


6-25-2020

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Recommended Citation

Abang Ali, Dayang Haszelinna (2020) "Gender Differences in Children's Non-Leisure Activities: A Decomposition Analysis," *Economics and Finance in Indonesia*: Vol. 66: No. 1, Article 5.

DOI: 10.47291/efi.v66i1.630

Available at: <https://scholarhub.ui.ac.id/efi/vol66/iss1/5>

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Gender Differences in Children's Non-Leisure Activities: A Decomposition Analysis

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Manuscript Received: 27 May 2019; Revised: 23 May 2020, 26 June 2020; Accepted: 30 June 2020

Abstract

The prevalence of son preference indicates that girls will have less leisure time compared to boys. This study aims to examine gender differences in weekly hours in schooling, housework, and working among children in Indonesia using Tobit Model and decomposition model of Bauer & Sinning (2005), to test whether son preference explains the differences. The dataset was drawn from the fourth wave of Indonesia Family Life Survey (IFLS) in 2007. The results show significant gender differences in housework and working for children aged 5–14 years and insignificant gender gap in schooling for both age groups. These results confirm the existence of gender differences among younger children compared to older children in their time allocation.

Keywords: decomposition; economically active children; gender differences; Tobit model; work hours

JEL classifications: O15; D13; J13

1. Introduction

Children are frequently found to be involved in a variety of activities, in which the time allocation is decided by their parents (Ali & Arabsheibani 2016). Some of these activities are directed at human capital accumulation, to produce marketable outputs or provide services for family members. The most common form of services for family members provided by children is helping with household chores (Evans 2010; Burrone & Giannelli 2016). In addition, there is a large gender gap in the hours of housework, where girls perform more household tasks than boys. Due to the reason that doing housework contributes little to human capital build-up of boys, parents are more likely to have their sons either engaged in education or other training activities, as they are expected to generate income for the family in future. Consequently, girls spend most of

their time on doing household chores as opposed to boys (Agesa & Agesa 2019; Raskind et al. 2020).

According to Lin & Adserà (2012), parents in Indian society believe that girls should be able to do household chores well in order to be socially fit once they enter adulthood. In addition, helping with daily housework is a way for parents to request their daughters to contribute to the family before leaving their biological family once they are married. In the context of labor, boys are found to have higher earnings than girls even after controlling for differences in many aspects such as work experience, working hours, and human capital investments in schooling (Behrman, Pollak & Taubman 1986; Saaritsa & Kaihovaara 2016; Rapoport & Thibout 2018). Generally, households continue childbearing until they reach the desired number of sons and reduce the resources available to disadvantaged children, more particularly girls. Furthermore, opportunities for women in the labor market are limited and remain restricted than those for men in most countries.

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In particular, in certain countries such as in South Asia, more boys are enrolled in primary school compared to girls, and the gap widens for secondary education. As stated by Alderman & King (1998), the gap is due to cultural influences, where Islam predominates, such as in Malaysia and Indonesia. In addition, according to World Bank (1996), the ratio of boys to girls in both primary and secondary schools in middle-income countries is 1.03. The departure of daughters to their marital homes following their marriage also reduces the desire of parents to invest in their education as a long-term investment. Hence, children with higher earning potential will be treated more favorably and receive disproportionate household resources (Lin & Adserà 2012).

A gender gap is observed from the activities of children, which may reflect the gender preference of parents in the households. Generally, gender preference is most prevalent in South Asia and East Asia because of a wide range of prevailing religious and cultural transitions, and Indonesia is one of the countries located in the region. Thus, the concern of this paper is to examine the gender differences in the time allocation of children's activities by decomposition analysis. The time allocation is separated into hours spent on schooling, housework, and working. This study will provide the importance of gender wage differences in the time allocation for children that reflect the prevalence of son preference in certain activities.

This paper is organized as follows. Section 2 reviews previous literature related to gender differences and the existence of son preference. Section 3 introduces the method consisting of the data used and the estimation requirement for the analysis. The results of the analysis are presented in Section 4 while Section 5 concludes the findings of this paper.

2. Literature Review

In the East and South Asia region, the existence of son preference is different and the opportuni-

ties for education, food allocation, and medical care are usually provided for boys (Arnold 1997; Das Gupta et al. 2003). For example, the need to pay dowries for daughters in India has increased the demand for sons compared to daughters in the family. In contrast, low female autonomy in South Korea among patriarchal families has strengthened son preference, a continuing practice up to the present time. In addition, the enforcement of one-child policy in China has increased discrimination against daughters. The policy began in 1979 and remains a practice among the Chinese population. Thus, patrilineal kinship system among families in these three countries has ensured that parents have strong economic incentives for sons even though adult women are economically active.

