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Children and the Labor Force Participation and Earnings of Parents in the Philippines

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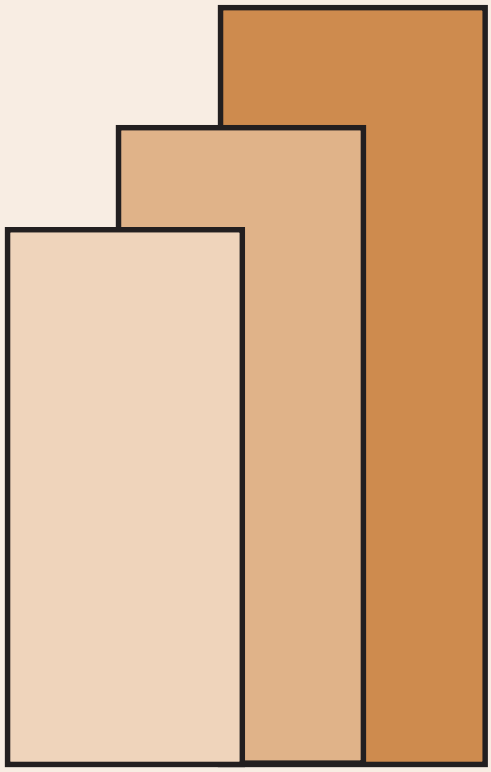

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Aniceto C. Orbeta, Jr.
June 2005

Abstract

This paper demonstrates how family size can be an important contributor to poverty in the Philippines. It examines one of the mechanisms behind this link by focusing on the relation between number of children and the decision to seek a job and parents' wage earnings. It surveys the international literature to establish how the problem has been approached and what the results are for other countries. It then formulates and tests a model using a nationally representative household survey data for the Philippines to explain what determines the decision to seek a job and the earnings of both mothers and fathers. The model specifically considered the endogeneity of the number of children in both the labor force participation and the earnings equations.

Keywords: Family Size, Labor Force Participation, Earnings, Philippines

Children and the Labor Force Participation and Earnings of Parents in the Philippines[1]

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1. Introduction

How children affects the labor force participation and earnings of mothers and fathers can spell the difference on whether additional children are can expect the needed care or not. When parents exert more effort with additional children, then their impact of on the welfare of the family will be mitigated. When the opposite happens, not only will additional children not get the needed support, they will also cause the deterioration of welfare of the other members of the household as resources are spread to more members. It is therefore important to quantify the impact of children on the work effort and earnings of their parents.

Even though the average education of women in the Philippines is higher, their labor force participation is significantly lower than her Asian neighbors. One explanation that can be put forward is, of course, the inconsistent growth rate the country has been experiencing for a couple of decades now. Another, perhaps commonly forgotten reason, is that while her neighbors have successfully brought down their fertility rates, the Philippines has failed to reduced its fertility rate as fast as say Thailand, Indonesia and Vietnam. The burden of many children can limit the ability of mothers to avail of work opportunities thus stalling the rise in the work uptake of Filipino women.

This paper formulates and estimates a model of the determinants of the labor force participation and earnings of mothers and fathers with the number of children as one the explanatory variables that include individual, household and community characteristics. It uses the nationally representative 2002 Annual Poverty Indicators Survey in the analysis. This is one of the few papers that recognized and thoroughly tested the endogeneity of the children in these equations. This, however, did not produce positive results with the dataset used. This result lends support to the validity of using estimates that consider the number of children exogenous in the data set used for the study. The estimation results generated rich results that provided quantitative estimates of the impact of children on the labor force participation and earnings of parents. The estimates point to highly regressive impact of additional children on Philippine households.

The paper is divided as follows. The next section provided a selective review the previous literature. A presentation of the methodology, instrument and data is provided

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next. The estimation results are presented in section four. The final section provides a summary and implications for policy.

2. Review of Previous Studies

Browning (1992) provides a full section in his paper reviewing the US literature on the impact of children on female labor supply up to the early 1990s. The observations he made on the literature was that it is clear that there is a strong negative correlation between the presence of young children and the labor supply of their mothers measured either as labor force participation or labor hours. The relationship, however, is not as clear as one moves from correlation to causal relationships. This is because the relationship between work and child bearing is very complex conceptually and also to estimate empirically, as paper has shown.

One important point highlighted in the Browing (1992) is that labor supply equations that does not include the children variables as regressors are by implication estimating a reduced form. To illustrate the importance of recognizing the endogeneity of the fertility the review indicated that those that consider fertility as endogenous have yielded not significant or even positive relationships putting to question results that show negative relationship. He expressed frustration that the studies that considered the endogeneity of fertility did not also show OLS results to be able to make a comparison. The results in Rosenzweig and Wolpin (1980) show that not instrumenting for the fertility variables underestimates the negative impact of exogenous changes in fertility. The results in Angrist and Evans (1998), on the other hand, show that controlling for the endogeneity either by the use of sex of first two births or twins as instrument yields negative impact of the number of children on the labor supply of mothers but the impact is much more subdued than those obtained from OLS estimates or the opposite of what Rosenzweig and Wolpin (1980) obtained. Gangadharan and Rosenbloom (1996) adds that the negative impact on hours increase as the magnitude of mothers enter the labor market and that while the negative impact on earnings in 1980 is temporary, the 1990 results show continued depressed earnings even after the labor supply effects had disappeared. Thus, while the negative effect of children in mother's labor supply in these three studies, the direction of the impact of recognizing endogeneity of fertility variables in the labor supply equation is not clearly established. In the case of the father's labor supply, Angrist and Evans (1998) did not find significant effect of children. Lundberg and Rose (2002), however, found positive effect of children. In addition, they found that the effect of children on male labor supply is substantially larger when endogeneity is taken into account lending support to the Rosenzweig and Wolpin (1980) result. Vere (2005) adds the new 2000 Census data to the 1980 and 1990 used in Angrist and Evans (1998). He finds that men respond to additional children by increasing earnings lending support to Lundberg and Rose (2002). It is also noted that specialization in husbands' and wives' roles in raising children has become more pronounced over time. In the case of the husband, not only is the sign of the impact of children is not clear but also the direction of the effect of controlling for the endogeneity of the number of children.

If the relationships between children and the parents labor supply and earnings are not clear in developed county literature, the same is true in less developed countries with the little evidence that is available.

The only study, to the knowledge of the author, using Philippine data that considers the endogeneity of children in women's work hours and earnings is Adair, et al. (2002). Using the Cebu Longitudinal Health and Nutrition Survey from 1983-1991, the paper models the joint decision of sector of work choice (wage, piece or self-employed) and earnings (or hours of work) with children included in the later equation. The study finds that children negatively affect hours and earnings in what the authors deemed as a form of a "child tax". They find that for the change in earnings equation the number of additional live births has significant effect but children less than 2 years is not. For the change in labor hours equation, it is the number of children less than 2 years that is significant. Child bearing, however, was not found to affect sector of employment.

The review of other studies using Philippine data that assumes fertility variables as exogenous show mixed results. Using survey data from Laguna province, Quizon-King (1978) found that while the number of children does not significantly affect the market time of both mother and father, the presence of children 6 years and below increases the home production time of mothers. Garcia (1990) also found that the percentage of children below six years old significantly increases the time for home tasks and decreases market work for wives while the opposite is true for husbands. Popkin (1983) found that the number of children below 6 yeas old decreases the leisure time of rural mothers; the presence of children one year old and below decreases their market production time while the presence of children 1-6 years old increase their home production time. King and Evenson (1983) found that the presence of children six years old and below increases the home time of wives. For husbands, the presence of children one year and below positively affects his home time. When the age structure of the children was controlled the effects turned out to be small. Market time, however, of both husband and wife, is not affected by the presence of children. Finally, using cross tabulation analysis from the Cebu data Tiefenthaler (1997) has confirmed earlier results on the negative relationship between child bearing and labor supply of mothers. However, it was pointed out that that for mothers with previous children, labor market hours 14 months postnatal is the same prior to the sample birth although this is lower for first-time mothers. For fathers, birth does not significantly affect their labor market hours. In addition, even if mothers decrease labor supply within the year after birth, fathers do not increase their market time to compensate for lost income. Birth only slightly increase father's time in childcare and only if there are not other children. It was also found that births increase the childcare and market time of older daughters (13-17 years). Thus, it appears that older daughters, rather than fathers, substitute for the lost market time of mothers due to birth.

