THE CORRUPTION-INEQUALITY INCOME TRAP: A STUDY OF SOME ASIAN COUNTRIES

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ABSTRACT

There is ambiguity found in the studies of the impact of corruption on economic growth—the Grease the Wheel Hypothesis as opposed to the Sand the Wheel Hypothesis—which has triggered this research to look at the impact of corruption from another perspective, i.e income inequality. This study demonstrates that a reciprocal influence exists between corruption and income inequality in some Asian countries, otherwise known as the corruption-inequality trap. This was done by using the Ordinary Least Square (OLS), Tobit, and Two Stage Least Square (2SLS) methods. The results show that higher levels of corruption can aggravate income inequality, and higher income inequality levels can affect the higher level of corruption in some Asian countries. Other variables that have a significant effect on income inequality in the Asian countries sampled are per capita income, the gross enrollment rate in primary education, population growth, foreign direct investment, and governance.

Keywords: Economic growth, income inequality, corruption, Grease the Wheel Hypothesis, Sand the Wheel Hypothesis

JEL Classification: D63, D73, O11

1. Introduction

There is the proposition that corruption can have a positive effect on economic development; it is known as the Grease the Wheel Hypothesis (GWH). On the other hand, the Sand the Wheel Hypothesis (SWH) proposes that corruption has a negative effect on economic development[1]. This study would like to examine the effect of corruption on another economic variable aside from economic growth, namely income inequality[2]. Studies show that economic growth and income inequality also have an ambiguous relationship[3]. Therefore, this study provides an opportunity to examination of the effects of corruption as seen from the perspective of income inequality. Several studies have shown that corruption is detrimental to income inequality[4]. Nevertheless, there are still some studies that consider corruption can have a positive effect on economic growth as aknowledged as GWH.

Shleifer and Vishny (1993) used embezzlement as a proxy for corruption, whereas Dzhumashev (2014) used a model in which bribery cases in tax evasion were a proxy for corruption. Both studies concluded that corruption can have a negative effect on economic growth. Other studies that support SWH identified the relationship between corruption and economic growth using empirical data at the macro level[5]. Leff (1964), Leys (1965), Huntington (1968), and Lui (1985) identify corruption as cases of bribery in a country that has a weak governance system which make it easier for companies or individuals to open businesses or get public services. Therefore, they argued, corruption can increase their income and so contribute to economic growth. Dreher & Gasebner (2013) identify corruption as a bribe in an effort to reduce the influence of strict regulations governing the establishment of new businesses. By using data from companies, Dreher & Gasebner (2013) argue that corruption can increase company activity due to the bypassing of overly strict regulations. Therefore, they argue, corruption can increase economic growth. The studies that support SWH usually identify corruption as embezzlement, and the studies that support GWH usually identify corruption as bribes by companies or individuals to open new companies or get public services easily.

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[1] The studies arguing for SWH are: Adenike (2013), Bardhan (1997), Dridi (2013), Dzhumashev (2014), Erlich dan Lui (1999), Mauro (1995, 1998), Meon dan Sekkat (2005), Mo (2001), Shleifer dan Vishny (1993). On the other side, Barreto (2001), Dreher dan Gassebner (2013), Huntington (1968), Leff (1964), Leys (1965), Lui (1985), Meon dan Weill (2010), conducted studies that support GWH.

[2] Macro indicators such as economic growth and income inequality, among others, were used as the measures for the achievement of economic development.

[3] Birdsall (1998), Forbes (2000), and Scully (2003) indicate that high levels of economic growth can cause higher income inequality. However Danielson (2004) suggests the otherwise, in Jamaica the high rate of economic growth can lead to lower income inequality.

[4] Studies showing that corruption is detrimental to income inequality include Batabyal & Chowdhury (2015), Dincer & Gunalp (2008), Gupta, Davoodi, & Alonso-Terme (2002), Gyimah-Brempong (2002), Mo (2009).

[5] It is Adenike (2013), Dridi (2013), Mauro (1995, 1998), Meon dan Sekkat (2005), Mo (2001).

From another prespective, some studies yield consistent results that show corruption increasing income inequality [6]. Therefore, efforts to reduce the level of corruption can also be a means of reducing income inequality. By contrast, Policardo & Carrera (2018), using panel data from 50 countries for the period 1995-2015, show that corruption has no significant effect on income inequality. Then again, other studies argue that income inequality can promote corruption (Fried, Lagunes & Venkataramani, 2010; Uslaner, 2007; 2011; You & Khagram, 2005). You and Khagram (2005) argue that, because rich people find it easier to pay bribes, they benefit from corruption more than poor people. Rich people also usually occupy strategic and important positions, so they have more power to engage in extortion and embezzlement. Poor people, they argue, are more vulnerable to being victims of extortion, therefore, income inequality increases.

Using analysis of a bribery game, Dutta & Mishra (2013) conclude that income inequality does not affect corruption. However, using the field research experimental method, Fried, Lagunes, & Venkataramani (2010) find that the police tend to ask for bribes from lower-class drivers while leaving the rich drivers alone when they have committed traffic violations. Research by Fried, Lagunes, & Venkataramani (2010) supports the conclusion of You and Khagram (2005) that income inequality can cause corruption.

Shabbbir & Anwar (2008) also find that income inequality is not a determinant of corruption in developing countries [7]. Their analysis indicates that income inequality is not a significant factor in corruption. Additionally, Uslaner (2007, 2011) states that there is an inequality trap in the relationship between corruption and income inequality in Africa [8]. That opinion is in line with Apergis, Dincer, & Payne (2010) who, using a sample comprising 50 US states, conclude that there is two-way causality between corruption and income inequality, both in the short and long term. Therefore, the relationship between corruption and income inequality can still be questioned.

The difference between the empirical results of studies of the relationship between corruption and income inequality provokes the question of whether it is corruption that is fueling income inequality or vice versa? Another question is whether there is a reciprocal effect between the two? This study will provide a theoretical framework to examine the process whereby corruption influences income inequality. For this, seen through the

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[6] Please see the more detail in Batabyal & Chowdhury (2015), Dincer & Gunalp (2008), Dobson & Ramlogan-Dobson (2012), Gupta, Davoodi, & Alonso-Terme (2002), Gyimah-Brempong (2002), Mo (2009).
[7] Shabbbir & Anwar (2008) using cross sectional data of 41 developing countries.
[8] Uslaner (2007, 2011) used a sample of 14 countries in Africa, using data from afrobarometer.

perspective of GWH, the proxy used for corruption is bribes paid by workes' households to bureaucrats' households in an effort to more easily obtain public services.

In general, the proponents of GWH state that corruption can improve the economy under conditions of poor governance [9]. However, in conditions of good governance, corruption has a negative impact on the economy. Therefore, this study on the corruption-income inequality trap in Asia is necessary because the majority of countries in the region have high levels of corruption and relatively poor governance. The data show that, in 2015, the average corruption index in Asia (45 countries) was 3.63 and the average of gini index was 32.65. This means that the majority of countries in Asia have high levels of corruption with moderate income inequality. Generally, Asian countries have poor governance with the average governance index being -0.39 in 2015 [10]. This study identifies the corruption-inequality trap in those Asian countries that have poor governance and high corruption in an effort to examine GWH from a different perspective.

