The Effects of Social Capital on Fertility in Indonesia

Path Analysis of Susenas 2014

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Abstract—This research aims to study the direct and indirect effects of social capital forming sub-dimensions on fertility seen from number of children ever born (CEB) through the practice of family planning by applying path analysis with generalized structural equation modeling (GSEM) method. The formation of sub-dimensional variables of social capital is performed by using factor analysis, forming 7 (seven) factors, i.e. participation in group, social network, religious tolerance, ethnic tolerance, collective action, trust and reciprocity. The control variables are urban status, education level, work status and age. This research uses the National Socio-Economic Survey in 2014 for Indonesian, with the analysis unit of women aged at 15-54 years who have ever married. The result of the analysis shows that sub-dimensions of social capital and control variables have direct and indirect effects on fertility from CEB through the practice of family planning of ever married woman aged 15-54 years. Older and higher educated women have the highest total effect, followed by the low religion tolerance and high network.

Keywords—social capital; family planning; fertility; path analysis; Indonesia

I. INTRODUCTION

Population with its various characteristics is a main factor that influences all aspects of development. Large population without good quality will be a burden for development. The high rate of population growth and the unequal distribution of population have been problems faced generally by developing countries, including Indonesia. The family planning program and awareness on controlling population that have been done by the Government of Indonesia through the national family planning program in the past have been successful in reducing fertility level and the population growth.

The results of the Indonesian Demographic and Health Survey (IDHS) show that fertility in Indonesia is still relatively high, although it has declined. Even in the period of 2002-2007 the birth rate in Indonesia showed a slight increase and had been stagnant. The fertility level of Indonesia indicated by the total fertility rate (TFR), has decreased from 3.03 children per women at childbearing age in 1991 to 2.56 in 2002. Furthermore, in 2007 the TFR experienced slight increase to 2.59 children and then stalled at 2.59 in 2012.

FIGURE 1. TOTAL FERTILITY RATE (TFR) IN INDONESIA, 1991 – 2012 (CHILDREN PER WOMAN).
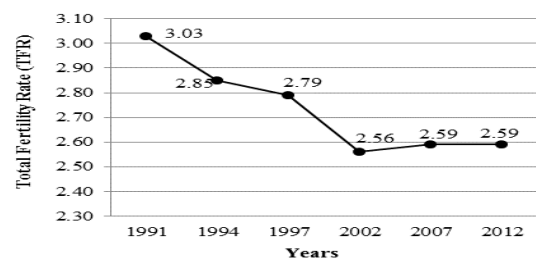
Source: BKKBN [15]

Many studies have attempted to explain the phenomenon causing fertility, primarily seen from the condition of individual characteristics, health conditions and program socialization. But, so far there is no study involving the relationship of fertility and social capital in households. The relationship between social capital and fertility is not a direct relationship [7, 22].

In addition, some experts proposed the theory of fertility. Davis and Blake [9] argued that social, economic and cultural factors will affect fertility through the intermediate variables, which are variables that directly affect the size of fertility such as the practice of family planning. Furthermore, Freedman [12] proposed that norms prevailing in society also have effects on fertility by looking at the number of children. Further, Balbo and Mills [1] investigated how the family network, one of the core of social capital, has a relationship with fertility.

Although theories linking fertility and social capital have been growing in number, existing researches are likely to ignore the condition that individuals, or couples, do not make fertility decisions independently but are actually affected by the people in their environment. Therefore, this study attempts to examine that fertility is determined by the decision to have children formed through social capital seen from its sub-dimensions of family planning practice. This research is expected to reveal how significant the sub-dimension factors of social capital formation and control variables will affect fertility either directly or indirectly through the practice of family planning. Moreover, social capital research is an interesting and important research to be discussed, although the materials and study in Indonesia is still very limited. Besides, the sub-dimension of social capital formation as one of the components is not easy.

II. LITERATURE REVIEW

A. Fertility

Fertility (birth) in the development of demographic science is defined as the result of real reproduction (children ever born) from a woman or group of women [10]. In general, fertility measurement is usually indicated by the total fertility rate (TFR). Davis and Blake [9] conducted a sociological analysis of fertility and proposed that social, economic and cultural factors affect fertility through the intermediate variables. Later, Freedman [12] developed a concept of variables of Davis and Blake [9] and argued that the norms prevailing in society also have effects on fertility. Bongaarts [4] proposed that fertility is influenced by indirect factors and direct determinants.

