

Analysis of central transfer funds and the probability of corruption at the local government level using the Zero-Inflated Poisson method

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Abstract: The majority of corruption in the regions in Indonesia is carried out on Regional Budget funds, which the main source of Regional Budget revenue comes from Central Government transfers. Based on the characteristics of their use, transfer funds can be classified into General Purpose Transfers (DTU) and Specific Purpose Transfers (DTK). This study was conducted to see the influence of DTU and DTK on the probability of corruption in the regions. The method used is Zero-Inflated Poisson (ZIP) regression because there is an overdispersion problem and excess zero in the dependent variable. With a sample of 519 Regency and City Governments in Indonesia in the 2010-2019 period, DTU was found to have a positive relationship to the level of corruption. The flexibility in managing the DTU budget is the cause that triggers an increase in corruption in the regions. Meanwhile, DTK shows a negative relationship with the level of corruption. The local government does not have the flexibility to use the DTK budget for other programs, and the supervision in the realization of the DTK program is also tighter.

Keywords: Corruption; General Transfer Fund; Special Transfer Fund; Zero-Inflated Poisson

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Introduction

Corruption crimes show an increasing trend in regions across Indonesia. According to statistical data on the corruption eradication actions handled by the Corruption Eradication Commission (CEC), the number of Corruption Crimes (CC) cases that occurred against the Regional Budget Funds in regions and already have permanent legal force (inkracht) in the 2010-2014 Fiscal Year (FY) period, reached a total number of 100 cases, before increasing to 121 cases in the 2015-2019 FY period.

The increasing number of corruption cases in regions throughout Indonesia has allegedly been a side effect of the implementation of the decentralization system in Indonesia (Saputra, 2012). Indonesia officially implemented the decentralization system in 1999, upon the issuance of Law (UU) No. 22 of 1999 concerning Regional Governments. Decentralization is defined as transfers of governmental power from the Central Government to regional governments within the framework of the Unitary State of the Republic of Indonesia. Law No. 22/1999 was amended by Law No. 32 of 2004 and Law No. 23 of 2014. The laws stipulate that the Central Government gives the local government the authority to regulate and manage their respective regions and gives them the freedom to manage their spending according to their own budget and the needs of each region. Decentralization, as the delegation of several tasks and responsibilities to local governments, was expected to improve the quality of public services in the regions and the welfare of their respective people (Baskaran, 2011).

However, in the implementation, fiscal gaps occur due to the fact each region has different abilities in financing a variety of their respective activities at local levels. Fiscal gaps between regions vary, depending on their fiscal need and fiscal capacity. In order to overcome fiscal gaps between regions, the Regional Original Income (ROI) of regions with low fiscal capacity should be increased.

Balance funds can be classified into two components that have similarities, namely General Purpose Transfers (*Dana Transfer Umum - DTU*), which consists of General Purpose Funds (*Dana Alokasi Umum - DAU*) and Revenue Sharing Funds (*Dana Bagi Hasil - DBH*), and Specific Purpose Transfers (*Dana Transfer Khusus - DTK*) which consists of Physical and Non-Physical Specific Purpose Funds (*Dana Alokasi Khusus - DAK*). The classification of these types of transfer funds is based on the function of their uses in the Regional Budgets. The management of the DTU is delegated to the regional governments in consistence with the conditions and needs of each region. Meanwhile, the use of DTK has been regulated and adapted to programs, being national and local government priorities, so that local governments have limitations to managing DTK by themselves.

To see the correlation between the increase in corruption in the regions and the decentralization system implemented in Indonesia, one can refer to the Fraud Triangle theory. According to the Fraud Triangle theory developed by Cressey in 1953, there are three backgrounds or factors of fraud, namely pressure, opportunity, and rationalization (Lou & Wang, 2011). In the Indonesian context, the increase in the amount of balancing funds transferred to the regions will open up wider opportunities for local governments to cheat. It has been proven in several studies that fiscal transfers have a positive correlation with the level of corruption in regions (Saputra, 1969) (Maria et al., 2018).

Several previous studies have been conducted to analyze the impacts of balancing fund transfers on the level of corruption in regions. Maria et al. (2018) show a positive correlation between the transfer of balancing funds from the Central Government to local governments and the level of corruption in the regions in Indonesia. However, previous research was still limited to the effects of the total transfer of balancing funds on the level of corruption in the regions, while the balancing funds consist of two components, namely DTU and DTK, each having different characteristics in their uses and functions. Goel and Nelson (2011) examined the effect of DTU and DTK on the level of corruption in states in America and found that there are differences between the two types of grants. The greater the DTU, the higher the level of corruption in the state. However, the impact of DTK on corruption remains inconsistent. Previous research failed to study and analyze the effects of DTU and DTK on the level of corruption in the regions in Indonesia.