Edmonds & Pavcnik (2005) find that labor force participation rates are high among children aged 10 to 14 years old in rural areas, where children usually work around 16 hours per week. In different regions of the world, Fares & Raju (2007) find that out of every five children between the ages of 7 and 14 years, one child is working. Latin American, Caribbean, Middle Eastern and North African countries have the lowest mean of children in economic activities, approximately 1 out of 10 children. A study carried out by Lukman (2009) reveals a high number of child prostitutes in Malaysia in the late 1970s, involving almost 2,000 to 8,000 young women under the age of 21 years. De Tray (1983) observes the work patterns of children in peninsular Malaysia, all of whom live with their parents. The findings show that the participation rates and working hours of children increase sharply with age. In particular, when children reach mid-to-late teens, the "desired"¹ weekly working hours rise by seven hours, or almost a full working day, per year of age. By focusing on gender differences, Burrone & Giannelli (2016) study the consequences of working for children during adulthood. They find that girls working in their childhood are underprivileged as

¹Referring to time allocation of children whether inside or outside the home as time allocation of adults in terms of a participation decision, hours worked conditional on participation, and to explore parent demand functions for child time.

they are more subject to the adverse effects and facing gender discrimination in the labor market. In contrast, boys have positive consequences, which can increase the probability of having resilient employment in adulthood (see also Emerson & Souza 2011).

Generally, boys are more likely to engage in the labor market than girls (Deb & Rosati 2004; Fares & Raju 2007; Hsin 2007). Fares & Raju (2007) discover that, approximately, 1 in 4 boys and 1 in 5 girls, on average, are economically active across 65 countries in different regions of the world. As studied by De Tray (1983), Malaysian girls perform traditional housekeeping activities more frequently and for longer hours compared to boys. Thus, under the broadest definition of productive hours², young Malaysian girls provide the greatest transfers³ to parents during their early years at home. A study by Putnick & Bornstein (2016) on 38 low and middle-income countries finds that the effect of gender differences is small and inconsistent. However, the finding reveals strong relations between gender differences in child labor and gender inequality indices at the national level.

A study by Kruger & Berthelon (2007) finds that once the definition of work includes household chores, girls are more likely to work and less likely to attend school (see also Bonke 2010; Evans 2010; Webbink, Smits & de Jong 2010). They also discover that the harmful effects of household domestic work (the burden of household chores on girls, harming their early human capital accumulation) are faced by girls from lower socio-economic levels. In particular, approximately 58% of Brazilian girls aged between 10 and 14 years spend their time on household chores per week. On average, girls spend more time doing chores for 13.8 hours per week compared to boys with 8.9 hours per week. Therefore, the incidence of work increases from 13

percent to slightly more than 63 percent with the definition of work that includes housework. Once considering household work, girls are less likely to merely attend school and more likely to concurrently go to school and work. Moreover, domestic activities have a negative impact on girls' education, especially girls from middle income families. As a result, they conclude that even a small amount of time dedicated to household chores is enough to cause young Brazilian girls to quit school.

In Egypt, Assaad, Levison & Zibani (2001) reveal that girls are more likely to delay school and start working at an earlier age instead. However, despite the fact that working is strongly related to not attending school for both boys and girls, a strong causal relationship is found between working and lack of school attendance for girls only. In addition, education for girls is more income elastic compared to boys. Kambhampati (2009) also reveals that the proportion of girls involved in both schooling and working in India has increased from 1 percent in 1993 to above 10 percent in 2004. However, the findings of Horrells & Humphries (1995) reveal that the reason for boys' involvement in the labor market is the fact that they have reached a certain age that allows them to work supposing opportunities are available, regardless of other factors including the family's circumstances. On the other hand, girls work since their households want them to work.

The existence of son preference is mainly in accordance with the beliefs and customs of certain countries. Several parents favor boys more than girls as they believe that sons remain staying with them even after they get married. Thus, instead of using univariate analysis as previous literature, this study implemented decomposition analysis to further examine the hourly gap in children's activities that are significantly explained by the given factors or unexplained elements. This will help explaining the existence of son preference especially with the strong influence of culture in Indonesia where Islam predominates. This situation is also found among Muslims in India (Nasir & Kalla 2006; Fuse 2008).

²The paper measures children's productive activities as (1) labour force activities plus time spent producing goods for home consumption, and (2) the sum of all productive activities including housework and child care.

