



The Contribution of Fiscal Decentralization and Natural Resources on Economic Growth in Indonesia: Does Corruption Hamper?

A Munif Hannani*, Candra Fajri Ananda
Universitas Brawijaya, Indonesia

*Corresponding Author: amunifhannani@gmail.com

Abstract

Objective –This study aims to explain the effect of fiscal decentralization and natural resources on economic growth in Indonesia; and the moderating role of corruption in both fiscal decentralization-economic growth and natural resources-economic growth nexuses.

Methodology –This study uses quantitative approach by utilizing a moderated panel data regression analysis with cross-sectional observations of 34 provinces in Indonesia from 2011 to 2021.

Results –Fiscal decentralization has no significant effect on economic growth, while natural resources positively affect economic growth. Furthermore, we found no moderating effect of corruption in the fiscal decentralization-economic growth nexus, but the weakening effect of corruption is evident in the natural resources-economic growth nexus.

Research limitation/implications – To further encourage economic growth in the regional level, it is vital to impose budget composition requirements on regional governments in the framework of fiscal decentralization, particularly related to employee and capital expenditure; and to maintain the decentralization of natural resources management on the regional level, while continuing efforts on eradicating corruption.

Novelty/Originality–Few researchers consider the role of corruption as a moderator in the relationship between fiscal decentralization and natural resources on economic growth. This study fills this gap by incorporating a moderating role of corruption that may weaken the ability of fiscal decentralization and natural resources to promote economic growth with the evidence from Indonesia's provinces.

Keywords: Corruption, economic growth, fiscal decentralization, natural resources

1. Introduction

Fiscal decentralization and regional autonomy marked by the issuance of Law Number 22 of 1999 on Local Government have given authority to local governments to regulate their own government. This law provides freedom to local governments to regulate and manage their own regional households, determine their own policies, and carry out their own financing and financial accountability. Fiscal decentralization was developed with the idea that the local governments are in closer proximity to the people and thus more knowledgeable about what is best for their communities than the central government (Ezcurra & Pascual, 2008), encouraging economic growth in their regions by providing public services and infrastructure that suit with the local characteristics and potencies. (H. Davoodi & Zou, 1998).

On the other hand, Indonesia is blessed with abundant natural resources. Neudorfer (2018) stated that governments in natural resource-rich areas should have more money compared to those in resource-poor areas. This is because there are additional sources of income, mainly from taxes and ownership of natural resources.

The Contribution of Fiscal Decentralization and Natural Resources on Economic Growth in Indonesia: Does Corruption Hamper?

The abundance of natural resources coupled with the implementation of decentralization should be a big provision for local governments in Indonesia to be able to accelerate development and economic growth in their respective regions. Since the implementation of fiscal decentralization, the authority to issue forest use and mining permits, particularly coal and mineral mining, has been decentralized to the local government level. The granting of this authority will provide freedom for local governments to optimize the utilization of their natural resources according to their own benefits.

However, the combination of fiscal decentralization and abundant natural resources does not always guarantee massive development for local governments in Indonesia. Figure 1 shows an interesting phenomenon. Provinces that are rich in natural resources do not demonstrate a fantastic average economic growth. The province of Aceh, Riau, and Kalimantan Timur, which have been known for their abundant natural resources, were only able to create an average economic growth rate of 3.076 percent, 2.388 percent, and 2.294 percent, respectively for 5 years. On the other hand, the highest average economic growth rate came from Sulawesi Tengah and Maluku Utara with average economic growth rate of 12.232 percent and 11.846 percent, respectively. Although these two provinces are known for their nickel production, they are relatively poor in natural resources compared to Aceh, Riau, and Kalimantan Timur. This phenomenon is quite interesting considering that natural resources are a crucial capital for a region in administering development and stimulating economic growth (Ibrahim, 2017).

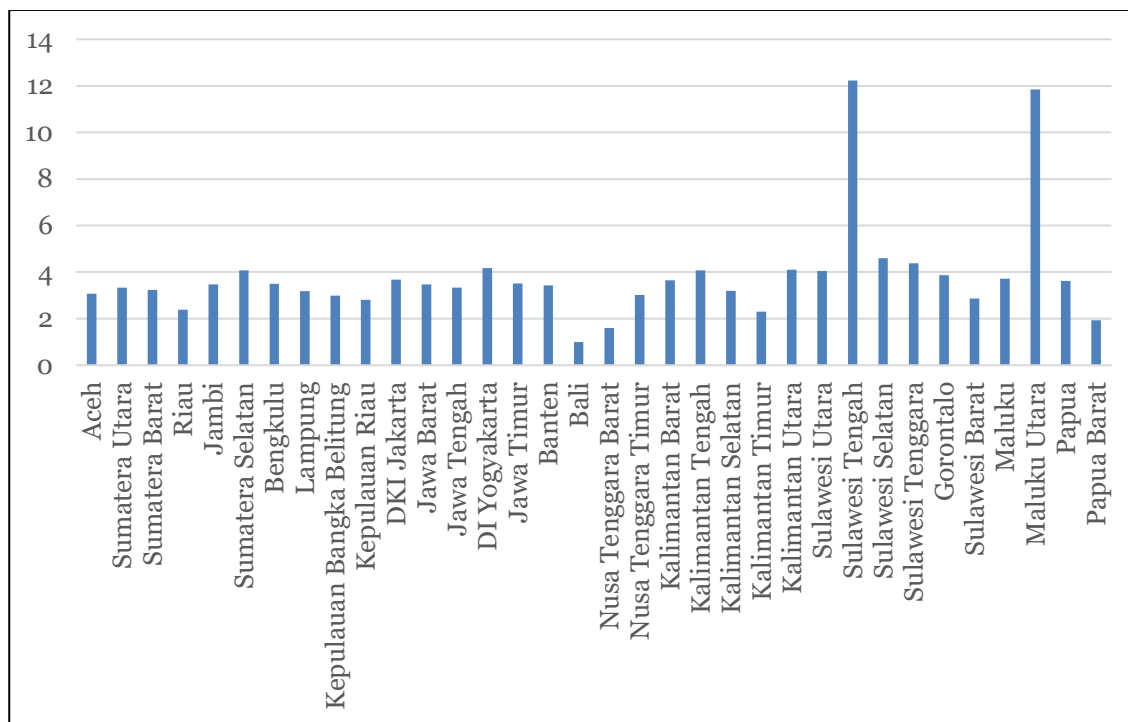


Figure 1: Average economic growth rate of Indonesian provinces in percent, 2018 to 2022

A decentralized system causes local governments to have direct access and opportunities under their authority to manage their regional potential, making it easier to manipulate directly. According to Shon and Cho (2020), a decentralized system allows certain groups to have a greater opportunity to interact directly with local politicians so that they are more likely to commit corrupt and unaccountable actions. Moreover, according to Alfada (2019), the implementation of the decentralized system cannot be separated from challenges such as the lack of ability, skill, and motivation of local government officials and the lack of monitoring or auditing institutions at the regional level.

