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Addressing Rapid Population Growth Through Government-Sponsored Programs: The Case of Pasay City, Eastern Samar, and Agusan del Sur

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Rapid population growth is one of the socioeconomic problems that plague the Philippines, contributing to underdevelopment, economic stagnation, resource depletion, a low literacy rate, and a high crime rate. It also gives rise to the widespread problems of poverty and unemployment—these happen most often in developing economies where population grows faster than the economy (Todaro & Smith, 2006). In 2015, as per the reports from the Philippine Statistical Authority (PSA, formerly known as the National Statistics Office), the Philippine population already reached 100 million. The factors that contribute to rapid population growth include poverty, high incidence of hunger, a lack of job opportunities, and substandard education, which may result from one another (Cuyegkeng, 2006).

The Philippine government also initiated legislative reforms to address rapid population growth such as the legalization of the use of contraceptives (i.e., condoms, birth control pills, and IUDs), and family planning—also known as the Responsible Parenthood and Reproductive Health Act of 2012

(RH Law). It guarantees universal access to contraception methods, fertility control, maternal care, and sexual education. It promotes information on and access to both natural and modern family planning methods that are medically safe and legally permissible. It also creates an enabling 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.

However, this law is being condemned by the Roman Catholic Church (RCC) because it contains penal provisions that constitute a violation of free choice and conscience and establishes religious persecution (de Ocampo, 2009). Additionally, by making modern forms of contraceptives readily available, the youth will have little to worry about premarital sex. It is also being criticized for its mandate that the public and the private sectors will fund and distribute contraceptives and the state will disseminate information on their use through health care centers (Gopalakrishnan, 2008).

Despite the abovementioned criticisms, Bernas (2008) rationalized that the arguments for and against the law are just natural consequences of the fact that the moral rules of Philippine society and much of its civil laws are grounded on religious values. Bernas (2008) furthered that the country is a religiously pluralist society, where citizens can differ in matters of morality. Most importantly, Bernas (2008) reasoned that the law is not entirely ruinous because it also seeks to address the needs of women and the youth, especially among the poor.

While the debate between the government, health organizations, and the RCC is still a long way to go, the population is rapidly expanding at an exponential rate. Hence, it may be necessary to explore other alternatives. Rapid population growth needs to be addressed now. Although the discourse on the issue of rapid population growth is healthy for society, it continues to delay the nation's transition towards a progressive society because the issue fails to be addressed. Hence, we explore an alternative to the RH Law that will limit family size and is aligned with both the goals of the state and the faith of the RCC. In this alternative, we explore whether the access of households to basic necessities and social services will inhibit them from having a family size beyond what is deemed to be optimal. As such, our specific research objectives include

1.   To determine whether access to basic sustenance of households, specifically water, electricity, housing, and food (i.e., living conditions), can influence family size;
2.   To determine whether access to education will aid in limiting family size;

3. To determine whether access to employment will aid in limiting family size; and

4. To provide policy recommendations on how the government will be able to address rapid population growth without contradicting the moral values of the RCC.

Once it is shown whether the access to welfare-enhancing instruments limits household size, then it is plausible to propose an alternative solution—instead of advocating the use of contraceptives, the state can simply develop its socioeconomic policies that the RCC supports.

Poverty, Fertility, Population, and Women Empowerment

Education and Household Size

In exploring the relationship between the level of parental education and fertility, Bautista (2007) suggested that parental education has an ambiguous impact on family size. Individuals with higher levels of education are bound to acquire more meaningful income-generating opportunities than their less educated counterparts. Thus, a trade-off between the exploitation of such opportunities and childcare begins to surface—the incentives of childbearing decrease as the returns to labor-force participation increase. When parents prefer pursuing career opportunities than having children, the substitution effect dominates. In a much earlier study by Turchi (1975), 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. That is, parents must be able to choose between the rewards of childbearing and the rewards from other activities that can be done should they decide not to have an additional child. Turchi (1975) also indicated the possibility of a positive relationship between education and family size. The additional income due to higher levels of education allows parents the financial capacity to have more children. In this situation, the income effect dominates.

Beyond the quantity of children, Janowitz (1976) suggested that education affects family size through 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 preference towards participation in the labor force and the choice of deferring marriage as a result of much time spent for schooling. Therefore, the educational attainment of both husband and wife does impact fertility rates. Van de Kaa (1996) reinforced

this finding by showing the strong interaction between quality and quantity of children. In most cases, educated parents tend to prioritize quality over quantity of children. It can be construed that there is focused spending on a few offspring as opposed to spreading income too thin amongst many children.

Poverty and Rapid Population Growth

There is a dual relationship between poverty and rapid population growth (McNicoll, 1997). Todaro and Smith (2006) provided a comprehensive explanation as to how this phenomenon is indeed applicable to many developing economies.

High population levels and growth rates are usually associated with higher levels of poverty. This is because an additional member of a household will require additional expenditures—reducing the family savings rate. Instead of spending on activities that will increase the quality of life of the household (i.e., entrepreneurial undertakings), income is spent to sustain the additional member. On an aggregate perspective, a larger population may hinder the effective and efficient provision of social services as scarce funds are distributed too thinly across a huge number of individuals.

