

Paqueo, Vicente B.; Orbeta, Aniceto C.

**Working Paper**

## Gender equity in education: Helping the boys catch up

PIDS Discussion Paper Series, No. 2019-01

**Provided in Cooperation with:**

Philippine Institute for Development Studies (PIDS), Philippines

*Suggested Citation:* Paqueo, Vicente B.; Orbeta, Aniceto C. (2019) : Gender equity in education: Helping the boys catch up, PIDS Discussion Paper Series, No. 2019-01, Philippine Institute for Development Studies (PIDS), Quezon City

This Version is available at:

<https://hdl.handle.net/10419/211075>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

# Gender Equity in Education: Helping the Boys Catch Up

*Vicente B. Paqueo and Aniceto C. Orbeta Jr.*



The PIDS Discussion Paper Series constitutes studies that are preliminary and subject to further revisions. They are being circulated in a limited number of copies only for purposes of soliciting comments and suggestions for further refinements. The studies under the Series are unedited and unreviewed. The views and opinions expressed are those of the author(s) and do not necessarily reflect those of the Institute. Not for quotation without permission from the author(s) and the Institute.

---

## CONTACT US:

**RESEARCH INFORMATION DEPARTMENT**  
Philippine Institute for Development Studies

18th Floor, Three Cyberpod Centris - North Tower  
EDSA corner Quezon Avenue, Quezon City, Philippines

publications@mail.pids.gov.ph  
(+632) 372-1291/(+632) 372-1292

<https://www.pids.gov.ph>

# Gender Equity in Education: Helping the Boys Catch Up

Vicente B. Paqueo and Aniceto C. Orbeta Jr.

PHILIPPINE INSTITUTE FOR DEVELOPMENT STUDIES

April 2019

## **Abstract**

The article argues that in the Philippines there is a need for a more nuanced view of gender equality. Historically, Filipino males were somewhat more educated than females. Now the males are lagging behind the females and the education gender gap is widening. This reversal was predictable early on in the 70s before it manifested itself in national statistics. The paper argues that today gender equality advocacy should go beyond the stereo-typical focus on girls' education and pay more attention to issues that are hurting boys' education. Failure to pursue win-win strategies to address gender bias in education working against boys will mean the country is foregoing valuable opportunities to raise equity and economic returns to its investment in education. To conclude, the paper suggests some experiments to deepen current understanding of boys' educational issues and develop tools for effectively removing existing impediments to schooling and learning.

**Keywords:** gender equity, education, Philippines

## Table of Contents

<b>Abstract</b> .....	<b>i</b>
<b>1. Introduction</b> .....	<b>1</b>
<b>2. Historical data on Philippine education</b> .....	<b>2</b>
<b>3. Recognizing gender bias against boys</b> .....	<b>4</b>
<b>4. Gender equity across income groups</b> .....	<b>6</b>
<b>5. The Pantawid Pamilyang Pilipino Program (4Ps) and gender equality</b> .....	<b>7</b>
<b>6. Conclusion</b> .....	<b>7</b>
<b>7. References</b> .....	<b>9</b>
<b>Appendix: Estimating the disparity in enrollment by sex and across income groups</b>	<b>11</b>

### List of Tables

Table 1. Shares of youth and young adults who have completed elementary and secondary schooling, 2016.....	3
--	---

### List of Figures

Figure 1. Proportion (%) of population 25 years and above who have finished college by sex, 1948-2015.....	2
Figure 2. Female-Male difference in enrollment rate by income quintile, 2017 .....	6

# Gender Equity in Education: Helping the Boys Catch Up

*Vicente B. Paqueo and Aniceto C. Orbeta, Jr.\**

## 1. Introduction

The fight for gender equality has a long history. An important part of this history is the intensification and widening of the fight for women's rights after World War II. Due partly to their valuable work in factories and other activities in support of the war efforts, respect for women's rights to equality with men got a huge boost. Improving the status of women became part of the agenda of many influential international organizations. In this regard the seventies saw the **"women in development"** agenda included in the development programs of the United Nations, its partner agencies, and civil society organizations. As nations confronted the challenges of development, world leaders increasingly realized the need to empower women and to ensure that human beings regardless of gender are treated equally.

In many parts of the world addressing this issue means reducing global education inequality that kept women poor and disadvantaged. This view was largely influenced by the experience of India, China, Bangladesh, Africa, the Middle East and other countries where girls and women were largely underprivileged. Their experience with gender inequality in education was, moreover, seen as emblematic of gender inequalities in the labor market and other dimensions of human well-being. On this score, analysts of gender issues have tended to attribute gender inequality to discrimination imbedded in traditional culture, institutions and policies.

