Assessing the impact of gendered labor markets in the rural Philippines

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Abstract

This paper aims to conduct an intergenerational analysis of the relationship between women's participation in off-farm paid activities and children's wellbeing by considering the two main hypotheses that have been considered in the literature. The first hypothesis suggests that mother's allocation of labor in paid activities has a negative effect on children's wellbeing due to a reduction in the time available to spend in unpaid house chores associated with the healthy development of children particularly, childcare. In contrast, the second hypothesis suggests that the income accrued by mothers who participate in paid activities has a direct positive effect on children's wellbeing because income controlled by women is more likely to be allocated on expenditures that benefit children's development. Our preliminary results from instrumental variables regressions provide substantial evidence to confirm that woman's participation in off-farm paid activities serves as a tool to break the inter-generational transmission of poverty by improving children's health. In addition, the vertical transmission of wealth and bargaining power as well as the horizontal transmission of social norms do indirectly affect children's welfare by increasing the probability of their mothers' participating in off-farm paid activities.

Key Words: Philippines, poverty reduction, children's nutrition, off-farm labor, bargaining power.

1. Introduction

Are different types of resources within the household associated with different household welfare outcomes? Does access to economic resources accrued through paid labor have a different effect on children's wellbeing? Does the identity of the earner of labor income affect household welfare and household members differently? This study aims to provide an insightful contribution to the literature by addressing these questions in a rural, developing-country context. Specifically, this paper aims to understand the determinants of women's allocation of labor to different types of employment (paid non agricultural, paid agricultural and unpaid) and to assess the relationship between women's participation in paid non agricultural activities and welfare outcomes (anthropometric measurements of children).

This issue is particularly relevant in rural environments where non agricultural activities have become increasingly important as an ex-ante mechanism to diversify risk and reduce vulnerability. The average share of non farm income in rural households' total income is about 40% in Latin America (Reardon, Berdegue and Escobar, 2001), 35% in Asia and 45% in Africa (Reardon et. al, 1998) and it is estimated that about 36% of the rural workers in Latin America, 25% in Asia and 11% in Africa are employed in rural non agricultural activities (Haggblade et. al, 2002). Diversification into non agricultural employment has a gender dimension as well. It has been found that women's participation in nonagricultural activities is high and has been increasing substantially over time. Out of the total number of workers employed in non-farm activities, 25% in Africa, 27% in Latin America and 20% in Asia are women (Haggblade et. al, 2002). These estimates do not include part-time or seasonal activities, which suggests that the importance of women's participation in nonfarm activities may be even higher.

Because of the growing importance of non agricultural activities in rural settings and the increasing participation of women in these, this analysis will focus on testing the relationship between women's employment in non agricultural activities and children's wellbeing in the rural Philippines. This country provides an interesting setting in which to examine the gender dimensions of labor and employment because it is a relatively egalitarian society with respect to gender roles (Bouis and Peña 1997, Estudillo, Quisumbing, and Otsuka 2001 and, Quisumbing, Estudillo, and Otsuka 2004). However, despite the generally gender egalitarian nature of Filipino society, there are marked differences in men's and women's labor market participation, as well as sector of employment. In January 2008, while the labor force participation rate of men was much higher than women's (78.5% vs. 48.4%), the unemployment rate of women (6.7%) was lower than men's (7.8%).[1] Occupational segregation is also evident, in 2006, 68% of the population employed as professionals and 64% of clerks were women while about 85% of the workers employed in agriculture were men.[2] In fact, the number of employed women as government officials, clerks, professionals and service workers is higher than that of males from 2001-2006 while the number of women employed in agriculture is significantly lower than men for the same period of time (See Graph 1). This shows that women's participation in non agricultural activities is of great importance in the Philippines. Therefore, this paper will focus on studying whether this type of labor serves as a path out of poverty in rural settings.

This paper is structured as follows. The next section reviews the literature devoted to test the relationship between women's access to economic resources and household welfare. Section 3 explains the theoretical framework. Section 4 describes the data used in this analysis, presents descriptive statistics as well as some general trends. Section 5 explains the empirical approach and Section 6 reports the main findings. Finally, the conclusions and possibilities for further research are discussed in Section7.

2. Women's Access to Economic Resources, Labor Participation and Household Wellbeing: Empirical Evidence.

Women's access to physical and human resources has been shown to be an important determinant of households' welfare. Different studies have confirmed the relationship between women's access to physical and human capital and children's well being by using different proxies for women's access to these types of resources. In general, for the case of access to human capital, there are a considerable number of studies that validate the existence of a positive relationship between mothers' education and children's survival (Lindenbaum (1990), Hobcraft et al. (1984), Mensch et al. (1985)) while other analyses have focused on the association between mothers education and children's health outcomes such as height, weight, immunization, etc (Bicego and Boerma (1991), Boerma, Sommerfelt and Rutstein (1991), Boerma et al. (1990)). Overall, most of the research in this area corroborates the hypothesis that women's education is positively related to children's survival as well as to children's health and education outcomes (Hobcraft, 1993).

Besides human capital, there is a second stream of research that explores the relationship between women's access to physical capital and income, and household wellbeing. This type of analysis is rather diverse, with no standard model being tested nor a uniform set of dependent or the explanatory variables. Instead, different researchers tend to use a variety of proxies for women's access to economic resources (access to assets, unearned income, wages, etc) as well as for household welfare (share of total expenditures allocated to certain categories, anthropometric measures, nutritional status, etc). A most common approach is to use household allocation of expenditures as a measure of household wellbeing. For example, Quisumbing and Maluccio (2003) tested the effect of assets brought to marriage by husband and wife on expenditures allocated to children's education for Bangladesh, Indonesia, South Africa and Ethiopia. They find that for Bangladesh and South Africa, women's assets increase the share of household expenditures allocated to education. Besides using access to physical assets, another approach to measure the impact of access to economic resources is conducted by analyzing the effect of the income received by women on household welfare. Hoddinot and Haddad (1995), test the hypothesis that cash income accrued by women has different effects on different types of expenditures categories in Cote d'Ivoire. The authors show that wives' share of income accrued in the form of cash has a positive effect on food expenditures and a negative effect on the share of expenditures allocated to meals eaten out, cigarettes and alcohol. A similar hypothesis is tested by Doss (2001) using household data from Ghana. The results show that transitory incomes obtained by men and women affect the shares allocated to different expenditure categories differently. For example, the share of total expenditures allocated to education expenditures increases when the transitory income of the male head of the household increases but there is not a significant change when the wives' income rises. Also, Phipps and Burton (1998) analyze the effect of women's and men's income on different categories of household expenditures in Canada. The authors also find significant evidence to confirm the hypothesis that women's income increases expenditures associated with child care while men's income is not significant. This research is conducted on couples where both women and men are employed full time throughout the year.

Using the share of total expenditure allocated to different categories, however, might not be the most adequate method to measure welfare. Households might have access to public education and free health care while others might consume own-produced food. If this is the case, the share of household expenditures allocated to education, health and food might underestimate the household's access to these commodities and therefore, household wellbeing.[3] To deal with this issue, some authors use instead other variables that could more accurately capture children's well-being such as health outcomes and anthropometric measurements. In his analysis of Brazilian households, Thomas (1990) analyzes the

effects of women's and men's unearned income on children's welfare, proxied by children's survival rates, calories and protein intakes and anthropometric measurements such as height and weight. He found that women's unearned income has a positive and stronger effect on children's health than men's, and that men's unearned income seems to have a stronger effect on the anthropometric measurements of sons than daughters. He concludes that control over unearned income (social security, pensions) by different household members has different effects on children's welfare. These findings are corroborated by Hoddinott and Haddad (1994).

Most of the literature mentioned so far has used these approaches to either corroborate or reject the unitary model of the household or to confirm the influence of women's bargaining power on household wellbeing. Most of these studies do not analyze the sources of these economic resources, using instead exogenously-determined measures of income to avoid problems of endogeneity of income source with respect to bargaining power. Because bargaining power might affect women's participation in paid labor and the amount of labor hours allocated to market activities, this paper does not analyze women's access to economic resources with the intention to assess bargaining power. For example, women with lower bargaining power might be less likely to allocate high number of labor hours to market activities than women with higher levels of bargaining power (Quisumbing and Maluccio, 2003). Instead, the aim of this paper is to analyze the effect of women's access to economic resources on household wellbeing by assessing the effect of women's participation in paid labor activities on household welfare.

Clearly, there is substantial evidence showing that women's access to economic resources is beneficial to household members and particularly to children. However, does women's access to paid labor produce the same effect? Unlike the studies presented above, there is no clear consensus in the literature about the effect of women's paid work on children's welfare (Glick, 2002). In general, this ambiguity is attributed to the presence of two opposite effects associated with paid employment. First, there is a positive effect due to an increase in household income associated with mother's paid work and second, there is a negative effect due to a decrease on the amount of time allocated to unpaid housework particularly to childcare (Popkin, 1983). Then, the effect of women's paid employment on household welfare is uncertain and depends highly on the context in which it is being analyzed.

Popkin (1983) studies the effect of women's labor force participation on child nutrition in the Philippines. The author finds that daily caloric and protein intakes increase with mother's participation in the labor force while mother's allocation of time to child care activities is not affected. In addition, children's weight and height are not influenced by the participation of their mothers in the labor force. This result is corroborated by Sonalde and Jain (1994) for the case of India. Their results show that mothers' work for wages does not have a statistically significant effect on children's weight for height and it has only a slightly negative effect on the mother's amount of time allocated to childrearing activities. Also, Wandel and Holmboe-Ottesen (1992) find that women's work in the fields of Tanzania does not have a significant effect on children's welfare measured by their level of nutrition. Lamontagne et.al (1998) confirm the positive significant relationship between children's weight for height and mother's work in their analysis of Nicaraguan households. Supporting these findings, Vial and Munchnik (1989) find that women's work reduces the duration of breastfeeding a newborn child but has a positive effect on infants'weight in Chile. Overall, the assessment of the net effect of women's work on Chilean children's level of nutrition is positive.

These results contrast with Chutikul (1986) who finds that women's work in the formal sector is related to children's malnourishment in Thailand. Moreover, Rabiee and Geissler (1992) find that, despite of having a higher socio-economic status, children with mothers who work more than three hours per day away from home face greater occurrence of diarrhea and lower levels of nutrition than children with mothers who work less than three hours per day in Tagengokeh, Iran. In the same line, Alderman (1983)

finds that the hours that women spend in paid work is associated with lower levels of children's welfare in Peru. Specifically, children with mothers who work full-time tend to be smaller than children with mothers who do not work or work only part time. Using a different measure for children's welfare, Anderson et.al (2003) find a positive significant relationship between overweight children and the number of hours per week allocated to market work by women in the United States. This relationship is particularly strong for mothers with better economic position.

