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DOES EDUCATION AND EMPLOYMENT IMPROVE WOMEN'S LIFE EXPECTANCY IN INDONESIA

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ABSTRACT

This paper examine the relation between women's income, women's education, and the percentage of women as professional workers toward women's life expectancy in Indonesia. This research use random effect model with 34 Provinces data from 2010 to 2017. This paper show that women's income, women's education, and the percentage of women as professional have positive and significant effect to women's life expectancy in Indonesia. This paper show that women's education has bigger effect on women's life expectancy in Indonesia than women's income and percentage of women as professional workers.

Keywords*: Education; Income; Profesional Workers; Women Life Expectancy*

I. INTRODUCTION

The question of whether or not education and employment has an effect toward life expectancy is a question that has been around since the end of Second World War. After the end of the Second World War the world population life expectancy are continue to rise especially in Europe (Mackenbach, 2013). The more somewhat stable political conditions in Post-world war 2 Europe bring many politicians across Europe to bring the focus of their agenda on public healthcare and public education, even though it still overshadowed by the rising threat of the cold war. The idea of public health and public education after world war 2 bring a new prosperity in many countries as world population especially in more developed nations are getting more healthy and have better income than during the world war 2 and during the interwar period (Mackenbach, 2013). This led to an increase in life expectancy in Europe as the political climate are somehow stable than the previous era, this leads to a rapid growth in production and innovation in technology led to an increase in income for people in Europe. As the income increases across Europe so does the demand for education, the increase in demand for education due to the increase in income in post-world war 2 Europe led to better life for most of people thus this led to an increasing life expectancy among the European populations.

The effect of rising life expectancy in many countries after the Second World War also happened in post-war Japan as per 1950's, life expectancy in Japan rose up even though poverty rate in post-world war 2 1950's japan still at the highest point. The

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increase in life expectancy in post-world war 2 Japan are mostly due to increasing medical effectiveness due to the government and allied administration effort to war torn japan (Sugiura, Ju, Yasuoka, & Jimba, 2010). The increasing life expectancy of world population are mainly due to the increase in income and better healthcare among many world populations. However, as previously mentioned that Education also played an important role on the rise of the world life expectancy, as more and more world populations getting better education due to many countries rising interest to invest in better education system and the increasing demand for education as the world are more peaceful.

As the education system getting better in many countries so does the basic income for average people. As more and more people getting better education their basic income also getting a significant increase thus increasing the number of the middle class population worldwide. The rise of the number of middle class or middle income people due to better education system and the spread of public education idea creating a healthier population with better life expectancy. This is proven by the survey in conducted in Belgium in 1991 to 2004 as more and more people getting better education the life expectancy among population of Belgium also getting a significant increase (Deboosere, Gadeyne, & Van Oyen, 2009). The increase of educated middle class has a significant effect towards general population life expectancy as more and more people has better knowledge about their health and they also has better access toward healthcare than most of people before world war 2 happened.

However, the improvement in education, health and income does not necessarily improve women's life expectancy. According to research conducted in the post-war Japan the rise of Japan's GDP and numbers of educated people in Japan from 1950's to 1980's, the increase in Japanese women life expectancy are not as high as Japanese men's life expectancy (Sugiura et al., 2010). The studies conducted in the United States also shows the same result that even though income and education among women are increasing in the United States, there is still a gap between women's life expectancy and men's life expectancy. Despite better income and education there still a gap in women's life expectancy and men's life expectancy.

Same condition also happens in Indonesia as women getting more education and more income the higher their life expectation become, even though they still earn less than men do. As more and more women are getting more educated their income also increased this has a significant effect on the life expectancy in Indonesia. Based on the data from The Indonesia's Central Bureau shows that the as women's income contribution and women's school expectancy increase over the time. This somewhat indicating there is an effect of education and income toward life expectancy.

Figure 1 shows that the average women's life expectancy in Indonesia is 70 years old with the lowest life expectancy is in Nusa Tenggara Timur with 66 years old of life expectancy with the highest is at DI Yoyakarta with 76 years old of life expectancy. Most of the provinces life expectancy remain constant throughout 2016 and 2017, with slight increase in 2017 in some of the provinces like Nusa Tenggara Barat and Kalimantan Selatan.