Likewise, with the decentralization system, the abundance of natural resources in a province may increase the incentives for corrupt behavior. According to Suprayitno and Pradipto (2017), corruption can occur when public officials abuse their authority for personal gain. The more abundant natural resources, the greater the potential of bribery to local government officials to receive greater self-benefits. Government officials in natural resource-rich provinces may demand a larger bribe for a privileged access to natural resources because the payer's profit is greater. Furthermore, government officials can also be involved in embezzling public funds from revenue related to natural resource wealth.

As an effort to eradicate corruption, the government of Indonesia established an independent institution through Law Number 30 of 2002 on the Corruption Eradication Commission (KPK). According to the KPK Annual Report 2022, Indonesia's Corruption Perception Index (CPI) was ranked 96th out of 180 countries in 2021 with a score of 38 points on a scale of 0-100. This value was lower than the world average of 43 points, indicating that the culture of corruption is deeply rooted in Indonesia. Moreover, KPK also conducted Integrity Assessment Surveys (SPI) on the provincial level to draw a corruption risks map and the progress of corruption prevention efforts undertaken. The results of SPI in 2022 showed that natural resource-rich provinces including Aceh, Riau, and Kalimantan Timur, were far below the national average, with the SPI scores of 68.37, 68.36, and 67.23, respectively, while the national SPI average score was 72.4. On the other hand, although below national average, Sulawesi Tengah and Maluku Utara have higher SPI scores of 68.91 and 70.10, respectively. These values indicate that these provinces are prone to the risks of corruption and are struggling to undertake effective efforts in preventing and combating corruption.

There have been many previous researches that studied the relationship and correlation between fiscal decentralization, natural resources, corruption, and economic growth such as Brunnschweiler (2008), Prud'homme (1995), and Sala-i-Martin et al. (2004). However, few researchers consider the role of corruption as a moderator in the relationship between fiscal decentralization, natural resources, and economic growth. Several studies that are available in the literature examine direct effect of corruption on economic growth as an independent variable, finding insignificant result and concluding that the effect of corruption on economic growth may be indirect (Aidt, 2009; Mo, 2001; Ugur, 2014). Therefore, this study fills this gap by incorporating a moderating role of corruption that may weaken the ability of fiscal decentralization and natural resources to promote economic growth with the evidence from Indonesia's provinces.

This study intends to answer two main research questions. First, do fiscal decentralization and natural resources have an impact on economic growth? Second, does corruption hamper the ability of decentralization and natural resources to drive economic growth? This paper proceeds in five sections. The second section sets out the main conceptual issues for literature review, theoretical framework and hypothesis development. The third section describes variables, data specification, and the underlying methodology employed in this study. Results and analysis will be presented in the fourth section, whereas the fifth section will provide the conclusion of the research study.

2. Literature Review Literature Review, Theoretical Framework and Hypothesis Development

2.1 Fiscal Decentralization and Economic growth

Fiscal decentralization in Indonesia is regulated in Law Number 22 of 1999 on Regional Government. Based on Article 1, decentralization is "the transfer of government authority by the Government to an Autonomous Region within the framework of the Unitary State of the Republic of Indonesia". Then, article 8 states

The Contribution of Fiscal Decentralization and Natural Resources on Economic Growth in Indonesia: Does Corruption Hamper?

"Government authority delegated to the region in the context of decentralization must be accompanied by the delivery and transfer of financing, facilities, and infrastructure, as well as human resources in accordance by the delegated authority." Fiscal decentralization in Indonesia provides local governments the authority to govern their fiscal policy regarding their revenues and expenditures. Fiscal decentralization from the revenue side gives local governments the authority to manage their own revenues sourced from regional taxes or retributions, and fiscal transfers from central government. Fiscal decentralization from the expenditure side gives local governments the authority to spend their own expenditures. In general, the objective of fiscal decentralization is to boost local economic growth and lower the levels of inequality across the country. The freedom to manage their own revenues and expenditures, further strengthened by the allocation of fiscal transfers from the central government, is expected to boost the economic activity in each subnational region in Indonesia.

Oates (2007) asserts that the level of economic progress is an outcome of the suitability of preferences between the community and local government. In theory, fiscal decentralization is expected to boost the economy considering that local governments have close proximity to the community and have informational advantages so that they can provide public services that are needed in their regions. Oates (1993) further asserts that the link between fiscal decentralization and economic growth is based on two assumptions. First, decentralization will increase economic efficiency because local governments are positioned better than the central government in providing public services as a result of information gains. Second, the needs of the population and competition between local governments for public services will ensure that the needs of local communities and local governments are met. Moreover, Prud'homme (1995) also believes that fiscal decentralization can have a positive impact on regional economic development in the future. This is due to the assumption that public spending, especially the provision of infrastructure for the community, will be more effectively carried out by local governments because they know better what the desires and needs of local communities are.

The government's involvement in economic development is centered on how it helps to build up physical capital and human resources to strengthen the economy. This notion is built by the arguments that public spending on building up physical and human capital is regarded as a growth engine (Yakita & Ogawa, 2009). The participation of sub-national governments is crucial in a modern public sector since fiscal decentralization not only transfers functions to the lowest tier of governments, but also the funding necessary to carry out those functions. Local taxes, however, are inadequate to meet all local demands or to promote regional development. Therefore, fiscal decentralization helps to narrow the gap between local government expenditure need and their own revenue capacity by introducing equalization transfers from the central government. These equalization transfers boost the fiscal capacity of local governments and help to achieve a long-run economic growth through their public spending on physical and human capital.

Even though several theories as previously noted suggested that fiscal decentralization could boost economic growth, however, various empirical studies produced the opposite conclusion. Martinez-Vazquez and McNab (2001) concluded that in developing countries, there is no relation between fiscal decentralization and economic growth. On top of that, results in developed countries surprisingly show that fiscal decentralization negatively affects economic growth. Similar research by Davoodi and Zou (1998) found that the impact of fiscal decentralization on economic growth is negative in developing countries while for developed countries they cannot find any significant relationship. They further explained that this result suggests that the "local governments may not be responsive to local citizens' preferences and needs" (ibid). Successful implementation of fiscal decentralization requires local governments not only to maintain their level of independence in revenue and expenditure decision-

making, but also sufficient institutional capacity and accountability (Vaillancourt & Bird, 1998).

2.2 Effects of corruption in fiscal decentralization-economic growth nexus

A decentralized system is like having two sides of a knife. On the one hand, the local government is able to optimize the utilization of its regional potential, thus further driving the economic growth of the region. On the other hand, it attracts higher corruption behavior in local governments for several reasons. First, public officials can have a tendency to abuse their authority for personal gain (Suprayitno & Pradiptyo, 2017). Local public officials are more vulnerable to any kind of corruption act because they have more direct access and opportunities under their authority resulting from fiscal decentralization (Siburian, 2024). Second, the implementation of the decentralized system cannot be separated from challenges such as the lack of ability, skill, and motivation of local government officials, thus leading to an increase in corruption behavior (Alfada, 2019). Finally, fiscal decentralization weakens the ability of the central government to control and monitor the expenditure and spending of local governments (Bardhan & Mookherjee, 2006). One of the reasons for the rising opportunity of local government officials to commit corruption is the lack of optimal monitoring and auditing carried out at the regional level. The existence of a weakness in the monitoring system in government creates an opportunity to commit corrupt acts.

