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The paradox of human resource investment in smoking households

Henny Oktavianti[1+]
Umar Burhan[2]
Marlina Ekawati[3]
Nurul Badriyah[4]

[1,2,3,4]*University of Brawijaya, Indonesia.*
[1]*Email: hennyok2020@student.ub.ac.id*
[2]*Email: umar@ub.ac.id*
[3]*Email: marlina@ub.ac.id*
[4]*Email: nurulbayhaqi@ub.ac.id*

(+ Corresponding author)

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ABSTRACT

This research aims to analyze the effects of cigarette expenditure on human resource investment in smoking households. Independent variables used besides cigarette expenditure were income and the level of education of the head of the family. The control variables used were poverty, residence location, the number of working family members, and the number of family members. The method of data analysis used in this study was Simultaneous Equation Estimation. This method was used due to the interplay between dependent and independent variables. The parameter estimation process in a simultaneous equation model employs the two-stage least squares (2SLS) method due to model identification indicating over-identification. The observed analytical units are two-generation smoking households, making the observations in this research intergenerational in character. The results of the study indicate that cigarette expenditures will reduce human resource investment in smoker households in the long term. A bigger impact was apparently found when the condition occurred in poor families. Poor smoking households will be trapped in a vicious cycle of poverty that is worsened by the addictive trait of cigarettes, which will reduce other essential expenditures in the household (such as education and health). The situation of poor smoking households will also infect the next generation (children's households), where intergenerational influences have taken place. A situation where cigarettes become an expenditure that cannot be displaced but rather will displace expenditures for education and health investment.

Contribution/ Originality: The novelty of this research lies in the research method. First, the analysis units of smoking households are observed intergenerationally. Second, the study utilizes the squared cigarette expenditure variable to examine long-term effects. The use of intergenerational and long-term observation methods contributes to the consistency of influence patterns between variables.

1. INTRODUCTION

Until today, the development of human resources is still a relevant issue. Human resources play a role in the development of a country. One of the development indicators of a country is economic growth performance. According to Drucker (1993), economic growth depends on factors of production in the form of laborers who have knowledge or quality human resources. The role of human capital is crucial as a catalyst for economic growth (Pelinescu, 2015). The results show a significant positive correlation between GDP per capita and the innovation capability of human resources. Quality human resources is one of the main factors generating high productivity.

Smoking households bear cigarette expenditures that, instead, can reduce the quality of human resources. In Indonesia, data on the quality of human resources indicates that the average schooling duration in 2022 will be 8.69 years (third grade of junior high school but not yet graduated) (BPS, 2022). The 9-year compulsory education program was initiated by the government starting in 1994 and was planned to be finished in 2008. However, until 2022, the average schooling duration in Indonesia has not been able to achieve the development goal. Therefore, the issue regarding human resources (human capital) is still pertinent.

In smoking households, there is cigarette expenditure that can reduce the quality of human resources (Allo, Sukartini, & Saptutyningsih, 2018). Cigarettes have an addictive nature, so in smoker households, of course, cigarettes are part of regular expenditure. Therefore, this study will discuss the impact of cigarette expenditure on spending on other important goods in the household, namely education and health. Previous studies discussed the relationship between tobacco consumption and household expenditure allocation. The results of these studies showed that an increase in tobacco cigarette consumption in poor households would sacrifice all types of household expenditures such as food, education, health, entertainment, communication, and durable goods (Akbar & Sari, 2021; Mugosa, Cizmovic, & Vulovic 2022). According to these studies, cigarette consumption can reduce other important expenditures in the household. The results of these studies were also confirmed by other studies, where the addition of cigarette expenditure in rural households would reduce expenditure for education and health (Oktavianti, Burhan, Ekawati, & Badriyah, 2021). The research by Wang, Sindelar, and Busch (2006) indicates that spending on tobacco (cigarettes) can eliminate other essential spending, (including basic needs and spending for human resource investments such as education and health. Similarly, the research titled 'The impact of smoking and quitting on household spending patterns and medical care costs in China' (Xin et al., 2009). The findings of Xin disclose that every five packs of cigarettes consumed per capita per month reduce household spending for other commodities such as education and health. The biggest impact occurs in low-income rural households. Spending on tobacco (cigarettes) can also eliminate basic needs spending and spending for human resource investments such as education and health (Wang et al., 2006). Based on the results of these studies, it raises the question of whether the condition of smoker households will continue to occur from generation to generation. Therefore, the paradox of cigarette expenditure and human resource investment needs to be studied intergenerationally.

