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Impact of Economic Situation on Availability of Secondary Education in Indonesia

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Introduction. School transition is important as a benchmark for education progress in many developing countries, including Indonesia. Moreover, the school transition has been identified as a crucial turning point in school progress in Indonesia. The purpose of the article is to analyze the role of income, gender against the school transition in Indonesia.

Materials and Methods. Methods in this research were conducted in two phases, fixed effect and conditional logit. The data used are from the Indonesian Family Life Survey and to capture the occurrence of several events in Indonesia with the risk associated with economic crisis in Indonesia against school transition.

Results. A sharp permanent income decrease shock will have a larger effect upon parental investment than one realized later in the child's lifetime and the effect of permanent household income shocks is significant and decreases in older childhood, as predicted by the permanent income hypothesis. When household income is faced with shocks constraint conditions of loans and credit market imperfections, girls tend to be used as a coping strategy to support private consumption in doing consumption smoothing, especially transition from primary to junior secondary education.

Discussion and Conclusion. Permanent income have long-term consequences of the decision-making process in the school transition. Girls experienced an increase in continuing education, especially at higher levels. Furthermore, when household income is faced with shocks constraint conditions of loans and credit market imperfections, girls tend to be used as a coping strategy to support private consumption in doing consumption smoothing.

Keywords: complete secondary education, role of income, gender, fixed effect, conditional logit, school transition

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Влияние экономической ситуации в Индонезии на доступность среднего образования

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Введение. В статье дается анализ экономической ситуации в Индонезии в контексте проводимой государством образовательной политики. Переход учеников из начальной школы в школы последующего уровня является важным показателем прогресса в области образования во многих развивающихся странах, в том числе в Индонезии. Доступность среднего образования была определена в качестве важнейшего приоритета в развитии школы в Индонезии. Цель статьи – проанализировать влияние доходов и гендерных факторов на доступность среднего образования в Индонезии.
Материалы и методы. В процессе исследования использовались фиксированный эффект и условный логит. Данные взяты из Индонезийского обследования семейной жизни.
Результаты исследования. На широком статистическом материале (для анализа ситуации были изучены и обработаны данные по США, Англии, Пакистану, Мадагаскару, Мексике) показано, как финансовые трудности вызывают проблемы с посещаемостью школы и приводят к отказу от получения или продолжения образования. В связи с этим обстоятельством такие семьи подразделяются на два типа домохозяйств. Среди ключевых причин, препятствующих посещению детьми школы, по степени значимости выделены следующие: экономический кризис в стране, стихийное бедствие, смерть или тяжелая болезнь главы семейства, потеря бизнеса, работы. Ситуация также проанализирована по таким факторам, как половозрастные характеристики и место проживания (городские и сельские жители и их источники дохода) и др.
Обсуждение и заключение. Предложена оригинальная динамическая модель домохозяйств, инвестирующих в образовательную деятельность в условиях неопределенности и с учетом постоянности/переменности источника дохода. Материалы статьи будут полезны ученым-экономистам, а также для других исследователей, интересующихся экономикой образования, особенно проблемой доступности среднего образования во время экономического кризиса в Индонезии.

Ключевые слова: полное среднее образование, роль дохода, пол, фиксированный эффект, условный логит, доступность среднего образования

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Introduction

School transition is an important time for children, families, and school communities. Research suggests that children who make a smooth transition and experience early school success tend to maintain higher levels of social competence and academic achievement[1]. Meanwhile, the school transition has been identified as a crucial turning point in school progress in Indonesia. Human capital investment in education is one essential component for the economic and social development of a country as education is one of the vital strategies to overcome poverty in most developing countries. If there is a decrease in the quality of human capital, it will be likely to have both direct and indirect consequences to the level of social welfare, poverty and economic development of a country. One of the problems of the decline in human capital investment in developing countries, including Indonesia, is the vulnerability of various risks associated with the shocks leading to high levels of volatility in income resulting in low levels of school enrolment, school transition and high level of dropout.

Generally, household options regarding education investment in addressing negative income shock can be divided into two. First, when households are faced with negative shocks, then the parents will encourage their children to be involved directly

[1] World Bank. World Development Report 2007: Development and Next Generation. Washington DC; 2006.

in activities that can generate income for the family making time allocated for education relatively small [1]. In this case, if the time allocation can be done optimally, it can reduce the level of school attendance without increasing dropout rate. Second, the presence of negative shocks will have an impact on the level of participation in education, either temporarily or permanently forcing parents not to send their children to school [2].

Some of the events in Indonesia with risks associated to negative income shocks on human capital investment are El Nino disaster, the Indonesian mid-1997 economic crisis, the death or the prolonged illness of the household head or household members, the loss of household business due to natural disaster, the loss of jobs and the decline of household incomes caused by natural phenomena such effects of weather, locust, etc. Furthermore, another issue of concern in many developing countries associated with negative income shocks is the widening gender disparities among boys and girls to school participation rates, including school transition. Finally, another critical issue is the presence of resource competition among siblings in the household when it comes to borrowing constraints condition and credit market imperfections.

