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DOES LESS CORRUPTION REDUCE INCOME INEQUALITY IN INDONESIA?

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ABSTRACT

It is widely believed that corruption is a cause of income inequality and a barrier to successful its eradication. It undermines the efforts of developing countries, including Indonesia to alleviate income inequality. It is also argued that the increased inequality caused by corruption worsens the position of the poorest people in a society as it reduces public resources available for social spending of government. In addition, corruption might have a negative impact on the quality and quantity of public services, such as education and health services. This study designed to know the long run and short run impacts of corruption on inequality of income. The study uses secondary data from World Bank and Transparency International then Auto Regressive Distributed Lag (ARDL) and dynamic Error Correction Model (ECM) during the year of 1995-2017. The results of study indicate that corruption has significant effects on the level of income inequality both in the short and long run. The negative implication of corruption on citizens' life is a major disaster in the economy and harmful to the growth and development of the people in Indonesian particularly, and the economy in general. The simple Pearson correlation findings also indicate that corruption has significant distributional consequences by affecting government expenditures. Therefore, the raise of corruption increases income inequality as it reduces the effectiveness of government spending on education, health and final consumption for society. Thus, it can be concluded that for the Indonesian context, an increased inequality due to corruption has worsened the position of the poorest as less resources available for social spending.

KEYWORDS:

corruption; income; inequality; ARDL; economy

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INTRODUCTION

Corruption is a cause of income inequality also an obstacle to successful its eradication. It could destroy the efforts of developing countries, including Indonesia, in order to alleviate income inequality. Corruption's relation to inequality are abundant and common. In the public sector, corruption delays and diverts economic growth and deepens income inequality. Alternatively, income inequality invites corruption as it weakens economic, political and social institutions. Corruption is one of the major determinants of income inequality. Combating corruption is therefore a crucial part in the income inequality reduction process. High levels of corruption worsen the poor's living conditions by distorting the entire decision making process related with public sector programs. Corruption deepens income inequality by hindering productive agendas for instance education and health care at the expense of larger capital intensive projects which can offer better opportunities to extract illegal incomes (Ndikumana, 2006).

The relationship between corruption and income inequality has been a subject of investigation by many researchers. Since recently, in both research directions, a growing attention has been reached to measure the more exact channels, through which corruption and income inequality impulse for growth could be generated (Yusuf, 2013). An increasing number of empirical studies e.g. Mauro (1997), Keefer (2004), and Mo (2001) present persuasive evidence regarding the detrimental effects of corruption on various economic variables such as the income inequality.

Corruption is a common global issue. The Corruption Perception Index (CPI), published annually by Transparency International (TI) since 1995, has been widely credited for raising the issue of corruption to

the international policy agenda. The CPI ranks approximately 180 countries/territories based on how corrupt their public sector is perceived, allotting scores between 0 and 100, where 0 indicates that a country is perceived as highly corrupt, while 100 denotes it is perceived as very clean. According to the CPI 2017, Indonesia ranks 96th, with a score of 37; being perceived as more corrupt than other Asia Pasific countries such as Japan (ranking 20th, with a score of 73), Taiwan (ranking 29th, with a score of 63) and Malaysia (ranking 62th, with a score of 47), but less corrupt than Thailand, Mongolia, Vietnam, and the Philippines. No country has received a perfect score (100). More than 70% of countries score below 60, showing a serious corruption problem in the world (Transparency International, 2017).

Corruption does not only influence the growth of income but also distribution of income. The advantages of corruption tend to increase in better-connected individuals, most of whom come from high income groups (Gupta et. al., 2002). As stated by Johnston (1989), corruption prefers 'have' rather than 'have not' especially if the stakes are large. The load of corruption falls disproportionately on low-income individuals. Individuals belonging to low income groups pay a higher proportion of their income than people belonging to high income groups. As Tanzi (1998) stated, corruption harms the redistributive role of government. Because only connected individuals are better off getting the most profitable government projects, the government is less likely to be able to increase income distribution and make the economic system fairer. Corruption diverts government expenditure from projects that benefit low-income individuals such as education and health for, defense projects that create opportunities for corruption for example (Chetwynd et al., 2003). Corruption reduces the effectiveness of social assistance (Dartanto & Nurkholis, 2013) and less cor-

rupt environment is a necessary condition for the public spending to have effect on enrollment rates (Suryadarma, 2012).

However, there are only limited empirical studies such as Li et al. (2000), Gupta et al. (2002), also Chong and Calderon (2000a & 2000b) analyze the corruption's effects on income inequality. Using data from mixed country groups, namely, low, medium, and high income, Li et al. (2000) also Chong and Calderon (2000a) observe an inverse U-shaped relationship between income inequality and corruption. They reveal a positive relationship between income inequality and corruption in high-income countries and negative relationship in low-income countries. Gupta et al. (2002), in contrast, using smaller country samples, discover a positive and linear relationship between them. Chong & Calderon (2000b) and Gupta et al. (2002) both study the effects of corruption on poverty and income inequality. As Chong & Calderon (2000b) say, increasing income inequality due to increased corruption does not necessarily mean that poverty also increases. If, for instance, income at the higher end of the distribution grows faster than income at the lower end of the distribution, income inequality increases while poverty decreases. Both Chong & Calderon (2000b) and Gupta et al. (2002) found a positive and linear relationship between corruption and poverty. Meanwhile, using panel data from African countries, Gyimah-Brempong (2002) investigates the effects of corruption on economic growth and income inequality. The research findings disclose that corruption reduces economic growth through a decrease on investment of physical capital, directly and indirectly. Also, the findings show that increasing corruption is correlated positively with income inequality.