2. LITERATURE

2.1. Human Capital

Humans are not only resources but also capital that can generate returns (Becker, 1993). In the concept of human resource investment, humans are defined as the capital that affects the productivity and growth of a nation. Human capital is a concept that first occurred in 1776 in classic economics (Fitzsimons, 2015). Human capitals is an investment that people make to increase their productivity from a production orientation perspective (Rosen, 1999). Human capital is one of the key factors in increasing the economic productivity of a country. There are two ways to achieve or gain human capital. First, humans are used as laborers based on quantity numbers. It means that more people or labor leads to higher productivity. Second, investment is the main way to increase or obtain human capital. Human capital can be assessed through education and the health field (Todaro, 2000). This can be elaborated as follows: the higher someone's education or the more training they attend, the higher their abilities and skills will be. Moreover, health is related to education. High education without a healthy body will not increase productivity. High education can also affect people's awareness of health. Todaro's opinion on human capital is aligned with Rosen's and Becker's that quality human resources will affect productivity.

2.2. Family Economics

According to the concept of family economics in the book written by Browning and Chiappori (2011), in a family, there is a public good and a private good, as frequently discussed in conventional economics. From the

perspective of family economics, a public good is a good that can be used and consumed by each of the family members equally. In a marriage, besides the public good, there is also the private good. To describe it, Browning explained the potential gain in a family (Browning & Chiappori, 2011).

Expenditure on children's education and healthcare investment are included as public good consumptions. To illustrate the position of public and private goods in a family, the author started with a simple situation where there are two agents, a and b, and two goods. One of them is a purely public good, Q, and the other one is a purely private good, q. Their respective income is denoted as y_a dan y_b, and the prices of the two goods were normalized into one. It is assumed that the two agents do not care for each other, and each of them has a private utility function used for their own private and public goods. Next, for s = a, b, we $(Q; q^s)$ give the felicity function (private utility), q^s denotes the consumption of the private good by person *s*. If the two agents live separately, then each individual *s* will maximize the utility this way: max $u^s(Q; q^s)$:

$$Q, q^s$$

$$\text{Subject to } Q + q^s = y^s (1)$$

Equation 1 presents the consumption of public goods (Q) and private goods (q) by family members (s), constrained by their budget. The optimal choices are respectively $\hat{Q}^s$; $\hat{q}^s$. Equation 2 describes family and their joint budget constraints are:

$$Q + q^a + q^b = y^a + y^b (2)$$

If the preferences of the two partners are increasing in the level of public interest, then both of them have great potential by living together in terms that we can find appropriate allocations. For example, by setting:

$$Q = \hat{Q}_a; q_b = \hat{q}_b \, dan \, q_a = \hat{q}_a + \hat{Q}_b (3)$$

The allocation written in Equation 3 becomes feasible because it can maintain the welfare built from the joint incomes.

According to Becker, the context for understanding preferences in the family technically is a two-person (woman a and man b) household 1, where the only decision (static) is how much is spent on various market goods available at fixed prices, given the total household expenditure fixed for all goods. First, some commodities are sometimes used in general and sometimes privately. For example, a husband can drive his car to work, or the whole family can ride together. Second, the privacy or publicity of a good is quite independent of the type of control that exists over the good and who uses it. Usually, parents have control over the private consumption of their young children.

3. RESEARCH METHODS

3.1. Research Approach and Data Sources

This study applied a quantitative approach because it has measurable, specific, and objective attributes (Creswell, 2008). The data used were collected from the results of surveys called IFLS data (Indonesia Family Life Survey) waves 2 and 5. IFLS data is longitudinal, which is needed to support the research objective, namely intergenerational behavior in smoker households. The use of data will be selected according to the research needs, namely the existence of a relationship between households in IFLS2 and IFLS5.

3.2. Data Analysis Model

Simultaneous Equation Estimation was applied as the data analysis method. The simultaneous equation model has certain characteristics in which dependent variables in one equation can appear as independent variables in other equations. As a result, dependent variables are correlated with the errors in the equation where the variables appear as independent variables. A simultaneous equation is used when there is an interdependent relationship between the dependent and independent variables of an equation (Juanda, 2020).

This study has more than one equation and uses variables that influence each other (income and expenditure on education and health). Therefore, the use of simultaneous equation estimation analysis is important to determine the relationship of dependence between one independent variable and another (Pérez-Sánchez, González, Perea, & López-Espín, 2021). The use of the simultaneous equation analysis method has several advantages over other methods, such as: 1) overcoming the problem of endogeneity, which is a situation where the variables being observed influence each other (income variable and expenditure on education and health); 2) the simultaneous equation estimation method can estimate parameters by equation from a model consisting of several equations; as known in this study, several equations will be analyzed simultaneously; 3) approaching the true value or more precise; 4) the simultaneous equation analysis method is specifically designed to analyze the simultaneous relationship between variables in a system of equations (Gujarati, 2012).