Poverty is one of the main causes of high fertility rates. One of the most important determinants of fertility lies in intergenerational wealth flows (Caldwell, 1978). That is, in traditional societies, where net wealth flows from young generations to the elderly, children were perceived to be sources of future income. In other words, in early stages of economic development, parents expect to benefit from having many children (McNicoll, 1999).

Alternatively, 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—called the "hoarding" and "replacement" motives (Schultz, 1997). Hoarding refers to how parents bear an excess number of children to hedge against the possibility of death of an offspring. This is very likely in areas experiencing limited access to basic necessities and social services. Replacement concerns the typical response of parents to replace a child after a death. These behaviors, although require a more complex understanding of human behavior and psychology, are attributed to the diminished need to replace dying children and the institutionalization of improved social services, which reduces the economic value once conferred upon children.

Other practical reasons why having more children is crucial are the following: (1) in locations where child labor is rampant, children are expected to augment income through employment at young ages; (2) children are

seen as substitute parents who will be assigned to fend for younger siblings; (3) children are used as means to acquire wealth from dowries; and (4) children are substitutes to a formal social security system, as aging parents seek support (Todaro & Smith, 2006).

Employment and Fertility Rate

In understanding the causal relationship between female labor force participation and fertility rates, a conceivable explanation can be found in the seminal work of Mincer (1962) and Becker (1965) stating that an individual's limited amount of time can be allocated between work-related activities, home-related activities, and leisure. Hence, an increased amount of time spent at work will naturally reduce the amount of time that can be spent for leisure and home-related activities. Such has been verified by the studies of Faria and Wang (2007) and El-Ghannam (2005), wherein they found a negative relationship between employment and the number of children. According to Faria and Wang (2007), the opportunity cost of women's time is the primary determinant of the inverse relationship with fertility rate. Increased wages for women makes childrearing costlier as time spent on childrearing will imply forgone returns to employment. It can be construed that women face the trade-off between employment and having children.

Other factors may also influence the type of relationship between female labor force participation and fertility rates. Rindfuss and Brewster (1996) categorized such factors into two major categories: (1) social structural factors and (2) attitudinal or ideational factors. Social structural factors refer to 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 facilities (i.e., daycare centers and nannies) allow women to simultaneously carry out both work-related and home-related duties. Attitudinal or ideational factors refer to the role of culture and gender perceptions in determining the relationship between labor force participation and family size. The rigidity of gender roles and societal perceptions on working mothers play a role in the ability to engage in work-related activities. The proper distribution of home-related duties and appropriate childbearing practices do vary across societies.

Women Empowerment and Opportunity Costs to Childbearing

Rising women's access to opportunities may diminish fertility rates (Todaro & Smith, 2006). Thus, access to women empowerment programs can create awareness of the potential lifestyle alternatives to motherhood and

childrearing. Davis, Bernstam, and Ricardo-Campbell (1986) and Garcia (2000) defined women empowerment as the provision to women of access to employment, access to education, and access to reproductive health care that is free from discrimination, compulsion, and aggression.

The facilitation of awareness campaigns, livelihood programs, and reduction of gender prejudices create possibilities where women can explore their personal development and perform childrearing without staying in the household. Likewise, as women are given access to the same economic returns enjoyed by males, excessive childbearing may be mitigated due to increased opportunity costs. Such findings warrant a growing concern for state planning for future workforce and social security needs (Chavkin, n.d.). Consequently, the decrease in birth rates led to improvements such as economic growth resulting from women's increased employment, improved health and education of children, benefits for women's health, and life opportunities.

While demographers have observed that fertility decline constitutes mortality decline attendant due to enhanced living conditions and medical advancement, they had expected fertility to level off at replacement rates. As expounded by Sorrentino (1990) and Mason and Jensen (1995), 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

The 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). In this study, categorization is done on the number of children a typical Filipino household has. Each household is classified as whether it has a relatively acceptable number of children or otherwise. We have specified that the acceptable number of children for a typical Filipino household is 4 based on the statistics from the PSA (http://psa.gov.ph) showing 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 6.

We employ a binary logistic regression model. For a binary outcome data, the dependent variable, y, takes one of two values as shown by Equation 1.

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

From Equation 1, y assumes a value of 1 if the number of children in the household is at most 4 and assumes a value of 0 if otherwise. 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 (Cameron & Trivedi, 2005). Equation 2 represents the model specification.

$$\ln\left(\frac{p_i}{1 - p_i}\right) = x'\beta + \varepsilon \qquad (2)$$

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, 2005). For the complete details of this section, refer to Rivera and See (2012).

