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The impact of selected macro variables on child labor in Indonesia

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ABSTRACT

This study investigates the impact of government expenditure, household expenditure and adult unemployment on child labour in Indonesia between 1985 and 2014. The data from the World Bank Indicators tested using Johansen &Juselius Cointegration (J&J), Vector Error Correction Model (VECM), Granger Causality, Generalized Variance Decomposition (GVDCs) and Generalized Impulse Response Functions (GIRFs) show thatthere are long run and short run relationships between the variables. Hence,the need to improve on policiesrelating to encouraging children to attend school without affecting their family income becomes critical. In addition household consumption pattern and spending decisions may require adjustment with the support of the authorities so as to assist the common man in prioritising their basic development needs, especially education.

1. Introduction

Child labour remains a disturbing global issue affecting the developing countries most severely (Ranjan, 1990). A phenomenon that can be traced back to the 16th century, in France, United Kingdom and Germany began at factories of cotton mills and glass and brick kilns. While inSweden and Norway, child labour was concentrated in the fishing and farming sectors. According to the latest report by the International Labour Orgnaization (ILO), approximately 211 million children aged between 5 to 15 are working all over the world. With 95% centred in developing countries and 61% in Asia alone, of which Indonesia was the first to be officially identified.

Expectedly, there exists a strong link between poverty and child labour as empirically found by previous researches. Family financial pressures force a child as young as 10 years old to work as a maid for the well offs. Lower wages, flexible working hours and the ability to control these groups of workers create a constant oversupply of child labour. Studies by Manning, 2000; Morice, 1981; Sharma &Mittar, 1990 conclude that child labour in Indonesia is focussed in the rural areas. The decreasing rate of child labour reversed automatically post 1997 crisis (Cameron, 2001).

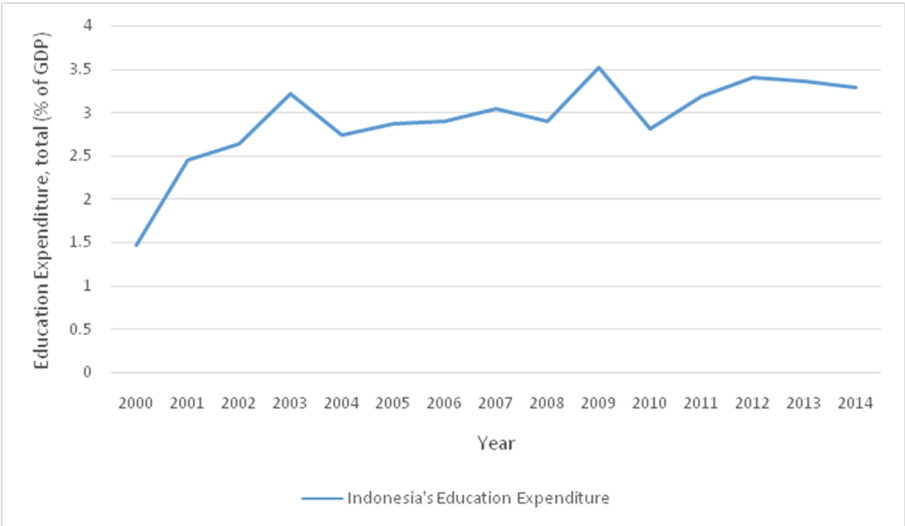

Fig 1. Indonesia's Education Expenditure from 2000 to 2014

1.1 National expenditure on education

Human capital is the most important resource for any economy to achieve the status of developed nation given its multiplier ability to increase national productivity. Subsequently, education is one of the three aspects that contributes to human development index. Historically, Indonesia lagged behind other High Performing Asian Economies (HPAEs) in East Asia (Booth, 1999). According to Juswanto (2009), the Law on National Education System was mandating a minimum allocation of 20% of the total development expenditure for education.

Theoretically, the link between education and economic growth dates back to Robert Solow's (1957) and Romer's (1990) neoclassical models. While Chandra (2010) established a bilateral relationship between GDP and expenditure on education, Tamang (2011) found a long run relationship between economic growth and education in India. Indonesia is no exception to reaping the returns of investment on education. Figure 1 above shows the gradual increase in the annual budget of Indonesia towards education.