Several studies on the effect of negative shocks to investment in human capital, especially in the field of education, involve a variety of different empirical results. Sawada showed that permanent and transitory incomes affected schooling decision process for school entrants and dropouts in Pakistan [3]. Subsequently, schooling response to transitory income is consistently larger for daughters than sons; followed by resource competition. Chevalier et al showed that permanent income had a significant effect on children schooling in the UK, with stronger effects on sons than daughters [4]. Several empirical studies in Indonesia, among others, performed by Thomas et al. identified that during the economic crisis in Indonesia, the participation rate of young children's education is relatively low if it had older siblings [5]. Cameron and Worswick showed that the coping strategy taken by farming households during income shocks was to reduce children education expenditure, especially girls of school age [6].

Many empirical studies show different results about the effect of income on the school attendance. McKenzie and Skoufias & Parker showed that the rate of school attendance was increasing during the crisis in Mexico [7; 8]. King received results indicating that the per-capita education expenditures declined in Indonesia following the crisis in the late 1990s, but the dropout rate did not increase[2]. Meanwhile, the rate of high school graduation and participation rose during the Great Depression in the United States [9; 10]. Several studies showed contradictory findings of the impact of negative income shocks to the level of child's education, with one side having a negative effect, but in some cases, also positive effect. In addition, there is still the debate on the issue of gender inequality in school transition, therefore, this study aims to analyze the role of income, gender against the school's transition in Indonesia.

This study contributes an empirical measurement and identification of transitory income. The previous study used rainfall deviation as a transitory variable [11; 12]. Meanwhile, transitory income shocks measurements in this study include the death of the head of household or household members, crop loss, prolonged illness of the household head or household members that require hospitalization or continuous need of medical care, loss of business and household sectors (due to fires, earthquakes and other disasters), unemployed household head or business failure, and the decline in household income due to falling prices or quantity of goods produced.

Materials and Methods

Empirical studies of income effect on human capital investment have long been of interest to economists and policymakers

[2] King E. The global economic crisis, education, and development partnerships. Keynote Presentation at the HDN-WBI Course on Innovations in Partnerships. Washington DC; 2009.

as it involves data, empirical results, and different approaches. Sawada conducted a study on the role of permanent and transitory income on investment in education using household panel data in Pakistan from the International Food Policy Research Institute (IFPRI) Pakistan Food Security Management Project from 1986 to 1991 [3]. The data is taken from the household survey of 3 (three) poor districts with conditional fixed effects model to estimate education investment with school attendance model and school dropout model. The results indicate that transitory income has more influence on the behavior of school attendance and dropout rate than permanent income. The study also shows gender disparities, with more detrimental effects for girls. Also, households with borrowing constraints caused by market imperfections lead to resource competition among siblings in a household.

The study results are in line with the works of Cameron and Worswick in Indonesia, and Gubert & Robilliard in Madagascar which both state income shocks have a more negative impact on girls than boys [6; 13]. Meanwhile, Gubert & Robilliard's studies were different from Sawada's study as it used the investment model of schooling and the school as a framework theory of consumption. Gubert & Robilliard conducted a study on household income shocks and investments in human capital of children in Madagascar. This study surveyed a sample of 5,046 households during 1995 to 2002. The estimation technique used in the study is conditional logit with household panel data for five (5) rounds of 4 (four) regions. The results showed that transitory income affects the dropout rates more than it affects the school attendance. Also, older siblings tend to drop out more than younger children during economic shocks. Critics state that the study did not consider various characteristics of the household. These characteristics are important to consider as those in the rural areas may have different strategies in coping or absorbing economic shocks than those in urban areas. Gubert & Robilliard's study differs from Sawada and Cameron and Worswick. In those studies, parents tend to favor girls than boys in attending school. Gubert & Robilliard's research has similarities with Sawada stating transitory income affects the dropout rate more than permanent income.

Chevalier et al. conducted a study on intergenerational transmission of education in the United Kingdom and investigate the extent to which individuals leave school early at the age of 16 years because of the variation in permanent income, parental education and income shocks at that age [4]. The data used was derived from the Labor Force Survey (LFS), which is a quarterly sample of households in the UK, with approximately 138 thousand respondents from approximately 59 thousand households in the survey. The method used is instrumental variables to consider the endogeneity on household income and education. The study results indicate a strong influence of maternal education level to boys than girls. Also, permanent income significantly influences school attendance rates and attainment levels of achievement during credit constraints at the age of 16 years. The finding is consistent with Alderman et al. in Pakistan stating that permanent income is more influential than transitory income to increase attendance rates of children, especially boys [14]. However, the study results contradicted Sawada and Gubert & Robilliard, which emphasizes the role of transitory income in influencing the level of school attendance in children.

King differs with previous studies which state school attendance rate increases during economic shocks[3]. The results of King's study indicate that education expenditure per capita has continued to decline during economic crisis in Indonesia, but the dropout rate is not increased, and attendance does not decline. This is due to the natural stickiness factor in school attendance rates in the short term and the desire of parents to protect education in-

[3] Ibidem.

vestment for older children. The findings contradict a previous study in Indonesia, which states that income shocks negatively impact school attendance rate.