³Transfers are measured in hours.

3. Method

3.1. Data

The data were drawn from the fourth wave of Indonesia Family Life Survey (IFLS) in 2007. The sample consists of 9,461 children aged 5–14 years (4,843 boys and 4,612 girls) and 2,502 children aged 15–17 years (1,232 boys and 1,270 girls), comprising 11,963 children in total. According to Rosati & Rossi (2007), the number of hours spent on working is not only important as a measure of the welfare of the children (a measure of forgone leisure), but also essential to evaluate the consequences of working in terms of health and human capital accumulation. Thus, we utilized the spent hours in each activity as the dependent variables of the analysis. Children with the age of 5–14 years are included as young people expected to attend school, while children with the age of 15–17 years are those who have completed basic schooling, for whom working is legal and further schooling is optional. Thus, time allocation for children aged 5–14 years and 15–17 years may vary depends on several factors. Table 1 provides summary statistics of total hours per week spent on schooling, housework and working by children aged 5–14 years.

Table 1. Total Number of Hours Spent per week on Schooling, Housework and Working by Children Aged 5–14 years in 2007

Gender	Total Number of Hours (per week)		
	Schooling	Housework	Working
Pooled	19.91	5.58	11.44
Boys	19.80	4.93	10.97
Girls	20.08	5.97	11.99

Source: IFLS4 (2007)

As shown in Table 1, the hours spent on working by girls aged 5–14 years (11.97 hours per week) are much higher than those of boys (10.97 hours per week). Girls also spend more hours on doing housework than boys with the gap of 1.07 hours per week. Even though girls are more likely to be in the labor market and doing housework than boys, they spend more time on schooling compared to boys

with an average of 20.08 hours per week.

Table 2. Total Number of Hours Spent per week on Schooling and Working by Children Aged 15–17 years in 2007

Gender	Total Number of Hours (per week)	
	Schooling	Working
Pooled	23.76	42.76
Boys	22.93	48.15
Girls	24.62	40.56

Source: IFLS4 (2007)

Table 2 displays the total hours spent on schooling and working by children aged 15–17 years. Due to no information on hours spent on doing housework by children aged 15–17 years provided in IFLS4, this study only reported the hours spent on schooling and working in the labor market. Older girls also spend most of their time on schooling with an average of 24.62 hours per week, or 1.69 hours longer than boys. In contrast, boys spend more than 40 hours working in the labor market with the gap of 7.59 hours relative to the girls. In total, it is clearly shown that older children are more likely to spend their time in the labor market than younger children, while girls are more likely to attend school and do housework compared to boys.

3.2. Estimation Method

Decomposition analysis was used to determine the extent to which the factors influence the time allocation for boys and girls⁴. In particular, the decomposition method will show the gap between hours spent for certain activities, in which the differences are significant between both genders. This method follows the method of Basilio (2009). The decomposition is conducted to the pooled sample and the elements of the differences are separated into working hours of children aged 5–14 years and working hours of children aged 15–17 years. Additionally, the decomposition is explained by the differences in predictors of the elements that are attributable to the returns of

⁴The results of Tobit estimation are available upon request.

these predictors, an approach similar to the decomposition method proposed by Blinder (1973) and Oaxaca (1973). However, since the dependent variables are censored, causing the marginal effects to depend on the estimated variance of the error term, it is not appropriate to use the Blinder-Oaxaca linear model decomposition (Basilio 2009). Thus, the procedure for Tobit model initiated by Bauer & Sinning (2005) is used to decompose the differences in the mean of labor supply between boys (m) and girls (f). Following Bauer & Sinning (2005)⁵, the following linear regression model is estimated separately for the group $k = m, f$:

$$Y_{ik} = X_{ik}\beta_k + \varepsilon_{ik} \quad (1)$$

As $i = 1, \dots, N_k$, then $\sum_k N_k = N$ and for this model, Blinder (1973) and Oaxaca (1973) state the decomposition as:

$$\begin{aligned} \bar{Y}_m - \bar{Y}_f &= \Delta^{OLS} \\ &= [E_{\beta_m}(Y_{im}|X_{im}) - E_{\beta_m}(Y_{if}|X_{if}) \\ &+ [E_{\beta_m}(Y_{im}|X_{im}) - E_{\beta_m}(Y_{if}|X_{if})] \\ &= (\bar{X}_m - \bar{X}_f)\hat{\beta}_m + \bar{X}_f(\hat{\beta}_m - \hat{\beta}_f) \end{aligned} \quad (2)$$