B. Social Capital

Social capital has a very important role in affecting individuals or couples on fertility decision. Buhler and Philipov [7] described the relationship of social capital and fertility based on the mutual exchange relationship; in which there is information and experience exchanges of fertility, which implicitly also contain subjective perceptions and mindsets. Each individual, family and environment has fertility norms and attitudes based on the background characteristics of individual, family and environment, such as perceptions of children's values, religion, settlement conditions, education, employment status, age at first marriage, income, infant/child mortality [11].

Hasbullah [14] argued that the real identity of social capital is guided values and norms taken as references to act and behave. They connect to other parties that bind to the process of change and to the efforts of society to achieve a goal. These values and elements are manifested in participatory attitudes, mutual caring attitudes, mutual giving and receiving, mutual trust, the willingness of the community or group to be constantly proactive in maintaining values, formation cooperation networks and creation of new ideas, and overall reinforced by the values and norms that support them.

Approaches or indicators recommended by Grootaert and Bastelaar [13] to represent social capital appropriately at the micro level are attitudes of trust and compliance with norms, membership in local associations and networks, and collective actions covering various activities undertaken by a group of people.

C. Fertility and Social Capital

Balbo and Mills [1] proposed that in addition to economic and cultural factors, social capital has an important effect associated with fertility decisions. The high level of family social capital has negative effect on the number of children; which means the higher the social capital level of a family, the lower the possibility of realizing the intention to have children or to add the number of children. Bongaarts & Watkins [5] proved the effect of one of social capital dimensions which is social interaction, on the fertility decision. Kuziemko [19] conducted a study on micro data related to the effects of social interactivity on fertility, by proving the chances of having a child will increase substantially after a sibling has a child.

Bernardi et.al. [2] conducted an investigation of social interaction on family formation. The purpose was to obtain evidence of the importance of informal social interaction on fertility and family behavior. Furthermore, Keim et.al. [17] conducted a research on the effects of social interaction on individual fertility decisions. This study shows that social interactions and partner fertility, subjective perceptions, and networks have effects on fertility.

Rossier & Bernardi [21] proposed how the theory planned behavior (TPB) can explain fertility event by integrating three social networking mechanisms; those are social effect, social learning, and social support. Billari et al. [3] conducted a study on low fertility cases in 2002 and stated that the TPB that relies on attitudes, norms and behaviors has relationship to individual fertility.

Based on the above empirical studies, it can be concluded that the TPB [21] integrating family network with fertility decision can be used as the basis in this study to examine the relationship of social capital and fertility. However, in assessing the problem of fertility and social capital, it is not enough to merely view social capital from the side of family networks. It should be studied comprehensively, especially related to the elements of social capital formation, including how dimensions of groups and networks, trust and solidarity and tolerance can affect fertility behavior.

In analytical framework of this study, measurements are made on women aged at 15-54 who have ever married by looking at control variables through the family planning practice to determine the direct and indirect effects of each sub-dimension of social capital on the number of children ever born (CEB) by measurement stages performed simultaneously.

III. METHODOLOGY

This study used data sources derived from the 2014 National Socioeconomic Survey on the selected households spread throughout Indonesia and consisted household information and social security module [6]. The analysis units in this study are ever married women aged 15-54 years in each selected sample household. The number of samples in this study is 79,754 of ever married women aged 15-54 years.

The formation of sub-dimension is performed by using factor analysis method, which aims to get stock of every sub dimension of social capital on ever married women aged at 15-54 years all over Indonesia. From a series of statistical tests conducted on 29 (twenty-nine) question-items, there were 24 (twenty-four) question items that fulfilled and formed 7 (seven) sub-dimensional factors of social capital formation, which are participation in groups, networks, religious tolerance, ethnic tolerance, collective action, trust and reciprocity relationships. The stock values of each sub-dimension of social capital formation are in the form of a numerical scale, then the stock values will be grouped into two categories: low (<average) and high (≥ average). In this study control variables are also used in determining the effects of social capital on fertility, i.e urban status, education level, work status and age. Table 1 describes the operational definitions of dependent variable, intermediate variable and independent variables used in this study.