The inconclusive relationship between women's access to resources obtained through paid labor and household's wellbeing suggests that it is essential to understand the gendered patterns of employment in different economic sectors, the types of employment obtained by women, and the intensity of their labor. This paper attempts to draw from both threads of this literature in order to understand whether women's participation in paid non-agricultural activities affects household welfare differently than women's participation in paid and unpaid agricultural activities.

3. Income versus Time: A Theoretical Approach

As mentioned in section 2, there are two main contrasting findings in the literature on the relationship between mothers' paid employment and children's wellbeing. First, some studies suggest a positive effect of women's paid employment on children's welfare due to an increase in income. Other analyses show instead a negative relationship between women's employment and children's welfare due to a decline in the time available to perform unpaid housework. These contrasting hypotheses are pooled together in a theoretical framework that is used as a general approach to understand the empirical methodology that is presented in Section 6.

Overall, the household wants to maximize all their members' utility but particularly the children's utility or wellbeing (Wc). Children's utility depends on the total amount of consumption allocated to each children (C_i) and the total amount of care received by the children i ($Care_i$). In this framework, children's wellbeing is aggregated as the summation of all the children's welfare. However, household members can be more concerned about the wellbeing of a given child and therefore, different weights can be allocated to each of the child's consumption or care. In other words, parents can benefit/harm each child's welfare by being more/less concerned about their consumption or care.

$$Wc = U\left(\sum \rho_i C_i, \sum \alpha_i Care_i\right) \qquad U_i'(Ci) > 0 \;;\; U_i'(Care\,i) > 0 \qquad (1)$$

Each parent j has to decide how to allocate his/her total time endowment (T_j) to paid activities (L_w), unpaid activities (L_u) and leisure (L_e). Notice that time allocated to childcare is an unpaid activity and therefore it is a component of L_u. These terms compose the parents' time constraint which is represented by equation (2).

$$T = L_w + L_u + L_e \qquad (2)$$

In addition, the household also faces an income constraint. In particular, we will assume that the household can obtain income from assets (A) or from wages obtained through paid labor (w). Hence, the total value of the amount of goods consumed by the household (PC) must be equal to the value of their assets and the wages accrued through the paid labor of their household members.

$$PC = A + w(L_w) \qquad (3)$$

Combining equations (2) and (3) we can obtain the overall constraint (Equation 4)

$$PC = A + w(T - L_u - L_e) \quad (4)$$

Hence, children's wellbeing is maximized subject to equation (4).

Based on the findings presented in other studies, we can hypothesize about the signs of the derivatives associated with each of the arguments that composed the children's welfare function. First, we know that each child's consumption depends on the total household's income (Y) which depends positively on parents' participation in paid employment (L_w) and negatively on parents' participation in unpaid activities (L_u). On the other hand, care given to each child depends positively on the availability of parent's time to perform unpaid activities and negatively on parents' participation in paid employment.

$$Ci = C(L_w, L_u) \qquad C'(L_w) > 0;\ C'(L_u) < 0 \quad (2a)$$

$$Care_i = Ca\,(T(L_w, L_u)) \qquad Ca'(L_w) < 0;\ Ca'(L_u) > 0 \quad (2b)$$

Hence, if women participate in paid employment, there are two contrasting effects on children's wellbeing; a positive effect on consumption from higher income and a negative effect from unpaid care reduction. The total effect of mothers' employment is the sum of both effects. Then if $C'(L_w) > Ca'(L_w)$, we can conclude that women's participation in paid activities has an overall positive effect on children's wellbeing and therefore $Wc'(Lw) > 0$ while if $C'(L_w) < Ca'(L_u)$, we can conclude that women's participation has an overall negative effect on children's wellbeing and $Wc'(Lw) < 0$. This study aims to test these two hypotheses by using the child's anthropometric measurements (weight for length, body mass index, weight for age and length for age) as a proxy for wellbeing. These anthropometric measures must capture how the income effect and the time effect influence children's wellbeing. Hence, if the time effect is greater than the income effect the coefficient that represents women's participation in paid activities must be negative and significant while if the income effect dominates, the coefficient must have the opposite sign. In this study we will focus on paid non agricultural activities mainly because of the increasing importance of these activities as a path out of poverty for women in rural areas. In addition, paid non agricultural activities are not seasonal as agricultural activities; these need to be performed all year round and are usually associated with stricter schedules as well as with higher and more stable wages than agricultural activities. Hence, the income effect and the time effect are greater than for agricultural activities. In other words, paid agricultural and non agricultural activities are substantially different. Then, it would not be appropriate to aggregate paid agricultural and non agricultural activities within the same category.

4. The Data

In order to test the hypotheses presented in Section 2, this study uses a unique longitudinal data set that was collected in Bukidnon province in Northern Mindanao, Philippines, by the International Food Policy Research Institute (IFPRI) and the Research Institute for Mindanao Culture, Xavier University (RIMCU).[4] This data set consists of two waves of data that were collected eighteen years apart. The first wave of data was collected in four rounds which were conducted four months apart between 1984-1985

and initially included 510 households, of which 448 were interviewed in all four rounds. The second wave of data collection, conducted in 2003-2004, was designed to interview all traceable original respondents, a maximum of two split households located in the same village (households of non co-resident children from parents of the original sample), and at least one household formed by children from the sample of original parents but who had migrated outside the village.[5] The second wave of data provides information on 311 households (61% of the original households), 261 split households and 231 migrant households. The second wave of data was collected in the year of 2003 for the original and split households and in the year of 2004 for the migrant households. However, we will not use the information collected on the original parents in 2003 because this is an intergenerational study. Hence, only the households of the children from the original parents are included (split and migrants). After the households without sons or daughters from 0 to 5 years old were dropped, we have a final sample of 382 households and 618 children in 1985 and 294 households with 415 children in 2003[6]. Outliers with z-scores above or below what is humanly feasible were not included.

The descriptive statistics on selected variables used in this study for both periods are presented in Table 1a and 1b. Also, a t-test of difference in means for continuous variables and chi-square for difference in percentages are included for households of mothers who participate in paid non agricultural jobs. For the year of 1985, the statistics presented in Table 1a suggest that this sample is mainly composed by poor households which are mainly dedicated to agricultural activities, own about two hectares of land and are rather large households with an average of 6.7 members living in the same dwelling (includes head of the household, spouse and children only). The households from this sample are also characterized by having deficient sanitation conditions; only 20% have access to sealed water toilet, only 11% of the households have cement floor, 18% use spring unimproved water as their main source of water supply, 3% use rainwater and only 7% use piped water. 93% of the households use wood as the primary source of fuel for cooking and less than 1% use electricity to cook their meals. Only 30% of the households have access to electricity.

Mothers from the sampled households are on average 32 years old and have achieved about 6.3 years of schooling. The household heads (husbands) are on average 36.6 years old and have about 5.7 years of schooling.[7] The t-test shows some significant differences between households of women who participate in paid non agricultural labor and other households. In particular, women who participate in non agricultural activities have on average 1.5 more years of schooling than women who do not. In addition, these households have greater access to durable assets, are more likely to have access to sealed water toilet and electricity. Interestingly, the level of access to farming assets, the amount of land owned and the amount of land cultivated by households with a mother who participates in paid non agricultural activities is not significantly different than for other households. This suggests that even though some mothers provide their labor to paid agricultural activities these households are mainly agricultural. For this first wave of data, information regarding women's health was collected and a nutritional test with grades between 0 and 25 was administered to mothers (unfortunately this information was not collected in 2003). The mothers' average nutritional knowledge score was 13 for the whole sample but there is evidence that mothers who did not participate in the labor market obtained lower scores, suggesting a positive correlation between formal education and nutritional knowledge. In addition, mothers who participate in paid non agricultural activities are more likely to consult a doctor when a child is sick. However, nonagricultural employment does not appear to affect the number of sick days experienced by children in the last fourteen days.

The statistics for the second wave of data (2003-04) show that these second sample of households own on average 0.37 hectares of land which is significantly lower than in 1985, reflecting population pressure, the transfer of land to children, and a shift from agricultural to non agricultural activities, among other issues. Interestingly, households with mothers who participate in paid non

agricultural activities own more land than other households but have about the same amount of land cultivated. There are also some trends suggesting better conditions of life, 70% of the households have cement floors, 70% have electricity, 55% have access to piped water and 80% have a flushing toilet. Households with mothers who participate in paid non agricultural activities are more likely to have access to any of these facilities.

With respect to household characteristics, these are smaller size households with higher educated parents. Specifically, mothers and fathers have on average three more years of education, with an average of 9.5 and 8.5 years of education respectively. These households have on average three less members than the households in 1985. Unlike in 1985, mothers who participate in paid non agricultural activities have higher weight and height than the mothers who participate in agricultural activities suggesting a better health status.

Table 2a and 2b present some descriptive statistics on four main anthropometric measurements (z-scores) of children who are 5 years old or younger, calculated using the WHO (World Health Organization) growth charts and methodology (WHO, 2007; WHO, 2008)[8]. The tables show the means, standard deviations for the z-scores of weight for age, height for age, Body Mass Index and weight for height as well as the t-test of difference in means for boys and girls as well as for children who belong to households where the mother is employed in off-farm jobs. These measures are also divided in three different age cohorts for children who are less than one year, between 1 and 3 years old and between 3 and 5 years old. Interestingly, we cannot reject the null hypothesis that girls and boys have on average the same z-scores. Most of the t-test of difference in means between boys and girls are not significant. In fact, none of the tests is significant for 2003 and the only significant tests in 1985 show more favorable outcomes for girls. This preliminary assessment of means between girls and boys confirms the low levels of gender inequality regarding anthropometric measures. This is also corroborated by the graphs presented in figure 1. This figure shows an almost identical distribution of these indices between boys and girls for both periods. However, the distribution becomes less dispersed for the children in 2003. Suggesting that children in this period, have more similar z-scores than in 1985.

With respect to children who belong to households where the mother works in non agricultural activities, the descriptive statistics suggest that for 1985, children who are less than 5 years old do not have significantly different z-scores than other children. None of the t-test of difference in means by cohorts is significant. This is confirmed by the distributions presented in Figure 2b. However, the descriptive statistics for 2003 show that the measures of weight for age and length for age in children with mothers who work in paid non agricultural activities are higher. This is confirmed by the distributions presented in Figure 2b. This preliminary assessment suggests that the z-scores of children with a mother who allocates her labor to paid off-farm activities have improved overtime.