Evidence from other developing countries also had varied results. Using the 1992 DHS for Morocco Assaad and Zoari (2003) found that in urban Morocco the presence of school-age children significantly reduces participation of women in all types of wage work. This particular study uses a three-stage sequential modeling of marriage, child bearing and labor force participation with predicted values of the dependent variable used in the subsequent stage to control for the endogeneity. Multivariate analysis using data in Urban Pakistan and assuming fertility variables as exogenous showed differential effects by sex of children (Cochrane, Kozel and Alderman, 1990). Males 7-14 and over 14 reduce the participation of women while females 7-14 and over 14 significantly increase the labor force participation of women. The magnitude of the effects, however, was small. The authors added that these implies that males provided alternative source while females free up women's home time. In the case of rural Thailand Poshisita et al (1990), using cross tabulation analyses supported by results

from focused grouped discussion, finds that while children does not prevent rural Thai women from working, they cause work interruption and interfere with there their economic activity.

3. Methodology, the Instrument and Data

3.1 Methodology

To determine the impact of the number of children in the household on the labor supply and earnings of parents we estimate these relationships by recognizing the endogeneity of the number of children. The importance of recognizing the endogeneity of children in the labor supply and earnings equation of parents has been highlighted in the previous section. We follow Angrist and Evans (1998) in assuming balanced sex-mix and using same sex of the first two-births as the instrument. The validity of this instrument for the number of children is explained after a discussion of the empirical specification.

While it would have been desirable to include labor hours, the data that we use does not have this information. For labor supply, therefore, we only estimate an equation for the labor force participation of parents.

Labor Force Participation of Parents. The labor force participation rate equation we estimate is the following model:

$$(1) \quad l = \alpha_0 + \alpha_1 w_1 + a_2 Y + \alpha_3 n + \mathbf{X}\boldsymbol{\alpha}_4 + \varepsilon$$

$$(2) \quad n = \beta_0 + \beta_1 z + \mathbf{X}\boldsymbol{\beta}_2 + \mu$$

Equation (1) is a typical labor supply equation where *l* is the labor force participation of the parent, *w* is wage, *Y* is other (non-wage) income received by the household, *n* is the number of children, and ***X*** as the set of control variables and e the disturbance term. The vector ***X*** would usually include age and education.

The estimation methodology is as follows. Since (1) is a dichotomous choice model, we will use probit to estimate the model. But the endogeneity of n will result in a biased estimate. We therefore test for the endogeneity of n using the suggestions in Rivers and Vuong (1988). They proposed a two-stage probit where the estimated error from the first-stage regression is added as an explanatory variable in the second-stage probit regression to obtain a consistent estimate. The pointed out that the coefficient of the error term will constitute a test for the endogeneity of *n*. Rivers and Vuong (1988) indicated that adjustment is needed for the variance-covariance matrix in the second stage probit to get asymptotically correct errors. Bollen, Guilkey and Mroz (1995) however, established through Monte Carlo simulations that results are not readily affected by using the asymptotically correct standard errors[3]. Another method is the efficient[4] full-information maximum likelihood (FIML) estimation of the two equations and

[3] Bollen, Guilkey and Mroz (1995) estimates a very similar problem of the endogeneity of the desired additional children on the contraceptive use equation.

[4] Although FIML produces efficient estimates, there are a couple of limitations inherent in the FIML. One, obviously it is much more difficult to estimate although this is increasingly not too much of a concern as most statistical package can be programmed to generate FIML estimates. In fact there is an available

directly testing the significance of the correlation between the error terms in the number of children equation and the labor force participation equation. Both of these methods are used to establish the endogeneity of the number of children variable in the labor force participation equation. If *n* is found to be endogenous we will use the estimation that will give us more precise (higher significance) estimate for the variable of interest – the number of children, otherwise, we use the simple probit results.

Earnings of Parents. Similarly, to determine the impact of the number of children on their parents' wage earnings we estimate an augmented Mincerian equation of the following form

$$(3) \quad \ln w = \alpha_o + \alpha_1 age + \alpha_2 age^2 + \alpha_3 educ + \alpha_4 n + X\alpha + \varepsilon$$

$$(4) \quad n = \beta_o + \beta_1 z + X\beta_2 + \mu$$

The estimation used the standard Mincerian equation for estimating the earnings of parents with the number of children and location dummies added. This is essentially adopted from Angrist and Evans (1998). We instrument for *n* using the sex of the first-two births as explained in the next section. In addition, *w* may not be observed for those who did not work requiring adjustment for the censoring.

The estimation methodology is similar to the one described above except that the second stage regression in this model is censored. Since the earnings will be zero both for the non-wage workers and the non-workers, Tobit estimation is used to take account for the censoring in the earnings equation. We test for the endogeneity of *n* in the earnings equation. Smith and Blundell (1986) suggested a two-stage Tobit to determine the endogeneity of the variable in the structure described above. Specifically, the estimated error term from the first-stage regression is added as a variable in the earnings equation to arrive at a consistent estimate. Thi A significant coefficient for the estimated error term implies endogeneity of *n*. If the *n* is found to be endogenous, we use the results of the two-stage Tobit estimation. Otherwise, we use the simple Tobit estimation results.

3.2 Balanced Sex-Mix as an Instrument

There are not too many instruments that one can find for the number children in household models. Most of the likely candidates such the 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, 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 balanced sex-mix of children as an instrument for the number of children. The Philippines is one of the countries in Asia where a balance sex-mix are found to have prevailed in contrast to countries in South and Eastern Asia where indications for son preference is often found (Wongboonsin and Ruffolo, 1995). Early literature that confirms preference for balanced sex-mix in the Philippines is found in Stinner and Mader (1975). The other instruments

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routine in Stata called `probitiv` that implement FIML estimation of the model above described in Filmer and Lokshin (nd). The second is the natural consequence of system estimation; that is any bias resulting from misspecification in the one of the equation is transferred to the whole system. Limited information estimates, such as the two-stage probit, limits the bias to the mis-specified equation only.

that are available are limited by their applicability only in very specific circumstances. The occurrence of twins have been also been used as instruments again using US data first in Rosenzweig and Wolpin (1980a) and in subsequent studies such as Angrist and Evans (1998). A much more recent application was done for the US (Vere 2005), for Romania (Glick, Marini and Sahn, 2005) and for Norway (Black et al, 2004). Son-preference in 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 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% families that had one male and one female for their first two children had another child while 71.8% had another child when the have 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 level of significance. 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 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 those obtained using US data.

3.3 Data Sources

The data on 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 (LFS) conducted by the National Statistics Office (NSO). The 2002 round is the third of the APIS 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 for the past 6 month period preceding the survey are also gathered.

All monetary values such as wage and non-wage income 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.

The unemployment rate is computed as the domain level average unemployment rate using APIS data.

3.4 Descriptive Statistics

Table 2 shows the proportion of mothers and fathers working by per capita income quintile and by number of children. The proportion of mothers working shows that more mothers in higher income households work both for all types of work and for paid work. The opposite appears to be true for fathers. One way to explain the difference is that richer households are able to pay for house helps freeing them to participate in the labor market and still contribute to household income. This may not be the case for mothers from poorer households. There is no clear explanation for the lower labor force participation of fathers from richer household except perhaps that they may be earning more from other sources. In terms of by number of children, as expected, mothers with smaller number of children work more. The same is true for fathers. It is also noteworthy that unpaid work (the difference between all types of work and paid work) is about 20 percent for mothers.

Table 3 provides the descriptive statistics of the variables used in the estimation. The average number of children is about 3.5. The average number of years of education is slightly higher for mothers than fathers at 9.2 versus 9.0, respectively. This is not a surprising phenomenon in the case of the Philippines. About 50% of the households have children below usual primary school aged (6 years).