Opportunities to commit fraud must be suppressed to minimize the potential for corruption in Regional Budgets in regions. To determine the appropriate preventive measures, an in-depth analysis of the correlation between the transfer of balancing funds and the level of corruption in a region is needed. The different characteristics of each type of balancing fund, namely DTU and DTK, need to be taken into consideration in analyzing the impacts of the number of funds transferred to the region and the opportunities for corruption in local governments. Therefore, this study aimed to see how each type of balancing fund transfer, namely DTU and DTK, affects the patterns and levels of corruption in regions in Indonesia.

Methods

The research population is all regency and municipal governments in Indonesia, with a total research sample of 519 local governments (except the local government in North Kalimantan province because it was just established in 2012). The dependent variable in this study is the level of corruption in the regions, while the main independent variables are DTU and DTK, and the control variables are the number of civil servants and the level of democracy in the regions.

In this study, the dependent variable is the level of corruption of the 2010-2019 FY Regional Budget in all local governments and has already been in *inkracht* status (already had the permanent legal force). The data was obtained from CEC. Until now, there has not been an institution or organization which has the instruments to measure levels of corruption continuously and consistently in regions across Indonesia and compare them over time. Therefore, the data from the CEC is the proxy, which can be easily measured and is the most representative of the variable of the corruption levels in the regions. The selection of the sample period of Regional Budget corruption in 2010 to 2019 fiscal year was due to the fact that trial processes for corruption cases

in Indonesia usually take a long time to arrive at an inkracht decision. There were 170 corruption cases under investigation by the CEC and already in inkracht status in the 2010-2019 FY.

This study used secondary data. The main independent variable was the realization of fiscal transfers from the Central Government, which have been grouped into DTU and DTK. The DTU, which consists of DAU and DBH, is used to finance the implementation of decentralization in general. Meanwhile, DTK, which consists of Physical and non-Physical DAK, is used to finance special regional affairs and national priorities projects. Data on fiscal transfers of DTU and DTK were obtained from the Ministry of Finance. Meanwhile, the control variables were the number of civil servants in the regions and the level of democracy in the regions, as measured by the variable of freedom of expression in the Indonesian Democracy Index (IDI). The model specification in the research is as follows:

$$\text{Corruption}_{it} = \beta_0 + \beta_1 \text{DTU}_{it} + \beta_2 \text{DTK}_{it} + \beta_3 \text{TotalCivilServants}_{it} + \beta_4 \text{Democracy}_{it} + \varepsilon_{it}$$

Understanding the type of data and the dependent variable should be defined to respond to the alleged influence of the dependent variable on the independent variable. The dependent variable is the number of inkracht corruption cases in the form of calculated data in non-negative integers. Statistically, the distribution of data on the number of inkracht corruption cases can be seen in Figure 1.

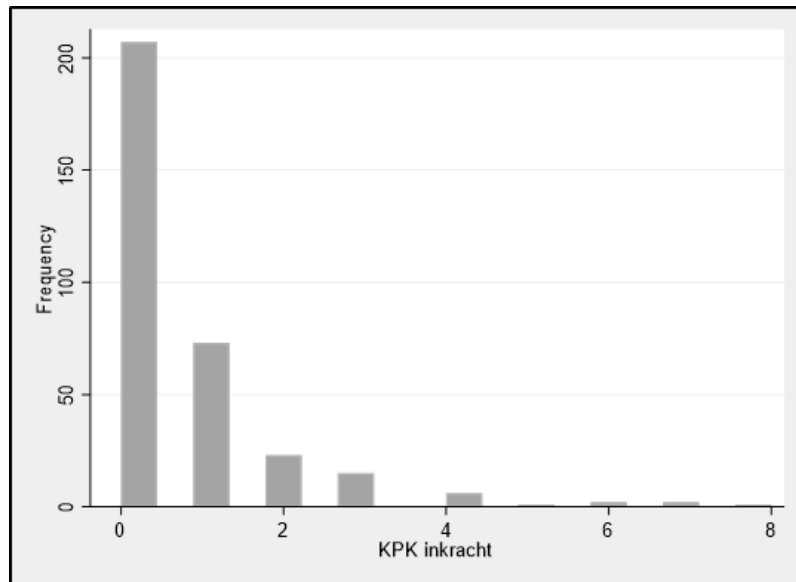


Figure 1. Distribution of Dependent Variable Values

Data on the number of inkracht corruption cases are not normally distributed; the majority is zero. The research found that of the total of 5.190 regional governments whose data were measured (519 regional governments multiplied by 10 for the 2010-2019 fiscal year), 5.011 samples had 0 cases of corruption or around 96,55%. Therefore, this study cannot use linear regression analysis, which assumes that the dependent variable data is normally distributed. The dependent variable in this study is also discrete data or arithmetical data, so the Poisson regression model was used as the appropriate regression method (Kusuma et al., 2013).