Model Specification

In tracing the influence of the availability of water, electricity, housing, education, food, and employment status on the probability that a household will have a relatively acceptable number of children, the data on household characteristics and demographics were sourced from the community-based monitoring system (CBMS) survey for Pasay City in 2005, Eastern Samar in 2005, and Agusan del Sur in 2006. These provinces were selected to capture the Philippine behavior in its entirety with sufficient and acceptable representatives from Luzon, Visayas, and Mindanao. Equation 3 gives the logistic specification of the variables influencing the probability that the household will have the optimal family size.

$$\ln\left(\frac{p_i}{1-p_i}\right) = f(WATERNEAR_i, ELECT_i, WALLSTRONG_i, ROOFSTRONG_i,$$

$$PERMANENT_i, SEASONAL_i, TEMPORARY_i, HHINCOME_i, ELEMGRAD_i, \quad (3)$$

$$HSUNDR_i, HSGRAD_i, PSUNDR_i, PSGRAD_i, COLUNDR_i, COLGRAD_i, WMSPHD_i,$$

$$WOMEN_i, HEALTH_i, SCHOLAR_i, TRAINING_i, HOUSING_i, CREDIT_i) + \varepsilon$$

where p_i is the probability that a household has four children at most, while $(1 - p_i)$ is the probability that a household has number of children greater than four. This is an indicator whether a family has the desired number of children below or beyond the usual number of children.

$WATERNEAR_i$ is a dummy variable indicating whether a household is near the source of water. It assumes a value of 1 if the distance of household from the source of water is near, and 0 if otherwise. Note that if the water source is inside the household fence or yard and/or outside the fence or yard but less than 250 m away, it is deemed to be near. On the other hand, when the water source is more than 250 m away from the household 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 if otherwise.

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

$WATERNEAR_i$, $ELECT_i$, $WALLSTRONG_i$, and $ROOFSTRONG_i$ are indicators of poverty and poor living conditions. Todaro and Smith (2006) 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 explained by Caldwell (1978), Rogers (1989), McNicoll (1997, 1999), and Schultz (1997). 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 four 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, or temporary, and 0 if 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 four in reference to the studies of Mincer (1962), Becker (1965), Rindfuss and Brewster (1996), El-Ghannam (2005), and Faria and Wang (2007). 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 from the microeconomic theory of fertility cited by Todaro and Smith (2006), 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.

$ELEMGRAD_i$, $HSUNDR_i$, $HSGRAD_i$, $PSUNDR_i$, $PSGRAD_i$, $COLUNDR_i$, $COLGRAD_i$, and $WMSPHD_i$ are dummy variables indicating the highest educational attainment of the household head, namely, elementary graduate, high school undergraduate, high school graduate, postsecondary undergraduate, postsecondary 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 four in reference to the studies of Turchi (1975), Janowitz (1976), Van de Kaa (1996), and Bautista (2007).

$WOMEN_i$ is an indicator 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 to have access to information about opportunities outside the household, 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 increase women's control over the decisions that affect their lives both within and outside the household. It assumes a value of 1 if the woman attended such programs and it brought positive effects to the household. Note that in the CBMS data set, 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, arranged, or done for a particular purpose, which is to promote women's welfare alone

unlike formal and technical education, whose purpose 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 four in reference to Sorrentino (1990), Mason and Jensen (1995), Castles (2003), Todaro and Smith (2006), and Chavkin (n.d.).

$HEALTH_i$, $SCHOLAR_i$, $TRAINING_i$, $HOUSING_i$, 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 will 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 four children because the burden of sending their children to school will be lower.

Results and Discussion

Pasay City, Metro Manila

Pasay City is a political subdivision in the National Capital Region (NCR). It has been on the pursuit of continuously providing the basic necessities of its swelling urban population. To meet its people's health requirements, Pasay has established the Pasay City General Hospital, which provides medical services to all its residents. Moreover, as a matter of policy, Pasay places education as its top priority evidenced by the local educational system that utilizes private–public partnerships (PPP). Basic education in the city is both publicly and privately provided. From the 2005 CBMS survey, the total number of households in Pasay is 65,117, with a mean household size of 4, and a total population of 132,704. Furthermore, electricity in Pasay is distributed by the Manila Electric Company (MERALCO), and water supply is handled by Maynilad Water Services, Inc.

The marginal effects for Pasay are shown in Table 1. For the rudiments of deriving the marginal effects for Pasay, refer to Rivera and See (2012). From Table 1, poverty indicators represented by the physical characteristics of the household have varying impacts and statistical significance. For instance, the water source convenience, availability of electricity, and the physical structure of the house do affect the probability that a household will have the optimal number of children. Results show that the probability a household will have at most four children will increase if the structural integrity of the

house is superior. This result suggest that the physical structure of a house indicates the income capacity of the household, such that superior physical construction of a house means that the owner may have the financial means to have it constructed. This is indicative of an improved wealth dimension of the household that induces them to prioritize the quality over the quantity of children. However, the ease of access to water source reduces the chance that a household will only have four children. An explanation for this is: regardless of wealth and income status, everyone will always have access to water since it is a common resource. Another plausible explanation can be attributed to health and sanitation purposes—water serves a primary necessity for everyday living such as for drinking, bathing, and cleaning. Thus, availability and accessibility of water increase the household size by means of improved health conditions via reduced water-borne diseases. The availability of electricity demonstrated a statistically insignificant marginal effect suggesting that electricity is not really a strong consideration for family size.