4. Estimation Results

4.1 Labor Force Participation of Mothers

Both the endogeneity tests using either the two-stage probit or the FIML all show that the number of children using boys and both girls or same sex[5] or in the first two births as instruments did not show significance. Table 4 shows, the error in number of children did turn out to be significant with z-value of 1.4. In addition, the test of the correlation coefficient from the FIML estimation for both the mother and father labor force participation equation also turned out to be insignificant with chi-square value of 0.2 (Table 5). Both of these imply that for this particular data set the endogeneity of the number of children is not established. This also lends support to the validity of using simple probit estimates. Subsequent discussion will then focus on the simple probit estimates.

The simple probit estimates of the determinants of the labor force participation of mothers are given in Table 6. The labor force participation of the mothers are expected to decline by 0.92[6] percentage points with each additional child. This slightly rises to 0.96 percentage points when only unpaid work is excluded. Another noteworthy result relative to the impact of children on the labor force participation of their mothers is the

[5] Not shown.

[6] This is from the marginal effects column. Note that probit is a non-linear model so the marginal effects, rather than the coefficients, provide the estimate of the impact of the change in the probability of working to a change in the dependent variable.

impact of the presence of children below normal school age – 0 to 5 years old. Table 5 shows that the presence of young children below normal school age reduces the probability of their mother working by a considerably higher 7.8 percentage points when all types of work are considered and 5.7 percentage points when unpaid work is excluded. This confirms many of the results in previous studies on the negative impact of children on the labor force participation of mothers.

The other significant determinant variables of mother's labor force participation are her age, education, wage income of the father and unemployment rate. The age of the mother was entered as a quadratic to capture non-linear effects. The signs of the coefficients confirm the expectation that that labor force participation of mothers rises at a declining rate with age. Education is a positive determinant as found in many other studies. The higher the wage income of the father the lesser is the likelihood that a mother would be working. Interestingly, the estimates shows that a thousand increase in the father's wage income per capita[7] would have an equivalent depressing effect of an additional child. Higher unemployment rate discourages mothers from looking for work lending support to the discouraged worker hypothesis. Contrary to expectation, non-wage income per capita of the household is a significant positive determinant of the labor force participation of mother for all types of work although it has the expected negative sign in the paid work equation.

To determine the differential impact of children on the labor force participation across income classes, the number of children variable was interacted with the per capita income quintile dummy variables. The result of the estimation is given in Table 7. For all types of work, the interaction variables are not significant except for the top two quintiles. For paid work, however, all the interaction terms are significant. Table 8 provides the summary of the impact on the labor force participation of mothers by per capita income quintiles expressed as a percentage of the recorded participation rates. For all types of work, mothers from the bottom three quintiles will reduce the proportion working by an average of over 2 percent for each additional child. For the top tow quintiles, however, the impact is positive implying that more of them will work with an additional child. This could even reach as high as about 7% for the richest quintile. In the case of paid work, the pattern is similar except that the impacts are much larger in magnitude. About a 6% decline for each additional child for mothers in the bottom quintile and more than 8% increase for each child for mothers in riches quintile. This differentiated impacts undoubtedly provides a richer view of the impacts than just the average impacts.

4.2 Labor Force Participation of Fathers

Similar to the results in the mothers labor force participation equation, the test results for endogeneity of the number of children in the fathers labor force participation equation also had insignificant results. The coefficient of the estimated error term in the first stage regression did not turn out to be significant in the second stage labor force participation equation with z value of 0.16 (Table 9). Similarly, the test of the correlation coefficient using FIML also turned out to be insignificant with chi-square value of .03 (Table 5). These lend support to the validity of using simple probit results.

The results for the labor force participation of fathers show that on the average the number of children does not affect their labor force participation (Table 10). It is negative

[7] Or about five thousand for a family of five

but not significant. This means that fathers, on the average, don't try to find work when a child is added in the family.

Similar variables that are significant in the mother's labor force participation equation are also significant in the father's labor force participation equation. Age of the father has a rising at a declining rate effect. One surprising results is the negative and significant coefficient for the years of education of the father. Perhaps, this may mean that highly educated fathers are earning more from other sources. Non-wage income is not a significant determinant. Like the mothers, discourage worker hypothesis also works for fathers, i.e., with higher unemployment they tend not to look for work all other things equal.

Again to determine the differential impact across income classes, the number of children of children variable was interacted with the per capita income quintile dummy variables. The estimation results are also shown in last four columns of Table 10. All the coefficients of the interaction terms are significant. Since the base category is not significant it will considered zero. The summary of the impact expressed in terms of the recorded proportion of fathers working is also provided in Table 8. For the poorest quintile there would be no effect. The impacts for the upper income quintiles are all positive with 0.3, 0.6, 0.4, and 1.2 for the 2^{nd}, 3^{rd},4^{th} and 5^{th} quintiles, respectively. Thus, there is slight positive effect for the labor force participation of fathers in the upper income quintiles.

4.3 Earnings of Mothers

The endogeneity test using two-stage tobit shows that the number of children is not endogenous in the earnings equation for this particular data set as is seen in the labor force equation. The coefficient of the estimated first-stage error term is not significant with t value of 0.63 (Table 11) lending support to the validity of using ordinary tobit estimates. Thus, the subsequent discussion will refer only to the ordinary tobit results. Table 12 shows the results of the Tobit and OLS estimates for the earnings of mothers. The number of children is found to negatively affect the earnings of mothers on the average. But when one looks at the coefficient of the interaction terms with per capita income, the negative impact is only for the bottom two quintiles[8]. The upper three quintiles have positive impacts and this is roughly consistent with the results for the labor force participation. It is easier to look at the impact as a percentage to recorded incomes and in absolute value.[9] These are shown in Table 13. The average effect is about a 5% decline in income or about 1 thousand pesos from the six-month earnings per additional child. For the bottom two quintiles, the impact is about -13% for the poorest and -7% for the lower middle quintile per additional child. These translate to about a reduction of about 700 and 600 pesos to the semesters wage income, respectively. For the top three quintiles, the impacts are positive: 2%, 15% and 33% for the middle, upper middle and richest quintile, respectively. This means an addition of 360, 6,200 and 25,736 pesos to the semesters wage income for the corresponding quintiles, respectively, per additional child.

[8] There are three things to note in computing the impact of the exogenous: (a) this is a tobit model so the marginal effects has to consider censoring, the marginal effects columns computes the unconditional values, (b) note that the dependent variable is in natural log so the marginal effects computed are in percentage terms.

[9] Since the estimation uses deflated values, these are inflated back to the 2002 values using the price index.

All the other variables, age, education, residing in urban areas and regional dummies are significant in determining the wage income of mothers. Wage income rises with age in a decreasing manner. Education positively affects earnings. There is on average higher earning in urban areas. Except for ARMM, which is unexpected, mothers in all other regions earn lower than those in the national capital region.

4.4 Earnings of Fathers

Again the endogeneity test using the two-stage tobit did not yield significant results. The coefficient of the estimated first-stage error term is not significant with a t value of 0.83 (Table 14) lending support to the validity of using the ordinary tobit results. This is what we use in subsequent discussions. The result shows that on average, the earnings of fathers are positively affected by the presence of children (Table 15). This is in contrast to the impact on labor force participation that showed no significant affects. Perhaps father are more serious in finding paying or higher paying jobs rather than just any job with additional children. The impact as a percentage of recorded income and in absolute value is also given in Table 13. There is an average increase of about 1% in income of fathers or an addition of about 233 pesos to the semestral wage income. The interaction terms between the number of children and per capita income quintile dummies also all turned out to be significant. Considering all of these, the negative impact remains for the bottom quintile with about a 6% decline in wage income or about a 76 pesos reduction in semestral income per additional child. For the lower middle up to the richest quintile, the effect is positive from 93 to 25,538 pesos addition to the semestral wage income for the lower middle to the richest quintile per additional child. Judging from these numbers, even though the impact is positive, this is hardly enough to pay for the marginal increase in expenditure due to the new child except perhaps for the richest quintile.
The other variables have similar performance with those in the mothers' earnings equation. Earnings rise with age at a declining rate. Education positively affects income. There is a higher average earnings of fathers in urban areas. Earnings of fathers in the national capital region are also higher than those in the other regions without exception.