2. The Relationship between Income Inequality and Corruption

Generally, corruption can be divided into three activities, namely bribery, extortion, and embezzlement (Bowles, 2000). In the case of corruption in the public sector, bribery is an amount of money or property being offered to potential recipients of bribes, usually public officials, so that the briber (in this case, members of the public) can get the public services they want. On the other hand, extortion is an amount of money or property demanded by public officials from members of the public, for personal and/or group gain, as a condition before providing public services. The third kind of corruption is embezzlement which, according to Shleifer dan Vishny (1993), is a form of theft where public officials charge equal to or even lower than what the price should be for public services but then they do not pay the money to the state treasury but instead use it for their personal and/or group gain.

Public sector corruption can be seen as the transfer of money from the general public to certain public officials through bribes and/or extortion fee. This can lead to higher income inequality especially in the middle to lower levels of society. When engaging in corruption, rich people have more options and resources to pay extortion fees or bribes, and to monitor the public officials than the poorer ones (You & Khagram, 2005)[11]. Public sector corruption

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[9] Please see more detail in Huntington (1968), Leff (1964), Leys (1965), Lui (1985), and Dreher dan Gassebner (2013)

[10] Governance index has intervals from -2.5 up to 2.5. A higher index indicates better governance. Intervals from -2.5 up to 0 are classified as poor governance.

[11] When certain public employees receive bribes, levies, and embezzle government budgets, it can be analogized as a transfer from the public to the certain public employees.

can be seen in Fried, Lagunes & Venkataramani (2010), find that police, in the case of traffic violations, tend to ask for bribes from lower-class individuals while letting the rich go. Their study concludes that corrupt behavior tends to benefit the rich because of the higher likelihood that the police will demand bribes from the poor.

Gyimah-Brempong (2002) finds that corruption has a negative effect on economic growth and income distribution in African countries. Furthermore, he explains that the combined effect of decreasing income growth and increasing inequality suggests that corruption is more detrimental to the poor than the rich in those African countries in his study. Income inequality has an adverse effect on the social norms related to corruption, and public confidence in the legitimacy of institutions and laws (You & Khagram, 2005). Furthermore, You & Khagram (2005) add that this situation makes it easier for people to tolerate corruption as an acceptable behavior; societies become more permissive. Therefore, You & Khagram (2005) state that income inequality could affect corruption, and corruption could also affect income inequality, so the country becomes trapped in a vicious circle between corruption and income inequality.

Uslaner (2007, 2011) explains that income inequality will lead to greater levels of corruption as a result of low levels of trust between groups. The growing inequality in incomes is due to the fact that people have a high level of trust in their own group and the less trust in those who are outside the group (Uslaner, 2007, 2011). A situation where people have greater trust in their group than outside their group can lead to corruption because it is an activity that is usually engaged in jointly (*joint corruption*) by a group. Furthermore, corruption leads to higher income inequality and lower trust in others outside the group. Therefore, Uslaner (2007, 2011) argues that the higher income inequality can cause the lower trust. And then the lower trust leads to the higher corruption, therefore, the higher corruption can contribute to the higher income inequality, and so on. Thus, there is the trap that is caused by the effects of income inequality and corruption which is called the corruption-inequality trap. Uslaner (2007, 2011) argues that the transmission of the relationship between corruption and income inequality is through trust.

In fact, the difference in research lies only in the direction of causality: whether income inequality affects corruption and/or whether corruption affects income inequality. The ambiguity in these findings is the background to this study's attempts to identify the forms and direction of causality between corruption and income inequality. The question of whether income inequality is one of the causes of corruption can also be identified through

the study of the determinants of corruption [12]. Of the many studies into the determinants of corruption, Serra (2006) used extreme bounds analysis methods and found that the robust variables causing corruption are income, democratic systems, religion, colonial history, and political instability. Shabbbir & Anwar (2008) added that the determinants of corruption in developing countries are economic freedom, globalization, the level of development, and education level [13]. In general, the existing research finds that there is a positive correlation between income inequality and corruption: The higher the level of corruption, the greater the income inequality [14].

The question of whether corruption is one of the causes of income inequality can also be examined through the study of the determinants of income inequality. Tanzi (1998) argues that systemic factors, such as social norms and attitudes, changes in foreign economic policies, and government activities are an important determinant of income inequality. Tanzi (1998) added that income inequality is created because of the contribution of social norms, and the distribution of assets to social capital and positional rents[15]. Thus, the government plays a role in the formation of human capital, and affects the condition of income inequality. This opinion concurs with that of Eicher, García-Peñalosa, and van Ypersele (2009) who stated that income inequality occurs due to institutional and educational factors.

SSewanyana, Okidi, Angemi, & Barungi (2004), explain that, in Uganda, income inequality can be affected by the age and gender of the head of the household, the number of family members, the level of education and public services. Lee, Kim, & Cin (2013) show that in Korea, income inequality can be affected by the education, per capita income, investment, unemployment rate, female unemployment rate, inflation, trade openness, and an aging population. Meanwhile, in the long run or the short term, income inequality can be affected by the national income and the level of economic openness (Bahmani-Oskooee, Hegerty, & Wilmeth, 2008)[16].

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[12] It were Aidt (2003), Guerrero & Orreggia (2008), Kolstad & Wiig (2008), Swami, Knack, Lee, & Azfar (2001), Serra (2006), Svensson (2005), Treisman (2000).

[13] Serra (2006) uses a global sensitivity analysis based on Extreme Bound Analysis (EBA) as did Levine & Renelt (1992). According to Serra (2006) the level of corruption is lower in rich countries, long-standing democratic countries, Protestant-majority countries, and countries that were former British colonies. Serra (2006) adds that corruption levels are higher in unstable political conditions.

[14] The studies are Apergis, Dincer, & Payne (2010), Barreto (2001), Batabyal & Chowdhury (2015), Dincer & Gunalp (2008), Gupta, Davoodi, & Alonso-Terme (2002), Gyimah-Brempong (2002), Uslaner (2007, 2011), You & Khagram (2005).

[15] With the development of a country, income inequality will be more affected by the distribution of human capital than the distribution of real assets.

[16] Bahmani-Oskooee, Hegerty, & Wilmeth (2008) with a sample of 16 countries namely Chile, Colombia, Ecuador, Egypt, India, Indonesia, Iran, Kenya, Malaysia, Mauritius, Panama, Phillippines, Syria, the United States, Venezuela, and Zimbabwe used time series data analysis.

The inequality in income is believed to be a problem caused by financial factors. Clarke, Xu, & Zou (2003) find that the development of the financial sector is able to reduce income inequality. Batabyal & Chowdhury (2015) have developed this by identifying the combined effects of financial sector development policies and the eradication of corruption on income inequality. The results of their research, in Commonwealth countries, indicate that the simultaneous use of policies for reducing corruption and developing the financial sector will have a greater impact on decreasing income inequality than the implementation of the two policies separately. This study will use control variables used in the previous research to identify the inequality and corruption trap. This study accommodates the cultural factors in identifying the corruption variable such as Uslaner (2007, 2011) does in showing that trust in a group can promote corruption. This study assumes that trust will appear one of them from people who have same culture. This study will discuss the existence of the corruption-income inequality trap in Asian countries who have relatively weak governance and high cooruption in an effort examining the GWH from another perspective.