1.2 Household FinalConsumption

Based on the national accounts of Indonesia, 2009was the worst year marking a decrease in gross domestic product to 4.6% and household consumption dropping by 1.8%. The largest part of household consumption representing 56.5% of GDP was recorded in year 2011. When summed up with government expenditure for public healthcare and education, it contributed to 71.4% of GDP. Basically this means any changes in household consumption has a grave affect on the economic growth of Indonesia.

1.3 Child Labour in Indonesia

During the 1998 crisis, the Indonesian's economy contracted by more than 13% resulting in average annual economic growth of 7%. Subsequently, it forced households to stop their children from going to schools and have them working to gain extra income for their families. Basu and Van (1998), argued that poverty is the main cause of the child labour in most cases because costs of education in including fees, uniforms and school equipment become burdensometo the poor.

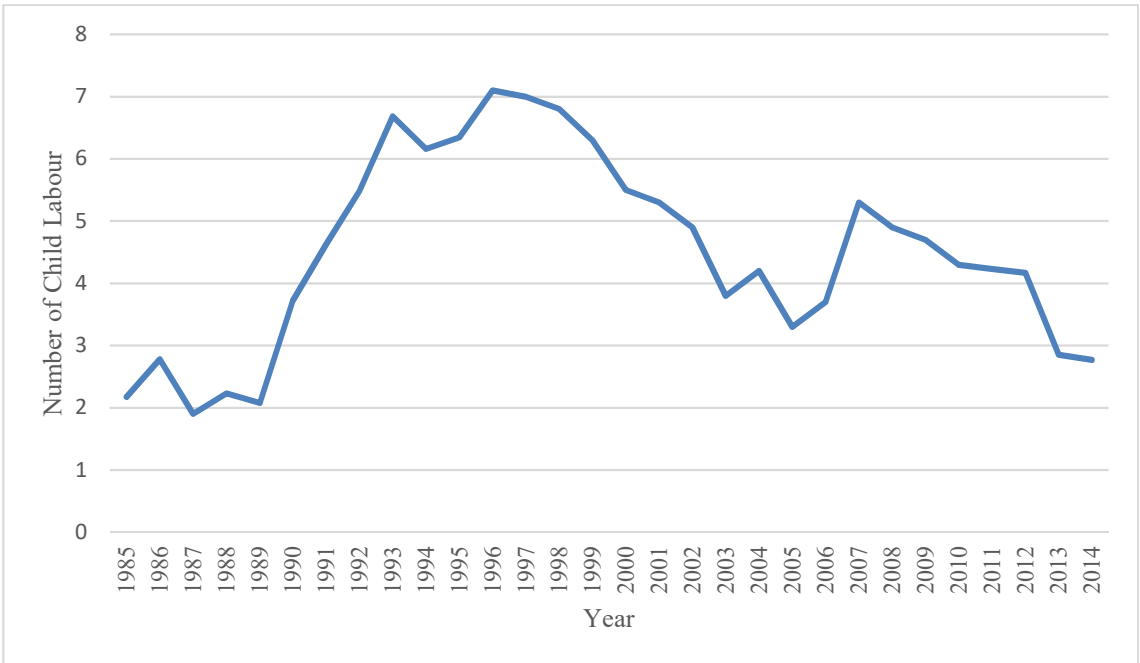

Fig 2. Child labour in Indonesia

1.4 Adult Unemployment

The rate of unemployment is highest among the age group of 15-19 years accounting to 13%, whereas the unemployment among those aged between 20 to 24 years accounted for 14%.

Table 1. Unemployment rate in Indonesia

in million	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
Labor Force	116.5	119.4	120.3	120.2	121.9	122.4	127.7
Working	108.2	111.3	113.0	112.8	114.6	114.8	120.7
Unemployed	8.3	8.1	7.3	7.4	7.2	7.6	7.0

Economic theories of child labour have, with few exceptions, been based on some shared premises. First, that child labour is socially undesirable and its reduction a worthy goal. Second, that there are other, more desirable, activities in which a child can engage, namely school attendance and leisure. Third, that the child labour decision is the prerogative not of the child but of a parent.