There is an argument that the increased inequality caused by corruption worsens the position of the poorest in society by reduc-

ing the resources available for social spending. In addition, corruption might have a negative impact on the quality and quantity of public services, such as education and health services. A study of the Philippines shows that corruption affects education outcomes by reducing test scores, lowering school rankings and reducing satisfaction ratings (Azfar & Gurgur, 2005). In public health services, corruption is proven to be responsible for the delay in the provision of treatments, increasing the waiting times for patients and discouraging the use of clinics (Azfar & Gurgur, 2005). Some studies have concluded that investing more funds in social programs will not bring the intended results unless corruption is addressed (Suryadarma, 2012). A study in Africa on corruption and income inequality advises that the well-being of the majority of citizens in African countries could be improved by the usage of domestic resources which is corruption-free and without recourse to asking for external aid (Gyimah-Brempong, 2002).

Although several studies provide evidence of how corruption might increase inequality, an empirical study on Latin America concludes that, in the Latin American context at least, lower corruption is associated with higher income inequality (Dobson & Ramlogan-Dobson, 2010). One of the reasons for this is the existence of a large informal sector in Latin America, composed in great part by the poorest, and to which anti-corruption policies will impose an important cost.

Murphy et al. (1991, 1993) presented a theoretical framework discussing how corruption affected income inequality and growth. This framework was modified by Li et al. (2000) in their paper; "Corruption, income distribution and growth". The framework assumes an economy where one can engage in one out of three economic activities. First, a person can produce a good for the market, at the output of α . Second, the person can produce

a subsistence good, at the output of $\gamma < \alpha$. This good cannot be subjected to rent-seeking behavior, that is, it cannot be stolen or confiscated. However, that is not the case for the market output, which can be subjected to rent-seeking behavior. Further on, the third activity that a person can engage in is rent-seeking. It is denoted by β and it is the maximum amount at which he can produce. The overall return from production (including rent-seeking) will fall under the circumstances of an increase in rent-seeking activities. The ratio of people engaging in market production and rent-seeking activities are denoted by “n”, and the income per capita by “y”. The equilibrium in this economy is established by the populations accumulated engagements in either production of a good (α), subsistence production ($\gamma < \alpha$) or rent-seeking (β). Therefore the allocation of labor will depend upon α , γ , and β .

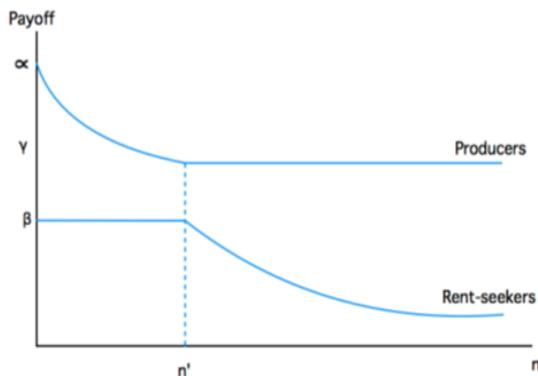


Figure 1. Payoff to production and rent-seeking, $\beta < \gamma$
 Source: Murphy et al., (1993)

In Case 1, $\beta < \gamma$, which correspond to figure 1. Under these circumstances property rights are well preserved and the society does not suffer from any corruption. The return for producers are higher than for rent-seekers, additionally the return for subsistence producers are also higher than for rent seekers.

As we assume that individuals want to maximize their own output, under this situation each individual will produce goods and there are no subsistence producers or rent-

seekers. The ratio of people engaging in rent-seeking activities is, $n=0$, and the return for rent-seekers is diminishing. However, n changes, let say $n > 0$, the market production can be described by $\alpha - n\beta$ (diminishing). We assume the Gini coefficient to be zero. No corruption and well preserved property rights lead to the highest possible output (per capita), denoted by α .

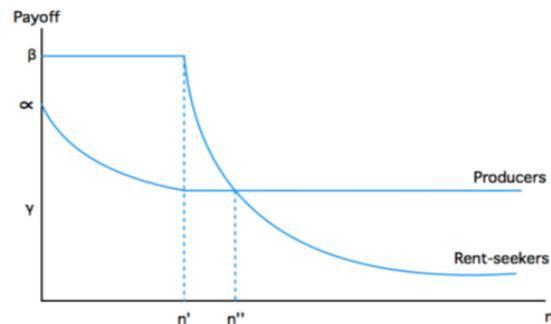


Figure 2. Payoff to production and rent-seeking, $\beta > \alpha$
 Source: Murphy et al. (1993)

In Case 2 correspond to figure 2 where, $\beta > \alpha$. Property rights are poorly preserved and therefore due to the greater return for rent-seekers, people rather engage in rent-seeking activities than anything else. This is an extreme corrupt society. Figure 3 shows that there can only be one equilibrium, at the point where the return from production has gone down to γ and that it is equal to the output from rent-seekers. This is when rent-seekers are crowding themselves out i.e.,

$$\gamma = \frac{(\alpha - \gamma)}{n} \text{ which in equilibrium is } n'' = \frac{(\alpha - \gamma)}{\gamma}$$

given that $n'' > n'$. In equilibrium all individuals' income is the same as subsistence production γ , hence, the equilibrium is not where the market productivity is, at α^2 .

The number of rent-seekers will increase over time and accordingly the number of producers will decrease, i.e. $\alpha - n\beta = \gamma$. As the number of individuals interacting in rent-seeking activities increase, the market output will decrease. The Gini coefficient has a likelihood of being high, as higher Gini coeffi-

cient as closer to being completely equal.

In Case 3, $\gamma < \beta < \alpha$. This last case we refer to an intermediate level of corruption which consist of three equilibria as shown in figure 3, those are (a) The first equilibrium refers back to Case 1 where all people choose to produce in accordance with output α . (b) Second equilibrium comes from Case 2, where people choose among production (α), subsistence production (β), and rent-seeking activities (γ). This is encountered under the circumstances where income per capita is pushed down to γ , and equilibrium based upon $n = \frac{\alpha}{\gamma} - 1$.

