INTERNATIONAL FOOD
POLICY RESEARCH INSTITUTE
sustainable solutions for ending hunger and poverty
Supported by the CGIAR

IFPRI Discussion Paper 01155

January 2012

Why Women Are Progressive in Education?

**Gender Disparities in Human Capital, Labor Markets, and
Family Arrangement in the Philippines**

Futoshi Yamauchi

Marites Tiongco

Poverty, Health, and Nutrition Division

INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

The International Food Policy Research Institute (IFPRI) was established in 1975. IFPRI is one of 15 agricultural research centers that receive principal funding from governments, private foundations, and international and regional organizations, most of which are members of the Consultative Group on International Agricultural Research (CGIAR).

PARTNERS AND CONTRIBUTORS

IFPRI gratefully acknowledges the generous unrestricted funding from Australia, Canada, China, Denmark, Finland, France, Germany, India, Ireland, Italy, Japan, the Netherlands, Norway, the Philippines, South Africa, Sweden, Switzerland, the United Kingdom, the United States, and the World Bank.

AUTHORS

Futoshi Yamauchi, International Food Policy Research Institute

Senior Research Fellow, Poverty, Health, and Nutrition Division

Marites Tiongco, International Food Policy Research Institute

Research Fellow, Markets, Trade, and Institutions Division

Notices

¹ IFPRI Discussion Papers contain preliminary material and research results. They have been peer reviewed, but have not been subject to a formal external review via IFPRI's Publications Review Committee. They are circulated in order to stimulate discussion and critical comment; any opinions expressed are those of the author(s) and do not necessarily reflect the policies or opinions of IFPRI.

² The boundaries and names shown and the designations used on the map(s) herein do not imply official endorsement or acceptance by the International Food Policy Research Institute (IFPRI) or its partners and contributors.

Copyright 2012 International Food Policy Research Institute. All rights reserved. Sections of this material may be reproduced for personal and not-for-profit use without the express written permission of but with acknowledgment to IFPRI. To reproduce the material contained herein for profit or commercial use requires express written permission. To obtain permission, contact the Communications Division at ifpri-copyright@cgiar.org.

Contents

Abstract	v
Acknowledgments	vi
1. Introduction	1
2. Model	4
3. Empirical Framework	6
4. Data	7
5. Empirical Results	13
6. Conclusion	18
References	19

Tables

1.1—College completion: Sex differences	1
1.2—Returns to schooling: Female effect	2
4.1—Sample student distributions	8
4.2—Summary statistics: Siblings	10
4.3—Current provinces	11
5.1—Schooling	13
5.2—Employment	14
5.3—Income	15
5.4—Income sharing	16
5.5—Coresidence	17

Figures

4.1—Map of sample provinces	7
4.2—School district income classes	9
4.3—Asset distribution in 2000: Log of total asset value	9

ABSTRACT

This paper shows mutually consistent evidence to support female advantage in education and disadvantage in labor markets observed in the Philippines. We set up a model that shows multiple Nash equilibria to explain schooling and labor market behaviors for females and males. Our evidence from unique sibling data of schooling and work history and from the Philippine Labor Force Survey support that family arrangement to tighten commitment between daughters and parents keeps a high level of schooling investments in daughters. Because wage penalty to females in labor markets means that education is relatively important as a determinant of their earnings, parental investments in their daughters' education has larger impacts on the income of their daughters than on their sons. Parents expect larger income shared from better-educated adult daughters. In contrast, males stay in an equilibrium, with low levels of schooling investment and income sharing.

Keywords: gender, education, labor market, family, Philippines

ACKNOWLEDGMENTS

We thank Micheal Alba, Agnes Quisumbing, and seminar participants at the University of the Philippines and the Philippine Institute for Development Study for useful comments. We are grateful to the following individuals: Yolanda Quijano, Ishidra Afunggol, Vanessa Arness, Keitaro Aoyagi, Hiroaki Asaoka, Fe Gascon, Violy Cordova, Pamela Castanar, Leonarda Ebron, Aida Papag, Keijiro Otsuka, Judith Borja, Nanette Lee, Lorna Perez, Delia Carba, Abet Bas, Elizabeth King, Juliet Abunyawon, Felisberta Sanchez, Ali Subandoro, Surajit Baruah, Maureen Bugatti, and Joceyln Binumnya; to the following organizations: the Bureau of Elementary Education, the Research and Statistics Division, and the Office of Population Study of the University of San Carlos; and to the following division offices of the Philippine Department of Education: Antique, Cebu, Ifugao, Iloilo, Leyte, Negros Oriental, Nueva Viscaya, and Western Samar, for collaboration, support, and guidance throughout this project.

1. INTRODUCTION

Gender plays important roles in decisionmaking and resource allocations critical to economic development. Mothers' human capital improves child health and education, which determines the well-being of the next generations (for example, Strauss and Thomas 1995; Behrman and Rosenzweig 2002). Empowering women, who tend to allocate more resources into productive means, is an important channel to improve economic performance in the long run (for example, Chattopadhyay and Duflo 2004; Pitt and Khandker 1998). Yet gender inequality remains an urgent policy issue.

In this paper we take up the Philippine case that women are more progressive in education than men but still suffer from lower wages in the labor market (after controlling other factors). Although we observe many countries where both education and labor markets favor males (King and Hill 1998; Blau and Khan 1992), we show that the Philippines represents a unique case in which women receive more schooling than men, but penalty (discrimination) against women still exists in the labor market.¹ Advantage in schooling and disadvantage in earnings coexist for women in the Philippines. In this paper, we argue that the above seemingly contradictory situation can be explained in a consistent way. That is, schooling investment in females has been an optimal response to the labor market discrimination.

Table 1.1 shows the percentages of males and females who completed college education in different cohorts. The data come from the October 2009 round of the Philippine Labor Force Survey.² It is shown that a larger fraction of females graduated from college than did males in all cohorts, and the gap widened recently among younger cohorts. This means that women attain more education in the country; that is, more general human capital is embodied in women than in men.

Table 1.1—College completion: Sex differences

Cohorts:	Females	Males	Difference
	(percent)	(percent)	
20–49	19.26	13.27	5.99
20–29	21.87	13.81	8.06
30–39	18.85	14.12	4.73
40–49	16.44	11.65	4.79

Source: The Philippine Labor Force Survey, October 2009.