in which $\bar{Y}_k = N_k^{-1} \sum_{i=1}^{N_k} Y_{ik}$ and $\bar{X}_k = N_k^{-1} \sum_{i=1}^{N_k} X_{ik} \cdot E_{\beta_k}(Y_{ik}|X_{ik})$ indicate the conditional expectation of Y_{ik} evaluated on a vector-valued parameter of β_k . The first term on the right hand side of Equation (2) shows the differences in the outcome variable between the two categories due to the differences in observable characteristics. The second term is the differences due to the differences in coefficient estimates. In other words, the latter term can be interpreted as the gap in working hours due to different labor supply of boys and girls. According to Álvarez & Miles (2003), this is referred as the "gender effect".

Given X_{ik} , the linear model is a good estimation

⁵An extension of the Blinder-Oaxaca decomposition to non-linear regression models was developed by Bauer & Sinning (2005). This method can be applied to models with discrete and limited dependent variables by using `nldecompose` in STATA. This command performs a Blinder-Oaxaca decomposition of the mean outcome differential of linear and nonlinear regression models, calculating different variants of the decomposition equation.

of the expected value of the outcome variable $E(Y_{ik}|X_{ik})$ for the value of X_{ik} that is close to the mean. According to Bauer & Sinning (2005), supposing the outcome variable Y_{ik} is censored, the use of OLS may lead to biased estimates of the parameter vector and thus deceives the results of the decomposition. By considering a Tobit model, Bauer & Sinning (2005, p. 2) illustrate the Blinder-Oaxaca decomposition for censored regression models, in which the distribution of the dependent variable is censored from above at the point a_1 and from below at the point a_2 :

$$\begin{aligned} Y_{ik} &= X_{ik}\beta_k + \varepsilon_{ik} \\ Y_{ik} &= a_1 \text{ if } Y_{ik}^* \leq a_1 \\ Y_{ik} &= a_2 \text{ if } Y_{ik}^* \geq a_2 \end{aligned}$$

$$Y_{ik} = Y_{ik}^* = X_{ik}\beta_k + \varepsilon_{ik} \text{ if } a_1 < Y_{ik}^* < a_2 \quad (3)$$

$$\varepsilon_{ik} \sim N(0, \sigma_k^2)$$

The unconditional expectation of Y_{ik} given X_{ik} comprises of the conditional expectations of Y_{ik} weighted with the respective probabilities of being censored or uncensored:

$$\begin{aligned} E(Y_{ik}|X_{ik}) &= a_1\varphi_1(\beta_k, X_k, \sigma_k) + a_2\varphi_2(\beta_k, X_k, \sigma_k) \\ &+ \forall(\beta_k, X_k, \sigma_k) \left[X_{ik}\beta_k + \sigma \frac{\gamma(\beta_k, X_k, \sigma_k)}{\forall(\beta_k, X_k, \sigma_k)} \right] \end{aligned} \quad (4)$$

where,

$$\begin{aligned} \varphi_1(\beta_k, X_k, \sigma_k) &= \varphi[\sigma_k^{-1}(a_1 - X_{ik}\beta_k)], \varphi_2(\beta_k, X_k, \sigma_k) \\ &= \varphi[\sigma_k^{-1}(a_2 - X_{ik}\beta_k)], \forall(\cdot) \\ &= \varphi_1(\cdot) - \varphi_2(\cdot) \text{ and } + \forall(\beta_k, X_k, \sigma_k) \\ &= \emptyset[\sigma_k^{-1}(a_1 - X_{ik}\beta_k)] - \emptyset[\sigma_k^{-1}(a_2 - X_{ik}\beta_k)] \\ &\text{for } k = m, f. \end{aligned}$$

Furthermore, $\emptyset(\cdot)$ represents the standard normal density function while $\varphi(\cdot)$ represents the cumulative standard normal density function. Particularly, in contrast to the linear regression model, the conditional expectations $E(Y_{ik}|X_{ik})$ in the Tobit model rely on the variance of the error term, namely σ_k . Consequently, they are dependent on which σ_k is used in the counterfactual parts of the decomposition equation. Therefore, the two possible decom-

positions are:

$$\Delta_f^{\text{Tobit}} = \left[E_{\beta_m, \sigma_m}(Y_{im}|X_{im}) - E_{\beta_m, \sigma_f}(Y_{if}|X_{if}) + E_{\beta_m, \sigma_f}(Y_{if}|X_{if}) - E_{\beta_f, \sigma_f}(Y_{if}|X_{if}) \right] \quad (5)$$