Not surprisingly, therefore, global leaders and organizations like the United Nations, the World Bank, Asia Development Banks, and international NGOs have pushed for gender equality as a priority in their agenda. They believe that gender gaps are largely due to discrimination against women and must, therefore, be a focus of worldwide attention.

Strictly speaking, the principle of gender equality means equality of human beings regardless of gender status. In practice, however, the concept has usually been limited to achieving gender equality by raising the status of women. This way of applying the gender equality idea is not unreasonable, given that women and girls were lagging behind in important indicators of social and economic well-being. Focusing on raising the status of women to bring about equality with men, the world has made considerable progress in promoting gender equality in many parts of the world, although there remain many challenges, particularly in developing countries. In fact, our analysis of the recently released human capital index data of the World Bank reveals that in about 70 percent of countries worldwide, average human capital is greater for females than males.

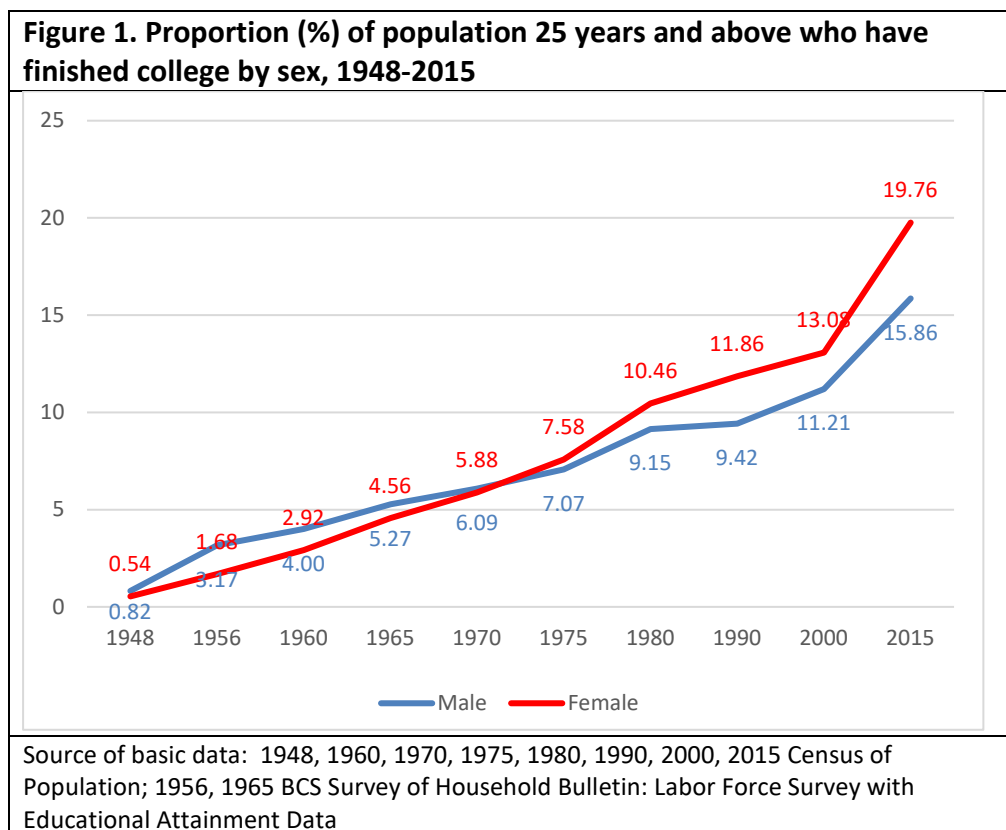
---

\* Dr. Vicente B. Paqueo is a Distinguished Visiting Fellow at the Philippine Institute for Development Studies (PIDS). Formerly, he was a UPSE Professor of Economics and a Lead Economist at the World Bank, Washington D.C. Dr. Aniceto C. Orbeta, Jr. is a Senior Fellow at the PIDS and former Professorial Lecturer at the UPSE. This article is an adapted version of an earlier paper, "Amado Castro and gender equity in education", published in the December 2017 volume of the Philippine Review of Economics.

The Philippines is an example of a country where female vis-à-vis male education has progressed so much that boys now need to catch up with girls. Efforts to promote gender issue in education need to be more nuanced to adhere to the originally meaning of the principle of gender equality.

## 2. Historical data on Philippine education

Male education in the Philippines during the World War II reconstruction period appears to be greater than female education, as shown for example by college completion rates. In a paper by Orbeta and Sanchez (1995), it is clear that the percentage of population 25 years old and over who completed four years of college education or more was initially greater on average for males than females from 1948 to 1970. But the male-female gap was steadily narrowing until the mid-70s when the proportion of college educated women began to surpass that of men. An obvious cause for concern is that the gap has not shown an indication of narrowing down since the crossover (see Figure 1).