McKenzie examines the impact of the peso crisis in Mexico in 1995-1996 to school attendance rate using the differences-in-differences approach [7]. The data was derived from the survey of the Encuesta Nacional de Ingresos y gastos de los Hogares household in 1992, 1994, 1996 and 1998 to estimate the effects of the economic crisis on the school level. The results showed that the level of school attendance increased for children aged 15-20 years during the crisis compared to the period before the crisis. Shocks aggregate give opposite effect on the income effect and substitution in determining the children's school and work behavior. The results contradict with previous studies stating shocks income have a positive impact on the level of school attendance [1; 2; 5; 6].

Literature studies indicate contradictory findings of the effects of income shocks with schooling decision. Some studies suggest that the role of permanent income has more influence on school attendance and dropout rate than transitory income. However, on the other hand, studies also stressed the importance of a transitory income than the level of educational attainment. Households are generally faced with gender gap between men and women in education participation when faced with shocks. Also, there is also resource competition between siblings in a household where there is a tendency for parents to protect investments of older school-age children. However, some other empirical studies show the opposite result.

The Investment Model of Schooling. In this section constructed a dynamic household model which is a multiple children version of Levhari & Weiss and Sawada on human capital investment under uncertainty [2; 15;]. For example, a household's generation with M children persists T periods. Consumption and schooling decision are assumed to be made by parents to maximize the household's aggregated expected life-cycle utility, which is represented by a time-separable utility function of the household's aggregated consumption allocation over T periods. Thus, the household problem can be written as follows:

$$\underset{\{C_t, S_{it}\}}{Max}\, E_t\left[\sum_{k=0}^{T-t}\beta^k U(C_{t+k}) + \beta^{T+1} W(H_{T+1}, A_{T+1})\right] \quad (1)$$

$$s.t.\ A_{t+1} = \left[A_t + Y_P^P + Y_{Pt}^P + \sum_{i=1}^{M} Y_{Cit}(1 - S_{it}) - C_t\right](1 + r_t) \quad (2)$$

$$H_{t+1} - H_t = \sum_{i=1}^{M}\left[f(S_{it}, CH_{it}, FEM_i, q_i) + e_{it}\right] \quad (3)$$

$$A_t + Y_P^P + Y_{Pt}^T + \sum_{i=1}^{M}(1 - S_{it})Y_{Cit} + B \geq C_t$$
$$B \geq 0, \text{ and } A_T \geq 0, \text{ given } A_0 \text{ and } H_0 \quad (4)$$

In equation (1), U (•) is a concave utility function, and β represents subjective discount factor. A concave function W (•) denotes the value of the financial estate, A_{T+1} and the value of the final stock of all children's human capital, H_{T+1}. In equation (2), A_t is the household's consumable resources in each period composed of pre-determined assets, then the stochastic parental income which is composed of time-invariant permanent income ($Y^{P,}$), and stochastic transitory incomes ($Y^{T,}$), and child's income (i') at t is Y_{Cit} $(1 - S_{it})$, where $0 < S_{it} < 1$ represents the time allocation to schooling of child i at t. Equation (2) above shows the flow intertemporal budget constraint of the household, where r denotes a non-stochastic interest rate on savings. In the period t, this household decides on the period-t consumption and schooling after transitory is realized.

The right-hand side of human capital accumulation equation (3) is the child's human capital production function, which is assumed to be a function of years of schooling (*S*), child-specific factors (*CH*), and the gender-specific indicator variable, (*FEM*). In this case, *FEM* = 1 if the child is female and *FEM* = 0 if the child is male. Meanwhile, *q* is the school accessibility and quality variable while the e_{it} is the error term. In this case, it is assumed that $\partial f/\partial S > 0$ and $\partial^2 f/\partial S^2 < 0$. Equation (4) is the potentially binding credit constraint where *B* represents a maximum amount of credit available to the household.

Estimation models in this research were conducted in two phases. In the first phase, income was divided into two components: permanent and transitory income. In the second phase, it is done to estimate the binary variable regressions as the dependent variable with permanent and transitory income as independent variables. Theoretically, a household's income at time *t* can be decomposed into permanent income and transitory income as: $Y_t = Y_t^P + Y_t^T$, where $E(Y^T) = 0$. In identifying the income, this writing employs Paxson, Kazianga and Sawada &Lokshin [3; 11; 16].

$$Y_{ht} = \beta_h + X_{ht}^P \beta_1 + X_{ht}^T \beta_2 + \beta_t + u_{ht} \quad (5)$$