3. Methodology

This research attempts to contribute to the literature on the theoretical modelling of the effect of corruption on income inequality, using development of the Ramsey Growth model. In identifying the effect of corruption on income inequality, this research attempts to model corruption as a bribe to obtain a public service as used in the model of Barro & Sala-i-Martin (2004) but developed by adding the bribe and law variables. The firm pays wages (w) for labor inputs, and pays the rental payment on the capital input (r). Then, the household use the income to cover their consumption (c).

The firm is not involved in bribery, therefore the modelling of the firm is as used by Barro & Sala-i-Martin (2004). The difference of the model is only in the modelling of household. The model assumes a closed economic system, in which there is no inter-economic lending. Thus, assets per capita are equal to capital per capita ($a = k$). In an economy where there is no bribery, the wage received by the worker household is as follows.

$$w = [f(\hat{k}) - \pi - \hat{k}f'(\hat{k})]e^{xt} \quad \text{...} \quad (1)$$

The wage of an effective worker is equal to the output of firm minus the profit minus the multiplication of capital by the *marginal product of capital per effective worker*.

And, the growth of per capita assets in an economy where there is no bribery is as follows.

$$\dot{k}_{nb} = (r - n)k_{nb} + (w)_{nb} - c_{nb} \quad \text{..} \quad (2)$$

In the case of this study, the household consist of two types, worker household and bureaucratic household. Then, it is assumed that bureaucratic household receive bribes (b) from other households (assumed to be worker households) in order to get the public services easier. Then, each household i.e. bureaucratic household and worker household, maximizes their utility. Households use income that is not consumed to accumulate more assets. Therefore, we can identify that the flow of assets in bureaucratic households, as bribery recipients, is greater than in workers' households. Then, there is a difference in the capital growth between bureaucrat and worker households, whereby the growth of bureaucratic households' capital is higher than that of the workers' households.

The flow of assets of worker household is:

$$\dot{a}_{n\varsigma} = (r - n_{n\varsigma})a_{n\varsigma} + (w - b)_{n\varsigma} - c_{n\varsigma} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (3)$$

The flow of a bureaucrat's household assets, as the recipient of bribes from the worker household is:

$$\dot{a}_{be} = (r - n_{be})a_{be} + (w + b - cc)_{be} - c_{be} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots \quad (4)$$

The equation shows that if worker household give the bribe to bureaucrat household to make it easier to get the public service, therefore, the growth of capital per worker in the economy becomes lower. The capital growth of the bureaucrat's household could be higher than if no bribes were paid if it assumes that $b > cc$ [17]. However, the growth of aggregate capital in the economy may not be optimal, due to the concealment cost (cc), which can be a burden on the economy[18].

The bureaucrat may make an effort to conceal the proceeds from the bribes, so the bribe, which should be able to increase the flow of capital, in fact becomes less than optimal. This is because the bribe money is taken out of the economy (even though this may be temporary) as a result of the bureaucrats concealing their proceeds from corruption. The capital flow of the bureaucrats becomes less than optimal along with the flow of aggregate capital. The existence of bribes causes the growth of capital to be below the optimal level, and this becomes lower when compared with conditions in which there are no bribes. The better the governance is, the higher the level of corruption detection, and the greater the concealment costs become, the lower the growth of capital will become. Then, bribes will be more detrimental to an economy that has a better governance than one that has worse governance because the higher concealment costs.

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[17] Please see the comparison between Equation (1) and Equation (3).
[18] Concealment cost is the cost used to conceal the bribery activity.

Changes in the capital growth of both types of households will lead to income inequality between them, in both the short and long run. When transfers (bribes) from workers' households to bureaucrats are directly used in their economic activities, then income inequality can occur in the short term. The use of bribery money directly in the economic activities of bureaucratic households is influenced by the degree of detection of corruption, or the corruption level of the legal system, which is reflected by the governance variable (g) in the empirical model. The governance variable (g) will influence the concealment cost (cc). The better the governance the higher the concealment cost. Thus, income inequality can occur because bribes are causing the asset flow and capital growth in the two types of households to be different. Inequality of income can occur due to bribery of bureaucrats by a worker. A bribe given by a worker household can lead to a reduction in the worker's capital. Therefore, the gap in both households' capital growth will be greater. Then, the income inequality between the workers' and bureaucrats' households will be higher. Thus, the model shows how the corruption—as a bribe by worker household—can lead to income inequality.

This study seeks to identify the existence of the corruption-income inequality trap in Asia. This is because, in general, the countries in Asia have high levels of corruption and weak governance systems[19]. The corruption-income inequality trap occurs when there is a mutual influence between corruption and income inequality. This will be identified through two regression models. The first model has income inequality as the dependent variable and corruption as the independent variable. The second model has corruption as the dependent variable and income inequality as the independent variable. This study will identify the influence of corruption on income inequality and the effect of income inequality on corruption, controlled by the variables affecting corruption and income inequality, according to the previous research.

Equations 3) and 4) explain that income inequality can be affected by population growth, the value of rent for capital, capital, wage levels, and the rate of bribery. In addition to accommodating the variables in the theoretical model, other independent variables have been adopted from the previous researches are as follows:

$GINI_{it} = \alpha_i + \gamma_{1i} COR_{it} + \gamma_{2i} Z_{it} + \varepsilon_{it}$ …………………………………………….….. (5)

The Z variable is a vector of the macroeconomic variables, consisting of the levels of openness to trade, investment, the unemployment rate, population structure, and globalization.

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[19] Basically, the Grease the Wheel Hypothesis states that corruption can have a positive impact on economic growth in countries with weak governance. As the average corruption index in Asia (45 countries) was 3.63 and the average of governance index being -0.39 in 2015.

The level of globalization is measured by certain trade variables, namely the sum of the exports and imports in the Gross Domestic Product (GDP). To identify the effect of income inequality on corruption, this study only uses variables that are considered robust in affecting corruption, in accordance with Serra (2006), Shabbbir and Anwar (2008). The research model is as follows:

$$COR_{it} = \alpha_i + \gamma_{1i} GINI_{it} + \gamma_{2i} X_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (6)$$

Variable X is a vector of the macroeconomic variables consisting of income, governance, education level, and globalization. The identification of the variables in models (5) and (6) is shown in Appendix 1. The meaning of the variables and the source of data also were shown in Appendix 1.

The causality analysis between corruption and income inequality is carried out with Ordinary Least Square (OLS) and Tobit Regression methods. This is because the dependent variable of the research model is the index scale. The use of a Tobit regression in this study is expected to be a contribution to the literature because previous research (You & Khagram, 2005) usually used a regression analysis with the OLS method in estimating the relationship of corruption and income inequality, in which corruption was a dependent variable or vice versa, and income inequality became the dependent variable. This research uses the OLS method as the comparison with the Tobit method, and 2SLS method analysis with instrumental variables.

