith).

And then there is, too, the reality that children are complements to housekeeping and in extreme cases, child labor (Basu, 1999). Hence, it can be concluded that as educational attainment corrects the perspective of household members on family size, it is being translated to whether employment is perceived as an opportunity cost of increasing family size or as an avenue to increase the capability of households to increase family size.

Meanwhile, government support and/or poverty-reduction programs provided to households ought to make the latter consider the costs and benefits of having a larger family size because such programs can give them supplementary training and/or resources necessary for them to raise a larger family. However, training, housing loan provisions, and credit access have shown insignificant effects on the probability that a household will have at most 4 children, as opposed to the negative and statistically significant marginal effect of women empowerment programs, provision of health benefits, and scholarship grants. Contrary to expected results, even if women were given empowerment programs in the form of sex education, the probability of having the optimal number of children decreases. From the results, it can be seen that these programs are ineffective to limit the number of children in a typical Filipino household. Instead, it can make women curious with regard to childbearing. Likewise, government attempts at women empowerment programs are challenged by Catholic beliefs. Similarly, government provision of health benefits and scholarship grants lessens the burden of households to raise children, such that parents no longer have to worry about medical expenditures and tuition fees. Therefore, this induces a positive effect on the probability that a household will have more than 4 children. Such result is indicative of the free-rider problem.

### *Eastern Samar*

The marginal effects for Eastern Samar are also shown on Table 1. Note that the violation of

heteroscedasticity has already been addressed. Likewise, there is tolerable multicollinearity among the explanatory variables. Results for Eastern Samar show that there is an irregularity in the impacts among various educational attainments. For instance, a high school graduate is more likely to have a larger family than a high school undergraduate. Also, a college graduate will have a larger family than a college

undergraduate. Likewise, a college undergraduate will have a smaller family than a high school graduate. It is also important to note that the dummy variables representing the educational attainment of post-secondary undergraduate, post-secondary graduate and one with graduate studies were dropped. This can be explained by the condition of the educational system in the province.

**Table 1**

*Marginal Effects after Logit*

Variables	Pasay		Variables	Eastern Samar		Agusan Del Sur	
	dy/dx	P> Z		dy/dx	P> Z	dy/dx	P> Z
<i>WATERNEAR<sub>i</sub>*</i>	-0.02639	0.000	<i>WATERNEAR<sub>i</sub>*</i>	0.09788	0.023	-0.01196	0.381
<i>ELECT<sub>i</sub>*</i>	-0.00769	0.139	<i>ELECT<sub>i</sub>*</i>	0.09421	0.024	0.03055	0.071
<i>WALLSTRONG<sub>i</sub>*</i>	0.01341	0.000	<i>WALLSTRONG<sub>i</sub>*</i>	0.16016	0.012	0.01655	0.357
<i>ROOFSTRONG<sub>i</sub>*</i>	0.00644	0.001	<i>ROOFSTRONG<sub>i</sub>*</i>	-0.08871	0.030	0.02235	0.240
<i>PERMANENT<sub>i</sub>*</i>	-0.01713	0.000	<i>PERMANENT<sub>i</sub>*</i>	-0.07098	0.046	0.58016	0.000
<i>SEASONAL<sub>i</sub>*</i>	-0.00729	0.038	<i>SEASONAL<sub>i</sub>*</i>	-0.21618	0.000	0.65603	0.000
<i>TEMPORARY<sub>i</sub>*</i>	-0.06330	0.000	<i>TEMPORARY<sub>i</sub>*</i>	-0.07737	0.085	0.57027	0.000
<i>HHINCOME<sub>i</sub></i>	-0.00000	0.950	<i>HHINCOME<sub>i</sub></i>	-0.00000	0.000	-0.00000	0.441
<i>ELEMGRAD<sub>i</sub>*</i>	-0.03513	0.000	<i>ELEMGRAD<sub>i</sub>*</i>	-0.22077	0.000	0.44941	0.000
<i>HSUNDR<sub>i</sub>*</i>	-0.02044	0.000	<i>HSUNDR<sub>i</sub>*</i>	0.01597	0.673	0.30861	0.000
<i>HSGRAD<sub>i</sub>*</i>	0.00326	0.374	<i>HSGRAD<sub>i</sub>*</i>	-0.12308	0.014	0.55905	0.000
<i>PSUNDR<sub>i</sub>*</i>	0.01510	0.115	<i>PSUNDR<sub>i</sub>*</i>	Omitted		0.76249	0.000
<i>PSGRAD<sub>i</sub>*</i>	0.03638	0.000	<i>PSGRAD<sub>i</sub>*</i>	Omitted		0.26188	0.300
<i>COLUNDR<sub>i</sub>*</i>	0.01095	0.005	<i>COLUNDR<sub>i</sub>*</i>	0.12511	0.013	0.53911	0.000
<i>COLGRAD<sub>i</sub>*</i>	0.03623	0.000	<i>COLGRAD<sub>i</sub>*</i>	-0.20220	0.000	0.60153	0.000
<i>WMSPHD<sub>i</sub>*</i>	-0.00721	0.873	<i>WMSPHD<sub>i</sub>*</i>	Omitted		Omitted	
<i>WOMEN<sub>i</sub>*</i>	-0.01125	0.077	<i>FEEDPROG<sub>i</sub>*<sup>3</sup></i>	-0.16053	0.039	-0.02882	0.241
<i>HEALTH<sub>i</sub>*</i>	-0.00836	0.000	<i>HEALTH<sub>i</sub>*</i>	0.06500	0.068	-0.04819	0.000
<i>SCHOLAR<sub>i</sub>*</i>	-0.03377	0.000	<i>SCHOLAR<sub>i</sub>*</i>	-0.18774	0.004	-0.08795	0.000
<i>TRAINING<sub>i</sub>*</i>	-0.00940	0.428	<i>TRAINING<sub>i</sub>*</i>	Omitted		-0.01608	0.589
<i>HOUSING<sub>i</sub>*</i>	-0.00796	0.546	<i>HOUSING<sub>i</sub>*</i>	Omitted		-0.01047	0.863
<i>CREDIT<sub>i</sub>*</i>	-0.01671	0.157	<i>CREDIT<sub>i</sub>*</i>	-0.21193	0.000	-0.04041	0.014
Predicted Probability	0.94287058		Predicted Probability	0.26115648		0.12417826	

