

Decomposition of Wage Differentials Across the Philippine Wage Distribution

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Abstract: Philippine basic education recently saw the implementation of the K-12 curriculum, which ideally guides students into post-secondary education as one of its benefits. However, recent studies indicate a decline in the returns to higher education in the Philippines. Our research aims to describe the latest wage trends per educational attainment and decompose wage differentials before and during the K-12 curriculum implementation. By employing the Oaxaca-Blinder decomposition, results reveal that all workers exhibit an increase in real wage throughout the Philippine wage distribution between 2015 and 2019. Analyzing across wage distribution shows that the largest increase in real wages is experienced by low-wage workers. Lastly, returns to workers' characteristics are the driving force in affecting both male and female real wages in the Philippine wage distribution.

Key Words: wage differentials, decomposition, post-secondary education, the Philippines

1. INTRODUCTION

The Philippines has had an increased completion rate in secondary and post-secondary education in the past decade. In 2020, 28.2% of the general population (5 years and older) received a high school diploma, compared to 19.1% in 2010. Similarly, 13.8% completed a college or higher education in 2020, compared to 10.8% in 2010 (Philippine Statistics Authority, 2010, 2020). It is unsurprising, as the literature discusses the positive effect of education on earnings (Becker, 1964; Mincer, 1974; Card, 1994).

Research on Philippine returns to education or schooling is also extensive and conducted by several researchers, including Paqueo and Tan (1989), Schady (2000), Gerochi (2002), Luo and Terada (2009), and Yee (2023), among others. This body of research, applied across the Philippine distribution, also identified returns to schooling as a source of wage differentials (Dacuycuy, 2006; Sakellariou, 2012). However, the latest data show a decline in Philippine returns to higher education. For example, Yee (2023) revealed that their returns fell by 69% points among low-wage workers with college diplomas. Also, Albert

et al. (2024) found returns on investment for college graduates dropped from 141.4% in 2010 to 93.7% in 2022.

The Philippine basic education saw the K-12 curriculum enacted into law in 2013 and had the two added years of Senior High School (SHS) implemented in 2015 (DepEd, 2019). The Philippine Business for Education (2015) stated that two practical benefits of the K-12 educational system are students' preparedness for post-secondary education and readiness to join the workforce. Seeing how the K-12 program ideally guides students to post-secondary education, but combined with the recent decreased returns to higher education, do workers' characteristics or their returns contribute to improving or worsening differences in earnings?

Hence, our research primarily aims to describe the latest wage trends per educational attainment and decompose wage differentials before and during the K-12 curriculum implementation. Through the Oaxaca-Blinder technique (via Unconditional Quantile Regression), they enable an in-depth decomposition of various wage earners' characteristics across the distribution, ensuring a comprehensive and robust analysis of the factors contributing to wage



differentials.

Our main findings are the following: First, male and female workers experienced an increase in real wages between 2015 and 2019 across the Philippine wage distribution. Second, the largest increase in real wages is experienced by workers earning wages on the lower part of the distribution. Lastly, the returns to workers' characteristics are the driving force in affecting both male and female real wages in the Philippine wage distribution. Due to this, the returns effects are largely accounted for the decline in real compensation.

The paper is organized as follows: Section 2 discusses the Oaxaca-Blinder decomposition technique, including the Unconditional Quantile Regression. Section 3 itemizes the data used, its transformation, and its descriptive statistics. Section 4 examines the results of wage trends and decomposition analysis. The last section concludes the study.

2. METHODOLOGY

The unconditional quantile regression to examine the influence of variables such as sectors on the wages of different quantiles of each sample, using the following:

$$RIF(\ln y; Q_\tau) = X_i \beta_i + \epsilon \quad (\text{Eq. 1})$$

where:

Q_τ = quantile of log wages

X = covariates such as human capital and work characteristics

This is coined by Firpo et al. (2009, p. 954) as the "Unconditional QR".

The UQR approach also allows for the standard Oaxaca-Blinder (OB) decomposition. Hence, UQR-OB decomposition based on reweighted regression is as follows:

$$\overline{Q}_{i(Y_{2015})} - \overline{Q}_{i(Y_{2019})} = \underbrace{[(\overline{\beta}_{2015} - \overline{\beta}_{2019}) \overline{X}_C]}_{\text{Pure Endowments/ Characteristics Effect}} + \underbrace{[\overline{X}_C(\widehat{\beta}_{2015} - \widehat{\beta}_{2019})]}_{\text{Specification Error}} + \underbrace{[\overline{X}_{2015}(\widehat{\beta}_C - \beta_{2015})]}_{\text{Pure Wage Structure/ Returns Effect}} + \underbrace{[(\overline{X}_C - \overline{X}_{2015}) \widehat{\beta}_C]}_{\text{Reweighting Error}} \quad (\text{Eq. 2})$$

where:

distributional time-related wage differentials at the t th quantile

\overline{X} = covariates averages

$\widehat{\beta}_C$ = estimated from an RIF regression of the

counterfactual wage distribution

part of the wage differentials attributable to characteristics of endowments (*characteristics effect*)

$(\overline{\beta}_{2015} - \overline{\beta}_{2019}) \overline{X}_C$ =

corresponds to the contribution of wage

differences in the coefficients (*returns effect*)

3. DATA & ITS TRANSFORMATION

The raw data are from the October rounds of the Philippine Labor Force Survey (LFS) from the year 2015 and 2019, as this is the only quarterly round where the wage interest variable is reported in the local currency of the Philippine Peso (PhP). On the other hand, the Consumer Price Index (CPI) data is from the Bangko Sentral ng Pilipinas website.