Next we show female disadvantage in labor market earnings by estimating the standard wage equations (Table 1.2). In all cohorts, the female effect is significantly negative, which means that women experience a penalty to their wages in the labor market, despite rather offsetting positive effects of more schooling attained among women. However, the female effect is becoming smaller in younger cohorts. Note that if more able women are likely to find jobs (therefore, their wages are observed), we expect upward bias in the above estimates, which implies that the true wage penalty (negative effect) is even larger. In Table 1.2, we did not control occupation and industry, so the female effect contains the effect of females' endogenous choices of occupations and industries within a region. On average, the female effect

¹ Although wages are lower for females (after controlling schooling and age), returns to schooling are higher for females (Yamauchi and Liu 2011). Our study argues that more schooling in females is the optimal action to overcome their disadvantaged position in the labor market. See Orbeta (2002) for labor force participation and education in the Philippines.

² There are four rounds of Labor Force Survey each year: in January, April, July, and October. We are using only the October round for this study to allow for new graduates in labor markets.

is about 40 percent of the college premium (that is, income gain from completing college relative to high school).³

Table 1.2—Returns to schooling: Female effect

Dependent: Log of daily earnings	Cohort			
	20–49	20–29	30–39	40–49
Female	-0.283 (19.04)	-0.211 (14.09)	-0.303 (21.71)	-0.385 (17.46)
Some elementary	0.192 (4.96)	0.212 (3.61)	0.091 (1.20)	0.236 (3.52)
Elementary completed	0.245 (6.41)	0.221 (3.19)	0.162 (2.17)	0.326 (5.18)
Some high school	0.344 (9.11)	0.286 (3.88)	0.277 (3.58)	0.426 (6.15)
High school completed	0.491 (12.98)	0.443 (6.07)	0.392 (5.29)	0.574 (8.65)
Some college	0.750 (23.87)	0.707 (9.36)	0.650 (9.28)	0.807 (11.74)
College completed	1.308 (24.42)	1.173 (15.94)	1.208 (13.41)	1.550 (19.82)
Postgraduate	1.779 (20.22)	1.315 (10.46)	1.803 (16.92)	2.031 (16.36)
Age	0.040 (11.49)	0.171 (4.47)	-0.041 (1.34)	-0.027 (0.40)
Age squared	-0.0004 (9.67)	-0.0030 (3.97)	0.0008 (1.78)	0.0003 (0.45)
Region dummies	Yes	Yes	Yes	Yes
Number of observations	25,527	10,229	8,366	6,932
R-squared	0.4848	0.4700	0.4882	0.5188

Source: The Philippine Labor Force Survey, October 2009.

Note: Numbers in parentheses are absolute t values, based on robust standard errors using region clusters.

Discrimination against women implies that education plays a more important role in determining wages among women than among men. An additional year of schooling is more important among women because they experience unconditional penalty, unrelated to their human capital, in the labor market.⁴ Therefore, the labor market discrimination can motivate women to attain higher levels of education to have comparable earnings with men. Our intuition relies on the above observation.

Moreover, it is possible that returns to children's schooling for parents can differ from those for children if children share their earnings with their parents. For example, parents and children co-reside and share resources, and parents often receive some remittances from children who live away. Through

³ Interestingly, we observe that the female effect is smaller among younger cohorts than among older cohorts. The trend is similar in many industrialized countries. College premiums are smaller in young cohorts. However, it is not straightforward to infer trends from the cross-cohort comparison. See Sakellariou (2004), Schady (2003), Lanzona (1998), and Yamauchi (2005) for existing estimates of returns to schooling in the Philippines. Sakellariou (2004) decomposed gender wage gaps. Both Schady (2003) and Yamauchi (2005) report convexity of the return structure. Yamauchi (2005) shows that higher returns to private school education are spurious in the sense that high-ability students are screened into private schools. Lanzona (1998) points out the importance of migration selectivity. Using the sample of former students (whose siblings are used in the current study), Yamauchi (2011) showed that the youth in the Philippines often change jobs at the early stage of their labor market experience, and that education increases the frequency of job changes, which significantly increases their wage growth.

⁴ Marginal utility from wage gain due to an additional year of schooling is larger if the wage level is lower.

these family arrangements, a portion of the returns to schooling investments is accrued by parents. These arrangements can take the form of income sharing, insurance, support, and inheritance. In exchange for support from parents who invest in child schooling, children have an incentive to share schooling returns with their parents. Alternately, parents have an incentive to invest in their children if the children share returns with them. Empirical results of this paper support the above hypothesis for women.

The institution of family is critical to determining child schooling. Filipino kinship patterns are generally categorized as belonging to a bilateral family system in which sons and daughters play equal roles in supporting their parents (Ofstedal, Knodel, and Chayovan 1999; Natividad and Cruz 1997; Agree et al. 2002; Domingo and Asis 1995). In some cases, daughters play more important roles than sons. This practice is quite common in Southeast Asia. Such observations of the intergenerational support system are consistent with tighter commitments between parents and daughters, which enhance parental investments in daughters, who are more likely to help parents.

Other compelling hypotheses were proposed in the studies that explain female advantage in education in the context of the Philippines. Estudillo, Quisumbing, and Otsuka (2001a, 2001b) posit a hypothesis that parents equally care about the expected lifetime incomes of their sons and daughters.⁵ In the agrarian setting, sons are more likely to inherit farmland, but daughters do not. To compensate for this gap in inheritance, parents rather invest in daughters' schooling.⁶ In the bilateral family system, we can also explain the above egalitarian behavior as the parents' optimal action because diversification of investments in children is the best strategy, given that they do not know who principally will take care of them (that is, sons and daughters are equally likely or daughters are more likely to provide intergenerational support to them). In their hypothesis, the intergenerational support system and labor market issues are not incorporated.

In our hypothesis, however, parents invest in children to maximize their own utilities in a game-theoretic setting. Parents can receive some income from their children, which constitutes returns to schooling for parents. Interestingly, Nash equilibria in this setting support two different situations: (1) high levels of investment and income sharing and (2) low levels of investment and income sharing. In the Philippines, the former case characterizes the situation for females, while the latter does for males.

Our empirical analysis uses unique sibling data collected in a recent survey. In 2010, the survey was conducted in eight provinces covering 3,481 households. For all siblings of our sample individuals, we gathered information on schooling, work histories, and family arrangement, including income sharing and remittances. This is an ideal dataset for testing our hypothesis because we can wipe out unobserved household-specific components by using within-sibling variations. In addition, because birth control is not usually practiced in a poor rural environment, the gender composition of children is regarded as random. We estimate and compare female effects in schooling, earnings, and income-sharing equations.

The paper is organized as follows: The next section lays out a simple model in which the multiplicity of Nash equilibria is generated to explain the stylized facts. Given the labor market imbalance, females tend to be in the equilibrium with higher levels of schooling investment and income sharing. Sections 3 and 4 describe our empirical framework and data, respectively.

