Assessing the Role of Education on Intergenerational Income Mobility: The Case of Indonesia

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Abstract

This paper aims to address the role of education in Indonesia's intergenerational income mobility. This will include measuring the level of intergenerational mobility to establish the general condition in Indonesia through the estimation of intergenerational income mobility. The main data used to test the model will be secondary data from the Indonesian Family Life Survey in 1993, 1997, 2000, 2007 and 2014. Through multiple linear regression analysis, the authors conclude that education influences the levels of intergenerational income mobility in Indonesia. Child's education has a larger coefficient than father's education in determining the child's income. Public policy must focus on human investment to develop human capital through a provision of quality education throughout the country, particularly for people from lower income groups. Indonesia's government should also allocate its education spending to increase the attainment of higher education level, establishing the next generations with higher productivity and income than previous generations.

Keywords: intergenerational mobility; inequality; education; income
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1. Introduction

Indonesia is one of the world's largest economies, ranking 7th in the world in terms of purchasing power parity (World Bank, 2021a). The World Bank (2016) reports that Indonesia has experienced an immense increase in its per capita income with a four times fold increase within the period of 1976–2015. But the situation has changed due to the COVID-19 pandemic where now the number of poor people has escalated to 27.55 million people as of September 2020, resetting the progress that has been made in the last three years (World Bank, 2021b). Thus, the current state of growth in Indonesia has not been able to facilitate the welfare situation of the citizens in the country.

As countries develop, they are faced with several challenges that follow economic growth. One of the main issues include the rise in inequality which occurs when there are varying levels of wealth in society (Milanovic, 2005; Bollen & Jackman, 1985). The result of past studies suggests that the existence of income inequality plausibly forces familial background to contribute more in determining the adult development of child (Corak, 2013). This implies that their own effort in building their future plays a significantly weaker role. A statement from OECD (2011) demonstrates that increasing inequality of income can stifle upward mobility. This relationship is explained by the Great Gatsby Curve[1] which indicates the correlation between income inequality and intergenerational mobility where lower intergenerational mobility is associated with higher income inequality.

Though Indonesia is predicted to be one of the seven countries with the biggest economy in 2030 (McKinsey & Company, 2012), Indonesia is no exception in suffering from the rise in inequality. With high poverty rates, the country has experienced rising inequality as the economy grows in the last decade as shown by the Gini Index which reached 0.38 in 2018 and is considerably higher than it was in 1998 at 0.311. This Gini Index is predicted to be exacerbated by the COVID-19 crisis in the year 2019 to 2020. Furthermore, the persistent gap in distribution of income might affect Indonesia's overall economic performance.

Intergenerational mobility can be seen as a multidimensional factor that incorporates various factors a person undergoes as they develop from a child to an adult. Examining intergenerational mobility will provide the authors with evidence on whether the increase in mobility can help resolve the problem of poverty and income inequality. As poverty and income inequality is likely to be followed by the problem of mobility.

The authors have chosen to rather focus on education than wealth as wealth is typically acquired by an individual's upbringing (Goldthorpe, 2007: 154-185). The participation rate for higher education has increased from 29.93% in 2017 to 30.28% in 2019 (BPS-Statistics Indonesia, 2021). This change is hoped to be

[1]The curve was named based on F.Scott Fitzgerald's novel The Great Gatsby. In the novel, the main character, Jay Gatsby, typifies the (confusing) idea of mobility, ascending from being a smuggler to a Long Island rich man.

followed by the rise in average income in the future. Based on the Capability Approach, the improvement in education can help provide people with capabilities which are viewed to be more essential than wealth (Clark, 2005). With equal access to education, child may possess higher skills that allow them to attain higher income jobs, which will influence their mobility between social classes. In Indonesia, the degree of inequality in general is related by the resource's parents provide their child with and the access to education they have (Arifin, 2017).