The survey has information on the earnings (wage) equation: wages (in the form of the basic pay per day for individuals 15 years old and above) and its explanatory variables. Highest educational attainment (generated as dummies) is generated as the response variable of interest. The eight highest educational attainments are the following: Elementary Undergraduate, Elementary Graduate, High School Undergraduate, High School Graduate, Post Secondary Undergraduate, College Undergraduate, Post Secondary Graduate (Associate's degree/Certificate), and College Graduate (Bachelor's degree).

Other control variables include experience (which takes on the usual Mincerian form of age minus years of schooling minus 6), age (generated as dummies), origin (generated as a dummy with a value of 1 if residency is in a rural area), primary occupation, and occupation's industry classification.

Adjustments are made for wages. It is the (nominal) basic pay per day was deflated into real wages via the CPI with the base year of 2012. The hourly salary was then computed by dividing it by eight. Real hourly wages are then transformed by taking their natural log to smooth out any extreme.

The sample of wage earners for econometric estimation is selected according to the following criteria: salaried male and female workers aged 18 years and above. Hence, after adjustment based on the non-missing data on male wages, the sample was reduced to 24,174 observations for 2015 and 22,196 observations for 2019. On the other hand, the female sample was reduced to 15,324 observations for 2015 and 13,479 observations for 2019.

4. RESULTS AND DISCUSSION

4.1. Real Wage Per Educational Attainment Descriptive Statistics

While the wage statistics are mixed for other individual characteristics, such as age group, primary occupation, and place of origin, male workers generally earn higher wages than female earners across all educational attainments for 2015 and 2019 based on Figure 1-2.^{1,2} Further, for both males and females, the educational attainment with the largest average daily wage increase between 2015 and 2019 was a post-secondary (non-bachelor) undergraduate.

Figure 1. Ave. Real Daily Wage Per Educational Attainment between 2015 and 2019, Male Workers¹

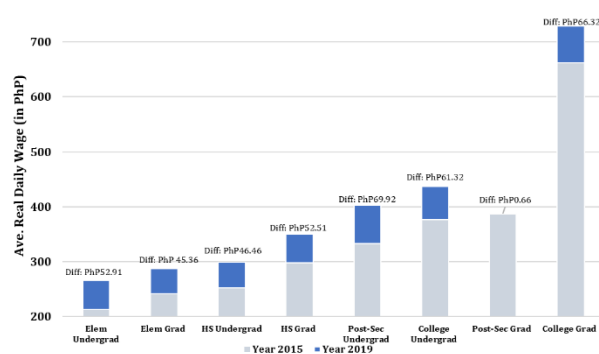
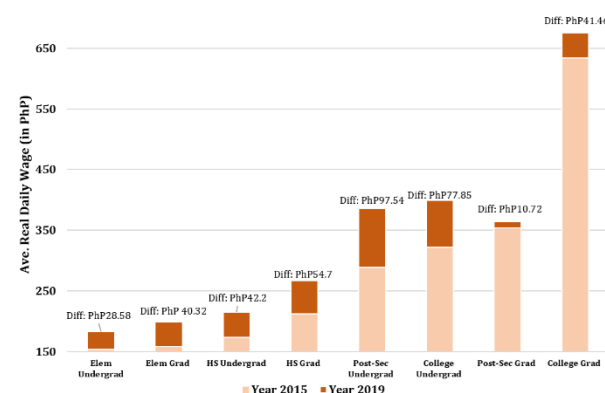
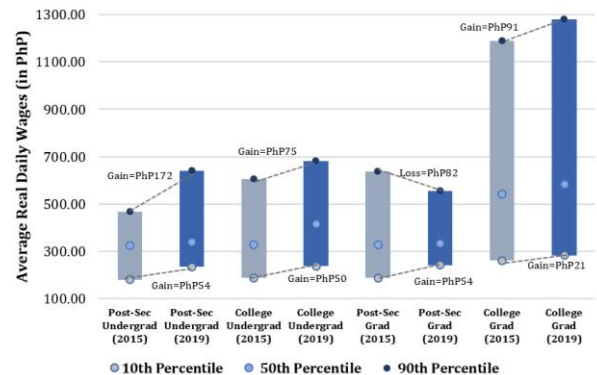


Figure 2. Ave. Real Daily Wage Per Educational Attainment between 2015 and 2019, Female Workers²