These incongruent findings just show that each poverty indicator does not categorically imply any definite conclusion. It indicates the ambiguity of how the state of poverty influences the decision to increase family size. According to Todaro and Smith (2006), increasing family size in the context of poverty has two motivations: (1) each additional member of the household is an additional mouth to feed, and this additional cost discourages the household to increase its size, and (2) each additional member of the household can be an additional source of future income, which encourages households to increase its size. As such, it can be concluded that poverty is not a strong consideration for family size because of the varying and conflicting motivations that households have towards an additional member. The decision to increase family size vis-à-vis the state of poverty is behavioral in nature.

To reinforce this claim, results have shown that the income generated by the household and the employment status of the household head showed negative and statistically significant marginal effects on the probability that a household will have at most four children. This exemplifies the ambiguity of income effect. Here, higher income provides households the financial capacity to have more children. With regards to employment, results showed that whether the household head is permanently, seasonally, or temporarily employed, the probability of having only four children in the household decreases. Just like income, being employed reinforces the capacity to have more children because there will be income to the household regardless of employment status.

Looking at the magnitude of the marginal effects, it is noticeable that when a household head is temporarily employed, the probability of obtaining the optimal household size for a Filipino family is reduced by the highest amount relative to being permanently or seasonally employed. This implies that despite a precarious state of employment, they view their children as investments that will augment family income in the future—an incentive to increase family size. Being permanently employed will permit households to increase its size because of the guaranteed streams of income in the future.

Table 1. Marginal Effects After Logit

Variables	Pasay		Variables	Eastern Samar		Agusan del Sur	
	dy/dx	$P > \lvert Z \rvert$		dy/dx	$P > \lvert Z \rvert$	dy/dx	$P > \lvert Z \rvert$
$WATERNEAR_i$*	−0.02639	0.000	$WATERNEAR_i$*	0.09788	0.023	−0.01196	0.381
$ELECT_i$*	−0.00769	0.139	$ELECT_i$*	0.09421	0.024	0.03055	0.071
$WALLSTRONG_i$*	0.01341	0.000	$WALLSTRONG_i$*	0.16016	0.012	0.01655	0.357
$ROOFSTRONG_i$*	0.00644	0.001	$ROOFSTRONG_i$*	−0.08871	0.030	0.02235	0.240
$PERMANENT_i$*	−0.01713	0.000	$PERMANENT_i$*	−0.07098	0.046	0.58016	0.000
$SEASONAL_i$*	−0.00729	0.038	$SEASONAL_i$*	−0.21618	0.000	0.65603	0.000
$TEMPORARY_i$*	−0.06330	0.000	$TEMPORARY_i$*	−0.07737	0.085	0.57027	0.000
$HHINCOME_i$	−0.00000	0.950	$HHINCOME_i$	−0.00000	0.000	−0.00000	0.441
$ELEMGRAD_i$*	−0.03513	0.000	$ELEMGRAD_i$*	−0.22077	0.000	0.44941	0.000
$HSUNDR_i$*	−0.02044	0.000	$HSUNDR_i$*	0.01597	0.673	0.30861	0.000
$HSGRAD_i$*	0.00326	0.374	$HSGRAD_i$*	−0.12308	0.014	0.55905	0.000
$PSUNDR_i$*	0.01510	0.115	$PSUNDR_i$*	Omitted		0.76249	0.000
$PSGRAD_i$*	0.03638	0.000	$PSGRAD_i$*	Omitted		0.26188	0.300
$COLUNDR_i$*	0.01095	0.005	$COLUNDR_i$*	0.12511	0.013	0.53911	0.000
$COLGRAD_i$*	0.03623	0.000	$COLGRAD_i$*	−0.20220	0.000	0.60153	0.000
$WMSPHD_i$*	−0.00721	0.873	$WMSPHD_i$*	Omitted		Omitted	

Table 1 continued...

WOMEN$_i$*	−0.01125	0.077	FEEDPROG$_i$*	−0.16053	0.039	−0.02882	0.241
HEALTH$_i$*	−0.00836	0.000	HEALTH$_i$*	0.06500	0.068	−0.04819	0.000
SCHOLAR$_i$*	−0.03377	0.000	SCHOLAR$_i$*	−0.18774	0.004	−0.08795	0.000
TRAINING$_i$*	−0.00940	0.428	TRAINING$_i$*	Omitted		−0.01608	0.589
HOUSING$_i$*	−0.00796	0.546	HOUSING$_i$*	Omitted		−0.01047	0.863
CREDIT$_i$*	−0.01671	0.157	CREDIT$_i$*	−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.

*The variable *FEEDPROG*$_i$ is a dummy variable that indicates government provision of feeding program. The data set for Eastern Samar and Agusan del Sur does not contain any data on the provision of women empowerment program. Instead, it provided for the provision of feeding program. Nonetheless, both variables capture government-funded programs aimed to reduce poverty.

The educational attainment of the household head also serves as a significant determinant of the probability that a household will have the optimal family size. From the results, the higher the household head's educational attainment, the higher the probability of obtaining the optimal family size. However, if the household head just finished elementary or if he/she is just a high school undergraduate, the probability of having only four children in the household decreases primarily because of the lack of schooling. Sufficient schooling provides the necessary knowledge, information, training, and guidance in building a decent home and sustainable family—having a low educational attainment implies the lack of essential parental planning. In the case of household heads being post secondary school graduates, college undergraduates, or college graduates, the probability of having only four children in the household increases. Having a higher educational attainment means that the household heads have prepared to raise the quality and quantity of children they desire. Moreover, most often, these parents are the ones who get employed, considering that education serves as a prerequisite to obtaining a stable and meaningful job. Having more children increases the opportunity loss of accepting career opportunities.