The parameter estimation process in the simultaneous equation model in this research applied the Two-Stage Least Squares (2SLS) method. This method was chosen because, during the model identification process in each equation, it was found that K-M > G-1 (over-identified). K is the total number of variables, M is the number of variables in a certain equation, and G is the number of equations in a simultaneous model. Compared to previous studies, where the data analysis model used was Flogit, this study uses the Simultaneous Equation Estimation model with Two-Stage Least Squares (2SLS) parameter estimation. This is because the Flogit model only involves one equation. Whereas in this study there are more than one equation that is interrelated and more complex, the simultaneous equation model will present more precise results.

3.3. The Procedure of Simultaneous Equation Analysis

The model structure illustrates the relationship between the observed variables. In smoking households, it is illustrated that the total income (Y) is spent for expenditure allocation for education investment (E_p), expenditure on health investment (E_k), and other expenditures (E_L). Therefore, the total income of smoking households can be written as the following: Equation 4:

$$Y = E_p + E_k + E_L \quad (4)$$

It was believed that income was affected by the amount or proportion of expenditures. On the other hand, the amount of expenditure allocation was influenced by income. Equation 4 predicted that expenditures and education, health care, and other things affected income and vice versa. In this study, it was predicted that human resource investment in smoking households was affected by expenditure on smoking. Cigarette expenditure is a part of the total income representation; thus, the income allocations for education and health were believed to be decreasing. Unless there is a compromise in determining preference, the decision variable will be included in the model to find out the effect on human resource investment. Therefore, the model can be described as follows:

$$E_p = f(ln\_trk, ln\_trk^2, HHeduc97, control\ variables) + \alpha\,\hat{Y} \quad (5)$$

$$E_k = f(ln\_trk, ln\_trk^2, HHeduc97, control\ variables) + \beta\,\hat{Y} \quad (6)$$

$$E_L = f(ln\_trk, ln\_trk^2, HHeduc97, control\ variables) + \lambda\,\hat{Y} \quad (7)$$

Then, the reduced form of Equation 2 until Equation 4 was made. The reduced form of the equation model is:

$$Y = f(ln\_trk, ln\_trk^2, HHeduc97, \hat{Y}, control\ variables) \quad (8)$$

$$E_p = f(exogenous\ variables) \quad (9)$$

$$E_k = f(exogenous\ variables) \quad (10)$$

$$E_L = f(exogenous\ variables) \quad (11)$$

The model structure above was written in the form of an equation based on intergenerational analysis aligned with the longitudinal data used in the study, which was the data of the parents' households in 1997 and the data of the children's households in 2014.

3.4. Estimation in 1997

$$ratioeduc97_i = \alpha_{10} + \alpha_{11} ln\_trk97_i + \alpha_{12} ln\_trk97_i^2 + \alpha_{13} \hat{Y}97_i + \alpha_{14} HHeduc97_i + \alpha_{15} Đ97_i + \mu_{1i} (12)$$

$$ratiohealth97_i = \alpha_{20} + \alpha_{21} ln\_trk97_i + \alpha_{22} ln\_trk97_i^2 + \alpha_{23} \hat{Y}97_i + \alpha_{24} HHeduc97_i + \alpha_{25} Đ97_i + \mu_{2i} (13)$$

In which

$ratioeduc97_i$	= education investment of the parents' household i.
$ratiohealth97_i$	= health investment of the parents' household i.
ln_trk97_i	= ln cigarette expenditure of the parents' household i.
$\hat{Y}97_i$	= predicted income (*predicted value*).
$HHeduc97_i$	= level of education of the head of the family.
$Đ97_i$	= control variable of the parents' household i (dummy poor/not poor; residence location rural/urban; the number of household members, the number of working members of the household.
α_{10}, α_{20}	= constants
Co-efficients	= $\alpha_{11}, \alpha_{12}, \alpha_{13}, \alpha_{14}, \alpha_{15}, \alpha_{21}, \alpha_{22}, \alpha_{23}, \alpha_{24}, \alpha_{25}$

3.5. The Second Estimation in 2014

$$ratioeduc14_i = \beta_{10} + \beta_{11} ln\_trk14_i + \beta_{12} ln\_trk14_i^2 + \beta_{13} \hat{Y}14_i + \beta_{14} HHeduc14_i + \beta_{15} ln\_trk97_i^2 + Đ14_i + \mu_{1i} (14)$$

$$ratiohealth14_i = \beta_{20} + \beta_{21} ln\_trk14_i + \beta_{22} ln\_trk14g_i^2 + \beta_{23} \hat{Y}14_i + \beta_{24} HHeduc14_i + \beta_{25} ln\_trk97_i^2 + \beta_{26} Đ14 + \mu_{2i} (15)$$

In which,

$ratioeduc14_i$	= Education investment of the children's household i.
$ratiohealth14_i$	= Health investment of the children's household i.
ln_trk14_i	= ln cigarette expenditure of the children's household i.
$HHeduc14_i$	= Level of education of the head of the family i.
ln_trk97_i	= ln parents' cigarette expenditure in the children's household i.
$\hat{Y}14_i$	= Income in 2014.
$Đ14_i$	= Control variable (dummy poor/not poor; residence location rural/urban, the number of household members, the number of the working members of the household.
β	= Constants.
Coefficients	= $\beta_{11}, \beta_{12}, \beta_{13}, \beta_{14}, \beta_{15}, \beta_{16} \beta_{21}, \beta_{22}, \beta_{23}, \beta_{24}, \beta_{25}, \beta_{26}$