2. Literature review

Theoretically, studies conducted in Indonesia and Morocco found several reasons to cause the existence and prevalence of child labour (Boyden, Ling, and Myers, 1998). Meanwhile, Lloyd and Blanc (1996) confirmed that the children school enrolment raises with the households standard of living.According to Basu and Van (1998) canonical child labour model, wealthy families lead to the

absence of child labour. It rises if and when the head of households or parents could not provide the family members with the supposed living standards. This theory is known as luxury axiom.

By having their children working, parents focus more on their household living needs instead of the long term importance of education of the children (Admassie, 2002). Amin et al. (2004) and Priyambada et al. (2002) investigated the link between the household poverty and child labour by using the income earn or expenditure consumption of household as the indicator of poverty. The former study proved poverty of household to result in children working for paid jobs. One way to prevent children from entering the labour market and have them attend school is by increasing the household or parental resources to afford expenses related to schooling. (Glick and Sahn, 2000; MieryTeran Rocha and Romero, 2003).Emerson and Portela Souza (2003) mentioned that working children belong to families, whereby the parents themselves were child labourers and had no formal education.

Demand for children in job market exists not because of the shortages of labor but because of the characteristics of the job market itself which is segmented by gender, caste, and class divisions that provide distinct for children participation in labour market (Kak, 2004). Duryea, Lam and Levison (2007) found that unemployment in urban areas of Brazil were significantly increasing the probability of labour participation of children and declining the probability of children to involve in education. Moreover, there was a strong negative association between adult unemployment and education.

Bhat (2010) argued that the high quality of education can help to remove all the children from working equivalent to how important for a school to make the children educated.Baht (2011) also argued that the compulsory education legislation can help make the children to be present in school and avoid from working.

According to the Survey on Children (SOC) factsheet, child labour in the Philippines continues to affect an estimated 2.1 million children aged 5-17 years, about eight percent of this age group. Furthermore, the Philippines 2011 Survey on Children Involvement in child labourshows that child labourseems to increase with age, arisingfrom the fact that the productivity of children improves as they grow older. Thus, this means that the opportunity cost of keeping children in school as opposed to the workplace also goes up. Involvement in child labour among male children is 50% higher than female children (five percent versus 3 percent). By contrast, female children are slightly more likely to attend school (95%) compared to their male peers (92%).

Del Carpio and Loayza (2012) study the effects of a conditional cash transfer program complemented with a productive investment grant in Nicaragua. Their study focuses on a different program than the one we analyse in this paper, as well as on a different (although not very dissimilar) region. The authors show that the intervention contributed to reduce overall child participation in household chores and agricultural work, but increased child participation in commerce and retail.De Hoop and Rosati (2015) analysed the impact on education and child labour of a programme aimed at increasing women economic participation in Nicaragua. The results point to the importance of women's empowerment in determining the impact of the programme on child labour and children's schooling.

3. Methodology

3.1 Data description

The World Bank database served as the primary source of information for all the independent variables, whereas the statistics for child labour in Indonesia was retrieved from the National Labour Force Survey, available in portals of Department of Statistics, Indonesia.

3.2 Empirical model

$$CL = \alpha + \beta_1(EDU) + \beta_2(HOU) + \beta_3(UN) + \varepsilon \quad (1)$$

Whereby
α = constant
CL = Child labour
EDU = Government expenditure on education
HOU = Household consumption
UN = Unemployment of adult labours
Ɛ = other possible factors or error terms

3.3 Empirical tests

In addition to the standard practice to ensuring data stationarity, the following tests described henceforth were conducted to answer these research questions:

1. Does national investment in education help reduce child labour in Indonesia?
2. Is child labour in Indonesia affecting adult unemployment adversely?
3. Are lower household income and child labour related in the case of Indonesia?

The unit root test is used to define the stationarity of series in the level and in the first difference based on the Augmented Dickey-Fuller (ADF) test. The null hypothesis is accepted if the variable series are non-stationary, that is when the value of the t-statistic is larger than its critical value implying the presence of a unit root.