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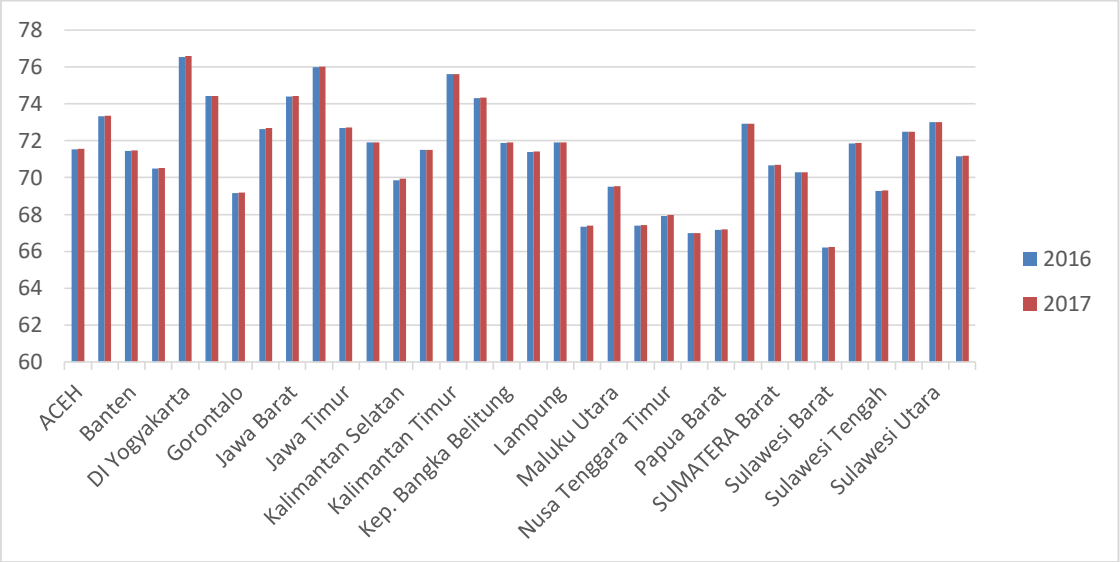

Source: BPS (2018)

Figure 1
Women's Life Expectancy in 34 Provinces from 2016-2017

From the data mentioned above, we could see that there is a differences in women's life expectancy in 34 provinces in Indonesia as some provinces have higher women's life expectancy. This paper examine whether or not the education, income, percentage of women as professional workers has an effect on the women's life expectancy in Indonesia based on the data from Indonesia's Central Bureau of Statistics.

II. THEORITICAL STUDY

There are some previous studies that have been studied the effect of income and education toward life expectancy. The previous researches are using various data from around the world with different periods. From the previous researches mostly led to a conclusion that the higher the income and education level the higher the life expectancy. Data from previous study also showed the differences in life expectancy between highly educated and low educated person, as showed by a study conducted in Belgium that stated between 1991 to 2004 that as more and more people are getting more educated, the life expectancy of educated people in Belgium also increased (Deboosere et al., 2009). The research conducted by Deboosere and Van Oyen in Belgium showed that there is significant differences in life expectancy between the highly educated and low educated people in Belgium as the life expectancy continue to rise so does the gap between the highly educated and low educated person life expectancy (Deboosere et al., 2009). Other research that examine link between education levels and life expectancy was the research conducted in the United States from 1970 to 1990 examine life expectancy differences between different genders, races, and educational background (Crimmins & Saito, 2001). The research concluded that there is a gap in life expectancy

between white men, white woman, African American men, and African American women with different education backgrounds. As white educated men will have a better life expectancy than any other categories (Crimmins & Saito, 2001). Another survey also conducted in Norway using the census data from 1961 to 2009 to examine the differences in life expectancy between different genders and educational backgrounds, and the research concluded there are significant differences between differences in life expectancy between different education background and gender (Steingrímsdóttir et al., 2012). The same research also conducted in Lithuania with almost the same result, the research conducted in Lithuania also concluded that the higher the person education the longer the life expectancy are (Kalediene & Petrauskiene, 2000). The same result also concluded by the research conducted by Rogot in the United States in 1979 that shows the positive effects between education and life expectancy (Rogot, Sorlie, & Johnson, 1979). Another research that shows a positive impact of education on life expectancy is the research conducted by Schnittker that concluded that both education and income has a positive effect on life expectancy even though income has a diminishing effect on health gradients (Schnittker, 2004).