On the contrary, household heads that are obtaining and have obtained a masters or doctorate degree have the tendency of having more than four children. A practical notion is that most often than not, these people are also the ones who have attained high-paying jobs or are at least well compensated in their profession. It boils down to monetary conditions, where they believe 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 reality that education has the capacity to change the mentality of households. Education can promote rationality on how households decide on their family size subject to financial constraints and other considerations. However, low educational attainment is not enough to correct the mentality of household members as seen by the negative and statistically significant impact of being in elementary, being an elementary graduate, and being in high school. This is because having low educational attainment will not offer lucrative job opportunities. Having a low educational attainment redirects the perspective of the household towards the expectations that an additional member of the family will be another source of income. It is even accompanied by the reality that children are complements to housekeeping and child labor. As such, educational attainment corrects the mentality of household members by translating how employment is perceived—an opportunity cost of increasing family size or an avenue to increase capability of households to increase family size.

From the regression results, it can be seen that employment reduces the probability of having an optimal family size. An explanation for this contradiction is the idea that education is being used as a vehicle to acquire employment that will provide the financial resource for the household to afford an additional member. Since employment, regardless of status, generates income for the household, financing an additional member of the household becomes likely.

Meanwhile, government support and/or poverty-reduction programs provided for households ought to make them consider the costs and benefits of having a larger family size. This implies that it will give them supplementary training and/or resources 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 four children as opposed to the negative and statistically significant marginal effect of women empowerment programs, provision for health benefits, and scholarship grants. Contrary to expected results, even if women were given empowerment programs in the form of sexual 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 family size. Also, the government's attempts at

women empowerment are overwhelmed by Catholic beliefs. Similarly, the 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 four children. Such result is evident of the free-rider problem.

Eastern Samar

Eastern Samar is a province in the Eastern Visayas region occupying the eastern portion of Samar Island. It is highly rural, and 96% of the people are Roman Catholic—the dominant Catholic faith influences the events of the provincial education, politics, and social functions of the people. Commercial activities in the province are centered in Borongan (provincial capital) while tourism activities are centered in Guiuan (where the historical Homonhon Island is located). The province's major economic industries are agriculture (production of copra, corn, rice, and sugar) and fishery.

The marginal effects for Eastern Samar are also shown in Table 1. For the rudiments of deriving the marginal effects for Pasay, refer to Rivera and See (2012). From Table 1, it can be observed that water distance, the availability of electricity, and the structural integrity of walls decrease the likelihood that the number of children in a family will exceed four. Meanwhile, the structural integrity of the roof increases the probability that the number of children in the household will be more than four. Similar with Pasay, these contrasting findings demonstrate that individual poverty indicators do not generate solid conclusions indicative of the ambiguity of how poverty influences the decision to increase family size. However, it must not be discounted that the quality of life is still an essential factor in the decision-making process of families insofar as family size is concerned.

To shed more light, it is important to look at the province's poverty threshold and incidence. According to the National Statistical Coordination Board (NSCB; http://nscb.gov.ph), among the six provinces in Eastern Visayas, Eastern Samar ranked next to the highest in poverty incidence of families in 2006 with 42.7%. Moreover, CBMS (2010b) showed that the province had 63.7% of its people living below the poverty threshold in 2006. Here, it might be the case that due to poverty, households would prefer a larger family size since children are perceived as investments to escape from poverty.

In terms of access to domestic water supply, according to CBMS (2010b), in 2006, there were a total of 5,345 water system facilities. Level 1 facilities consisting of shallow and deep wells provided the domestic water requirements of majority of households in the province. This type

of water source comprises 94.6% of the total number of water facilities. Other households depended on Level 2 and Level 3 water systems (superior sources of water). For power supply, electricity is directly provided by the Eastern Samar Electric Cooperative (ESAMELCO), which derives most of its power supply from the National Power Corporation (NPC). According to CBMS (2010b), as of 2006, 66.6% of all barangays in the province had been energized to serve a total of 49% of all households in the province. Moreover, as of 2009, 77.5% of all barangays have been energized. Thus, regardless of wealth and income status, everyone will always have access to water and electricity, so these elements are trivial considerations regarding family size. There is a higher probability that a higher quality of life may diminish the need for children as a source of future income and as a means to ensure social safety nets.

Employment is shown to decrease the likelihood of a family having less than five children, which is contrary to a priori expectations. Although employment may imply higher opportunity costs to childbearing and childrearing, it may also imply a higher capacity to sustain a larger family in Eastern Samar. This provides much insight to the probable bidirectional relationship between employment and family size. The choice to bear an additional child in the context of employment may be a function not only of opportunity costs but also the capacity to raise offspring given the desire to have one. Such is the case because the province's labor force and employment in 2005 and 2006 indicated that 37.1% of the total population is employed (CBMS, 2010b). Moreover, CBMS (2010b) reported an employment rate of 77.7%, which is higher in the rural areas, with 79.0%, than in the urban areas, with only 74.6%.