Some of the statistics related to labor market trends for mothers and fathers are shown in Table 2. The t-test for the difference in means and chi-square test for difference in percentages between males and females are also reported. In particular, we found very different labor patterns between the two periods among parents. In 1985, 27% of the mothers participated in paid non agricultural activities (wage activities or non agricultural owned business) while 34% participated in paid agricultural activities. In 2003, we find that 25% of women participated in paid non agricultural activities and only 14% participated in paid agricultural activities. For the case of fathers, the statistics show that in 1985, 46% of the fathers received non agricultural wages and 71% received agricultural wages while in 2003, 62% of the fathers received non agricultural wages and only 37% received agricultural wages. For both periods, men are more likely to be employed in either activity. Since paid non agricultural activities include individuals who work for a wage or in a family business, we find that in both periods, a greater percentage of mothers work in non agricultural family owned business while most of the head of

households participate in non agricultural wage activities. However, the percentage of women who work in family businesses decreased substantially from 1985 to 2003 while the percentage of fathers who work in family businesses increased. With respect to participation in non agricultural wage activities, fathers increased their participation in this type of activities by about 13% while the percentage of women in non agricultural wage activities increased by only one percentage point. Regarding the occupations performed by gender in 1985, 16% of the women were teachers, 10% were municipal officials, 12% were agents or sales persons, 10% were beauticians, and 2% were housemaids. Men were mainly employed in construction (10%), carpentry (8%) and as bus drivers (5%). In 2003, we find that women are mainly employed as salespersons (16%), teachers (18%), municipal or government officials (12%) , bookkeepers (9%) and housemaids (6%) while men are mainly employed as bus drivers (13%), carpenters (9%), security guards or military (9%) and cab drivers (7%). In general, three conclusions can be drawn from this preliminary analysis of the labor market. First, women's and men's participation in paid agricultural activities has been reduced drastically from 1985 to 2003. Second, there has been a slight decrease in the percentage of women who allocate their labor to non agricultural activities which is mainly caused by a decline in the percentage of women who allocate their labor in non agricultural businesses. This is rather surprising since women's education has increased significantly between 1985 and 2003. Third, there has been an increase in the percentage of individuals in non agricultural wage activities; however, the percentage increase in women's participation is rather small with respect to men.

In general, the households in our sample are poor households who allocate most of their labor to agricultural activities, particularly sugar and corn cultivation. They are large households with very few facilities in their dwellings. On average, mothers from these households are younger and more educated than their male counterparts and seem to be moving away from agricultural employment to obtain jobs as sales persons, house maids, bookkeepers, etc. In addition, despite the higher levels of education, women are seemed to be less likely to participate in paid non agricultural activities than men.

5. The Econometric Approach

To assess the relationship between women's participation in paid non agricultural activities and children's wellbeing we use an Instrumental Variable approach. As mentioned, children's wellbeing can be influenced through two opposite effects: time versus income effect. If the first effect is stronger then we should see a negative significant effect of women's participation in paid non agricultural activities. On the other hand, if the income effect dominates, it is expected that women's participation in paid activities would increase the amount of financial resources available for the household members and particularly benefit children. However, there are two main issues that need to be considered when estimating the effect of women's participation in paid non agricultural activities on children's wellbeing. First, mothers' participation in the labor market might be endogenous. Women with healthier children might be more inclined to join the labor force while women with ill children might be obliged to stay home providing care work. Also, women might be pushed to work in paid activities if the household's expenditures are higher for any particular reason. Second, there might be some unobservable characteristics that might influence both labor participation and children's health. If this is the case, then estimating a regular OLS regression with women's participation as an independent variable might generate biased estimators.

Following Angrist (2000), the econometric methodology to be implemented is an Instrumental Variable (IV) approach where the first stage will estimate the determinants of women's participation in non agricultural activities by using a Linear Probability Model (LPM) and the second stage will estimate the effect of women's participation in paid activities on children's wellbeing. It is argued that this approach is more appropriate than using a Probit in the first stage (See Angrist, 2000). The instruments used to identify women's participation in non agricultural activities are the amount of land owned in

hectares, the percentage of women working in non agricultural wage activities and the distance to the "poblacion" or the center of the community. In particular, it is presumed that having access to large amounts of land might encourage women to allocate their labor in this land and therefore, increase the probability of women participating in unpaid agricultural activities. On the other hand, land constraints might push women to join the labor force but should not have a direct effect on children anthropometric scores other than by affecting the probability of their mothers participating in paid activities once we control for the amount of land cultivated by the household which might have a direct impact on children's health outcomes. The percentage of women working in the barangay or the neighborhood is a proxy for social norms. It is presumed that this variable influences the probability of women participating in paid non agricultural activities positively because a high percentage of women working in non agricultural wage activities might have a positive effect on the probability that women supply their own labor since it suggests that it is socially acceptable for women to participate in this type of activities. On the other hand, a greater percentage of women working in non agricultural wage activities influence the demand for women's labor because employers might feel more comfortable when hiring women since it is socially acceptable for them to employ them. Also, the percentage of women working in the community might be capturing the "horizontal transmission" of bargaining power (Agarwal, 1997). Finally, if the household is located close to the center of the community, where the economic activity is high, women might have more opportunities to be employed outside agriculture. The first stage is estimated as follows:

$$Prob(non\ ag|\ xi) = \alpha + \beta_2 \sum' HH_i + \beta_3 \sum' Y_i + \beta_4 \sum' M_i + \beta_5 \sum' I_i + \beta_6 \sum' G_i + \varepsilon_1 \quad (5)$$

Where,

$Prob(\ non\ ag|\ xi)$ is the probability of the mother choosing a non agricultural job;

α is a constant term;

M_i is a vector of individual specific characteristics of the mother (age, education, weight, height);

HH_i is a vector of household demographic characteristics (number of children between0-5 years old, number of children between 6-10 years old, number of children between 11-17 years old, number of adults above 18 years old);

Y_i is a vector of economic and sanitary characteristics of the household (total land cultivated, durable assets, farming assets[9], having cement floor and having access to toilet);

I_i is a vector that includes the instruments used to identify the participation equation (land ownership, percentage of women participating in non agricultural wage activities and distance to the market);

G_i is a vector of dummy variables for each municipality;

ε_1 is the error term;

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ are the coefficients to be estimated.

Once the first stage is estimated using a LPM, the predicted values are incorporated in the second stage that analyses the relationship between women's participation and children's wellbeing. Equation 6 captures this relationship:

$$W_{ji} = \gamma + \delta L_{wi} + \theta_1 \sum X_{ji} + \theta_2 \sum HH_{ji} + \theta_3 \sum Y_{ji} + \theta_4 \sum M_{ji} + \theta_5 \sum G_{ji} + \varepsilon_2 \qquad (6)$$

Where,

W_{ji} is a vector of anthropometric measures used to proxy for children's wellbeing: weight for height (zwfl), body mass index (zbmi), weight for age (zwei) and height for age (zlen);

γ is a constant term;

L_{wi} is the endogenous regressor, probability that the mother *i* is participating in paid non agricultural activities;

X_{ji} is a vector of the child's specific characteristics (age, gender, whether the child is the youngest or the oldest);

HH_{ji}, Y_{ji}, M_{ji}, G_{ji} are defined in equation (5);

ε_2 is the error term and,

$\theta_1, \theta_2, \theta_3, \theta_3, \theta_4, \theta_5$ are the coefficients to be estimated.

The effect of women's participation in paid non agricultural activities is captured by the θ_1 coefficient. Specifically, the income hypothesis would be corroborated if θ_1 is positive and significant. Then, we could argue that women's participation in paid non agricultural activities has a positive effect on children's wellbeing because of its positive effect on income. On the other hand, if θ_1 is negative and significant we would corroborate the time restriction hypothesis where it is presumed that children's from mothers who work in these type of activities have lower z-scores because of the mothers unavailability of time restricts them from performing house work activities such as child care.

6. Results: *Assessing Children's Wellbeing*

As mentioned, the econometric methodology used to estimate equation (6) is an Instrumental Variable approach. The instruments used are land owned, percentage of women working in the community and distance to the "poblacion" or community center. However, some variations needed to be made when estimating children's wellbeing for each sample in order to assure the exogeneity of the instruments as well as to control for the fact that the social and economic contexts are different for each sample. For the sample of parents (1985), we included the amount of land owned by the household in round 1 which is exogenous to the z-scores of children collected in round 4 or 9 months later. In addition, historically, land markets in developing countries have been thin and incomplete which implies that it is complicated for women to sell the household's land in order to participate in the labor market. In fact, land is transferred from generation to generation[10]. The distance from the household to the community center is also

included as an instrument because this sample was chosen to be mainly agricultural; therefore, distance to the community center is exogenous to participation in the labor market since household location is almost predetermined in this particular context. In fact, parents have a tendency to divide up their land to allow their children to live there with their spouse and their children; people's mobility was not as frequent as in 2003. Then, the probability that women would move to a certain location, closer to the center of the community, in order to participate in paid non agricultural activities is very low. Finally, the percentage of women working in non agricultural wage activities is also included to capture the horizontal transmission of social norms as it was explained in Section 5.

For the 2003 sample, which is made up by households of children from parents sampled in 1985, we included the amount of land purchased before marriage or inherited by women and the percentage of women working in off-farm wage activities as instruments. In fact, because the surveys conducted in 2003 for split households and 2004 for migrant households were collected in only one round it was not possible to use land owned by the household as an instrument during this period since this might be endogenous to women's participation, however, the amount of land purchased before marriage or inherited from their parents is exogenous not only to participation in non agricultural paid activities but also to marriage dynamics. Indeed, land inherited by women is used in other studies as a proxy for women's bargaining power. Hence, using this instrument would also allow us to capture how bargaining power influences women's participation in paid non agricultural activities and therefore, children's wellbeing. A priori, the sign of the coefficient associated with the amount of land owned by women before marriage or inherited is ambiguous because it captures two opposite effects. On one hand, having access to land might increase the probability that women allocate their labor to agricultural activities because it reduces the likelihood of facing land constraints. On the other hand, land owned before marriage or inherited could be capturing women's bargaining power which could affect positively the probability of women supplying their labor in paid activities. Distance to the market was not used as an instrument for this later period because it might be endogenous to women's participation in paid non agricultural activities. As mentioned, the economic and social circumstances are completely different to the ones experienced in 1985. Many of the households surveyed in this second wave migrated to nearby communities which many are primarily urban, suggesting that the intention to look for better opportunities including labor prospects might be one of the primary reasons to migrate. Indeed, 25% of the heads of household mention starting a new job in the destination as the main reason for migrating and 7% mention job seeking which suggests that participation in labor activities influences the actual location where the household members reside. Then, this instrument was excluded from the estimations.