The survey conducted in the post-war Japan also found the positive correlation between education and life expectancy based on data from 1950's to 1980's that concluded as the more and more people in Japan are getting more educated the life expectation also increased (Sugiura et al., 2010). Education also has the positive effect on life expectancy on elderly in the United States; based on by the two research that studied the education effects on elderly life expectancy. The first research conducted by Manton concluded that education effects on life expectancy and disability is greater on elderly women than elderly men (Manton, Stallard, & Corder, 1997). And another studies also concluded that elderly with higher education has less chance of getting serious illness like cancer than elderly with lower education, thus they have a greater life expectancy than the elderly with lower education levels (Lièvre, Alley, & Crimmins, 2008). As previously mentioned that previous studies has concluded that education has positive effects toward life expectancy, including women's life expectancy. Hill and King in her research concluded that education has helped women to improve their social and economic wellbeing, including their life expectancy (Hill & King, 1995). This also proved by the research conducted by Minicuci that concluded that education helped women with disability to get higher life expectancy (Minicuci & Noale, 2005).

However, different result came from the former Soviet Republics, based on the research conducted in Central and Eastern Europe after the fall of the Soviet Union concluded that even though in some part of central Europe and Eastern European Countries such as Czech Republics and Finland showed a positive correlation between education and the increase in life expectancy. However, the result in former Soviet Republics like Russia and Estonia showed a different result (Shkolnikov et al., 2006). Even though most of the research showed a positive correlation between education and life expectancy, it also showed widening gap between the highly educated person and low educated person, the gap also happened between men and women. According to several researches such as the research by Olshansky and his team concluded that there is a significant differences in life expectancy between people with longer years of

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education and people with shorter years of education (Olshansky et al., 2012). While the gap between the highly educated and low educated person seems widening, the gap between different genders with the same education level are narrowing. According to studies conducted by Glei, the gap in life expectancy between highly educated men and highly educated women in the world after the Second World War are narrowing (Glei & Horiuchi, 2007). However, the same thing could not be said for the low educated female, as the study conducted in the United States shows that the low educated women life expectancy in the United States are declining over the past two decades (Montez & Zajacova, 2014).

Same as education, income also has the significant effects of life expectancy according to many previous studies. As we know before that highly educated person are most likely to have better income than person with low education. One of the studies that found connection between education and income positive relations with life expectancy are the studies conducted by Messias based on the data in Brazil concluded that the higher the income inequality and illiteracy rate in Brazil the lower the life expectancy (Messias, 2003). The research conducted by Lynch also the same result, that the higher the GDP per capita in one area the higher the life expectancy as more people with high income has a better healthcare (Lynch, Smith, Kaplan, & House, 2000). Lynch also found that the higher the inequality rate in one area the lower the life expectancy are. The survey conducted in the United States from 2001-2014 also found that the higher income lead to higher life expectancy with the gap between the richest 1% and the poorest population in the United States are 14.6 years (Chetty et al., 2016).

Even though the result are mostly the same between Income and life expectancy, but many studies found that the poor people in less developed nations have higher mortality rate and lower life expectancy rate. One of the studies that found that the higher mortality rate among poor populations in less developed nations are the studies conducted by Rodgers. The study by Rodgers found that people in less developed nations has higher mortality rate among the poor population (Rodgers, 2002).

Study from 1980 and 1990 Spain also found that people who lived in a poverty or below the poverty has a lower life expectancy, if the person living 25% below average in Spain they have less 0.67 years life expectation than average population in Spain (Regidor, Calle, Navarro, & Domínguez, 2003). Income inequality has a significant effect on population life expectancy based on studies by Babones, as the country with high gini coefficient index the higher infant mortality and murder rates are thus lowering life expectancy of that country (Babones, 2008). Bloom also found that country with high productivity, better education, and high investment in physical capital has a better life expectancy than country with low productivity, worse education system, and low investment in physical capital (Bloom & Canning, 1999). The negative effects between income inequality and life expectancy also proven by the studies conducted in various region in Italy, as the region in Italy that has a higher Gini ratio has lower life expectancy than any other region in Italy (De Vogli, Mistry, Gnesolto, & Cornia, 2005). Lower income also has a higher risk of death according to study Marmont that stated if the individual has income less than $15000 a year, they would face a bigger odd than people higher income (Marmot, 2002).

