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**Poverty, Vulnerability and Family Size:
Evidence from the Philippines**

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1. Introduction

The population and poverty nexus is not new but remains an important development issue for many countries. In the Philippines, for instance, the debate on role of population growth and family size in development, in general, and poverty, in particular, is largely unresolved. Recent research has added the important dimension of vulnerability to poverty to the debate on the determinants of the welfare status of a population. Dercon (2005) has emphasized that vulnerability can even cause poverty. The issue of vulnerability has hardly been dealt with using Philippine data. This paper summarizes the empirical evidence, both from secondary sources and from the author's own analyses, on the importance of family size in poverty and vulnerability to poverty.

The role of demographic changes in the development of the Philippines has been highlighted in many papers for a considerable period. While it has been credited as one of the earliest adopters of a strong population program in Asia, today its still has not resolved the population problem while her late adopting neighbors have successfully addressed the problem and turned to face other problems. Several papers came out recently to highlight the issue of the importance of demographic concerns in Philippine development. Herrin (2002) highlights the role of a clear population policy. Mapa and Balisacan (2004) have done simulations to show the benefits of just being able to generate the fertility reduction achieved by Thailand with all other things the same. Alonzo et al. (2004) highlighted the role of population in helping achieve the Medium-Term Development Plan objectives. Orbeta (2002) reviewed the implications of population concerns for the Philippine's fight against poverty.

This paper draws together recent results using household survey data of the impact of family size on the various aspects of family welfare. In particular, it shows results of cross-tabulation and multivariate analyses of the role of family size on such areas as poverty incidence, vulnerability to poverty, as well as the underlying mechanism of savings, labor supply and earnings of parents and human capital investments. These results are expected to compliment the results of aggregate level analysis mentioned earlier and hopefully help complete the story of the role demographic changes in Philippine development.

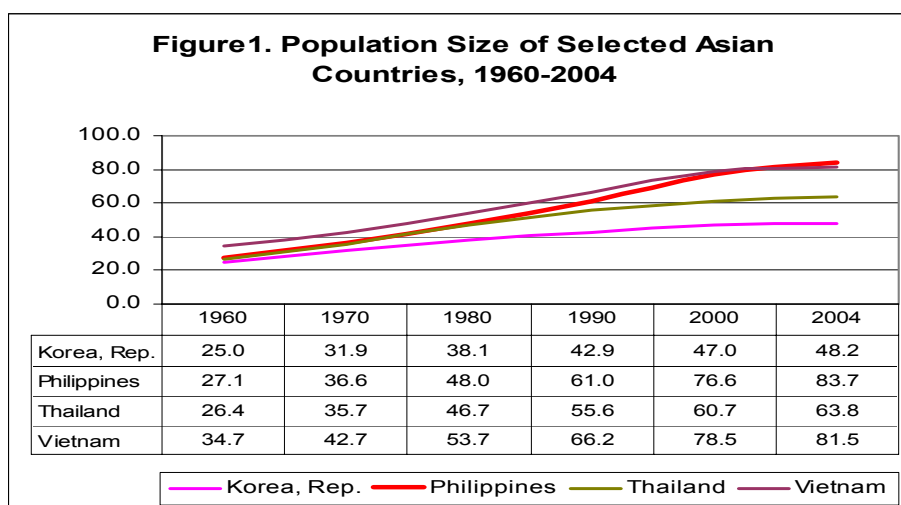
The paper is divided as follows. The next section provides a brief context of the population and development issues in the Philippines. The succeeding section provides an empirical overview of the links between poverty and vulnerability to poverty and

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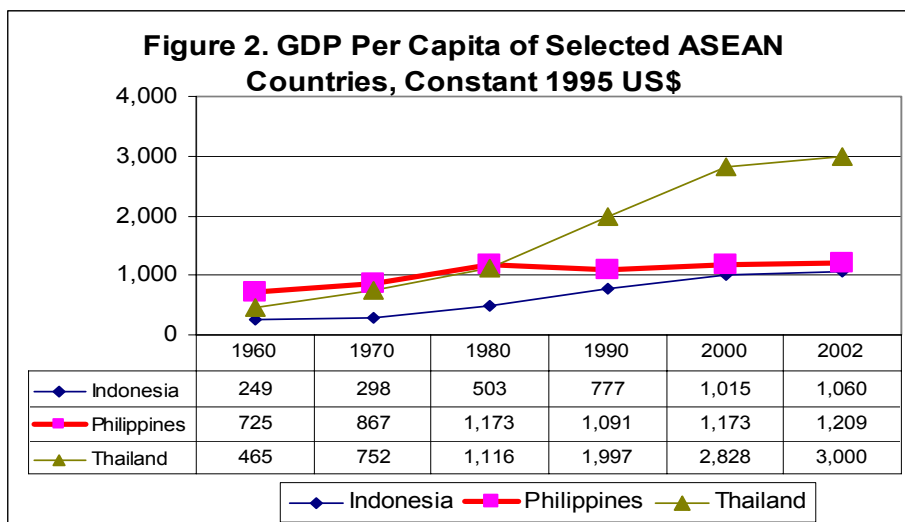
family size. The fourth section provides the result of cross-tabulation analyses between family size and the household welfare indicators. The results of the multivariate analyses are provided in the fifth section. The final section summarizes and provides the implications for policy.