TABLE I. DEFINITIONS OF OPERATIONAL VARIABLES

No.	Variables	Operational Definitions	Categories
(1)	*(2)*	*(3)*	*(4)*
Dependent Variable			
1.	The number of Childer Ever Born (CEB)	The number of Childen Ever Born owned by respondents during enumeration	0 = Large number of children (more than 3 children) 1 = Small number of children (less than 3 children)
Intermediate Variable			
2.	The practice of family planning	Contraception used by respondents to prevent pregnancy during enumeration	0 = Other 1 = Is practicing family planning
Main Independent Variables			
3.	Participation in groups (group)	Participation in activities that are both fun and rewarding in group	0= Low (<44.68) 1= High (>=44.68)
4.	Network (netw)	Ability of a group of people to engage in a network of social relationships	0= Low (<24.51) 1= High (>=24.51)
5.	Religious tolerance (religi)	Attitude to accept and appreciate religious differences among members of the community	0= Low (<49.54) 1= High (>=49.54)
6.	Ethnic tolerance (ethnic)	Attitude to accept and appreciate ethnic differences among members of the community	0= Low (<70.17) 1= High (>=70.17)
7.	Collective Action (action)	Various activities undertaken by a group of people	
8.	Trust (trust)	Refers to individual belief in people and systems	0= Low (<72.30) 1= High (>=72.30)
9.	Reciprocity (resip)	Mutual relationship between two parties, i.e. giving and receiving	0= Low (<70.26) 1= High (>=70.26) 0= Low (<61.83) 1= High (>=61.83)
Control Variable			
10.	Place of Residence (dtt)	Classification of residential areas based on the last address during enumeration	0 = Rural 1 = Urban
11.	Level of education (didik)	The last level of education respondents graduated during enumeration	0 = Low (No School/Not Graduated from SD) 1 = Medium (Graduated SD/ Graduated SMP) 2 = High (Graduated SMA or Higher)
12.	Work Status (kerja)	Employment status of respondents during enumeration	0 = Not Working 1 = Working
13.	Age (kelum)	Age (in years) of respondents during enumeration, categorized into: adolescents, adults, and elderly	0 = Adolescents (15 - 25 Years) 1 = Adults (26 - 45 Years) 2 = Elderly (46 - 54 Years)

The analytical methods used are descriptive analysis and path analysis. Path analysis is employed to find out how significant direct, indirect and total effects of independent variables on the dependent variable are. Most of the path theory pathway approaches are conducted using the ordinary least squares (OLS) method [8]. But, one method that can be used when the data are dichotomous is the logistic regression method by measuring relationships using maximum likelihood [8]. Karima [16] stated that the measurement coefficients of each path analysis model are carried out separately based on logistic methods to measure the direct and indirect effects between exogenous and endogenous variables represented in the path diagram. Data processing for dependent variable of dichotomous or binary type is performed by generalized structural equation model (gsem) method.

A. Inferential Models

In general, the inferential models for fertility used in this study are as follows.

- Model 1 Y = Effect of sub dimension of social capital and control variable on the practice of family planning

$$\ln\left(\frac{\pi_1}{1-\pi_1}\right) = \beta_{10} + \beta_{11}group + \beta_{12}netw + \beta_{13}religi + \\ \beta_{14}ethnic + \beta_{15}action + \beta_{16}trust + \beta_{17}resip + \\ \beta_{18}dtt + \beta_{19}didik1 + \beta_{110}didik2 + \beta_{111}kerja + \\ \beta_{112}kelum1 + \beta_{113}kelum2 + \varepsilon_1$$

- Model 2 Y = Effect of the practice of family planning on fertility

$$\ln\left(\frac{\pi_2}{1-\pi_2}\right) = \beta_{20} + \beta_{21}KB + \varepsilon_2$$

- Model 3 Y = Effect of sub dimension of social capital and control variables on fertility

$$\ln\left(\frac{\pi_3}{1-\pi_3}\right) = \beta_{30} + \beta_{31}group + \beta_{32}netw + \beta_{33}religi + \\ \beta_{34}ethnic + \beta_{35}action + \beta_{36}trust + \beta_{37}resip + \\ \beta_{38}dtt + \beta_{39}didik1 + \beta_{310}didik2 + \beta_{311}kerja + \\ \beta_{312}kelum1 + \beta_{313}kelum2 + \varepsilon_3$$

Where:

π_i : Probability of having; small number of children (3 children or less)

$1-\pi_i$: Probability of having; large number of children (more than 3 children)

B. Calculation of Direct, Indirect and Total Effects

The calculation of total effect on the number of children ever born can be illustrated as follows.