\* *dy/dx* is for discrete change of dummy variable from 0 to 1

According to CBMS (2010b), in School Year (SY) 2005 to 2006, Eastern Samar had a total of 469 elementary schools, 458 of which were government schools, 7 private schools, 66 secondary schools, and 8 tertiary schools. Among government elementary schools, 304 were complete elementary and 154 were incomplete elementary and primary schools. Incomplete elementary schools with few enrollees were usually located in the small and hard-to-reach *barangays*. Moreover, the vocational schools in the province have subjects in agriculture, crafts and home industries, arts and trades, and fisheries. Degree programs in tertiary schools, apart from the postsecondary, were baccalaureates in management, education, agriculture, fisheries, tourism, engineering, nursing and commerce. The only state college in the province, *Eastern Samar State University*, offers master's programs in agriculture, education, and management and a doctoral program in educational management. As such, the availability and accessibility of educational institutions and educational programs in the province inhibit households to fully harness the intended goals of education towards maintaining a sustainable family size.

Another plausible reason for the irregularity in the results for education attainment can be attributed to shortcomings in the data. Note that the dataset as well as the regression results cannot capture the context and quality of educational programs offered in Eastern Samar. Hence, there is a need to upgrade, restructure, and reframe the educational system in the province so that it will be aligned to the behavior of Eastern Samar, as well as achieve its desired impact of changing the perspective of households and correcting false notions on family size.

Lastly, results suggest an ambiguous relationship between government-funded programs and family size. On one hand, health programs are shown to increase the likelihood of limiting family size, while scholarship and credit programs accomplish the contrary. On way to explain this is to look at the state of health facilities in the province where health programs are administered. According to CBMS, in 2006,

the province had 12 government hospitals, 10 private hospitals and clinics, 26 municipal health centers, and 104 *barangay* health stations. Government hospitals include one provincial, five district, and six municipal hospitals. Availability of these health facilities allows households to respond to intended objectives of health programs.