Zero-Inflated Poisson

Poisson regression is a type of Generalized Linear Model (GLM) regression used to perform regression to models with a dependent variable in the form of calculated data or count data. The assumption that the Poisson regression must be met is that the dependent variable's variance value must be the same as the average value, also called equidispersion. The testing of the equidispersion assumption on the dependent variable is shown in Table 1 of descriptive statistics.

The variance value (s^2) of the dependent variable can be known through the value of the standard deviation (s); the variance value is the square of the standard deviation. So, in this study, the value of the variance of the dependent variable is the square of 0.258, i.e. 0.067. The value of

the variance of the dependent variable is greater than the average value of 0.043, so the dependent variable experienced overdispersion. To solve the problem of overdispersion and excess zero in the dependent variable, the Zero-inflated Poisson (ZIP) regression was applied (Fitriyah et al., 2014).

Table 1. Descriptive Statistics of Dependent Variable

Dependent Variable	Observation	Mean	Deviation Std	Variance	Min	Max
Corruption	5,190	0.043	0.258	0.067	0	5

In the ZIP model, excess zeros are generated by a process separated from the calculated values, and excess zeros can be modelled independently. This model assumes that the number of excess zeros comes from the Logit Model and the remainders come from the Poisson Model. In other words, the ZIP model has two parts; the first model is to calculate the dependent variable, which shows arithmetic numbers with a Poisson distribution; the second model is to predict excess zero using the logit model. In this study, the number of civil servants in the regions was used as a predictor, which causes an excess zero value in the dependent variable.

Results and Discussion

The data in this study uses the unit of analysis at the regional and municipal governments across Indonesia in a total number of 519 in the 2010-2019 period. The Figure 2 shows that the trend of the number of corruption cases has increased from year to year in line with the increase in the number of transfers to local governments.

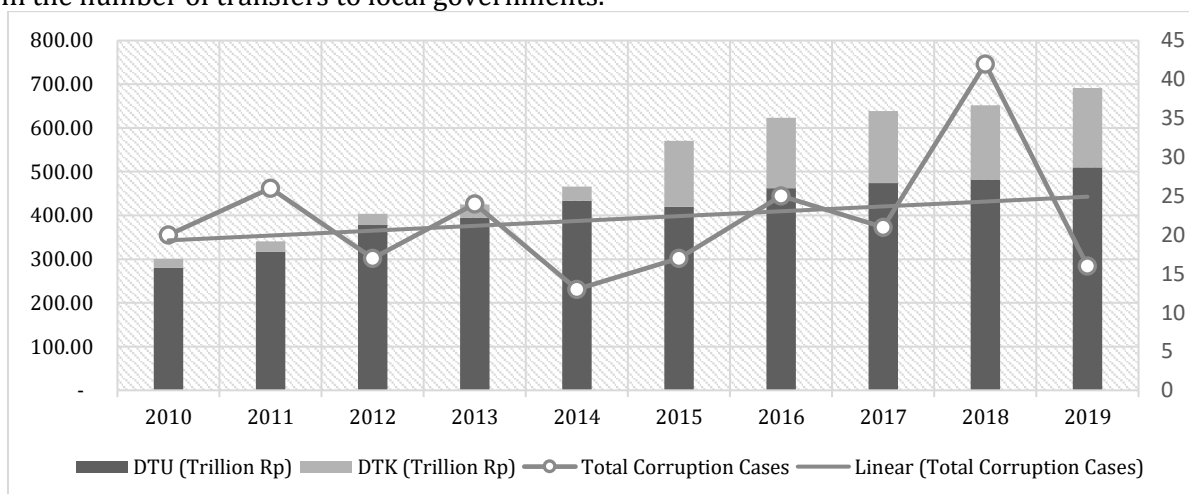


Figure 2. Realization of DTU and DTK with trends in corruption cases in Regional Budget funds at the local government level

This indicates that there is a positive correlation between the total amount of transfer funds and the trend in the level of corruption in the regions. A more detailed explanation of the dependent and independent variables and the findings of the regression results in this study will be explained in the next sub-chapter.