The reason why the women to men student ratio in college favors women after the 60s is likely due, at least in part, to the lower academic performance of boys relative to girls during their basic education years. The boys' lower academic performance compared to girls' in elementary and secondary education appears to be continuing.

On this score, Paqueo, Orbeta and Albert (2011) had noted that the share of youth aged 16-19 who completed elementary education (according to the 2008 APIS data) was higher for girls (94 percent) than boys (87 percent). For young adults 20-24 years old who completed

secondary level education, the corresponding shares for girls and boys were 78 percent and 66 percent, respectively. The same data also indicated that the gap in completion rate between boys and girls was much larger among the poorest 30 percent than the richest 30 percent. Updating these figures using APIS 2016 show similar results as show in in Table 1. This is 95 and 89 percent for girls and boys, respectively, for elementary completion and 79 and 64 percent for secondary completion.

As pointed out in Orbeta and Sanchez (1995) , there are several possible explanations of this phenomenon pointed out by earlier studies, namely: (i) the pressure on boys to drop out of school to help their parents earn needed income is greater for boys than for girls because there are more employment opportunities in agriculture for boys (Bouis, 1992); (ii) daughters receive more education but less land (Quisumbing, 1991), and (iii) parents rely more on their daughters than on their sons to study conscientiously, keep stable jobs, and provide more consistent support in their old age (King and Domingo, 1986; Lynch and Makil (1968), and Hollnsteiner, 1970).

**Table 1. Shares of youth and young adults who have completed elementary and secondary schooling, 2016**

	Overall Completion		Girls' Completion		Boys' Completion	
	Elementary	Secondary	Elementary	Secondary	Elementary	Secondary
Mean (full sample)	92	71	95	79	89	64
Richest 30 percent	98	93	99	98	97	87
Poorest 30 percent	85	46	92	55	79	38

Note: The basic analysis uses the first three income deciles (i.e., the 30% of households with the lowest income) to proxy “the poor,” with the highest three income deciles to proxy the most affluent or “rich” families. Estimates of elementary and secondary completion are based on attainments of 16–19 and 20-24-year-old respondents, respectively.

Source of basic data: APIS 2016

In regard to learning achievement outcomes, data also reveal that functional literacy rate among 10-15 year old children is lower for boys (55.5%) than for girls (63.0%). Moreover, the mean percentage scores of grade six students in the National Achievement Tests (NAT) appears to be uniformly higher for girls than for boys in Filipino, Math, English, Science and Hekasi (Paqueo, Orbeta and Albert, 2011).

Tan, Canales, Cruz and Punongbayan (2011) dig deeper into why boys are falling behind girls in education. Elaborating on previous explanations, they estimate and compare male and female rates of return of education. The study articulates four reasons to explain why women in the Philippines are pursuing education more intensely than men. In addition to the great expansion of education institutions and growth of job opportunities for women, they cite traditional culture that keeps girls at home where they acquire greater discipline and allows them to study better, as the Economic Historian Professor Amado Castro had earlier argued.<sup>1</sup> But they also find that the rate of returns to women’s education is higher relative to men’s. This empirical evidence is consistent with standard economic theory of human capital accumulation. Women’s education is more intense because its return is higher compared to men’s.<sup>2</sup>

<sup>1</sup> See Paqueo and Orbeta (2017)

<sup>2</sup> Controlling for the types of higher education institutions they graduate from and other variables, preliminary findings by Paqueo, Orbeta, Melad (forthcoming), using APIS 2013 data, indicate that the rate of increase in earnings of males associated



### 3. Recognizing gender bias against boys

We tried to call attention to this reverse gender inequality phenomenon on various occasions in the Philippines and in a few international fora. Paqueo, for example, in discussing a research report on Northeast Brazil (a poor region) in the 1990s asked for explanations about its finding showing that the educational status of boys was lagging behind that of girls – pointing out in the process that a similar phenomenon had been observed in the Philippines. In another forum, he asked whether there were similar experiences in other countries (perhaps in their sub-population groups) to find out the importance of the phenomenon found in the Philippines and Northeast Brazil. Disappointingly, the participants of the forum showed no curiosity at all about the question, oblivious to the true meaning of gender equality.

For decades, the development community benignly ignored observations that boys in some areas of the world actually lag behind girls in educational achievement. This attitude is understandable in light of the feminist agenda and the perception that ensuring fair treatment of boys is not a priority issue, given the huge global challenge of raising women's status towards parity with men's.