β_h is household fixed effects and $X_{ht}^T \beta_1$ denotes the components of permanent income of physical and human asset variables. For example, demographic structure of the household, the household characteristics by level of education, occupation, number of household members, assets of households, the asset value of work in agriculture and not the agricultural sector which is owned by the household, the household use of electricity, households with televisions, household owning its own home, the household with its own toilet, poultry value and the value of land managed by the household. In addition, $X_{ht}^T \beta_2$ represents transitory income and β_t are the time specific fixed effects treated as another component of the transitory income, since these capture effects of aggregate shocks. Meanwhile, the residual is unobserved components of permanent income and transitory income. Next, second step uses a model with a binary dependent variable is the school transition. The model is a discrete response model with household fixed effects, assuming that F(·) is logistic distribution function estimated by conditional logit. Conditional logit models have several advantages; among others, it can control the unobserved heterogeneity that is fixed over time or time-invariant with a dependent variable that is binary [17]. Furthermore, to determine the exact model Hausman testing was done [18]. The next stage is identifying the existence of imperfect credit markets and borrowing constraint using Wald Test [2]. The data used are from the 1997 and 2000 Indonesian Family Life Survey to capture the occurrence of several events in Indonesia with the risk associated with economic crisis against investment in education, especially school transition.

Various components are included in the permanent income (*YP*) among others, the death or sickness of a household member, non-agricultural business, education of head of household, number of household members, number of household members squares, the total rental / leasing income or profit-sharing of non agricultural business (nonfarm business) for 12 months, household assets, total revenue from the rental / leasing or profit sharing households in the form of agricultural land and cattle over 12 months, the employment status of the head of the household, the area or location of households in rural areas, the use of electricity by households and homeownership status and toilets owned by households.

Transitory income (Y^T) is divided into several components, among others, crop loss, disease suffered by head or household members who require hospitalization or continuous need for medical care, the decline in household income or business sector as a result of fires and earthquakes and other disasters, unemployment of the head of the household or failure of a business, the decline in household income due to the decline in the price or quantity of goods produced, non-agricultural business

interaction with lower household income or business as a result of fires, earthquakes and other disasters, the interactions between crop loss with land values and the 2000 dummy variable to capture the effect of aggregate shocks. Meanwhile, the information regarding the transition from primary to the junior secondary education and from junior to senior secondary education. This is done by examining at the students' who graduated from primary education and continuing or in grade 1 or 7 in the junior secondary education. The same is done to look at the school transition from junior to senior secondary education.

Descriptive statistics in Table 1 shows that the biggest economic shocks during the previous five years were crop loss, which reached 13,7 percent. Meanwhile, the average of the lowest economic shock due to decreased household income or business sector caused by fires, earthquakes, and other disasters was 2,0 percent. The majority of the household head's education is generally a primary school (SD), which reached 54,9 percent with an average family size of between 5 and 6

Table 1. **Summary statistics of key variables**
Таблица 1. **Сводная статистика ключевых переменных**

Variables / Переменная	Mean / Среднее значение	Standard Deviation / Стандартное отклонение
Transitory Shock Variables (Y^T) / Преходящие шоковые переменные (Y^T)		
Crop loss (yes = 1) / Потери урожая (да = 1)	0,137	0,344
Sickness (yes = 1) / Болезнь (да = 1)	0,129	0,335
Disasters (yes = 1) / Стихийные бедствия (да = 1)	0,020	0,140
Unemployment (yes = 1) / Безработица (да = 1)	0,042	0,201
Price fall (yes = 1) / Падение цен (да = 1)	0,076	0,265
Interaction between nonfarm business and disasters / Взаимосвязь между несельскохозяйственным бизнесом и стихийными бедствиями	0,010	0,101
Interaction between crop loss and farm land / Взаимосвязь между потерей сельскохозяйственных культур и сельскохозяйственными угодьями	0,181	1,538
Permanent Shock Variables (Y^P) / Постоянные шоковые переменные (Y^P)		
Death (yes = 1) / Смерть (да = 1)	0,098	0,297
Education of household head / Образование главы домашнего хозяйства		
No school (yes = 1)* / Не посещал школу (да = 1)	0,112	0,315
Primary (yes = 1) / Начальное образование (да = 1)	0,549	0,498
Junior secondary education (yes = 1) / Младшее среднее образование (да = 1)	0,128	0,334
Senior secondary education (yes = 1) / Старшее среднее образование (да = 1)	0,151	0,358
University (yes = 1) / Высшее образование (да = 1)	0,059	0,235
Household size / Размер домохозяйства	5,426	1,897
Household size squared / Размер домохозяйства в квадрате	33,042	24,283
Nonfarm business entirely owned by the household (yes = 1) / Неаграрный бизнес, полностью принадлежащий домохозяйству	0,445	0,497
Nonfarm business (log) / Неаграрный бизнес (лог.)	0,216	1,703
Household Assets (log) / Активы домохозяйства (лог.)	0,989	3,527
Farm land (log) / Сельскохозяйственные угодья (лог.)	0,760	3,096
Livestock (log) / Скот (лог.)	0,088	1,065

Sources: IFLS2 and IFLS3 / *Источники*: IFLS2 и IFLS3.

* The reference category / Эталонная категория

people, and household with non-agricultural business amounted to 44,5 percent of total income received by the 21,6 percent. Meanwhile, the total household income from agriculture, especially land reached 76 percent, while sourced from livestock on average by 9 percent.