2. Population and Development in the Philippine Context

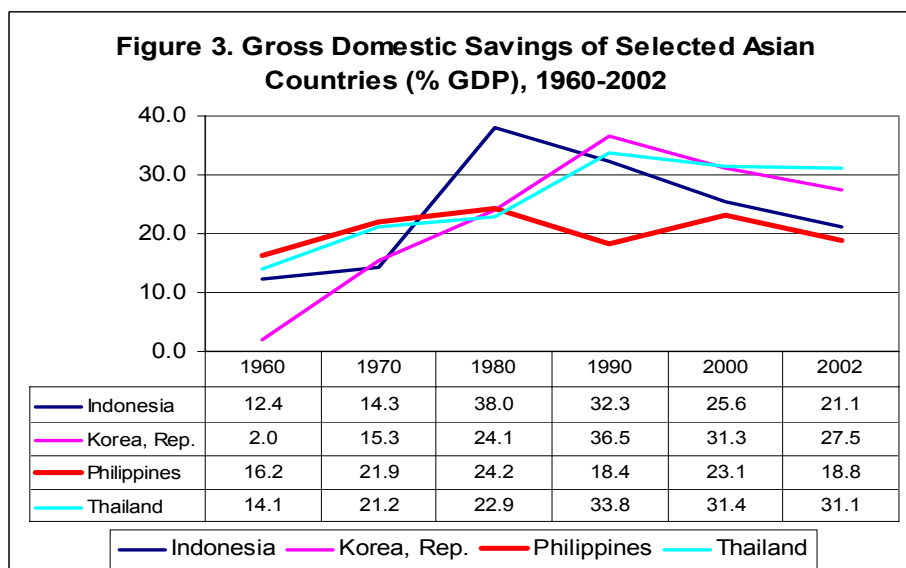
Around the beginning of the 1960s, the Philippines, Thailand and the Republic of Korea had about the same population size. While these two other countries have long achieved replacement fertility (total fertility rate (TFR) of around 2), the Republic of Korea before the 1990s and Thailand about the middle of the 1990s, the Philippines has still a long way to go with the latest computed TFR of 3.5 in 2003. As a result, the population sizes of the three countries have diverged. By around 2000, Philippines had about 30 million more people than the Republic of Korea and 16 million more than Thailand (Figure 1).² In addition, while these two countries continued to register consistently high economic growth, the Philippines had slow and inconsistent growth rates. After putting these two together, it would not be difficult to understand why the per capita income of the country has not gone far beyond 1,000 US dollars for more than two decades now (Figure 2). It would not be surprising also to realize, as will be discussed in the detail in the succeeding sections, that poverty reduction has been slow and tentative (Reyes, 2002).



² It should be noted had the mortality rates of the two countries been the same as the Philippines rather than lower; the difference in population sizes would have been even bigger.



As one looks at other development indicators, the overall long-term development picture given becomes even easier to understand. Savings rates have been low, even often times lower than Indonesia in spite of the higher per capita income in the Philippines (Figure 3). Labor force participation of women is lower compared to many other countries in Asia even if the educational attainment of women is higher (see for instance, Manning, 1999). The high school attendance rate³ that the country is proud about for so long is eroding fast.



³ That Philippines is an outlier in this regard is well-documented (see for instance, Berhman and Schneider, 1994; Behrman 1990).

Yet the issue of the role of population growth and family size in development, in general, and poverty and vulnerability, particular, is largely unresolved. This reality persists despite the growing literature worldwide and also in the Philippines providing evidence on the importance of population growth and family size in development (see for instance Schelzig, K. (2005), Alonzo et al. (2004), Orbeta (2002), and de Dios and Associates (1993) in the case of the Philippines). The two glaring testimonies to this problem are: (a) the equivocal support given by the government to the population program, and (b) the fact that up to now virtually all of contraceptives supplies in public facilities are supplied by donors as national government has not appropriated money for these commodities.⁴ Herrin (2002) describes in detail the noncommittal attitude of the national government on the program and the hazy population policy. He urges the national government to: (a) address the issue of rapid population growth and fertility reduction, (b) be clear about its population policy, (c) provide the needed resources for the program, (d) work with the Catholic church hierarchy, and (e) listen to the married couples with unmet needs who have consistently expressed their need for family planning services. There have been several ways the national leadership had avoided the issue. The current government, for instance, has left it to local government units (LGUs) to decide what to do with family planning services citing the Local Government Code (LGC) of 1991 as the basis. The LGC has transferred many direct services, including maternal and child health service and family planning, to LGUs. This lack of national guidance has resulted in a fragmented and local programs often working in opposite directions largely depending on the persuasion of the local executive (Orbeta 2004; Alonzo et al. 2004). One perhaps may ask whether there is any real demand for family planning services that government has to respond to. As pointed out by earlier, all demographic surveys have documented the consistent high demand for family planning services from women of reproductive age (Herrin, 2002). It has been pointed out also in Orbeta (2004) that the poor have lesser access to family planning services and that their unwanted fertility is very much higher than those of the rich. The demand, therefore, for an appropriately funded population program is clear what is absent is the national government's resolve to push the program consistently as other countries, such Thailand, Indonesia and Viet Nam, have done. The environment is ripe for a long time but the national government has refused to respond positively to this consistent and well-expressed demand.

3. Empirical Overview of the Relationships of Family Size, Poverty and Vulnerability to Poverty

3.1 Poverty Incidence, Gap and Severity and Family Size

The easiest and perhaps the most obvious way to demonstrate the relationship of poverty and family size is to show the extent of poverty incidence by size of family. Table 1 shows the incidence of poverty by family size in the last 25 years using the Family Income and Expenditure Survey (FIES) and official poverty lines. Clearly the incidence of poverty rises as family size increases. For instance, in 1985 the poverty incidence for a four-member household is 36.4 while it is 59.9 for a 9 or more-member household. Hardly surprising, twenty-five years later in 2000, the incidence of poverty for a 4-member household is 23.8, while the corresponding incidence for a 9 or more-member

⁴ USAID, the primary donor of contraceptive supplies, has recently indicated to government that it is phasing out its provision of contraceptive supplies.

household is 57.3. This relationship has not changed over the last 25 years. If at all, the difference in poverty incidence has even widened.