To overcome any bias due to the potential problems of endogeneity that may arise because of the emergence of reciprocal effects between corruption and income inequality, instrument variables are used. The instrument variables for the corruption variable are ethnic fractionalization index and religious fractionalization index, as used in the research of Dincer & Gunalp (2008). Instrument variables are assumed to affect only the corruption variables and not to directly affect the inequality variables. Meanwhile, the mature cohort size variable is used as an instrumental variable for income inequality's affect on corruption, as used by You & Khagram (2005). The mature cohort size variable represents the ratio of the population aged 65 years and over to the population aged 15 to 64 years. The mature cohort size variable is assumed to affect only the income inequality variables and does not directly affect the corruption variables.

4. Results and Discussion

Income inequality in this paper is measured by the Gini index: the higher it is, the higher income inequality is. The range of the index is 0-100. The Corruption Perceptions

Index is the proxy for the corruption variable, whereby a higher index indicates a lower level of corruption. The range of the index is 0-10. The descriptive statistics of the variables are below.

Table 1. *Descriptive Statistics*

Variable	Mean	Standard deviation	Minimal	Maximum
Corruption	3.170	1.018	1.7	6.3
Inequality	35.413	6.753	24.09	46.26
Governance	-0.394	0.420	-1.203	0.448
Unemployment	6.768	5.041	0.7	28.4
Primary education	100.953	7.310	83.295	125.697
Secondary education	78.952	20.505	25.273	106.683
Tax revenue (%GDP)	14.833	3.686	6.858	21.398
Health expenditure (%GDP)	5.196	1.484	2.558	7.808
Share capital (%GDP)	24.170	9.120	12.521	67.984
Population growth	0.769	1.017	-0.994	2.158
FDI	3.608	3.653	0.057	23.526
Trade	78.490	35.332	30.174	185.807
Capital growth	2.523	15.082	-50.50	33.013
GDP per capita growth	3.201	5.635	-14.421	15.408
Expense (%GDP)	24.178	9.750	8.143	43.541
Democracy	5.755	2.703	0	10

Source: author's calculation (2017)

Table 1 shows that the mean of corruption perception index in some Asian countries is 3.170 with a standard deviation of 1.018. This means that the rate of corruption in Asia is relatively high. The mean of governance index in some Asian countries is -0.394 with a standard deviation of 0.420. This means that the quality of governance in some Asian countries is relatively poor.

The result of the regression analysis using the OLS method is shown in Table 2 and the analysis using the Tobit regression method is shown in Table 3. Because of the missing data on the independent and dependent variables, the sample of Asian countries is diminished. The research sample data that met the requirements for them to be analyzed numbered 56 samples[20].

Table 2. *The Influence of Corruption on Income Inequality in Asia Using the OLS Method*

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Corruption	-2.645***	-2.693***	-2.367**	-2.123**	-0.410	-0.639
	(0.890)	(0.895)	(0.903)	(0.961)	(0.886)	(0.852)
Unemployment	-0.278**	-0.273**	-0.276**	-0.266**	-0.112	-0.118
	(0.120)	(0.121)	(0.118)	(0.119)	(0.122)	(0.122)

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[20] Research samples that can be analyzed consist of 14 countries namely Armenia (2007-2009), Azerbaijan (2008), Bangladesh (2005, 2010), Bhutan (2007, 2012), China (2008, 2010), Iran (2005, 2009), Malaysia (2004, 2007, 2009), Mongolia (2010), Pakistan (2004, 2007, 2010, 2011, 2013), the Philippines (2003, 2006, 2009), Thailand (1996, 1998, 2002, 2004, 2006-2013), Turkey (2008-2013), Ukraine (2002-2014), and Vietnam (1998).

	(1)	(2)	(3)	(4)	(5)	(6)
Ln_GDP per capita	6.451***	6.349***	5.658***	5.633***	5.073***	5.219***
	(1.140)	(1.151)	(1.213)	(1.232)	(1.309)	(1.293)
Primary education	0.188**	0.180**	0.136**	0.144*	0.104	0.108
	(0.073)	(0.073)	(0.078)	(0.077)	(0.070)	(0.070)
Secondary education	0.004	0.003	0.031	0.023	0.046	0.040
	(0.055)	(0.055)	(0.057)	(0.056)	(0.047)	(0.047
Tax revenue	-0.730***	-0.734***	-0.840***	-0.850***	-0.576**	-0.566**
	(0.202)	(0.203)	(0.210)	(0.214)	(0.237)	(0.238)
Health expenditure	-1.254**	-1.186**	-1.177**	-1.047**	0.225	0.197
	(0.498)	(0.507)	(0.498)	(0.508)	(0.657)	(0.661)
Share capital	0.091	0.082	0.052	0.061	-0.021	-0.023
	(0.074)	(0.075)	(0.076)	(0.075)	(0.069)	(0.070)
Population growth	2.499***	2.498***	2.392***	2.488***	2.219***	2.200***
	(0.759)	(0.762)	(0.751)	(0.751)	(0.693)	(0.696)
FDI	-0.464***	-0.481***	-0.476***	-0.453***	-0.347**	-0.370***
	(0.149)	(0.151)	(0.149)	(0.150)	(0.130)	(0.131)
Democracy	-0.027	-0.045	-0.199	-0.169	0.210	0.212
	(0.196)	(0.198)	(0.217)	(0.212)	(0.203)	(0.206)
Governance	8.207***	8.671***	9.821***	9.734***	6.013***	6.274***
	(2.528)	(2.600)	(2.657)	(2.660)	(2.229)	(2.321)
Trade	0.004	0.002	-0.004	-0.002	-0.004	-0.006
	(0.022)	(0.022)	(0.022)	(0.022)	(0.021)	(0.021)
Capital growth		0.024	0.107*	0.085*		0.009
		(0.029)	(0.060)	(0.050)		(0.025)
GDP per capita growth			-0.250			
			(0.159)			
Corr*GDPCapGrowth				-0.064	-0.015	
				(0.043)	(0.021)	
Expense					-0.365***	-0.355***
					(0.094)	(0.093)
Constant	-8.010	-5.715	5.737	3.630	-0.095	-0.469
	(12.230)	(12.594)	(14.352)	(13.903)	(10.923)	(11.124)
F test	19.23***	17.76***	17.34***	17.22***	25.27***	25.00***
Adj R^2	0.8116	0.8101	0.8167	0.8156	0.8750	0.8738
N	56	56	56	56	53	53

Note: standard error in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$. All models have met the OLS assumption of passing the test of normality, non-heterocedasticity, and non-multicolinearity as shown in Appendix 2.
Source: author's calculation (2017)

Table 2 and Table 3 show that corruption has a significant effect on income inequality in some Asian countries. The lower the level of corruption in a country, the lower the level of income inequality in that country. The countries in the Asia region with samples that could be analyzed are: Armenia, Azerbaijan, Bangladesh, Bhutan, China, Iran, Malaysia, Mongolia, Pakistan, the Philippines, Thailand, Turkey, Ukraine, and Vietnam. Although models (5) and (6), using the OLS and Tobit methods, show that corruption has a negative effect, it is not significant. However, in general, we can conclude that a lower level of corruption can lead to a lower level of income inequality.