In the last ten years, there appears to be some change in attitude. Some analysts have come to recognize the importance of understanding education inequality not just from the girls' but also from the boys' perspective. The United Nations Girls Education Initiative (UNGEI, n.d.), for example, recently examined the above questions in a report entitled: *Why are Boys Underperforming in Education? Gender Analysis of Four Asia-Pacific Countries*. In developed countries, there also appears greater awareness and concern about males lagging behind in education, particularly in college. On this point, Terrier (2016) writes that boys are increasingly lagging behind girls at school in OECD countries. Citing OECD data, she revealed that the percentages of women and men who entered a university program in 2009 were 66 percent and 52 percent respectively – and the gap between them was growing (OECD 2012).

It is noteworthy that some policy analysts are re-discovering the argument that if education is indeed a universal human right, unfair gender bias regardless of whether they are detrimental to the education of a boy or a girl should not be acceptable. One has to be careful, of course, that the observed gender gap is not the result of voluntary decisions of individuals and families that optimize their well-being within the bounds of legitimate constraints and employment opportunities facing them.

In regard to the UNGEI study, the question about boys' lower academic performance relative to that of girls is analyzed in four case studies, involving Malaysia, Mongolia, Philippines and Thailand. These are countries where boys' educational achievements are less than the girls'. The report is relevant to our discussion of the gender equality issue in regard to males for two reasons. First, the report confirms our observation that the lower academic performance of boys relative to that of girls is not rare and unique to the Philippines. We had observed it in Northeast Brazil (previously mentioned); now other Asian countries have reported it as well. Second, the report provides interesting hypotheses about the factors that appear to work against boys' right to good education. Those hypotheses culled out mostly from key informant and focus group discussions are worth verifying and complementing with quantitative analyses, using more rigorous causal models.

---

with college education is significantly higher than that of females. A possible explanation is that controlling for college education rate of return, there are other unaccounted for factors that favor higher earnings for males compared to females.

UNGEI reports specifically the following findings: (a) families play a central role in children's educational achievement; (b) poor families tend to withdraw boys from school because they seem to be unresponsive to learning and because boys have more diverse work opportunities than girls; (c) the nature of the school environment itself is not gender neutral, and stereotypes (and gender bias) impede boys' potential and achievements.

Interestingly, on the last point, UNGEI observes that the four country studies identified a common notion that school 'is for girls'. It reports, for example, the finding of Thailand researchers that the formal education system caters primarily to girls who are perceived to be academically superior. They were told by participants in group discussions that boys become "the group of students in the back of the room that the teachers often ignore and don't show much interest in their learning, in contrast to the more attentive girl students in the front rows who normally get greater attention from the teachers ..." UNGEI (page 2).

The study of Terrier (2016) confirms that female teachers can be an important factor adversely affecting boys' academic achievement. Starting off from the hypothesis now widely discussed in the literature that teacher biases can be a significant factor adversely affecting gender equality, Terrier explores teacher's favoritism in grading students' examination answers. Employing rigorous quantitative causal modeling on a French data set and using a combination of blind and non-blind test scores, she reports the following findings.

She finds that middle school teachers favor girls when they grade. She further finds that this favoritism has long-term consequences. Measuring their national evaluations three years later, she estimates that male students make less progress than their female counterparts. She also calculated that 21 percent of boys falling behind girls in math during middle school is accounted for by gender-biased grading. Interestingly, girls who benefit from gender bias in math are more likely to select a science track in high school. These are provocative findings that should inspire Filipino researchers to do a similar study (adapted) in the Philippines where teachers in basic and college education are predominantly women.

To further enrich the discussion in this section, we present a summary of a paper by Natasha Mulji (2016). We highlight this study to illustrate teacher gender effects on students of schools in low versus high income communities. The intriguing finding in this paper is the interaction effect of the economic condition of the community and the teacher's gender on the sex-specific learning achievement scores of boys and girls.

Using TIMSS data (Trends in Mathematics and Science Study) and fixed effect regression analysis, Mulji examines the effect of female teachers on the academic performance of male and female grade 8 students in math and science. The study finds that female teachers increase the test scores of students.