The picture is virtually duplicated when one looks at both poverty gap and severity by family size. The average proportionate distance between the poverty line and the average income of the poor (the poverty gap) doubles as one moves from a 4-member household to a 9 or more-member household. This has even worsened over the years. In 1985 this gap is 10% and 23% for the 4-member and 9 or more-member household, respectively, or about twice as large (Table 1). By 2000 the relative proportions are 6% and 22%, respectively, or more than three times as large. The square of this gap, which a well-accepted measure of the severity of poverty because it puts higher weight on those farther from the poverty line, also tells an identical story.

All of these indicators, thus show that no matter what poverty measure one uses, there is clear indication that poverty worsens as one moves from smaller to bigger family size households.

Table 1. Poverty Incidence, Gap and Severity by family size, 1985-2000

| Family Size | 1985 | 1988 | 1991 | 1994 | 1997 | 2000 |
|------------------|------|------|------|------|------|------|
| Incidence | | | | | | |
| <i>National</i> | 44.2 | 40.2 | 39.9 | 35.5 | 31.8 | 33.7 |
| 1 | 19.0 | 12.8 | 12.7 | 14.9 | 9.8 | 9.8 |
| 2 | 20.0 | 18.4 | 21.8 | 19.0 | 14.3 | 15.7 |
| 3 | 26.6 | 23.2 | 22.9 | 20.7 | 17.8 | 18.6 |
| 4 | 36.4 | 31.6 | 30.1 | 25.3 | 23.7 | 23.8 |
| 5 | 42.9 | 38.9 | 38.3 | 31.8 | 30.4 | 31.1 |
| 6 | 48.8 | 45.9 | 46.3 | 40.8 | 38.2 | 40.5 |
| 7 | 55.3 | 54.0 | 52.3 | 47.1 | 45.3 | 48.7 |
| 8 | 59.8 | 57.2 | 59.2 | 55.3 | 50.0 | 54.9 |
| 9 or more | 59.9 | 59.0 | 60.0 | 56.6 | 52.6 | 57.3 |
| Gap | | | | | | |
| <i>National</i> | 14.7 | 12.8 | 13.0 | 11.3 | 10.0 | 10.7 |
| 1 | 4.6 | 3.4 | 3.1 | 3.5 | 2.2 | 2.2 |
| 2 | 4.9 | 4.4 | 5.4 | 4.7 | 3.7 | 3.7 |
| 3 | 7.0 | 5.8 | 6.3 | 5.3 | 4.4 | 4.6 |
| 4 | 10.3 | 8.6 | 8.4 | 6.7 | 6.3 | 6.3 |
| 5 | 13.1 | 11.6 | 11.6 | 9.3 | 8.8 | 8.9 |
| 6 | 16.6 | 14.5 | 15.4 | 12.8 | 12.1 | 13.0 |
| 7 | 19.8 | 18.7 | 18.7 | 16.3 | 15.7 | 16.7 |
| 8 | 22.2 | 20.4 | 22.0 | 20.3 | 18.5 | 20.9 |
| 9 or more | 23.1 | 22.4 | 22.9 | 21.5 | 20.2 | 22.1 |
| Severity | | | | | | |
| <i>National</i> | 6.6 | 5.5 | 5.8 | 5.0 | 4.3 | 4.6 |
| 1 | 1.8 | 1.2 | 1.2 | 1.4 | 0.8 | 0.7 |
| 2 | 1.8 | 1.6 | 2.1 | 1.7 | 1.4 | 1.3 |
| 3 | 2.7 | 2.1 | 2.5 | 2.0 | 1.6 | 1.6 |
| 4 | 4.1 | 3.3 | 3.4 | 2.5 | 2.4 | 2.4 |
| 5 | 5.6 | 4.7 | 4.8 | 3.8 | 3.5 | 3.5 |
| 6 | 7.6 | 6.2 | 6.9 | 5.5 | 5.2 | 5.5 |
| 7 | 9.4 | 8.5 | 8.7 | 7.5 | 7.1 | 7.6 |
| 8 | 10.7 | 9.5 | 10.7 | 9.8 | 8.8 | 10.1 |
| 9 or more | 11.4 | 10.8 | 11.2 | 10.5 | 9.9 | 10.9 |

Source: Author's calculation using NSO Family Income and Expenditure Surveys

It is also informative to show a very similar result obtained from looking at the vulnerability of households to poverty given the size of their families.

3.2 Vulnerability to Poverty and Family Size

Observing the poverty status of households experiencing economic shocks can reveal the relationship of vulnerability to poverty and family size. Reyes (2002) used a panel data constructed from the 1997 FIES and the 1998 and 1999 Annual Poverty Indicator Surveys (APIS) to study the movement of households in and out of poverty. These surveys were done right after the Asian Financial Crisis in 1997. Table 2 shows the poverty status of household across the three surveys. Letter P means “poor” while N means “non-poor”. Thus, PPP means always poor throughout the three years while NNN means always non-poor throughout the three years. What one can readily observe as one goes from always non-poor to the always-poor categories over the three years is that family size is increasing. Families that are always poor over the three-year period have an average of size of 6.1 while those that are always non-poor have a size of 4.6. This clearly indicates that the vulnerability to poverty increases with family size.⁵

Table 2. Vulnerability to poverty and family size, 1997-1999

| Poverty Group (1997-1999) | Mean Family Size | Prop. Of Families (Unweighted) |
|---------------------------|------------------|--------------------------------|
| PPP | 6.1 | 21.7 |
| PPN | 5.1 | 3.7 |
| PNP | 5.4 | 3.2 |
| NPP | 5.4 | 8.7 |
| PNN | 4.8 | 2.7 |
| NNP | 5.1 | 7.1 |
| NPN | 4.6 | 6.4 |
| NNN | 4.6 | 46.4 |
| Philippines | 5.0 | 100 |

P-Poor; N-Non-Poor

Sources of Basic Data: Run from the matched Public Use Files of the 1997 Family Income and Expenditures Survey, and the 1998 and 1999 Annual Poverty Indicators Surveys.