FIGURE 2. ILLUSTRATION OF DIRECT, INDIRECT AND TOTAL EFFECT ON THE NUMBER OF CHILDREN EVER BORN
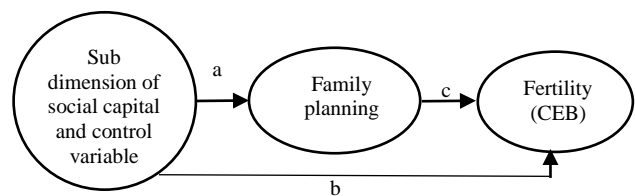
Influence Description
-Direct : b
-Indirect: a*c
-Total: Direct + Indirect

Based on Fig. 2, it can be seen that the direct effect is illustrated by arrow direction of the sub-dimensions of social capital and control variables into fertility (CEB) shown by the letter b. Meanwhile, the indirect effect is indicated by arrow direction of sub-dimensional variables of social capital and control variables into the practice of family planning indicated by the letter a; and the arrow direction of the practice of family planning into fertility (CEB) is indicated by letter c. The indirect effect is obtained by multiplying the standardized coefficients of a * c. The total effect is obtained by summing the coefficients of direct and indirect effects (b + (a * c)).

IV. RESULTS AND DISCUSSION

A. Descriptive Analysis

An overview of respondents' characteristics based on main independent variables used is the sub-dimension values of social capital. It can be seen that the majority of ever married women aged 15-54 years are those in high participation of a group (56,79%), having low network (70.64%), low religious tolerance (51.11%), high ethnic tolerance (74.50%), high action (56.71%), high trust (63.54%) and a high reciprocity (62.61%). Based on the control variables, most of the women in the sample live in rural area (57.70%), the highest level of education is being graduated from primary or junior high school (48.81%), employment status (59.26%) and adult (26-45 years) (64.96%).

The stock values of social capital in Indonesia have a range from 57.97 to 65.84, with an average of 52.99. These values indicate that women in Indonesia have relatively good or moderate social capital. Based on the sub dimensions of social capital formation, the sub-dimension of action has a fairly high contribution compared to sub dimensions of other social capital (8.38%), and the sub dimension of network has the lowest contribution (6.23%).

B. Path Model of Fertility

From the path analysis, it can be seen that there is variable that has no significant effect on the predisposition of family planning practice and the small number of children (3 children or less). Therefore, in order to obtain the best model, variables that have no significant effect on the practice of family planning or the small number of children will not be included in the path analysis, i.e. the religious tolerance variable. The same result was obtained from the research by Pauline et al. [20] in religious and ethnic effects on family approval on the practice of family planning in the case of women in Kenya. In the model resulting from his research, it shows that religious indicator has insignificant effect on family planning practice. Then, trust variable also has insignificant effect on the predisposition to have small number of children. This is because women have different perceptions of trust about women's ease of trust and fear of risks, such as believing that having many children is future investment. On the other hand having many children has health risk such as cervical cancer and heart disease, and other maternal and child health problems.

The results of the significance test on the best model of fertility path analysis to determine whether all independent variables can be used together in forming the model can be seen in Akaike's information criterion and Bayesian information criterion table of log (likelihood) value (67.511,78). Thus, it can be concluded that the model consisting of all explanatory variables is statistically significant and can be used together in forming the model.

FIGURE 3. PATH ANALYSIS MODEL OF FERTILITY
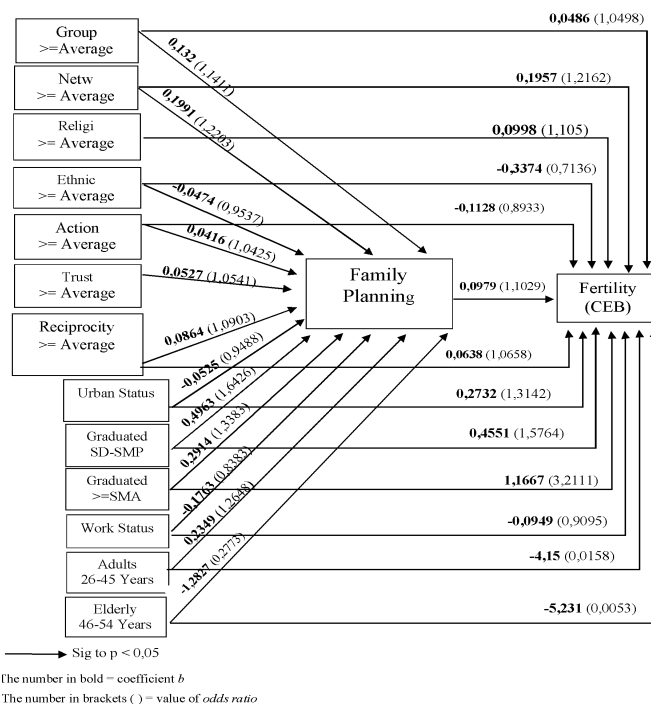
The model shows that variables of participation in groups, networks, ethnic tolerance, action, trust, reciprocity, residential area, education level, employment status and age statistically make significant direct effects on the decision to do family planning with p value <0,05. Similarly, variables of participation in groups, networks, religious tolerance, ethnic tolerance, action, reciprocity, residential area, education level, employment status and age, including decisions on practicing family planning have statistically significant effects on predisposition of having small number of children (3 children or less) with p <0.05.