The results of the descriptive statistics in Table 1 suggest that, on average, there were 0.043 corruption cases in local governments in the 2010-2019 fiscal year. The results of the ZIP regression estimation to see the effect of DTU and DTK on corruption cases are shown in Table 2.

The probability value of the Likelihood Ratio test for all models shows the number 0.0000 at the confidence level of 95%, except for model (2), which shows a probability number of 0.9949. Therefore, models (1), (3), and (4) reject H0, which shows that the independent variables simultaneously significantly affect the dependent variable. So, the independent variables are maintained in the model.

The *Wald test* (one of three classical approaches to hypothesis testing) for the DTU variable showed significant results in all models at the confidence level of 99%. Meanwhile, the DTK variable in model (2) showed insignificant results, but in models (3) and (4), the DTK variable showed

significant results at the confidence level of 90%. The Democracy variable showed insignificant results. The number of civil servants variable showed significant results in the overall model at the 99% confidence level.

Table 2. ZIP regression output results

Dependent Variable: Corruption Cases	Zero-Inflated Poisson Coefficient			
	(1)	(2)	(3)	(4)
<i>Main Model</i>				
<i>DTU_{it}</i>	0.190*** (0.0235)		0.205*** (0.0246)	0.205*** (0.0246)
<i>DTK_{it}</i>		-0.000376 (0.0584)	-0.136* (0.0769)	-0.138* (0.0777)
<i>Democracy_{it}</i>				-0.00133 (0.00312)
<i>Constant</i>	-1.596*** (0.197)	-0.826*** -0.147	-1.503*** (0.198)	-1.411*** (0.292)
<i>Inflate</i>				
<i>TotalCivilServants_{it}</i>	-0.220*** (0.0297)	-0.216*** (0.0249)	-0.220*** (0.0287)	-0.221*** (0.00288)
<i>Constant</i>	3.202*** (0.261)	3.774*** (0.223)	3.291*** (0.260)	3.300*** (0.260)
N	5.190	5.190	5.190	5.190
wald chi2	47.76	0	51.64	51.82
Prob>chi2	0,0000	0.9949	0,0000	0,0000

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Determination of the best model in the ZIP model can be made by comparing the magnitude of the Likelihood Ratio (LR) value in each model. Based on the ZIP regression output results in table 2, the largest LR value is shown in the output model (4) with a value of 51.82; this indicates that in this study, the best model is the equation model (4).

Based on the ZIP regression output shown in Table 2, it can be seen that the DTU variable has a significant and consistent influence on corruption cases. The DTU variable shows a positive slope that indicates a positive relationship between DTU and the level of corruption in the regions, meaning that the greater the transfer of DTU from the Central Government to the regional government, the greater the level of corruption occurring in the regions. This finding is in line with the one of Goel and Nelson (2011) and Hubbard (2007) that the transfer of DTU from the Central Government can increase the probability of corruption in the regions. Goel and Nelson (2011) explained that the flexibility or leniency in the transfer of DTU could trigger unscrupulous officials in the regions to create programs that are not productive and are not oriented towards the improvement of people's welfare. According to them, routine programs that appear in the budget every year are very prone to fraud because the intense cooperation can often lead to corrupt relationships between officials and service providers. Hubbard (2007) explained that the discretion in the DTU is very vulnerable to corruption in the allocation process if there is no clear supervision from the central government.

Based on data collected over the period of 2010-2019, the average annual transfer of DTU funds was five times greater than DTK (the average of DTK transfers was 19.07%, compared to DTU in 2010-2019 Fiscal Year). This shows that the existence of DTU has a more dominant role in Regional Budget revenues. As a form of implementation of the decentralization system, the Central Government gives local governments the freedom to make regulations or programs related to the management of the Regional Budget. Officials can use the flexibility in budget management in the regions to create programs that can maximize personal or group interests compared than prioritizing public interests (Maria et al., 2018; Sjahrir et al., 2013; Syurmita, 2014).

The DTK variable shows significant results in models (3) and (4). The DTK variable shows a negative slope, meaning that the DTK variable has a negative correlation with the level of corruption in regions. The higher the number of DTK transferred to the regions, the lower the level of corruption in the regions. This finding is in line with the research conducted by Goel and Nelson

(2011), in which the DTK used for the implementation of special programs that become national priorities has clear objectives and stricter requirements so that the relationship between authorized officials and service providers will occur more professionally and reduce the risk of a conflict of interest.