Corruption may impair economic growth through a pathway that increases the budget of public expenditure resulting from markup and lowers the standard of public infrastructure (Tanzi, 1997). This results in lower productive capability of public spending because of its poor quality, and in some cases, cannot be utilized by the community to achieve substantial economic outcomes. In addition, the existence of corruption may also decrease the tax revenues of governments (Ibrahim, 2021). As a result, it reduces the fiscal capacity of the regions and creates an opportunity cost to further drive the economy through potential public spending. Moreover, corruption may hinder economic growth by creating political instability (Mo, 2001). There are many cases where government expenditure programs were executed in politically affiliated locations with a minimum strategic value to obtain economic development.

Fiscal decentralization delegates the authority to local governments to regulate their own revenue and provides various transfer funds from the central government to execute their programs regarding their priority with the objective of encouraging economic growth in the region. As discussed above, fiscal decentralization can be seen as a force to drive economic growth, however, the presence of corruption may decrease its performance to achieve it. Thus, it can be argued that there is an interaction between fiscal decentralization and corruption because it attracts corrupt behavior and the existence of corruption hinders its ability to drive economic growth.

2.3 Natural resources and economic growth

Since the implementation of decentralization in Indonesia in 2001, the authority to issue mining and forest use permits has been gradually decentralized to the local government level. The management of coal and mineral mining has been delegated in 2011 through the signing of Law Number 4 of 2009 on Mineral and Coal Mining. Based on article 4 paragraph (2), "control of minerals and coal by the state is carried out by the government and/or regional governments". Moreover, the authority related to forest management and utilization were decentralized through Government Regulation Number 6 of 2007 on Forest Management, Preparation of Forest Management Plans, and Forest Utilization. Based on article 8 paragraph (1), forest management is carried out by a Forest Management Unit (KPH) determined by the provincial and/or city district governments under. The policy to delegate these authorities to the local governments is implemented based on the spirit of fiscal decentralization to promote economic development in the region and pursue the welfare of the community.

The speed and optimization of the development of a region will certainly be largely determined by the capacity and capability of economic resources. One of these economic resources, if not the most important, is the natural resources as capital to drive the economies to grow. Limitations in quality natural resources, human resources, artificial resources, and social resources can cause a very significant setback in the dynamics of regional economic development (Junaidi & Zulgani, 2011). Furthermore, Ibrahim (2017) stated that “natural resource is a key input in the production process that stimulates economic growth.”

Since the late 1960s, it has been widely acknowledged that the increase in economic welfare is influenced by the quantity of natural resources (Toman, 2003). Sala-i-Martin et al. (2004) identified natural resources as one of the ten most important factors driving long-term economic growth, notably mining assets. Economic activities such as industrialization require massive amounts of natural resources to produce goods. Abundant natural resources should be able to accelerate economic growth because in addition to meeting domestic needs, they can also be exported. González-Val and Pueyo (2019) stated that their availability is usually concentrated in certain areas of the world that do not necessarily coincide with the areas in which they are put as input in production activities, giving rise to important volumes of trade across borders.

However, natural resource abundance can also be a curse and has a tendency to deter economic growth. Sachs and Warner (1995) conclude that natural resources are a curse, showing that resource-rich countries were outperformed by resource-poor countries in terms of economic growth. Furthermore, Norrbint et al (2008). also found that the abundance of natural resources does not have a direct impact on economic growth. They argue that rent-seeking behavior in resource-abundant countries affects corruption and thus forfeits the ability of natural resources to drive economic development.

2.4 Effects of corruption in natural resources-economic growth nexus

Natural resource wealth should be able to make a positive contribution to the economy. However, economists argue that instead of increasing wealth, the abundance of natural resources is actually a curse that hinders economic development and growth (Tsani, 2015). Furthermore, he further states that the resource curse is related to the deviant behavior of economic actors along with worsening governance and institutions. Resource wealth causes deviant behavior that encourages rent-seeking, corruption, and patronage. Government officials may facilitate the permit licensing process and/or certain administrative processes to help third parties, in this case, private parties, with the aim of obtaining personal economic benefits.

In the rent-seeking theory developed by Gordon Tullock, rent is defined as “something that has economic value and is made to be rare (can be through monopolistic actions)” (Priyono, 2018). As a result, this rent is contested by many seekers. This effort to obtain economic value is called rent-seeking. Those who seek to rent will use their “effort, time, and resources in various ways to obtain the rent.” The competition is usually carried out by illegal means including “bribery, collusion, gratuities, prizes, lobbying, and nepotism networks.” (ibid). Furthermore, Krueger (1974) referred to it as competitive rent-seeking, which is “a variety of ways to influence the desired allocation, these various ways include sightseeing treats, bribes, hiring officials' relatives and hiring retired officials.”

Natural resource utilization permits can be seen as a ‘rent’ due to the fact that it is considered an act of monopolistic action by the government as “the authority to issue mining and forest use business permits is a discretionary power for the executives” (Ulum et al., 2019). According to Aidt (2016), government officials and politicians are “gatekeepers” who can regulate which entrepreneurs can gain access to these rents. Entrepreneurs are motivated to invest time, energy, and other resources in rent-seeking activities. “gatekeepers” who can regulate which entrepreneurs can gain access to these

rents. Entrepreneurs are motivated to invest time, energy, and other resources in rent-seeking activities.

In general, the literature that is currently available on corruption and economic growth nexus in the context of natural resource abundance, reveals that corruption can both help and hinder economic development. There are mainly two empirical hypotheses that examine the effect of corruption on economic growth, namely the 'grease the wheel' hypothesis and the 'sand the wheel' (Sharma & Mishra, 2022). Proponents of 'grease the wheel' hypothesize that the existence of corruption in an economy helps to promote economic growth. They believe that through facilitating profitable transactions between parties, corruption aids in pursuing rapid economic growth. Businesses and companies provide presents, host banquets, and engage in bribery to maintain profitable political links with government officials (Meschi, 2009), hoping to gain privileged access to natural resources at below-market prices (Park & Luo, 2001). The 'speed money' given to government officials by these companies helps to grease the bureaucratic process's rusted wheels (Aidt, 2009).

On the other hand, proponents of 'sand the wheel' hypothesize that the presence of corruption has a negative effect on economic growth because it makes it more difficult for undeveloped countries to transform into developed nations (Sharma & Mishra, 2022). Krueger (1974) explains that the existence of corruption stemming from rent-seeking activities incurs additional costs for the firms. This additional cost for the sake of competition to obtain privileged access, that are artificially created to be scarce, is a waste of resources (Priyono, 2018). Firms would have more meaningful resources to be spent elsewhere if corrupt behavior and rent-seeking activities did not exist in the economy. These corruption problems further discourage investment by breeding uncertainty (Mauro, 1995).