C. Direct, Indirect and Total Effects

In order to estimate the total effect of each independent variable on the number of children ever born, the calculation of direct and indirect effects was performed. This calculation can be performed when b coefficient for each variable is standardized by using Microsoft Excel function/formula [18]. For example, the calculation for sub-dimensional variable of participation in group was estimated to have direct effect on the small number of children and indirect effect on the practice of family planning. The significant of direct effect of the sub-dimension of participation in groups on the small number of children is 0.0059, whereas the indirect effect was obtained by multiplying b coefficient of sub-dimension of participation in group that directly affects the practice of family planning (0.0160) with b coefficient of the effect of the practice of family planning on the small number of children (0,0122). So, the value of indirect effect of the sub dimension of

participation in the group obtained is 0.0160 x 0.0122 = 0.0002. The total effect of sub-dimensions of participation in groups on the small number of children is 0.0059 + 0.0002 = 0.0061. Similarly, the same calculation was performed for all variables used.

Based on the sub-dimensions of social capital formation, participation in group has positive total effect on the decision to have small number of children (3 children or less) with b coefficient of 0.0061. This means that participation in a high group will be likely to make women have small number of children. In simple terms, organizations promote active roles for women in social and economic life, both within family and society. The integration of three mechanisms of social networking, namely social effect, social learning, and social support is well explained through the Theory Planned Behavior (TPB) [21].

Of all sub dimensions of social capital formation, ethnic tolerance has the greatest total effect, but has negative effect on the decision to have small number of children that is equal to -0.028. The greatest total positive effect on the decision to have small number of children is in the sub dimension of network that is equal to 0.0187, greater than the sub dimensions of other social capital formation. This is in line with previous researches using networking concept to determine relationships with fertility [7, 1].

Viewed from all the independent variables used, the total effect of age variable is greater in affecting the decision to have small number of children, where the effect is negative, i.e. women with adult age (26-45 years) and elderly age (46-54 years) have total effect of -0.4203 and -0.397 respectively. This means that elderly women are more likely to have large number of children (more than 3 children). The greatest total effect is then followed by the variables of high education (graduated from senior high school or more) and intermediate levels of education (graduated from elementary and junior high) with total effect values of 0.1194 and 0.0575 respectively. This means that women ever married aged around 15-54 years with higher level of education are more likely to have small number of children (3 children or less).

V. CONCLUSION

The predisposition of ever married women aged at 15-54 to practice family planning is higher among women with high group participation, high networking, low ethnic tolerance, high collective action, high trust, and high reciprocity, and who are rural residents, highly educated, unemployed and adult (26-45 years). The predisposition for women aged15-54 years to have small number of children (3 children or less) among women with high group participation, high networking, high religious tolerance, low tribal tolerance, low collective action, high trust, and high reciprocity, and are urban residents, highly educated, unemployed and youth (15-26 years). Meanwhile the sub-dimensional variable of religious tolerance has no significant effect on the use of family planning, and the sub dimensional variable of trust does not have a significant effect to have small number of children (3 children or less).

In addition, there are direct effects (participation in groups, networks, ethnic tolerance, collective action, trust, reciprocity, residence, education and age) and indirect effects through the practice of family planning (participation in groups, networks, religion tolerance, ethnic tolerance, collective action, reciprocity, residential area, education and age) of the number of children ever born. Based on the calculation of the total effect of standardized b coefficient value of each independent variable on the small number of children, it was found that the age and high education level (graduated from high school or higher) have the greatest total effect, followed by sub dimensions of low ethnic tolerance and high network.

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