and

$$\Delta_m^{\text{Tobit}} = \left[E_{\beta_m, \sigma_m}(Y_{im}|X_{im}) - E_{\beta_m, \sigma_m}(Y_{if}|X_{if}) + E_{\beta_m, \sigma_m}(Y_{if}|X_{if}) - E_{\beta_f, \sigma_f}(Y_{if}|X_{if}) \right] \quad (6)$$

where $E_{\beta_k, \sigma_k}(Y_{ik}|X_{ik})$ refers to the conditional expectation of Y_{ik} evaluated at the parameter vector β_k and the error variance σ_k for $k = f, m$. In particular, in both equations, the differences in the outcome variable between the two categories shown in the first term on the right-hand side are due to the differences in the predictors X_{ik} while the differences in Y_{ik} in the second term are due to the differences in coefficients. According to Bauer & Sinning (2005), the two versions of the decomposition equation may vary from each other, supposing large differences in the variance of the error term between the two groups exist. The decomposition using σ_{fto} calculate the counterfactual parts, as in Equation (5), is more comparable to the OLS decomposition described in Equation (2), since the counterfactual parts differ from $E_{\beta_f, \sigma_f}(Y_{if}|X_{if})$ only by using the parameter vector group m , β_m , rather than using the parameter vector and the error variance for group m in the alternative decomposition described in Equation (5). Using the sample counterpart of Equation (4):

$$S(\hat{\beta}_k, X_{ik}, \hat{\sigma}_k) = N^{-1} \sum_{i=1}^N \left\{ a_1 \varphi_1(\hat{\beta}_k, X_{ik}, \hat{\sigma}_k) + a_2 \varphi_2(\hat{\beta}_k, X_{ik}, \hat{\sigma}_k) + \forall a_1 \varphi_1(\hat{\beta}_k, X_{ik}, \hat{\sigma}_k) \left[X_{ik} \hat{\beta}_k + \hat{\sigma}_k \frac{\gamma(\hat{\beta}_k, X_{ik}, \hat{\sigma}_k)}{\forall(\hat{\beta}_k, X_{ik}, \hat{\sigma}_k)} \right] \right\}$$

Thus, Equation (4) can be estimated by:

$$\hat{\Delta}_f^{\text{Tobit}} = [S(\hat{\beta}_m, X_{im}, \hat{\sigma}_m) - S(\hat{\beta}_m, X_{if}, \hat{\sigma}_f)] + [S(\hat{\beta}_m, X_{if}, \hat{\sigma}_f) - S(\hat{\beta}_f, X_{if}, \hat{\sigma}_f)] \quad (7)$$

Similarly, Equation (6) can be estimated by:

$$\hat{\Delta}_m^{\text{Tobit}} = [S(\hat{\beta}_m, X_{im}, \hat{\sigma}_m) - S(\hat{\beta}_m, X_{if}, \hat{\sigma}_m)] + [S(\hat{\beta}_m, X_{if}, \hat{\sigma}_m) - S(\hat{\beta}_f, X_{if}, \hat{\sigma}_f)] \quad (8)$$

Therefore, the estimation model is written as:

$$H_i = \alpha_{ij} + \beta_{ij} X_{ij} + \varepsilon_{ij} \text{ for } i = m, f \text{ and } j = 1, 2 \quad (9)$$

where H is the vector of the hours spent on working in a week by child i in group j (two groups: 5–14 years and 15–17 years), α is the estimated constant, X represents the gender explanatory variable, and β is the associated coefficient vector. In addition, ε is the error term assumed to be normally distributed. The theoretical model suggests that explanatory variables will have different effects on boys and girls, thus we estimated the function separately by gender. Moreover, Equation (9) is estimated separately for children aged 5–14 and 15–17 years to investigate the effects of the differences of the explanatory variables based on age of the children since the time spent on working and schooling is different between two groups of age.