(c) The third equilibrium, where people either engage in market production or rent-seeking. The output is denoted by β . It is Observed that in this equilibrium there is no people engaging in subsistence production. The equilibrium is based upon

$$\alpha - \beta n = \beta, \text{ or } n''' = \left(\frac{\alpha - \beta}{\beta} \right) \text{ given that } n''' < n'.$$

This occurs since new entries of rent seekers will force the return of the producers on the market down to the same return as the rent-seekers, and that is before any initiated crowding out. However, this last equilibrium is not stable, nor desirable as it push n beyond n'' . Consequently, it implies a rising

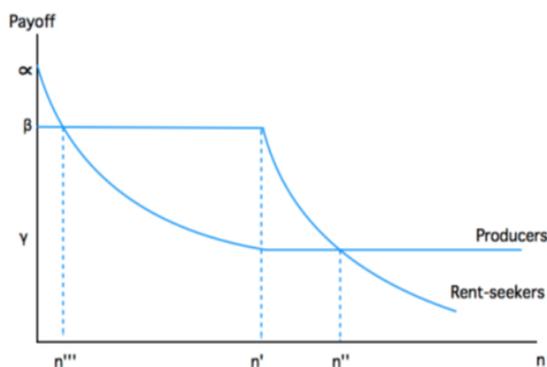


Figure 3. Payoffs to production and rent-seeking, $\gamma < \beta < \alpha$

Source: Murphy et al. (1993)

return to rent-seekers. Therefore there is only two stable equilibria, one where $n=0$ and another where $n=n''$. In accordance with the former, less people will engage in rent-seeking activities than what is shown in case 2. Additionally the income level β is higher than in case 2, but still lower than case 1. Concluding case 3, one can see that the variation in income will vary more than in case 1, however, not as much as in case 2. Countries which have a low corruption level will have a lower level of income variation than countries with an intermediate or high level of corruption. The Gini coefficient is higher than in case 1 but not as high as in case 2.

The empirical implications of the modified model this study find that the best situation is case 1, where property rights are well preserved and no existing corruption. This is under the conditions of β placed below γ . It will lead to the highest possible per capita output, denoted by α . Anti-corruption beliefs, i.e. legal system or cultural impacts may also affect an important role (North, 1991). Hence, the hypothesis states that a high level of corruption imply high income inequality. The impact of corruption on income inequality is positive. This study will be addressed to prove it. In doing so, the study will answer the research question; does less corruption reduce inequality level?

Although the connection between corruption and income inequality is frequently noted, the question of whether a short and long-run relationship exists between them has obtained less attention especially for Indonesia case as a developing country. In other words, most of the studies which have investigated the link between them may conclude on causality in models that only show correlation. Therefore, the policy recommendation for fight against especially for income inequality and corruption may simply be wrong. Taking it to the limit, particularly for Indonesia, how good is it to try to decrease corruption by im-

plementing anti inequality strategies if the high inequality level is simply caused by high corruption and not the other way around? As the author stated above, based on the Survey of Transparency International for CPI in 2017, Indonesia laced on the group of worst level of the corrupted countries in the Asia Pacific. On the other side, for the last of decades, Statistics of Indonesia reported that Indonesia's Gini coefficient, income inequality' indicator of a country, rose from 0.376 in 2007 increased to 0.402 in 2015 (the upper the Gini coefficient means the distribution of income is more unequal). Although Indonesia is worse than Thailand, Laos, Vietnam, and Cambodia in income inequality, Indonesia is better than China and Philippines. The latest World Bank report revealed that only 20% of Indonesians were benefited from the growing economic wealth in the last decade, whereas 205 million citizens or 80% of Indonesians were left behind. Moreover, The World Bank also reported that Indonesia has one of the highest wealth concentrations in the world and been increasing faster than other countries. The richest citizens or 10 percent of Indonesians possess approximately 77 percent of the country's wealth. One percent of the richest Indonesians own the half of the country's assets. However, the income tax from these assets sometimes is at a lower rate than worker income, likewise for its tax compliance (The Jakarta Post, 2018).

When looking at the Gini Ratio trend, an indicator of income inequality in a country (table 1), Indonesia's Gini Coefficient rose from 0.37 in 2007 to 0.40 in 2015. From table 1, we also may suggest that inequality levels in Indonesia do not necessarily correlate with the levels of property, but rather an unequal distribution of wealth towards higher income earners.

Meanwhile, the World Bank's 5.3 percent Gross Domestic Product (GDP) forecast for the 2018-2020 period indicates that Indonesia will have an accelerating growth from the estimated 5.1 percent (y/y) growth pace in 2017. Nevertheless, the forecast is not as confident as the government's 5.4 percent (y/y) growth target that was set in the state budget of year 2018. One of the main reasons why the World Bank in 2018 requires a robust jump to 5.3 percent (y/y) GDP growth for Indonesia and beyond is due to the nation's household consumption is projected to improve on the back of rising wages. In the meantime, rising commodity prices are also expected to boost the Southeast Asia's largest economy. Indonesia remains as one of the big commodity exporters in the world. Although the 5.3 percent (y/y) growth pace is not as high as President Joko Widodo once promised during his campaign in 2014, Indonesia becomes one of the few Asian economies which is not expected to see sliding economic growth in the future years. Malaysia's economic growth, for instance, is projected to slide almost one percent between 2017

Table 1. Indonesian Poverty and Inequality Statistics

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Relative Poverty (% population)	16.6	15.4	14.2	13.3	12.5	11.7	11.5	11.0	11.1	10.9
Absolute Poverty (in millions)	37	35	33	31	30	29	29	28	29	28
Gini Coefficient (Gini Ratio)	0.376	0.368	0.367	0.378	0.388	0.413	0.406	0.414	0.402	0.394

Source: Statistics of Indonesia (BPS, 2018)

(5.8 percent) and 2020 (4.7 percent) (Indonesia-Investments, 2018).