Source: Reyes (2002)

⁵ There are recent studies that relate specific measures of vulnerability to household characteristics (e.g. Ligon and Schechter, 2003). This study has applied a well-defined vulnerability measure to food consumption using 12-month Bulgarian data. It finds that large family size significantly contributes to the vulnerability of households.

While it is very clear from the foregoing that family size and poverty incidence as well as vulnerability to poverty are positively related, their usefulness for policy is limited unless one understands better the mechanisms behind the connection. It is hypothesized that the main mechanisms operating between family size and poverty and vulnerability to poverty are savings, the labor supply and earnings of parents and the investments in the education of children. The first two are known to be the primary engines for consumption smoothing of households. The last one is the main avenue for securing the future consumption of children and also of parents in their old age.

The rest of the paper uncovers the role of family size in these mechanisms.

4. Evidence from Cross-tabulation Analyses

This section shows that simple cross-tabulations can reveal useful information on the relationship between family size and different indicators of family welfare.

Table 3 provides the mean per capita income, per capita expenditure and savings of households by size of household. It is clear from the table that households are not able to maintain income per capita, expenditure per capita and savings per capita as household size increase. The mean per capita income declines from 18,429 for a four-member household to 8,935 for a 9 or more-member households. Mean consumption per capita also declines from 15,480 to 7,699 from a four-member to a 9 or more-member household. Finally, the mean savings per capita declines from 2,950 for a four-member household to 1,236 for a 9 or more-member household.

Table 3. Mean per capita income, expenditure and savings by family size, 2002

| Family Size | Mean per capita income | Mean per capita expenditures | Mean per capita savings |
|-------------|------------------------|------------------------------|-------------------------|
| 1 | 39,658 | 33,885 | 5,773 |
| 2 | 25,712 | 20,858 | 4,854 |
| 3 | 21,342 | 18,307 | 3,035 |
| 4 | 18,429 | 15,480 | 2,950 |
| 5 | 15,227 | 13,159 | 2,068 |
| 6 | 12,787 | 11,416 | 1,371 |
| 7 | 11,147 | 9,341 | 1,806 |
| 8 | 9,259 | 8,168 | 1,091 |
| 9 or more | 8,935 | 7,699 | 1,236 |
| Total | 14,280 | 12,252 | 2,028 |

Source of basic data: 2002 APIS, NSO

Looking at the changes in human capital expenditures, actual school attendance and incidence of child labor as family size increase provides even more revealing information. Not only does expenditure per student decline but also actual school attendance declines and child labor increases as household size increase.

Table 4 shows that as household size increases the education expenditure per student declines. In addition, the expenditure per sick or injured member, as well as the health expenditure per capita declines as household size increase. For a four-member household education expenditure per student is 1,787 while for a nine or more-member household this is 682. Expenditure per sick member also declines from 1,464 for a four-member household to 756 in a nine-member household. Finally, health expenditure per capita declines from 438 for a four-member household to 150 for a nine or more-member household. Since expenditure per member is a good measure of the extent of investment, these figures reveal that families are spreading resources more thinly as family size increase. This has obvious deleterious effects on human capital outcomes.

Table 4. Education and Health Expenditure by Family Size, 2002

| Family Size | Mean education expenditure per student | Mean health expenditure per injured/sick member | Mean health expenditure per capita |
|-------------|--|---|------------------------------------|
| 1 | 5,558 | 2,437 | 1,700 |
| 2 | 3,135 | 1,969 | 922 |
| 3 | 2,243 | 2,124 | 802 |
| 4 | 1,787 | 1,464 | 438 |
| 5 | 1,558 | 1,454 | 336 |
| 6 | 1,090 | 1,311 | 299 |
| 7 | 858 | 940 | 206 |
| 8 | 1,081 | 744 | 166 |
| 9 or more | 682 | 756 | 150 |
| Total | 1,369 | 1,400 | 466 |

Source of basic data: 2002 APIS, NSO

Going beyond the education expenditure to actual school attendance by household size provides similar revealing results, albeit in a more subdued manner. The absence of drastic changes is easily explained by the well-known attitude of Filipino parents to always keep their children in school as long as possible.⁶ This is the main explanation of the relatively high attendance rates one finds in the Philippines given its per capita income. In addition, in looking at the attendance table (Table 5) one must consider the fact that the smaller households may also contain young starting out families with no school-age children or old families with children no longer present. This partly explains the increasing attendance from household size of one to about 4 or 5 members.⁷ With these considerations in mind, one can see that in a four-member household, 67.9 % of the school-age members 6 to 24 years old attend school while in a nine or more-member household the proportion is 65.6% (Table 5). Similar patterns are also obtained if one examines the school attendance in the different age groups corresponding to the elementary, secondary and college levels.

Combining this particular information and the one in the previous table means that even though lesser number of students are attending school with higher family size, the expenditure per student can still not be maintained as family size increase. This reveals the kind of difficulties large households are facing in trying to keep their children in school trying to keep a revered Filipino tradition.

Table 5. Proportion attending school by age group, 2002

| Family Size | Total (6-24) | Age group | | |
|--------------|-----------------|-------------|-------------|-------------|
| | | 6-12 | 13-16 | 17-24 |
| 1 | 35.9 | | 73.4 | 34.6 |
| 2 | 49.5 | 95.5 | 84.3 | 26.4 |
| 3 | 57.5 | 96.5 | 84.4 | 29.0 |
| 4 | 67.9 | 95.9 | 88.0 | 32.9 |
| 5 | 72.6 | 95.5 | 88.3 | 35.9 |
| 6 | 72.6 | 94.2 | 88.5 | 35.4 |
| 7 | 71.1 | 93.8 | 84.2 | 32.9 |
| 8 | 68.2 | 92.9 | 81.5 | 28.2 |
| 9 or more | 65.6 | 91.3 | 80.4 | 28.5 |
| Total | 69.0 | 94.1 | 85.3 | 32.2 |

Source of basic data: APIS 2002

⁶ De Dios and Associates (1993) succinctly describe this Filipino trait in the following statement: "*Makapagpatapos* (to let as son/daughter graduate) is still the standard by which successful parenting is measured; the stereotype of good parents, bordering caricature, is still those who scrimp and save to send their children to school and to college."