The balance of argument can be argued as more in favor of the 'sand the wheel' hypothesis rather than the 'grease the wheel'. In addition to discouraging economic development transformation by unproductive use of resources, Aidt (2016) argues that corruption deters economic growth from such channels that it increases the price of commodities. Based on the model proposed by Krueger, the value and cost of rent-seeking activities caused the total cost of production and allocation to increase. Entrepreneurs will definitely transfer these costs into the price of goods and services that must be paid by consumers. If the purchasing power of consumers cannot match the rising price, it will create a disruption in the economy.

In summary, it can be argued that there is an interaction between the abundance of natural resources and corruption in the economic growth nexus. The abundance of natural resources attracts corrupt behavior through rent-seeking activities; and corruption also possesses the ability to deter economic growth in the context of the utilization of natural resources.

2.5 Research framework and hypotheses

This study examines the effect of fiscal decentralization and natural resources on economic growth, while incorporating the moderating role of corruption in both nexuses as illustrated in Figure 2. Based on theories and previous studies that has been discussed in the preceding section, we develop following hypotheses:

- H1: Fiscal decentralization has a positive effect on economic growth
- H2: Natural resources have a positive effect on economic growth
- H3: Corruption reduces the positive effect of fiscal decentralization on economic growth.
- H4: Corruption reduces the positive effect of natural resources on economic growth.

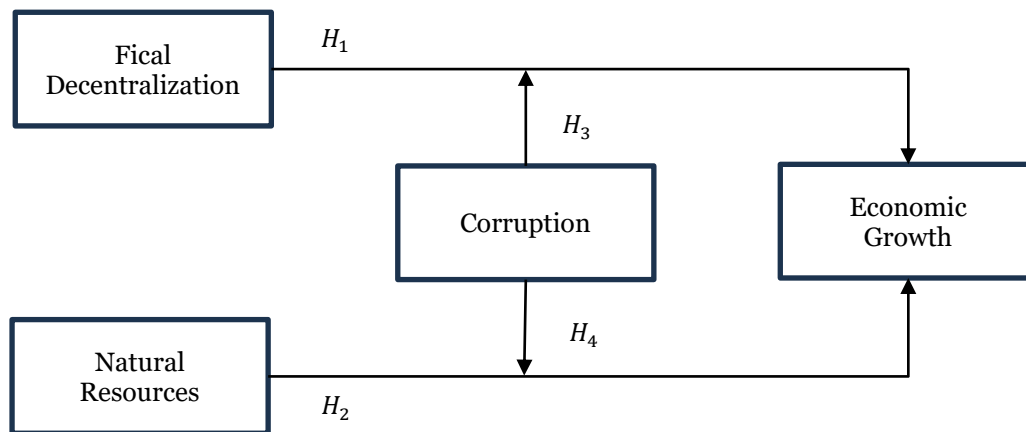


Figure 2:
Research
Framework

3. Research Method

This study uses a quantitative approach to test the hypothesis using statistical methods to determine the effect of fiscal decentralization and natural resources on economic growth, and the role of corruption in moderating these effects in both nexuses. The data used in this study is secondary data in the form of panel data from 34 provinces in Indonesia for a 11-year period from 2011 to 2021. The selection of the study period is because this is the time when the authority to issue mining and forest use permits was delegated to the local governments, which then was retracted by the central government since the issuance of Law Number 3 of 2020. This study has an unbalanced panel data due to the Kalimantan Utara province was newly created in 2012 and started to function as a government in 2014.

The analytical framework of the endogenous growth model put forth by Davoodi and Zou (1998), and Xie et al. (1999), which assumes that the output is determined by the production function with two inputs: public expenditure, and private capital, is the foundation for the majority of studies on the relationship between fiscal decentralization and economic growth. This study employs an augmented Davoodi and Zoo growth model and incorporates interaction terms of corruption as a moderating variable in the model. The equation model used is as follows:

$$EG_{it} = \alpha + \beta_1 FD_{it} + \beta_2 NR_{it} + \beta_3 COR_{it} + \beta_4 FD_{it} * COR_{it} + \beta_5 NR_{it} * COR_{it} + \beta_6 Z'_{it} + \mu_{it}$$

Description

<i>EG</i>	: Economic growth
α	: Constant
β_{1-6}	: Coefficients
<i>NR</i>	: Natural Resources
<i>COR</i>	: Corruption
<i>Z'</i>	: Vectors of control variables
μ	: Error terms
<i>i</i>	: Cross section (34 provinces in Indonesia)
<i>t</i>	: Time series (The year 2011-2021)
<i>Z'</i>	: Vectors of control variables

Economic growth is represented in the real growth of GDP using the growth rate of provincial RGDP at a constant price. This dataset is annually provided by the Indonesia Statistics (BPS).

Fiscal decentralization in this study uses revenue indicator based on Shon and Cho (2020) with adjustments in regards to fiscal decentralization in Indonesia. Fiscal decentralization is measured by the share of the provincial government's Own-Source Revenue (PAD) and equalization grants to the provincial government's total revenue. In the case of fiscal decentralization in Indonesia, the equalization grants are transferred by the central government in the form of General Allocation Funds (DAU),

Special Allocation Funds (DAK) and Revenue Sharing Funds (DBH). This indicator shows the financial authority level of the provincial government provided by the implementation of fiscal decentralization to determine the utilization of their revenue for funding their expenditures. Using a ratio as the proxy of fiscal decentralization is intended to control the possibility of reverse causality. Assuming that economic growth has a scale effect toward revenues, the ratio will not be affected unless there are changes in policy and regulation on fiscal transfer formula. The dataset for this measurement is obtained from the Ministry of Finance.

The natural resources variable is measured by the production value of forestry commodities, minerals, and coal mining at the provincial level. The production value of mining excludes oil and gas extraction because the authority to issue business permits related to these extractions is not delegated to the local government level. This dataset was obtained from the Indonesia Statistics (BPS).

Corruption in this study is based on the research of Fisman and Gatti (2002), Rini and Damiaty (2017), and Ulum (2019) where the level of corruption is not measured by the Corruption Perception Index (CPI) but uses actual data of corruption. The level of corruption in this study is represented in the number of corruption crimes cases (TPK) in the public sector that had been prosecuted at the provincial level obtained from the Corruption Eradication Commission (KPK).

The control variables used are human capital, physical capital, and population based on the economic growth model by Solow and Swan (1956) and subsequent study by Mankiw et. al (1992). Human Development Index (IPM) is used as the proxy for human capital; Gross Fixed Capital Formation (PMTB) is employed as a measure of physical capital; and ratio of working population aged 15 or older to the total population serves as a proxy for population. The dataset for these variables is obtained from Indonesia Statistics (BPS).