5. Summary and Policy Implications

The paper presented and estimated a model of the determinants of the labor force participation and the earnings of parents with the number of children as one of the determinants among the usual individual, household and community characteristics. The estimation strategy tests first for the endogeneity of the number of children as suggested in the literature using the sex of the first two births as instruments as suggested in Angrist and Evan (1998). Using both two-stage probit and FIML, the tests failed to establish the endogeneity of the number of children in the data set both in the labor force participation equation. Similarly, using two-stage tobit, the endogeneity of the number of children in the earnings equations was not also substantiated. These lend support to the use of the simple probit results in the labor force participation equation and simple tobit in the earning equations.

The results show that on average the impact of children is negative on the labor force participation of mothers and insignificant in the labor force participation of fathers. To determine the differential impact across income quintile, the number of children was interacted with the per capita income quintile dummy variables. This generated a richer

result. It was shown that the negative impact of children on the labor force participation of mothers is only found in the bottom three quintiles. For the top two quintiles the impact is positive. Perhaps the mothers in the top quintiles are able to pay for child-care, e.g., house helps, so they are free to work even with additional children. In the case of fathers, the impact is insignificant only in the bottom quintile. In the upper four quintiles the impact is positive, i.e., fathers work more with additional children. In relative terms, the impact in the case of the fathers is much more subdued than it is with the mothers which is not surprising given that mothers have the primary responsibility in child rearing. Turning to the impact on earnings, the average impact is again negative of mothers but this time positive for fathers. The negative impact on earnings is only found in the bottom two quintiles while in the top three quintiles the impact is positive. For fathers, even though the average impact is positive, the impact on the bottom quintile is still negative. The positive impact for the upper four quintiles accelerates as one goes up the income quintiles.

From the foregoing, it appears that there is a regressive impact of additional children on the labor force participation and earnings of parents. Combining the results on earnings, the bottom quintile has a double negative impact with each additional child --the mother as well as the father has reduced wage income. For the lower middle quintile, there is an offsetting effect although the increase in the father's income is not enough to cover the loss in the mother's income. For the upper three quintiles there is a double positive income effect.

The results point to important implications for policy. Owing the regressive impact of additional children, government needs to train family planning assistance at the bottom quintile where there is double negative impact of additional children. In the short run there is a need to assist this group in achieving their fertility goals. Advocating for smaller family size maybe necessary in the long run. The design of any employment or livelihood assistance needs to consider the burden of children, in general, and pre-school children, in particular, as these are shown in this paper to limit the ability of mothers to take up work.

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Table 1. 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	SD	SE	Mean	SD	SE	
(1) One Male, One Female	0.6740	0.4688	0.0042	3.4850	1.5436	0.0315	0.964
(2) Both male	0.7179	0.4500	0.0052	3.6452	1.5994	0.0420	0.432
(3) Both female	0.7180	0.4500	0.0063	3.5575	1.4975	0.0495	0.261
(4) Same Sex	0.7179	0.4500	0.0040	3.6095	1.5592	0.0320	1.037
Difference (4)-(1)	0.0439		0.0058	0.1245		0.0449	

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

Table 2. Proportion of mothers and fathers working per capita income quintile and number of children, 2002

	Mother		Father
	All typles	Paid work	All types
Per capita			
Income quintile			
Poorest	0.534	0.305	0.941
Lower middle	0.510	0.334	0.926
Middle	0.503	0.343	0.901
Upper middle	0.555	0.384	0.870
Richest	0.657	0.384	0.856
No. of children			
2	0.550	0.433	0.867
3	0.544	0.433	0.908
4	0.548	0.436	0.918
5	0.550	0.419	0.925
6	0.529	0.411	0.943
7	0.526	0.410	0.948
8	0.519	0.374	0.918
9 and above	0.523	0.398	0.915
Philippines	0.5451	0.3489	0.9041

Table 3. Descriptive Statistics

	Obs	Mean	Std. Dev.	Min	Max
Mother working, all types	23828	0.5451	0.4980	0	1
Mother working, paid	30652	0.3489	0.4766	0	1
Father working, all types	21873	0.9041	0.2944	0	1
No of children	24931	3.5484	1.5528	2	12
Age of mother	23828	42.9238	10.8725	15	99
Age of father	21873	45.0971	10.7714	18	99
Education of mother, years	23828	9.2002	3.7755	0	17
Education of father, years	21873	9.0478	3.7678	0	17
Deflated fathers wage earnings, thousand (1994=	24931	1.7588	4.1080	0	313
Non-wage income, thousand (1994=100)	30651	5.7028	15.6870	0	1578
Unemployment rate, % domain level	24751	5.4276	2.6211	0.8	18
Presence of children below 6 years	30652	0.4961	0.5000	0	1
Urban dummy	24931	0.5898	0.4919	0	1
Region 1 dummy	30652	0.0464	0.2104	0	1
Region 2 dummy	30652	0.0376	0.1902	0	1
Region 3 dummy	30652	0.0952	0.2935	0	1
Region 4 dummy	30652	0.1607	0.3672	0	1
Region 5 dummy	30652	0.0533	0.2246	0	1
Region 6 dummy	30652	0.0716	0.2579	0	1
Region 7 dummy	30652	0.0584	0.2346	0	1
Region 8 dummy	30652	0.0533	0.2247	0	1
Region 9 dummy	30652	0.0430	0.2028	0	1
Region 10 dummy	30652	0.0505	0.2190	0	1
Region 11 dummy	30652	0.0509	0.2197	0	1
Region 12 dummy	30652	0.0440	0.2052	0	1
NCR dummy	30652	0.1035	0.3046	0	1
CAR dummy	30652	0.0441	0.2053	0	1
ARMM dummy	30652	0.0500	0.2180	0	1
Caraga dummy	30652	0.0374	0.1898	0	1

Table 4. Determinants of labor force participation of mothers, all types of work, 2002
(Two-Step Probit estimates)

Explanatory Variables	Model 1 Coef.	Model 1 Std. Err.*	Model 1 z	Model 2 Coef.	Model 2 Std. Err.*	Model 2 z
Predicted No. of children**	-0.2543	0.1558	-1.63			
No. of children				-0.2536	0.1558	-1.63
Estimated residual of no. of children				0.2309	0.1560	1.48
Age, mother	0.1934	0.0439	4.40	0.1940	0.0439	4.41
Age, mother squared	-0.0020	0.0004	-4.60	-0.0021	0.0004	-4.62
Years of educ., mother	0.0301	0.0076	3.97	0.0302	0.0076	3.98
Wage income per capita, father, (000)	-0.0349	0.0055	-6.31	-0.0353	0.0056	-6.35
Non-wage income per capita (000)	-0.0005	0.0022	-0.21	-0.0005	0.0022	-0.23
Unemployment rate, domain level	-0.0114	0.0038	-3.03	-0.0115	0.0038	-3.04
Presence of children below 6 years	0.1162	0.2015	0.58	0.1154	0.2016	0.57
Urban	-0.1373	0.0192	-7.15	-0.1369	0.0192	-7.13
Region 1	0.2819	0.0532	5.30	0.2814	0.0532	5.29
Region 2	0.4931	0.0589	8.37	0.4927	0.0589	8.36
Region 3	0.0777	0.0392	1.98	0.0775	0.0392	1.98
Region 4	0.2900	0.0370	7.84	0.2898	0.0370	7.84
Region 5	0.3558	0.0631	5.64	0.3554	0.0631	5.63
Region 6	0.4830	0.0493	9.79	0.4828	0.0493	9.79
Region 7	0.3715	0.0477	7.80	0.3712	0.0477	7.79
Region 8	0.4540	0.0595	7.63	0.4539	0.0595	7.63
Region 9	0.0071	0.0520	0.14	0.0069	0.0520	0.13
Region 10	0.6521	0.0489	13.34	0.6520	0.0489	13.33
Region 11	0.3531	0.0472	7.48	0.3528	0.0472	7.47
Region 12	0.5592	0.0623	8.98	0.5592	0.0623	8.98
CAR	0.4719	0.0684	6.90	0.4713	0.0684	6.89
ARMM	-0.2662	0.0654	-4.07	-0.2663	0.0654	-4.08
Caraga	0.3673	0.0526	6.98	0.3671	0.0527	6.97
Constant	-3.6530	0.4817	-7.58	-3.6647	0.4819	-7.60
Psuedo-R2	0.0688			0.0692		
No of Obs.	23,656			23,656		