4. RESULT AND DISCUSSION

4.1. Estimation Results and Evidence for the Hypothesis

Estimation 1997 is the parents' household model, and 2014 is the children's household model. Estimation results on the equations of parents' and children's households both have the same effects, where all the main variables significantly affect human resource investment. Table 1 explains the influence of independent variables on the dependent variables in a parent's household (1997). All independent variables have a significant impact on human resource investment (education and health investment).

Table 2 presents the influence of independent variables on the dependent variables in children's households (2014). In the children's household, all independent variables have a significant impact on education investment. However, there is one variable, which is the number of working household members that does not affect health investment.

Table 1. Estimation results on equation 1997 2014 (Parents' household).

Variables	*ratioeduc97*	*ratiohealth97*
Main variable		
$\hat{Y}97$	0.249***	0.260***
	(0.021)	(0.029)
ln_trk97	0.310***	0.288***
	(0.046)	(0.049)
ln_trk97^2	-0.018***	-0.017***
	(0.003)	(0.003)
$HHeduc97$	-0.027***	-0.033***
	(0.004)	(0.005)
Control variable		
Location97	0.032***	0.049***
	(0.008)	(0.008)
Work97	-0.015***	-0.011***
	(0.003)	(0.003)
Poverty97	0.196***	0.208***
	(0.020)	(0.026)
Hhsize97	0.040***	0.036***
	(0.003)	(0.004)
Constant	-4.217***	-4.300***
	(0.403)	(0.519)
Observations	1,815	1,815

Note: Standard errors in parentheses.
*** p<0.01.

Table 2. Estimation results on equation (Children's household).

Variables	*ratioeduc14*	*ratiohealth14*
Main variable		
$\hat{Y}14$	0.411***	0.273***
	(0.033)	(0.026)
ln_trk14	0.481***	0.296***
	(0.075)	(0.050
ln_trk14^2	-0.023***	-0.014***
	(0.003)	(0.002)
$HHeduc14$	-0.040***	-0.029***
	(0.006)	(0.004)
ln_trk97^2	-0.001***	-0.0007***
	(0.000)	(0.000)
Control variable		
Location14	0.025***	0.021***
	(0.010)	(0.006)
Work14	-0.009***	-0.002
	(0.002)	(0.002)
Poverty14	0.266***	0.187***
	(0.027)	(0.020)
Hhsize14	0.081***	0.047***
	(0.006)	(0.005)
Constant	-8.182***	-5.326***
	(0.756)	(0.568)
Observations	1,815	1,815

Note: Standard errors in parentheses.
*** p<0.01.

The effect of income variables, cigarette expenditure, and household head education level on spending for education and health investment has the same pattern. Income has a positive effect on human resource investment spending, where an increase in income will lead to an increase in human resource investment spending (education and health). Cigarette expenditure has a positive effect in the short term and a negative effect in the long term on

human resource investment spending. In the short term, household cigarette expenditure will continue to increase spending on education and health. However, in the long term, cigarette expenditures will reduce spending on education and health. The third main variable, which is the education level of the household head, has an impact on the increase in human resource investment spending, but its ratio will decrease due to an increase in income.

4.2. Cigarette Expenditure and Human Resource Investment

The effect of cigarette expenditure is divided into two kinds: short-term effects and long-term effects. A quadratic model is needed to analyze this type of influence because of the addictive nature of cigarettes, but long-term consumption will decrease due to health reasons, age, or other reasons. The quadratic analysis model becomes one of the distinguishing factors of this study compared to previous studies. As for the short-term effect, the increase in cigarette expenditure will keep on increasing human resource investment, while for the long-term effect; the increase in cigarette spending will reduce human resource investment. This pattern applies to both parents' and the children's households. It indicates that there is an intergenerational pattern in smoking households. It is strengthened by the variable of cigarette expenditure in the parents' households, which significantly affects the human resource investment in the children's households. Based on several previous studies, household cigarette expenditure in China, South Africa, and Montenegro can reduce other important expenditures, one of which is education and health. However, there is no explanation regarding the intergenerational review of this matter. It has been previously explained that this study focuses more on the sustainable impact that occurs in smoking households, and the analysis results have answered the hypothesis that there is a similarity in the pattern of the influence of cigarette expenditure on spending for education and health in both parental households and child households.