4. Results

4.1 Descriptive Statistics

The statistical summary for the variables is provided in Table 1. Economic growth has a maximum value of 21.76 percent in Nusa Tenggara Barat province in 2015, while the minimum value of economic growth is in Papua province in 2019 with a value of -15.74 percent. The economic contraction in Papua province in 2019 was mainly because of the decline in mining production in Freeport due to a shift in the mining system to underground mining. The highest value of fiscal decentralization is in Kalimantan Timur province in 2014, while the lowest value is in Aceh province in 2012. The natural resources variable is not normally distributed given that the value of the standard deviation is higher than the mean value. This indicates that the abundance of natural resources is unevenly distributed between provinces in Indonesia. The corruption variable has a mean value of 1.991, indicating that corruption occurred nearly two cases on average per year in each province. The most corruption cases occurred in Jawa Timur in 2018 with 37 cases. This province of Jawa Timur also has the largest average corruption cases in Indonesia, indicating that corruption is rampant in the province.

Table 1:
Statistical summary

Variables	Indicator	Unit	Min	Max	Mean	Std. Deviation
Dependent						
Economic growth	EG	%	-15.74	21.76	4.8575	3.4063
Independent						
Fiscal decentralization	FD	%	24.36	99.99	87.9990	16.4733
Natural resources	NR	IDR Trillion	0.26	196.59	16.6481	32.1594

Moderating						
Corruption	COR	cases	0	37	1.9919	4.5127
Control						
Human capital	HC	index	55.01	81.11	69.0891	4.4117
Physical capital	PC	IDR Trillion	4.21	747.26	88.6795	133.6044
Population	POP	%	56.91	85.53	71.9929	3.9677

4.2 Panel data model selection

The empirical model is estimated in two specifications. The effects of fiscal decentralization and natural resources on economic growth are examined in the first specification. In the second specification, the moderating effect of corruption in both nexuses is examined by incorporating interaction terms of corruption with both fiscal decentralization and natural resources.

To select the best panel data model between pooled ordinary least square, fixed effect, and random effect, this paper uses Chow test, Breusch–Pagan Lagrangian Multiplier (BP-LM) test, and Hausman test. First, the selection between a common effect and a fixed effect is evaluated using the Chow test, with the null hypothesis that no country-specific effects in intercepts. Second, the BP-LM test, with the null hypothesis that residuals across entities are not correlated, is conducted to choose between pooled OLS and random effect. Third, to compare random effect vs fixed effect, the authors use the Hausman test, with the null hypothesis that the difference in coefficients is not systematic.

The results of panel data model selection tests are presented in Table 2. The Chow test result shows that the probability value is less than 0.01, thus the fixed effect model is more appropriate than pooled OLS for both specifications. Furthermore, the result of the BP-LM test indicates that the random effect is more suitable compared to pooled OLS with the probability value is lower than 0.01. Finally, the Hausman test result, with a probability value that is significant at 1%, concludes that the fixed effect model is more appropriate than the random effect. Thus, given the implication of these results, this paper proceeds to estimate the panel data using the fixed effect model.

Model selection test	(1)		(2)	
	Test value	Probability	Test value	Probability
Chow test	5.1700	0.0000	5.2800	0.0000
Hausman test	70.1200	0.0000	73.0200	0.0000
BP-LM test	13.4400	0.0000	12.9400	0.0000

Table 2:
Selection model test

4.3 Hypothesis test

Table 3 shows the results of panel data regression analysis using the fixed effect model. Fiscal decentralization does not have a significant effect on economic growth in both specifications, thus rejecting the first hypothesis. Furthermore, natural resources positively influence economic growth with a positive and significant effect at 5% statistical significance in both specifications (1) and (2). Therefore, the second hypothesis is affirmed that natural resources have a positive effect on economic growth. The coefficient of natural resources in specification (1) is 0.3524. It means that if the production of forestry commodities, coal, and mineral mining activities are increased by Rp 1 trillion, the economic growth will be increased by 0.3524 percent. Moreover, we found that both the interaction terms of corruption with fiscal decentralization and natural resources have a negative effect on economic growth. However, the moderating role of corruption is statistically significant only in the natural resource-economic growth nexus. Therefore, we reject the third hypothesis and accept the fourth hypothesis. Consequently, we conclude that corruption weaken the effect of natural resource on economic growth. As displayed in equation (2), the effect of natural resource on economic growth without the presence of corruption is 0.3700 (i.e., β_2).

Table 3:
Select Panel data
regression

	Dependent Variable	
	EG	
	(1)	(2)
FD	-0.0011 (0.0220)	0.0025 (0.0252)
NR	0.3524** (0.1475)	0.3700** (0.1496)
COR		0.2700 (0.2041)
FD*COR		-0.0017 (0.0021)
NR*COR		-0.0028** (0.0013)
HC	-0.7532*** (0.1232)	-0.7634*** (0.1264)
PC	0.0046 (0.0064)	0.0035 (0.0064)
POP	-0.2314** (0.1126)	-0.2394** (0.1132)
Constant	67.3676*** (8.7896)	68.0613*** (9.0319)
Observations	371	371
R-squared	0.2578	0.2675
F test	18.89 ***	11.28 ***

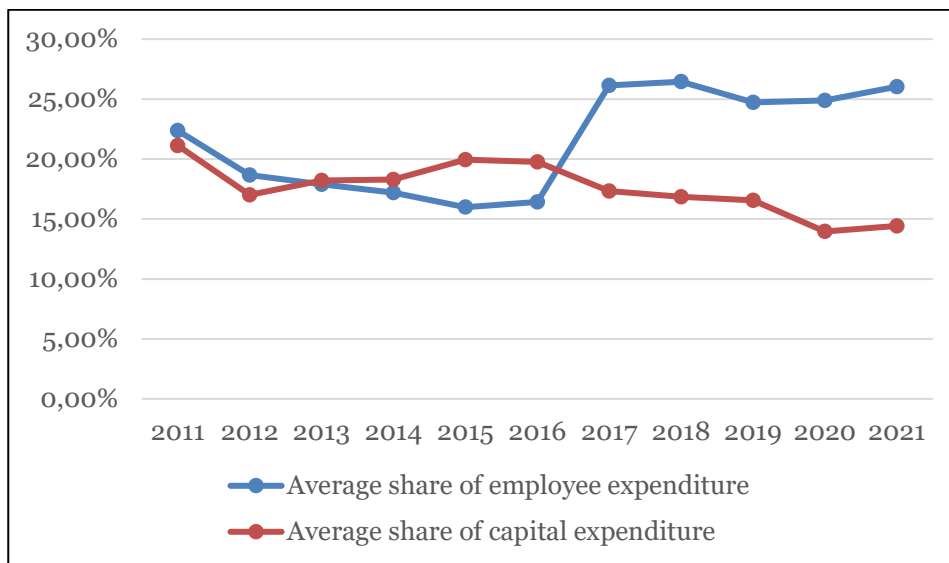
4.4 The effect of fiscal decentralization on economic growth

The regression results show that fiscal decentralization in Indonesia does not have a significant effect on economic growth in the provincial level. The Own-Source Revenue (PAD) of provinces combined with the fiscal transfers by the central government to balance the fiscal capacity of each province as part of fiscal decentralization are not able to increase economic growth in the regional level. This finding is in line with studies conducted by Prud'homme (1995), Martinez-Vazquez and McNab (2001), and Davoodi and Zou (1998), and Sofilda et al. (2023) that conclude fiscal decentralization does not have relationship with economic growth. Regional governments were unable to fulfill the preferences of local communities, either because there is no political will, or because officials are unqualified to carry out these decentralized responsibilities.