* Huber-White "Robust" Standard Errors
** Instruments: Both male and both female

Table 5. Determinants of Labor Force Participation of mothers and fathers, 2002
(Full-Information Maximum Likelihood estimates)

Explanatory Variables	Mother Coef.	Mother Std. Err.*	Mother z	Father Coef.	Father Std. Err.*	Father z
Labor force participation equation:						
No. of children	-0.2662	0.4960	-0.54	-0.0205	0.2235	-0.09
Age, mother	0.1901	0.1076	1.77			
Age, mother squared	-0.0020	0.0011	-1.89			
Years of educ., mother	0.0271	0.0334	0.81			
Wage income per capita, father, (000)	-0.0340	0.0085	-4.00			
Age, father				0.0749	0.0457	1.64
Age, father squared				-0.0011	0.0005	-2.35
Years of educ., father				-0.0131	0.0116	-1.14
Non-wage income per capita (000)	-0.0008	0.0067	-0.12	-0.0008	0.0030	-0.27
Unemployment rate, %, domain level	-0.0108	0.0048	-2.23	-0.0345	0.0052	-6.65
Presence of children below 6 years	0.1441	0.6920	0.21			
Region 1	-0.1289	0.0364	-3.54	-0.3289	0.0318	-10.33
Region 2	0.2678	0.0488	5.49	0.1376	0.0770	1.79
Region 3	0.4603	0.1928	2.39	0.4158	0.1109	3.75
Region 4	0.0741	0.0381	1.95	-0.0242	0.0513	-0.47
Region 5	0.2744	0.0485	5.66	0.0365	0.0490	0.74
Region 6	0.3415	0.0755	4.53	0.3381	0.1157	2.92
Region 7	0.4580	0.0578	7.92	0.2665	0.0742	3.59
Region 8	0.3516	0.0614	5.73	0.0971	0.0697	1.39
Region 9	0.4330	0.0481	9.00	0.4523	0.1033	4.38
Region 10	0.0082	0.0602	0.14	0.3895	0.0845	4.61
Region 11	0.6136	0.1609	3.81	0.4655	0.0781	5.96
Region 12	0.3338	0.0652	5.12	0.3299	0.0700	4.71
CAR	0.5320	0.0525	10.14	0.3063	0.0966	3.17
ARMM	0.4511	0.0658	6.85	0.1370	0.1013	1.35
Caraga	-0.2432	0.2204	-1.10	0.3694	0.1126	3.28
Constant	0.3440	0.1270	2.71	0.2286	0.0804	2.84
	-3.5276	0.7419	-4.76	0.8992	0.2582	3.48
No. of children equation:						
Both male first two births	0.1235	0.0272	4.54	0.1365	0.0241	5.67
Both female first two births	0.0628	0.0432	1.45	0.0951	0.0273	3.48
Age, mother	0.2789	0.0062	44.76			
Age, mother squared	-0.0028	0.0001	-42.43			
Years of educ., mother	-0.0454	0.0034	-13.31			
Wage income per capita, father, (000)	-0.0297	0.0081	-3.67			
Age, father				0.2062	0.0062	33.44
Age, father squared				-0.0022	0.0001	-33.97
Years of educ., father				-0.0495	0.0031	-15.74
Non-wage income per capita (000)	-0.0120	0.0018	-6.60	-0.0121	0.0020	-6.01
Unemployment rate, domain level	0.0002	0.0040	0.06	-0.0033	0.0045	-0.75
Presence of children below 6 years	1.2841	0.0261	49.28			
Urban	-0.0055	0.0219	-0.25	-0.0432	0.0237	-1.82
Region 1	0.1160	0.0558	2.08	0.1329	0.0616	2.16
Region 2	-0.1115	0.0553	-2.02	-0.2244	0.0597	-3.76
Region 3	0.0453	0.0391	1.16	0.0131	0.0434	0.30
Region 4	0.0699	0.0362	1.93	0.0658	0.0399	1.65
Region 5	0.2656	0.0518	5.13	0.4203	0.0582	7.22
Region 6	0.1470	0.0465	3.16	0.1897	0.0519	3.66
Region 7	0.0934	0.0487	1.92	0.1407	0.0552	2.55
Region 8	0.2224	0.0530	4.20	0.3279	0.0612	5.36
Region 9	0.0644	0.0561	1.15	0.1155	0.0621	1.86
Region 10	0.0185	0.0497	0.37	0.0663	0.0547	1.21
Region 11	0.0748	0.0487	1.53	0.0860	0.0537	1.60
Region 12	0.2278	0.0574	3.97	0.2865	0.0637	4.50
CAR	0.2846	0.0548	5.20	0.3096	0.0601	5.15
ARMM	0.2658	0.0560	4.75	0.3687	0.0608	6.07
Caraga	-0.0406	0.0563	-0.72	0.0258	0.0616	0.42
Constant	-2.9922	0.1514	-19.77	-0.6012	0.1482	-4.06
LR test of indep. Eqns. (rho=0)						
Chi2(1)	0.200			0.030		
P-value	0.657			0.873		
Obs	23,656			23,656		
Wald Chi(24)	2,329.09			1,734.27		

Table 6. Determinants of labor force participation of mothers, by type of work, 2002
(Probit estimates)

Explanatory variables	All types of work				Excluding unpaid			
	Coef.	Std. Err.*	z	Mar. Eff.	Coef.	Std. Err.*	z	Mar. Eff.
No. of children	-0.0231	0.0061	-3.81	-0.0092	-0.0242	0.0061	-4.00	-0.0096
Age, mother	0.1295	0.0059	21.89	0.0513	0.1189	0.0061	19.46	0.0469
Age, mother squared	-0.0014	0.0001	-22.47	-0.0006	-0.0013	0.0001	-19.61	-0.0005
Years of educ., mother	0.0407	0.0026	15.58	0.0161	0.0603	0.0026	22.83	0.0238
Wage income per capita, father, (000)	-0.0284	0.0030	-9.48	-0.0113	-0.0069	0.0024	-2.86	-0.0027
Non-wage income per capita (000)	0.0023	0.0011	2.11	0.0009	-0.0031	0.0009	-3.66	-0.0012
Unemployment rate, domain level	-0.0116	0.0038	-3.07	-0.0046	-0.0055	0.0037	-1.46	-0.0022
Presence of children below 6 years	-0.1812	0.0232	-7.82	-0.0719	-0.1444	0.0231	-6.24	-0.0568
Urban	-0.1354	0.0192	-7.06	-0.0535	0.0297	0.0190	1.56	0.0117
Region 1	0.2543	0.0499	5.10	0.0985	0.1022	0.0498	2.05	0.0405
Region 2	0.5173	0.0565	9.16	0.1919	0.3211	0.0551	5.83	0.1275
Region 3	0.0673	0.0386	1.74	0.0266	0.1210	0.0387	3.13	0.0480
Region 4	0.2736	0.0353	7.75	0.1065	0.2735	0.0353	7.74	0.1086
Region 5	0.2938	0.0475	6.19	0.1133	0.2370	0.0474	5.00	0.0943
Region 6	0.4486	0.0437	10.28	0.1694	0.3747	0.0432	8.68	0.1486
Region 7	0.3499	0.0455	7.69	0.1339	0.3250	0.0455	7.14	0.1291
Region 8	0.4023	0.0482	8.34	0.1526	0.2982	0.0478	6.24	0.1185
Region 9	-0.0077	0.0511	-0.15	-0.0031	-0.0386	0.0519	-0.74	-0.0152
Region 10	0.6472	0.0488	13.27	0.2343	0.3409	0.0472	7.23	0.1353
Region 11	0.3355	0.0457	7.35	0.1286	0.2945	0.0454	6.49	0.1171
Region 12	0.5072	0.0514	9.86	0.1886	0.3290	0.0509	6.46	0.1307
CAR	0.4052	0.0519	7.81	0.1535	-0.0103	0.0516	-0.20	-0.0041
ARMM	-0.3269	0.0512	-6.38	-0.1298	-0.3867	0.0537	-7.20	-0.1459
Caraga	0.3766	0.0522	7.21	0.1433	0.2520	0.0519	4.86	0.1002
Constant	-2.9829	0.1410	-21.15		-3.3074	0.1451	-22.80	
Psuedo-R2	23,656				23,656			
No of Obs.	0.0692				0.0641			