Parents and children's households have several different characteristics; they are: the cigarette expenditure ratio of children's households is higher than it is of the parents'. In addition to that, their income was two times higher than their parents'. This condition was relevant to the level of effects on the cigarette expenditure coefficient, because in children's households, the increase in cigarette expenditure will suppress education investment, unlike in parents' households. As for health investment, the difference in the effect of cigarette expenditure was really subtle. It means that cigarette expenditure shows more effects on decreasing education investment than health investment.

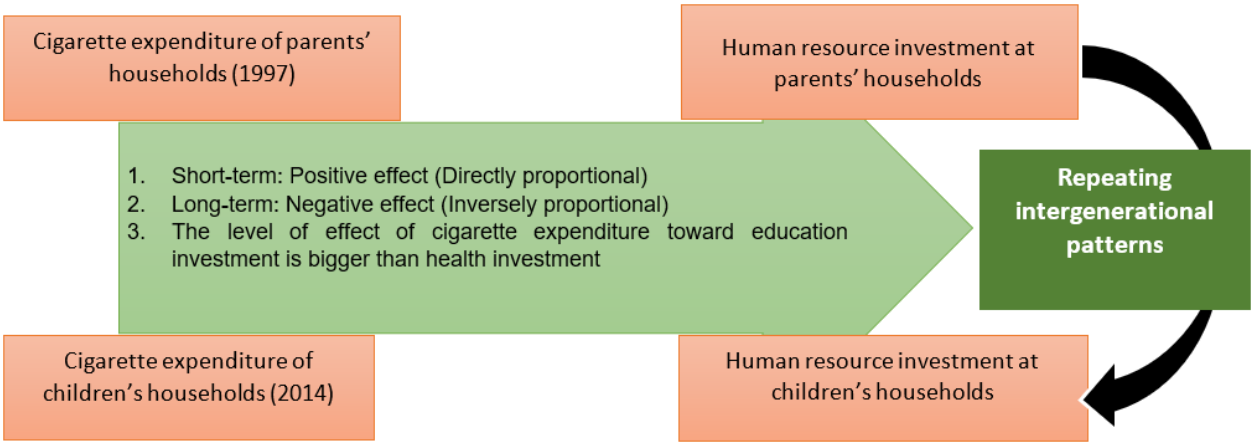

Figure 1. Intergenerational patterns on the correlation between cigarette expenditure with human resource investment.

Figure 1 illustrates the presence of a recurring pattern from parent's households to children's households. These recurring patterns indicate intergenerational influences on smoking households.

The difference between the findings of this study and previous studies is the presence of an intergenerational pattern, namely parental and child households showing a similar trend, that cigarette expenditure can reduce

spending on education and health. If this pattern continues sustainably and is passed down in smoking households, it will be difficult to achieve ideal conditions, especially in poor smoking households. As explained in the literature study, investment to improve human resource quality is very important because it is needed to promote the welfare of a nation (Harbinson, 1971). Therefore, the allocation for its expenditure also needs to be prioritized. An expense that actually lowers the quality of human resources (such as cigarettes) shouldn't take the place of something that is a priority.

4.3. Income and Human Resource Investment

The results of the statistical analysis indicated that income has an influence on human resource investment. Increasing income can cause education and health spending to also increase. In previous research, households with smokers at various income levels (quintiles 1-5) in Australia tended to allocate less spending on education, insurance, and dining out compared to former smokers. Households with smokers also had higher alcohol expenditures compared to former smokers (Lal, Mohebi, White, Scollo, & Mccaffrey, 2022). The study explained that regardless of the income of households with smokers, expenditures on education, insurance, and dining out were always lower, and expenditures on alcohol were always higher compared to non-smoking households. Meanwhile, households with smokers with the lowest income tended to have smaller expenditures on vehicle fuel compared to non-smoking households. The results of the study indicate that even though the income of households with smokers is categorized as high, the allocation for education expenses remains lower compared to non-smoking households. In family economics, parents will allocate their income to pay for education and health, although they will not directly feel the satisfaction of the services they have already bought. This is because children are public goods for parents (Browning & Chiappori, 2011). Therefore, the optimal choice is when a family collects their income and spends it on public goods within the family. $Q + q^a + q^b = y^a + y^b$, in which Q is a purely public good, $q^a$is private consumption for a, q^b is private consumption by b, y^a is income for, a dan y^b is income for, b. Findings from this research revealed that cigarette expenditure is higher than expenditure on human resource investment. Therefore, theoretically, there is a possibility that smoking households will find it difficult to achieve maximum satisfaction with the goods and services they buy. It means that maximum satisfaction with public goods (education and health investment) is lower than maximum satisfaction with private goods (cigarettes). Then, theoretically, the likelihood of conflicts occurring in the family will be greater. Browning explained that private good domination is acceptable since the concept of family is love or affection. Meaning that, a certain commodity consumed by a single individual will become a conflict, but when it comes to the context of family, it can minimize or weaken conflicts. Therefore, Browning elaborated further that marriage and living under the same roof will be beneficial.