Results

Variables and Estimation Results of Income Regression. The estimates of various components of transitory income to household income in Table 2 indicates that the shock caused by the decline in household income or business sector due to fires, earthquakes and other disasters have negative effect on household Income amounting to 0,1434 households and was statistically significant at level 5 percent, with the greatest influence in rural areas. This finding is consistent with previous studies in Indonesia which show that household income shock or business sector due to fires, earthquakes, and other disasters negatively affect the welfare of households, especially in rural areas than urban areas [19]. This condition is largely due to domestic life in the countryside which is inseparable from the unpredictable events leading to adverse consequences. One example is the high volatility of income heavily dependent on the agricultural sector which is vulnerable to climate change or weather. Also, households in rural areas rely heavily on individual businesses and family agricultural business to sustain the economy of the household [12].

The interaction between a nonfarm business owned by the household with lower household income or business sector due to fires, earthquakes, and other disasters have a positive effect amounting to 0,2587 against the household income and are statistically significant at the 5 percent level. Furthermore, the interaction of a positive effect is apparent especially in rural areas compared to urban areas. Thus, households with no business in agriculture are relatively capable and experienced in anticipation of such shocks than those who have a business in the field of agriculture. These results are consistent with previous studies in rural areas of Africa which show that the boost factor such as shock household, seasonal factors in agriculture and surplus labor force in rural areas are the deciding factor of households in rural areas to conduct non-agricultural business [20].

Interactions between crop loss and the value of farm land negatively affect the value of agricultural land, especially in urban areas. This result is consistent with previous research that showed the interactions between crop loss and the value of farm land negatively affects household income level [6]. Other transitory income components that affect the household income was the period in 2000. Meanwhile, other temporary income components that are crop loss, sickness, and income decline due to falling prices, sick head of the household or its members did not show a statistically significant effect on the level of household income. This reflects that during the period 1997 and 2000, households tend to anticipate the various types of shocks.

Meanwhile, permanent income component showed that the shock of the death of the head of household or household members positively effect household income, but did not show statistical significance. Furthermore, the number of household members negatively affects household income, both in rural and in urban areas. The estimation results indicate that the decline in household income from the number of household members is generally more prevalent in rural areas than urban areas. These findings indicate that the greater the number of household members, the bigger the burden of households due to higher levels of consumption and reduced household income. This result is consistent with previous studies showing that the greater the number of household members, the lower the level of household income [12; 21; 22].

Table 2. **Estimation of income equation "Dependent variable": Log per capita household income**

Таблица 2. **Оценка уравнения дохода «Зависимая переменная»: логарифм дохода на душу населения в домохозяйстве**

Independent variables / Независимая переменная	Full Sample / Полный образец	Rural / Село	Urban / Город
	(1)	(2)	(3)
1	2	3	4
Transitory Shock Variables (Y^T) / Преходящие шоковые переменные (Y^T)			
Crop loss (yes = 1) / Потери урожая (да = 1)	0,0069	0,0024	-0,0278
	[0,0184]	[0,0216]	[0,0377]
Sickness (yes = 1) / Болезнь (да = 1)	0,0059	0,0099	-0,017
	[0,0219]	[0,0366]	[0,0242]
Disasters (yes = 1) / Стихийные бедствия (да = 1)	-0,1434**	-0,1902**	-0,0486
	[0,0625]	[0,0885]	[0,0960]
Price fall (yes = 1) / Падение цен (да = 1)	0,0128	0,0178	0,0376
	[0,0243]	[0,0310]	[0,0329]
Unemployment (yes = 1) / Безработица (да = 1)	-0,0143	-0,0439	0,0038
	[0,0343]	[0,0501]	[0,0414]
Crop loss* Farm land / Потери урожая* сельскохозяйственных угодий	-0,001	0,0055	-0,0140*
	[0,0056]	[0,0073]	[0,0075]
Nonfarm business entirely owned by the household* Disasters / Несельскохозяйственный бизнес, полностью принадлежащий домохозяйству* Катастрофы	0,2587***	0,3957***	0,1479
	[0,0777]	[0,1326]	[0,1092]
Year dummy (2000 = 1) / Воображаемый год (2000 = 1)	0,0296***	0,0336**	0,0194
	[0,0112]	[0,0168]	[0,0142]
Permanent Shock Variables (Y^P) / Постоянные шоковые переменные (Y^P)			
Death (yes = 1) / Смерть (да = 1)	-0,0075	0,0210	-0,0413
	[0,0199]	[0,0299]	[0,0286]
Household size / Размер домохозяйства	-0,1371***	-0,1610***	-0,1251***
	[0,0088]	[0,0125]	[0,0096]
Household size squared / Квадрат размера домохозяйства	0,0007***	0,0009***	0,0006***
	[0,0001]	[0,0001]	[0,0001]
Nonfarm business entirely owned by the household (yes = 1) / Неаграрный бизнес, полностью принадлежащий домохозяйству (да = 1)	0,0899***	0,1093***	0,0772***
	[0,0173]	[0,0286]	[0,0217]
Nonfarm business (log) / Неаграрный бизнес (логарифм)	0,0105**	0,0116	0,0093**
	[0,0042]	[0,0089]	[0,0038]
Household assets (log) / Активы домохозяйства (логарифм)	0,0004	-0,0036	0,0014
	[0,0020]	[0,0045]	[0,0021]
Farm land (log) / Сельскохозяйственные угодья (логарифм)	0,0100***	0,0086*	0,0109**
	[0,0033]	[0,0046]	[0,0043]
Livestock (log) / Скот (логарифм)	0,0125**	0,0099	0,0197***
	[0,0056]	[0,0063]	[0,0071]
Constant / Константа	7,8575***	8,3582***	7,6657***
	[0,2646]	[0,3733]	[0,3452]