In brief, the instruments used in the 1985 estimations are the amount of land owned in hectares in round 1, the percentage of women working in off-farm wage activities in the neighborhood and the distance to community center. On the other hand, the instruments used in the 2003 estimations are the amount of land purchased before marriage or inherited by women and the percentage of women working in off-farm wage activities in the neighborhood. The chi-square values for the Anderson test of instruments' relevancy and the Hansen J test of validity of the instruments are presented at the bottom of each Table. The estimations pass the test of relevance and identification. The Hansen-J test confirms that the instruments are valid and correctly excluded from the second stage and the Anderson test suggests that the instruments are relevant and the equation is identified. Moreover, the instruments pass the rule of thumb suggested by Stock and Watson where the F-statistic of the first stage must be higher than ten (test of join significance). Then, there is not statistical justification for excluding the use of each set of instruments.

The first stage estimation for the sample of 1985 using LPM demonstrates that the percentage of women participating in agricultural wage activities increases the probability of the mother being involved

in paid non agricultural activities while distance to the center of the community or the "poblacion" decreases the probability that the mother participates in paid non agricultural activities. These results confirm that women who are located closer to the center of the community have more opportunities to obtain a job in this sector, probably because the supply of this type of jobs is higher. Also, since most of the non agricultural jobs are located in the "poblacion", mothers who are closer to this place face lower transaction costs when traveling to their jobs. Hence, it becomes more attractive for them to supply their labor in paid activities. The positive significant effect of the percentage of women who work in paid non agricultural activities in the neighborhood suggests that social norms also influence participation. This corroborates the hypotheses that women who belong to neighborhoods where it is socially acceptable for women to work are more likely to participate in paid non agricultural activities. On the other hand, land owned doesn't influence the decision to participate in these activities. For the sample of 2003, the results show that once again social norms, proxy by the percentage of women working in the neighborhood, influence women's participation in paid non agricultural activities. This result implies that social norms are an intergenerational determinant of women's participation in paid non agricultural activities. In addition, land purchased before marriage or inherited also increases the probability of participation in paid non agricultural activities. This can be explained by the possibility that bargaining power could be influenced positively by the amount of resources brought at marriage and therefore, women are more likely to allocate their labor into paid non agricultural activities. On the other hand, women with larger landholdings can decide to hire workers to cultivate their land, rent their land to others or give it to their husband for cultivation while they allocate their labor endowments in the market. The results can also be capturing a wealth effect.

Other variables such as mother's education and age have a positive effect on women's participation in paid non agricultural activities for both samples. However, demographic characteristics of the household seem to influence women's decision to participate in paid non agricultural activities differently for each year. Specifically, in 1985, having children from 0 to 10 years old increases the probability of participation. Probably, this is because large sized households require more resources to feed their members and therefore, women are pushed to provide their labor to acquire financial resources. On the other hand, having children between 11 to 17 years old decreases the probability of mother's participation probably because these children are considered to have the appropriate age to perform paid and unpaid labor activities, hence they can assist their parents to reduce the financial constraints faced by the household; these children can help to cultivate the land owned by the household or provide their labor in paid activities which might allow mothers to drop out of the labor force. In 2003 the results are the opposite. First, the number of children between 0 to 5 years old reduces the mother's probability of participating in paid non agricultural activities which suggests that women with young children might now prefer to stay home to provide child care. Second, the number of adults in the household increases the probability of women participating in the labor force. This suggests that the presence of other adults in the same dwelling can serve as a possible substitute for mother's time within the household. In other words, other adults might help mothers by performing unpaid activities such as child care or other domestic activities, freeing up the mother who can spend more time in paid activities. The estimations for the first stage are available upon request.

The second stage estimations for the sample of daughters and sons who belong to households with a living father and mother are presented in Table 5a for the 1985 households and Table 5b for the 2003 households. The results for the 1985 sample show that mothers' participation in paid non agricultural activities does not affect children's wellbeing. Most of the coefficients that capture women's participation in non agricultural activities are positive but not significant. Interestingly, the results to the regular OLS estimations presented in columns 5-8 show negative coefficients which suggest that not controlling for the endogeneity between women's participation and children's wellbeing underestimates

the effect of women's participation on paid non agricultural activities. Overall, these results reject the hypothesis that women's participation in the labor force has a negative effect on children's wellbeing due to time constraints that reduce the amount of time available for mothers' to perform housework activities such as childcare. The non statistical significance of the coefficient of mother's participation might be due to the fact that the time and the income effects are canceling each other out. However, there is some evidence implying that income effect might be stronger and therefore, the positive sign of the coefficient. For the year of 2003, the results presented in Table 5b show that for this generation, mother's participation in non agricultural activities has a positive significant effect on weight for length and body mass index suggesting an increase of about 1.4 and 1.2 points respectively. This increase is rather substantial since these anthropometric measurements vary from -5 to 5 with -5 being the lowest level and 5 being the highest level that is humanly possible for a given age and gender. Hence, an increase of 1.4 and 1.2 points represents about 14% and 12% increase[11]. This result suggests that women's participation in paid non agricultural activities has become more important for children's wellbeing in later generations.

With respect to individual specific characteristics, being a boy or an older child has a negative effect on health outcomes in 1985. In fact, being a boy reduces weight for age and length for age about 0.15 to 0.2 points respectively (about 1.3% and 1.6%) while being one year older decreases the weight and length for age by about 0.2 points (about 1.5% per year). This suggests that children's wellbeing decreases with time and is influenced by gender. These gender differences seem to have disappeared by 2003. The male variable is negative but not significant. However, the child's age still negative and significant by about the same amount than in 1985. Other individual characteristics such as whether the child is the younger or the older son or daughter do not have a statistically significant effect. Indeed, being a younger child is only significant when using length for age as a measure of wellbeing in the sample of 1985 and it reduces it by about 3%.

With respect to the demographic characteristics of the household, the results for the sample of original parents show that having young siblings (0 to 10 years old) is associated with lower health outcomes. This might be caused by the fact that large size households might face stronger resource constraints than smaller size households. The negative effect associated with the number of children between 0 and 10 years old disappears for the sample in 2003. This might be caused by the fact that these are smaller size households. On average, these households have 1.5 less children between 0 to 10 years old than the households sampled in 1985. As expected, mother's anthropometric measurements have strong effects on children's health outcomes in 1985 and 2003. This is explained by the following two reasons. First, the parents' anthropometric measurements represent the genetic material that is transferred to children. Hence, children from taller mothers or fathers are more likely to be tall. Second, the anthropometric measures are also a proxy for parents' health and it is expected that children from healthier parents are also healthier. In addition, in rural societies, the productivity of the individuals depends highly on their health status and therefore, healthier parents are more likely to obtain higher income. Hence, children from more productive parents are expected to be healthier because their parents are more likely to obtain the resources needed to provide them with an adequate nutrition. Other mother's characteristics such as mother's education or mother's age do not seem to have a significant effect on children's health outcomes in either sample. Mother's age is only significant when using length for age as the dependent variable for the sample of 1985 but the coefficient is rather small. From the variables that capture the household's economic status in 1985, we find surprisingly that having access to durable assets has a negative effect on children's health outcomes particularly on weight for length and body mass index. In addition, the amount of land cultivated by the household has a negative effect on children's wellbeing which suggests that children who belong to highly agricultural households have lower anthropometric measures than other children. For the sample of 2003 households, we find that farming assets have a negative effect on children's wellbeing which suggests again that children from more

agricultural oriented households have lower health outcomes. On the other hand, having access to durable assets increases children's wellbeing when measured as length per age. Interestingly, the amount of land cultivated by the household influences the child's health outcomes positively which might be the consequence of a more intensive and productive cultivation overtime caused by the adoption of new technologies and fertilizers. Finally, children who belong to migrant households (households made up by children from the parents sampled in 1985 and who migrated outside the municipality) have higher health outcomes than children from other households. In fact, being a child from a migrant household increases weight for age by about 13% and length for age by about 7%. This might be explained by the fact that these migrant households moved to urban, more developed areas with better infrastructure which might have affected children's health positively.

7. Conclusions

This paper tested the income and time hypotheses of women's participation in paid labor activities. Specifically, the contradictory effects on children's wellbeing of women's participation in paid employment were assessed. The results provide evidence rejecting the hypothesis that women's paid employment reduces children's wellbeing, here proxy by anthropometrics measures. For the sample in 1985, women's participation in off-farm activities does not affect children's health outcomes although the coefficient is positive suggesting a stronger income effect. On the contrary, there is some statistical evidence to confirm that women's participation in off-farm paid activities benefits their children in 2003. Specifically, the results using Instrumental Variable approach suggest that mother's participation in off-farm wage activities increases the body mass index and the weight for height by 13%.

Interestingly, there is evidence that inter-generational transmission of wealth might affect children's welfare. Specifically, land purchased before marriage or inherited by women has a positive significant effect on women's participation in off-farm paid activities suggesting that grandparents can affect grandchildren's health outcomes by enhancing the bargaining power of women through inheritance of land. In addition, the estimations also confirm that horizontal transmission of bargaining power or social norms, proxy by the percentage of women working in off-farm wage activities influences the wellbeing of children by increasing the probability of women participation in off-farm activities. These two results are rather interesting because they might confirm the importance of vertical transmission of bargaining power (from parents to daughters) as well as the horizontal transmission (from other women in the community to mothers (Agarwal, 1997)).

In conclusion, women's participation in off-farm paid activities must be considered as an important path out of poverty in rural areas. In particular, studies conducted previously have shown the importance of children's nutrition and health outcomes on education achievements and access to future income generating activities. Specifically, it is well known that in rural areas the productivity of the individuals is positively related to their health and therefore, better health status is associated with higher income. This study provides empirical evidence confirming the hypothesis that women's participation in paid off-farm activities is an important tool that can be used to enhance children's wellbeing through health, therefore, improving their future productivity and their access to higher income. This suggests, that women's participation in off-farm paid activities can serve as a tool to break the circle of inter-generational transmission of poverty.