* Huber-White "Robust" Standard Errors

Table 7. Determinants of labor force participation of mothers, by type of work, 2002
(Probit estimates; with interaction of number of children and per capita income quintile)

Explanatory variables	All types of work				Excluding unpaid			
	Coef.	Std. Err.*	z	Mar. Eff.	Coef.	Std. Err.*	z	Mar. Eff.
No. of children	-0.0287	0.0067	-4.27	-0.0114	-0.0509	0.0068	-7.46	-0.0201
No. of children x quintile 2	-0.0059	0.0059	-1.01	-0.0023	0.0259	0.0060	4.32	0.0102
No. of children x quintile 3	-0.0018	0.0068	-0.26	-0.0007	0.0372	0.0069	5.43	0.0147
No. of children x quintile 4	0.0382	0.0079	4.85	0.0152	0.0821	0.0079	10.45	0.0324
No. of children x quintile 5	0.1393	0.0123	11.36	0.0552	0.1825	0.0123	14.82	0.0720
Age, mother	0.1270	0.0060	21.30	0.0503	0.1156	0.0062	18.74	0.0456
Age, mother squared	-0.0014	0.0001	-22.24	-0.0006	-0.0013	0.0001	-19.35	-0.0005
Years of educ., mother	0.0296	0.0028	10.60	0.0117	0.0447	0.0028	15.77	0.0176
Wage income per capita, father, (000)	-0.0396	0.0036	-11.10	-0.0157	-0.0200	0.0030	-6.68	-0.0079
Non-wage income per capita (000)	-0.0029	0.0010	-2.79	-0.0011	-0.0097	0.0013	-7.41	-0.0038
Unemployment rate, domain level	-0.0132	0.0038	-3.49	-0.0052	-0.0074	0.0038	-1.97	-0.0029
Presence of children below 6 years	-0.1654	0.0234	-7.08	-0.0656	-0.1095	0.0234	-4.69	-0.0431
Urban	-0.1536	0.0196	-7.85	-0.0607	-0.0123	0.0195	-0.63	-0.0048
Region 1	0.3128	0.0503	6.22	0.1202	0.1691	0.0503	3.36	0.0672
Region 2	0.5667	0.0568	9.98	0.2080	0.3766	0.0555	6.78	0.1493
Region 3	0.1080	0.0390	2.77	0.0425	0.1531	0.0391	3.92	0.0608
Region 4	0.3061	0.0357	8.57	0.1188	0.3083	0.0357	8.63	0.1224
Region 5	0.3615	0.0481	7.52	0.1380	0.3381	0.0481	7.03	0.1342
Region 6	0.5122	0.0443	11.55	0.1912	0.4562	0.0439	10.40	0.1802
Region 7	0.3986	0.0460	8.66	0.1514	0.3908	0.0461	8.48	0.1549
Region 8	0.4614	0.0487	9.47	0.1732	0.3886	0.0485	8.01	0.1540
Region 9	0.0411	0.0513	0.80	0.0162	0.0317	0.0522	0.61	0.0125
Region 10	0.7152	0.0495	14.46	0.2548	0.4418	0.0481	9.18	0.1746
Region 11	0.4088	0.0462	8.84	0.1549	0.3871	0.0461	8.40	0.1534
Region 12	0.5635	0.0519	10.86	0.2071	0.4121	0.0517	7.98	0.1631
CAR	0.4290	0.0525	8.17	0.1618	0.0181	0.0519	0.35	0.0072
ARMM	-0.3068	0.0514	-5.97	-0.1219	-0.3704	0.0537	-6.90	-0.1401
Caraga	0.4500	0.0528	8.53	0.1690	0.3604	0.0524	6.87	0.1430
Constant	-2.8182	0.1422	-19.81		-3.0899	0.1464	-21.11	
Psuedo-R2	0.0753				0.0726			
No of Obs.	23,656				23,656			

* Huber-White "Robust" Standard Errors

Table 8. 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

* insignificant, assumed same as base case
Computed from Tables 7 and 9

Table 9. Determinants of labor force participation of fathers, 2002
(Two-Step Probit estimates)

Explanatory Variables	Model 1 Coef.	Model 1 Std. Err.*	Model 1 z	Model 2 Coef.	Model 2 Std. Err.*	Model 2 z
Predicted No. of children**	-0.0228	0.2092	-0.11			
No. of children				-0.0189	0.2092	-0.09
Estimated residual of no. of children				0.0344	0.2096	0.16
Age, father	0.0749	0.0441	1.70	0.0747	0.0441	1.69
Age, father squared	-0.0011	0.0005	-2.41	-0.0011	0.0005	-2.40
Years of educ., father	-0.0132	0.0111	-1.19	-0.0131	0.0111	-1.18
Nonwage income per capita, (000)	-0.0008	0.0028	-0.28	-0.0008	0.0028	-0.27
Unemployment rate, domain level	-0.0346	0.0052	-6.61	-0.0345	0.0052	-6.61
Urban	-0.3291	0.0329	-10.01	-0.3293	0.0329	-10.01
Region 1	0.1385	0.0773	1.79	0.1376	0.0773	1.78
Region 2	0.4160	0.1058	3.93	0.4168	0.1058	3.94
Region 3	-0.0242	0.0514	-0.47	-0.0242	0.0513	-0.47
Region 4	0.0361	0.0490	0.74	0.0364	0.0490	0.74
Region 5	0.3368	0.1157	2.91	0.3379	0.1158	2.92
Region 6	0.2670	0.0753	3.55	0.2665	0.0753	3.54
Region 7	0.0979	0.0695	1.41	0.0970	0.0695	1.40
Region 8	0.4519	0.1054	4.29	0.4524	0.1056	4.29
Region 9	0.3893	0.0859	4.53	0.3898	0.0859	4.54
Region 10	0.4659	0.0790	5.90	0.4661	0.0789	5.90
Region 11	0.3312	0.0711	4.66	0.3302	0.0711	4.64
Region 12	0.3070	0.0973	3.16	0.3063	0.0973	3.15
CAR	0.1369	0.1000	1.37	0.1367	0.1000	1.37
ARMM	0.3719	0.1135	3.28	0.3693	0.1134	3.26
Caraga	0.2288	0.0805	2.84	0.2289	0.0807	2.84
Constant	0.9118	0.2473	3.69	0.9015	0.2459	3.67
Psuedo-R2	0.1619			0.1621		
No of Obs.	21,709			21,709		

* Huber-White "Robust" Standard Errors
** Instruments: Both male and both female

Table 10. Determinants of labor force participation of fathers, 2002
(Probit estimates)