End of table 2 / Окончание табл. 2

1	2	3	4
R^2 is R-squared = Explained variation / Total variation / Учтенная дисперсия / Общее отклонение	0,6968	0,703	0,7129
N is the number of observations / количество наблюдений	16 020	8 689	7 331
F is F-test for overall significance / F-тест для общего значения	114,8465	70,4437	67,3528

Note: Robust standard errors in parentheses. Estimation includes household fixed effects, head employee (unpaid family worker, government worker and private worker), education of household head (primary, junior secondary education, senior secondary education and university), home ownership status (self-owned = 1), household have a television (yes = 1), household head has its own toilet (yes = 1), household utilize electricity (yes = 1), * significant at 10 %; ** significant at 5 %; *** significant at 1 %.

Примечание: Устойчивые стандартные ошибки приведены в квадратных скобках. Оценка включает в себя фиксированные эффекты домохозяйства, главного кормильца (неоплачиваемый семейный работник, государственный служащий и работник частного предприятия), образование главы домашнего хозяйства (начальное, младшее среднее образование, старшее среднее образование и высшее), право собственности на дом (собственник = 1), наличие телевизора (да = 1), санузла (да = 1); использование электричества (да = 1), *значительно при 10 %; ** значительно при 5 %; *** значительно при 1 %.

The nonfarm business owner had a positive effect on the income level of households, both in rural and urban areas. The estimation results indicate that households with nonfarm businesses have a positive influence on household income, both in rural and urban areas. This finding confirms that nonfarm businesses have an essential role in contributing to household income. These results are consistent with studies in rural Africa which show that the role and contribution of nonagricultural companies, especially in rural areas, is quite significant and impact labor and income growth in rural areas [23].

The total revenue from the rental/leasing or profit sharing that comes from nonfarm business for 12 months showed a positive effect on household income. Estimates indicate that the total income from the rental/leasing or profit sharing of non-agricultural businesses in urban areas has greater influence than the countryside. The total income derived from agricultural lands for 12 months has a positive effect. This confirms that the total income of agricultural land during the 12-month positively affect household income, both in rural and urban areas. Furthermore, the total income derived from livestock, poultry, and fish kept by the households positively affect household income. These results are consistent with previous studies in Indonesia which state that the total income of livestock, poultry, and fish, positively affect household income [12].

School Transition Model. In determining the right model for school transition, the Hausman test is done. The test results of Hausman against school transition in Table 3 show unobserved heterogeneity contained in the model. Thus, if the estimation is done using the logit, it is not appropriate because it would produce a biased, inefficient and inconsistent result. Therefore, the right model estimates are conditional logit or fixed effect logit. Also, the results of other Hausman test shows that the fixed effect logit models are more precise than the random effect logit models to estimate the school transition. In identifying the existence of perfect credit markets and borrowing constraints, the Wald test is done. The Wald test showed that the school transition occurs lending constraints and imperfect market presence.

Estimates in Table 3 show that permanent income has a positive effect on the probability of a child to attend school from the primary (SD) to junior secondary education (SMP) of 0,3602 and are statistically significant at the 1 percent level. This means that an early permanent income shock will have a larger effect upon parental investment (and therefore child outcomes) than one realized later in the child's lifetime and the effect of permanent household income shocks is significant and decreases in older childhood, as predicted by the permanent income hypothesis (PIH) [4; 24]. The same thing happened in secondary education,

where permanent income has a positive effect on the transition rate from junior to senior secondary education. This indicates that the permanent household income is vital to the probability of a child to attend school or school transition than transitory income.

Girls have a positive effect on the probability of attending school at junior secondary education (SMP) and senior secondary education (SMA). Estimates show that girls experienced an increase in continuing education, especially at senior secondary education level. It is not separated from the presence of gender disparity in proceeding from primary to junior secondary education between boys and girls which is greater than the transition rate from junior to senior secondary education. This finding is consistent with studies in Indonesia, which states that girls have a low probability to continue their education at junior secondary education than boys [25].

The number of children working in a household has a negative effect on the probability of children in school, both to junior or high secondary education. This condition indicates that the child's school transition rate will decline in line with the parent's decision to involve their children to work. These findings indicate that children who spent more time to work, including helping parents to raise household income, will have little chance to get an education, so it is likely to be lower in school.