⁷ This inherent weakness of cross-tabulation analysis will be dealt with in multivariate analysis that allows one to control for these mentioned factors. The results are presented in a subsequent section.

Finally, the incidence of child labor by size of household also generates revealing information. The proportion of working children under 15 years old rises with the family size (Table 6). For a family of four, only 3.3% of children less than 15 years are working while 4.6% are working in a family of nine-or more. This pattern is, of course, repeated in the 5-9 and 10-14 age groups. This explains somewhat the decline in school attendance in the previous table as family size increase. Of course, it can be argued that students can still attend school even if working. But this can only be done at the expense of leisure or more frequent absences from classes. Both have negative effects on the welfare of the child.

Table 6. Proportion of children under 15 who are working by family size, 2002

| Family Size | Working | Age group | | |
|-------------|---------|-----------|-------|-------|
| | | 5-9 | 10-12 | 13-14 |
| 2 | 7.2 | 0.0 | 47.0 | 53.1 |
| 3 | 3.2 | 2.6 | 38.4 | 58.9 |
| 4 | 3.3 | 4.9 | 45.2 | 49.9 |
| 5 | 3.2 | 5.5 | 42.3 | 52.2 |
| 6 | 3.3 | 6.0 | 49.2 | 44.8 |
| 7 | 4.2 | 6.7 | 41.4 | 51.9 |
| 8 | 4.0 | 4.5 | 36.6 | 59.0 |
| 9 or more | 4.6 | 10.1 | 38.1 | 51.8 |
| Total | 3.7 | 6.4 | 42.0 | 51.7 |

Source of basic data: APIS 2002

Cross-tabulation analyses, of course, suffer from not being able to control for other variables that are known to affect the relationship of family size and the various indicators of family welfare. We, therefore, turn to multivariate analyses in the next section.

5. Evidence from Multivariate Analyses

5.1 Methodology

5.1.1 The Generic Model

The estimation results discussed in the subsequent part of the paper employ a generic model of the form

$$(1) \quad y = \alpha_1 n + X\alpha_2 + \varepsilon$$

The dependent variable of interest y is a function of the number of children n and a host of other individual, household and often times also community variables X . The parameters to be estimated are α and β and ε the error terms assumed to have the

usual convenient properties. The implied subscripts are omitted for clarity. The essential characteristic of this generic model is that n is endogenous and explained by a function, so

$$(2) \quad n = \beta_1 z + X\beta_3 + \mu$$

$$(3) \quad \mu = \rho\varepsilon + \eta$$

The basic motivations for an endogenous n are the quantity-quality hypothesis (Becker and Lewis 1973), and that children are a form of old-age security (Neher 1971). The quantity-quality hypothesis argues that there is a trade-off between the number and the quality (usually expressed in terms of human capital investments) of children, i.e., the number of children is chosen with a given quality in the parent's mind. The variable z is often called the instruments to identify n in the y equation. The error term μ is then correlated with ε as in (3). Given (2), if y is estimated by OLS or some LDV estimation techniques if the dependent variable of interest is discrete the estimate would be biased. One needs to use instrumental variable (IV) estimation or two-stage LDV estimation techniques to generate consistent estimates. The problem is that it is not easy to find an appropriate instrument z for n that is not included in X . This is a problem we turn to in the next section.

To provide estimates for the responses of the different socioeconomic classes, the number of children variable was interacted with per capita income quintiles.

5.1.2 Balanced Sex-Mix as an Instrument

There are not too many instruments that one can find for the number of children in household models. Most of the likely candidates such as household income, education of the parents or age of marriage are also related to the dependent variable of interest such as labor force participation of parents, and savings or education of children, rendering these inappropriate as instruments. Recent research using US data such as Angrist and Evans (1998) has used the hypothesis that families prefer to have a balanced sex mix of children as an instrument for the number of children. The Philippines is one of the countries in Asia where a balanced sex-mix is found to have prevailed in contrast to countries in South and Eastern Asia where indications for son preference are often found (Wongboonsin and Ruffolo, 1995). Early literature that confirms a preference for a balanced sex-mix in the Philippines is found in Stinner and Mader (1975). The other instruments that are available are limited by their applicability only in very specific circumstances. The occurrence of twins has been used as instruments again using US data first in Rosenzweig and Wolpin (1980) and in subsequent studies such as Angrist and Evans (1998). A much more recent application was for Romania (Glick, Marini and Sahn, 2005). Son-preference in the Republic of Korea was also used as an instrument for the fertility for instance in Lee (2004). Finally, another instrument would be an exogenous policy change that could affect child bearing. Quian (2004), for instance, used the relaxation of the one-child policy in the People's Republic of China that allows rural households to have another child if the first child is a girl. Viitanen (2003), on the other hand, used the large-scale giving out of vouchers for privately provided childcare in Finland.

In the case of the balanced sex-mix hypothesis, the fact that families do not have control over the sex of their children makes same sex for the first two children virtually a random

assignment. As argued in Angrist and Evans (1998) using same sex as an instrument will allow a causal interpretation. It should be noted, however, that the downside of this instrument is that it will render families that has less than two children unusable for analysis. While this maybe a serious problem in low fertility areas, this may not be in the case of the Philippines where the average number of children exceeds four.