	Without per capita income quintile				With per capita income quintile			
Explanatory variables	Coef.	Std. Err.*	z	Mar. Eff.	Coef.	Std. Err.*	z	Mar. Eff.
No. of children	0.0155	0.0091	1.72	0.0021	-0.0006	0.0102	-0.06	-0.0001
No. of children x quintile 2					0.0229	0.0100	2.30	0.0031
No. of children x quintile 3					0.0400	0.0110	3.65	0.0054
No. of children x quintile 4					0.0280	0.0119	2.35	0.0038
No. of children x quintile 5					0.0741	0.0161	4.61	0.0099
Age, father	0.0676	0.0088	7.71	0.0091	0.0644	0.0088	7.30	0.0086
Age, father squared	-0.0011	0.0001	-12.08	-0.0001	-0.0010	0.0001	-11.82	-0.0001
Years of educ., father	-0.0114	0.0039	-2.92	-0.0015	-0.0183	0.0044	-4.19	-0.0025
Nonwage income per capita, (000)	-0.0004	0.0012	-0.30	0.0000	-0.0016	0.0012	-1.38	-0.0002
Unemployment rate, domain level	-0.0344	0.0052	-6.64	-0.0046	-0.0351	0.0052	-6.75	-0.0047
Urban	-0.3278	0.0317	-10.35	-0.0426	-0.3511	0.0325	-10.81	-0.0454
Region 1	0.1330	0.0721	1.85	0.0163	0.1628	0.0726	2.24	0.0195
Region 2	0.4244	0.0950	4.47	0.0425	0.4415	0.0954	4.63	0.0435
Region 3	-0.0246	0.0513	-0.48	-0.0034	-0.0128	0.0513	-0.25	-0.0017
Region 4	0.0342	0.0473	0.72	0.0045	0.0460	0.0475	0.97	0.0060
Region 5	0.3233	0.0752	4.30	0.0350	0.3700	0.0768	4.82	0.0387
Region 6	0.2600	0.0642	4.05	0.0296	0.2885	0.0647	4.46	0.0321
Region 7	0.0922	0.0633	1.46	0.0117	0.1187	0.0638	1.86	0.0147
Region 8	0.4411	0.0804	5.48	0.0440	0.4781	0.0817	5.85	0.0463
Region 9	0.3858	0.0827	4.67	0.0399	0.4228	0.0834	5.07	0.0424
Region 10	0.4636	0.0780	5.95	0.0456	0.5100	0.0793	6.43	0.0485
Region 11	0.3272	0.0690	4.75	0.0354	0.3663	0.0696	5.26	0.0384
Region 12	0.2966	0.0783	3.79	0.0325	0.3368	0.0788	4.28	0.0358
CAR	0.1261	0.0751	1.68	0.0156	0.1385	0.0753	1.84	0.0169
ARMM	0.3567	0.0856	4.17	0.0380	0.3772	0.0859	4.39	0.0395
Caraga	0.2279	0.0806	2.83	0.0262	0.2794	0.0819	3.41	0.0309
Constant	0.9203	0.2175	4.23		1.0482	0.2216	4.73	
Psuedo-R2	0.1621				0.1640			
No of Obs.	21,709				21,709			

* Huber-White "Robust" Standard Errors

Table 11. Determinants of wage income of mothers
(2-Stage Tobit estimates)

	Model 1			Model 2		
Explanatory Variables	Coef.	Std. Err.*	t	Coef.	Std. Err.*	t
No. of children	-0.1669	0.1841	-0.91			
Estimated residual of no. of children**	0.1168	0.1842	0.63			
Predicted no. of children**				-0.1536	0.1846	-0.83
Age, mother	0.1040	0.0341	3.05	0.0967	0.0342	2.83
Age, mother squared	-0.0010	0.0004	-2.58	-0.0009	0.0004	-2.36
Years of educ., mother	0.2137	0.0119	18.02	0.2151	0.0119	18.09
Urban	0.3981	0.0311	12.81	0.3999	0.0312	12.82
Region 1	-0.6006	0.0817	-7.35	-0.6039	0.0819	-7.37
Region 2	-0.6867	0.0745	-9.22	-0.6842	0.0747	-9.15
Region 3	-0.3019	0.0581	-5.20	-0.3105	0.0582	-5.33
Region 4	-0.2733	0.0543	-5.03	-0.2755	0.0545	-5.06
Region 5	-0.6271	0.1074	-5.84	-0.6307	0.1078	-5.85
Region 6	-0.5662	0.0751	-7.54	-0.5684	0.0753	-7.55
Region 7	-0.3616	0.0748	-4.84	-0.3611	0.0750	-4.82
Region 8	-0.5078	0.0993	-5.12	-0.5111	0.0996	-5.13
Region 9	-0.3843	0.0918	-4.18	-0.3871	0.0921	-4.20
Region 10	-0.7846	0.0700	-11.21	-0.7918	0.0702	-11.29
Region 11	-0.5659	0.0736	-7.69	-0.5669	0.0738	-7.68
Region 12	-0.5283	0.0890	-5.93	-0.5368	0.0893	-6.01
CAR	-0.3068	0.0960	-3.20	-0.3167	0.0962	-3.29
ARMM	-0.0376	0.1202	-0.31	-0.0969	0.1202	-0.81
Caraga	-0.7451	0.0821	-9.07	-0.7426	0.0824	-9.01
Constant	-1.7328	0.2574	-6.73	-1.6403	0.2575	-6.37
Censoring parameter	0.9259	0.0092		0.9287	0.0093	
Observations	5,540			5,540		

* Huber-White "Robust" Standard Errors
** Instruments: Both male and both female

Table 12. Determinants of wage income of mothers
(Tobit and OLS estimates)

	Tobit Estimates								OLS (Robust SE)		
	Without per capita income quintile				Without per capita income quintile						
Explanatory variables	Coef.	Std. Err.	t	Mar. Eff.*	Coef.	Std. Err.	t	Mar. Eff.*	Coef.	Std. Err.	t
No. of children	-0.0504	0.0088	-5.75	-0.0500	-0.1277	0.0089	-14.37	-0.1273	-0.0510	0.0094	-5.45
No. of children x quintile 2					0.0599	0.0087	6.89	0.0598			
No. of children x quintile 3					0.1485	0.0099	15.07	0.1481			
No. of children x quintile 4					0.2822	0.0104	27.01	0.2814			
No. of children x quintile 5					0.4613	0.0132	35.06	0.4599			
Age, mother	0.0835	0.0111	7.55	0.0829	0.0569	0.0098	5.79	0.0567	0.0860	0.0120	7.18
Age, mother squared	-0.0008	0.0001	-6.32	-0.0008	0.2603	0.0257	10.11	0.2594	-0.0008	0.0001	-6.03
Years of educ., mother	0.2208	0.0035	62.78	0.2192	-0.0006	0.0001	-5.66	-0.0006	0.2214	0.0038	58.91
Urban	0.4059	0.0286	14.20	0.4022	0.1317	0.0039	33.54	0.1313	0.4054	0.0313	12.96
Region 1	-0.6217	0.0746	-8.34	-0.6104	-0.3576	0.0666	-5.37	-0.3556	-0.6213	0.0758	-8.20
Region 2	-0.6688	0.0690	-9.70	-0.6561	-0.4331	0.0615	-7.04	-0.4304	-0.6905	0.0682	-10.12
Region 3	-0.3067	0.0576	-5.33	-0.3034	-0.1490	0.0515	-2.89	-0.1484	-0.3102	0.0531	-5.84
Region 4	-0.2857	0.0507	-5.64	-0.2829	-0.1422	0.0452	-3.15	-0.1417	-0.3021	0.0454	-6.66
Region 5	-0.6793	0.0690	-9.84	-0.6661	-0.3030	0.0621	-4.88	-0.3015	-0.6849	0.0646	-10.59
Region 6	-0.5945	0.0603	-9.86	-0.5849	-0.3031	0.0541	-5.60	-0.3016	-0.6067	0.0569	-10.66
Region 7	-0.3814	0.0679	-5.61	-0.3766	-0.1783	0.0606	-2.94	-0.1776	-0.4009	0.0682	-5.88
Region 8	-0.5520	0.0707	-7.80	-0.5431	-0.2344	0.0634	-3.70	-0.2333	-0.5898	0.0724	-8.15
Region 9	-0.4009	0.0880	-4.55	-0.3956	-0.1046	0.0786	-1.33	-0.1043	-0.4057	0.0812	-5.00
Region 10	-0.7971	0.0671	-11.87	-0.7789	-0.4174	0.0604	-6.91	-0.4148	-0.7922	0.0660	-12.00
Region 11	-0.5804	0.0700	-8.29	-0.5706	-0.2384	0.0628	-3.80	-0.2374	-0.5909	0.0695	-8.50
Region 12	-0.5609	0.0727	-7.71	-0.5516	-0.2276	0.0652	-3.49	-0.2266	-0.5539	0.0667	-8.30
CAR	-0.3457	0.0738	-4.68	-0.3415	-0.2538	0.0656	-3.87	-0.2527	-0.3463	0.0728	-4.76
ARMM	-0.0724	0.1070	-0.68	-0.0718	-0.1131	0.0954	-1.19	-0.1127	-0.0706	0.0867	-0.81
Caraga	-0.7548	0.0807	-9.35	-0.7378	-0.3702	0.0724	-5.12	-0.3680	-0.7887	0.0898	-8.78
Constant	-1.7960	0.2373	-7.57	-1.7828	-0.5335	0.2131	-2.50	-0.5319	-1.8615	0.2566	-7.26
Censoring parameter	0.9260	0.0092			0.8219	0.0082					
Pseudo R2/R-square	0.2250				0.2893				0.5224		
Observations	5,540				5,540				5,540		