Household income exhibited a negative and statistically significant effect on the likelihood that a household will have an optimal family size. This can be explained by looking at the 1997 and 2000 Family Income and Expenditure Survey (FIES) conducted by the PSA. Eastern Samar's average family income was estimated at PHP 71,527.00 in 2000 (up by 28.42% from the 1997 level of PHP 55,694.00). Meanwhile, the average family expenditure in 1997 was PHP 47,625.00, which increased to PHP 61,742.00 in 2000. It is also interesting to note that the province's main source of income is entrepreneurial and family-operated activities—42.6% of the households derive their income from these activities (CBMS, 2010b). Meanwhile, 24.2% of households in the province earn from salaries and wages, and the remaining 33.2% derive income from other sources other than work such as cash receipts, gifts, pension and retirement, and rental of buildings, spaces, and other properties (CBMS, 2010b). These figures suggest that residents have a lot of alternative sources of income that will allow them to finance the cost of having a larger family size.

For education, results show that there is an irregularity in the impacts among various educational attainments. Specifically, 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, and a college undergraduate will have a smaller family than a high school graduate. These odd results can be explained by the state of the educational system in the province. 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 and 7 were private schools, 66 were secondary schools, and 8 were tertiary schools. Among the government elementary schools, 304 were "complete" elementary and 154 were "incomplete." Incomplete elementary schools were usually located in the small and hard-to-reach barangays with few enrollees. Moreover, the vocational schools in the province have courses on agriculture, crafts and home industries, arts and trades, and fisheries. Courses in tertiary schools, apart from postsecondary, were baccalaureate degrees in management, education, agriculture, fisheries, tourism, engineering, nursing, and commerce. The only state college in the province, Eastern Samar State University, has master's programs in agriculture, education, and management and a doctorate program in educational management. It can be construed that the availability and accessibility of educational institutions and programs in the province inhibit the households from fully harnessing the intended target of education towards maintaining a sustainable family size. One can also argue that the data failed to capture the context and quality of the educational programs. It can also be argued that there is a need to upgrade, restructure, and reframe the educational system in the province to achieve its desired impact of correcting false precepts towards family size.

Lastly, results suggest an uncertain relationship between government-funded programs and family size—health programs are shown to increase the likelihood of limiting family size while scholarship and credit programs accomplish the opposite. This can be explained by the state of health facilities in the province where health programs are managed. Based on the figures of CBMS (2010b), in 2006, the province had 12 government hospitals, 10 private hospitals and clinics, 26 municipal health centers, and 104 barangay health stations. The presence of these health facilities provides access to households.

Access to scholarship and credit programs significantly increase the spending capacity of households. This supplements the idea that financial capacity may be a significant consideration in determining family size. The free-rider problem is also looming—reinforced by the joint efforts of local government, nongovernment, and people's organizations in the development

of Eastern Samar. In 2006, 10 nongovernment organizations (NGOs) operated province-wide providing development services in education, potable water supply and sanitation, and health care (CBMS, 2010b). A number of NGOs served as partners of government in environmental protection, agricultural development, and policy advocacy. Additionally, households have access to 490 registered cooperatives providing credit financing, marketing, transport services, processing, and other developmental activities.

Agusan del Sur

Agusan del Sur is a landlocked province comprising the Caraga Region in the island grouping of Mindanao. It is a first-class province with a total income of PHP 729 million in 2007, according to the Provincial Accounting Office as cited in CBMS (2010a). The province has the highest level of population in the region. According to the report of the CBMS (2010a), population in the province is projected to reach 691,211 by 2017 and is growing at 1.19%. Moreover, the population of indigenous people is 33% of the total population, and children comprise half of the total population. Urban and rural population comprises 27% and 73%, respectively, of the total. Because agricultural land comprises 46% of the province's total land area, the major economic activity is crop farming and gardening where rice and corn are the major crops produced. The province is also abundant in mineral resources (gold, silver, and copper). It also keeps abreast of technological developments elsewhere, with educational institutions offering skills development courses in information technology.

The marginal effects for Agusan del Sur are also shown in Table 1. For the rudiments of deriving the marginal effects for Pasay, refer to Rivera and See (2012). From Table 1, it can be observed that both water access and the strength of materials used in home construction are not statistically significant in influencing family size, while the availability of electricity seems to increase the likelihood that a family will have less than five children. Noting that these variables serve to capture poverty incidence and quality of life, such have little to no influence to the decision-making calculus of parents in selecting a desirable family size. This is suggestive of a shortsighted approach to decisions made at the household level—may be dominated by preferences and impulse. This is a function of a lack of family planning programs and information campaigns that aim to make parents aware of the implications that successive childbearing may lead to deterioration of family well-being. As emphasized in earlier discussion, the state of poverty is expected to either (1) increase the likelihood of a larger family size if children are perceived as investments or (2) decrease the likelihood of a larger family size if children are perceived as additional mouths to feed.