Section 5 discusses empirical findings in detail. Our evidence shows that, as Tables 1.1 and 1.2 confirmed, females are likely to attain more education but experience penalty in labor market earnings. By receiving more education, females can have earnings that are more comparable to those of males. Second, females are likely to share more of their income with their parents. In this sense, for parents, more returns are accrued from investing in female schooling. Section 6 concludes.

⁵ Quisumbing, Estudillo, and Otsuka (2003) collect evidence on bequest behavior from several countries.

⁶ One way to test their hypothesis is to use a special situation that parents pass their land to the eldest son. In this setting, parents are expected to invest more schooling in the other sons as well as daughters. Another characteristic of their study is that their sample households are rice farmers in two clustered locations in Luzon and Western Visayas. Our sample was drawn from mountainous areas, in many cases, where farming prospect is limited.

2. MODEL

In this section we describe our basic insights using a simple model. The model has three key elements: schooling investment, income share, and labor market returns to schooling. The child is assumed to decide how much income to share with his or her parents. The parents decide schooling investment in the child. They decide schooling and income share simultaneously (that is, intertemporal aspects of the above decisions are assumed in the model). We construct Nash equilibria to characterize the observed empirical regularities in the labor market returns to schooling, schooling investments, and income sharing between parents and children.

The child decides income sharing, given the parents' decision on schooling investment:

$$\max_{\phi} (1 - \phi)(\beta s + \alpha) + A(\phi),$$

where $\beta s + \alpha$ is earnings in labor markets, s is schooling investment ($s \in \{s^H, s^L\}$ where s^H is a high level of schooling and s^L is a low level of schooling; $s^H > s^L$), ϕ is the share of income with parents, and $A(\phi)$ is support from parents as a function of the income share. $A(\phi)$ can take various forms such as coresidence, emergency support, childcare, and inheritance. Note that α is a discrimination measure in the labor.

Parents have the following payoff function:

$$\max_{s \in \{s^H, s^L\}} \phi(\beta s + \alpha) - ps + Y - A(\phi),$$

where p is unit price for schooling investment and Y is parents' income. A certain proportion ϕ of the child's labor earnings is shared with parents. Given ϕ , parents decide s .

We assume that the support function $A(\phi)$ is

$$\begin{aligned} A(\phi) &= \bar{A} \text{ if } \phi \geq \tilde{\phi} \\ &= 0 \text{ if } 0 \leq \phi < \tilde{\phi}. \end{aligned}$$

The value of AA jumps from zero to $\bar{A}$ at $\phi = \tilde{\phi}$. The child will choose either $\phi = 0$ or $\phi = \tilde{\phi}$ since, in either case, the child does not have an incentive to marginally increase the share. If the gain is large, the child wants to share $\tilde{\phi}$ of his or her labor income; otherwise, the child does not share at all.

The parents' decision is straightforward since they cannot influence the support to the child. Given ϕ , marginal returns and costs determine the optimal investments in schooling. If parents' share from schooling returns is greater (smaller) than the unit cost of schooling, parents invest a large (small) amount into children. That is, $\phi\beta - p > (<)0 \Rightarrow s^* = s^H (s^L)$. Therefore, the larger the share from the child and labor market returns, and the smaller the unit price, the more the parents will invest in child schooling.

On the other hand, the child's decision depends on labor market returns (β) and discrimination (α), and the support function ($\bar{A}$, $\tilde{\phi}$). As conjectured, the child can choose either $\phi = 0$ or $\phi = \tilde{\phi}$. If children receive more support from their parents than what they share with their parents, then they are willing to commit to sharing. That is, $\frac{\bar{A}}{\tilde{\phi}} > (<)\beta s + \alpha \Rightarrow \phi^* = \tilde{\phi} (0)$. Therefore, labor market earnings (as a function of schooling) and the average returns to income sharing determine the child's decision on income sharing.

We can construct two Nash equilibria: low investment and high investment. The evolution of these different equilibria depends on discrimination in the labor market (α). First, if income is guaranteed regardless of human capital, the relative importance of schooling investments is small to parents (given the share parameter). This dominates the parental decision on schooling investments. Under this

condition, the child has a small incentive to share income with parents: $(s^L, 0)$. Given $\phi = 0$, choosing s^L is optimal (since $-p < 0$). If $s = s^L$, choosing $\phi^* = 0$ is optimal if

$$\alpha > \bar{\alpha} \equiv \frac{\bar{A}}{\bar{\phi}} - \beta s^L.$$

Second, if wages for low-skilled labor are small (small α), it is important to have human capital for earnings in the labor market. In other words, schooling investment is relatively important in this setting, and the parental decision affects the child's income. The child can also control the incentive to parents by holding a high ϕ . When α is sufficiently small, the child chooses $\tilde{\phi} : (s^H, \tilde{\phi})$. Given $\phi^* = \tilde{\phi}$, choosing s^H is optimal if $\tilde{\phi}\beta - p > 0$. If $s = s^H$, choosing $\phi^* = \tilde{\phi}$ is optimal if

$$\alpha < \underline{\alpha} \equiv \frac{\bar{A}}{\bar{\phi}} - \beta s^H.$$

In the above, we establish properties to explain key empirical regularities: (1) labor markets penalize females relative to males ($\alpha_{male} > \alpha_{female}$), (2) females reside and share more income with parents, and (3) females receive more schooling investments than males. Our interpretation of these observations critically depends on labor market discrimination ($\alpha_{male} > \alpha_{female}$). If this penalty (regardless of schooling) is sufficiently large for females, females reach the high investment equilibrium $(s^H, \tilde{\phi})$, while males stay at the low investment equilibrium $(s^L, 0)$, generating multiple equilibria.

3. EMPIRICAL FRAMEWORK

In this section we discuss our empirical approach. We use data from a recently conducted household survey in eight provinces in the Philippines. The survey captured sibling data that recorded schooling and work history of all biological siblings of the students who were tracked in our survey (see details described in Section 4). Sibling information was collected from their mothers or guardians. The sample size of the siblings is 19,787. In the analysis, we aim to identify gender gap in educational attainment, income, and income-sharing behavior. Educational attainment is measured by years of schooling completed and college entry.

Determining sex at or before birth is random in our empirical setting. Since most of our sample households are Catholic Christian, and the Catholic Church actively discourages modern forms of contraception, parents hesitate to use modern contraceptives. Moreover, our sample households are located in rural villages, where access to reproductive health information and services is poor, and hence a relatively large proportion of adolescent women rely on traditional birth control methods (such as rhythm) that are presumably less effective.⁷ Sex selection using selective abortion, even if it is available as a choice, is widely discouraged and punishable by law (abortions are illegal). Hence, the number of children is unlikely to be strictly controlled, and the sex identification of a child can be treated as random. However, the decision to bear an additional child depends on the family's sex composition and sibling size.