There are studies that scrutinize a relationship between education and intergenerational mobility (see for instance Jerrim & Macmillan, 2015; Fan et al., 2015; Pattinasarany, 2012; Arifin, 2017). Previous empirical evidence demonstrated a strength and positive correlation between education and income intergenerational mobility. Consistent evidence was also discovered between different gender (man-woman), area (rural-urban) and level of education attainment (primary-secondary).

Unlike existing research, the objective of paper is to examine Indonesia's intergenerational income mobility not only through the inclusion of education as a determining factor, but also comparing the evidence of different group of income level. The evidence will capture the impact of education on intergenerational mobility not only over a longer period (mean) but also across different income distribution and inequality (median). Thus, the existence of income mobility may mitigate not only chronic poverty but also the widening income inequality in Indonesia. Given this, the question of this paper is whether education significantly affect intergenerational income mobility (IGM) over time and across income group.

Intergenerational income mobility can be depicted by the Great Gatsby curve. The curve was first introduced by Narayan et al. (2018) that indicates the correlation between income inequality and intergenerational mobility where lower IGM is associated with higher income inequality. It explained that the high levels of inequality which limits the relative mobility that further worsen the levels of inequality. Income inequality caused intergenerational income mobility which further resulted in greater intergenerational economic heritance among the poor. With that, economic deprivation would create a vicious circle of disadvantage (i.e., chronic poverty) which would further lessen intergenerational mobility. With higher levels of inequality, there will be more varying levels of parents' investments in children and opportunities. Disparity in opportunity leads to bringing down relative mobility and greater inequality in the future.

Theoretical models regarding social factors that create inequality have emerged in the middle 1990's (Bénabou, 1996; Durlauf, 1996; Fernandez & Rogerson, 1996). Most of these models discussed how human capital plays a major role in determining a person's productivity. Meanwhile Becker & Tomes (1986), Corak (2013), Duncan & Murnane (2016), and Solon (1992) argued that societies with greater inequality will have larger differences in the resources that are invested in children between the rich and the poor. In the US, better neighborhoods tend to have better schools and firms around, providing more opportunities for the

children in the area to grow. Income inequality will then lead to greater school and neighborhood segregation (Harding et al., 2011). Disadvantaged children that have less-resourced parents would attend lower-quality schools than their more prosperous peers (Garner & Raudenbush, 1991). To understand inequality where the focus is on the quality of human capital, where education is the most affecting factor; the capability approach will be a suitable theory. With higher capability, an individual might be exposed to more opportunities to experience upward mobility and achieve a quality life i.e. doing well and being well (Clark, 2005).

Past studies have shown that there exists a relationship between education and intergenerational mobility. Jerrim & Macmillan (2015) concluded that educational attainment is the best driving link between parental education and offspring's earnings in all countries. Moreover, a strong relation was discovered between income inequality and the residual effect of parents' education. The intergenerational correlation of education is the most important driver in linking income inequality, with financial resources also playing an important role. It is also found that cross-sectional inequality of parental income and schooling years increases between the groups of observation in a research based on China (Fan et al., 2015). Research by Pattinasarany (2012) on two provinces in Indonesia comprising West Java and East Java also showed a positive correlation between education and social mobility. Arifin (2017) elaborated that the higher a person's education level, the greater the upward mobility he has based on his experiment. His results on the estimation of upward vertical mobility illustrates those respondents with an education equivalent to SMP (Junior High School) have a 21.3% higher chance of advancing social class than those with an SD (Elementary School) education or less. Meanwhile, the chances of increased mobility were higher for those with an education equivalent to SMA (25.2%) and tertiary education (46.1%). Hence, raising the quality of education may be the key that allows a country to transition to a higher income status.

2. Methodology

The main data used to test the model in this research will be secondary data sourced from the Indonesian Family Life Survey (IFLS) from the years of 1993, 1997, 2000, 2007 and 2014. The IFLS is a longitudinal survey conducted in Indonesia which is on-going until present time. The observation follows the same individual over a certain period, and it is deemed as being able to represent about 83% of the Indonesian population. The data consists of samples from 13 provinces in Indonesia, including: North Sumatra, West Sumatra, South Sumatra, Lampung, Bali, West Nusa Tenggara, South Kalimantan, South Sulawesi, DKI Jakarta, West Java, Central Java, DI Yogyakarta, and East Java.