Employment has been shown to increase the likelihood of a smaller family size. This reaffirms the findings of existing literatures, which suggest a trade-off between time spent in the workplace and time spent child rearing at home. Hence, the more time parents allocate for employment translates into less time allocated for home-related activities. Beyond time constraints, employment also increases the opportunity costs of having more children (i.e., forgone wages, unsatisfactory job performance, parental leaves). It is also interesting to note that regardless of permanent, seasonal, or temporary status, employment is crucial in limiting family size.

Likewise, education is shown to increase the likelihood of a smaller family size. This reaffirms findings on the inverse relationship between education and family size, that is, education plays an informational and a practical role. However, beyond the generalized relationship established between education and family size, regression results reveal that undergoing at least elementary or high school education already increases the likelihood of a smaller family. Initially, it seems to be counterintuitive as some may argue that basic education should have incremental informational and employment benefits. However, given that the study is situated in a predominantly urban area, it may be conceivable that undergoing basic education may already have extensive benefits to an individual.

It is apparent that findings in Pasay and Agusan del Sur are consistent with each other and with established frameworks. In Agusan del Sur, it can be attributed to the provision of education in urban areas. The education indicators of Agusan del Sur show an increasing trend during SYs 2004 to 2005 and 2006 to 2007 CBMS (2010a). For SY 2006 to 2007, the participation rate in elementary and secondary school is 74.95% and 44.14%, respectively. Meanwhile, the achievement rate in elementary and secondary level is 69.49% and 55.93%, respectively. It is also vital to note that dropout rates have been decreasing at both the elementary and secondary levels, bringing about a positive impact to the province. The dropout rate in the elementary and secondary schools for SY 2006 to 2007 is 5.93% and 17.57%, respectively. These show that the province is able to provide households access to education, which induces households to maintain a smaller family size.

On the other hand, 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 transfers alleviate for parents the financial burden of child-rearing. This effectively decreases the perceived and actual costs of having a child thereby increasing the desirability of increasing family size. Consequently, parents find it difficult to realize the true costs of having more children because the parents and the state share the burden. However, not all government-funded programs influences family size—results show that

feeding, training, and housing programs do not have statistically significant effects on limiting family size.

Zooming in on the positive contribution of health programs to the likelihood of a larger family size, it can be explained by looking at the province's crude birth rate (CBR) and crude death rate (CDR), which have been fluctuating from 2003 to 2007. According to CBMS (2010a), the CBR in 2007 is at 21.9% per 1,000 population while CDR is only at 1.84%. Moreover, the infant mortality rate (IMR) per 1,000 live births is only 4.2% and has decreased in the past five years. While the under-five mortality rate per 1,000 children aged zero to four is only 1.14%, the maternal mortality rate is 0.89% and has dropped in the past five years because of the maternal care and services provided. Similarly, the health program on feeding of malnourished children has greatly contributed to lowering the incidence of malnutrition in the province. The 2007 prevalence rate of malnutrition among children aged zero to five dipped to 16.46% from 24.44% in 2003. Also, the provincial provision of immunization activity that resulted to 91.25% of children immunized in 2007. Programs that provided access to safe drinking water and access to sanitary toilet facilities also helped improve the health conditions of the populace. In 2007, according to CBMS (2010a), the number of households served with potable water rose from 73% in 2005 to 77% in 2007. Similarly, there has been a remarkable improvement in the access to sanitary toilet from 72.53% in 2004 to 76% in 2007. In conclusion, the incidence of death in the province is not alarming, and the provision of health programs is adequate to defray the personal cost of health care allowing households further financial flexibility in increasing family size.

The probability of having a larger family size in the province is also being reinforced by its social infrastructure support—construction of 5 public hospitals, 2 private hospitals, 14 rural health units, 132 barangay health stations, and 203 day care centers. As a result, the Human Development Index (HDI) of the province improved significantly. In 2003, the HDI stood at only 0.494, but in 2006, the HDI has increased to 0.556 (CBMS, 2010a). These may have allowed households to have a larger family size—a consequence of developmental strategies implemented by their local government.

Conclusions

Rapid population growth and poverty are coupled. The poorest households are evidently those who have larger family sizes, supporting more members with limited and scarce resources. As such, the household is susceptible to the vicious cycle of poverty. Most often, the situation is worsened by the fact that the poorest social groups are unaware, uninformed, or if informed

are badly informed. For instance, most poor households have an inadequate understanding of family planning methods whether natural or artificial. Although there are some who are aware of the existence of modern family planning methods, a significant number are still alarmed by its unknown side effects.

To unscramble the issue, the RH Law has been enacted in conjunction with objections from the RCC. That is, the RCC and the state have different approaches to addressing rapid population growth. The RCC prefers natural forms of birth control (abstinence, withdrawal, and the rhythm method) while the state encourages the use of artificial birth control methods. However, the fact remains that in the Philippines, a fervently religious nation, the RCC has substantial pressure on government policy and has succeeded in the mitigation of government initiatives on controlling pregnancy.

Despite the disagreements of the RCC and the state, 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 to listen to propagandas without basis. Rapid population growth needs to be mitigated immediately.