$$U^a\,(Q, q^a; q^b) = U^a\,(Q, q^a) + \delta^a u^b\,(Q, q^b),$$
$$U^b(Q, q^a, q^b) = u^b(Q, q^b) + \delta^b u^a(Q, q^a). \quad (16)$$

In Equation 16, it is indicated that family members (a and b) care about each other, but not as much as their self-care. Thus, the formula is $\delta^a=\delta^b=0$. It is aligned with the existence of selfish preference, and $\delta^s > 0$ represents altruism (care about others) in the family. If $\delta^a\delta^b = 1$, then the spouses, husband and wife (a sand b), have the same ordinal preferences. In the case of smoking households in the sample, $\delta^a\delta^b = 1$ is not possible because smoking households clearly have regular cigarette expenditure. It means that smoking households must have a selfish preference since cigarettes are a purely private good; thus, the conflict in determining the amount of expenditure on public goods (human resource investment) will most probably occur. In the context of family, selfishness (individualistic) is found in each of the individuals as though they were single or unmarried. On the other hand, a family also has altruism (caring about each other), which can minimize selfishness and reduce conflicts. It has been proven in the study that the higher the income, the higher the education and health investment will be. The same thing happened to cigarette expenditure; it will be higher. It means that the conflict potential due to spending on cigarettes (private goods) can be reduced by maintaining spending allocations on education and health expenditures

(spending on public goods) by prioritizing altruism and supporting higher income rather than higher consumption of cigarettes. The importance of household income is also supported by the effective variables of working household members. More working household members can lead to an increase in household income, which will help support household expenditures for education and health. And the more household members, the more burdens there are for spending on education and health. Indonesia is classified as a lower-middle-income country (Bank, 2018). According to previous research, tobacco cigarette use in low- and middle-income countries can have a negative impact on human capital investment (Do & Bautista, 2015). Therefore, addressing the issue of tobacco smoking is crucial to improving the health and well-being of both smoking households and their families. In this context, income levels become important in supporting well-being, alongside the existence of altruism within a household.

4.4. Level of Education and Human Resource Investment

A higher level of education will reduce human resource investment. This statement sounds controversial since highly educated people are usually concerned with education and health. But how can a higher level of education reduce human resource investment? Let's take a closer look at it. This study used a human resource investment measure, which is the ratio of education and health expenditure. This measurement is related to the amount of household income. The higher the level of education, the higher the income will be. The higher and faster the increase in income, the farther the ratio of expenditures on education and health from the income. Despite increasing education and health spending, the increase is lower than income, so it will not mess up the allocation of income on other spending. Therefore, smoking households whose head of the family has a high income will be more flexible in allocating human resource investment as well as cigarette consumption. In other words, the higher the level of education, the higher the expenditure on education and health investments.

The findings from a study in China (Yan, Peng, Hao, Irfan, & Wu, 2021) indicate that the educational level of the household head influences the pattern of child education investment in China. Household heads with higher education are more likely to have higher education expenses for their children. Intergenerational transmission patterns have emerged from these research findings. This supports the notion that intergenerational transmission patterns can also occur in smoking households. If the parents' household has a highly educated head, the allocation of expenses for their children's education is also higher compared to households with low levels of education.

As children grow up and start their own households, intergenerational transmission in smoking households is not only related to the children's education but also to smoking habits (Zhao, Konishi, & Paul, 2010). Therefore, the opposite occurs in smoking households with heads of low education; the allocation of human resource investment expenses for children is lower. The consequence of low educational and health allocations is that future income opportunities for children will also be low. When the children start their own households, the allocation of human resource investment for their children will also be low. However, there is an opportunity to break this vicious circle. In the future, when the children find partners with higher levels of education, there is an opportunity for prosperity.

4.5. Analysis of Human Resource Investment on Smoking Households Based on Residence Location and Poverty Level

Smoking households that live in rural areas will have smaller human resource investments compared to those who live in urban areas. This is because those that live in rural areas have smaller incomes compared to those living in towns. If households in rural areas want to consume cigarettes, but at the same time, they also want to increase human resource investment, they have to increase their income under the condition that their income growth acceleration has to be higher than the cigarette expenditure and human resource investment spending. Research conducted by Xin et al. (2009) found that smoking habits have made poor rural households in China even poorer. The findings of another study also confirm the same, where low-income smoking households tend to forego expenditures on food items such as dairy products, fruits, nuts, and cooking oil, choosing instead to use their limited income to purchase cigarettes. Furthermore, the research reveals that cigarettes and alcohol are complementary

goods (Chelwa & Koch, 2019). Income that tends to be small leads to more inflexible choices; in other words, households in rural areas are more inelastic in terms of choices compared to those living in urban areas. On the other hand, households in towns still have flexible preference probabilities. Moreover, regarding health investment expenditure, urban areas offer more varied and accessible healthcare facilities. The fact that they already have healthcare insurance could be ignored due to the choices that occurred. The results of the analysis based on residence location were corroborated by the results of the analysis based on the households' poverty level.