The apparent paradox of this increasing economic growth with high levels of corruption and inequality raises issues of concern among various studies on whether corruption is beneficial or harmful to growth and under what conditions do channels influence inequality. Therefore, the dominant literature such as Mauro (1995), Keefer & Knack (1997), and Gupta et al. (2002) report empirical evidence confirming that corruption is far more destructive in contexts where corruption is higher as a result of growth - blocking patterns of accumulation. They go further to state that corruption reduces investment and its consequences, economic growth.

However, the results of these studies are confused. First, they failed to provide a clear transmission mechanism in which corruption hampers economic growth. Second, this type of research is very interesting in cross-country panel data analysis ignoring the specificities of unique country contexts. Although there are quite a number of country-specific case studies such as the study of Aliyu and Elijah (2008), Ajie and Wokekoro (2012), Adenike (2013), and Uma and Eboh (2013), this study is not far from certain imperfections. Since most of these studies have failed to pay great attention to other channels of transmission mechanisms through corruption that affect economic growth such as income inequality, which causes a potential bias for endogeneity and missing variables.

The main objective of this study is to know the long run and short run impact of corruption on inequality of income. The findings of this study will be necessary to be able to get a clear picture of the extent of the problem of corruption and income inequality in Indonesia and shall analyze and determine the con-

nection or contribution of corruption to the problem of increasing inequality in Indonesia. The findings shall also be useful to policy makers and the general public not only for the purpose of creating awareness of the adverse effects of corruption, economic growth and income growth of the poor but also to utilise the data in policy formulation and implementation.

RESEARCH METHOD

This study may have a comprehensive effort on this topic for the economy of Indonesia and it will contribute to the study of corruption and inequality literature in several ways: (i) using a comprehensive measure of corruption and inequality; (ii) structural break unit root test; (iii) the ARDL bounds testing approach to cointegration for long run relationship between the variables in the presence of structural breaks; and (iv) Error Correction Mechanism (ECM) for short run impacts.

The aim of this study is to know the long and short run relationship between corruption and income inequality in case of Indonesia using annual frequency data from the Transparency International and World Bank over the period of 1995-2017. In addition to the focus variables of corruption and poverty, the author also includes three control variables in model. First, this study includes the variable of GDP per capita because it is highly correlated with poverty and income inequality. Second, this study also includes the inflation rate as other control variable. Inflation is another classic variable in the development literature theorized to harm growth. Regardless of how it is measured, inflation has consistently been shown to harm growth (Levine & Renelt, 1992). Inflation may be particularly significant in the literature stu-

dying inequality's effects on subsequent growth since inflation rises inequality (Li & Zou, 2002). Last, the author uses poverty as other control variable. Poverty is clearly about more than insufficient income. It is also connected to the access to and quality of public services vital to the poor for instance health, education, water, infrastructures and sanitation. It is also about insufficiency of opportunities, access to information, voice and lack of representation (Chetwynd et al., 2003). The general functional form of the model is as follows:

$$IE_t = f(CPI_t, GDP_t, INF_t, POV_t)$$

In this equation, IE is income inequality measured by Gini index (%), CPI (Corruption Perception Index) is index denotes the level of corruption where countries with a higher Corruption Perception Index score are perceived as having less corruption, GDP is economic growth measured by GDP per capita growth (annual %), INF illustrates the consumer price index (2010 = 100), and POV is poverty measured by poverty headcount ratio at national poverty lines (% of population). The author has converted all the series into natural logarithm (Ln) for consistent and reliable results. The log-linear specification provides better results because the conversion of the series into logarithm reduces the sharpness in time series data (Shahbaz, 2012).

Especially for CPI, over the 1995 to 2011 period, the CPI ranks countries/territories on a scale of 0 to 10, with 0 indicating highly corrupt (most corrupt) and 10 indicating very clean (least corrupt). During 2012, the CPI scores countries from 0 to 100 instead of 0 to 10 scale. This study utilizes the CPI, which is provided and accumulated by Transparency International. It is the far broadest index available and it is matching our intentions with this study as the author is only interest-

ed in the perceived level of corruption in a country. The author is not targeting any specific form or measure of corruption. The CPI index currently contains data from approximately 180 countries and has been recorded since 1995. For making interpretation more natural also for the sake of simplicity, the author follows the same procedure as Wei (2000) and Li et al. (2000) by taking 10 minus the Corruption Perception Index (inverting). Therefore, a higher score now stands for a higher level of corruption.

This study first tested the unit root of all the variables using both the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. After checking for the unit root, this study can then employ either the Johansen & Juselius (1990) or the Engle Granger cointegration test if the series of each variable is integrated of the same order. If the author finds that the variables used in this study are not all integrated of the same order and hence, the author will employ the ARDL approach to test for cointegration as Johansen method for testing for cointegration requires the variables to be integrated of the same order. If not the predictive power of the models tested would be affected.

The ARDL approach as developed by Pesaran et al. (2001) overcome these problems as ARDL can be applied irrespective of whether the variables are I(0) and/or I(1). More importantly, Johansen approach is not suitable for studying cointegration for small sample time series as in this study. ARDL on the other hand provides robust results even in small samples (Pesaran & Shin, 1999) and this is advantageous as income inequality data is only available for annual data and the period available are also limited for many emerging economies like Indonesia. Another benefit of ARDL is that it lets the optimal lag lengths for the variables to differ, while the Johansen approach requires that all variables in the model to have the same number

of lags. For this study, AIC (Akaike Information Criterion) has been used to determine the optimal lag lengths for the ARDL model. Eventhough using Schwarz Bayesian Criterion (SBC) provided smaller standard errors for some of our models tested under the ARDL, the author found that in some models, SBC ran the models with ARDL (0,0,0,0) such that no ECM statistical output was produced. This is due to the SBC's method of choosing the minimum lag possible and accordingly, the author finds that AIC is more suitable for the study.