The mother's education has a positive influence on the probability of transition from primary to junior secondary education, even to senior secondary education. Meanwhile, the father's education positively affects the level of transition or to continue school, but did not show a statistically significant mark. This indicates that the role of the mother's education is important to a child's education transition process. Based on estimates indicate that the mother has the bargaining power position than the father in the decision of children to schools in the basic education level. This finding supports studies conducted in Indonesia, where the mother's education is more dominant in deciding their children to school at the primary level [26; 27].

Table 3. **Estimations of school transition**

Таблица 3. **Оценки доступности среднего образования**

Independent variables / Независимая переменная	Dependent Variable: School Transition, yes = 1, no = 0 / Зависимая переменная: переход школы, да = 1, нет = 0					
	Transition from Primary to Junior Secondary Education / Переход от начального к младшему среднему образованию			Transition from Junior to Senior Secondary Education / Переход от младшего к старшему среднему образованию		
	Logit / Логит	RE Logit / RE-логит	FE Logit / FE-логит	Logit / Логит	RE Logit / RE-логит	FE Logit / FE-логит
	(1)	(2)	(3)	(4)	(5)	(6)
1	2	3	4	5	6	7
Income Variables / Переменные дохода						
Transitory Income / Преходящий доход	3,2888***	3,3580**	1,071	3,2699***	3,6158**	1,4033
	[0,9181]	[1,6946]	[2,0045]	[0,9113]	[1,6428]	[1,9211]
Permanent income / Постоянный доход	0,0372*	0,2133***	0,3602***	0,0364*	0,2052***	0,3208***
	[0,0216]	[0,0469]	[0,0945]	[0,0214]	[0,0452]	[0,0913]
Residual Income / Остаточный доход	0,0674	0,1317	0,0471	0,0545	0,0981	0,0073
	[0,0833]	[0,1361]	[0,1613]	[0,0831]	[0,1318]	[0,1625]
Gender Variable / Гендерная переменная						
Sex (girls = 1) / Пол (девочки = 1)	-0,0176	0,1396	0,2303**	0,0129	0,1735**	0,2524**
	[0,0470]	[0,0875]	[0,1036]	[0,0466]	[0,0848]	[0,1009]

End of table 3 / Окончание табл. 3

1	2	3	4	5	6	7
Number of Siblings / Количество братьев и сестер						
Number of younger sibling / Количество младших братьев и сестер	-0,1567***	-0,2184***	0,0451	-0,1777***	-0,2410***	0,0018
	[0,0344]	[0,0710]	[0,1022]	[0,0336]	[0,0682]	[0,0983]
Number of older sibling / Количество старших братьев и сестер	-0,0303	-0,0375	0,1393	-0,0306	-0,0459	0,0858
	[0,0338]	[0,0686]	[0,1097]	[0,0335]	[0,0664]	[0,1066]
Control Variables / Контрольные переменные						
Number of children working / Количество работающих детей	-0,4729***	-0,6887***	-0,3096***	-0,4778***	-0,6870***	-0,3206***
	[0,0295]	[0,0624]	[0,0802]	[0,0294]	[0,0603]	[0,0773]
Father's education (year) / Образование отца (год)	0,0724***	0,1030***	0,0183	0,0702***	0,0962***	0,0190
	[0,0069]	[0,0150]	[0,0227]	[0,0068]	[0,0143]	[0,0215]
Mother's education (year) / Образование матери (год)	0,1297***	0,2552***	0,2241***	0,1270***	0,2446***	0,2142***
	[0,0080]	[0,0183]	[0,0280]	[0,0079]	[0,0175]	[00265],
Constant / Константа	-9,6433***	-10,5233**		-7,0235***	-6,8024	
	[2,5723]	[4,7517]		[2,5514]	[4,6050]	
Total number of observation / Общее количество наблюдений	16 020	16 020	7 572	16 020	16 020	7 656
Prob > Wald Statistic / Вероятность > Статистика Вальда	0,0004***	0,0000***	0,0006***	0,0004***	0,0000***	0,0017***
Hausman X^2 : Logit vs FE Logit / X^2 Хаусмана: Логит против FE-логита			0,0000***			0,0000***
Hausman X^2 : RE Logit vs FE Logit / X^2 Хаусмана: RE-логит против FE-логита			0,0013***			0,0000***

Note: Standard errors in parentheses. Estimation includes household fixed effects, child age, rural dummy, year dummy (2000 = 1), * significant at 10 %; ** significant at 5 %; *** significant at 1 %.