To check on the validity of this instrument, Table 7 provides a cross tabulation of the average proportion of families that have additional children and the average number of number of children by sex of their first two children for 24,000 families that have two or more children using the APIS 2002 dataset. The table shows that 67.4% of families that had one male and one female for their first two children had another child, while 71.8% had another child when they have the same sex for their first two children, or a difference of more than 4%. In terms of average number of children, this is 3.49 as against 3.61 or an average difference of a little over 0.12 children. These average differences are statistically significant under conventional levels. Comparing this with Table 3 and 5 in Angrist and Evans (1998) one can observe several differences. The difference in the proportion of families having a third child for the two groups of families is smaller and the standard error is larger. In the case of the difference in the average number of children, the difference is larger but so is the standard error. This is not unexpected given the larger family size in the Philippines compared to the US and the expected larger dispersion of the distribution. Consequently, the implied t statistics in Table 7 are not as large as those in Angrist and Evans (1998) indicating that discrimination generated from the same-sex instrument may not be as strong as that obtained using US data.

Table 7. Proportion of families that had a third child and average number of children by sex of first two children

| Sex of first two children | Proportion that has a third child | | Number of children | | Proportion to sample |
|---------------------------|-----------------------------------|--------|--------------------|--------|----------------------|
| | Mean | SE | Mean | SE | |
| (1) One Male, One Female | 0.6740 | 0.0042 | 3.4850 | 0.0315 | 0.491 |
| (2) Both male | 0.7179 | 0.0052 | 3.6452 | 0.0420 | 0.302 |
| (3) Both female | 0.7180 | 0.0063 | 3.5575 | 0.0495 | 0.207 |
| (4) Same Sex | 0.7179 | 0.0040 | 3.6095 | 0.0320 | 0.509 |
| Difference (4)-(1) | 0.0439 | 0.0058 | 0.1245 | 0.0449 | |

Source of basic data: National Statistics Office, Annual Poverty Indicators Survey, 2002

5.1.3 Data Sources

The data on most individual and household characteristics and location characteristics were taken from the 2002 Annual Poverty Indicator Survey (APIS). The APIS is a rider survey to the July round of the quarterly Labor Force Survey conducted by the National Statistics Office (NSO). The 2002 APIS is the third of the series conducted by the NSO. The other two were conducted in 1998 and 1999. It provides basic demographic information on all members of the household as well as household amenities. Income and expenditure data for the past 6 months are also gathered.

All monetary values such as income and savings are deflated using provincial consumer price indices compiled by the Price Division of the NSO. This is done to control for inter-provincial price variability.

Barangay and municipal-level data from the 2000 Census of Population and Housing are also used to provide measures of investment opportunities, availability of financial institutions and school facilities. It is therefore assumed that there is not much difference in the structure of distribution of the facilities in 2000 and in 2002 or that whatever changes happened did not upset the distribution of the availability of facilities. These barangay and municipal data set were aggregated at the domain level of the APIS and attached to the APIS data set using domain identification variables.

5.2 Number of Children and their Education

The impact of additional children on their education was estimated by using the proportion of school-age children 6 to 24 years old to the number of children in the household. Estimates for the different age groups corresponding to the three education levels, elementary (6-12), secondary (13-16) and tertiary (17-24), were also done to provide indications of the differential impacts.

The estimate given in Orbeta (2005a) shows that each additional child reduces the proportion of school-age children attending school. The estimated impact of each additional child for the total school-age population of 6-24 is -19% of current attendance rates (Table 8). The impact for the elementary age group is not significant. The estimated impact for the secondary and tertiary levels are, respectively, -26% and -57%. By socioeconomic class, the impact exhibits a regressive effect with a larger impact for poorer households. For instance, for the 6-24 age group, the impact is -24% for the poorest quintile and this is -16% for the quintile. In the secondary age group, this is -29% for the poorest quintile and -17% for the richest quintile. Finally, for the tertiary age group, this is -77% for the poorest age group and -22% for the richest quintile.

Table 8. Impact on proportion of enrollment of children by per capita income quintile, %

| | Age Groups | | | |
|------------------|------------|------|-------|-------|
| | 6-24 | 6-12 | 13-16 | 17-24 |
| Average | -19.3 | ns | -25.6 | -57.4 |
| Poorest | -23.6 | ns | -29.1 | -76.7 |
| Lower middle | -15.5 | ns | -16.0 | -41.9 |
| Middle | -16.0 | ns | -16.5 | -37.5 |
| Upper middle | -16.0 | ns | -16.5 | -28.3 |
| Richest | -16.1 | ns | -17.1 | -22.2 |
| Curr. Attendance | 73.7 | 94.2 | 86.7 | 38.6 |

ns - not statistically significant

Source: Orbeta (2005a)

The preceding discussion highlights several important conclusions. One, the impact of additional children on school attendance is negative. Two, the impact is regressive with bigger negative impacts on poorer households relative to richer households. Three, the regressiveness intensifies as one goes up the levels of the education ladder.

5.3 Children and the Labor Supply and Wage Income of Parents

The impact of the additional children on the labor supply of parents and their wage income is estimated. A distinction is drawn between all types of work and paid work for the mothers. For fathers this distinction is not made.

The estimates, given in Orbeta (2005b), show that labor force participation of the mother declines by -1.68% per additional child (Table 9). This effect rises to -2.13% when one considers only paid work. Another noteworthy result is that the presence of children below the normal school age of 6 years results in a -7.2% decline for all types of work and -5.7% for paid work of mothers. The estimates for fathers show insignificant results.

Table 9. Impact on labor force participation (LFP) of mothers and fathers by per capita income quintile as % of recorded LFP

| | Mother | | Father |
|----------------------------------|-----------|-------|-----------|
| | All types | Paid | All types |
| Average | -1.68 | -2.13 | 0.00 * |
| Poorest | -2.12 | -5.68 | 0.00 * |
| Lower middle | -2.12 * | -2.43 | 0.33 |
| Middle | -2.12 * | -1.26 | 0.60 |
| Upper middle | 0.69 | 2.45 | 0.43 |
| Richest | 6.68 | 8.52 | 1.16 |
| Average lab. force part. Rate, % | 54.51 | 34.89 | 90.41 |

* insignificant, assumed same as base case
Source: Orbeta (2005b)

The estimates using the interaction between the number of children and the per capita income quintile show that the impact for mothers in the bottom quintile is higher than the average; -2.12% of all types of work and -5.68% for paid work. The impact for mothers in the higher income groups interestingly becomes smaller negative for the lower middle and middle-income quintiles and turns positive for the top two classes. This positive effect for higher income groups may mean that mothers are not affected by the presence of children. This may mean that for richer income groups the families are perhaps able to pay for child care and still contribute to household income.