Typically, an ADF unit root test can be estimated as below:

$$\Delta Y_t = \alpha + \beta\, Y_{t-1} + \sum_{i=1}^{k} \gamma\, \Delta Y_{t-1} + u_t$$

According to Equation (3.1), ΔY is the first difference of Y series, ΔYt-1 is the lagged in the first difference to adjust the serial correlation in the error term,t denotes the time index, variables at time t is denoted as Yt , β is the coefficient based on a time trend, k is the lagged value of ΔY which are included to enable the serial correlation in the residuals and utis the error term. The hypothesis for ADF unit root test is:

$H_0 : \beta = 0$
$H1 : \beta \neq 0$

Another common test for stationary is the one developed by C.B. Philips and Pierre Perron in 1988. It proposes control for serial correlation problem when testing for unit root. The hypothesis is:

H_0 : The variable is not stationary

Ha : The variable is stationary

The rejection rule for PP test is when the p-value is less than 5 percent level of significance.The Kwiatkowski-Phillips-Schemidt-Shin (KPSS) test is used to determine whether or not the model has trend stationary. Interestingly, the decision rule is quite different than the previous unit root tests.

Ho: There is no unit root or it is trend stationary

Ha: There is unit root or it is not trend stationary.

The null hypothesis is rejected if the test statistic is greater than the critical value and when the p-value is lower than the significant level of 0.05. If the unit root tests indicate that all series are stationary at first difference, then the Johansen-Juselius (JJ) Cointegration Test is used to determine time series cointegration, that isto test the long run relationship between the variables.Nevertheless, the Engle-Granger Test of cointegration is preferred due to its ability to allow for more cointegrating relationship.

The hypothesis for the JJ test is:

Ho: There are no cointegration vector

Ha: There are cointegration vector

The null hypothesis is rejected when the test statistic has a greater value than the critical value or the p-value is smaller than the significant level.

The Vector Error Correction Model (VECM) isapplied only when there is a cointegration in a long run relationship between the variables, and it enables the identification of short run properties in a cointegrated series. However, if there is no co-integration between the variables, we proceed with Granger Causality. The number of cointegrating vectors for VECM is shown by the cointegration rank. A positive and not significant coefficient of the Error Correcting Model (ECM) justifies any short term fluctuations among independent and dependent variables reducing the stability of the long run relationship between variables.

Establised by Granger in 1969, the Granger Causality tells whether any variable in the model granger causes another. The decision rule is:

Ho: The independent (X) does not granger cause dependent (Y) variable

Ha: The independent (X) granger cause dependent (Y) variable

If the null hypothesis is rejected when p-value is less than 5% level of significant, it can be inferred that explanatory variables granger cause the dependent variable or another explanatory variable.

Next, we conduct theGeneralized Forecast Error Variance Decomposition Test which helps explain the vector auto regression, by separating the variation within a model into endogenous or otherwise. In short, it shows how the total variance of the forecast error for all variables contributes to the variance of each structural shocks.

Following this, the impulse respons function is applied. According to Sims (1980), the system's variable response can be tracked by impulse response function to impulses of the system's shocks. Lin

(2006) found this tool to be useful in analysing policy effectiveess primarily. The estimated impulse response function is not consistent in a long run for unrestricted VARs if the unit roots and/ or cointegration exist. The impulse response functions for cointegrated system can compute:

i) Likelihood ratio tests are used to determine the cointegration,
ii) Estimate the error correction model:

$$\Delta Y_t = \alpha\beta' Y_{t-1} + \sum_i^p \Gamma_i \Delta Y_t + \Phi D_t + U_t,$$

iii) The error correction model is convert to vector autoregression model and
iv) The result of the autoregression model is used to perform impulse response function.

4. Results and findings

This section presents and discusses the findings from the tests mentioned in the preceding section.