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Table 1a: Descriptive Statistics (1985)

	Obs	Mean	Non Participants	Participants	t-test
Household Characteristics					
Mother's age	448	32.31	31.83	33.49	2.15***
Father's age	448	36.63	36.12	37.88	2.04***
Mother's education	448	6.25	5.81	7.33	5.49***
Father's education	448	5.7	5.33	6.61	4.07***
Household Size	448	6.7	6.68	6.73	0.18
Land	448				
Land Owned	448	2.06	2.1	2.2	0.51
Land Cultivated	448	2.48	2.47	2.5	0.07
Sanitation Conditions	448				
Toilet (Y/N)	448	20.31	14.06	35.94	27.02***
Cement Floor	448	11	9.06	16.41	4.97***
Electricity	448	29.91	22.19	49.22	31.86***
Assets	448				
Durable Assets	448	-0.34	-0.1	0.24	3.66***
Farming Assets	448	-0.03	-0.01	0.02	0.43
Health Variables	448				
Mother's nutritional scr	448	13.27	12.69	14.71	5.27***
Sick days of child	448	6.01	5.99	6.05	0.09
Consult doctor when ill	448	33.26	27.81	46.88	14.96***
Mother's weight	448	47.21	46.62	48.66	2.78***
Mother's height	448	150.56	150.53	150.63	0.18
Weight for age	618	-1.59	-1.57	-1.63	0.57
Length for age	618	-2.32	-2.32	-2.3	0.22
Weight for length	618	-0.36	-0.34	-0.42	0.85
Body mass index	618	-0.11	-0.08	-0.18	1.03

Absolute value of t-test reported for difference in means and chi-square for difference in percentages.
Source: Budkinon Data Set, Authors' calculations. *significant at 10%; ** significant at 5%; *** significant at 1%

Table 1b: Descriptive Statistics (2003)

	Obs	Mean	Non Partic	Particip	ttest
Household Characteristics					
Mother's age	440	29.96	28.88	32.41	4.68***
Father's age	440	32.69	31.62	35.14	4.32***
Mother's education	440	9.57	8.76	11.41	8.2***
Father's education	440	8.58	7.99	9.92	5.1***
Household Size	440	3.73	3.66	3.92	1.37*
Land					
Land Owned	440	0.37	0.22	0.75	3.39***
Land Cultivated	440	0.77	0.73	0.86	0.76
Sanitation Conditions					
Toilet (Y/N)	440	80	73.53	94.78	26.29***
Cement Floor	440	70.23	62.42	88.06	29.3***
Electricity	440	69.92	62.15	89.86	36.24***
Assets					
Durable Assets	440	-0.09	-0.25	0.25	6.99***
Farming Assets	440	-0.13	-0.2	0.14	5.31***
Health Variables					
Mother's weight	440	52.35	51.43	54.43	3.09***
Mother's height	440	150.47	149.94	151.67	2.34***
Weight for age	440	-0.9	-0.99	-0.54	3.21***
Length for age	440	-1.17	-1.32	-0.59	4.03***
Weight for length	440	-0.33	-0.34	-0.29	0.31
Body mass index	440	-0.24	-0.24	-0.24	0.01

Absolute value of t-test reported for difference in means and chi-square for difference in percentages.
Source: Budkinon Data Set, Authors' calculations. *significant at 10%; ** significant at 5%; *** significant at 1%

Table 2a: Anthropometric Measurements (1985)

Children <5 yrs old											
Variable	Obs	Mean	Std. Dev.	Min	Max	Boys	Girls	ttest	Non pn in non ag	Pn in non-ag	ttest
_zwei	662	-1.59	1.018	-4.36	1.63	-1.66	-1.51	1.79**	-1.57	-1.63	0.57
_zlen	662	-2.32	1.302	-5.78	4.61	-2.39	-2.23	1.59	-2.33	-2.30	0.22
_zbmi	662	-0.11	1.068	-4.49	4.1	-0.13	-0.09	0.42	-0.08	-0.18	1.03
_zwfl	662	-0.37	1.085	-4.64	4.87	-0.43	-0.28	1.73	-0.34	-0.42	0.86
Children <1 yr											
Variable	Obs	Mean	Std. Dev.	Min	Max	Boys	Girls	ttest	Non pn in non ag	Pn in non-ag	ttest
_zwei	74	-0.81	0.120	-3.13	1.28	-0.97	-0.65	1.31	-0.71	-1.24	1.76*
_zlen	74	-1.03	1.489	-3.82	4.61	-1.27	-0.78	1.42	-0.95	-1.37	0.94
_zbmi	74	-0.28	0.153	-3.4	3.08	-0.30	-0.26	0.15	-0.20	-0.62	1.06
_zwfl	74	-0.17	1.565	-4.64	4.87	-0.16	-0.19	0.05	-0.08	-0.57	1.06
Children >=1 and <3yrs											
Variable	Obs	Mean	Std. Dev.	Min	Max	Boys	Girls	ttest	Non pn in non ag	Pn in non-ag	ttest
_zwei	379	-1.66	1.015	-4.36	1.63	-1.72	-1.59	1.30	-1.66	-1.67	0.12
_zlen	379	-2.50	1.212	-5.78	4.45	-2.56	-2.42	1.12	-2.53	-2.41	0.84
_zbmi	379	-0.06	1.117	-4.49	4.10	-0.08	-0.02	0.52	-0.02	-0.13	0.85
_zwfl	379	-0.41	1.068	-4.32	3.78	-0.671	-0.573	1.57	-0.38	-0.45	0.51
Children >=3 and <=5											
Variable	Obs	Mean	Std. Dev.	Min	Max	Boys	Girls	ttest	Non pn in non ag	Pn in non-ag	ttest
_zwei	165	-1.76	0.854	-3.80	0.80	-1.78	-1.74	0.30	-1.81	-1.64	1.09
_zlen	165	-2.50	1.212	-5.38	1.97	-2.56	-2.42	1.12	-2.54	-2.31	1.20
_zbmi	165	-0.16	0.789	-2.62	1.74	-0.16	-0.16	0.02	-0.15	-0.17	0.13
_zwfl	165	-0.36	0.829	-2.84	1.75	-0.43	-0.27	1.22	-0.37	-0.32	0.35

Absolute value of ttest reported for difference in means and chi-square for difference in percentages.
Source: Budkinon Data Set, Authors' calculations.

Table 2b: Anthropometric Measurements (2003)

Children <=5										
Variable	Obs	Mean	Std. Dev.	Min	Max	boys	girls	ttest	Non pn in non ag	Pn in non-ag	ttest
_zwei	415	-0.904	1.182	-4.48	4.04	-0.92	-0.88	0.30	-0.99	-0.54	3.21***
_zlen	415	-1.172	1.538	-5.13	4.28	-1.17	-1.17	0.03	-1.32	-0.59	4.03***
_zbmi	415	-0.242	1.322	-4.82	4.03	-0.25	-0.23	0.19	-0.24	-0.24	0.10
_zwfl	415	-0.332	1.311	-4.65	4.51	-0.36	-0.29	0.56	-0.34	-0.29	0.31
Children <1										
Variable	Obs	Mean	Std. Dev.	Min	Max	Boys	Girls	ttest	Non pn in non ag	Pn in non-ag	ttest
_zwei	90	-0.538	1.211	-4.48	2.47	-0.60	-0.46	0.52	-0.62	-0.15	1.41
_zlen	90	-0.745	1.351	-4.74	2.60	-0.69	-0.80	0.36	-0.89	-0.08	2.23**
_zbmi	90	-0.144	1.535	-4.01	4.03	-0.26	-0.01	0.79	-0.14	-0.13	0.03
_zwfl	90	-0.028	1.678	-4.57	4.51	-0.15	0.11	0.72	-0.02	-0.05	0.07
Children<=1 and <3										
Variable	Obs	Mean	Std. Dev.	Min	Max	Boys	Girls	ttest	Non pn in non ag	Pn in non-ag	ttest
_zwei	154	-0.912	1.289	-3.64	4.04	0.88	-0.94	0.27	-0.98	-0.58	1.49
_zlen	165	-1.309	1.840	-5.13	4.28	-1.28	-1.34	0.22	-1.43	-0.72	1.87*
_zbmi	165	-0.107	1.250	-3.43	2.97	-0.09	-0.11	0.11	-0.09	-0.18	0.34
_zwfl	165	-0.298	1.172	-3.28	2.76	-0.29	-0.30	0.01	-0.30	-0.26	0.15
Children >=3 and <=5										
Variable	Obs	Mean	Std. Dev.	Min	Max	boys	girls	ttest	Non pn in non ag	Pn in non-ag	ttest
_zwei	171	-1.090	1.016	-3.64	2.30	-1.11	-1.05	0.37	-1.22	-0.66	3.19***
_zlen	171	-1.273	1.177	-3.98	1.66	-1.32	-1.21	0.62	-1.45	-0.71	3.65***
_zbmi	171	-0.415	1.196	-4.82	3.28	-0.44	-0.39	0.27	-0.44	-0.32	0.53
_zwfl	171	-0.522	1.178	-4.65	3.14	-0.54	-0.50	0.21	-0.56	-0.39	0.79

Absolute value of ttest reported for difference in means and chi-square for difference in percentages
Source: Budkinon Data Set, Authors' calculations.

Table 3: Labor Market

	1985	t-test difference	2003-04	t-test difference
Mothers who participate in ag activities	34.55	104.46***	13.95	56.85***
Fathers who participate in ag activities	71.47		37.76	
Mothers who participate in non ag activities	26.96	30.87***	24.88	88.31***
Fathers who participate in non ag activities	46.34		62.05	
Mothers who participate in non ag business	19.11	24.80***	12.59	0.01
Fathers who participate in non ag business	8.12		12.24	
Mothers who participate in non ag wage	10.99	89.86***	11.90	115.10***
Fathers who participate in non ag wage	41.10		53.40	

Absolute value of ttest reported for difference in means and chi-square for difference in percentages
Source: Budkinon Data Set, Authors' calculations.