In the case of the fathers, while the average effect is not significant, the not significant effect is only found in the poorest income class. From the lower middle up to the richest income class, the impact is positive although not as large as the one obtained for mothers. This may be explained by the already high labor force participation rate. It would have been interesting to see the impact on labor hours, but unfortunately, the data does not contain information on labor hours.

Turning to the impact on wage income, each additional child is estimated to reduce mothers' average earnings by 1,010 pesos (deflated with 1994=100) (Table 10). This represents about a 5% decline from a six-month⁸ average wage income of 20,200. The impact on the wage income of fathers is 233 (deflated with 1994 =100). This is about 1.1% of the six-month average wage income of 21,900.

⁸ The reference period for wage income in APIS 2002 is six-months.

Table 10. Impact on wage income of mothers and fathers by per capita income quintile

| | Mothers | | Fathers | |
|--------------------------|--------------|-------------|--------------|-------------|
| | As % of inc. | Abs. Value* | As % of inc. | Abs. Value* |
| Average | -5.0 | -1,010 | 1.1 | 233 |
| Poorest | -12.7 | -659 | -6.0 | -76 |
| Lower middle | -6.8 | -598 | 5.1 | 93 |
| Middle | 2.1 | 360 | 12.5 | 394 |
| Upper middle | 15.4 | 6,200 | 18.7 | 1,762 |
| Richest | 33.3 | 25,736 | 35.4 | 12,538 |
| Average wage inc. (000)* | | 20.2 | | 21.9 |

* Deflated (1994=100)
Source: Orbeta (2005b)

The impact across income class shows that the negative impact on the earnings of mothers is for the bottom two quintiles. This is -13% for the poorest quintile and -7% for the lower middle quintile. The impact of the higher income quintile is positive at 2%, 15% and 33% for the middle, upper middle and the richest quintile, respectively. In the case of fathers, the positive impact is only for the top four quintiles as the impact of the poorest quintile is still negative (-6%). The impact for the higher income classes are 5%, 12%, 19% and 35% for the lower middle, middle, upper middle and richest quintile, respectively.

The foregoing discussions can be summarized in the following conclusions. One, the impact of additional children on the labor force participation of mothers is negative, on the average, with a higher impact for wage employment compared to all types of work while for the fathers this is insignificant. Two, the impact on labor force participation of additional children is regressive with a negative impact on the poorer households and a positive one for the top two quintiles. Three, the impact of additional children on wage incomes substantially echoes the impact on labor force participation with the addition that the impact on fathers, although much more subdued than that for mothers, is positive and significant. It should also be pointed out that while the average impact on the wage income of fathers is small and positive, for the poorest quintile it is still negative.

5.4 Children and Household Savings

The impact of children on saving were estimated using two measures of savings, namely: (a) the average savings rates – the ratio of savings to disposable income; and (b) savings levels. There are, in turn, two savings definitions of savings used: (i) income minus expenditures (definition 1) and, (ii) (i) with expenditure on durable furniture, education and health which have benefits over the longer term added back (definition 2).

The estimates in Orbeta (2005c) showed that each additional child will cause an average reduction in savings rates of about -0.36% for definition 1 and insignificant for definition 2 (Table 11). While this number may look small in absolute value, it is substantial when measured relative to the recorded average savings rates. Given the average savings rate in the sample of 0.028 (definition 1) this estimate represents a reduction of about -13%.

Table 11. Impact on children on savings rate and levels

| | Rate | | | | Levels | | | |
|--------------|--------|--------|--------|--------|--------|---------|--------|--------|
| | Def 1 | | Def 2 | | Def 1 | | Def 2 | |
| | coeff. | in % | coeff. | in % | coeff. | in % | coeff. | in % |
| Average | -0.36 | -12.96 | ns | ns | -254 | -3.28 | -309 | -2.74 |
| Poorest | -2.76 | -13.90 | -2.79 | -18.22 | ns | ns | ns | ns |
| Lower middle | 0.87 | 41.12 | 0.97 | 32.42 | -594 | -433.35 | -592 | -61.13 |
| Middle | 2.91 | 48.97 | 3.21 | 27.50 | -1,538 | -63.16 | -1,445 | -32.63 |
| Upper middle | 4.82 | 36.96 | 5.55 | 27.24 | -3,458 | -43.52 | -3,044 | -25.28 |
| Richest | 6.27 | 27.07 | 7.68 | 23.53 | -9,114 | -23.86 | -7,279 | -14.46 |
| Means | 0.028 | | 0.091 | | 7,742 | | 10,854 | |

ns - not significant

Source: Orbeta (2005c)

The impact across income classes shows that the negative impact is only for the bottom per capita income quintile. In addition, the negative impact is larger for the poorest quintile at about -3% for both definitions; in terms of proportion to the recorded savings rate it is -14% for definition 1 and -18% for definition 2. For the rest of the income classes the impact is positive indicating that children increase the household savings rates and increasing as one goes up the income classes. The pattern of the percentage change is declining, because the rates of savings rise faster with the income classes.

Turning to the total household savings, each additional child is expected to cause a reduction of -254 (definition 1) or -309 (definition 2) in 1994⁹ pesos. This would mean a -3.3% and -2.7% reduction, respectively, with a recorded average savings levels of 7,742 and 10,854 under the two savings definitions.