In poor households (both in 1997 and 2014), preferences were hard to define due to small incomes. In poor smoking households, although they have idealism regarding the importance of human resource quality through education, education expenditure was not allocated from cigarette expenditure but from other allocations. It indicated that smoking expenditure must have used up other spending, although it was not from human resource investment. However, human resource investment expenditure will not disturb the cigarette expenditure; it will use up other spending instead. What occurred in parents' households also occurred in children's households. If the parents' households were categorized as poor households, the same thing would happen to the children's households since they could not allocate human resource investment properly. If children's households had much higher income than their parents' and were not categorized as poor, then the possibility of children's households getting out of the poverty trap could effectively determine bigger preferences. Human capital theory states that humans are capital if their quality is improved (investment), which will yield returns in the future. The returns can be achieved after the 'production process', in which good or top human resource quality will increase productivity. High productivity will give maximum output, then the benefits can be obtained, and they will go back to human resources, where income will be increasing. Figure 2 explains how low-income households with smokers are trapped in a generational vicious cycle. Cigarette expenditures have displaced spending on human resource investments. This condition has led to a decrease in productivity. Low productivity is a cause of poverty, and this has been occurring intergenerationally.

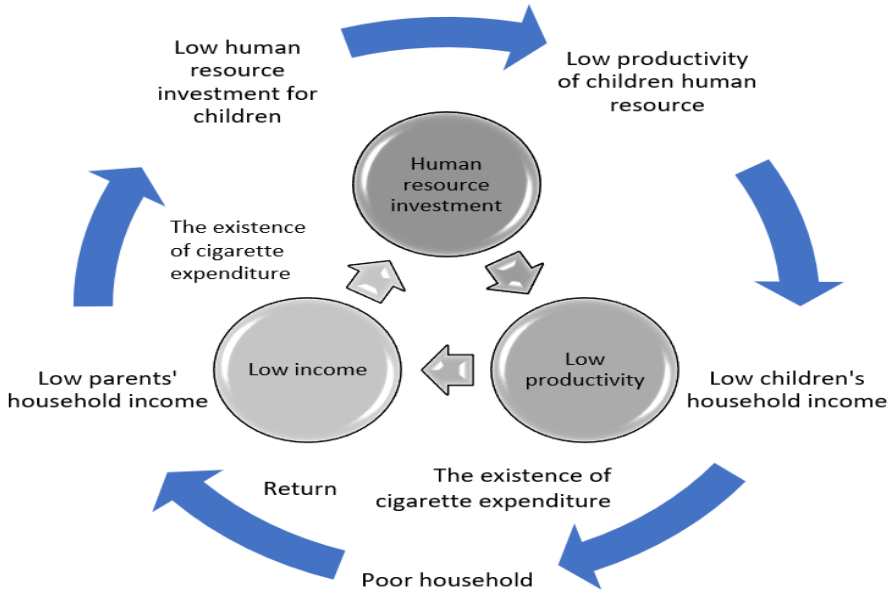

Figure 2. Vicious circle of poor smoking households.

5. CONCLUSIONS

The conclusions taken from the results of the intergenerational analysis with human resources investment in smoking households as the subject are:

1. The increase in cigarette expenditure in the long term will reduce human resource investments, especially in poor households and households living in rural areas. However, smoking households with high incomes (not poor) and who live in towns still have opportunities to make better human resource investments. Spending

on smoking affects education and health investment in both parents' and children's households. These findings give us proof that parents' spending habits on cigarettes also apply to their children's spending habits (reoccurrence of habit patterns passed down from parents to the children). Thus, it was concluded that there was a vicious circle and intergenerational effects.

2. Smoking households must have a high income if they want to keep investing to increase human resource quality and break the vicious circle of poor smoking households, and the children's households have to be more welfare-oriented compared to the parents.
3. Level of education affected household income and will finally affect the decision to invest to improve human resource quality.

6. IMPLICATIONS

The implications of this research emphasize the importance of reducing cigarette consumption among the Indonesian population to enhance the quality of human resources. Therefore, by reducing or eliminating cigarette expenses, it is hoped that low-income households can redirect their resources towards more beneficial expenditures, such as investments in education and health.

7. POLICY SUGGESTION

The research results indicate that cigarette consumption plays a role in increasing poverty and decreasing the quality of human resources in Indonesia. In fact, smoking households are highly susceptible to getting caught in a vicious circle of poverty and intergenerational smoking behavior. Thus, raising cigarette prices is one way to reduce cigarette consumption. In previous research (Rasyid, 2019), it has been explained that increasing cigarette prices in Indonesia aims to reduce cigarette consumption without decreasing government revenue from the tobacco industry. A cigarette price increase would have a more pronounced effect on reducing the number of smokers among low-income households.