Table 2. ADF test results

Variables	**Level**		**First Difference**	
	Intercept	**Trend & intercept**	**Intercept**	**Trend & intercept**
LX1	-0.856290[0]	-2.340713[0]	-7.483079[0]**	-7.348664[0]**
LX2	-2.539586[0]	-2.459121[0]	-5.685685[1]**	-5.649382[1]**
LKX2	-1.746479[3]	-1.487545[3]	-6.857933[0]**	-7.089173[0]**
LY	-1.516563[0]	-1.293681[0]	-4.569104[0]**	-4.913004[0]**

Note: Asterisk (**) indicates statistically significant at 5% level. Figures in parentheses [ ] are the lag length

Table 1 shows that the null hypothesis is rejected at trend and also with trend and intercept at 5 percent significant level, as the t-stat values are less than their critical values. Meanwhile, all variables are found to be stationary after first differencing at 5% significant level for both intercept and trend and intercept. Thus, the JJ cointegration test was conducted and the results are shown below (Table 3).

Table 3. Cointegration test

Null	Alternative	k=3		r=1	
		ʎ max		Trace	
		Unadjusted	95 percent C.V.	Unadjusted	95 percent C.V.
r = 0	r = 1	28.26326**	27.58434	45.21537	47.85613
r≤ 1	r = 2	10.49814	21.13162	16.95212	29.79707
r≤ 2	r = 3	3.889668	14.26460	6.453980	15.49471
r≤ 3	r = 4	2.564312	3.841466	2.564312	3.841466

Notes: Asterisks (*) denote statistically significant at 5 percent level. The k is the lag length and r is the cointegrating vector(s). Chosen r: number of cointegrating vectors that are significant under both tests.

The value of test statistics of trace is smaller than the critical value, 45.21537<47.85613. However, the max-eigen value is greater than critical value, 28.26326>27.58434. Therefore, there is at least one co-integrating vector in the model and the existence of long-run relationship between the variables. The relationship is depicted by the equation below:

Normalized Equation (VECM)

$$CL = 1.662357UN - 5.999291EDU - 0.654452HOU + 45.73698$$

It can be interpreted that the increase of one percentage of adult unemployment, increases child labour by 1.66%. Meanwhile, increases of one percentage of government expenditure on education (EDU), and household final consumption expenditure can decrease child labour by 5.99% and 0.65% respectively.

Table 4: Granger Causality Results

Dependent Variable	CL	EDU	HOU	UN	ECT	
		χ2-statistic (p-value)			Coefficient	t-ratio
CL	-	5.242769	0.549907	8.023651**	-0.162413	-3.29691**
		(0.0727)	(0.7596)	(0.0181)		
EDU	0.963126	-	3.026961	2.439083	0.051225	1.48349
	(0.6178)		(0.2201)	(0.2954)		
HOU	1.005263	1.687858	-	0.719707	-0.018430	-0.04388
	(0.6049)	(0.4300)		(0.6978)		
UN	1.078550	0.286700	0.605611	-	-0.019426	-0.14549
	(0.5832)	(0.8665)	(0.7387)			

Notes: The χ^2-statistic tests the joint significance of the lagged values of the independent variables, and the significance of the error correction term(s). Asterisks (*) indicate statistically significant at 5 percent level.

In Table 4, we see that there appears to be a single short run relationship between adult unemployment and child labour. Also, one significant ECT with a speed of adjustment of 16.24% per year, an equivalent of 74 months for short run shocks to readjust. Meanwhile, the results from the variance decomposition analysis is presented in Table 5.