Table 5a: Assessing Children's Well-being (1985)

	(1) IV REG:zwei	(2) IV REG:zlen	(3) IV REG:zwfl	(4) IV REG:zbmi	(5) REG:zwei	(6) REG:zlen	(7) REG:zwfl	(8) REG:zbmi
Endogenous Regressor								
Mother's participation in non ag. Activities	0.157	-0.129	0.157	0.265	-0.084	-0.001	-0.104	-0.105
	(0.676)	(0.788)	(0.708)	(0.536)	(0.387)	(0.992)	(0.350)	(0.361)
Mother's Characteristics								
Mother's education	0.011	0.008	0.016	0.012	0.018	0.004	0.023	0.023
	(0.530)	(0.725)	(0.416)	(0.521)	(0.239)	(0.832)	(0.177)	(0.171)
Mother's age	0.016	0.028	0.003	-0.001	0.019	0.027	0.006	0.003
	(0.103)	(0.016)**	(0.803)	(0.942)	(0.038)**	(0.012)**	(0.581)	(0.739)
Child's Characteristics								
Male	-0.155	-0.240	-0.154	-0.024	-0.167	-0.233	-0.167	-0.042
	(0.047)**	(0.012)**	(0.088)*	(0.797)	(0.027)**	(0.016)**	(0.053)*	(0.631)
Age	-0.185	-0.282	-0.015	0.006	-0.181	-0.284	-0.010	0.012
	(0.000)***	(0.000)***	(0.707)	(0.884)	(0.000)***	(0.000)***	(0.796)	(0.761)
Youngest child (1 if youngest child)	-0.160	-0.295	-0.078	-0.045	-0.147	-0.302	-0.063	-0.025
	(0.145)	(0.043)**	(0.500)	(0.697)	(0.191)	(0.049)**	(0.585)	(0.833)
Eldest child (1 if eldest child)	-0.140	0.101	-0.256	-0.250	-0.118	0.089	-0.232	-0.216
	(0.263)	(0.531)	(0.086)*	(0.101)	(0.345)	(0.581)	(0.115)	(0.148)
Economic Characteristics of the Household								
Toilet (1 if having a toilet)	-0.140	-0.133	-0.048	-0.023	-0.104	-0.153	-0.008	0.033
	(0.224)	(0.334)	(0.713)	(0.866)	(0.306)	(0.203)	(0.942)	(0.776)
Cement (1 if having cement floor)	0.098	-0.057	0.186	0.219	0.056	-0.035	0.139	0.153
	(0.503)	(0.747)	(0.279)	(0.194)	(0.681)	(0.833)	(0.381)	(0.326)
Farming Assets	0.069	0.094	0.032	0.030	0.072	0.092	0.035	0.034
	(0.214)	(0.208)	(0.620)	(0.656)	(0.205)	(0.230)	(0.595)	(0.613)
Durable Assets	-0.092	0.118	-0.154	-0.196	-0.065	0.103	-0.124	-0.154
	(0.206)	(0.332)	(0.055)*	(0.017)**	(0.276)	(0.344)	(0.066)*	(0.027)**
Land Cultivated (Log/hecs)	-0.003	0.026	-0.033	-0.026	-0.006	0.028	-0.037	-0.032
	(0.836)	(0.112)	(0.036)**	(0.091)*	(0.634)	(0.089)*	(0.016)**	(0.038)**

Table 5a: Assessing Children's Well-being (1985) Continued

	(1) IV REG:zwei	(2) IV REG:zlen	(3) IV REG:zwfl	(4) IV REG:zbmi	(5) REG: zwei	(6) REG: zlen	(7) REG: zwfl	(8) REG: zbmi
Demographic Characteristics of the Household								
# children 0-5	-0.087	-0.118	-0.036	-0.025	-0.077	-0.123	-0.025	-0.011
	(0.086)*	(0.087)*	(0.567)	(0.668)	(0.126)	(0.080)*	(0.687)	(0.858)
# children 6-10	-0.117	-0.028	-0.108	-0.103	-0.102	-0.036	-0.091	-0.079
	(0.013)**	(0.666)	(0.051)*	(0.075)*	(0.017)**	(0.515)	(0.059)*	(0.109)
# children 11-17	-0.053	-0.056	-0.019	-0.024	-0.061	-0.052	-0.027	-0.036
	(0.222)	(0.346)	(0.711)	(0.648)	(0.146)	(0.359)	(0.581)	(0.470)
# of adults	-0.098	-0.161	-0.007	0.003	-0.102	-0.159	-0.012	-0.004
	(0.158)	(0.049)**	(0.926)	(0.972)	(0.144)	(0.057)*	(0.880)	(0.963)
Parents' Anthropometric Measurements								
Mother's weight	0.033		0.031	0.029	0.033		0.031	0.028
	(0.000)***		(0.002)***	(0.003)***	(0.000)***		(0.003)***	(0.004)***
Father's weight	0.042		0.033	0.028	0.043		0.034	0.029
	(0.000)***		(0.000)***	(0.000)***	(0.000)***		(0.000)***	(0.000)***
Father's lenght		0.049	-0.036	-0.040		0.049	-0.036	-0.039
		(0.000)***	(0.000)***	(0.000)***		(0.000)***	(0.000)***	(0.000)***
Mother's lenght		0.054	0.008	0.005		0.054	0.008	0.005
		(0.000)***	(0.401)	(0.579)		(0.000)***	(0.437)	(0.633)
Constant	-4.508	-17.432	1.158	2.655	-4.623	-17.356	1.054	2.507
	(0.000)***	(0.000)***	(0.571)	(0.144)	(0.000)***	(0.000)***	(0.615)	(0.176)
Observations	616	618	616	616	616	618	616	616
F-statistic of instruments join significance	10.99	11.07	11.67	11.67				
Anderson Test	41.63	40.62	42.57	42.57				
Hansen J Test	0.085	0.49	0.52	0.61				

Robust p values in parentheses; Community Fixed Effects included; *significant at 10%; ** significant at 5%; *** significant at 1%
Source: Authors' Estimations

Table 5b: Assessing Children's Well-being (2003 and 2004)

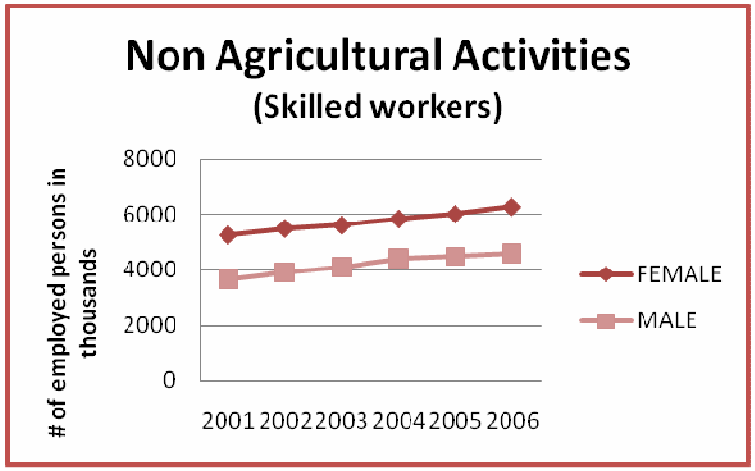
	(1) IV REG:zlen	(2) IV REG:zwei	(3) IV REG:zbmi	(4) IV REG:zwfl	(5) OLS: zlen	(6) OLS: zwei	(7) OLS: zbmi	(8) OLS: zwfl
Endogenous Regressor								
Mother's participation in non ag. Activities	-0.962	0.238	1.408	1.276	0.390	0.353	0.117	0.103
(1 if mother participates)	(0.178)	(0.674)	(0.046)**	(0.058)*	(0.027)**	(0.016)**	(0.526)	(0.567)
Mother's Characteristics								
Mother's education (# of years)	0.002	-0.004	-0.018	-0.012	-0.022	-0.007	0.002	0.006
	(0.960)	(0.842)	(0.533)	(0.684)	(0.427)	(0.770)	(0.954)	(0.810)
Mother's age (# of years)	0.029	0.000	-0.026	-0.021	0.016	-0.001	-0.013	-0.009
	(0.122)	(0.995)	(0.132)	(0.228)	(0.314)	(0.947)	(0.399)	(0.568)
Child's Characteristics								
Male (1 if male)	-0.007	-0.028	0.004	-0.043	0.022	-0.024	-0.029	-0.073
	(0.957)	(0.794)	(0.979)	(0.741)	(0.872)	(0.826)	(0.824)	(0.575)
Age (# of years)	-0.227	-0.196	-0.075	-0.118	-0.223	-0.196	-0.078	-0.120
	(0.000)***	(0.000)***	(0.163)	(0.027)**	(0.000)***	(0.000)***	(0.141)	(0.023)**
Youngest child (1 if youngest child)	-0.077	0.045	0.060	0.087	-0.069	0.047	0.050	0.077
	(0.735)	(0.773)	(0.762)	(0.646)	(0.759)	(0.775)	(0.799)	(0.680)
Eldest child (1 if eldest child)	0.155	0.209	0.071	0.095	0.176	0.212	0.040	0.067
	(0.440)	(0.179)	(0.726)	(0.632)	(0.367)	(0.190)	(0.837)	(0.730)
Economic Characteristics of the Household								
Toilet (1 if having a toilet)	0.233	0.116	-0.021	0.045	0.060	0.100	0.143	0.194
	(0.253)	(0.487)	(0.920)	(0.834)	(0.748)	(0.513)	(0.455)	(0.319)
Cement (1 if having cement floor)	-0.113	-0.233	-0.199	-0.202	-0.205	-0.239	-0.107	-0.117
	(0.498)	(0.058)*	(0.208)	(0.199)	(0.209)	(0.050)*	(0.489)	(0.442)
Farming Assets	-0.040	-0.180	-0.239	-0.235	-0.158	-0.190	-0.128	-0.133
	(0.719)	(0.024)**	(0.032)**	(0.029)**	(0.072)*	(0.003)***	(0.144)	(0.120)
Durable Assets	0.317	0.072	-0.132	-0.118	0.284	0.068	-0.088	-0.078
	(0.004)***	(0.366)	(0.177)	(0.213)	(0.008)***	(0.406)	(0.343)	(0.394)
Land Cultivated (Log/hecs)	0.019	0.045	0.046	0.049	0.021	0.045	0.044	0.048
	(0.342)	(0.001)***	(0.015)**	(0.009)***	(0.288)	(0.002)***	(0.018)**	(0.011)**

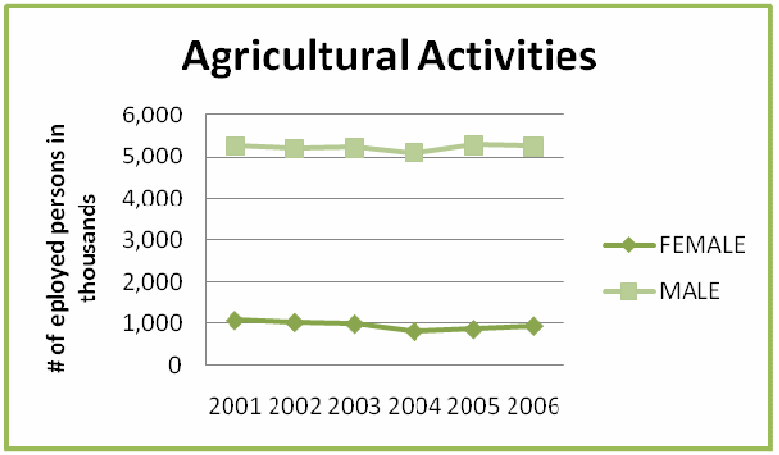
Table 5b: Assessing Children's Well-being (2003 and 2004) Continued