Примечание: стандартные ошибки приведены в квадратных скобках. Оценка включает фиксированные эффекты домохозяйства, возраст детей, воображаемую величину для сельской местности, воображаемый год (2000 = 1), * значительная на 10 %; ** значительный при 5 %; *** существенный при 1 %

Meanwhile, in Table 4 show that in (1) and (2), permanent income has a positive effect and statistically significant at the 10 percent level. This indicates that as permanent income increases, the probability of girls continuing education will increase and vice versa. These findings indicate that when household income is faced with shocks constraint conditions of loans and credit market imperfections, girls tend to be used as a coping strategy to support private consumption in doing consumption smoothing, especially transition from primary to junior secondary education. This is consistent with earlier studies showing that in the event of shocks, households try to reduce the expen-

diture of the children's education, especially girls to make consumption smoothing [6]. This implies a low probability of girls with school enrollment compared to boys. These results are in line with which showed that households generally prioritize the education of boys than girls in difficult conditions or situations [28].

Table 4. **Estimations of School Transition with gender interaction**

Таблица 4. **Оценка доступности среднего образования с гендерным взаимодействием**

Independent variables / Независимая переменная	Dependent Variable: School Transition, yes = 1, no = 0 / Зависимая переменная: среднее образование доступно, да = 1, нет = 0	
	Transition from Primary to Junior Secondary Education/ Переход от начального к младшему среднему образованию	Transition from Junior to Senior Secondary Education/ Переход от младшего к старшему среднему образованию
	FE Logit / FE-логит	FE Logit / FE-логит
	(1)	(2)
1	2	3
Transitory Income * Sex (girls = 1) / Преходящий доход Пол (девочки = 1)	-0,2213 [1,1413]	-1,0196 [1,1073]
Permanent income * Sex (girls = 1) / Постоянный доход Пол (девочки = 1)	0,1963* [0,1078]	0,1947* [0,1052]
Residual Income * Sex (girls = 1) / Остаточный доход Пол (девочки = 1)	0,2313 [0,3888]	0,2071 [0,3819]
Income Variables / Переменные дохода		
Transitory Income / Преходящий доход	1,2597 [2,0628]	1,9065 [1,9739]
Permanent income / Постоянный доход	0,2849*** [0,1057]	0,2468** [0,1014]
Residual Income / Остаточный доход	-0,0078 [0,2031]	-0,0430 [0,2028]
Gender Variable / Гендерная переменная		
Sex (girls = 1) / Пол (девочки = 1)	0,3891 [3,2659]	2,707 [3,1680]
Number of Siblings / Количество братьев и сестер		
Number of younger sibling / Количество младших братьев и сестер	0,052 [0,1026]	0,0091 [0,0988]
Number of older sibling / Количество старших братьев и сестер	0,1515 [0,1105]	0,1012 [0,1077]
Control Variables / Контрольные переменные		
Number of children working / Количество работающих детей	-0,3096*** [0,0803]	-0,3208*** [0,0774]
Father's education (year) / Образование отца (год)	0,0176 [0,0228]	0,019 [0,0216]
Mother's education (year) / Образование матери (год)	0,2235*** [0,0281]	0,2128*** [0.0266]

End of table 4 / Окончание табл. 4

1	2	3
Total number of observation / Общее количество наблюдений	7 572	7 656
Prob > Wald Statistic / Вероятность > Статистика Вальда	0,0004***	0,0009***

Note: Standard errors in parentheses. Estimation includes household fixed effects, child age, rural dummy, year dummy (2000 = 1), * significant at 10 %; ** significant at 5 %; *** significant at 1%.

Примечание: стандартные ошибки приведены в квадратных скобках. Оценка включает фиксированные эффекты домохозяйства, возраст детей, воображаемую величину для сельской местности, воображаемый год (2000 = 1), * значительная на 10 %; ** значительный при 5 %; *** существенный при 1 %.

Conclusions

There are several findings from this research that can be inferred. First, on an ongoing basis, permanent income households have long-term consequences of the decision-making process in the school transition from primary to junior secondary education (SD to SMP) and from junior to senior secondary education (SMP to SMA). Second, girls have a positive effect on the probability of attending school at junior secondary education (SMP) and senior secondary education (SMA). It means that girls experienced an increase in continuing education, especially at higher levels. It is not separated from the presence of gender disparity in proceeding from primary to junior secondary education between boys and girls which is greater than the transition rate from junior to senior secondary education. Furthermore, when household income is faced with shocks constraint conditions of loans and credit market imperfections, girls tend to be used as a coping strategy to support private consumption in doing consumption smoothing.

Government policies that can be done to increase the transition schools are giving scholarship program for basic and senior secondary education, particularly from households lacking or not able to pay for school supplies so that students do not drop out of school due to economic difficulties. Thus, students have more opportunities to stay in school and continue their education to the next level. Policies that prioritize girls to be given wider access to education so that gender bias in education can be minimized. However, government efforts can be achieved if there is a change of household perception about the role and position of girls in the family and society because of socio-cultural and economic factors. Thus, there is also a need for public policies through government transfer programs to enhance the role of women empowerment and to participate in school decision-making in the household or family.

Finally, the limitations of this study are the variety of economic shocks reported or self-reported as transitory components. The weakness of the use of self-reported economic shocks as transitory component is the emergence of its own reporting bias. Thus, further studies are expected to take into account information from rainfall as transitory components for more exogenous economic shocks than the self-reported.

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