Analyzing the Degree of Social-Economic Transformation of Displaced Community Using Probit Model: A Case Analysis

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Abstract:

The 1998 Poso conflict caused many fatalities, hundreds of missing people, loss of property, and the decline of social order and economic life. The conflict has changed the social and economic order of the society, and most people uprooted from their hometown into new places.

Thus, this study aims to analyze the degree of social and economic transformation in one decade after the conflict by examining the intervention role of the government, private sector and NGOs on the post-conflict socio-economic transformation in some refugee locations as the District of Poso, Central Sulawesi. By involving 98 household heads as respondents, and using Probit model as the analytical tool, the results reveal that a mass population displacement has caused a sense of prolonged trauma among the minorities.

Moreover, the results show that the process of social and economic transformation takes place simultaneously. Statistically, there are no significant impact of natural factors and government intervention on the process of social transformation in the new settlement, while the intervention of the private and non-governmental organizations shows a positive and insignificant influence. In terms of economic transformation, the natural factors and government intervention are proved to have no significant effect on the process of economic transformation, while the private sector and non-governmental intervention is capable of providing a positive and insignificant impact on economic transformation.

The study implies for decision makers to make better direction in development planning, and funding for displaced people, and to encourage and provide higher support to the private sector and NGOs.

Keywords: Poso conflict, socio-economic transformation, government intervention natural factor, private and NGO intervention.

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1. Introduction

Conflicts in Poso between 1998-2001 has resulted in fatalities of 1,129 inhabitants, ± 1754 houses burned, and 93,254 refugees scattered in various regions both within and outside the region of Central Sulawesi (Marzuki, 2007; Sidel, 2008; Van Klinken, 2005). The conflict according to Suparlan (1999) is seen as an individual or group struggle to win something that they both wanted to achieve. Conflicts generally appear from individual or group interest, in efforts to comply with the interests at the expense of the interests of others and ignoring rules (Horowitz, 1985). Since 2001, the Poso conflict can be said to have ended through a peaceful resolution of the Malino I and II (Wanandi, 2002). However, the conflict still leaves social and economic problems, that have implications for local economy and the welfare of the society (Din *et al.,* 2017a; Munawarah *et al.,* 2017a; Siallagan, 2017).

Migration phenomenon after the conflict can not be avoided. The live of refugees is based on a sense of trauma, and a minority community group is afraid of being attacked by a majority group, and the lack of gaining a new job (Smith, 2010; Nasrum, 2016; Ali-Fauzi *et al.,* 2009). In Poso, the society tends to switch jobs and move to other sectors, from primary traditional sector of agricultural and fishing to the secondary industrial sector such as services and trade. To increase the socio-economic level as well as to treat the refugee trauma, assistance comes from various parties both governmental and private through CSR funds and also from NGOs originating from the country and from abroad. Some studies have paid attention to the development of Poso communities after conflict (Viartasiwi, 2012). This study henceforth is aimed at providing a reflection of Poso development one decade after conflict in social and economic sphere. To direct the analysis, the study examines the role of government intervention factor (GOV), natural factors (NAT) or private sector / NGOs (PRV). Some studies have examined the role of both government intervention as well as that of the private sector (Din *et al.,* 2017b; Kurniawan, 2017; Munawarah *et al.,* 2017b), but they were not conducted in conflict analysis.

The purpose of this study is to facilitate the central government, central Sulawesi provincial government and the Government of Poso District in planning socio-economic development policies in particular, in areas associated with post-conflict recovery program. Rather than merely focusing on the conflict background and peace arrangement between parties after conflict that have been largely examined in other studies (Dese, 2015; Abuza, 2007; Pusponegoro, 2003; Viartasiwi, 2011; Multazam, 2014; Li, 2009; Suwarno, 2005), the originality of this study is in the empirical consideration of post-conflict socio-economic transformation in Poso.

2. Research Methodology

The study analyzes the process of social and economic transformation of post-conflict in Poso. By considering this purpose, the Probit model is considered more suitable, because this model is based on the cumulative normal distribution function

(CDF). According to Ghozali (2013) the model estimation using the normal CDF is also called Probit model or Normal model. This study selected the locations in three villages, Kawua, Pamona, and Petirodong as the research sample. These places are considered appropriate to select the sample because they are among the largest refugee areas in Poso, where refugees came from 20 urban and rural origins. The sample consists of 98 households.