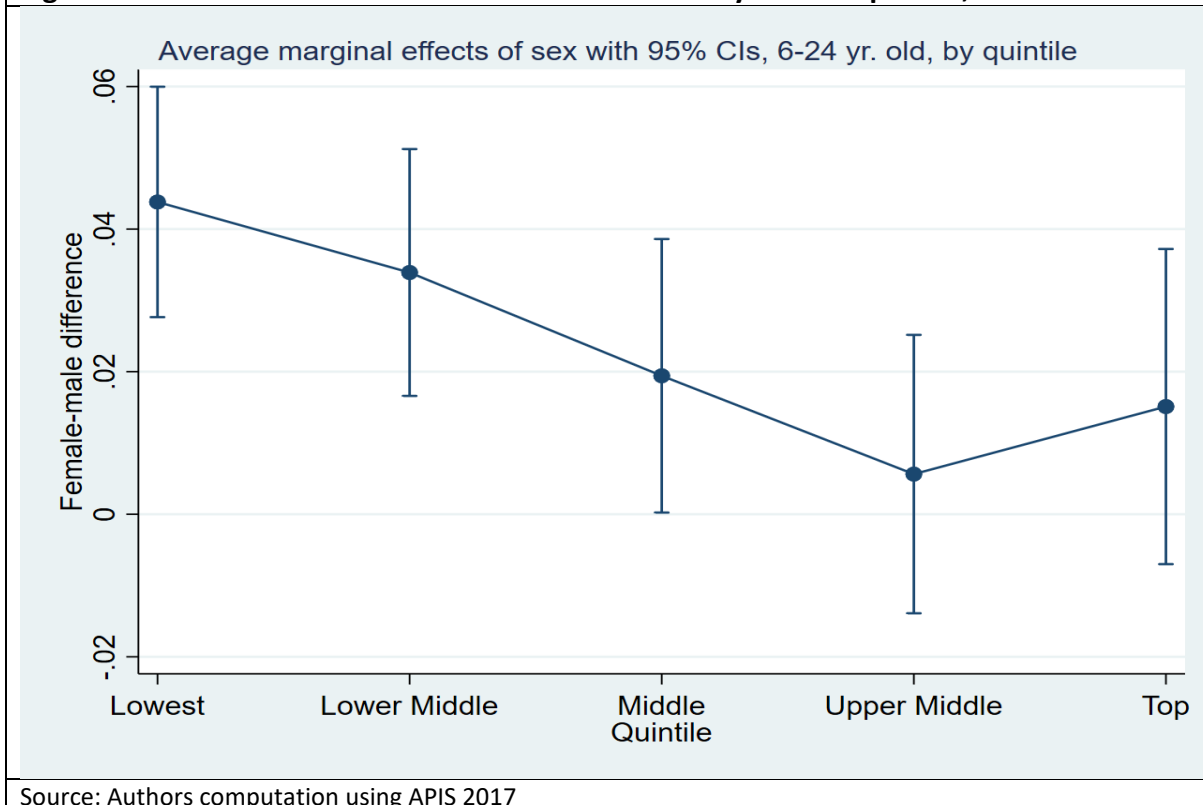
But the effect depends on the income level of the area in which their school is situated. In low income areas, *the test scores of girls are significantly raised when taught by a female teacher, while the boys lose out when taught by female teachers.* In contrast, in high income areas students improved their test scores regardless of gender. Why the gender effects differ between low and high community income schools is a question that calls for further investigation. It could be that school children in low income communities in Tunisia are heavily influenced by traditional culture regarding male-female interactions. In high income communities, school children may be comfortable with their teachers regardless of gender.

#### 4. Gender equity across income groups

As mentioned, it is commonly believed that the pressure on boys to drop out of school to help their parents earn needed income is greater than on girls because there are more employment opportunities in agriculture for boys (Bouis, 1992). If the hypothesis is true, then one would expect that the education gap between boys and girls would be smaller as household income increased, as it becomes less of a binding constraint on children's education, other things being equal.

This hypothesis is strongly supported by comparing enrollment rate in APIS 2017 across income groups. Appendix A provides the detailed analysis. The results show that the disparity in enrollment rate is indeed higher at the lower income groups. For all school-aged children 6 to 24 years old, the disparity for those in the lowest quintile is more than 4 percentage points going down to a little over 2 percentage points in the middle quintile and not significantly different for the upper two quintiles with confidence intervals cross zero (Figure 2). The analysis by age groups shows that the difference lies in secondary age groups including both the junior (12 to 15-year-old) and senior high school (16 to 17-year-old). It is noted that there is no significant difference for the elementary (6-11 years old) and beyond secondary (18-24 years old) across the different income groups.

**Figure 2. Female-Male difference in enrollment rate by income quintile, 2017**



## 5. The Pantawid Pamilyang Pilipino Program (4Ps) and gender equality

The 4Ps provides cash grants to poor households conditional on satisfying specific requirements. The conditions include school attendance of children for 85 percent of the school days, regular health checkups for mother and children and attendance in family development sessions. In 2014 the education grant was extended from children 0 to 14 years to up to 18 years and increased from 300 per child per month regardless of school level to 500 per child per month for those in secondary school. But unlike in other countries, like Mexico, the grants are the same for both boys and girls. The program can support up to three children and transfers are given to the mother. It would be interesting to know whether the cash grants provide a dent on the educational gap between boys and girls. Survey data collected to evaluate 4Ps provides indication of narrowing the education gap between male and female children of poor households because of the program. The question is: If other factors were kept the same, would giving cash transfers to poor households as 4Ps does result in a significant reduction in boy-girl education gap. Interestingly, randomized control trial (RCT) of 4Ps indicates that the favorable effect of conditional income transfer on the education outcomes between boys and girls are the same in the case of enrollment for all age groups but higher for boys in terms of school attendance for children 6 to 11 years old and similar for other age groups (DSWD and WB 2014). The second wave evaluation using regression discontinuity design (RDD) also showed similar results with no difference in enrollment rates impact for boys and girls for all age groups but significantly higher school attendance rates for boys in the elementary (6 to 11) age group (DSWD 2014). This indicates that while undifferentiated cash transfers between boys and girls may have no differential impact on the enrollment between boys and girls, it has improved the frequency of school attendance of boys which is expected to generate better education outcomes for them.