Table 3. *The Influence of Corruption on Income Inequality in Asia Using the Tobit Method*

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Corruption	-2.666***	-2.723***	-2.374***	-2.107**	-0.395	-0.625
	(0.782)	(0.777)	(0.773)	(0.822)	(0.749)	(0.720)
Unemployment	-0.282***	-0.277**	-0.281***	-0.270**	-0.116	-0.122
	(0.105)	(0.105)	(0.101)	(0.102)	(0.103)	(0.103)
Ln_GDP per capita	6.494***	6.381***	5.636***	5.607***	5.119***	5.231***
	(1.002)	(0.999)	(1.038)	(1.054)	(1.107)	(1.092)
Primary education	0.187***	0.177***	0.129*	0.137**	0.102*	0.105*
	(0.064)	(0.064)	(0.067)	(0.066)	(0.059)	(0.059)
Secondary education	0.004	0.003	0.003	0.024	0.047	0.041
	(0.048)	(0.048)	(0.049)	(0.048)	(0.040)	(0.040)
Tax revenue	-0.744***	-0.750***	-0.867***	-0.879***	-0.590***	-0.580***
	(0.178)	(0.176)	(0.181)	(0.185)	(0.201)	(0.202)
Health expenditure	-1.267***	-1.190***	-1.181***	-1.040**	0.233	0.222
	(0.438)	(0.440)	(0.426)	(0.435)	(0.556)	(0.558)
Share capital	0.092	0.082	0.049	0.059	-0.023	-0.026
	(0.065)	(0.065)	(0.065)	(0.064)	(0.059)	(0.059)
Population growth	2.501***	2.499***	2.385***	2.489***	2.201***	2.187***
	(0.667)	(0.661)	(0.643)	(0.642)	(0.586)	(0.588)
FDI	-0.455***	-0.472***	-0.466***	-0.440***	-0.334***	-0.358***
	(0.131)	(0.131)	(0.127	(0.129)	(0.110)	(0.111)
Democracy	-0.021	-0.042	-0.208	-0.176	0.221	0.217
	(0.172)	(0.171)	(0.186)	(0.181)	(0.172)	(0.174)
Governance	8.326***	8.868***	10.15***	10.06***	6.106***	6.463***
	(2.222)	(2.262)	(2.289)	(2.291)	(1.885)	(1.966)
Trade	0.003	0.000	-0.006	-0.004	-0.005	-0.008
	(0.019)	(0.019)	(0.019)	(0.019)	(0.018)	(0.018)
Capital growth		0.028	0.118**	0.095**		0.013
		(0.026)	(0.052)	(0.044)		(0.021)
GDP per capita growth			-0.271*			
			(0.137)			
Corr*GDPCapGrowth				-0.069*	-0.014	
				(0.037)		
Expense					-0.373***	-0.363***
					(0.080)	(0.079)
Constant	-7.838	-5.192	7.335	5.060	0.102	0.203
	(10.743)	(10.932)	(12.346)	(11.952)	(9.234)	(9.409)
LR Chi2	107.3***	108.4***	112.3***	111.9***	127.4***	127.2***
Pseudo R2	0.2910	0.2942	0.3045	0.3035	0.3646	0.3638
N	56	56	56	56	53	53

Note: standard error in parentheses
*** p<0.01, ** p<0.05, * p<0.1.
Source: author's calculation (2017)

The results of the analysis also indicate that the other variables that significantly influence the level of income inequality are the unemployment rate, income per capita, gross enrollment rate in primary education, tax revenue, health spending, population growth, Foreign Direct Investment (FDI), governance system, GDP per capita growth, and total government spending. The higher the unemployment rate, the lower the income inequality level. High per capita income, a larger number of people who receive a primary school education, can lead to higher income inequality.

High tax revenues, FDI, percentage of government spending on GDP, and high government spending on the health sector can lead to low levels of income inequality. Increasing population growth has a significant positive effect on income inequality; this means that with increasing population growth, the income inequality level will become higher. Meanwhile, the growth in the gross fixed capital formation has a significant positive effect on income inequality, meaning that higher growth in gross fixed capital formation will cause higher income inequality.

Interaction variables between corruption and GDP per capita growth are also significant in influencing income inequality. With lower corruption and higher GDP per capita growth, this can lead to lower levels of income inequality. Higher GDP per capita growth can also lead to lower income inequality. The variables used in this study which have no significant effect on income inequality are: gross enrolment rates for secondary education, gross fixed capital formation (% of GDP), democracy and trade variables. Thus, the analysis of the effect of corruption on income inequality using both the OLS and Tobit methods concludes that corruption has a significant negative impact on income inequality. This shows that the level of income inequality will be lower with lower corruption in some Asian countries.

The study shows that the better governance will increase income inequality. This is because, with good governance, everyone has the same opportunity to develop and invest in the economy. So, people with more capital have greater investment opportunities than those who have less capital. Individuals who have more capital will invest more and will get greater returns on investments than individuals who have less capital. So, when people have more capital, this can lead to greater capital growth. And the opposite is also true. Therefore, income inequality will become higher. Therefore, better governance will increase the income inequality according to this study.

Table 4. *The Influence of Income Inequality on Corruption in Asia Using the OLS Method*

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Inequality	-0.066***	-0.067***	-0.062**	-0.064**	-0.022	-0.023
	(0.024)	(0.025)	(0.024)	(0.025)	(0.031)	(0.031)
Unemployment	-0.017	-0.016	-0.015	-0.015	-0.022	-0.021
	(0.021)	(0.021)	(0.020)	(0.020)	(0.025)	(0.025)
Ln_GDP per capita	0.789***	0.779***	0.794***	0.786***	0.648**	0.621**
	(0.165)	(0.169)	(0.156)	(0.160)	(0.266)	(0.276)
Primary education	0.026**	0.025*	0.027**	0.026**	0.022**	0.021**
	(0.013)	(0.013)	(0.012)	(0.013)	(0.010)	(0.010)
Secondary education	-0.011	-0.011	-0.013	-0.012	-0.013	-0.013
	(0.014)	(0.014)	(0.014)	(0.014)	(0.013)	(0.013)
Tax revenue	0.003	0.001	0.012	0.008	0.002	0.003
	(0.039)	(0.040)	(0.040)	(0.039)	(0.047)	(0.048)
Health expenditure	-0.041	-0.034	-0.029	-0.029	-0.157	-0.143