To find out the process of post-conflict Poso social and economic transformation in the new settlement location, the following equation was used:

$$P_i(Y_i = 1|X_i) = \Phi(\beta_0 + \beta_1 X_1 + \beta_2 X2 + \beta_3 X_3 + e_i) \tag{1}$$

in which Y_i = the occurrence of socio-economic transformation; $X1$ = natural factor; $X2$ = government intervention factor; $X3$ = private and NGOs intervention factor; Φ = (Z) function probit model based on normal distribution Z.

The Probit model is non-linear with respect to the parameters. The consequence is that it is not justified to provide an interpretation of the parameters directly. If $\beta_i > 0$ or $\beta_i < 0$, then the increase in X will increase the probability value (P_i) (Effendi and Setiawan, 2014). The coefficient interpretation of Probit model results is done by the calculation of the change in the probability value also called marginal effect. The marginal effect calculates the change of probability when there are changes in the independent variables conducted by: (1) calculating the probability prediction value on the value of a certain independent variable as the basis of calculation; (2) calculating the probability value on the value of another particular independent variable as a new value; (3) calculating the difference between both probability values (Widarjono, 2013).

The accuracy measurement of model predictions of the actual value of the dependent variable is based on the goodness of fit model. This measurement refers to the pseudo-R2 and McFadden-R2. The measure is based on the difference in the loglikelihood maximum value of a model without the independent variable (LR from the restricted model) and another model with independent variables (Lur from unrestricted model) (Ghozali, 2013). In this study, the measurement of pseudo-R2 is showed by the equation:

$$pseudo - \text{R}^2 = 1 - \frac{1}{1 + 2(\log L_{UR} - \log L_R)/N}$$

where N is the number of observations. The value of McFadden-R2 showed the meaning of the variability of the dependent variable that can be explained by the variability of independent variables amounted to the value from McFadden-R2. The output testing value of McFadden-R2 is based on good-of-fit test (Hosmer-Lemeshow), with the basis that if the Hosmer- Lemeshow coefficient has the α value more than 0.05, then the model is considered capable of predicting the observation

value or the model can be declared to be accepted because it is suitable with the data observation. Moreover, the testing accuracy prediction is based on Expectation-Prediction Table using α=0.05 as the restriction. This study also used the F and t statistical test to justify the significance of the variables studied.

3. Results and Discussion

3.1. Social Transformation

The social transformation (ST) based on the Probit model estimates of post-conflict communities in Poso is believed to be influenced by several variables of natural factors (NAT), government intervention (GOV), and private and NGO (PRV) interventions. The three variables after going through the estimation results using Probit model can be seen in Table 1.

Table 1. *Results of Estimates of Post-Conflict Social Transformation in Poso*

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.949251	0.200449	-4.735629	0.0000
FA	-4.23E-08	7.64E-08	-0.553492	0.5799
IP	-6.82E-06	2.585149	-2.64E-06	1.0000
ISLSM	9.48E-07	6.90E-07	1.374420	0.1693
Mean dependent var	0.163265	S.D. dependent var		0.371508
S.E. of regression	0.369965	Akaike info criterion		0.943967
Sum squared resid	12.86618	Schwarz criterion		1.049476
Log likelihood	-42.25437	Hannan-Quinn criter.		0.986643
Restr. log likelihood	-43.61442	Avg. log likelihood		-0.431167
LR statistic (3 df)	2.720084	McFadden R-squared		0.031183
Probability(LR stat)	0.436825			
Obs with Dep=0	82	Total obs		98
Obs with Dep=1	16			

Source: *Data processed, 2017.*

The testing result of goodness of fit model show that the statistical value of Hosmer and Lemeshow (HL) of 8.1436 is greater than α=0.05. Thus, it can be declared that the research model is able to predict the value of observation or it can be said that the research model can be accepted because the data match with the observation. In addition, this study also uses the pseudo R2 and H-L, and the percentage of prediction accuracy. The statistical testing reveals that the percentage value of prediction accuracy reached 84.24 percent which indicates a good research model. Therefore, this estimation of the model can be used as the basis for the analysis of results, as follows.