	(1) IV REG:zlen	(2) IV REG:zwei	(3) IV REG:zbmi	(4) IV REG:zwfl	(5) OLS: zlen	(6) OLS: zwei	(7) OLS: zbmi	(8) OLS: zwfl
Demographic Characteristics of the Household								
# children 0-5	-0.198	0.051	0.225	0.231	-0.103	0.060	0.121	0.136
	(0.110)	(0.613)	(0.112)	(0.098)*	(0.366)	(0.516)	(0.304)	(0.259)
# children 6-10	-0.061	0.033	0.076	0.027	-0.008	0.039	0.012	-0.031
	(0.605)	(0.719)	(0.550)	(0.829)	(0.944)	(0.680)	(0.918)	(0.797)
# children 11-17	-0.073	-0.045	-0.011	0.002	-0.065	-0.045	-0.011	0.002
	(0.434)	(0.520)	(0.898)	(0.981)	(0.439)	(0.538)	(0.890)	(0.983)
# of adults	0.070	-0.043	-0.111	-0.116	-0.023	-0.053	-0.008	-0.022
	(0.386)	(0.606)	(0.346)	(0.325)	(0.756)	(0.509)	(0.941)	(0.833)
Migrant household (1 if migrant)	1.352	0.682	-0.258	-0.078	1.349	0.682	-0.253	-0.074
	(0.000)***	(0.000)***	(0.162)	(0.670)	(0.000)***	(0.000)***	(0.157)	(0.680)
Parents' Anthropometric Measurements								
Mother's lenght	0.036		-0.015	-0.011	0.031		-0.008	-0.005
	(0.002)***		(0.114)	(0.216)	(0.006)***		(0.350)	(0.562)
Father's lenght	0.006		-0.002	-0.001	0.003		0.002	0.002
	(0.291)		(0.773)	(0.900)	(0.592)		(0.814)	(0.738)
Mother's weight		0.028	0.028	0.029		0.029	0.022	0.023
		(0.000)***	(0.002)***	(0.001)***		(0.000)***	(0.009)***	(0.005)***
Father's weight		0.017	0.012	0.015		0.017	0.014	0.017
		(0.009)***	(0.067)*	(0.025)**		(0.011)**	(0.050)*	(0.021)**
Community Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-7.625	-2.987	0.913	-0.294	-6.031	-2.969	-0.786	-1.837
	(0.000)***	(0.000)***	(0.640)	(0.878)	(0.003)***	(0.000)***	(0.671)	(0.317)
Observations	415	415	415	415	415	415	415	415
F-statistic of instruments join significance	13.61	10.47	13.45	13.45				
Anderson Test	27.89	23.38	27.48	27.48				
Hansen J Test	0.46	0.99	0.25	0.15				

Robust p values in parentheses; Community Fixed Effects included; *significant at 10%; ** significant at 5%; *** significant at 1%
Source: Authors' Estimations

Graph 1:





Note 1: Agricultural Activities includes farmers, fishermen and forestry workers. Non Agricultural Activities (Skill workers) includes government officials, professionals, technicians, clerks and service workers.
Reference: http://www.phil-lmi.dole.gov.ph/lmi/apec-lmi/d06_001to027_emp_occ_sex.html

Figure 1a: Anthropometric Measurements by Gender (1985)

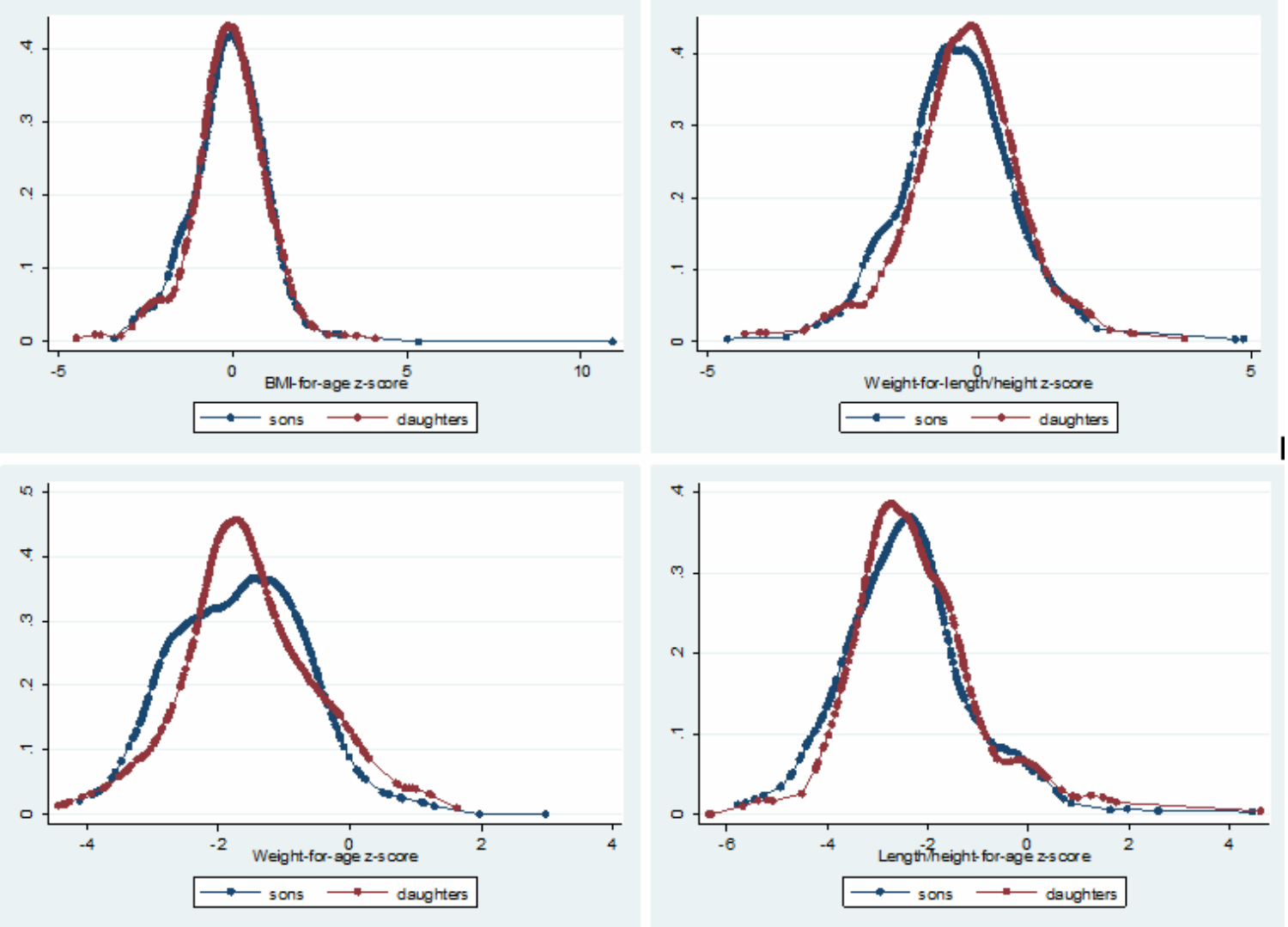


Figure 1b. Anthropometric Measures by Gender (2003)

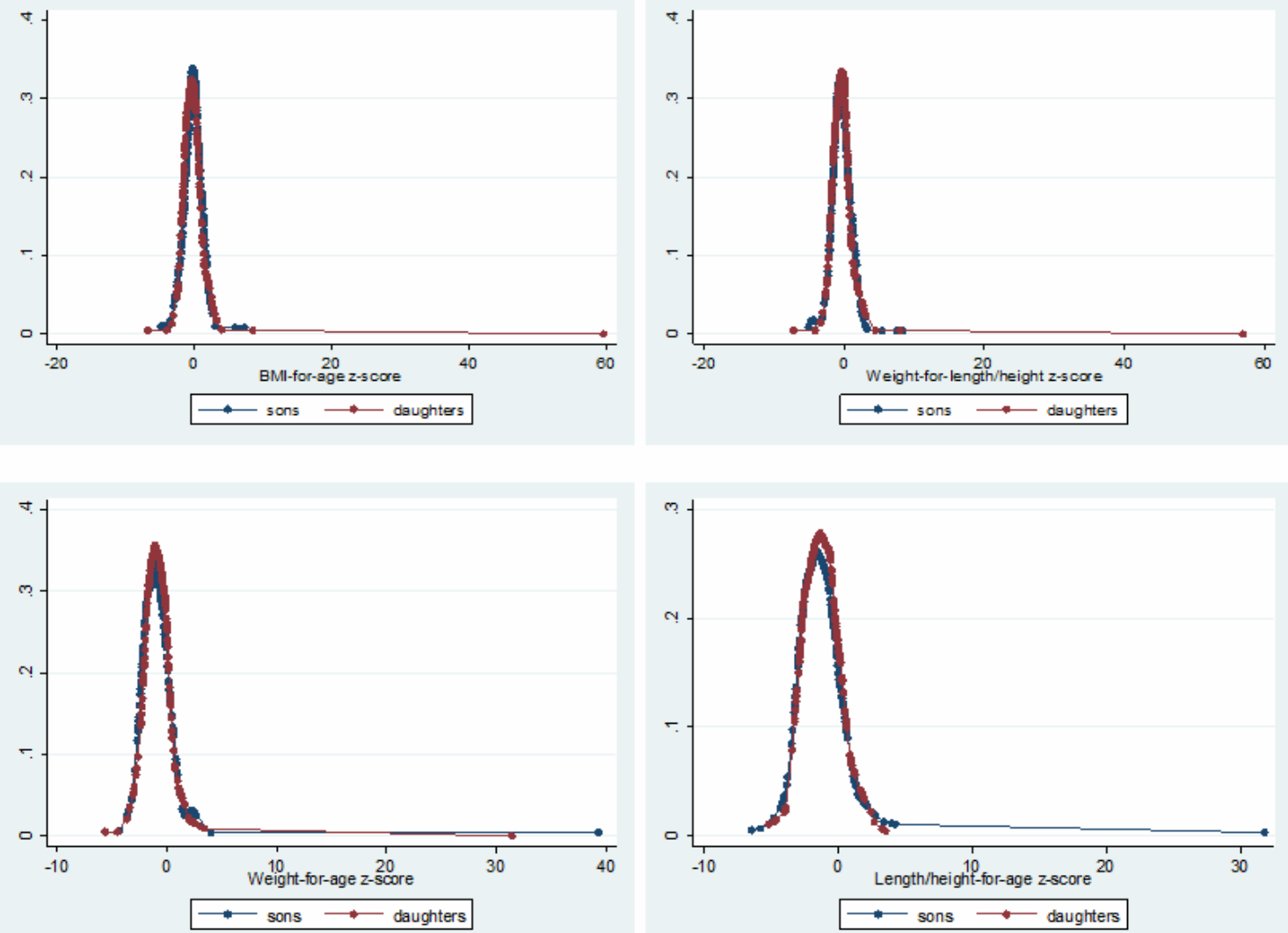


Figure 2a: Anthropometric Measurements (1985), by mothers who participate in non agricultural activities