* Unconditional expected value

Table 13. 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

* insignificant, assumed same as base case
Computed from Tables 12 and 15

Table 14. Determinants of wage income of fathers
(2-Stage Tobit estimates)

Explanatory Variables	Model 1 Coef.	Model 1 Std. Err.*	Model 1 t	Model 2 Coef.	Model 2 Std. Err.*	Model 2 t
No. of children	-0.0852	0.1149	-0.74			
Estimated residual of no. of children**	0.0959	0.1149	0.83			
Predicted no. of children**				-0.3266	0.0335	-9.75
Age, father	0.0433	0.0246	1.76	0.0707	0.0076	9.34
Age, father squared	-0.0005	0.0003	-1.75	-0.0008	0.0001	-9.10
Years of educ., father	0.1318	0.0067	19.53	0.1240	0.0026	47.21
Urban	0.4073	0.0184	22.12	0.3845	0.0177	21.78
Region 1	-0.5923	0.0475	-12.48	-0.5495	0.0451	-12.19
Region 2	-0.6026	0.0502	-12.02	-0.6397	0.0455	-14.07
Region 3	-0.1668	0.0321	-5.19	-0.1510	0.0323	-4.67
Region 4	-0.2434	0.0306	-7.96	-0.2206	0.0294	-7.50
Region 5	-0.6554	0.0661	-9.92	-0.5501	0.0425	-12.95
Region 6	-0.4898	0.0436	-11.25	-0.4193	0.0374	-11.22
Region 7	-0.3053	0.0437	-6.99	-0.2641	0.0394	-6.70
Region 8	-0.4787	0.0587	-8.15	-0.3933	0.0438	-8.98
Region 9	-0.2784	0.0483	-5.76	-0.2270	0.0461	-4.93
Region 10	-0.6832	0.0407	-16.78	-0.6611	0.0395	-16.72
Region 11	-0.4213	0.0415	-10.14	-0.3839	0.0405	-9.47
Region 12	-0.4156	0.0553	-7.51	-0.3610	0.0447	-8.07
CAR	-0.1581	0.0580	-2.73	-0.0951	0.0464	-2.05
ARMM	-0.2271	0.0770	-2.95	-0.1457	0.0637	-2.29
Caraga	-0.6279	0.0466	-13.48	-0.6055	0.0464	-13.05
Constant	0.7873	0.1506	5.23	1.1147	0.1397	7.98
Censoring parameter	0.7830	0.0054		0.7779	0.0054	
Observations	21,873			21,873		

* Huber-White "Robust" Standard Errors
** Instruments: Both male and both female

Table 15. Determinants of wage income of fathers
(Tobit and OLS estimates)

	Tobit Estimates								OLS (Robust SE)		
	Without per capita income quintile				Without per capita income quintile						
Explanatory variables	Coef.	Std. Err.	t	Mar. Eff.*	Coef.	Std. Err.	t	Mar. Eff.*	Coef.	Std. Err.	t
No. of children	0.0107	0.0050	2.13	0.0107	-0.0598	0.0049	-12.10	-0.0598	0.0113	0.0054	2.09
No. of children x quintile 2					0.1104	0.0047	23.31	0.1104			
No. of children x quintile 3					0.1844	0.0053	34.86	0.1844			
No. of children x quintile 4					0.2472	0.0061	40.26	0.2472			
No. of children x quintile 5					0.4137	0.0082	50.74	0.4136			
Age, father	0.0234	0.0062	3.75	0.0234	0.0056	0.0055	1.01	0.0056	0.0228	0.0071	3.21
Age, father squared	-0.0002	0.0001	-3.59	-0.0002	-0.0002	0.0001	-2.85	-0.0002	-0.0002	0.0001	-3.00
Years of educ., father	0.1371	0.0023	59.90	0.1371	0.0777	0.0023	33.35	0.0777	0.1381	0.0025	55.06
Urban	0.4126	0.0172	23.93	0.4124	0.2640	0.0156	16.94	0.2640	0.4196	0.0189	22.24
Region 1	-0.6071	0.0440	-13.79	-0.6061	-0.4174	0.0393	-10.63	-0.4173	-0.6117	0.0460	-13.30
Region 2	-0.5831	0.0444	-13.14	-0.5822	-0.4436	0.0395	-11.22	-0.4435	-0.5902	0.0493	-11.97
Region 3	-0.1700	0.0319	-5.33	-0.1699	-0.0957	0.0284	-3.37	-0.0957	-0.1680	0.0260	-6.46
Region 4	-0.2517	0.0289	-8.72	-0.2516	-0.1706	0.0257	-6.64	-0.1706	-0.2531	0.0246	-10.30
Region 5	-0.6997	0.0394	-17.77	-0.6984	-0.3781	0.0355	-10.64	-0.3780	-0.7075	0.0407	-17.38
Region 6	-0.5101	0.0361	-14.13	-0.5095	-0.2932	0.0324	-9.06	-0.2932	-0.5130	0.0343	-14.95
Region 7	-0.3225	0.0386	-8.37	-0.3222	-0.1581	0.0344	-4.60	-0.1581	-0.3220	0.0327	-9.85
Region 8	-0.5131	0.0417	-12.30	-0.5125	-0.3042	0.0373	-8.15	-0.3041	-0.5290	0.0435	-12.15
Region 9	-0.2930	0.0451	-6.50	-0.2928	-0.0702	0.0403	-1.74	-0.0702	-0.2871	0.0387	-7.42
Region 10	-0.6931	0.0389	-17.80	-0.6918	-0.4061	0.0350	-11.60	-0.4060	-0.6992	0.0413	-16.93
Region 11	-0.4313	0.0398	-10.84	-0.4308	-0.2128	0.0356	-5.98	-0.2128	-0.4305	0.0370	-11.63
Region 12	-0.4444	0.0433	-10.26	-0.4439	-0.2041	0.0387	-5.27	-0.2041	-0.4438	0.0414	-10.73
CAR	-0.1889	0.0447	-4.22	-0.1888	-0.1622	0.0397	-4.09	-0.1622	-0.1914	0.0460	-4.16
ARMM	-0.2648	0.0623	-4.25	-0.2646	-0.2480	0.0553	-4.49	-0.2479	-0.2682	0.0624	-4.30
Caraga	-0.6339	0.0460	-13.77	-0.6328	-0.3397	0.0413	-8.23	-0.3397	-0.6347	0.0473	-13.41
Constant	0.8426	0.1353	6.23	0.8422	1.6545	0.1211	13.67	1.6544	0.8335	0.1494	5.58
Censoring parameter	0.7830	0.0054			0.6948	0.0048					
Pseudo R2/R-square	0.1801				0.2612				0.3986		
Observations	10,995				10,995				10,995		

* Unconditional expected value