Table 5. Variance decomposition

Percentages of variation in	Horizon (quarters)	CL	EDU	HOU	Due to innovation in: UN	CU
Quarters relative variance in:CL	1	**100.0000**	0.000000	0.000000	0.000000	0.000000
	4	**29.40247**	23.15375	33.65253	13.79125	70.59753
	8	**16.55572**	12.09207	43.00778	28.34443	83.44428
	12	**18.86956**	7.213452	42.28001	31.63698	81.130442
	20	**20.79425**	4.537901	41.24903	33.41882	79.205751
	30	**21.44082**	3.615359	40.90366	34.04015	78.559169
	40	**21.71304**	3.225027	40.76036	34.30157	78.286957
	50	**21.86392**	3.008827	40.68108	34.44617	78.136077
Quarters relative variance in: EDU	1	0.479447	**99.52055**	0.000000	0.000000	0.479447
	4	1.133023	**95.87848**	0.834307	2.154190	4.12152
	8	5.187576	**91.25465**	2.148419	1.409358	8.745353
	12	9.258989	**85.45078**	3.654088	1.636142	14.549219
	20	13.39757	**79.55841**	5.075139	1.968879	20.441588
	30	15.38346	**76.72793**	5.751781	2.136835	23.272076
	40	16.34999	**75.35130**	6.081074	2.217640	24.648704
	50	16.92358	**74.53416**	6.276543	2.265720	25.465843
Quarters relative variance in:HOU	1	0.102337	0.897410	**99.00025**	0.000000	0.999747
	4	0.797672	4.637262	**92.60902**	1.956048	7.390982
	8	2.674443	8.139658	**83.08319**	6.102709	16.91681
	12	5.275471	8.644226	**76.02547**	10.05483	23.974527
	20	8.830863	8.910076	**67.26764**	14.99142	32.732359
	30	10.86601	9.020177	**62.29395**	17.81987	37.706057
	40	11.96338	9.081709	**59.61432**	19.34059	40.385679
	50	12.65120	9.120110	**57.93534**	20.29335	42.06466

Quarters relative variance in: UN	1	10.94459	16.38847	2.756796	**69.91014**	30.089856
	4	14.56988	17.98466	2.471037	**64.97442**	35.025577
	8	13.96347	22.96129	3.606625	**59.46862**	40.531385
	12	11.77228	25.58035	5.429017	**57.21835**	42.781647
	20	9.444707	27.90486	7.771082	**54.87935**	45.120649
	30	8.083806	29.21004	9.139641	**53.56652**	46.433487
	40	7.351721	29.91627	9.874862	**52.85715**	47.142853
	50	6.893897	30.35803	10.33455	**52.41352**	47.586477

Note: The column in **bold** font represents their own shock. The last column provides the percentage of forecast error variances of each variable explained collectively by the other variables. The column in bold represent the impact of their own shock.

Based on Table 5, child labour seems to be the most interactive variable in the model. The VDC test shows that 78% of the forecast error variance can be explained by EDU (3%), HOU (41%) and UN (34%) at the end of the 50 horizons. Government expenditure on education is the most exogenous variable in the model with only 25% of its forecast variance been explained by other variables in the forecast horizon.The variance decomposition results show that 22% of forecast error variance in child labour (CL) can only be explained by its own shock.

5. Conclusion

The impact of investments in basic school education on combatting child labour in Indonesia relates to government expenditure on education, household consumption expenditure and adult unemployment. Given the magnitude of and trade-off involved with government expenditure on public services, especially education, researches relating to its well known, opportunity costs, child labour continues to be an important subject matter of enquiry.

The purpose of this study is to understand the impact of government expenditure on education, household consumption expenditure and adult unemployment on child labour in Indonesia between 1985-2014.Empirical findings reveal that all variables in the model have a long run relationship, and adult unemployment is related to child labour in the short run. Government expenditure on education is found to be the most exogenous variable, taking a longer time to improve and hence, affects child labour in Indonesia.

Given the strong positive relationship between poverty and household expenditure on basic needs (education being a key component), the national authorities are recommended to continue investing in services related to schools. Infrastructure, qualified teachers, conducive environment and affordable education will encourage families to prioritize finishing secondary schooling over sending off their young teenage children to work. Also transfer payments in the form of allowances for students attending schools and as well as food stamps are found be attractive motivations for the hard core poor families.

On the demand side, the labour law needs to be strengthened, making it mandatory for businesses employing children to meet a minimum requirement of basic education. As far as work conditions are concerned, the Ministry of Human Resource should consider legalising child labour in order to prevent exploitation of under age workers. Instead of offering higher wages (which will further increase the supply of child labour), the employers must be held responsible for their formal education and medical benefits. To become a developed nation, Indonesia has to achieve a Human Development Index of 0.80. In implication the largest asset of any economy, the labour force must be enhanced for higher productivity which inevitably depends on the quality of education and health. Children being the future generation for productive labour, is the key focus. Having them enter the labour market prematurely at the expense of proper education, only means a permanent trade-off to sustainable economic development.