Fiscal decentralization in Indonesia has provided local governments the authority to govern their fiscal policy regarding their revenues and expenditures. Provincial governments have failed to manage this authority to drive economic activity by providing public services and infrastructures that are needed in their regions. Successful implementation of fiscal decentralization requires local governments to maintain sufficient institutional capacity (Vaillancourt & Bird, 1998). Local governments in Indonesia may not have adequate human resource capacity in managing the utilization of revenues to prioritize on financing their spending on economic development. This incapability in managing their budgets can be seen from the composition of their budget expenditures as displayed in Figure 3.

Figure 3 shows the average employee and capital expenditure as a share of total expenditures of provincial governments in Indonesia. Capital expenditure consists of public spending for the acquisition of fixed assets that provide benefits for more than one fiscal year including public infrastructures such as roads, schools, and machinery. According to Yakita & Ogawa (2009), public spending on building up physical and human capital is regarded as a growth engine. In the period of this study from 2011 to 2021, the share of capital expenditure of provincial governments in Indonesia were

mostly below 20 percent of their total spending and had constantly decreased over time in the period, reaching only 14.43 percent in 2021. The bulk of the spending were mainly consisted of government employee salaries and allowances, reaching more than a quarter of total expenditure in 2021.



The Contribution of Fiscal Decentralization and Natural Resources on Economic Growth in Indonesia: Does Corruption Hamper?

Figure 3: Trend of average provincial governments expenditures composition

The implementation of fiscal decentralization in Indonesia is not on the right track. The provincial governments are unable to manage the utilization of their revenues combined with the fiscal transfers by the central government as part of fiscal decentralization to prioritize on funding their public spending that accumulate physical and human capital to increase regional economic development. In line with our finding, Indonesian government has introduced a new legislation to enhance the implementation of fiscal decentralization through the Law Number 1 of 2022 on Financial Relations between Central Government and Regional Government. This law regulates the maximum limit for employee expenditure at 30 percent of the total spending, while the minimum limit for capital expenditure is at least 40 percent of the total spending. Establishing a certain standard requirement of local public expenditure is necessary in the context of fiscal decentralization (Siburian, 2022), to ensure regional governments to appropriately manage their budgets to stimulate economic growth in the regions.

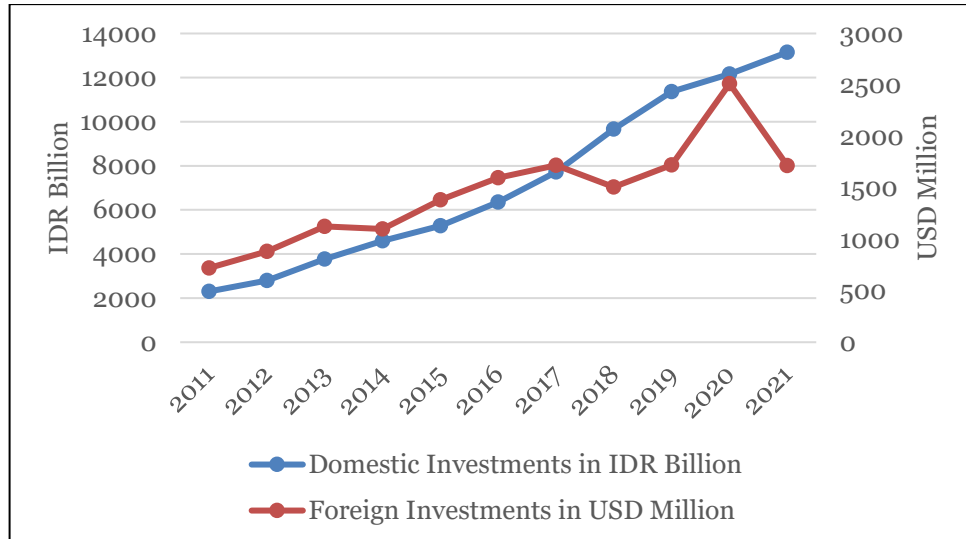
4.5 The effect of natural resources on economic growth

The second finding in this paper is that natural resources positively affect economic growth. Despite previous prominent studies such as Sachs and Werner (1995), and Norrbint et al (2008). concluded that natural resource is a curse, this study shows that the natural resources curse is not evident in Indonesia, especially the extraction of natural resources that are within the authority of regional governments including the forestry sector, mineral, and coal mining industries. This finding is supported by studies conducted by Sala-i-Martin et al. (2004), Brunnschweiler (2008), and Tahir et al. (2023) who found that natural resource is one of the key determinants of long-term economic growth.

Provincial governments have successfully executed their authority related to the management of natural resources and have taken advantage of the opportunity risen by this authority transfer to drive economic growth in their region. Since the enactment of regulations on regional autonomy, particularly the decentralization of authority to govern the utilization of natural resources, almost all regions in Indonesia have competed to exploit the natural resources in their regions. For that reason, many leaders of regional governments have carried out advertisements and promotions abroad and domestically in an effort to attract foreign and domestic businesses to invest

JAROE VOL. 7(2)

Figure 4:
Trend of average
domestic and
foreign investments
at provincial level.



However, since the passing of Law Number 3 of 2020 on Mineral and Coal Mining which has been applied since 10 June 2021, this authority to issue mining permits has been retracted by the central government. Based on Law Number 3 of 2020 concerning Mineral and Coal Mining in Article 1 paragraph (1), “control of mineral and coal by the state is carried out by the central government under the provisions of this Law.” There is a possibility that this authority will be delegated to the provincial government, awaiting further derivative regulations as stated in Article 35 paragraph (4), “the central government may delegate the authority to grant business licensing to the provincial regional government under the provisions of laws and regulations”. However, at the time this paper was written, derivative regulations from this law had not been issued. These changes in regulation may undermine the ability of natural resources to boost the economic growth of provinces in Indonesia.

4.6 The moderating role of corruption

A decentralized system coupled with abundant natural resources may attracts rent-seeking activities and corrupt behavior. The existence of this corruption may forfeit the ability of fiscal decentralization and natural resources to stimulate economic development. Based on the regression output, the interaction terms of corruption on both nexuses have a negative coefficient. However, the effect is only significant on natural resource-economic growth nexus. Therefore, we concluded that corruption does not moderate the effect of fiscal decentralization on economic growth; but it weakens the effect of natural resources on economic growth. This is the first time in the literature that found interaction of corruption and natural resource negatively affects economic growth, indicating that the positive effect of natural resources on economic growth diminishes as corruption level rises.