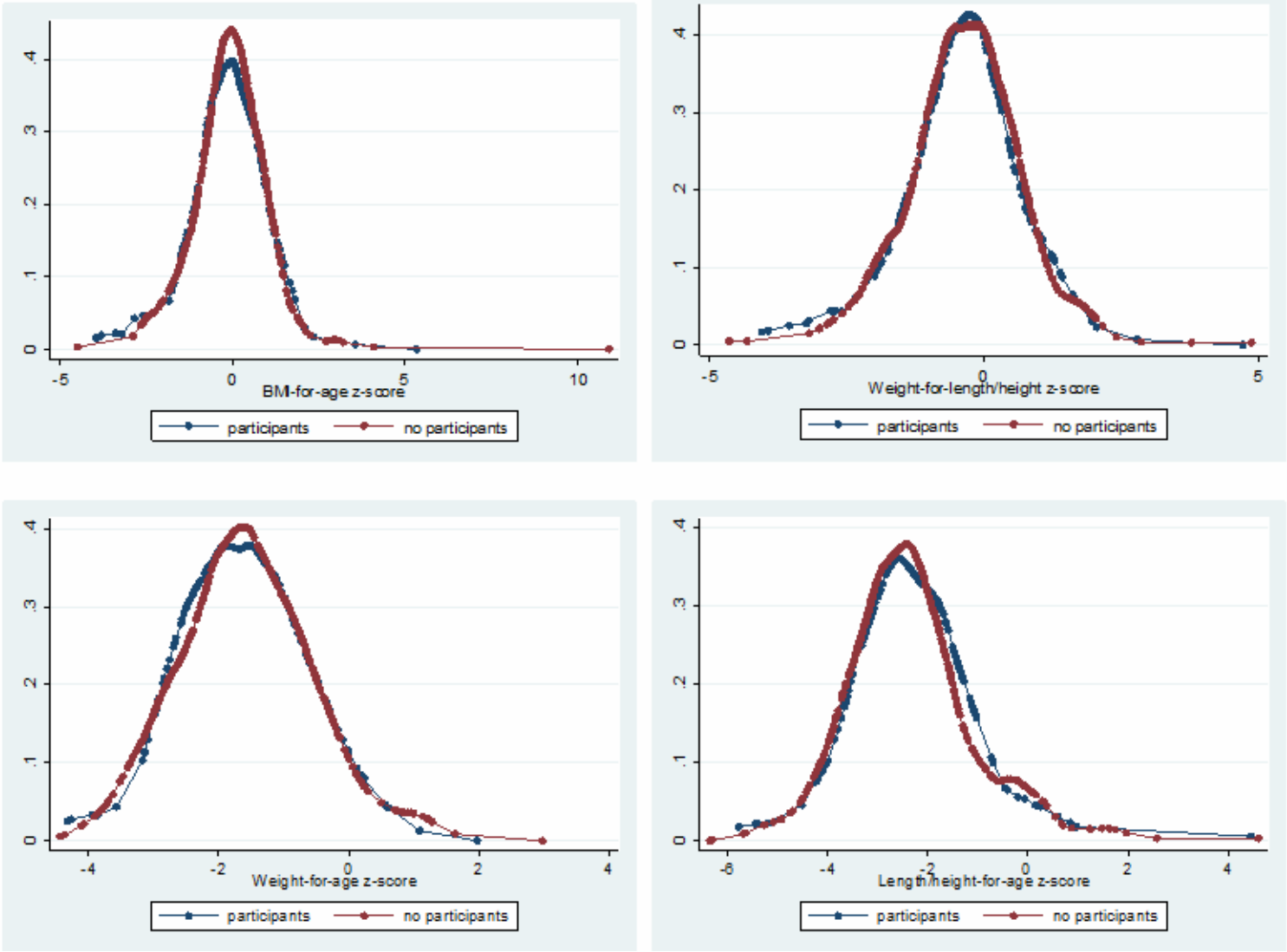
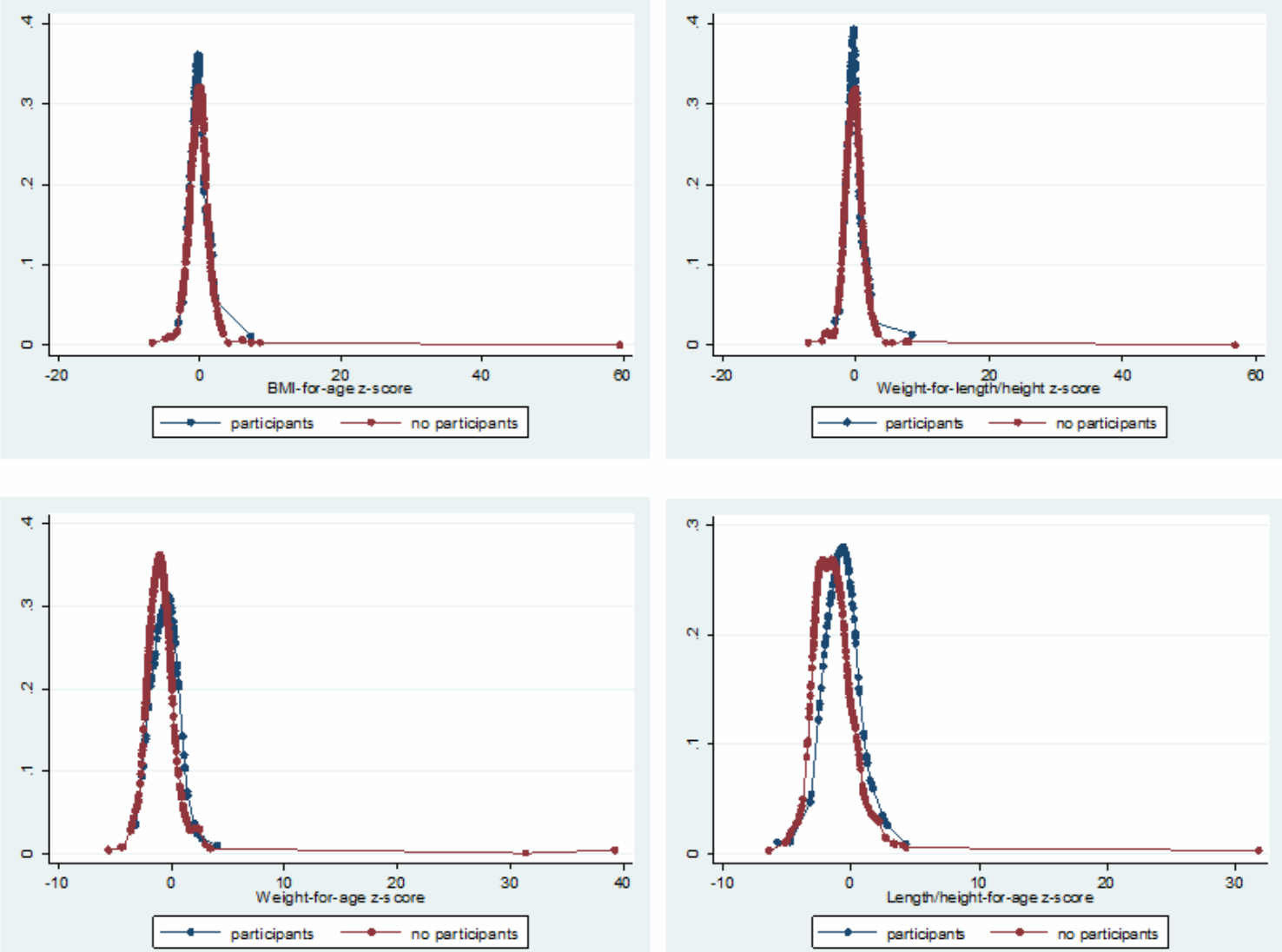


Figure 2b: Anthropometric Measurements (2003), by mothers who participate in non agricultural activities



Notes

[1] National Statistics Office: http://www.census.gov.ph/data/sectordata/2007/lf070126.htm

[2] See http://www.phil-lmi.dole.gov.ph/lmi/philLMI_2.htm and http://www.phil-lmi.dole.gov.ph/lmi/apec-lmi/d06_001to027_emp_occ_sex.html for Philippine labor market information.

[3] Of course, in well-designed household surveys, respondents should be asked to value consumption of own-produced food at market prices, or quantities of food consumed should be collected and later valued by the researcher using market prices. This would reduce the underreporting of food expenditures.

[4] See Quisumbing and McNiven (2005) for a detailed description of the 2003-2004 data and sample design.

[5] Budgetary constraints prevented tracking all migrant children, so the team tracked children who had migrated to other areas in rural Bukidnon, nearby areas of Davao and Cotabato (adjacent provinces), urban centers in Bukidnon, and Cagayan de Oro, the major metropolitan center of Northern Mindanao, located in the province of Misamis Oriental.

[6] In 1985, 29 children (4.4%) did not have feasible z-scores. In 2003, 11 children (2.6%) did not have feasible z-scores

[7] Most household heads in this sample are male, partly because the original sample was required to have a preschooler, so sampled households are likely to be those where the husband and wife are both present.

[8] This z-scores were calculated using the STATA program: WHO Child Growth Standards, STATA igrowup package and macros.

[9] The measures for access to durable and farming assets are calculated by using factor analysis.

[10] Notice that land owned can be cultivated and not cultivated. In addition, land cultivated can be rented in or owned by the household. The last one is included as a control variable in the second stage for both samples because it might influence children's wellbeing directly.

[11] The anthropometric measurements of weight for age and length for age vary between -6 to 5 and -6 to 6 respectively while weight for length and body mass index vary from -5 to 5.