We estimate four equations determining educational attainment (years of schooling completed or college entry), income (log of monthly earnings), income sharing with parents or the original households (the proportion of earnings shared), and coresidence:

$$y_{ij}^k = \alpha + \beta^k female_{ij} + x_{ij}\delta + \gamma_1^k age_{ij} + \gamma_2^k age_{ij}^2 + \xi_{ij}^k + \mu_j^k + \varepsilon_{ij}^k, \quad (1)$$

where i and j denote sibling and household, respectively; y_{ij}^k is an outcome variable: educational attainment ($k = 1$), income ($k = 2$), income sharing ($k = 3$), or coresidence ($k = 4$); x_{ij} is a vector of other characteristics (such as schooling in the income equation); ξ_i^k is the sibling (individual) fixed effect; μ_j^k is the household fixed effect; and ε_{ij}^k is an error term.

To estimate $(\beta^k, \gamma_1^k, \gamma_2^k)$ $k = 1, 2, 3, 4$, we take deviations from the household-specific mean in all variables to wipe out ξ_i^k ,

$$y_{ij}^k - \bar{y}_j^k = \alpha + \beta^k \left(female_{ij} - \frac{\sum_i female_{ij}}{N_j} \right) + (x_{ij} - \bar{x}_j)\delta + \gamma_1^k (age_{ij} - \overline{age_j}) + \gamma_2^k (age_{ij}^2 - \overline{age_j^2}) + (\xi_{ij}^k - \bar{\xi}_j^k) + (\varepsilon_{ij}^k - \bar{\varepsilon}_j^k). \quad (2)$$

Gender $female_{ij}$ is not correlated with unobserved individual endowments $(\xi_{ij}^k - \bar{\xi}_j^k)$ as well as $(\varepsilon_{ij}^k - \bar{\varepsilon}_j^k)$, but it is possible that the proportion of females in siblings could be when N_j is relatively large. If the endogeneity of birth spacing and sibling size is unlikely, both the numerator and the denominator of $\frac{\sum_i female_{ij}}{N_j}$ are not correlated with the unobserved error components.

⁷ National data from the Department of Health suggest that contraceptive prevalence rate is low at 14.8 percent (2006 Demographic and Health Survey, National Statistical Office, the Philippines).

4. DATA

In this section we describe the data we use in our analysis. The data come from the survey conducted in eight education divisions in the Philippines from July 2010 through April 2011. The survey aimed to gather household and individual data to assess the impact of a large school-based intervention called Third Elementary Education Project (TEEP), implemented in 23 poor education divisions in the period of 2001 to 2006.⁸ For this objective, the survey includes 4 intervention and 4 nonintervention divisions. An intervention division is paired with an adjacent nonintervention division in the same area so that the pair shares similar socioeconomic conditions. In the above method, our sample is demarked into four areas: (1) Ifugao and Nueva Vizcaya, (2) Antique and Iloilo, (3) Negros Oriental and Cebu, and (4) Leyte and Western Samar. Figure 4.1 maps all 23 intervention divisions in the Philippines.

Figure 4.1—Map of sample provinces

Source: Authors' calculation.

In each division, first, relatively poor municipalities (school districts) were chosen. Municipalities whose 2000 Census income classes ranked 3 to 5 (the highest income rank is 1 and the poorest is 6) were chosen from the adjacent area (near the division border) of an intervention and a nonintervention division (see Philippines—Department of Finance 2001). In one intervention division, all of our school districts

⁸ These divisions are what the Social Reform Agenda identified as most socially depressed areas (Ramos 1995; Philippine Congress 1998).

are taken from income classes 4 and 5, which created imbalance with the paired nonintervention divisions, where some of the school districts are ranked 3.

Second, schools are randomly sampled from the list of elementary schools in school year (SY) 2002/03 satisfying three criteria: (1) total enrollment being larger than 120, (2) monograde (at least one class for each grade), and (3) complete (grades 1 to 6). That is, schools had, on average, at least 20 students in each grade. In an intervention division, 15 schools were randomly sampled from the basic list, satisfying the above-mentioned conditions. Similarly, 10 schools were randomly sampled in a nonintervention division. In Antique (an intervention division), however, we added two more schools since we found that two schools were severely damaged in a typhoon in 2006. Therefore, we have 17 schools in Antique.

Third, we collected lists of students enrolled in grade 6 in SY 1999/2000, SY 2004/05, and SY 2005/06. SY 1999/2000 is a preintervention cohort, while both SYs 2004/05 and 2005/06 are cohorts that were exposed to a school intervention. If schools did not keep student lists, we had to replace them with schools that were randomly resampled from the basic school lists. The process required a few months in each division.

We randomly sampled 15 students from SY 1999/2000 grade 6, and 20 students altogether from SYs 2004/05 and 2005/06 grade 6. The sampling was done regardless of sex and age. Note that since the listed students are those who were enrolled at that time, some of our sample students might not have graduated from their elementary schools.

Data collection has two components: household survey and student tracking survey. In the household survey, we gathered information on household rosters in 2010 and 2000, schooling and work histories of biological siblings (of our sample students), household income (2010) and asset holding (2010 and 2000), parents' participation in school governance for each sibling, and public service and infrastructure access (2010 and 2000). The survey was supplemented by *barangay* (community) leader, Parents Teachers and Community Association head, and school surveys.

In the student tracking survey, we tracked our sample students to collect information on their schooling and work histories in detail as well as marriage, anthropometry, and illness. Either face-to-face or phone interview was adopted. Tracking activities involved two stages: first, the teams tracked students who reside within their original divisions. This was done immediately after the household survey. Second, in out-of-division tracking, the teams attempted to schedule face-to-face interviews with students who reside in National Capital Region (NCR; Manila), Baguio, and Cebu City. For students who reside in other provinces, we used mostly phone interviews. However, the teams tried to visit students who reside near or within the province of Laguna and between northern Luzon and Manila to conduct face-to-face interviews.

Table 4.1 shows the composition of our sample households and students. We have the total of 3,481 students in our sample. TEEP divisions and cohorts (SYs 2004/05 and 2005/06) are oversampled. Among TEEP divisions, Ifugao shows smaller numbers in each grade 6 sample year, due to the decision to drop some unreliable and unverified information in the second visit in the division (implemented November 2010 to April 2011).

Table 4.1—Sample student distributions

Grade 6 school year	Antique	Cebu	Ifugao	Iloilo	Leyte	Negros Oriental	Nueva Viscaya	Western Samar
1999–2000	244	144	188	143	217	230	139	148
2004–2005	159	107	137	97	160	163	92	98
2005–2006	177	95	145	111	139	148	101	99
Total	580	346	470	351	516	541	332	345

Source: TEEP Household and Tracking Surveys.