The weakening effect of corruption in natural resources-economic growth nexus can be explained in several ways. First, it imposes an additional cost for firms and businesses in natural resources sector to attain privileged access for natural resources or to fund litigation processes in the case of these activities were detected and prosecuted by law enforcement forces. This additional cost can be seen as a waste of

resources as it can be spent elsewhere to drive economic activity. Second, investigation and prosecution process of corruption cases may impede the implementation of existing agreements on natural resource rents, with a substantial risk of licenses and permits being revoked. Third, high level of public corruption in a region can be perceived by private sector as a non-friendly place for business activities, rising an uncertainty on business prospect. This uncertainty may deter potential domestic and foreign investors for devoting their resources in the region (Spyromitros & Panagiotidis, 2022).

In line with our finding, public corruption in the natural resources sector has received substantial attention in Indonesia. Given the detrimental effect of corruption in natural resource sector, Corruption Eradication Commission (KPK), a government institution established to prevent and prosecute corruption in the public sector, has committed to eradicate corruption with an intensified focus in the natural resources sector. Initiated in 2015, KPK has conducted a program called the National Movement to Save Natural Resources (GNP-SDA) in cooperation with 27 ministries and government institutions in the forestry, plantation, mining, marine, and fisheries sectors. The GNP-SDA movement comprises of a combined method of prevention and prosecution of corruption cases in the natural resources sector through investigating the loopholes in regulation and strengthening control in licensing procedures, thus minimizing the room for relevant actors to commit corruption acts in this sector.

Furthermore, the regression results that found no significant effect of corruption as a moderating variable in the fiscal decentralization-economic growth nexus may be due to the limitation of this study in using the number of real corruption cases as a proxy for the corruption variable. This proxy may not capture the actual corruption behaviors in the economy that have not been detected and prosecuted by law enforcement forces. Finding accurate data to assess actual corruption behavior is nearly impractical due to the intricate underground nature of this activity. Therefore, the actual effect of moderating the role of corruption in both fiscal decentralization-economic growth and natural resources-economic growth nexuses might be even larger.

5. Conclusion

This study aims to explain the effect of fiscal decentralization and natural resources on economic growth; and the moderating role of corruption in both fiscal decentralization-economic growth and natural resources-economic growth nexuses. Based on the results, we found that fiscal decentralization has no significant effect on economic growth, while natural resources positively affect economic growth. Provincial governments have failed to managed their authority related to the fiscal decentralization, but successfully executed their authority regarding the management of natural resources to drive economic growth in their region. Furthermore, we found no moderating effect of corruption in the fiscal decentralization-economic growth nexus, but the weakening effect of corruption is evident in the natural resources-economic growth nexus.

The practical implication of this research is to provide input for local governments and policymakers regarding the implementation of fiscal decentralization and natural resource management to encourage economic growth in the provinces in Indonesia. In accordance with the findings, it is vital to impose certain requirement on how local governments can spend their revenue in the framework of fiscal decentralization, particularly related to the composition of their budget on employee and capital expenditure. Furthermore, the decision to retract the authority related to the management of mineral and coal mining by the central government may undermine the ability of natural resources to drive the economic development of provinces in Indonesia. Therefore, it is necessary to maintain the decentralization of natural resources management on the provincial level. Moreover, given the detrimental effect of corruption, it is essential to maintain the continuous efforts in eradicating corruption particularly in natural resource sector.

The authors acknowledge that this research has several limitations. First, real corruption cases used as the proxy for the corruption variable may not capture the actual corruption behavior in Indonesia that has not been detected and prosecuted by law enforcement forces. Second, the time period of this study is limited from 2011 to 2021 due to the authority related to the management of natural resources had been delegated during this period. Future studies may extend the period covering the fiscal decentralization era since the beginning in 2001 to provide a better portrayal of the whole spectrum of fiscal decentralization-economic growth nexus, and the role of corruption within this nexus.

References

- Aidt, T. S. (2009). Corruption, institutions, and economic development [Article]. *Oxford Review of Economic Policy*, 25(2), 271–291. <https://doi.org/10.1093/oxrep/grp012>
- Aidt, T. S. (2016). Rent seeking and the economics of corruption [Article]. *Constitutional Political Economy*, 27(2), 142–157. <https://doi.org/10.1007/s10602-016-9215-9>
- Alfada, A. (2019). Does fiscal decentralization encourage corruption in local governments? Evidence from Indonesia [Article]. *Journal of Risk and Financial Management*, 12(3), 1–14. <https://doi.org/10.3390/jrfm12030118>
- Bardhan, P., & Mookherjee, D. (2006). Decentralisation and accountability in infrastructure delivery in developing countries [Article]. *The Economic Journal* (London), 116(508), 101–127. <https://doi.org/10.1111/j.1468-0297.2006.01049.x>
- Brunnschweiler, C. N. (2008). Cursing the blessings? Natural resource abundance, institutions, and economic growth [Article]. *World Development*, 36(3), 399–419. <https://doi.org/10.1016/j.worlddev.2007.03.004>
- Cheema, G. S., & Rondinelli, D. A. (1983). *Decentralization and development: Policy implementation in developing countries*. SAGE Publications.
- Davoodi, H., & Zou, H. (1998). Fiscal decentralization and economic growth: A cross-country study [Article]. *Journal of Urban Economics*, 43(2), 244–257. <https://doi.org/10.1006/juec.1997.2042>
- Ezcurra, R., & Pascual, P. (2008). Fiscal decentralization and regional disparities: Evidence from several European Union countries [Article]. *Environment and Planning*, 40(5), 1185–1201. <https://doi.org/10.1068/a39195>
- Fisman, R., & Gatti, R. (2002). Decentralization and corruption: Evidence across countries. *Journal of Public Economics*, 83(3), 325–345. [https://doi.org/10.1016/S0047-2727\(00\)00158-4](https://doi.org/10.1016/S0047-2727(00)00158-4)
- González-Val, R., & Pueyo, F. (2019). Natural resources, economic growth and geography [Article]. *Economic Modelling*, 83, 150–159. <https://doi.org/10.1016/j.econmod.2019.02.007>
- Ibrahim, C. (2021). Corruption, public debt and economic growth – evidence from developing countries [Article]. *International Journal of Development Issues*, 20(1), 24–37. <https://doi.org/10.1108/IJDI-12-2019-0208>
- Ibrahim, M. J. (2017). *Emerging issues in economics and development* [Book]. IntechOpen. <https://doi.org/10.5772/66236>
- Junaidi, J., & Zulgani, Z. (2011). Peranan sumberdaya ekonomi dalam pembangunan ekonomi daerah. *Jurnal Pembangunan Daerah*, 3, 27–33.
- Kim, A. (2008). Decentralization and the provision of public services: Framework and implementation. The World Bank. <https://doi.org/10.1596/1813-9450-4503>
- Krueger, A. O. (1974). The political economy of the rent-seeking society [Article]. *The American Economic Review*, 64(3), 291–303.

The Contribution of Fiscal Decentralization and Natural Resources on Economic Growth in Indonesia: Does Corruption Hamper?