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Political conditions also played an important role in determining income and life expectancy of some countries, as study by Mackenbach stated that during the Second World War 2 income and life expectancy dropped to low point before rise again in the 1950's, but for some countries that faced a crisis the income dropped and life expectancy also dropped (Mackenbach, 2013). Income has a significant effect on crime rate on certain areas, as study conducted in Chicago concluded that a neighborhood with lower income has a higher crime rate and thus also lowering the life expectancy of people who live in that area (Wilson & Daly, 2011).

III. RESEARCH METHODOLOGY

Data Description

This research used a secondary data obtained from Indonesia's Central Bureau of Statistics from 2010-2017. This research is focusing on measuring the relations between income and education on women's life expectancy in Indonesia using the data from 34 provinces across Indonesia from 2010 to 2017. This paper measured all the provinces in Indonesia to measure the relations of income and education on women's life expectancy from 2010 to 2017. The data used in this research paper are women's life expectancy from 34 provinces in Indonesia from 2010 to 2017 as dependent variables. The data used as independent variables in this paper are women's Income Contribution in percentage from 34 provinces, women as Professional in percentage from 34 provinces across Indonesia, and women's school expectancy in 34 provinces all of it in time range of 2010-2017. The variable was chosen based on previous studies that use school expectation and women's income contribution as an indicator to estimate the relation between income and education toward life expectancy. Like studies conducted by Crimmins that use school expectation in America as one of the variables to measure the relations between education and life expectancy

Method

The method used in this paper is the random effect panel data regression to measure the effects of the percentage of women as professional, the percentage of women's income contribution, and women's school expectation toward women's life expectancy, the panel data regression model used in this paper are:

$$Ylifeexpwom = \beta 0 + \beta 1 schoolexp + \beta 2 IncomeWom + \beta 3 WomProf + u$$

Lifeexpwom	Women's life expectancy
Schoolexp	women's school expectation
IncomeWom	% of women's income contribution
WomProf	% of women as professional

As previously discussed, that according to previous studies regarding the effect of income and education toward life expectation is positive. So the value of β1, β2, and β3 are expected to be positive. The data used in this paper are panel data because panel data gives an informative data, and has a better efficiency. The analytic model used for regression model is the random effect model because random effect give the individual

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model in random effect are randomly distributed across the cross-sectional unit and in order to capture the individual effect, the regression model is specified with term representing the overall term (Hiestand, 2016).

IV. RESULT

The following empirical model were estimated using random effect model with result as stated below:

Table 1. Regression Result

Variable	*Coefficient*	*Standard Error*	*Z-Statistic*	*Prob*
Schoolexp	2.512298	0.3192259	7.87	0
IncomeWom	0.4893436	0.1373557	3.56	0
WomProf	0.4192075	0.0638772	6.56	0
Constanta	4.501007	2.095869	2.15	0.032
R-Square = 0.602				
Observation = 272				
Number of Provnum = 34				
*** p<0.01, ** p<0.05, * p<0.1				

All of the variables are appear on the correct sign, and all of the variables are significant at 5% level. With r2 at 0.602 the relations between the independent variables and dependent variable are strong, thus all of the independent variables has a strong relation with the dependent variable.

Based on the result from the regression that the women's school expectation has a positive effect towards life expectancy in Indonesia's Province, and the variable is significant at 5% level. Based on that result we could also assume if the women's school expectation in some province increase by one year the women's life expectation would increase about 2.5 years. This means that the province with low women's school expectation has worse life expectancy than the province with higher women's school expectation like. This result is in match with previous studies that concluded education has positive effects on life expectancy such as the research conducted in Belgium that concluded that as citizen of Belgium getting more educated the higher their life expectancy become (Deboosere et al., 2009). This is also in match with the result of the research in the United States that concluded there is a difference in life expectancy between the highly educated citizen and the low educated citizen as the highly educated citizen has a better life expectancy than low educated US citizen (Crimmins & Saito, 2001). As the this result also proved that there is a discrimination in life expectancy in the provinces with lower school expectancy as previously mentioned in the previous research.