Next, the regression model that will be used will be a multiple linear regression. This type of regression would be the most appropriate method for the research as it will examine the relationship of several independent variables

towards one dependent variable. Furthermore, the data incorporated in this research will be in cross-sectional form. The regression model will allow the researcher to estimate the value for intergenerational income elasticity in Indonesia. This method has also been used in countries like the United States (Song, 2020), China (Fan et al., 2015), Netherlands (Moonen & van den Brakel, 2011), and Italy (Piraino, 2007). The authors will also test for Classical Linear Regression Model (CLRM) assumptions to test the accuracy of the model. Lastly, a quantile regression will be performed to examine the relationship between Father's income, education, and Child's education on the Child's income at various income levels. We investigate the impacts of each independent variable towards the dependent variable at every ten percentiles and will show results for the 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, and 0.9 percentiles. This method is inspired by Yang et al. (2019) with their research of intergenerational poverty transmission in China.

2.1. Model Estimation

The first regression model will measure the intergenerational income elasticity between Father and Child in general and is defined as follows:

$$\begin{aligned} kidlogearn &= \beta 0 + \beta 1 fatlogearn + \beta 2 fatedu3 + \beta 3 kidedu5 + \beta 4 kidage + \beta 5 kidage^2 \\ &\quad + \beta 6 fatage + \beta 7 fatage^2 + \beta 8 kidgen5 + \beta 9 fatarea3^2 + \varepsilon \end{aligned} \tag{1}$$

The dependent variable in the model is child's income (in natural logarithm) represented by 'kidlogearn'. The independent variables include the natural log of father's income and father's years of schooling, represented by the variables 'fatlogearn' and 'fatedu3' respectively. The control variables include child's years of schooling ('kidedu5'), child's age ('kidage'), centered child's squared ages ('kidage^2'), father's age ('fatage'), centered father's squared ages ('fatage^2'), child's gender ('kidgen^5'), and father's household roster ('fatarea3^2').

The second regression model is a quantile regression model and will measure the intergenerational income elasticity between fathers and child at various income levels.

$$\begin{aligned} &y_i = x_i' \beta\theta + \mu\theta \\ &Quant\theta(y_i|x_i) = x_i' \beta\theta \\ &(i = 1 \ldots n) \end{aligned} \tag{2}$$

In this regression model, $\beta\theta$ will represent the coefficient of xi and quant θ $(y_i|x_i)$ symbolize the quantile function of y based on the quantile of θ according to the condition of given x. This method is used by Koenker & Bassett (1978) in their paper on regression quantiles.

3. Result and Analysis

3.1. Multiple Regression Result

Having established the first regression model in the previous chapter, multiple linear regression is conducted to obtain the degree of intergenerational income mobility. It is done by regressing the natural log of child's income towards the natural log of father's income. The authors will regress the independent and dependent variable with the control variables to see the effect of father's income on child's income. It is important to incorporate other variables that may contribute to the dependent variable. This is done to make sure that the unobserved independent variables or error terms have no correlation with the observed independent variable. Hence, the authors incorporate some control variables to the models. These control variables are age and two dummy variables–child's gender and father's area of living. Comprises the result on Table 1.