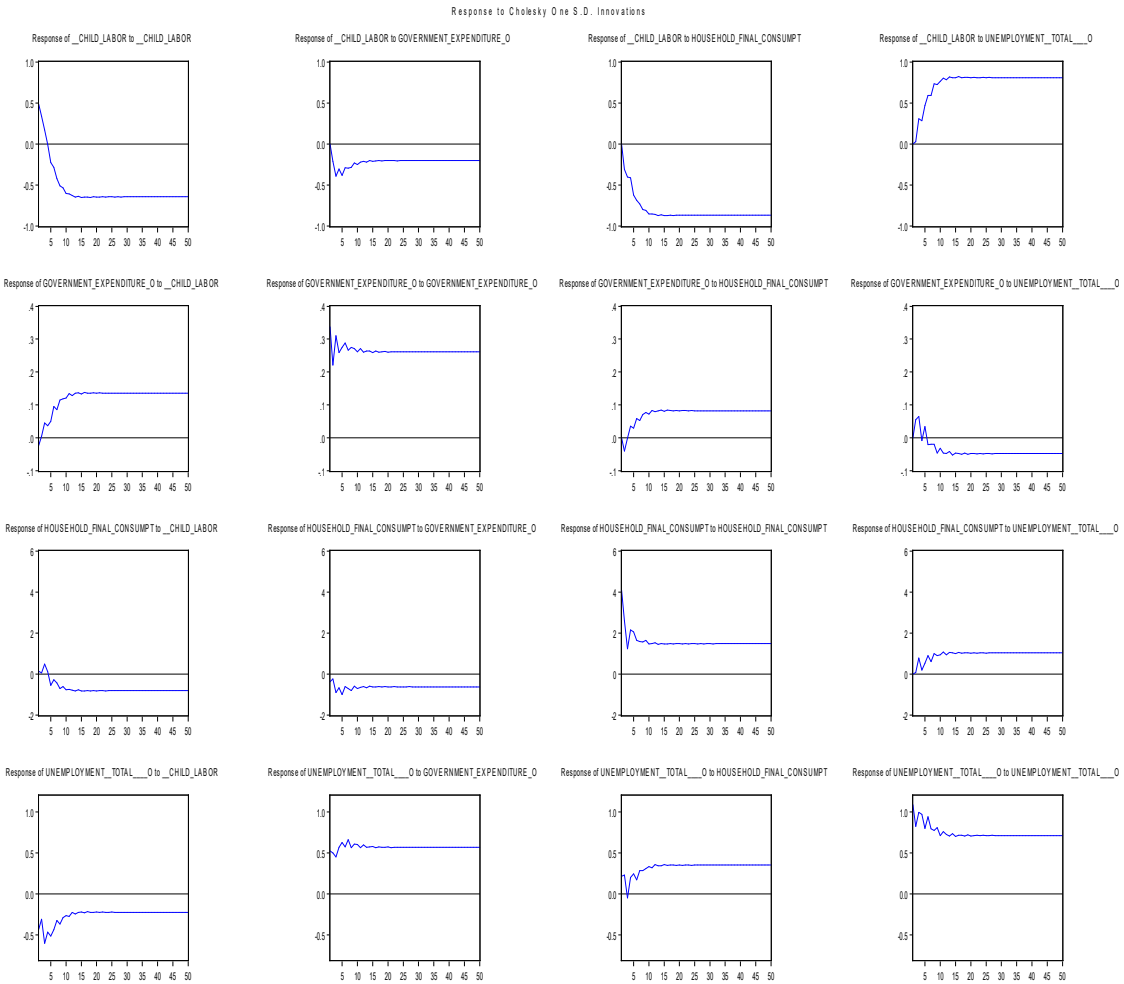

Fig 3. Impulse response functions

Lastly, it is equally important to create awareness about the necessity of formal education and the advantages of academic qualification amongst the rural folks. While technical skills and working experience remain essential in the job market, the public in general and parents in particular must be informed of the higher returns of investment in formal education. A balanced approach by all stakeholders can reduce both poverty and child labour in Indonesia.

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