The initial step in ARDL is to investigate empirically the existence of long run relationship among the variables. Then, the calculated F-statistic is compared against the upper and lower critical bound provided by Pesaran et al. (2001) which correspond to the assumptions that the variables are I(0) and I(1) respectively. If the calculated F-statistics exceeds the upper critical bound (UCB). Then the series are cointegrated; if it is below the lower critical bound (LCB), there is no cointegration. If the calculated F-statistics is between the UCB and the LCB, then decision about cointegration is inconclusive and knowledge of the cointegration rank of the forcing variables is required to continue further.

The ARDL cointegration test is analyzing the following hypotheses:

H₀: $\delta_1 = \delta_2 = \delta_3 = \delta_4 = 0$ i.e there is no long run relationship between the variables,

H_a: $\delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq 0$ i.e there is cointegration or long run relationship between the variables.

In the second step, once cointegration between the variables has been established, the long run coefficients and the error correction term (ECT) can be estimated. The ARDL cointegration procedure allows cointegrating

relationship to be estimated by OLS once the lag order is selected. The model can be identified as follows.

$$\Delta IE = a_0 + \sum_{i=1}^k b_i \Delta CPI_{t-1} + \sum_{i=1}^k c_i \Delta GDP_{t-1} + \sum_{i=1}^k d_i \Delta INF_{t-1} + \sum_{i=1}^k e_i \Delta POV_{t-1} + \delta_1 LCPI_{t-1} + \delta_2 LGDP_{t-1} + \delta_3 LINF_{t-1} + \delta_4 LPOV_{t-1} + \mu_t$$

Where IE is inequality, CPI is corruption, and GDP is growth, INF is inflation, and POV is poverty. Δ is the first difference of the logged variables and u_t is the residual term. This equation is a standard vector auto regression (VAR) model in which a linear combination of lagged-level variables are added as proxy for lagged error terms. The coefficients b_i , c_i , d_i and e_i represent the short run effects while all δ_j (for $j=1 \dots 4$) represents the long run effects.

The dynamic error correction model (ECM) is derived from the ARDL model through a simple linear transformation where the ECM incorporates the short run dynamics along with long run equilibrium, without losing the long run information. Through the t-statistic of the ECM, the causality in the earlier step will be tested and confirmed. Meanwhile the coefficient of the ECM shows the speed of adjustment of the dependent variable towards its long run equilibrium. The endogeneity or exogeneity of the variable is tested through the ECM, and the same equation is used with each proxy of corruption as well as poverty in turn being the dependent variable. The hypothesis is tested by the ECM as follows: H₀: The variable is Exogenous; and H_a: The variable is Endogenous.

RESULT AND DISCUSSION

The descriptive statistics of sample data collected from World Bank and Transparency International as shown in table 2. The unit root test provides guidance to ascertain whether ARDL is applicable or not because it is only applicable to the analysis of variables that are integrated of order zero [I(0)] or order one [I(1)], but not applicable when higher order of integration such as I(2) variable is involved. Testing the stationarity of the variables is important to avoid spurious regression. Thus, the Augmented Dickey-Fuller (ADF) of Dickey & Fuller (1981) and Phillips-Perron (PP) test by Phillips & Perron (1988) technique were used to investigate the stationarity of the variables. The ADF and PP test results are showed in table 3.

The null hypothesis of the unit root problem is rejected at the first difference. This shows that most variables are found to be stationary at 1st difference implying that variables are integrated at I(1) and the variables used in this study are not all integrated of the same order, hence the author may employ the ARDL approach to test for cointegration.

After having confirmed the stationarity of the variables, the next step of the analysis was to test for cointegration among the variables. Therefore, ARDL bounds testing approach is employed to test for the existence of long run relationship. However, in order to do this, it is important to identify an appropriate lag length to calculate the F-statistics. The ARDL model is sensitive to the lag order. In addition,

optimum lag order would be helpful in reliable and consistent result in the analysis. Thus, the Akaike Information Criterion (AIC) is considered to obtain the optimum lag length. The choice of this criterion is based on the stricter penalties imposed by AIC. This AIC provides better and consistent results compared to other lag length criteria (Uddin et al., 2013). Based on the lag selection criteria test, the AIC maximum lag length of 1 was selected and employed in the estimation of ARDL model (1,0,0,0,0), as shown in table 4.

After stationary tests among variables and choosing lap optimum for model, then the variables were tested for cointegration by applying ARDL bound testing approach for testing the Null that there is no long-run (LR) relationship among the variables. The computed F-statistic is compared with upper and lower critical bounds generated by Pesaran et al. (2001) to test for the existence of cointegration. The null hypothesis is $H_0 : \lambda_j = 0$, (where $j = 1, 2, \dots, 4$) in equation (4). This implies no long run relationship among the variables, against the alternative hypothesis, $H_1 : \lambda_j \neq 0$, implying the existence of long run relationship among the variables.

The results in table 5 showed that the computed F-statistic (3.55) is greater than the upper bound (3.52) at 10% level of significance with unrestricted intercept and no trend (Upper bound is 3.52 and Lower bound is 2.45). This implies that there is evidence to reject the null hypothesis of no long run relationship among the variables. Hence,

Table 2. Descriptive Statistics of Sample Data

Variables	Unit of Measuring	Minimum	Maximum	Mean	Std. Dev.
Inequality (IE)	%	0.28	0.41	0.37	0.03
Corruption (CPI)	0-10	1.70	3.70	2.57	0.65
Growth (GDP)	%	-14.35	6.56	3.06	4.13
Inflation (INF)	%	19.39	142.18	77.90	38.77
Poverty (POV)	%	4.00	58.00	10.20	11.44

Source: Transparency International and World Bank (WDI, 2018)

Table 3. Results of the ADF and PP test

Level				
Variables	ADF Test		PP Test	
	t-statistic	Prob.*	t-statistic	Prob.*
IE	-0.465457	0.4874	-0.432705	0.5003
CPI	-1.626007	0.0966***	-1.707635	0.0827***
GDP	-1.010231	0.2685	-1.034192	0.2594
INF	4.015510	0.9999	3.544102	0.9996
POV	-3.971922	0.0005*	-4.158296	0.0003*
1 st Difference				
IE	-2.749158	0.0120*	-2.793527	0.0111**
CPI	-4.373333	0.0001*	-4.293229	0.0002*
GDP	-4.361624	0.0002*	-4.361624	0.0002*
INF	-5.298057	0.0000*	-2.217773	0.0287**
POV	0.042843	0.6810	-1.745454	0.0768***

* Significance at 1 % level, ** Significance at 5 % level, *** Significance at 10 % level.