	(1)	(2)	(3)	(4)	(5)	(6)
	(0.123)	(0.124)	(0.123)	(0.122)	(0.157)	(0.163)
Share capital	0.032**	0.031*	0.032*	0.031*	0.038***	0.036***
	(0.015)	(0.015)	(0.016)	(0.016)	(0.012)	(0.013)
Population growth	0.375**	0.375**	0.367**	0.371**	0.263	0.266***
	(0.180)	(0.180)	(0.179)	(0.179)	(0.183)	(0.180)
FDI	-0.092***	-0.094***	-0.091***	-0.093***	-0.073***	-0.076***
	(0.019)	(0.019)	(0.021)	(0.019)	(0.016)	(0.017)
Democracy	-0.018	-0.020	-0.008	-0.013	-0.032	-0.036
	(0.037)	(0.037)	(0.038)	(0.038)	(0.037)	(0.038)
Governance	1.321**	1.388**	1.245**	1.311**	1.039*	1.117*
	(0.530)	(0.532)	(0.478)	(0.499)	(0.607)	(0.621)
Trade	0.002	0.002	0.002	0.002	0.003	0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)	(0.004)
Capital growth		0.003	-0.003			
		(0.003)	(0.007)			
GDP per capita growth			0.019	0.012		0.003
			(0.020)	(0.009)		(0.003)
Expense					0.038*	0.037
					(0.022)	(0.022)
Constant	-2.634	-2.298	-3.110	-2.740	-2.961	-2.563
	(2.455)	(2.456)	(2.095)	(2.302)	(2.727)	(2.819)
F test	23.98***	24.92***	26.21***	28.05***	24.95***	24.41***
Adj R^2	0.8385	0.8405	0.8426	0.8422	0.8530	0.8550
N	56	56	56	56	53	53

Note: standard error in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$. Model (1), (2), (3), (4) have met the OLS assumption of passing the test of normality, non-heterocedasticity, and non-multicolinearity. Models (5), (6) have not met the non-multicolinearity assumption. See the detail in Appendix 3.
Source: author's calculation (2017)

The research model to test the effect of corruption on income inequality is also used to examine the effect of income inequality on corruption. The test to identify the effect of corruption on income inequality is done with a robust method, because some models do not fulfill non-heteroscedasticity assumptions. The results of test can be seen in Table 4 and Table 5. Models (5) and (6) in Table 4 have not met the non-multicolinearity assumptions but other models in the table met the OLS regression assumption. Therefore, the conclusion for Table 4 is based on Model (1) up to Model (4). Table 5 shows the test results using the Tobit regression method.

Table 5. *The Influence of Income Inequality on Corruption in Asia Using the Tobit Method*

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Inequality	-0.065***	-0.067***	-0.061***	-0.064***	-0.022	-0.023
	(0.019)	(0.019)	(0.020)	(0.019)	(0.027)	(0.026)
Unemployment	-0.016	-0.015	-0.014	-0.014	-0.020	-0.020
	(0.017)	(0.017)	(0.017)	(0.017)	(0.020)	(0.020)
Ln_GDP per capita	0.792***	0.783***	0.797***	0.789***	0.643***	0.617**
	(0.180)	(0.179)	(0.179)	(0.178)	(0.236)	(0.236)
Primary education	0.026**	0.025**	0.027**	0.026**	0.022*	0.021*
	(0.010)	(0.010)	(0.011)	(0.010)	(0.011)	(0.011)
Secondary education	-0.011	-0.011	-0.013*	-0.012	-0.013*	-0.013*
	(0.007)	(0.007)	(0.008)	(0.007)	(0.007)	(0.007)

	(1)	(2)	(3)	(4)	(5)	(6)
Tax revenue	0.005	0.003	0.015	0.010	0.005	0.006
	(0.032)	(0.032)	(0.034)	(0.032)	(0.042)	(0.042)
Health expenditure	-0.035	-0.029	-0.023	-0.024	-0.148	-0.134
	(0.074)	(0.074)	(0.074)	(0.074)	(0.105)	(0.105)
Share capital	0.031***	0.030***	0.031***	0.030***	0.037***	0.035***
	(0.009)	(0.010)	(0.010)	(0.009)	(0.010)	(0.010)
Population growth	0.376***	0.376***	0.368***	0.371***	0.267**	0.270**
	(0.106)	(0.105)	(0.105)	(0.105)	(0.122)	(0.122)
FDI	-0.092***	-0.094***	-0.091***	-0.092***	-0.073***	-0.075***
	(0.019)	(0.019)	(0.019)	(0.019)	(0.021)	(0.021)
Democracy	-0.021	-0.023	-0.011	-0.016	-0.035	-0.039
	(0.027)	(0.027)	(0.030)	(0.027)	(0.033)	(0.034)
Governance	1.339***	1.403***	1.256***	1.329***	1.054***	1.129***
	(0.348)	(0.354)	(0.391)	(0.344)	(0.373)	(0.381)
Trade	0.002	0.002	0.002	0.002	0.003	0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Capital growth		0.003	-0.003			0.003
		(0.004)	(0.009)			(0.004)
GDP per capita growth			0.019	0.012		
			(0.022)	(0.010)		
Expense					0.038**	0.037**
					(0.017)	(0.017)
Constant	-2.693	-2.369	-3.206	-2.796*	-2.988*	-2.603
	(1.661)	(1.699)	(1.945)	(1.644)	(1.716)	(1.766)
LR Chi2	101.5***	102.2***	102.9***	102.8***	101.5***	101.6***
Pseudo R2	0.6393	0.6433	0.6480	0.6470	0.6619	0.6664
N	56	56	56	56	53	53

Note: standard error in parentheses
*** p<0.01, ** p<0.05, * p<0.1.
Source: author's calculation (2017)

From Table 4 and Table 5 it can be seen that income inequality can have a significant effect on the level of corruption. The higher the level of income inequality can lead to higher levels of corruption. Another variable that significantly affects the level of corruption is per capita income, the gross enrollment rates for primary and secondary education, gross fixed capital formation (% of GDP), population growth, FDI, and governance. High per capita income, a higher number of people with a primary school education, can lead to lower levels of corruption. However, the number of people who get secondary level schooling can lead to higher levels of corruption in significance of 10%. In the model (1), (2), (4) Table 5, the variable of secondary education does not have significance in increasing the corruption variable. Therefore, it is concluded that the secondary education variable does not affect the corruption variable. A higher gross fixed capital formation (% of GDP), a higher population growth can lead to lower corruption. High FDI values can have a significant effect on causing high levels of corruption. Furthermore, improved governance systems can reduce the level of corruption in some Asian countries.

The analysis of the effect of income inequality on the level of corruption using the OLS and Tobit methods concludes that income inequality has a significant negative impact on the

level of corruption. It shows that a higher level of income inequality can lead to higher levels of corruption in some Asian countries. This study conclude that the trap of income inequality and corruption does exist, that is, corruption can affect income inequality and income inequality can affect corruption. The results of this study support You & Khagram (2005), Apergis, Dincer & Payne (2010), Uslaner (2007, 2011).

To conduct a more in-depth analysis, the study attempts to identify the relationship between corruption and income inequality using a Two-Stage Least Square (2SLS). It is because the results of this study indicate a mutual influence between corruption and income inequality, which may lead to a potential bias. Therefore, this study has attempted to use the instrument variable of the ethnic fractionalization index against the corruption variables as used by Dincer & Gunalp (2008) and You & Khagram (2005). However, this study also attempts to add a new instrument variable, which is the religion fractionalization index. According to Treisman (2000), the religion variable can influence the corruption level of a country. The result of the analysis using the 2SLS method to identify the effect of corruption on income inequality is as in Table 6.