It is worth noting, however, that in Mexico the conditional cash transfers (CCT) program has a significantly larger effect on the education of poor girls, where their secondary education enrollment rate is lagging that of boys. Part of the reason is that Mexico's CCT program gives households more grant money for girls' than for boys' education. The idea behind this differential is to motivate households to keep their children enrolled in secondary schools (Parker and Todd, 2017; Parker and Vogl, 2018). It also probably helps that Mexico's CCT amount per student is quite substantial, at least compared to that of 4Ps. The bottom line is that by providing a higher amount of cash transfers for girls' education the Government sends a strong signal and economic incentive for households to enroll them in secondary education.

## 6. Conclusion

**Fine tuning gender equality advocacy.** To conclude, we recall Professor Amado Castro's concern about gender equality in education and his advocacy that the University of the Philippines School of Economics (UPSE) should re-calibrate the way it selects applicants into its master's program. While his immediate concern was focused on UPSE, his arguments have led us to a re-examination of the assumptions and interpretations of the development communities' call for increased educational status of females to close the education gender gap.

In remembering his gender equity concern, we revisited our previous economic-demographic work and look at recent developments in gender inequality and current understanding of its

determinants. In our view, there is indeed a need for a broader and more informed conversation about the gender gap issue, specifically on ways to fine tune the way it is being addressed.

Rounding out the article, we share with the readers the following thoughts. First, there should be greater clarity about the meaning of the gender equality objective in education for situations where boys are lagging behind girls. Second, how to achieve this more inclusive objective also needs to be clarified. On this, more evidence-informed strategies and policy tools are needed. Third, reducing the gender gap should mean in practice improving the educational status of the educationally disadvantaged gender group (albeit, males in the Philippines) at a faster rate than the increase in academic achievement of the opposite sex.

In light of the low student academic achievement of both Filipino boys and girls, however, it is clearly important to ensure that raising the academic performance of one gender group should not be at the expense of the other gender category. That this unintended consequence could happen is a lesson we draw from the above-cited studies of Terrier (2016) and Mulji (2016).

Fourth, a mix of interventions to modify household, teacher and school attitudes, norms and practices should be pursued to eliminate unfair gender biases that unjustifiably impede children's right to good education. In short, the country should go for gender equality strategies that would on the whole produce win-win results for boys and girls. Failure to effectively pursue above win-win strategies and reduce those gender biases means that the country is foregoing valuable opportunities to raise equity and economic returns to its investment in education.

Fifth, to find, design and implement a win-win mix of interventions, more and better ideas based on analytically sound empirical research is needed. On this score, more studies should be undertaken on the gender gap issue from the lens of the educational development of Filipino males who are currently disadvantaged on average. To make sure, however, that those interventions would lead to desired results, more experimental and quasi-experimental impact evaluation methods should be employed to complement currently available studies, which are mostly qualitative and correlation analyses. For such purpose, a good place to start would be studies that would examine teacher characteristics, their gender biases and their sex-specific impact on the academic performance of students.

Finally, related to the above points, we specifically recommend that (i) a systematic study of the effects of female teacher dominance of Filipino classrooms and other aspects of the school and class environment that might unintentionally adversely affect the boys' educational performance; and (ii) a pilot study to test the cost-effectiveness of giving a bigger conditional grant amount for the boys of CCT families. These proposals draw from the experience and empirical studies mentioned above.

The hope is that this research would lead to greater awareness among parents, teachers and school authorities of the social, cultural and economic factors that are hurting (perhaps unintentionally) the well-being of the young simply by virtue of being a boy or being a girl. Equally important, the goal is to find tools that are proven to work cost-effectively to enable and motivate the boys to catch up with girls in education, even as the latter continue to improve their progress.