Figure 4.2 shows the frequency of school division income classes (Census 2000). Our school districts are in income classes 3 to 5. Therefore, our sample is concentrated in relatively poor municipalities.

Figure 4.2—School district income classes

Source: Census 2000, Republic of the Philippines.

To characterize poverty levels of our sample households, we construct asset values in 2000 (evaluated at the 2010 price; Figure 4.3). The household survey collected information on asset holdings and values in 2010. For 2000, we captured only the holdings. Using the unit values in 2010 and asset holdings in 2000, it is possible to estimate the values in 2000. If a household did not own an asset in 2010 but owned it in 2000, we used the average unit value in the same *barangay* (community) to estimate the asset value in 2000.

Figure 4.3—Asset distribution in 2000: Log of total asset value

Source: TEEP Household Survey.

Sibling Data

The sibling section of the household module aims to capture schooling and work histories of the sample students' siblings. With respect to schooling, we have information starting from preschool investments to postgraduate level. To capture preschool investments, we know types of preschool institutions and the number of months attended. In the schooling stage, we identify school (name and school ID), school type (public or private), age started, graduated or not, age graduated, and whether still in school. At the college level, we also captured course of major and degree attained.

In the work histories, the survey collected information on the first job and the current job. In both cases, job description, occupation type, employment type, and industry are identified. For the current job, we asked about monthly earnings. For the income-sharing arrangement, we asked how much is shared with parents (most likely the respondents) when siblings co-reside with them, and how much is remitted if siblings do not live with parents.

In the current analysis, we use years of schooling completed, monthly earnings, and incomes shared or remitted. One advantage of using sibling data (within-sibling variations) is to wipe out unobserved household-level fixed error components.

Table 4.2 shows summary statistics of important variables. Our sample consists of relatively young adults and adolescents. In most of our analyses, we use siblings of ages 15 to 30. Table 4.3 tabulates provinces where they are currently living. In the table, we omitted siblings who live in foreign countries. It is straightforward to confirm that our sample individuals (siblings) are residing in various locations different from their original eight provinces.

One pitfall of the sibling data is that most of the information was collected from their parents or guardians, so we expect relatively large measurement errors in job-related information on siblings. However, we expect the schooling data to contain smaller measurement errors.

Table 4.2—Summary statistics: Siblings

Variables	Number of observations	Mean	Standard deviation	Minimum	Maximum
Sibling variables					
Age	19,766	20.18	8.51	0	54
Female	19,787	0.49	0.50	0	1
Years of schooling	18,994	8.02	3.58	0	19
Birth order	19,766	3.95	2.49	1	15
Household variables					
Mother (guardian) years of schooling	3,481	7.15	3.40	0	19
Log total household asset (2000)	3,428	11.47	1.49	3.91	22.33
Sibling size	3,481	5.68	2.64	1	15

Source: TEEP Household Survey.

Table 4.3—Current provinces

Province	Frequency	Percent	Cumulative
1	6	0.03	0.03
2	5	0.03	0.06
3	4	0.02	0.08
4	14	0.07	0.15
5	8	0.04	0.19
6	2,333	12.29	12.48
7	3	0.02	12.50
8	11	0.06	12.55
9	1	0.01	12.56
10	61	0.32	12.88
11	248	1.31	14.19
12	13	0.07	14.26
13	13	0.07	14.32
14	105	0.55	14.88
15	11	0.06	14.93
16	12	0.06	15.00
17	4	0.02	15.02
19	9	0.05	15.07
20	3	0.02	15.08
21	201	1.06	16.14
22	2,103	11.07	27.22
23	5	0.03	27.24
24	17	0.09	27.33
26	13	0.07	27.40
27	2,240	11.80	39.20
28	2	0.01	39.21
29	4	0.02	39.23
30	1,725	9.08	48.31
31	40	0.21	48.52
32	3	0.02	48.54
33	12	0.06	48.60
34	111	0.58	49.19
35	2	0.01	49.20
37	2,185	11.51	60.70
38	2	0.01	60.71
39	536	2.82	63.54
40	2	0.01	63.55
41	3	0.02	63.56
42	10	0.05	63.62
43	20	0.11	63.72
44	4	0.02	63.74
45	167	0.88	64.62
46	2,211	11.64	76.27
47	7	0.04	76.30
48	8	0.04	76.34

Table 4.3—Continued

Province	Frequency	Percent	Cumulative
49	28	0.15	76.49
50	1,332	7.01	83.51
51	3	0.02	83.52
52	6	0.03	83.55
53	26	0.14	83.69
54	79	0.42	84.11
55	43	0.23	84.33
56	18	0.09	84.43
57	45	0.24	84.66
58	125	0.66	85.32
59	5	0.03	85.35
60	1,495	7.87	93.22
61	2	0.01	93.23
62	4	0.02	93.25
63	11	0.06	93.31
64	8	0.04	93.35
65	10	0.05	93.41
66	2	0.01	93.42
67	8	0.04	93.46
68	6	0.03	93.49
69	11	0.06	93.55
70	2	0.01	93.56
71	15	0.08	93.64
72	7	0.04	93.68
73	7	0.04	93.71
74	579	3.05	96.76
75	196	1.03	97.79
76	397	2.09	99.88
78	12	0.06	99.95
79	9	0.05	99.99
98	1	0.01	100.00
Total	18,989	100.00	

Source: TEEP Household Survey.

5. EMPIRICAL RESULTS

Education and Labor Markets

In this section we summarize our empirical results on educational attainment, income, income sharing, and coresidence.

Table 5.1 shows the estimation results of educational attainment equations. The sample consists of siblings aged 15 to 30. We examine years of schooling completed, college entrance, and completion. Columns 1 and 2 show the results on years of schooling completed. In column 1 where school (*barangay*) fixed effects are controlled, it is found that female effect is significantly positive. Age has a positive but diminishing effect, birth order and sibling size both have negative effects, and both mother's (or guardian's) schooling and the household asset have positive effects on years of schooling completed. As discussed, however, the estimates are biased to correlations between household- and individual-level unobservables and the above variables. In column 2, we use household fixed effects to make inference based on within-sibling variations. As confirmed before, female effect is significantly positive. Therefore, our findings remain robust even after wiping out household-level fixed unobservables.