Likewise, given that scholarship and credit programs significantly increase the spending capacity of households, the idea is reinforced that financial capacity may be a significant consideration insofar as family size is concerned. These results are also indicative of the free-rider problem, which is reinforced by complementing efforts from non-government and people's organizations in the development of Eastern Samar. For instance, according to CBMS, in 2006, 10 non-government organizations (NGOs) operated province wide by extending varied development services in education, potable water supply and sanitation, and healthcare. A number of NGOs served as partners of government in environmental protection, agricultural development, and policy advocacy. Also, there were 490 registered cooperatives providing credit financing, marketing, transport services, processing and other developmental activities.

Generally, there is a notable difference between results derived from Eastern Samar and Pasay. This difference can be attributed to the behavioral aspect of the province. For instance, the level of urbanity and development affects the behavior of the people. A highly rural province like Eastern Samar is likely to exhibit culture, philosophy, pedagogy manifested in specific ways of thinking, which are imbibed in all facets of society including their educational system. Note that according to CBMS, in 2006 the rural household population in the province was composed of 70.6 percent of all households. It still outnumbered the household population in urban areas which constituted 29.4 percent only. Given this data, there is therefore a need to assess or determine the behavioral characteristics of the province before implementing any population and/or poverty-alleviation policies.

## *Agusan Del Sur*

The marginal effects for Agusan Del Sur are also shown on Table 1. Note that the violation of heteroscedasticity has been addressed earlier. Likewise, there is tolerable multicollinearity among the explanatory variables. Results for Agusan Del Sur indicate that education is shown to increase the likelihood of a smaller family size. Again, this is in line with previously mentioned assumptions on the inverse relationship between education and family size. It was mentioned that education plays both an informational and a practical role. The informational role is concerned with equipping parents with better decision-making skills and making them more conscious of the consequences of having additional children. On the other hand, the practical role of education is concerned with making available to individuals various employment opportunities. However, beyond the rather generalized relationship that has been established between education and family size, results show that having at least an elementary or a high school education already increases the likelihood of having a smaller family. Initially, this may seem counter-intuitive as some may claim that basic education should have incremental informational and employment benefits. However, given that the study is situated in a predominantly rural area, it may be posited that getting basic education may already have extensive benefits to the individual. In fact, several industries in rural areas do not require too high a level of education.

This result from Agusan Del Sur consistent with that of Pasay can be attributed to the provision of education in the former. The education indicators of the province show an increasing trend during the two SYs 2004-2005 and 2006-2007 as reported by CBMS (2010a). For SY 2006-2007, note the 33 percent enrolment under the Early Childhood Care and Development Program for aged 3 to 5 years old children. The participation rate in elementary is 74.95 percent; that in the secondary school is 44.14 percent. The achievement rate in the elementary level is 69.49

percent, while it is 55.93 percent in secondary schools. The dropout rate has been decreasing at both the elementary and secondary levels, bringing about positive impact to the province. The dropout rate in elementary and secondary schools for SY 2006-2007 is 5.93 percent and 17.57 percent, respectively. Furthermore, CBMS reported that there are 3,092 classrooms in elementary schools and 1,736 rooms in secondary schools. These provide evidence that the intended objective of providing education to households is being met by inducing a smaller family size among households.

Lastly, government-funded health, scholarship, and credit programs are shown to increase the likelihood of a larger family size. This can be explained by how such provisions shift a portion of the financial burden of child-rearing from the parent to the state, thus effectively decreasing the perceived and actual costs of raising a child. Referring to the Microeconomic Theory of Fertility, a decrease in the costs of childbearing and childrearing, holding perceived benefits constant will increase the desirability of having an additional child. It could be that parents do not realize the true costs of childbearing and childrearing, given that the burden is split between the parents and the state. On a side note, results show that feeding, training and housing programs do not have statistically significant effects on family size.

Another explanation for the positive contribution of health programs to the likelihood of a larger family size can be seen in the province's crude birth rate (CBR), which has been fluctuating from 2003 to 2007. According to CBMS, the CBR in 2007 was at 21.9 percent per 1,000 of the population. The crude death rate (CDR) in 2007 was only 1.84 percent. Moreover, the infant mortality rate (IMR) per 1,000 live births is only 4.2 percent and has decreased in the past five years. While the under-five mortality rate per 1,000 children aged 0 to 4 years old was only 1.14 percent; the maternal mortality rate was 0.89 percent and has also dropped in the past five years because of maternal care