Taking a closer look at the implementation of the DTK program in Indonesia, the Central Government has determined priority programs to be implemented in regions so that the flexibility to use the DTK budget outside the predetermined program should be reduced. In addition, the Central Government has also made efforts to improve supervision in the implementation of DTK programs by involving several institutions appointed by the Central Government. As described in Presidential Regulation Number 123 of 2016 concerning Technical Guidelines for Physical DTK for the 2017 Fiscal Year, it is stated that monitoring and evaluation of physical DTK management is not only carried out by the regional government but also by the Central Government, either individually or in cooperation with the Minister/Head of institutions, the Minister of Finance, the Minister of National Development Planning, and Minister of Home Affairs. In this study, the efforts that have been made in handling the transfer of DTK show significant findings of the negative effect of DTK on the level of corruption in regions.

The estimation results show that the democracy variable has no effect on the level of corruption in the regions. The level of democracy in the regions is indicated by the score of the freedom of expression variable as set forth in the aspect of civil liberties in IDI. This finding shows that the level of democracy as reflected in the level of freedom of expression in the regions is still unable to explain how it affects the level of corruption in the regions.

Although the results are not significant, the direction of the relationship shown between democracy and the level of corruption is negative. This can be used as an indicator of a decrease in the level of corruption in the regions for every increase in the score of the freedom of expression variable. This finding is in line with the finding of the research conducted by Lessmann and Markwardt (2009), and Kotera et al. (2012). Lessmann and Markwardt (2010) found that decentralization in developed countries with high levels of press freedom would reduce the level of corruption in regions. Meanwhile, Kotera et al. (2012) found that an increase in the size of the government, as measured by the percentage of the government's total consumption expenditure to GDP, can lead to a decrease in corruption if the level of democracy in the country is high enough, and, vice versa; low democracy can lead to an increase in corruption. A high level of democracy in society will support the fight against acts of corruption (Fatkuroji & Meilinda, 2022).

In the ZIP regression model, an additional model with an inflate variable predicts the cause of the excess value of zero in the dependent variable. The coefficient of the inflate variable used in this study is the number of civil servants. The number of civil servants showed consistent and significant results. The variable of the number of civil servants shows a negative slope, which means that an increase in the number of civil servants will reduce the possibility of a zero score (no corruption cases). In other words, an increase in the number of civil servants in regions has a positive correlation with an increase in corruption cases in regions. This finding is in line with the opinion of Astuti and Adrison (2019). Civil servants are considered subjects who can corrupt the Regional Budget funds so that more civil servants in the regions will reduce the level of supervision carried out by the authorities.

Conclusion

Based on the analysis in this study, several conclusions can be drawn as follows: First, the amount of DTU transferred to the regions shows a strong correlation with the level of corruption in the regions. The bigger the transferred DTU funds, the increase the probability of corruption in the regions. Unscrupulous officials can misuse the flexibility given in managing the DTU budget to act corruptly by abusing their position in managing a budget. Second, the greater the DTK transferred to the regions, the lower the probability of corruption in the regions. The Central Government has set certain priority programs to be realized in DTK transfers so that local governments have no flexibility in using the DTK budget for other programs. In addition, supervision in the realization of the DTK program is more stringent than that of the DTU. The issuance of a

Presidential Regulation can demonstrate this before each fiscal year as a reference for the implementation of DAK.

Recommendations and Suggestions

Based on this research, policy recommendations for the government and suggestions for further research are as follows: First, transfers of DTK to regions in Indonesia have a negative correlation with corruption levels in the regions. The literature supports this on previous DTK-related studies in several countries on the level of corruption which shows a negative relationship. The opposite result is shown by the transfer of DTU to the regions, which shows a positive correlation with the level of corruption in the regions. Based on these findings, to reduce the level of corruption in regions, the Central Government can reduce DTU transfers and shift them into the DTK transfers. Of course, this requires further comprehensive studies so that the expected development goals can be more measurable, controllable, and easy to evaluate. Second, the Central Government needs to improve supervision of implementing spending in regions by issuing policies specific to the types of transfers and by including punishment points as set forth in PMK No. 139/PMK.07/2019 concerning the management of DBH, DAU, and the Special Autonomy Fund, namely in the form of deduction, delays, terminations, and redistribution of budget funds. Thus, it is hoped that this will be a concern for local governments to carry out budgetary expenditures in agreement with the need for the implementation of decentralized service tasks to the people.

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