ST = 1-@CNORM {-(-0.9492514631 - 4.230876761e-08*NAT - 6.819253591e-06*GOV+ 9.484896096e-07*PRV)}   (2)

The significance of the Probit model coefficients used in this study is based on the log of the odds of social transformation as the basis of interpretation. The negative sign -0.9492514631, with the value of the log of the odds = 0.387030621, shows that in a ceteris paribus condition or when the variables of natural factors (NAT), government intervention (GOV), and private and NGO intervention (PRV) held constant, the odds decrease the occurrence of social transformation by 0.3870. This means that without the three variables of natural factors and institutional interventions, the social transformation process of the displaced communities in the new settlement areas are predicted to decrease by 38.7 percent.

The negative sign of $-4.230876761e\text{-}08*NAT$, with the value of the log of the odds 0.014539637, shows that if the variable of natural factors is increased, then the odds the social transformation will be decreased by 0.0145. This means that through this Probit model approach, the social transformation in the displaced and settled communities in the new location partially will decrease by 1.45 percent. Next, the negative sign of $-6.819253591e\text{-}06*GOV$, with the value of the log of the odds 0.001092536097, shows that if the variable of government intervention increases, then the odds of occurrence of social transformation will be decreased by 0.11 percent.

This means that through this Probit model approach, despite the intervention of the government in society who fled and settled in new locations, the social transformation will partially be decreased by 0.11 percent. Moreover, the negative sign $-9.484896096e\text{-}07*PRV$, with the value of the log of the odds 13.15945902, shows that if the private sector and NGOs intervention variable is improved, then the odds for the occurrence of social transformation will increase by 13.1594. This means that through this Probit approach, the private and NGO intervention on displaced and resettled communities in new locations will experience an increase in social transformation by 13.16 percent. This value reveals an interesting empirical evidence regarding the role of private sector and NGOs intervention in social transformation in post-conflict Poso. This is maybe related to the deep involvement of private parties and NGOs from the beginning of the process. Prior to intervention, they firstly strengthened the community related to the living needs that impact on long-term income increase.

The next step is to prove the hypotheses, that firstly begins with examining the simultaneous effect of independent variables on the dependent variable of social transformation. The statistical testing shows that the probability value (LR-stat) is 0.436825, which shows that simultaneously, all variables have no significant impact on the social transformation of the society after the conflict in Poso. In more details, in the partial testing of hypotheses, the value of Z-Statistic is -0.55349 with a probability of natural factors (NAT) of 0.5799> α of 0.05, which indicates that the alternative hypothesis (Ha) is rejected and the null hypothesis (Ho) is accepted, meaning that the variable of natural factors (NAT) has a negative and insignificant effect on the social transformation of the community after the conflict in Poso

District. The Z-Statistic of -0,64E-06 with probability value of the variable of government intervention (GOV) of 1.000> α of 0.05, indicates that the alternative hypothesis (Ha) is rejected and the null hypothesis (Ho) is accepted, meaning that the variable of government intervention has negative and insignificant influence to the social transformation of the community after the conflict in Poso District. Lastly, the Z-Statistics of 1.374420 with a probability 0.1693> α of 0.05 for the variable of private and NGO intervention (PRV) indicates that the alternative hypothesis (Ha) is rejected and the null hypothesis (Ho) is accepted, meaning that the variable of private and NGO intervention has a positive influence to the social transformation of the community after the conflict in Poso District.

3.2. Economic Transformation

The economic transformation (ET) based on the Probit model estimates of post-conflict communities in Poso is believed to be influenced by the variables of natural factors (NAT), government intervention (GOV), and private and NGO (PRV) interventions. The estimation result using Probit model can be seen in the following Table 2.