MacKinnon (1996) one-sided p values.

Source: Author's data processing and analysis

the alternative hypothesis is accepted that there is long run equilibrium relationship among income inequality, corruption, growth, inflation and poverty.

The Error Correction Model (ECM) associated with ARDL was estimated to show the short and long run effect of corruption on the income inequality level. In addition to the fact that ECM comprises the short run transitory effects and the long run relationships, the speed of adjustment of the dependent variable to changes in the independent variables is also determined within the framework.

The results of the ECM in table 6 showed the short effect of corruption on income inequality. From the p-value (Prob.) of error correction (ECM(-1)) in that table (where 1%, 5%, and 10% as significance level), the author can

conclude that in the short-run both income inequality and corruption are endogenous. That is all these variables are dependent on other variables, which helps the author to argue that there is dynamic relationship among income inequality, corruption, growth, inflation and poverty in short-run. The lagged ECM terms for model have the expected negative sign. Moreover, the coefficient of the ECM (-1) in table 6 is the speed of adjustment of poverty level to shocks in exogenous variables in the model. The negative and statistically significant of the coefficient of the Error Correction (ECM) indicates a stable process of adjustment to the long run equilibrium.

In the short run, the results show that corruption is significant in 1% significance level (Prob. <0.01, t=42.39) and it has a positive

Table 4. Model Selection Criteria

Model	LogL	AIC*	BIC	HQ	Adj. R-sq	Specification
1	54.217962	-10.715103	-10.583620	-10.998843	0.996881	ARDL (1, 0, 0, 0, 0)

Source: Author's data processing and analysis

Table 5. Result of Bounds Testing

Estimation Model	$IE = f(CPI, GDP, INF, POV)$	
Test Statistic	Value	K
F-statistic	3.559432***	4
Null Hypothesis :	No long-run relationships exist	
Critical Value Bounds		
Significance	Lower Bound	Upper Bound
10%	2.45	3.52
5%	2.86	4.01
1%	3.74	5.06
Decision :	Reject the Null Hypothesis	

*** Significance at 10 % level

Source: Author's data processing and analysis

effect on the level of income inequality level in Indonesia. A 1% change in corruption, other things being equal, will change the level of inequality by 0.44% in the same direction. The argument for a positive correlation between income inequality and corruption level is as in highly unequal societies similar to Indonesia, the well-connected or rich have

larger resources to purchase influence illegally. With increased inequality in a society, more pressure will be exerted by the poor for redistributive measures such as progressive taxation. This leads to an added incentive for the well-connected or rich to employ political corruption for combating such measures and preserving the status quo. Given that high-

Table 6. Results of the Error Correction Model (ECM) for Short Run

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(IE)	-0.128097	0.028044	-4.567703	0.0447**
CPI	0.445548	0.010510	42.39128	0.0006**
D(GDP)	-0.050960	0.011422	-4.461664	0.0467**
D(INF)	-0.018209	0.011234	-1.620812	0.2465
POV	0.025922	0.006201	4.180169	0.0527***
ECM (-1)	-1.463392	0.246071	-5.947030	0.0271**
C	0.803456	0.008921	90.06506	0.0001
R-squared	0.999938	Mean dependent var		0.392222
Adjusted R-squared	0.999750	S.D. dependent var		0.018157
S.E. of regression	0.000287	Akaike info criterion		-13.42297
Sum squared resid	1.65E-07	Schwarz criterion		-13.26957
Log likelihood	67.40337	Hannan-Quinn criter.		-13.75400
F-statistic	5337.972	Durbin-Watson stat		2.120169
Prob(F-statistic)	0.000187			

* Significance at 1 % level, ** Significance at 1 % level, *** Significance at 1 % level

Source: Author's data processing and analysis

inequality societies are more likely to insufficiently provide basic public services to the poor, the poor in turn will also depend on forms of corruption, albeit petty corruption, to secure these services.

Economic growth (proxied by GDP) is also significant (Prob. <0.05, $t=-4.46$) in the short run but it has a negative impact. This means that a 1% increase in economic growth will decrease the level of income inequality by 0.05%. This is in line with the expectation of negative relationship between growth and inequality where an increase in economic growth is expected to reduce poverty and income inequality. The negative relationship between inequality level and economic growth in Indonesia is worthy of concern. This serves as evidence that growth in the economic activities, aggregate incomes or outputs has trickled down to the bottom poor people. Nevertheless, this condition must be a serious attention for government, because this also means that the structural shift in the process of Indonesia's economic growth does follow the common assumption in the economic theory. The theory says that when an economic growth process creates movement of labor from low productivity agriculture to the high productivity industrial sector, it will improve the income and welfare of the labor force and cause a client in the inequality of income. In the other side, the poverty rate has a positive significance effect on

income inequality by 0.02%.