4. Result

4.1. Summary Statistics

Table 4 and 5 present the summary statistics according to the activities reported by children in the previous week. The older working children, on average, attain 11.91 years of schooling, and 27% of them are other relatives of the head of the household. It is a smaller percentage compared to working children aged 5–14 years. The fathers and the mothers are likely to stay at home for working children aged 15–17 years as opposed to children aged 5–14 years. In addition, older children have better educated parents, with an average of 7.4 years for the fathers and 7.09 years for the mothers, while parents of working children aged 5–14 years have averagely attained 6.7 years for the fathers and 6.57 years for the mothers. The size of households

Table 3. Description and Measurements of Explanatory Variables

No	Variable	Description	Measurement
Dependent variable			
	Working Hours per week	Total working hours per week reported in the questionnaire	
Independent and control variables			
1	Girls	Gender of the child	Dummy = 1 if female; 0 if male
2	Age	Age of the child	Exact age (years)
3	Years of schooling	Total years of schooling	Total years of schooling
4	Non-biological	Biological and non-biological relationship with the head of the household	Dummy = 1 if he/she is a son/daughter; 0 = if others (niece/foster, etc.)
5	Father-stay	The father of the child stays in the household	Dummy = 1 if father stays; 0 if father does not stay
6	Mother-stay	The mother of the child stays in the household	Dummy = 1 if mother stays; 0 if mother does not stay
7	Level of education: father	Level of education of the father of the child	Level of education of the father in years
8	Level of education: mother	Level of education of the mother of the child	Level of education of the mother in years
9	Household income	Total household income minus child's income (in tens of thousands IDR)	
10	Household size	Total members of the household	
11	Child (under 5 years)	Total number of children aged below 5	
12	Piped water	The household is provided with the piped water	Dummy = 1 if piped water is provided; 0 if piped water is not provided
13	Muslim	Religion of the child	Dummy = 1 if Muslim; 0 if other religions
14	Sumatera	Respondent living in Sumatera	Dummy = 1 if living in Sumatera; 0 if living in other islands
15	Java	Respondent living in Java	Dummy = 1 if living in Java; 0 if living in other islands
16	Lesser Sunda Islands	Respondent living in Lesser Sunda Islands	Dummy = 1 if living in Lesser Sunda Islands; 0 if living in other islands
17	Kalimantan	Respondent living in Kalimantan	Dummy = 1 if living in Kalimantan; 0 if living in other islands
18	Sulawesi	Respondent living in Sulawesi	Dummy = 1 if living in Sulawesi; 0 if living in other islands

is approximately 7.0 for working children aged 5–14 years and almost 6.5 for working children aged 15–17 years. The proportion of households having access to piped water and the proportion of Muslims between working children aged 5–14 years and working children aged 15–17 years do not show great differences. Working children are mostly located in Java Island, where the proportion reaches more than 35% for both groups of age, while the lowest proportion is living in Kalimantan Island, namely 3% and 4% of working children aged 5–14 years and 15–17 years, respectively.

It is clearly shown in Table 4 (column 2) that almost 63% of girls do housework. The age of children involved in housework is 10.73 years on average. The years of schooling attained are lower than the

children in working category, namely 6.70 years. Fathers have attained 7.70 years of schooling, while mothers have attained 7.58 years of schooling. On average, household income of children in housework category is IDR1,707.35 per month. In addition, 21% of households have piped water and 90% of them are Muslim.

In terms of schooling, girls are more likely to attend school than boys, with the proportion of 51% for both younger and older children (Table 5). On average, a child aged 5–14 years has spent 9.99 years of schooling while a child aged 15–17 years has spent 15.99 years of schooling. More than 85% of fathers and mothers of children from both age groups stay at home. Fathers and mothers of younger children have attained 8.06 years and 7.85

Table 4. Summary Statistics of Explanatory Variables of Children Aged 5–14 Years by Activity³

Explanatory Variables	Activity		
	Schooling	Housework	Working
Girls	0.51 (0.01)	0.63 (0.01)	0.47 (0.02)
Age (years)	9.99 (0.03)	10.73 (0.04)	11.91 (0.09)
Years of Schooling	6.67 (0.02)	6.7 (0.03)	7.19 (0.07)
Non-biological	0.27 (0.01)	0.27 (0.01)	0.27 (0.02)
Father-Stay	0.9 (0.003)	0.89 (0.005)	0.88 (0.01)
Mother-Stay	0.97 (0.002)	0.97 (0.003)	0.98 (0.01)
Level of Education: Father ¹	8.06 (0.05)	7.7 (0.008)	6.66 (0.18)
Level of Education: Mother ¹	7.85 (0.04)	7.58 (0.07)	6.57 (0.17)
Household Income ²	1,841.37 (41.49)	1,707.35 (67.55)	1,562.14 (78.65)
Household Size	6.45 (0.03)	6.48 (0.05)	7.03 (0.12)
Child (under 5 years)	0.47 (0.01)	0.48 (0.01)	0.47 (0.03)
Piped Water	0.22 (0.005)	0.21 (0.007)	0.18 (0.02)
Muslim	0.9 (0.003)	0.9 (0.005)	0.81 (0.02)
Sumatera	0.23 (0.005)	0.29 (0.008)	0.33 (0.02)
Java	0.55 (0.006)	0.49 (0.009)	0.39 (0.02)
Lesser Sunda Islands	0.11 (0.004)	0.13 (0.006)	0.19 (0.02)
Kalimantan	0.05 (0.002)	0.04 (0.003)	0.03 (0.007)
Sulawesi	0.06 (0.003)	0.05 (0.004)	0.05 (0.009)

Note: ¹The years of schooling for fathers and mothers are reported similar to years of schooling for children, ranging from 0 = no schooling and 18 = 18 years of schooling.