Table 2. *Results of Estimates of Post-Conflict Economic Transformation in Poso*

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.919222	0.195624	-4.698933	0.0000
FA	1.04E-07	7.17E-08	1.455048	0.1457
IP	-7.08E-06	2.706065	-2.62E-06	1.0000
ISLSM	-9.56E-07	1.42E-06	-0.674615	0.4999
Mean dependent var	0.224490	S.D. dependent var		0.419391
S.E. of regression	0.418247	Akaike info criterion		1.112120
Sum squared resid	16.44350	Schwarz criterion		1.217628
Log likelihood	-50.49386	Hannan-Quinn criter.		1.154796
Restr. log likelihood	-52.18815	Avg. log likelihood		-0.515243
LR statistic (3 df)	3.388573	McFadden R-squared		0.032465
Probability(LR stat)	0.335504			
Obs with Dep=0	76	Total obs		98
Obs with Dep=1	22			

Source: *Data processed, 2017.*

The testing results of goodness of fit model shows that the value of Hosmer and Lemeshow (HL) of 6.9670 is greater than α. Accordingly, it can be stated that the research model is able to predict the value of observation or it can be said that the research model is acceptable because it fits with the data observation. The percentage value of prediction accuracy reached 78.28 percent which indicates that

the research model is capable of prediting the dependent variable quite well. The estimation of the model prediction used as the basis of an analysis of the research results can be showed in this following equation:

$$ET = 1-@CNORM\{-(-0.9192217445 + 1.043368096e\text{-}07*NAT\text{-}7.081111892e\text{-}06*GOV - 9.559313193e\text{-}07*PRV)\} \qquad (3)$$

The coefficient resulted from Probit model can be used as the basis for interpretation. The figure of -0.9192217445, with the value of the log of the odds 0.398829311, shows that in the condition of all independent variables held constant, the odds of the transformation of the economy will decreased by 0.3988. The figure of 1.043368096e-07*NAT, with the value of the log of the odds = 2.838762154, demonstrates that if the variable of natural factors is increased, then the odds the economic transformation will increase by 2.8387. The coefficient of -7.081111892e-06*GOV, with the value of the log of the odds 1.189290146, shows that if government intervention variable is increased, then the odds the economic transformation will be decreased by 1.1892. The coefficient of -9.559313193e-07*PRV, with the value of the log of the odds 14.17610661 shows that if the intervention private and NGO intervention is increased, then the odds the economic transformation will increase by 14.1761.

Furthermore, the process of proving hypotheses by Probit model of economic transformation can be seen in the probability value (LR- stat) of -4.698933 meaning that together, the independent variables of natural factors, government intervention, and private and NGO intervention have no significant impact on the the post-conflict economic transformation of the displaced community in Poso District. By using partial testing, the Z-statistic amounted to 1.455048 with probability value of 0.1457> α of 0.05 for the natural factor variable, and the Z-statistic for -0,62E-06 with probability 1.000> α of 0.05 of the government intervention variable indicates that the alternative hypothesis (Ha) is rejected and the null hypothesis (Ho) is accepted, meaning that the variable of natural factors and government intervention have a negative and insignificant effect on the economic transformation. The Z-statistic of -0.674615 with probability of 0.4999> α of 0.05, indicates that the variable of private and NGOs intervention has a positive and insignificant impact on the economic transformation of displaced communities in post-conflict development in Poso District.

4. Conclusions

Poso conflict has resulted in mass displacement and only a small part returning to the village of origin, followed by the emergence of a prolonged sense of trauma among minorities. The process of social and economic transformation runs simultaneously, due to the collapse of social relations, kinship and customs in

society. This study aims to provide the role of government intervention (GOV), natural factors (NAT) and the intervention from private sector and non-governmental organizations (PRV).

Statistically, the results of Probit model coefficients, reveal that natural factors and government intervention, did not give a significant effect on the occurrence of social transformation process in research locations, while private and non-governmental organization intervention has positive and not significant effect for social transformation in new resettlement areas. In terms of economic transformation, the statistical testing of Probit model coefficients shows that natural factor and government intervention did not have a significant influence on the process of economic transformation, while the intervention of private and non-governmental organizations provides a positive significant influence to the economic transformation. These findings show the importance of the presence of private sector and NGOs, especially in increasing the level of economic aspect for displaced people in Poso Regency.

References:

Abuza, Z. 2007. Sectarian Bloodletting in Indonesia's Troubled Sulawesi and Maluku Provinces: Jemaah Islamiyah's New Lease on Life. Jane's Intelligence Review.

Ali-Fauzi, I., Alam, R.H. and Panggabean, S.R. 2009. The patterns of religious conflict in Indonesia, 1990-2008. Yayasan Wakaf Paramadina.