In the long run from table 7, only corruption that has a significant effect on the level of income inequality in 1% significance level. This implies that in the long run, there is positive relationship between corruption and income inequality. In the long run, the coefficient of corruption effect implies that 1% increase in corruption would increase the income inequality by 0.38%. This result complements the findings of both Chong and Calderon (2000b) and Gupta et al. (2002) on the positive association between corruption and income inequality. Moreover, the evidence of this association lends weight to the theoretical basis for the relationship between income inequality and corruption proposed by Murphy et al. (1991). Figure 4 demonstrates the relationship between corruption and inequality. The figure is based on the regression result in table 7. A higher growth in the corruption means the country has a higher rate of income inequality.

In the society and governmental context, corruption is perceived as a function of motivations and opportunities. In the face of increasing inequality, society is likely to react by demanding redistribution of income and higher levels of progressive taxation (Meltzer & Richard, 1981). As the redistribution pressure rises, elites will have a stronger motivation to buy political influence and

Table 7. Results of ARDL Estimation Based on AIC for Long Run

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPI	0.386977	0.019541	19.802972	0.0003*
GDP	0.016209	0.062318	0.260105	0.8116
INF	0.009272	0.022100	0.419563	0.7030
POV	0.011711	0.051174	0.228837	0.8337
C	0.676641	0.199861	3.385557	0.0429

* Significance at 1 % level

Source: Author's data processing and analysis

exercise political corruption to influence decision making in an attempt to preserve their privileges (Glaeser et al., 2003). According to some studies, this effect of inequality on motivating corruption is greater in more democratic societies (Jong-Sung & Khagram, 2005). According to Kaufmann & Vicente (2005), political corruption or lobbying to ensure legal processes aimed at private gain, what the authors call 'legal corruption', is more likely to arise when there is low inequality, high (initial) income and accountability—understood by the authors as population's awareness of corruptible behaviour by the elite is low. In the same economic conditions, if accountability is high, a successful insurrection would surface and there is nothing the elite can do to stay in power, so not even legal corruption may arise. However, when there is high inequality and the income is low, which implies that the population might not have the power to threaten the elite with a successful insurrection, the elite opts for cheapest illegal forms of corruption (Kaufmann & Vicente, 2005).

The result of ARDL above have shown that corruption among others affect income inequality. This could be labeled as the direct impact of corruption on inequality. However, corruption may also affect inequality indirectly through its impact on variables such as social spending. As this study stated before from previous findings that corruption deepens income inequality by hampering productive programs such as education, health care, water, infrastructures, housing and sanitation, corruption distorts the redistributive role of government. Since only the better-connected persons gain the most profitable government projects, it is less possible that the government is capable of improving the distribution of income and making the eco-

nomie system more equitable. It diverts government spending away from projects that benefit mostly low income individuals such as education and health to, for example, defense projects that create opportunities for corruption. This is an argument that the increased inequality caused by corruption worsens the position of the poorest in society by reducing the resources available for social spending. Well-targeted social programs are believed to transfer relatively more income to the poor and reduce the incidence of poverty. In reality, it is quite conceivable that much of the benefits of social programs accrue to the middle and higher-income groups.

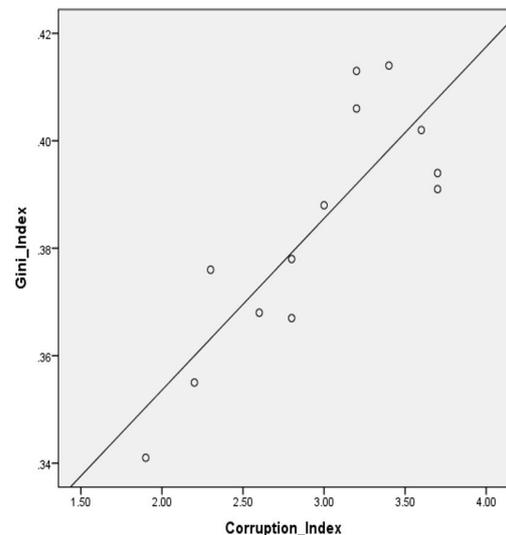


Figure 4. Scatter Plot of Relationship between Corruption Index and Inequality

Source: Author's data processing and analysis

To determine whether data supports the role of social spending in alleviating inequality and how corruption can affect the inequality through social spending, then social spending is correlated by simple Pearson Product Moment Coefficient of Correlation estimation¹ on corruption index. For this matter, the author uses several broad proxies. These are government or public spending (expenditure) on education (% of GDP), health (% of GDP), and final consumption (% of GDP)² from World Bank Data.

¹Estimated by IBM SPSS Statistics Version 22

²Measured by general government final consumption expenditure (formerly general government consumption) includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security, but excludes government military expenditures that are part of government capital formation.

Table 8. Pearson Correlation Results

Variable	CPI	Health	Education	Final Consumption
CPI	1	-0.917 (0.000)*	-0.464 (0.061)***	-0.837 (0.000)*
N		17	16	22

* Significance at 10 % level, *** Significance at 10 % level

Source: Author's data processing and analysis

The results in table 8 shows that higher corruption tends to have lower levels of social spending. Of the three correlations, they are statistically significant at 1 percent level for health and final consumption spending and 10 percent level for education spending. Corruption is statistically significant in negative sign on health, education and final consumption spending of government. A 1% change in corruption index, other things being equal, will change the level of health spending by 0.91%, level of education spending by 0.46%, and level of final consumption by 0.83% in the opposite direction. This implies that increasing corruption will decrease the total spending of government for social services. Whereas the previous section stated that higher social spending increases the income growth of the poor. Together these results show that corruption not only reduces income growth of the poor directly, but also indirectly through lower social spending for health, education and final consumption expenditure (formerly general government

consumption) includes all government current expenditures for purchases of goods and services. These results indicate that corruption leads to higher income inequality by reducing the effectiveness of government spending for society. These are supported by a study using data from 21 OECD countries for the period 1998 to 2011 by Jajkowicz and Drobiszova (2015). The authors show that, due to corruption, government expenditure on defense and general public services increased, while public expenditure on education, health, culture and religion declined. The implication of this corrupt practice on inequality, especially when the sector most affected is education, is the prevention of economic growth considering the positive relationship between investing in education and economic development.