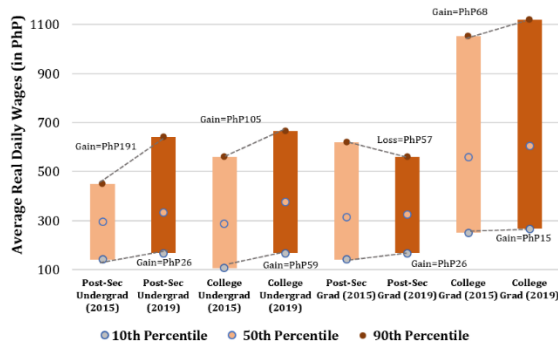
Regardless of the percentile across the distribution, one posits that there should have been a bigger earnings margin between 2015 and 2019 for higher educational attainments, such as for college (bachelor) degree graduates. Yet, the largest real wage increase is for earners with a post-secondary (non-bachelor) undergraduate for both males (PhP172 gain) and females (PhP191 gain) at the 90th percentile. On the other hand, the second largest real wage increases are for male earners with college (bachelor) degrees (PhP91 gain) and female earners with college undergraduate (PhP105 gain) both at the 90th percentile. One of the lowest wage increases belongs to college graduates at the 10th percentile for both males (PhP21 gain) and females (PhP15 gain) as presented in Figure 3 and Figure 4, respectively.^{3,4} Workers with lesser educational attainments in the same percentile receive higher earnings gains. This interesting observation may mean that a post-secondary education (with a diploma) is unable to generate increasing returns to education, which has been observed recently by Yee (2023) and Albert et al. (2024).

Figure 3. Real Daily Wage per Higher Educational Attainment between 2015 and 2019, Selected Percentiles for Male Workers³



^{1, 2, 3} Tabulated numerical results and their significance can be requested from the corresponding author.

Figure 4. Real Daily Wage per Higher Educational Attainment between 2015 and 2019, Selected Percentiles for Female Workers⁴



4.2. Detailed Decomposition

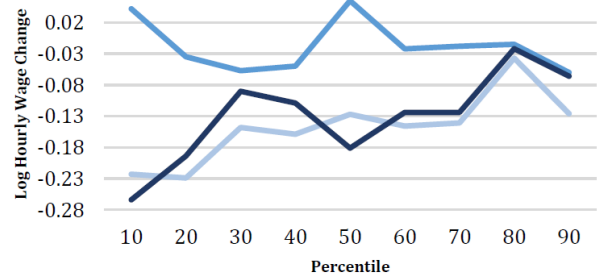
The RIF estimation procedure's decomposition gives estimates of the separated components of the total change in log wage for both males and females: characteristics and returns effects, respectively.

The total effect on the difference of log hourly wages between the years 2015 and 2019 can be divided into the characteristics and returns effects. Further, looking at the significant “total effects” results in Figure 5 (male workers) and Figure 6 (female workers), all workers exhibit an increase in the real wage throughout the Philippine wage distribution as attested by the negative numbers.^{5,6,7} The size of the decline is also in a non-monotonic pattern that decreases along the distribution as one goes from the lowest to the highest. This means the largest decrease in real wages is experienced by workers earning wages on the lower part of the distribution.

Based on Figures 5 and 6, the returns effect is the driving force in affecting both male and female real wages in the Philippine wage distribution. For both figures, the returns effect's pattern majority follows the total effect's as compared to the characteristics effect's pattern. Due to this, the returns effects are largely accounted for the real wage gain. For males, the increase in real wages can be seen at the lower end (10th to 20th percentiles) and around the middle (50th percentile) of the distribution. Similarly, for females,

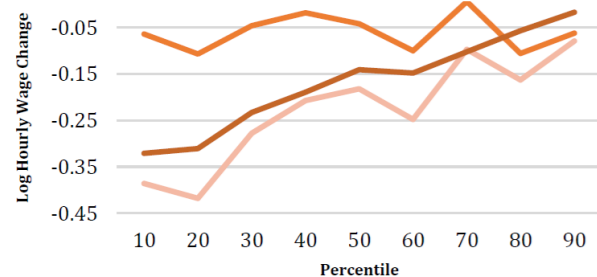
the increase in real wages can be seen only at the distribution's lower end (10th to 20th percentiles).

Figure 5. Decomposition of change in log-wages, Male⁶



— Total Effect — Characteristics Effect — Returns Effect

Figure 6. Decomposition of change in log-wages, Female⁷



— Total Effect — Characteristics Effect — Returns Effect

5. CONCLUSIONS

The paper's main aim is to describe the latest wage trends per educational attainment and decompose wage differentials before and during the K-12 curriculum implementation. With the implementation of the K-12 curriculum, male and female workers experienced an increase in real wages between 2015 and 2019 throughout the Philippine wage distribution, yet the largest real wage gain was only experienced by workers on the lower part of the distribution. Lastly, the returns to workers' characteristics is the driving force in affecting both male and female real wages in the Philippine wage distribution. Due to this, the returns effects are largely accounted for the rise in real compensation.

^{4, 5, 6} Tabulated numerical results and their significance can be requested from the corresponding author.

⁷ The interpretation of total effect of the log-wage change is the predicted log hourly wage of 2015 minus the predicted log hourly wage

of 2019. As such, negative figures of total effect mean a log hourly wage gain between 2015 and 2019.

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