Table 5.1—Schooling

Dependent	Years of schooling		College	
	(1)	(2)	(3)	(4)
			Entry	Completion
Ages	15–30		15–30	20–30
Female	1.237 (21.96)	1.335 (30.13)	0.1253 (16.65)	0.0932 (10.07)
Age	1.116 (20.48)	1.038 (17.74)	0.1306 (13.55)	0.1097 (4.36)
Age squared	-0.0227 (18.08)	-0.0203 (18.64)	-0.0030 (14.77)	-0.0022 (4.32)
Birth order	0.0688 (4.50)	-0.1780 (4.08)	-0.0342 (4.61)	-0.0211 (2.13)
Sibling size	-0.1510 (9.28)			
Mother/guardian schooling	0.2095 (15.96)			
Log total asset value (2000)	0.1944 (8.01)			
School fixed effects	Yes			
Household fixed effects		Yes	Yes	Yes
Number of observations	12,743	12,919	12,951	8,049
R-squared (within)	0.1910	0.1538	0.0704	0.0401

Source: TEEP Household Survey.

Note: Numbers in parentheses are absolute t values based on robust standard errors.

Columns 3 and 4 examine the determinants of college entrance and completion (household fixed effects), respectively. Essentially our previous findings on years of schooling completed are valid in these cases. Among their siblings, females have an advantage in entering college and completing their college education. Therefore, our results confirm that females (among their siblings) tend to advance in schooling significantly more than males. This finding is also consistent with what we observed on college completion in the Philippine Labor Force Survey (Table 1.1).

Next we estimate employment equations to know whether females are less (or more) likely to be employed. Table 5.2 shows the estimation results. First, females are less likely to be employed than males in both school and household fixed-effect estimations. Second, with household fixed effects, we found that educational attainment increases the likelihood of employment. Hence, females can increase the probability of being employed by attaining more education. This insight is supported in column 3, where the interaction of schooling and females is included. Interestingly, the schooling effect is significantly positive only for females. Education is important for females to find jobs.⁹

Table 5.2—Employment

Dependent: Employed or not	(1)	(2)	(3)
Female	-0.1315 (12.14)	-0.1514 (14.81)	-0.4346 (11.96)
Years of schooling	-0.0030 (1.49)	0.0069 (2.81)	-0.0039 (1.37)
Years of schooling × female			0.0303 (8.15)
Age	0.1841 (18.58)	0.1901 (16.23)	0.1833 (15.57)
Age squared	-0.0036 (15.90)	-0.0036 (14.53)	-0.0035 (13.93)
Birth order	-0.0143 (4.50)	-0.0015 (0.17)	-0.0029 (0.33)
Sibling size	0.0047 (1.91)		
Mother/guardian schooling	-0.0067 (3.77)		
Log of total asset value (2000)	-0.0140 (4.04)		
School fixed effects	Yes		
Household fixed effects		Yes	Yes
Number of observations	12,407	12,577	12,577
R-squared	0.1081	0.1156	0.1231

Source: TEEP Household Survey.

Note: Numbers in parentheses are absolute t values based on robust standard errors. Sample consists of siblings currently residing in the country (province recoded) aged 15 to 30.

In Table 5.3, we examine returns to schooling and female effect in income equations. In the estimation, we control employment selectivity (analyzed in Table 5.2). Columns 1 and 2 compare results with school and household fixed effects.

In Column 1, returns to schooling exhibit increasing convexity, which is consistent with what is reported in the literature for the Philippine labor market, and age has positive but diminishing effects on log of annual earnings. Sibling size, mother's (or guardian's) education, and the household asset all have positive effects. Interestingly, female effects are insignificant in both cases. Interestingly, the female effect is significantly negative (8 percent), and the inverse mill ratio is significant. As we have observed in Table 5.2, the selection process into employment plays a statistically important role in determining wages. Note that without controlling the selectivity, the female effect is insignificant.

⁹ The interaction of schooling and females is not significant in our wage equations.

Table 5.3—Income

Dependent: Log of annual earnings	(1)	(2)
Female	-0.0833 (1.76)	-0.1014 (1.66)
Years of schooling	-0.0261 (1.23)	0.0344 (1.15)
Years of schooling squared	0.0072 (5.93)	0.0030 (1.68)
Age	0.3207 (4.96)	0.2454 (3.02)
Age squared	-0.0057 (4.46)	-0.0039 (2.44)
Birth order	-0.0097 (1.14)	0.0208 (0.59)
Sibling size	0.0157 (2.41)	
Mother/guardian schooling	0.0197 (4.14)	
Log of total asset value (2000)	0.0462 (3.63)	
Inverse mill's ratio	0.3214 (2.23)	0.2660 (1.93)
School fixed effects	Yes	
Household fixed effects		Yes
Number of observations	4,796	4,191
R-squared (within)	0.2268	0.1110

Source: TEEP Household Survey.

Note: Numbers in parentheses are absolute t values based on robust standard errors. Sample consists of siblings currently residing in the country (province recoded) aged 15 to 30. The first-stage probit estimations include the interaction of female and years of schooling completed.

Column 2 includes household fixed effects to use within-sibling variations of wages. As before, we include the inverse mill ratio to control the selectivity of employment in the labor market. Being consistent with column 1, we confirm that selectivity and female effect are both significant (5 percent and 10 percent, respectively). Females suffer from lower wages, once employment selectivity is controlled.

In sum, females are less likely to be employed than males among siblings, and they also suffer from lower wages among their siblings (that is, relative to males from the same family). We observed female earning disadvantage in labor markets, yet females are progressive in educational attainment. They also experience significantly lower wages in labor markets in which they participate. This could happen if labor markets exhibit segregation by sex in occupations and industries within local labor markets.

Family Arrangements

In this subsection, we summarize our results on income-sharing and coresidence decisions.

Table 5.4 shows the results on income-sharing decisions. The proportion of income shared with parents (in both coresident and migrant cases) is used as the dependent variable. First, years of schooling completed do not change the proportion of income shared. Second, females tend to share significantly more of their earnings with their parents than males do. This is consistent with our theoretical conjecture to explain larger returns to daughters' schooling for parents as well with as the literature (for example, Quisumbing and McNiven 2010).

Table 5.4—Income sharing

Dependent: Proportion of income shared with parents	(1)	(2)
Female	0.0367 (4.05)	0.0308 (3.39)
Years of schooling	-0.0053 (3.08)	-0.0012 (0.59)
Age	0.0466 (5.19)	0.0332 (2.83)
Age squared	-0.0011 (5.48)	-0.0008 (3.44)
Birth order	-0.0051 (2.20)	-0.0082 (1.16)
Sibling size	-0.0016 (0.77)	
Mother/guardian schooling	-0.0024 (1.43)	
Log of total asset value (2000)	0.0007 (0.24)	
School fixed effects	Yes	
Household fixed effects		Yes
Number of observations	4,929	4,991
R-squared	0.0210	0.0132

Source: TEEP Household Survey.