and services provided. Likewise, the health program on feeding malnourished children has greatly contributed to lowering the incidence of malnutrition in the province. The 2007 prevalence rate of malnutrition among children aged 0 to 5 years old in the province dipped to 16.46 percent from 24.44 percent in 2003. Of equal importance is the provincial provision of immunization projects that achieved 91.25 percent immunized children in 2007. Programs such as providing access to safe drinking water and access to sanitary toilet facilities also helped improve the health condition of the populace. According to CBMS, the number of households served with potable water rose from 73 percent in 2005 to 77 percent in 2007. Similarly, there has been a remarkable improvement in access to sanitary toilets from 72.53 percent in 2004 to 76 percent in 2007. Therefore, the incidence of death in the province is not very alarming; and the provision of health programs is sufficient to defray the personal cost of healthcare, allowing households further financial flexibility. Hence, family size is expected to increase.

Additionally, the probability of having a larger family size in the province is also being reinforced by its social infrastructure support which includes 5 public and 2 private hospitals; and 14 rural health units, 132 *barangay* health stations, and 203 day care centres. With this, the Human Development Index (HDI) of the province has also improved. In 2003, the HDI stood at only 0.494, making the province hit the 69<sup>th</sup> rank among provinces in the country. In 2006, the HDI has increased to 0.556, bringing the province to the 57<sup>th</sup> rank (CBMS). This statistical data would point to the fact that households will have larger family sizes, which is a consequence of developmental strategies implemented by their local government.

The results derived from the regression of Pasay, Eastern Samar, and Agusan Del Sur demonstrate varied impacts on the probability that a household will have at most 4 children. Such results convey a stark contrast between the decision-making process and priorities of the households in Pasay, Eastern Samar, and Agusan

del Sur. While more weight seems to be accorded to the costs of child bearing and child rearing in Pasay and Eastern Samar, there seems to be a general inclination to have more children in Agusan Del Sur. This can perhaps be explained by cultural nuances and differences in living standards in these locations.

## CONCLUSION AND POLICY RECOMMENDATIONS

Many economists deem rapid population growth to be necessarily yoked with poverty. It has been observed that the poorest households are those who have the most number of children. Consequently, these households have to support more people with fewer resources. As an outcome, the family is destined to a life of inherited poverty. Such is the case because the poorest social groups are unaware, uninformed, or if informed they are badly informed. For instance, these poor households do not even know how a woman gets pregnant. Moreover, others may have not even heard of prevention in the form of contraceptives, whether natural or artificial. Although there are some who are aware of the existence of modern family planning methods, a significant number are still fearful of its unknown side effects. Hence, it can be construed that these are the possible arguments why women keep on having more children, even though they do not want to, nor do they have the economic means to provide for them.

This problem is further exacerbated by the mismatch in the ways by which the state and the RCC proposes to address rapid population growth. Note that RCC, which is the dominant religion in the Philippines, is against abortion, sterilization, and all other forms of modern family planning methods. However, the RCC is highly in favor of natural forms of birth control, which include abstinence, withdrawal, and rhythm methods (i.e. where women track their ovulation periods in order to prevent pregnancy). As a significant influence on the nation, the RCC exerts substantial

pressure on government policy; it has succeeded in the mitigation of government campaigns on pregnancy-prevention and sexual education, among others.

From a radical perspective, it can be seen that the facts are clear and the solutions are simple – there is a need to lower the birth rate by making contraceptives available to everyone, providing family planning education to everyone, and encouraging households to think for themselves and not listen to propaganda without basis. While the debate continually rages between and among the government, health organizations, and the RCC regarding the RH Bill, the population keeps on growing at an exponential rate. Rapid population growth needs to be addressed now. Debates on whose plan of action must prevail are delaying the nation's move towards a progressive society because the problem is not really being addressed. Hence, this study explores an avenue by which population can be controlled, consistent with both the goals of the state and the faith of the RCC, by way of exploring whether the provision of basic necessities and social services inhibit households from having a family size beyond what is deemed to be optimal.

Regression results suggest that higher levels of educational attainment decrease the likelihood of larger families - results that conform to conventional theories on fertility. This implies that education does indeed increase the opportunity costs to childbearing and returns to employment. On the contrary, results for Eastern Samar suggest that higher educational attainment increased the likelihood of larger families. This is evidence to the fact that education may also be perceived as means of ascertaining financial security and capacity to support a larger household. Therefore, higher educational attainment may either serve to likely increase or decrease family size, depending on which motivations dominate. Should the preference for children take ascendancy over perceived opportunity costs to bearing and rearing offspring, then the case of Easter Samar becomes a highly plausible scenario. Given this analysis, it can be said that utility is not necessarily derived

solely from financial returns but may also be derived from other non-monetary objectives.