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REFERENCES

Akbar, U. U., & Sari, Y. P. (2021). Does tobacco consumption affect allocation household expenditure: A study literature advances in economics business and management research. In (Vol. 179, pp. 191-195). Padang: Atlantis.

Allo, A. G., Sukartini, N. M., & Saptutyningsih, E. (2018). Smoking behavior and human capital investment: Evidence from Indonesian household. *Signifikan: Jurnal Ilmu Ekonomi*, *7*(2), 233-246. https://doi.org/10.15408/sjie.v7i2.5793

Bank, W. (2018). *World development report 2019: The changing nature of work*. Washington, DC: The World Bank.

Becker, G. S. (1993). *Human capital: A theoretical and empirical analysis, with special reference to education*. Chicago and London: The University of Chicago Press.

BPS. (2022). *Statistik Indonesia*. Indonesia: BPS.

Browning, M., & Chiappori, P. A. (2011). *Family economics*. Oxford: Printer Opaque This.

Chelwa, G., & Koch, S. F. (2019). The effect of tobacco expenditure on ecpenditure shares in south african households: A genetic matching approach. (R. Sane, Ed.). *PLoS One*, *14*(9), 1-16. https://doi.org/10.1371/journal.pone.0222000

Creswell, J. W. (2008). *Research desaign: Qualitative, quantitative, and mixed methods approaches*. London, India, Singapore: SAGE Publications Ltd.

Do, Y. K., & Bautista, M. A. (2015). Tobacco use and household expenditures on food, education, and healthcare in low-and middle-income countries: A multilevel analysis. *BMC Public Health*, *15*, 1-11.

Drucker. (1993). *Post capitalist society in post capitalist society*. New York: Roudledge.

Fitzsimons, P. (2015). *Human capital theory and education Townsville city, QLD*. Australia: Springer.

Gujarati, D. N. (2012). *Basic econometrics*. Noida: Tata MacGraw-Hill Education.

Harbinson, F. H. (1971). Human resources as the wealth of nations. *Proceedings of the American Philosophical Society*, *115*(6), 426-431.

Juanda, B. (2020). *Model persamaan simultan*. Indonesia: Bogor West Java.

Lal, A., Mohebi, M., White, S. L., Scollo, M., & Mccaffrey, N. (2022). Household expenditure of smokers and ex-smokers across socioeconomic groups: Result from a large natiowide Australian longitudinal survey. *BMC Public Health*, 1-11. https://doi.org/10.1186/s12889-022-14083-y

Mugosa, A., Cizmovic, M., & Vulovic, V. (2022). Impact of tobacco spending on intrahousehold resource allocation in Montenegro. *Tobacco Control*, 1-6. https://doi.org/10.1136/tc-2022-057786

Oktavianti, H., Burhan, U., Ekawati, M., & Badriyah, N. (2021). Cigarette expenditure and its effect on human resource investmeny allocation advance in economics, business and management research. In (pp. 99-105). Malang: Atlantis Press.

Pelinescu, E. (2015). Impact of human capital on economic growth procedia economic and finance 22. In (pp. 184-190). Bucharest Romania: Elsevier.

Pérez-Sánchez, B., González, M., Perea, C., & López-Espín, J. J. (2021). A new computational method for estimating simultaneous equations models using entropy as a parameter criteria. *Mathematics*, *9*(7), 1-9. https://doi.org/10.3390/math9070700

Rasyid, M. (2019). Elasticity of demand for Tobacco products in Indonesia: Study of cigarette consumption across households. *Jurnal Ekonomi Kuantitatif Terapan*, *12*(1), 102-107.

Rosen, H. S. (1999). *Public finance*. New York: McGraw-Hill.

Todaro, M. P. (2000). *Economics for a developing world*. London: Longman.

Wang, H., Sindelar, J. L., & Busch, S. H. (2006). The impact of tobacco expenditure on household consumption patterns in rural China. *Social Science & Medicine*, *62*(6), 1414-1426. https://doi.org/10.1016/j.socscimed.2005.07.032

Xin, Y., Qian, J., Xu, L., Tang, S., Gao, J., & Critchley, J. A. (2009). The impact of smoking and quitting on household expenditure patterns and medical care costs in China. *Tobacco Control*, *18*(2), 150-155. https://doi.org/10.1136/tc.2008.026955

Yan, G., Peng, Y., Hao, Y., Irfan, M., & Wu, H. (2021). Household head's educational level and hpusehold education axpenditure in china: The mediating effect of social class identification. *International Journal of Educational Development*, 1-9. https://doi.org/10.1016/j.ijedudev.2021.102400

Zhao, M., Konishi, Y., & Paul, G. (2010). Does smoking make one dumber? evidence from teenagers in rural China. *Gansu Survey of Children and Families Papers*, *37*, 1-31. https://repository.upenn.edu/handle/20.500.14332/34690