Table 1: Multiple Regression Result

Variable	Coefficient	P-value
Father income	0.10*	0.00
Child education	0.08*	0.00
Child age	0.01	0.06
Father age	0.00	0.67
Child age^2	-0.00	0.16
Father age^2	-0.00*	0.03
Child gender	0.57*	0.00
Father living area	0.02	0.52
Adjusted R^2		0.21
F-statistic		0.00

Note: * indicates significant at 5%

The p-value of F-statistic is less than the significance level on the statistical test insinuating that the model can be a good representation of the relationship between child's income and independent variables. Results from the regression analysis depict that the approximate degree of intergenerational income mobility is significant at 0.05 with a P-value of 0.00. The coefficient of 0.10 infers that for every 1% increase of father's income will likely result in the increase of child's income by 10.4%. Moreover, child's year of schooling is shown to have a positive relationship with child's income. For every 1-year increase in child's year of schooling will be followed by an 8.2% increase in child's income. Compared to the previous model that excludes the control variables, the coefficient for father's income is way lower at 0.10 which is a 56.5% decrease from the coefficient from the model without control at 0.23.

3.2. Quantile Regression Result

As mentioned in the previous sections, the purpose of generating a quantile regression model is to measure the intergenerational income elasticity between

Fathers and Child at various income levels. This is done due to the large deviation of both father and child's income. Table 2 depicts the quantile regression result for the model. Generally, results from the quantile analysis are similar towards the multiple regression model. For most of the quantiles, father's income has a positive significant relationship with child's income with exceptions on the 0.7, 0.8, and 0.9 quantiles. The highest effect of father's income on child's income is discovered on the 0.1 quantile with the value of 9.6%. This indicates that for every 1 percent increase in father's income in the lowest quantile or lowest income group, child's income increases 9.6%. The lowest impact of father's income on child's income is discovered on the 0,2 quantile with 5.96%.

Regarding education, father's education and child's education is found to be significant on all quantiles. All in all, there is no distinct linear relationship between father's education and child's income, but relatively a positive relationship between the two. The fact that father's education is significant towards child's education on all quantiles means that father's education plays a role in the amount of income the child is earning. Based on Table 2, it can be concluded that the relationship between child's income and child's education is an inverted U-shape. In general, the relationship between the two is positive where additional years of schooling by the child result in a gradual increase in child's income. Furthermore, when comparing the effects of father's education and child's education on child's income, child's education on average poses more impact compared to father's education as seen by the greater coefficients of child's education compared to father's education at all quantiles. The average value of the impact of child's education on child's income is 6.75% while the average value of the impact of father's education is 2.69%.

3.3. Multiple Regression Result with addition of Father's Education

Moreover, to see if education exerts influence on the levels of intergenerational income mobility in Indonesia, the authors will apply the father's year of schooling variable. The table below depicts the result of multiple regression with education applied. The results of this regression result have passed the CLRM assumptions test and have no endogenous properties.

The F-statistic p-value is significant, meaning that the model is a good representation of the relationship between child's income and father's income. Moreover, the regression results show that the approximate degree of intergenerational income mobility is statistically significant at 0.05 with a P-value of 0.003. The coefficient of 0.0737629 implies that for every additional 1% increase of father's income, child's income will increase by 7.4. Father's and child's year of schooling is exhibited to have a positive relationship with child's income. For father's education, every 1-year increase of education will result in an increase in income by 2.8%. For child's education, every one year increase in education will be followed by an increase of 6.9% in income. Both father's and child's schooling years are