- Mankiw, N. G., Romer, D., & Weil, D. N. (1992). A contribution to the empirics of economic growth [Article]. *The Quarterly Journal of Economics*, 107(2), 407–437. <https://doi.org/10.2307/2118477>
- Martinez-Vazquez, J., & McNab, R. M. (2001). Cross-country evidence on the relationship between fiscal decentralization, inflation, and growth. *Proceedings. Annual Conference on Taxation and Minutes of the Annual Meeting of the National Tax Association*, 94, 42–47. <http://www.jstor.org/stable/41954701>
- Mauro, P. (1995). Corruption and growth [Article]. *The Quarterly Journal of Economics*, 110(3), 681–712. <https://doi.org/10.2307/2946696>
- Meschi, P.-X. (2009). Government corruption and foreign stakes in international joint ventures in emerging economies [Article]. *Asia Pacific Journal of Management*, 26(2), 241–261. <https://doi.org/10.1007/s10490-007-9067-y>
- Mo, P. H. (2001). Corruption and economic growth [Article]. *Journal of Comparative Economics*, 29(1), 66–79. <https://doi.org/10.1006/jcec.2000.1703>
- Neudorfer, N. S. (2018). Commodities and corruption – How the middle class and democratic institutions lead to less corruption in resource-rich countries [Article]. *Resources Policy*, 58, 175–191. <https://doi.org/10.1016/j.resourpol.2018.05.003>
- Norrbin, S. C., Pipatchaipoom, O., & Bors, L. (2008). How robust is the natural resource curse? [Article]. *International Economic Journal*, 22(2), 187–200. <https://doi.org/10.1080/10168730802079722>
- Oates, W. E. (1993). Fiscal decentralization and economic development [Article]. *National Tax Journal*, 46(2), 237–243. <https://doi.org/10.1086/NTJ41789013>
- Oates, W. E. (2007). On the theory and practice of fiscal decentralization (Issues 2006–05). <https://EconPapers.repec.org/RePEc:ifr:wpaper:2006-05>
- Park, S. H., & Luo, Y. (2001). Guanxi and organizational dynamics: organizational networking in Chinese firms [Article]. *Strategic Management Journal*, 22(5), 455–477. <https://doi.org/10.1002/smj.167>
- Priyono, B. H. (2018). *Korupsi: Melacak arti, menyimak implikasi*. Gramedia Pustaka Utama.
- Prud'homme, R. (1995). The dangers of decentralization [Article]. *The World Bank Research Observer*, 10(2), 201–220. <https://doi.org/10.1093/wbro/10.2.201>
- Rini, R., & Damiati, L. (2017). Analisis hasil audit pemerintahan dan tingkat korupsi pemerintahan provinsi di indonesia. *Jurnal Dinamika Akuntansi Dan Bisnis*, 4(1), 73–90.
- Sachs, J. D., & Warner, A. (1995). *Natural resource abundance and economic growth*. National bureau of economic research Cambridge, Mass., USA.
- Sala-i-Martin, X., Doppelhofer, G., & Miller, R. I. (2004). Determinants of long-term growth: A Bayesian averaging of classical estimates (BACE) approach [Article]. *The American Economic Review*, 94(4), 813–835. <https://doi.org/10.1257/0002828042002570>
- Sharma, C., & Mishra, R. K. (2022). On the good and bad of natural resource, corruption, and economic growth nexus [Article]. *Environmental & Resource Economics*, 82(4), 889–922. <https://doi.org/10.1007/s10640-022-00694-x>
- Shon, J., & Cho, Y. K. (2020). Fiscal Decentralization and Government Corruption: Evidence from U.S. States [Article]. *Public Integrity*, 22(2), 187–204. <https://doi.org/10.1080/10999922.2019.1566427>
- Siburian, M. E. (2022). The link between fiscal decentralization and poverty – Evidence from Indonesia [Article]. *Journal of Asian Economics*, 45(2)(228–239), 101493. <https://doi.org/10.1016/j.asieco.2022.101493>
- Siburian, M. E. (2024). Fiscal decentralization and corruption: A case of indonesia [Article]. *Applied Economics Letters*, 45, 228–239. <https://doi.org/10.1080/13504851.2022.2128164>
- Sofilda, E., Zilal Hamzah, M., & Kusairi, S. (2023). Analysis of fiscal decentralisation, human development, and regional economic growth in indonesia [Article].

- Cogent Economics & Finance, 11(1).
<https://doi.org/10.1080/23322039.2023.2220520>
- Solow, R. M., & Swan, T. W. (1956). Economic growth and capital accumulation. *Economic Record*, 32(2), 334–361.
<https://doi.org/https://doi.org/10.1111/j.1475-4932.1956.tb00434.x>
- Spyromitros, E., & Panagiotidis, M. (2022). The impact of corruption on economic growth in developing countries and a comparative analysis of corruption measurement indicators [Article]. *Cogent Economics & Finance*, 10(1).
<https://doi.org/10.1080/23322039.2022.2129368>
- Suprayitno, B., & Pradiptyo, R. (2017). Fiscal decentralization and corruption: The facts in regional autonomy in Indonesia [Article]. *Journal of Advanced Research in Law and Economics*, 8(5(27)), 1467–1483.
[https://doi.org/10.14505/jarle.v8.5\(27\).09](https://doi.org/10.14505/jarle.v8.5(27).09)
- Tahir, M., Burki, U., & Hayat, A. (2023). Natural resources and economic growth: evidence from Brunei Darussalam [Article]. *International Journal of Emerging Markets*, 18(10), 4252–4269. <https://doi.org/10.1108/IJOEM-05-2021-0762>
- Tanzi, V. (1997). Corruption, public investment, and growth (H. R. Davoodi, Ed.) [Book]. International Monetary Fund.
- Toman, M. (2003). The roles of the environment and natural resources in economic growth analysis.
- Tsani, S. (2015). On the relationship between resource funds, governance and institutions: Evidence from quantile regression analysis [Article]. *Resources Policy*, 44, 94–111. <https://doi.org/10.1016/j.resourpol.2015.01.003>
- Ugur, M. (2014). Corruption's direct effects on per-capita income: A meta-analysis [Article]. *Journal of Economic Surveys*, 28(3), 472–490.
<https://doi.org/10.1111/joes.12035>
- Ulum, A. S., Rohman, A., Puji Harto, Ratmono, D., & Imam Ghazali. (2019). The role of natural resources on moderating the relationship between fiscal decentralization and corruption: Evidence from Indonesia [Article]. *International Journal of Energy Economics and Policy*, 9(1), 67.
<https://doi.org/10.32479/ijeep.7252>
- Vaillancourt, F., & Bird, R. M. (1998). Fiscal decentralization in developing countries (F. Vaillancourt & R. M. Bird, Eds.) [Book]. Cambridge University Press.
- Xie, D., Zou, H., & Davoodi, H. (1999). Fiscal Decentralization and Economic Growth in the United States [Article]. *Journal of Urban Economics*, 45(2), 228–239.
<https://doi.org/10.1006/juec.1998.2095>
- Yakita, S., & Ogawa, H. (2009). Equalization transfers, fiscal decentralization, and economic growth [Article]. *Finanzarchiv*, 65(1), 122–140.
<https://doi.org/10.1628/001522109X444198>