## 7. References

- Bouis, H. (1992). Adolescents in Farm Households: Their Nutrition, Education and Contribution to Family Welfare, Paper presented to the IFPRI-World Bank Conference on Intra-Household Resource Allocation: Policy Issues and Research Methods, February 12-14, Washington, D. C.
- DSWD and World Bank. 2014. Philippines Conditional Cash Transfer Program Impact Evaluation 2012. Report Number 75533-PH, Washington DC: DSWD and World Bank.
- DSWD. 2014. "Keeping Children Healthy and in School: Evaluating the Pantawid Pamilya Using Regression Discontinuity Design." Processed.
- Hollnsteiner, M. (1970). The Filipino Family Confronts the Modern World, in Gorospe, V. (ed.) Responsible Parenthood in the Philippines (Manila: Ateneo Publications).
- King, E. and L. Domingo (1986). The Changing Status of Filipino Women Across Family Generations, *Philippine Population Journal* 2:1-31.
- Lynch, F and P. Makil (1968). High-ed, Low-ed, Family and Religion, Institute of Philippine Culture, Ateneo de Manila, Quezon City.
- Mulji, Natasha (2016), "The Role of Teacher Gender on Students' Academic Performance," Lund University Publications.
- OECD (2012), *Education Indicators In Focus*, OECD Publishing
- Orbeta, Aniceto C. Jr., and Ma. Teresa Sanchez (1995), "Population Change, Development and Women's Role and Status and Development in the Philippines," ESCAP Population and Development Asian Population Studies Series No. 134.
- Paqueo, Vicente B., Aniceto C. Orbeta, Jr. and Jose Ramon G. Albert (2011), "A Critical Look at the Education Sector: Achievements, Challenges, and Reform Ideas," in Jose Ramon G. Albert et al. (2011), **Education for Development**, PIDS 2011 Economic Policy Monitor
- Paqueo, Vicente B. and Aniceto C. Orbeta (2017), "Amado Castro and gender equity in education," in **The Philippine Review of Economics**, Special Issue in Honor of Amado A Castro, Volume LIV No. 2, December.
- Paqueo, V., Aniceto Orbeta, and K, Melad (forthcoming) "Rates of Return to Higher Education in the Philippines: Is there a difference by Institution type?"
- Parker, S and P. Todd (2017) "Conditional cash transfers: The case of Progres/Oportunidades," *Journal of Economic Literature*, 55(3), 866-915.
- Parker, S. and T. Vogl (2018) "Do conditional cash transfers improve economic outcomes of the next generation? Evidence from Mexico," NBER Working Paper 24303.
- Quisumbing, Agnes (1991), "Intergenerational Transfers in the Philippine Rice Villages: Gender Differences in Traditional Inheritance Customs," Yale University

Tan, Edita A., Kristine S. Canales, Kevin G. Cruz and Jan Carlos B. Punongbayan (2011), "Why are Boys Falling behind Girls in Schooling?" UP School of Economics Discussion Paper No. 2011-12, November

Terrier, Camille (2016), "Boys Lag Behind: How Teachers' Gender Biases Affect Student Achievement," IZA Discussion Paper No. 10343, Institute for the Study of Labor (IZA), Bonn.

UNGEI (n.d.), **Why are Boys Under-performing in Education? Gender Analysis of Four Asia-Pacific Countries**, Report Commissioned by EAP United Nations Girls Education Initiative (UNGEI) Secretariat.

## Appendix: Estimating the disparity in enrollment by sex and across income groups

### Introduction

This appendix describes the estimation of the disparity in enrollment rates by sex across per capita income quintiles. APIS 2017 is used in the estimation. The data set has information on enrollment and sex of all household members as well as per capita income of the household.

### Estimation

To compute the difference in enrollment by sex and by income quintile, the following regression was estimated:

$$enroll = F \left( \beta_1 + \beta_2 * sex + \sum_{i=1}^4 \gamma_i Inc_i + \sum_{j=1}^4 \delta_j Inc_j * sex + \beta_3 * age + \beta_4 * age^2 + \epsilon \right)$$

where:

enroll = enrollment dummy

sex = sex dummy

Inc = per capital income quintile dummies

age = age

F= logistic function

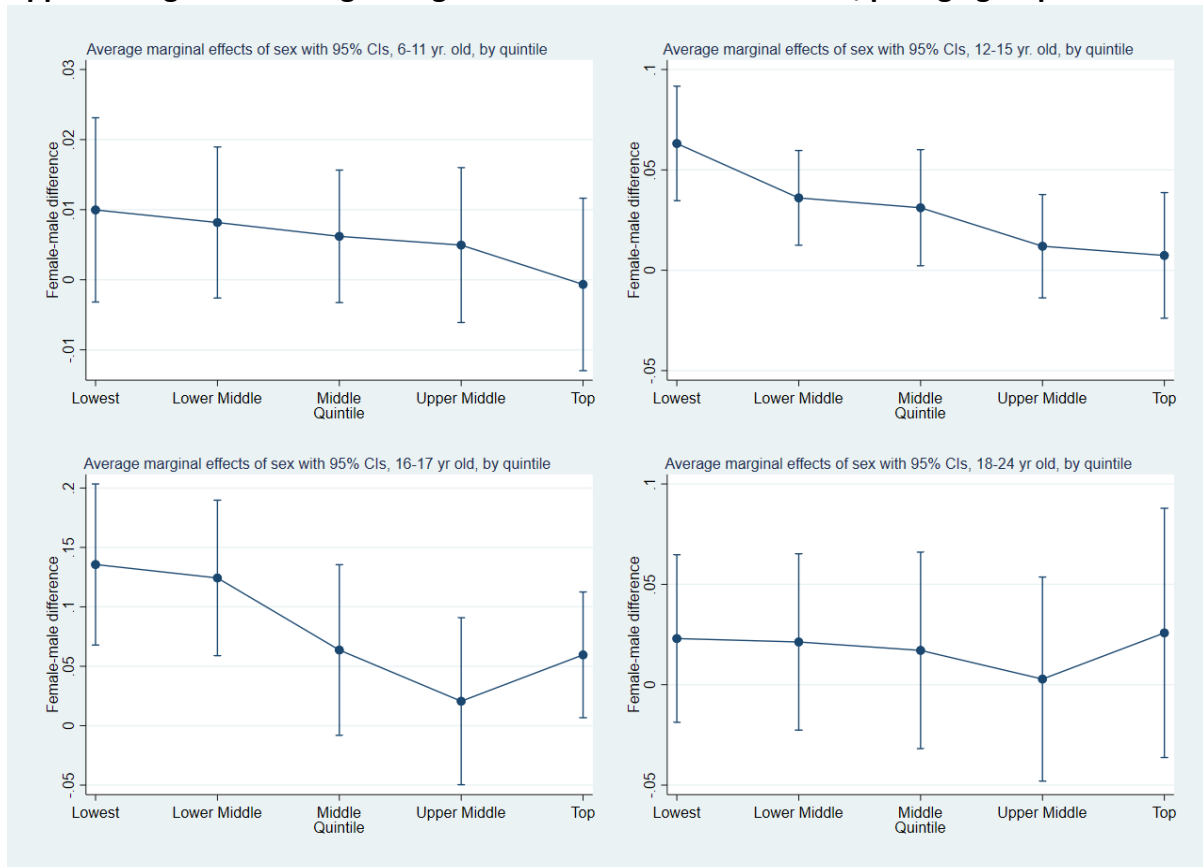
$\frac{\partial F}{\partial sex}$  provides the estimate of the difference in enrollment rates by sex at  $Inc_j$  per capita income quintile  $j$ . These are computed using margins routine in Stata and plotted using `marginsplot`.

The estimate of the difference in enrollment rates by sex by income quintile shows that disparity is bigger at the lower income groups compared to the higher income groups. For instance, for the total of the school-going population of 6 to 24 years, the difference for the lowest per capital income quintile is more than 4 percentage points. The difference goes down to about 2 percentage points for the middle income quintile. The differences for the upper middle and top quintiles are no longer significantly different from zero with confidence intervals crossing zero (Figure 2).

Interestingly, it is shown that the source of the difference is in the secondary level or ages 12-15 and 16-17 (Appendix Figure 1). There is no significant difference for elementary ages 6-11 and beyond secondary or ages 18-24.



**Appendix Figure 1. Average marginal effects of sex with 95% CIs, per age group.**



The estimation results are given in Appendix Table 1. It is noteworthy that these also show that the coefficient of the female variable is significant for age groups 6 to 24, 12-15 and 16-17 and not significant for age groups 6-11 and 18-24.

**Appendix Table 1. Estimation results.**

Variable	6-24	6-11	12-15	16-17	18-24
Age	0.28261***	1.70668*	-2.79165	-0.60615***	-1.32323**
Age Square	-0.02488***	-0.09501*	0.07925		0.01595
Lower Middle	0.35999***	0.79262*	0.77979***	0.33034	0.03519
Middle	0.64088***	1.37726**	0.87165**	0.71841**	0.27965
Upper Middle	0.97364***	1.42481*	1.48380***	1.24944***	0.55038***
Top	1.32775***	2.11129*	1.61406***	1.78305***	0.89183***
Female	0.51140***	0.37317	0.87822***	0.78513***	0.15269
Lower Middle#Female	-0.08750	0.41047	0.13699	0.11359	-0.01239
Middle#Female	-0.25824	0.93610	0.03711	-0.25620	-0.04556
Upper Middle#Female	-0.43413**	0.57289	-0.35341	-0.55773	-0.13579
Top#Female	-0.28517	-0.52381	-0.54150	1.25237	-0.00447
Constant	3.10465***	-3.95722	25.33800	10.85634***	19.14223***
No. of Obs.	16967	5869	3971	1910	5217

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$