Table 2: Quantile Regression Result

v1	v2	v3	v4	v5	v6	v7	v8	v9	v10	v11
	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
VARIABLES	kidlogearn	kidlogearn	kidlogearn	kidlogearn	kidlogearn	kidlogearn	kidlogearn	kidlogearn	kidlogearn	kidlogearn
fatlogearn	0.0964**	0.0596*	0.0804**	0.0643*	0.0674**	0.0866***	0.0368	0.0279	0.0428	0.272***
	-0.0423	-0.0345	-0.0316	-0.0373	-0.0284	-0.0196	-0.0277	-0.0258	-0.0547	-0.0515
fatedu3	0.0328**	0.0220***	0.0209***	0.0263***	0.0219***	0.0227***	0.0355***	0.0328***	0.0270**	-0.0271
	-0.0142	-0.0081	-0.00771	-0.00741	-0.00591	-0.00566	-0.00568	-0.00924	-0.0106	-0.0404
kidedu5	0.0563***	0.0695***	0.0694***	0.0759***	0.0808***	0.0743***	0.0649***	0.0570***	0.0602***	0.114*
	-0.0118	-0.00891	-0.00598	-0.00699	-0.0101	-0.0077	-0.0087	-0.00533	-0.00849	-0.0582
kidage	0.0141	0.0056	0.00536	0.00682	0.00347	0.013	0.0232***	0.0312***	0.0407***	0.0272
	-0.0151	-0.0143	-0.0142	-0.0119	-0.0101	-0.0104	-0.00882	-0.00686	-0.00861	-0.0482
fatage	-0.000759	-0.00499	0.00249	-0.00595	-0.00301	-0.00504	-0.00864	-0.0134**	-0.00272	-0.0154
	-0.00859	-0.00706	-0.00882	-0.00576	-0.00846	-0.00617	-0.00696	-0.00629	-0.00547	-0.0203
kidagemeansq	-0.00943**	-0.00923***	-0.00461	-0.00125	0.000732	-1.26E-05	0.000924	-0.00236	-0.00318	0.00471
	-0.00373	-0.0024	-0.00471	-0.0044	-0.00306	-0.00271	-0.00292	-0.00293	-0.00204	-0.0208
fatagemeansq	-0.00318*	-0.00336**	-0.00418*	-0.00167	-0.0015	-0.00141	-0.00104	0.00132	0.000451	0.00178
	-0.00185	-0.00166	-0.00227	-0.00151	-0.00103	-0.000997	-0.00124	-0.000974	-0.00183	-0.00266
1.kidgen5	0.997***	0.926***	0.759***	0.630***	0.549***	0.472***	0.363***	0.271***	0.276***	0.701***
	-0.126	-0.11	-0.0588	-0.0715	-0.0792	-0.0793	-0.0779	-0.0871	-0.0681	-0.23
1.fatarea3	0.251**	0.167***	0.119**	0.0309	-0.0214	-0.0344	-0.104***	-0.186***	-0.113*	0.548**
	-0.101	-0.0521	-0.0562	-0.047	-0.0585	-0.0446	-0.0385	-0.0467	-0.0594	-0.236
Constant	11.95***	13.37***	13.10***	13.86***	14.04***	13.86***	14.85***	15.38***	14.67***	7.919***
	-0.763	-0.864	-0.605	-0.615	-0.526	-0.398	-0.429	-0.418	-0.937	-1.831
Observations	1,545	1,545	1,545	1,545	1,545	1,545	1,545	1,545	1,545	1,545

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3: Multiple Regression Result with Addition of Education

Variable	Coefficient	P-value
Father income	0.07*	0.00
Father education	0.02*	0.00
Child education	0.06*	0.00
Child age	0.01	0.08
Father age	-0.00	0.53
Child age^2	-0.00	0.21
Father age^2	-0.00	0.09
Child gender	0.57*	0.00
Father living area	0.02	0.67
Adjusted R^2		0.23
F-statistic		0.00

Note: * indicates significant at 5%

significant variables in the model.

3.4. Discussion

Since the value of intergenerational income elasticity is between 0 and 1 (Moonen & van den Brakel, 2011), the authors have found that the estimated intergenerational income elasticity in Indonesia is 0.104. This shows that 10.4% of the child's income can be explained by the father's income. The found coefficient is higher compared to a study by Rosyadha (2019) where it was found that the value for intergenerational income elasticity is 0.166, but nevertheless quite similar with the value that was generated by this research. This disparity might be caused by the difference in the calculation of income as income can be defined in many ways. The coefficient of 0.104 from the adjusted intergenerational income is an inconclusive sign for mobility. The reason for this is that the father's income only explains 10.4% of the child's income, however, the coefficient is much larger compared to the child's education on their own income. If the authors compare the magnitude of the effect between child's education and father's income towards child's income, it can be concluded that father's income still has a bigger impact on child's income compared to the child's education itself based on the size of the coefficients.