Note: Numbers in parentheses are absolute t values based on robust standard errors. Sample consists of siblings aged 15 to 30.

Coresidence patterns are examined similarly in Table 5.5. First, females tend not to live with their parents, but this may reflect daughters who get married after schooling and may continue to provide remittance to their parents. Parents invest in their daughters on a higher level of commitment that enables daughters to keep sharing their incomes with parents. The above finding is likely consistent with the accumulated research observations on the bilateral family system prevalent in the Philippines that married daughters play a more important role in supporting parents than married sons (Ofstedal, Knodel, and Chayovan 1999; Natividad and Cruz 1997; Agree et al. 2002; Domingo and Asis 1995).

Second, although the effect of schooling is positive with school fixed effects, we observe that it is significantly negative with household fixed effects. Upward bias exists in the estimate due to a positive correlation between schooling and household-specific unobserved endowment determining coresidence decision. Educated siblings turned out to be more likely to migrate when our inference is based on within-sibling variations. Therefore, it seems that returns to schooling are more easily accrued to parents if stronger commitment between parents and children is maintained.

In terms of family arrangement and intergenerational transfers under the Philippine traditional norms, children are still expected to support their parents, so parents have expectations for gaining (at least a part of) returns to education investment. Moreover, there is also a traditional culture of sharing income with parents, especially if children are residing with their parents, which is assumed to be a reliable source of assistance and support for parents (Domingo and Casterline 1992). Females give a higher share of their incomes to parents than males do, which is consistent with our conjecture. So, even if females have lower wages than males, females share more of their earnings, which helps parents trust more in their female children.

The above findings are also consistent with previous research findings on bilateral family arrangements and intergenerational support. Coresidence is negatively associated with age but at a diminishing rate, which reflects the life course stages of children. In particular, younger children and

unmarried females co-reside with their parents and are most likely to be still dependent, particularly those who are studying and are not working.

Table 5.5—Coresidence

Dependent: Whether living with parents or not	(1)	(2)
Female	-0.1665 (19.55)	-0.1587 (18.06)
Years of schooling	0.0061 (2.79)	-0.0047 (2.09)
Age	-0.1184 (10.26)	-0.1044 (9.75)
Age squared	0.0016 (6.01)	0.0013 (5.51)
Birth order	0.0089 (3.45)	0.0090 (1.15)
Sibling size	-0.0167 (6.92)	
Mother/guardian schooling	0.0055 (2.79)	
Log of total asset value (2000)	0.0058 (1.41)	
School fixed effects	Yes	
Household fixed effects		Yes
Number of observations	12,743	12,919
R-squared	0.2392	0.2419

Source: TEEP Household Survey.

Note: Numbers in parentheses are absolute t values based on robust standard errors. Sample consists of siblings aged 15 to 30.

Filipino parents are equally likely to co-reside with married daughters and sons (Ofstedal, Knodel, and Chayovan 1999; Domingo and Casterline 1992; Domingo and Asis 1995; Knodel and Debavalya 1997). Our finding that educated siblings turned out to be less likely to live with parents then implies that it is difficult to ensure returns to female schooling, but a stronger commitment between parents and daughters seems to overcome the distance problem.

6. CONCLUSION

This paper shows mutually consistent evidence to support female advantage in education and disadvantage in labor markets. Family arrangement to tighten commitment between daughters and parents is an institution that keeps high levels of schooling investments in daughters. This is rational to parents because they can expect larger income shared from daughters who become educated in adulthood. For females relative to males, wage penalty in labor markets means that education is of relatively large importance as a determinant of their earnings. Thus, parental investments in daughters' education has larger impacts on the income of daughters than sons. Our evidence from unique sibling data of schooling and work history, as well as the Philippine Labor Force Survey, supports the above hypothesis.

REFERENCES

- Agree, E. M., A. E. Biddlecom, M.-C. Chang, and A. E. Perez. 2002. "Transfers from Older Parents to Their Adult Children in Taiwan and the Philippines." *Journal of Cross-Cultural Gerontology* 17 (4): 269–294.
- Behrman, J. R., and M. R. Rosenzweig. 2002. "Does Increasing Women's Schooling Raise the Schooling of the Next Generation?" *American Economic Review* 92 (1): 323–334.
- Blau, F. D., and L. M. Kahn. 1992. "The Gender Earnings Gap: Learning from International Comparisons." *American Economic Review* 82 (2): 533–538.
- Chattopadhyay, R., and E. Duflo. 2004. "Women as Policy Makers: Evidence from a Randomized Policy Experiment in India." *Econometrica* 72 (5): 1409–1443.
- Philippines—Department of Finance. 2001. Department Order No. 32-01 (effective November 20, 2001). Republic of the Philippines.
- Domingo, L. J., and M. M. B. Asis. 1995. "Living Arrangements and the Flow of Support between Generations in the Philippines." *Journal of Cross-Cultural Gerontology* 10 (1–2): 21–51.
- Domingo, L. J., and J. B. Casterline. 1992. "Living Arrangements of the Filipino Elderly." *Asian Pacific Population Journal* 7 (3): 63–88.
- Estudillo, J. P., A. R. Quisumbing, and K. Otsuka. 2001a. "Gender Differences in Land Inheritance and Schooling Investments in the Rural Philippines." *Land Economics* 77 (1): 130–143.
- . 2001b. "Gender Differences in Land Inheritance, Schooling, and Lifetime Income: Evidence from the Rural Philippines." *Journal of Development Studies* 37 (4): 23–48.
- King, E., and A. Hill. 1998. *Women's Education in Developing Countries: Barriers, Benefits, and Policies*. Washington, DC: World Bank.
- Knodel, L., and N. Debavalya. 1997. "Living Arrangements and Support among the Elderly in Southeast Asia: An Introduction." *Asia-Pacific Population Journal* 12 (4): 5–16.
- Lanzona, L. A. 1998. "Migration, Self-Selection, and Earnings in Philippine Rural Communities." *Journal of Development Economics* 56 (1): 27–50.
- Natividad, J. N., and G. T. Cruz. 1997. "Patterns in Living Arrangements and Familial Support for the Elderly in the Philippines." *Asia-Pacific Population Journal* 12 (4): 17–34.
- Ofstedal, M. B., J. Knodel, and N. Chayovan. 1999. "Intergenerational Support and Gender: A Comparison of Four Asian Countries." *Southeast Asian Journal of Social Science* 27 (2): 21–42.
- Orbeta, A. C. 2002. *Education, Labor Market and Development: A Review of the Trends and Issues in the Philippines for the Past 25 Years*. Manila: Philippine Institute for Development Studies.
- Philippines—National Statistical Office. 2006. Demographic and Health Survey. Republic of the Philippines, Manila.
- Philippine Congress. 1998. Republic Act 8425 (Social Reform and Poverty Alleviation Act). Republic of the Philippines, Manila.
- Pitt, M. M., and S. Khandker. 1998. "The Impact of Group-Based Credit on Poor Households in Bangladesh: Does the Gender of Participants Matter?" *Journal of Political Economy* 106 (5): 958–996.
- Quisumbing, A., and S. McNiven. 2010. "Moving Forward, Looking Back: The Impact of Migration and Remittances on Assets, Consumption, and Credit Constraints in the Rural Philippines." *Journal of Development Studies* 46 (1): 91–113.
- Quisumbing, A., J. Estudillo, and K. Otsuka. 2003. *Land and Schooling: Transferring Wealth across Generations*. Baltimore: Johns Hopkins University Press.
- Ramos, F. V. 1995. *The Social Reform Agenda: Winning the Future*. Quezon City, Philippines: Republic of the Philippines.