The result of the analysis using 2SLS shows that the instrument variables consisting of ethnicity, language and the religion fractionalization index have qualified as good instruments[21]. Therefore, this study concludes that the corruption variable significantly affects income inequality in some Asian countries. The negative sign indicates that a lower level of corruption triggers a lower level of income inequality. Other robust variables significantly affecting income inequality are: per capita income, the gross enrollment rate for primary education, gross fixed capital formation (% of GDP), population growth, FDI, and governance.

Table 6. *The Influence of Corruption on Income Inequality in Asia Using the 2SLS Method*

Variable	(1)	(2)	(3)	(4)	(5)
Corruption (IV= ethnic, language and religion fractionalization index)	-14.961*** (5.256)	-9.976*** (2.688)	-10.058*** (2.719)	-10.233*** (3.020)	-10.368*** (2.921)
Unemployment	0.159 (0.129)	-0.262 (0.160)	-0.254 (0.157)	-0.253 (0.158)	-0.253 (0.159)
Ln_GDP per capita	4.478 (2.863)	9.690*** (2.138)	9.524*** (2.092)	9.746*** (2.169)	9.917*** (2.184)
Primary education	-0.156 (0.144)	0.306** (0.149)	0.292** (0.143)	0.305** (0.140)	0.315** (0.152)
Secondary education	-0.135 (0.126)	-0.094 (0.153)	-0.097 (0.151)	-0.105 (0.155)	-0.111 (0.161)

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[21] They pass the diagnostic test (Wald test, the endogeneity test, the First stage F test, and the Overidentifying test).

Tax revenue	-0.042	-0.274	-0.280	-0.246	-0.222
	(0.381)	(0.339)	(0.332)	(0.388)	(0.359)
Health expenditure	2.045*	-0.887	-0.774	-0.772	-0.779
	(1.103)	(0.943)	(0.959)	(0.967)	(0.972)
Share capital	0.569**	0.319*	0.304*	0.314**	0.324*
	(0.268)	(0.168)	(0.166)	(0.181)	(0.176)
Population growth	6.654***	4.366***	4.365***	4.415***	4.455***
	(1.575)	(1.254)	(1.238)	(1.330)	(1.270)
FDI	-1.129***	-1.012***	-1.039***	-1.047***	-1.052***
	(0.387)	(0.299)	(0.303)	(0.313)	(0.318)
Democracy	0.045	-0.171	-0.201	-0.162	-0.134
	(0.375)	(0.324)	(0.315)	(0.317)	(0.341)
Governance	27.091***	15.143***	15.914***	15.69***	15.509***
	(7.946)	(4.224)	(4.392)	(4.238)	(4.407)
Trade		0.019	0.016	0.017	0.019
		(0.030)	(0.029)	(0.029)	(0.030)
Capital growth			0.040	0.018	
			(0.028)	(0.070)	
GDP per capita growth				0.067	0.109
				(0.206)	(0.089)
Constant	56.092**	-26.707	-22.924	-26.195	-28.708
	(24.498)	(23.914)	(22.867)	(22.396)	(23.642)
Wald	42.69***	219.8***	272.0***	271.0***	263.2***
Endogeneity test, p-value	0.002	0.003	0.003	0.003	0.003
First stage F test, p-value	0.011	0.014	0.017	0.028	0.024
Overidentifying test, p-value	0.146	0.094	0.084	0.084	0.088
N	83	56	56	56	56

Note: robust standard error in parentheses
*** p<0.01, ** p<0.05, * p<0.1.
Source: author's calculation (2017)

Table 2, which uses the OLS method, shows that each increase of 1 unit in the corruption index will reduce the level of income inequality by between 2.12 and 2.69 points. Table 3, which uses the Tobit method, shows that each increase by 1 unit in the corruption index will reduce the level of income inequality by between 2.11 and 2.72 points. The conclusion of this study refers to Table 6 which uses the TSLS method because it is considered to have eliminated the endogeneity problems in the model. Table 6 shows that each increase by 1 unit in the corruption index will reduce the level of income inequality by between 9.98 and 14.96 points in the inequality index (in the range of 0-100).

Higher per capita income, A higher gross enrollment rate in primary education, a higher population growth, a higher gross fixed capital formation (% of GDP), tends to lead to higher levels of income inequality. Furthermore, a high value for a country's FDI tends to affect the level of income inequality, which becomes lower. However, a better level of governance can actually have a significant effect on the higher income inequality. Everyone has the same opportunity to develop and invest in the economy with good governance. Therefore, people who have more capital can lead to greater capital growth, and vice versa.

Further identification of the effects of income inequality on corruption using the 2SLS method has still not shown econometrically sound results. This is because the instrument variable (mature cohort size) used to measure income inequality is rejected by the endogeneity test. The results of the endogeneity test show that the income inequality variable is categorized as an exogenous variable in the model, so it is not necessary to use the instrument variables in identifying the effect of income inequality on corruption. Therefore, the conclusion of the influence of income inequality on corruption refers to the results of OLS and Tobit methods. It is maybe necessary to look for an alternative instrument variable for further research. Table 4 and Table 5 show that each increase by 1 unit in the gini index will reduce the corruption index by between 0.061 and 0.067 points (in the index range of 0-10 corruption). Decreasing the corruption index in this case shows the level of corruption is getting higher. Therefore, it can be concluded that an increase in income inequality can increase the level of corruption.

5. Conclusion

Several studies have shown that corruption is detrimental to economic growth (Bardhan, 1997; Dzhumashev, 2014; Mauro, 1995; Meon & Sekkat, 2005; Mo, 2001; Shleifer & Vishny, 1993). Meanwhile, corruption can also lead to higher levels of income inequality (Batabyal & Chowdhury, 2015; Dincer & Gunalp, 2008; Gyimah-Brempong, 2002; Gupta, Davoodi & Alonso-Terme, 2002; Mo, 2009). In fact, some researchers conclude that there is a mutual influence between corruption and income inequality (Uslaner, 2007, 2011; You & Khagram 2005).

The results of the analysis using the OLS, Tobit, and 2SLS regression methods show that the corruption variable has a robust and significant effect on income inequality in some Asian countries. The results conclude that a lower level of corruption triggers a lower level of income inequality. In other words, a higher level of corruption can lead to higher levels of income inequality. Other variables that affect income inequality in Asia are per capita income, the gross enrollment rate in primary education, gross fixed capital formation (% of GDP), population growth, FDI, and governance. High per capita income, a high gross enrollment rate in primary education, a higher gross fixed capital formation (% of GDP), a higher population growth, and, better governance of a country, can lead to a higher income inequality. Furthermore, a high FDI value for a country tends to lead to a lower income inequality.

It has also been identified that a high level of income inequality can lead to higher levels of corruption. High per capita income, the greater the number of people who receive a primary school education, a higher gross fixed capital formation (% of GDP), a higher population growth, can lead to lower levels of corruption. High FDI values can trigger high levels of corruption in some Asian countries. Furthermore, improved governance systems can reduce the levels of corruption in some Asian countries. This study has demonstrated the negative effect of corruption on income inequality using the development of the Ramsey model and has verified it with an empirical model. Furthermore, this study also demonstrates that there is a mutual influence between corruption and income inequality in some Asian countries, which is known as the corruption-inequality trap. Therefore, more efforts are needed to eradicate corruption. It is recommended that future research needs to use different and more comprehensive research objects.