The impact across income classes shows that it is negative for all except for the poorest quintile where it is not significant. The impact for the lower middle quintile is -594 and this rises to -9,114 for the richest quintile per additional child for definition 1. A similar pattern is seen for the impact using definition two although at slightly smaller magnitudes. Again in percentage terms the negative impact declines because of the higher levels of savings as one goes up the income classes.

These results highlight the regressive impacts additional children have on the savings rates and savings levels of households that can be summarized in two statements. One, the impact on the savings rates of the bottom quintile is negative. Two, the impact on

⁹ To inflate to the survey year (2002) pesos, use the price index values of 1.666.

savings levels is negative and in percentage terms is bigger among lower income households.

6. Summary and Policy Implications

The paper set out to document the relationship between family size, poverty and vulnerability to poverty. It used cross-tabulation analyses and buttressed these with results from careful multivariate analyses done by the author. There are several conclusions that one can make from the evidence presented. One, there is a clear negative impact, on average, of additional children on household welfare. Two, and more importantly, these negative impacts are regressive, i.e. the negative impacts on poorer households are bigger. Three, the associations between larger family size, poverty incidence and vulnerability to poverty are strong and enduring.

The multivariate analyses have shown that additional children, on average, cause a substantial decline in household savings rates and levels, reduce the work participation and wage income of mothers, have no impact on the labor force participation of fathers, and reduce the proportion of school-age children attending school. These estimates were achieved after carefully controlling for the usual individual, household and community factors that are known to affect these relationships. Estimates on the differential impact of additional children across income classes were also provided. These estimates showed the regressive effect additional children have on household welfare. Additional children have bigger negative impacts on school attendance of all school-age children and the regressiveness rises as one goes to higher schooling levels. Additional children have negative impacts on the labor force participation of mothers from the bottom three quintiles and have a positive effect only for the top two quintiles. Additional children have no effect on the labor force participation of fathers from the poorest quintiles, but have a small positive effect only for the upper four quintiles. Additional children have negative effects on the earnings of mothers from the bottom two quintiles and have positive effects only for the upper three quintiles. Additional children have a negative impact on the earnings of fathers from the poorest quintile and a positive effect only for the upper four quintiles. Additional children have negative effect on the savings rates of the poorest quintile and a positive effect only for the upper four quintiles. Finally, additional children have a negative effect on the savings levels for all households except for the poorest quintile.

Cross-tabulation evidence also shows that families are not able to maintain per capita income, per capita expenditures and per capita savings as family size increase. The tables show that families are also not able to maintain per capita expenditure on human capital as family size increases. Finally, the tables show that as family size increase school attendance declines and child labor rises.

This paper has also shown the strong and enduring link between poverty incidence and vulnerability to poverty and family size. It has shown that larger family size is associated with higher poverty incidence, gap and severity. This association is also shown to be enduring over 25 years for which family income and expenditure data is available. It has also shown that larger family size is associated with higher vulnerability to poverty.

These results have several implications for efforts at poverty reduction – the centerpiece program of many Philippine administrations without much success (Reyes 2002). Many

attributed this lack of success to low and inconsistent growth rates (e.g. Balisacan 2000). This paper adds large family size as an obvious, but not well-understood reason, not only for the low and inconsistent economic growth rates but also for direct debilitating effects on many aspects of household welfare. The results of this paper points to several implications for policy.

First, a strong population program must accompany poverty alleviation efforts. In the short run, this may come in the form of providing family planning services for those who need them. In the long run, this may include advocacy for smaller family size. The negative impact of large family size on household savings pointed out in this study has both a macroeconomic impact and a household impact. Larger family size reduces household savings contributing to the already low national savings. This hampers investment particularly in an environment where foreign direct investment is not high, as is observed in the Philippines. This is particularly important, since for the Philippines growth is still the main engine for poverty reduction (e.g., Balisacan and Pernia 2003, Reyes 2002, Balisacan 2000). In addition to the macroeconomic effect, lower savings also exposes larger households more to the adverse effects of income shortfalls compared to smaller households. Unless something can be done quickly to improve the lackluster performance and limited coverage of the Philippine social security system reduction in family size will be important as an alternative to a formal safety net. It has also been shown that having additional children prevents mothers from taking up work preventing them from contributing to household income. In addition, it has been shown that fathers are not encouraged to take up work because of additional children. Having additional children has also prevented more school-age children from attending school and has sent more of them to child labor. Finally, from the perspective of development measured in terms of capabilities (Sen 1980), helping families achieve their desired family size directly increases their well being all other things constant (Herrin 2002). This is particularly important because it has been shown that poorer households, which are also shown here to have larger family size, have a higher unmet need for family planning (Orbeta et al. 2004).

Second, there is a limit to what employment generation programs, assuming this could be done, can do for large families. Additional children, as the results in this study show, hinder mothers from taking on employment, particularly, paid employment. In addition, the study has not shown that additional children encourage more fathers to take on work except for those from higher income households.

Third, there is a need to stop the implied intergenerational transmission of poverty indicated by the negative impact of the number of children on school attendance. Perhaps some education subsidies directed at large families could be crafted. Education is long acknowledged as one of the potent means for moving out of poverty and more recently has also been found to be important in reducing vulnerability to poverty (e.g. Laigon and Schechter 2003). The study shows that larger families have prevented school-age children from attending school and sending children to work instead. While it can be argued that child labor may help finance education (e.g., Suryahadi, Priyambada and, Sumarto 2005), it has not been shown that this does not hamper a student's performance in school or reduce a child's leisure – both causing a reduction in their well being. In addition, since school performance is a good determinant of retention, working children may not stay long in school after all. The design of the subsidies should, of course, consider their potential behavioral effects, i.e. encouraging families to have more children. Considerations, such as giving subsidies to families with completed family sizes

or to those who effectively promise to stop bearing any more children, should be included in the design.

Fourth, targeting poor households also means targeting large households and vice-versa. In addition, considering the regressiveness of the impact of additional children, there will be bigger impacts by targeting poorer or larger households.

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