From the regression result, we also could say that the percentage of women's income contribution has a positive effect on women's life expectation, and the variable

is significant at 5% level. Based on that result also we could assume that if the percentage of women's income contribution increase by 1% the life expectation would increase about 0.5 years. This means that the province with better percentage of women's income contribution have a better life expectancy than the province with less percentage of women's income contribution. This result also in match with previous research that concluded the higher income has a positive effect on life expectancy. The previous research such as the research conducted in Brazil that concluded the higher income citizen has a better life expectancy and the higher income inequality leads to worse life expectancy (Messias, 2003). Another research conducted in the United States also backed the result as the research concluded that higher income citizen has a better life expectancy than low income citizen in the United States (Chetty et al., 2016). The previous research also backed the result that there is a discrimination in life expectancy in the provinces with lower women's life expectancy. The research conducted in the Spain that the region in Spain with lower income has lower life expectancy than the region with higher income (Regidor et al., 2003).

The variable of percentage of women as professional has a positive effect on life expectancy based on the regression result and the variable is significant at 5% level. Based on the regression result we could assume that if some province in Indonesia has a 1% increase in the percentage of women as professional, the life expectancy will increase approximately 0.4 years. This means that the province with better percentage of women as professional has a better life expectancy than the province with low percentage of women as professional. This result is also in match with previous result that concluded higher income and higher education has positive impact on life expectancy. The previous studies such as the research conducted in Japan that after the world war 2 the increase in income and educated people resulted in a higher life expectancy (Sugiura et al., 2010). Another studies conducted in the United States also backed this result as the studies concluded that higher educated with higher income citizen has a better life expectancy than low educated with low income citizen (Crimmins & Saito, 2001).

V. CONCLUSION

This paper showed an important finding that previously has been acknowledge by previous research that income and education has a significant effect on life expectancy. The data showed that in Indonesia the higher income does improve women's life. It was proven by the regression result that showed positive relations between percentage of women's income contribution and life expectancy, as the provinces with low percentage of women's income contribution has lower life expectation than provinces with higher percentage of women's income contribution. This is somewhat correlated with the previous research conducted elsewhere that income has a positive effect on life expectancy, but it also arise the same question with previous research does it mean there is an inequality in life expectancy between low income area and the area with much higher income? This was previously discussed in Van Oyen's research and any other researches that even though the life expectancy and income are continue to rise throughout the year, but the life expectancy gap between high income and low income

area or individual are widening (Deboosere et al., 2009). Even though income are somewhat increasing compared to decades ago, but it still not enough to elevate discrimination in life expectancy based on income. This is mainly due to the high increase of income in the middle to high-income population.

This is also a question arise with education, as education also has the positive effects on life expectancy. As we previously knew from the result that the increase in school expectancy in one province would increase that province the life expectancy, so province with low school expectancy would have lower life expectancy than province that has better school expectancy. The question arise is still the same whether or not there is a discrimination in life expectancy based on education? The answer for this question is still the same as the question about income, as it was previously discussed by Crimmins that there is a significant discrimination on life expectation based on education and gender (Crimmins & Saito, 2001).

This come to conclusion that even though income and education has a positive effect on women's life expectancy it still leave a gap in life expectancy between the lower income province and province with relatively has a low women's education level than the province with higher income and higher education. Therefore, the government might need to look at the life expectancy gap between provinces in Indonesia too see how wide the inequality really are between the provinces in Indonesia. The government also might need to allocate the domestic budget to improve the education system in the provinces where the school expectation is still low and to give the women in those provinces a necessary work programs that could improve their basic living income, so that the government could reduce the inequality in life expectancy between provinces in Indonesia.

There are limitations to this analysis. Due to lack of data regarding women's income and women's education, the variables use in this paper are limited. While previous study usually use primary data collected in various places in certain set of time, this paper only use secondary data from Indonesia's Central Statistics Bureau. This study only use woman's school expectancy per province in Indonesia instead of using individual education data. It is better to include individual women's income and education data for further research for better representation. This study also only use percentage of women's income contribution and percentage of women's as professional instead of using GDP as the measure to measure the income effects on life expectancy. It is also better to include GDP as the measure of income for further research for better representation.

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