This concludes that the parental resources play a significant role in the child's income rather than their own efforts, abilities, and resources, showing a sign of low mobility between generations. The results are in conjunction with findings by Pohan & Vitale (2016) which stated that parent's income plays a bigger role in predicting child's income. This could be explained as wealthy child being more likely to attain higher education hence earning more as adults, which indirectly explains why parental income contributes significantly to child's income. However, the results are in contrast with Rosyadha (2019), where it was found that the linear regression of permanent income of child on father's permanent income shows a relatively low intergenerational income elasticity.

Education proxied by years of schooling is shown to influence the levels

of intergenerational income mobility in Indonesia. With the variable education applied towards the regression, it is found that the intergenerational income elasticity coefficient lowers to 0.074 from 0.104 which is a 28.8% decrease. This means that only 7.4% of child's income can be explained by father's income when father's education is taken into consideration. When comparing the influence of parental education and child's education, child's education plays a bigger role in determining income. While every 1-year increase of father's education results in a 2.8% increase in income, child's income increases by 6.9% with every 1-year increase of child's education. The finding is consistent with studies by Pattisarany (2012) and Rosyadha (2019) who found that education can influence child's income and represent a factor in the levels of intergenerational income mobility. The result from the regression also highlights the importance of education in determining social payoffs, employment, income and improving social mobility (Mocetti, 2007).

Lastly, according to the quantile regression analysis, father's earnings do not appear to influence child's earnings among high-income children. The father's income coefficients are also smaller compared to child's education. This means that the probability of mobility is higher for child in the higher-income group. When it comes to low-income child, father's earnings play a significant role added by the fact that the coefficient for father's income is higher than child's education. Moreover, child's education poses more impact compared to father's education as the average impact of child's education on child's income between all quantiles is 6.75% while the average impact of father's education is significantly lower at 2.69%. This confirms the result from the previous regression analysis where it is found that child's education plays a bigger role compared to father's education. In conclusion, child's own efforts and capabilities play a more important role for those in the upper class. However, the condition is different for those in the lower class where father's income and parental roles play a bigger role.

Education attainment is the key towards achieving higher income and upwards mobility. Hendajany (2016) exhibits that in Indonesia, each additional year of schooling will increase an individual's annual income by 8.48% and that higher level of education leads to higher additional income. Considering that 10.19% of Indonesian people are still living below the national poverty line as of the end of September 2020 (World Bank, 2021b), government intervention is highly encouraged to improve the education of child in Indonesia as it is statistically found to have an effect towards income and mobility.

4. Conclusion and Implication

The authors conclude that education exerts influence on the levels of intergenerational income mobility in Indonesia. Both father and child's education play a role in the level of intergenerational income elasticity indicated by them being significant variables in the model. Child's education has a larger coefficient than father's education, indicating that it plays a more significant role in determining

the levels of intergenerational income elasticity. Furthermore, according to the quantile regression results, there is a higher possibility of mobility for child in the high-income group compared to those in the low income group. The child's and father's education relatively has the same effect on the levels of intergenerational income elasticity in all income groups. However, the effect of child's education on average is higher than the effect of father's income on all quantiles simultaneously. This confirms the result from the simple regression results.

Since the capability approach is the chosen framework to guide and improve education policy in Indonesia; therefore, the authors focus on expanding the capabilities of people living in the country. Education itself is one way and is proven that it remains essential to increase the likelihood of mobility not only between generations but also across income distribution. Thus, public policy must focus on human investment to develop human capital through a provision of quality education throughout the country, particularly education for people from lower income groups. The government of Indonesia should also allocate its education spending to increase the attainment of higher education level in order to establish the next generations with higher capability and higher productive than previous generations. In addition, government policy should also ensure the return to higher education are worthwhile to result higher income rather than depending on father's wealth. With a high education attainment and high return to education, people will easily earn more than their previous generations and move up the mobility ladder.

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