To address the first research objective, regression results suggest a rather ambiguous relationship between living conditions and family size. In Pasay, the structural integrity of a family's residence decreases the likelihood of a large family while it is the other way around for access to water. In Eastern Samar, access to basic utilities and the structural integrity of a house's walls increase the likelihood that a family will opt to have less than five children. In Agusan del Sur, access to electricity increases the probability of having fewer children while other indicators of living conditions have no significant relationship with family size.

The bizarre variation in the results can be seen as a vague and weak relationship between actual living conditions and family size. Perhaps, this is a manifestation of how quality of life is given little consideration in the decision-making process of parents. Given that family size seems to be at best mercurial and at worst indifferent to living conditions, there is much reason in concluding that quality of life exerts little to no influence on family size. However, one may argue that the variables used to measure the construct are mere manifestations of quality of life and may not be able to capture the precise relationship.

Poverty alleviation has been the overarching goal of most governments of developing economies. In the Philippines, to ease poverty, the state has been subsidizing the basic necessities of the poor households including health and education. For all regions concerned, the state-sponsored social

provisions have been shown to increase the chances of a larger household size. Hence, the idea that increased government provision of basic services decreases the need to bear children as a substitute for social security becomes less applicable for the Philippines. In this context, government provisions seem to transfer some financial burden from the household to the state, thus freeing resources that would have been spent on basic necessities. The incentive to bear children can be attributed to two plausible sources: (1) increased purchasing power diminishes the fear of becoming financially unsustainable should an additional household member be born, and (2) the costs of bearing and rearing children also become less weighty given that expenses are partially subsidized by the state. Assuming that the decisions to bear child is contingent on a cost–benefit model, this effectively lessens the perceived monetary outlay an additional member of the family will require.

To address the second research objective, regression results suggest that higher levels of educational attainment in Pasay and Agusan del Sur indicate a decrease in the likelihood of a larger family size—results that are consistent with literature and theories on fertility. Truly, education increases the opportunity costs to childbearing and increases the likelihood and returns to meaningful employment. On the contrary, results for Eastern Samar suggest that higher educational attainment increased the likelihood of larger families. This is evidence to the argument that education is perceived as a vehicle to ascertain financial security and capacity to support a larger household. Thus, education may serve to either increase or decrease family size, depending on which motivations dominate. Should the preference for children take priority over the perceived opportunity costs to having children, the case of Easter Samar becomes a highly conceivable scenario. As such, having a larger family size is not necessarily dependent on financial return but also on other nonmonetary objectives.

To address the third research objective, regression results suggest that in Pasay and Eastern Samar, the relationship between employment and family size describes a decrease in the likelihood that a family will have less than five children. This raises questions on the motivations and preferences that underpin the decision-making process of households as far as family size is concerned. In addition, the existence of extended family members who may rear children in the absence of parents may reduce the relevance of a necessary trade-off between time spent at work and time spent at home. Meanwhile, in Agusan del Sur, it is not statistically true that employment is a disincentive to have additional children in the household.

It has been evident that the results do not fully adhere to conventional theory. Also, results derived from Pasay, Eastern Samar, and Agusan del Sur demonstrated varied impacts on the probability that a household will

have at most four children. Such results convey a stark contrast between the decision-making process and priorities of the households within these areas. This can be explained by cultural nuances and differences in living standards in these areas. For instance, a highly urban area like Pasay and Agusan del Sur and a highly rural province like Eastern Samar are likely to exhibit distinct culture, philosophy, pedagogy, or mentality, which are imbibed in all facets of society including their educational system.

This suggests a need to implement rather less conventional policies, that is, population control policies should be tailor fitted to a certain area. Additionally, beyond tailor–fitting population control policies, there is also a need to calibrate policies based on relevant socioeconomic, political, and cultural nuances each area may possess. Different locations exhibit heterogeneous behavior insofar as population dynamics are concerned. It has been apparent that each surveyed province responded differently to various stimuli such as living conditions, educational attainment, employment status, and government-funded programs. Hence, it warrants the need to peer into the nuances 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. Specifically, the idea that education and employment are inversely related with the number of offspring has been affirmed in some cases while invalidated in others. Such inconsistencies must not be misjudged as they provide valuable insight as to how governments must vary policies in accordance to characteristics exclusive to a certain region.

On an aggregate level, it is also important that regardless of provincial location, there is a need to recalibrate government-sponsored programs because it has the tendency to incentivize free riding among poor households. It breeds dependence to the government in the deferral of their cost to childbearing. Perhaps, instead of providing these programs, conditional cash transfers (CCTs) must be given to households who are capable of maintaining a socially acceptable family size, which have yet to be determined by the government (i.e., targeting). Also, the rules and the scope of these incentives will also have to be settled by the government.

The unmistakable differences in the impacts of the variables of interest to the probability of having an optimal family size just indicate that the responsibility for slowing rapid population growth must be redirected from the national government to the local municipalities. It seems that population policies to combat rapid population growth is no longer a national plan. Moreover, consistent with the United Nation's Development Program (UNDP), to decelerate the rapid rise in population, poverty reduction and the provision of education and reproductive counseling are the necessary

methods by which information about family planning can be relayed to the public. However, it also requires good governance and sound economic policies.

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