²In tens of thousands IDR.

³No housework activity reported for children aged 15–17 years in the survey.

years of schooling, respectively. Meanwhile, fathers and mothers of children aged 15–17 years have attained 7.44 years and 7.09 years of schooling, respectively.

4.2. Estimation Results

The following estimates are presented using the behavioral responses of the boys as the reference. The counterfactual scenario is that in the absence of inherent differences in gender behavior, girls with

given characteristics will supply the same amount of work as boys with the same elements.

The raw difference in schooling for the full sample is approximately 0.66 hours with girls spending more time for schooling (Table 6). However, the gender gap that can be explained by the differences in gender attributes does not show significant results. The raw difference is shown to be higher among children aged 15–17 years, with the gap of 1.56 hours. However, more than 80 percent of the gap remains unexplained. Thus, there are no significant

Table 5. Summary Statistics of Explanatory Variables of Children Aged 15–17 years by Activity

Explanatory Variables	Activity	
	Schooling	Working
Girls	0.51 (0.01)	0.48 (0.01)
Age	15.99 (0.02)	15.97 (0.02)
Years of Schooling	9.85 (0.05)	10.37 (0.05)
Non-biological	0.3 (0.01)	0.29 (0.01)
Father-Stay	0.85 (0.007)	0.85 (0.008)
Mother-Stay	0.92 (0.005)	0.92 (0.006)
Level of Education: Father1	7.44 (0.10)	7.25 (0.09)
Level of Education: Mother1	7.09 (0.09)	6.99 (0.10)
Household Income2	1,998.62 (89.33)	1,973.47 (89.61)
Household Size	6.48 (0.07)	6.46 (0.07)
Child (under 5 years)	0.31 (0.01)	0.29 (0.01)
Piped Water	0.23 (0.01)	0.24 (0.009)
Muslim	0.89 (0.01)	0.88 (0.007)
Sumatera	0.23 (0.008)	0.23 (0.009)
Java	0.55 (0.01)	0.53 (0.01)
Lesser Sunda Islands	0.12 (0.006)	0.13 (0.007)
Kalimantan	0.04 (0.004)	0.04 (0.004)
Sulawesi	0.06 (0.005)	0.06 (0.005)

Note: ¹The years of schooling for fathers and mothers are reported similar to years of schooling for children, ranging from 0 = no schooling and 18 = 18 years of schooling.

²In tens of thousands IDR.

Table 6. Decomposition of the Gap in Time of Schooling

	Full Sample	5–14 years	15–17 years
Raw difference (Δ)	-0.6622**	-0.6388**	-1.5643**
standard error (s.e.)	(0.2633)	(0.2688)	(0.7021)
Explained part	-0.0793	-0.0833	-0.0699
standard error (s.e.)	(0.1317)	(0.1405)	(0.1440)
% of Δ	12	13	4
Unexplained part	-0.5828**	-0.5555**	-1.4944**
standard error (s.e.)	(0.2286)	(0.2296)	(0.7146)
% of Δ	88	87	96

Notes: *, **, *** statistically significance at 1%, 5%, and 10%.

gender differences in the time of schooling between both age groups.

Table 7. Decomposition of the Gap in Time of Doing Household Chores

	5-14 years ^a
Raw difference ($\hat{\Delta}$)	-0.9812*
standard error (s.e.)	(0.2322)
Explained part	0.1162**
standard error (s.e.)	(0.0559)
% of $\hat{\Delta}$	12
Unexplained part	-1.0975*
standard error (s.e.)	(0.2300)
% of $\hat{\Delta}$	88

Notes: *, **, *** statistically significance at 1%, 5%, and 10%.

^aThe housework activity is only available for children aged 5–14 years.