Dese, D.C. 2015. Relationship between Prejudice with Aggressiveness on Religion (Christian-Islam) in Poso Post-Conflict Poso Year 1998-2001. Doctoral dissertation, Program Studi Psikologi FPSI-UKSW.

Din, M., Paranoan, S., Masdar, R., Siallagan, H., Achmad, T. 2017a. Public accountability based on the value of local wisdom. International Journal of Civil Engineering and Technology 8(8), 1046-1053.

Din, M., Munawarah, Ghozali, I., Achmad, T. 2017b. The follow up of auditing results, accountability of financial reporting and mediating effect of financial loss rate: An empirical study in Indonesian local governments. European Research Studies Journal, 20(4), 443-459.

Effendi, N. and Setiawan, M. 2014. Econometrics: Theory and Applied Approach. Jakarta: Salemba Four.

Ghozali, I. and Ratmono, D. 2013. Multivariate Analysis and Econometrics Theory, Concepts, and Applications with Eviews 8. Diponegoro University Publishing Agency Semarang.

Horowitz, D.L. 1985. Ethnic groups in conflict. Univ of California Press.

Kurniawan, R. 2017. Effect of Environmental Performance on Environmental Disclosures of Manufacturing, Mining and Plantation Companies Listed in Indonesia Stock Exchange. Arthatama, Journal of Business Management and Accounting, 1(1), 6-17.

Li, T.M. 2009. Reflections on Indonesian violence: two tales and three silences, https://tspace.library.utoronto.ca/handle/1807/67639.

Marzuki, M. 2007. Revitalization of Local Culture for Peace Building in Indonesia. Peace Journal (1).

Multazam, U. 2014. Viewpoint of Religious Conflict Based on The Conflict Vulnerable Index In Indonesia Underdeveloped Areas. IEESE International Journal of Science and Technology, 3(4), 9.

Munawarah, Widowati, C., Muharam, H., Din, M. 2017a. State ownership and Corporate Governance: An empirical study of State Owned Enterprises in Indonesia. International Journal of Civil Engineering and Technology, 8(7), 951-960.

Munawarah, Din, M., Zainuddin, F., Muharam, H. 2017b. What effects do privatisation policies have on corporate governance of state-owned enterprises? European Research Studies Journal, 20(4), 124-132.

Nasrum, M. 2016. From Communal Conflicts to Terrorism in Poso, Central Sulawesi, Indonesia: A Shifting Terrain. Journal of Peacebuilding and Development, 11(2), 83-88.

Pusponegoro, A.D. 2003. Terrorism in Indonesia. Prehospital and disaster medicine, 18(2), 100-105.

Siallagan, H., Rohman, A., Januarti, I., Din, M. 2017. The effect of professional commitment, attitude, subjective norms and perceived behavior control on whistle blowing intention. International Journal of Civil Engineering and Technology 8(8), 508-519.

Sidel, J. 2008. The manifold meanings of displacement: explaining inter-religious violence, 1999-2001, 45, 29-59, Cornell University Southeast Asia Program.

Smith, A.L. 2010. Indonesia. In Fixing Fractured Nations,15-35, Palgrave Macmillan, London.

Suparlan, P. 1999. Social Conflict and Alternative Solutions. Journal of Anthropology in Indonesia, 33(59).

Suwarno, P. 2005. Resolving Religious Conflicts Through Expanding Inter-Religious Communication: Issues and Challenges. Al-Jami'ah, Journal of Islamic Studies, 43(2), 309-325.

Van Klinken, G. 2005. New actors, new identities: Post-Suharto ethnic violence in Indonesia. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1134267.

Viartasiwi, N. 2011. Is It 'Order'or 'Peace': Security, Political Stability, and Democratic Governance in Post-Conflict Poso During 2001-2011. Sustainable Future for Human Security Sustainable Future for Human Security.

Viartasiwi, N. 2012. Calming Down The Ghost Of Conflict: Post-Conflict Governance at Poso, Central Sulawesi-Indonesia 2001-2011, http://r-cube.ritsumei.ac.jp/bitstream/10367/4252/1/isa_12nino%E6%A7%98.pdf.

Wanandi, J. 2002. Indonesia: A failed state?. Washington Quarterly, 25(3), 135-146.

Widarjono, A. 2013. Econometrics Introduction and Its Application. Yogyakarta: UPP STIM YKPN.