- Sakellariou, C. 2004. "The Use of Quantile Regressions in Estimating Gender Wage Differentials: A Case Study of the Philippines." *Applied Economics* 36 (9): 1001–1007.
- Schady, N. 2003. "Convexity and Sheepskin Effects in the Human Capital Earnings Function: Recent Evidence for Filipino Men." *Oxford Bulletin of Economics and Statistics* 65 (2): 171–196.
- Strauss, J., and D. Thomas. 1995. "Human Resources: Empirical Modeling of Household and Family Decisions." In *Handbook of Development Economics*. Vol. 3, edited by J. R. Behrman and T. N. Srinivasan, 1883–2023. Amsterdam: Elsevier.
- Yamauchi, F. 2005. "Why Do Schooling Returns Differ? Screening, Private Schools, and Labor Markets in the Philippines and Thailand." *Economic Development and Cultural Change* 53 (4): 959–981.
- . 2011. "Wage Dynamics, Turnover, and Human Capital: Evidence from Adolescent Transition from School to Work in the Philippines." Manuscript. International Food Policy Research Institute, Washington, DC.
- Yamauchi, F., and Y. Liu. 2011. "Girls Take Over: Long-term Impacts of an Early Stage Education Intervention in the Philippines." Manuscript. International Food Policy Research Institute, Washington, DC.

RECENT IFPRI DISCUSSION PAPERS

For earlier discussion papers, please go to www.ifpri.org/pubs/pubs.htm#dp.
All discussion papers can be downloaded free of charge.

1154. *Resource-rich yet malnourished: Analysis of the demand for food nutrients in the Democratic Republic of Congo*. John Ulimwengu, Cleo Roberts, and Josee Randriamamonjy, 2012.
1153. *Putting gender on the map: Methods for mapping gendered farm management systems in Sub-Saharan Africa*. Ruth Meinzen-Dick, Barbara van Koppen, Julia Behrman, Zhenya Karelina, Vincent Akamandisa, Lesley Hope, and Ben Wielgosz, 2012.
1152. *Household preferences and governance of water services: A Hedonic analysis from rural Guatemala*. William F. Vásquez, 2011.
1151. *Peer effects, risk pooling, and status seeking: What explains gift spending escalation in rural China?* Xi Chen, Ravi Kanbur, and Xiaobo Zhang, 2011.
1150. *Agricultural productivity and policies in Sub-Saharan Africa*. Bingxin Yu and Alejandro Nin-Pratt, 2011.
1149. *Common-pool resources, livelihoods, and resilience: Critical challenges for governance in Cambodia*. Blake D. Ratner, 2011.
1148. *The impact of global climate change on the Indonesian economy*. Rina Oktaviani, Syarifah Amaliah, Claudia Ringler, Mark W. Rosegrant, and Timothy B. Sulser, 2011.
1147. *Evaluating the Mexico City Policy: How US foreign policy affects fertility outcomes and child health in Ghana*. Kelly M. Jones, 2011.
1146. *Income shocks and HIV in Sub-Saharan Africa*. Marshall Burke, Erick Gong, and Kelly Jones, 2011.
1145. *Emerging policies and partnerships under CAADP: Implications for long-term growth, food security, and poverty reduction*. Ousmane Badiane, Sunday Odjo, and John Ulimwengu, 2011.
1144. *Girls take over: Long-term impacts of an early stage education intervention in the Philippines*. Futoshi Yamauchi and Yanyan Liu, 2011.
1143. *The broken broker system?: Transacting on agricultural wholesale markets in India (Uttarakhand)*. Bart Minten, Anneleen Vandeplas, and Johan F.M. Swinnen, 2011.
1142. *Responding to land degradation in the highlands of Tigray, Northern Ethiopia*. Tyhra Carolyn Kumasi and Kwadwo Asenso-Okyere, 2011.
1141. *The quiet revolution in agrifood value chains in Asia: The case of increasing quality in rice markets in Bangladesh*. Bart Minten, K.A.S. Murshid, and Thomas Reardon, 2011.
1140. *Sanitary and phytosanitary standards as bridge to cross*. Abdul Munasib and Devesh Roy, 2011.
1139. *Climate change and floods in Yemen: Impacts on food security and options for adaptation*. Manfred Wiebelt, Clemens Breisinger, Olivier Ecker, Perrihan Al-Riffai, Richard Robertson, and Rainer Thiele, 2011.
1138. *Unintended effects of urbanization in china: Land use spillovers and soil carbon loss*. Man Li, Junjie Wu, and Xiangzheng Deng, 2011.
1137. *A regional computable general equilibrium model for Guatemala: Modeling exogenous shocks and policy alternatives*. Samuel Morley and Valeria Piñeiro, 2011.
1136. *Who owns the land?: Perspectives from rural Ugandans and implications for land acquisitions*. Allan Bomuhangi, Cheryl Doss, and Ruth Meinzen-Dick, 2011.
1135. *Comprehension and risk elicitation in the field: Evidence from rural Senegal*. Gary Charness and Angelino Viceisza, 2011.
1134. *External shocks and policy alternatives in small open economies: The case of El Salvador*. Samuel Morley, Valeria Piñeiro, and Sherman Robinson, 2011.
1133. *How does ownership of farm implements affect investment in other farm implements when farmers' liquidity constraint is relaxed?: Insights from Nigeria*. Hiroyuki Takeshima and Sheu Salau, 2011.

**INTERNATIONAL FOOD POLICY
RESEARCH INSTITUTE**

www.ifpri.org

IFPRI HEADQUARTERS

2033 K Street, NW
Washington, DC 20006-1002 USA
Tel.: +1-202-862-5600
Fax: +1-202-467-4439
Email: ifpri@cgiar.org