The raw difference shown in Table 7 in house-work is 0.98 hours, reflecting that girls spend more hours doing housework compared to boys. The factors significantly explaining the differences in hours spent on doing house work account for 12 percent of the gap between girls and boys. This reflects that the hourly gap is explained by differences in gender attributes. The result suggests that there are significant differences between genders related to hours devoted for housework, particularly among children aged 5–14 years. However, the balance of 88 percent remains unexplained.

Finally, Table 8 displays the decomposition of hours spent on market work between girls and boys in both age groups. The raw difference in working for the full sample is about 1.83 hours with boys spending more time in market work. However, supposing girls would have the same attributes, the gap in working would be decreased by 0.47 hour.

The raw difference is shown to be higher among children aged 15–17 years, with the gap of 1.69 hours, while the gap of 1.44 hours is given by children aged 5-14 years. In addition, the factors significantly explaining the differences in working hours account for 27 percent and 51 percent for children aged 5-14 years and children aged 15–17 years, respectively. It is also interesting to note that more

than 50 percent of hourly gap of children aged 1-5-17 years is explained by gender attributes. Thus, this result indicates the significant gender differences in hours spent on market work. Overall, the result suggests that there is significant gender differences in time allocation for both housework and market work, however, the gender gap is not significant in time allocated for schooling. Thus, the significant gender differences observed in housework and working may reflect the existence of son preference, especially among children aged 5–14 years. Gender preference for children in Muslim societies may be shaped by cultural factors arising from the subordinate position of women within the family and in the society at large. The results support the findings of Deb & Rosati (2004), Fares & Raju (2007), Hsin (2007), and Putnick & Bonstein (2016), where boys are more likely to be involved in economic activities compared to girls, contributing to the significant gender differences in market work. The significant gender differences among girls in Indonesia in doing chores are found to be similar among Brazilian girls (Kruger & Berthelon 2007; Bonke 2010; Evans 2010; Webbink, Smits & de Jong 2010), thus this result reveals that girls are still overlooked in twentieth century.

5. Conclusion

The decomposition method to observe the mean gender differences in weekly hours in schooling, housework and working is estimated to draw some conclusions regarding the importance of gender wage differences in time allocation for children. The decomposition model of Bauer & Sinning (2005) shows significant gender differences in housework and working for children aged 5–14 years. However, there are no significant gender differences in schooling for both age groups. These results confirm the existence of gender differences among younger children related to their time allocation, and this suggests that son preference may be one of the factors explaining the observed gender differences

Table 8. Decomposition of Hourly Gap in Market Work

	Full Sample	5–14 years	15–17 years
Raw difference (Δ)	1.8262***	-1.4410**	1.6901**
standard error (s.e.)	(1.0383)	(1.0213)	(0.8324)
Explained part	0.4724**	0.3873**	0.8540**
standard error (s.e.)	(0.3029)	(0.1680)	(0.1071)
% of Δ	26	27	51
Unexplained part	1.3538**	1.8283**	1.7756**
standard error (s.e.)	(0.9001)	(1.2081)	(0.8330)
% of Δ	74	73	49

Notes: *, **, *** statistically significance at 1%, 5%, and 10%.

in non-leisure time allocation.

However, there is a need for further and more general exploration of the instruments that determine son preference and gendered economic behavior in Indonesia. Furthermore, as the variables in the models are limited to certain households and characteristics of the community, further analysis are required in the future. For example, access to school and other infrastructures and socio-economics condition of the family may show significant gender differences and support the prevalence of son preference in Indonesia. Moreover, the sector of work performed by a child (e.g. trade and agriculture) is essential as this will provide a clear picture of their working conditions, the types of tasks they are engaged to, and the factors encouraging the child to work. Thus, the potential for overestimation and underreporting may be an issue during data collection.

Hence, based on the results found in this study, improving the educational status of women and raising the value of girls in the society should be a matter of importance, even policy requirements. These may help reduce the gender gap between boys and girls. It includes improving their reproductive health, in which a woman can plan for her family and the rest of her life. It also includes the right to decide the number, timing and distance of their children, to ensure their freedom to participate more fully and equally in society. In terms of education, schools can promote gender-sensitive curricula, thus expanding educational and occupational opportuni-

ties for girls in order for girls to be perceived as important and desirable. Lack of education severely limits women's access to information and opportunities. Thus, increasing the educational attainment of women and girls benefits both individuals and future generations. In addition, higher levels of women's education are strongly associated with lower infant mortality and lower fertility, as well as better outcomes for children in future.

Acknowledgement

This research was supported by Universiti Malaysia Sarawak under a Special Short-Term Grant (F01/SpSTG/1572/2017).

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