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Appendix 1.

Variables Identification

Variable	The Meaning of Variables	Reference	Source of Data
Inequality	Income inequality is measured by the Gini index, the higher it is, the higher income inequality is.	Theoretical model You and Khagram (2005), Apergis, Dincer & Payne (2010)	World Bank
Corruption	Corruption is proxied with the Corruption Perceptions Index, in which a higher index indicates a lower level of corruption.	Theoretical model, You & Khagram (2005), Apergis, Dincer, & Payne (2010)	Transparency International
Unemployment	Unemployment Rate	Apergis, Dincer, & Payne (2010)	World Bank
Ln_GDP per capita	Real income per capita as a reflection of capital per capita	Theoretical model	World Bank
Primary education	Gross enrolment rate in primary education	Apergis, Dincer, & Payne (2010)	World Bank
Secondary education	Gross enrolment rate in secondary education	Apergis, Dincer, & Payne (2010)	World Bank
Tax revenue	Tax revenue (% of GDP)	Ramsey model development	World Bank
Health expenditure	Health expenditure, total (% of GDP)	Ramsey model development	World Bank
Expense	Expense (% of GDP). Expense is cash payments for operating activities of the government in providing goods and services.	Apergis, Dincer, & Payne (2010)	World Bank
Share capital	Gross fixed capital formation (% of GDP)	Lee, Kim, & Cin (2013)	World Bank
FDI	Foreign Direct Investment, net inflows (% of GDP)	Analogy of Cuervo-Cazurra (2006)	World Bank
Capital growth	Gross fixed capital formation (annual % growth)	Theoretical model	World Bank
GDP per capita growth	GDP per capita growth (annual %)	Theoretical model	World Bank
Trade	Merchandise trade (% of GDP)	You & Khagram (2005)	World Bank
Population growth	Population growth (annual %)	Theoretical model, Barreto (2001)	World Bank
Democracy	Instutionalized Democracy		The QoG Institute
Governance	Governance index (the average of six dimensions i.e. voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, control of corruption)	Theoretical model as proxy of the law variable in the model.	Worldwide Governance Index
Variable instrument of corruption: Ethnic, language and religion fractionalization index	The probability of a country's people speaking the same language, the probability of a country's people having the same religion	Dincer & Gunalp (2008)	The QoG Institute
Variable instrument of income inequality: Mature cohort size	The ratio of the population aged 65 years and over to the population ratio aged 15 to 64 years	You & Khagram (2005)	World Bank

Source: author identification (2017).

Note: It downloadable in the website of World Bank, The QoG Institute, and Transparency International.

Appendix 2.

Test of the Assumption of Ordinary Least Square (OLS) in the Estimation of the Effects of Corruption on Income Inequality in Asia

A. Test of Non-Multicolinearity

Independent Variable	*Variance Inflation Factor* (VIF) in the Model					
	(1)	(2)	(3)	(4)	(5)	(6)
Corruption	5,11	5,14	5,42	6,10	7,42	6,79
Unemployment	2,32	2,32	2,32	2,33	3,46	3,43
Ln_GDP per capita	4,46	4,51	5,19	5,32	7,98	7,71
Primary education	2,00	2,04	2,34	2,27	2,38	2,36
Secondary education	8,02	8,03	8,91	8,52	8,48	8,32
Tax revenue	3,62	3,62	4,03	4,17	6,96	6,97
Health expenditure	3,38	3,47	3,47	3,59	8,67	8,68
Share capital	3,19	3,27	3,49	3,39	3,64	3,70
Population growth	3,72	3,72	3,75	3,72	4,53	4,53
FDI	1,85	1,88	1,88	1,91	2,06	2,07
Democracy	2,15	2,17	2,72	2,57	2,74	2,80
Governance	6,97	7,32	7,92	7,89	8,00	8,59
Trade	3,79	3,85	3,95	3,89	4,91	4,95
Capital growth		1,23	5,32	3,69		1,24
GDP per capita growth			5,30			
*Corr*GDPCapGrowth*				4,21	1,38	
Expense					7,66	7,50
Mean VIF	**3,89**	**3,76**	**4,40**	**4,24**	**5,35**	**5,31**
Meet Non-Multicollinearity	Y	Y	Y	Y	Y	Y

B. Test of Non-Heterocedasticity and Normality

Test of Statistic	Model					
	(1)	(2)	(3)	(4)	(5)	(6)
Kolmogorov-Smirnov	0,071	0.067	0,078	0,065	0,113	0,121
P-Value	0,943	0,962	0,882	0,971	0,511	0,419
Meet Normality	Y	Y	Y	Y	Y	Y
Breusch-Pagan/ Cook-Weisberg	0.00	0,04	0,11	0,26	0,24	0,09
P-Value	0.959	0,848	0,737	0,609	0,623	0,768
Meet Non-Heterocedasticity	Y	Y	Y	Y	Y	Y

Appendix 3.

Test of the Assumption of Ordinary Least Square (OLS) in the Estimation of the Effects of Income Inequality on Corruption in Asia

A. Test of Non-Multicolinearity

Independent Variable	*Variance Inflation Factor* (VIF) in the Model					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Inequality	5,74	5,79	6,40	5,77	10,94	10,97
Unemployment	2,57	2,57	2,60	2,58	3,44	3,44
Ln_GDP per capita	5,81	5,84	5,89	5,81	9,62	9,79
Primary education	2,08	2,12	2,25	2,08	2,34	2,36
Secondary education	7,73	7,73	8,54	7,92	8,01	8,01
Tax revenue	4,75	4,78	5,63	4,82	8,03	8,04
Health expenditure	3,87	3,92	3,94	3,94	8,20	8,40
Share capital	2,74	2,84	2,95	2,76	2,86	3,00
Population growth	3,81	3,81	3,84	3,81	5,26	5,26
FDI	1,60	1,63	1,68	1,60	1,96	2,01
Democracy	2,13	2,15	2,78	2,18	2,75	2,82
Governance	6,90	7,27	8,96	6,90	8,31	8,82
Trade	3,76	3,83	3,92	3,77	4,84	4,92
Capital growth		1,23	5,73			1,23
GDP per capita growth			5,55	1,19		
Expense					9,50	9,53
Mean VIF	**4,11**	**3,96**	**4,71**	**3,94**	**6,15**	**5,91**
Meet Non-Multicollinearity	Y	Y	Y	Y	N	N

B. Test of Normality

Test of Statistic	Model					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Kolmogorov-Smirnov	0,106	0,110	0,105	0,104	0,086	0,093
P-Value	0,550	0,508	0,570	0,581	0,832	0,747
Meet Normality	Y	Y	Y	Y	Y	Y

C. Testing of Non-heteroscedasticity Assumptions is done by using the robust method in the regression analysis performed