Rapid population growth is seen as one of the major reasons for relentless poverty in the Philippines. For which reason, the government has been implementing programs that subsidize basic necessities such as health and education. As such, the last set of variables under scrutiny is concerned with government programs and subsidies on various services. For all regions concerned, the state-sponsored social provisions have been shown to increase the chances of a larger household size. Therefore, the idea that increased government provision of basic services decreases the need to bear children as a substitute for social security, becomes less applicable to the Philippines. In this particular context, government provisions seem to transfer some financial burdens from the household to the state, thus freeing resources that would otherwise have been spent on such basic necessities. The incentive to having more children can be attributed to two plausible sources: First, increased purchasing power in itself diminishes the fear of becoming financial unsustainable should an additional household member be born. Second the costs of bearing and rearing children also become less weighty, given that expenses are partially borne by the state. Assuming that the decisions to have another child are contingent on a cost-benefit model, this lessens the perceived monetary outlay an additional member of the family will require.

The apparent departure of results from conventional theory may suggest a need to implement rather less conventional policies as well. However, beyond tailor-fitting population control programs, there is also a need to calibrate policies based on relevant socioeconomic, political, and cultural nuances each region may possess. However, generally speaking, it is evident that regardless of provincial location, there is a need to regulate government-sponsored programs because they may just promote free-riding among poor households. The dependence of households on the government in the deferral of their costs of childbearing and childrearing must be mitigated.



Perhaps, instead of providing these programs, conditional cash transfers or incentives must be given to households which are capable of maintaining a socially acceptable family size. In this way, the government will be providing incentives so as to decrease family size.

Different locations have been shown to exhibit heterogeneous behavior insofar as population dynamics is concerned. It is quite apparent that each surveyed province responded differently to various stimuli, such as living conditions, educational attainment, employment status, as well as government-funded programs, among others. This suggests a need to peer into the nuances of each region's socioeconomic context and underlying cultural psyche. The milieu within which an individual resides may greatly influence his rational calculus and decision-making process.

Also, such results reflect a departure from conventional microeconomic theories on fertility and decision-making processes on childbearing. The idea that education and employment are inversely related to the number of offspring has been affirmed in some cases, while invalidated in others. Such inconsistencies must not be misjudged as they provide valuable insights on how the government must vary policies in accordance with characteristics specific of and unique to the region.

The evident difference in impact of the variables of interest to the probability of having an optimal family size just shows that responsibility for slowing overpopulation must be redirected from national government to local municipalities. As such, population policies to combat overpopulation must no longer be in the form of a national plan. Implementing a national population policy and/or poverty-alleviating policies is subject to false paradigms in which each region has an unconventional response relative to the nation as a whole. Moreover, consistent with the United Nation's Development Program (UNDP), in order to decelerate the rapid rise in population, poverty reduction accompanied by the provision of education and

reproductive counseling are necessary methods by which information on family planning can be disseminated to the public. However, these must be accompanied by good governance and sound economic policies.

## NOTES

- <sup>1</sup> This study was culled from the research conducted by Rivera & See (2011) "Limiting Family Size through the Sufficient Provision of Basic Necessities and Social Services: The Case of Pasay, Eastern Samar, and Agusan Del Sur" funded by the Angelo King Institute (AKI) in cooperation with the Community Based Monitoring System (CBMS) under the project "Poverty, Inclusive Growth, and Social Protection".
- <sup>2</sup> The cut-off point of 4 children was opted by this study for the following reasons: First, the dataset used for Pasay was for 2005 while the datasets for Eastern Samar and Agusan Del Sur were for 2006. Second, the authors decided to round up the average number of children of 3.2 to 4 following Lind, Marchal & Wathen (2006) who suggested that the usual practice is to round up any fractional statistic.
- <sup>3</sup> The variable  $FEEDPROG_i$  is a dummy variable that indicates government provision of a feeding program. The dataset for Eastern Samar and Agusan Del Sur does not contain any data on the provision of women empowerment programs. Instead, it provided for the provision of a feeding program. Nonetheless, both variables captures government-funded programs aimed to reduce poverty.

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