In order to have better understanding of the relation between corruption and all broad proxies, this study plotted them visually on scatter plot graphs. Figure 5 shows a nega-

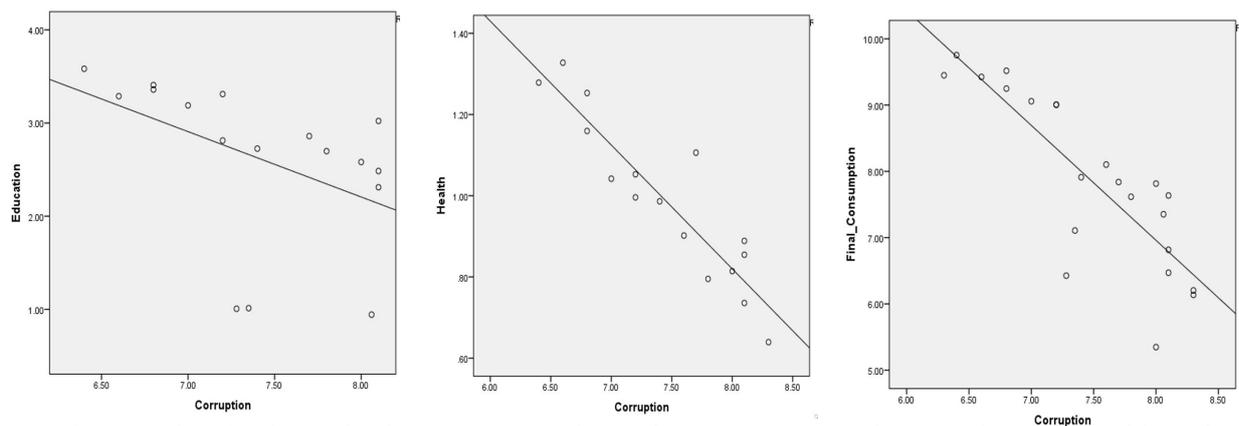


Figure 5. Plot of Relationship between Corruption and Government Spending for Education, Health, and Final Consumption

Source: Author's data processing and analysis

tive correlation between corruption and government spending for education, health, and final consumption.

CONCLUSION

The results from the above analysis indicated that corruption affects income inequality in Indonesia both in short run and long run. Corruption is a very complex phenomenon that has been connected with variety factors such as economic, legal, cultural and demographic. Any anti-corruption campaign will not succeed if it concentrates on a single perceived cause at the expense of others. Furthermore, lots of the corruption forms will take, and the pervasiveness with which it will manifest itself, are dependent on country-specific conditions. Thus, it makes policy prescriptions for anti-corruption efforts difficult and perhaps fundamentally misguided. Nonetheless, by enhancing further evidence to the relationship between income inequality and corruption, this study may propose insight of how certain corruption forms may come about, and a possible explanation of why certain factors previously thought to underlie corruption. Also, which of the factors that have inspired anti-corruption measures but have not been supported by empirical research. In the short run, the results show that corruption is significant in 1% significance level (Prob. <0.01, $t=42.39$) and it has a positive effect on the level of income inequality level in Indonesia. A 1% change in corruption, other things being equal, will change the level of inequality by 0.44% in the same direction. This study also results the possible long-term economic consequences of pronounced income inequality. The impact of corruption on income inequality is considerable that 1% increase in corruption index would increase the income inequality by 0.38%.

For citizens' life, the negative implication of corruption becomes a main disaster in the economy and harmful to the growth and development of the citizens particularly and the economy generally. For the effectiveness, sustainability and management of this disaster, government should initiate policies that will decrease the level of corruption significantly. Therefore, it will bring influence on the standard of living of the citizens positively regarding the quality and efficient education, sound management of natural resources, provision of good health facilities as well as other infrastructures that will transcend to the growth of the economy. Also, the leading Indonesia's Corruption Eradication Commission (Komisi Pemberantasan Korupsi), abbreviated as KPK, as a government agency established to fight corruption, and all institutions related need to join hands with the fast growing economies to stop the corrupt officials from getting away with it by imposing reasonable sanctions that will serve as a deterrent to others. This may be informed of arresting and conviction of several individuals that are found guilty of the offence. Anti-corruption efforts need to be strengthened and sustained. This will help in eradicating high level of income inequality among the people.

The empirical evidence presented in this study shows that corruption has significant distributional consequences by affecting government expenditures. High and rising corruption has increased poverty by reducing the level and effectiveness of growth and social spending (health as well as education). All ARDL estimation results and Pearson correlation findings suggest that the adverse distributional consequences of corruption can be mitigated by: (1) efficient spending on education, health and other public services; (2) effective targeting of social programs; and (3) a low level of inequality in the access to education.

This study has contributed to knowledge by empirically investigating the impact of corruption on income inequality in Indonesia where it was found that high level of corruption has led to an increase in the level of income inequality in Indonesia. The study therefore also suggested that for national sustainable development and disaster management (corruption and income inequality), the KPK and the other ministries linked should join hands together with the fast growing economies to stop the corrupt officials from getting away with their corrupt practices.

The author believes that with a larger sample size the evidence becomes more reliable and the probability of any error will decrease. The author only reaches a dataset of annually based, hopefully more data will become more accessible and a greater data sets can be constructed. As greater dataset are conducted accurately one can start looking at cross regional regressions for each region depending upon legal origin and possibly achieve greater significance in each group of countries. Valuable information and conclusions can be drawn from both the regression model with and without dummies. Suggestions for further research that could be of use and give even better results is to continue using new and greater datasets as they become available and using other model to catch the corruption as a consequences of inequality condition. The difficulties with measuring and defining corruption will sustain however without trying to change either the method of measuring or the definition one can compare newer research with previous for a greater understanding.

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