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The Impact of COVID-19 Pandemic on Local Fiscal Revenue: Empirical Evidence from the Regions with Dominant Tertiary Sectors

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Abstract

The COVID-19 crisis has devastatingly affected social and economic sectors, including service or tertiary sectors such as banking, insuran;ce, hospitality, telecommunications, and industrial services. The pandemic has also aggravated fiscal conditions along with the slowing economy. This paper aims to assess the impact of COVID-19 on local own-source revenue in regions with dominant tertiary sectors and to examine how a fiscal incentive policy can increase the local own-source revenue. We applied the difference-in-difference panel random effect method by estimating total revenue and local own-source revenue as the outcome variables. The treatment variable is the districts/cities with dominant tertiary sectors of more than 40%, while the control variable is otherwise. The time variables comprise 2018-2019 (before the COVID-19 crisis) and 2020 (at the time of the COVID-19 crisis). The results show that the COVID-19 pandemic causes a decline in total revenue by 2.18%. However, the local own-source revenue increases by 4.62%. In addition, the cross-sectional method was employed to observe the effect of fiscal incentives on local own-source revenue. The results indicate that fiscal incentives, albeit not statistically significant, increase local own-source revenue by 25.7%. It implies that the role of incentives is not yet optimal. The local revenue recovery is mostly due to the large tax base in the tertiary economic regions.

Keywords: COVID-19; difference-in-difference method; local own-source revenue

JEL classifications: E62; H24; H71; H72; J21

1. Introduction

The COVID-19 pandemic has had a major impact on the global economy and posed serious challenges to governments worldwide. It has affected lower exports because of the sluggish global economic performance and disruptions in the global supply chain. The pressures were compounded as the large-scale social restrictions reduced mobility. Consequently, global GDP in 2020 fell by 3.41% (year-on-year) compared to 2019. Indonesia also experienced a deep contraction of GDP by 5.32% in the second quarter of 2020 (OECD 2020; Bank Indonesia 2020).

The effects vary greatly on different sectors.

European Commission (2021) discovers that contact-intensive service sectors such as tourism have been hit hard, while services that facilitate contactless activities such as ICT support and service delivery have been largely unaffected. Contact-intensive services are relatively insensitive to economic cycles in general yet mostly affected by COVID-19. In second quarter of 2020, transportation and warehouse sectors contracted the most at 30.78% and hotel restaurants fell at 22.01%. However, other tertiary sectors, such as health services, experienced a positive growth acceleration at 3.67% while information and communication grew positively at 10.85% in the second quarter of 2020 (BPS-Statistics Indonesia 2020).

One of the negative effects is a significant economic retraction. The mobility restriction policies have

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closed numerous businesses, particularly small retail and other activities deemed non-essential in the tertiary sectors. This has prominently impacted the revenue obtained by the central and local governments. The authors conducted an in-depth analysis at the impact of COVID-19 on the local revenue of districts/cities with dominant tertiary sectors covering services for both businesses and consumers. We expected that the tertiary sectors, as a large contributor to the economy with their high-contact industries, will experience a more severe impact than other sectors. This study also explored the impact of COVID-19 on fiscal conditions at the local level. Even though the impact on the fiscal system of each local government varies based on its economic drivers, the analysis discussed an early estimation of how the effect of government spending, particularly in providing fiscal incentives, influence the revenue increase at the local level.

The tertiary sectors play a key role in increasing productivity, efficiency, and effectiveness in the economy, and contribute two-thirds of economic output, more than half of worldwide jobs, and a quarter of global direct exports (Antunes 2020). The sectors include high-contact industries such as retail and wholesale, transportation and distribution, entertainment, restaurant, office service, media, tourism, insurance, banking, medical, defense, and law (Hoekstra 2015).

In Indonesia, the tertiary sectors contribute significantly to Gross Regional Domestic Product (GRDP) and employment in economic activities. BPS-Statistics Indonesia (2019) report that the tertiary sectors contributed to approximately 44.25% of Gross Domestic Product (GDP) of Indonesia in 2019. The second largest contributors to the GDP of Indonesia in 2019 were the manufacturing and construction sectors (31.69%), followed by the agricultural and mining sectors (19.97%). In 2019, 29% of Indonesian employees were active in the agricultural sector, 22% in industry, and 49% in the service sector (BPS-Statistics Indonesia 2019).

The pandemic has also exacerbated fiscal conditions, including increased government spending and lower tax revenue that have led to an increase in the budget deficit and government debt. The government has been refocusing its budget on health spending, social safety nets, and economic recovery to mitigate the COVID-19 pandemic and its impacts that threaten to endanger the national economy and/or financial system. Central and local governments face fiscal shocks on both the revenue and expenditure sides that may deepen the recession and impede the recovery.

International Monetary Fund (IMF) (2020) predicts a decrease in tax revenue in most countries due to the COVID-19 pandemic. OECD (2020) also states that a contraction of GDP will be overwhelming even though the estimates of the impact of the COVID-19 pandemic remain ongoing. It is caused either directly by the economic slowdown or indirectly by taxation policies and the response to administrative measures taken.

Several previous studies have discovered a significant decrease in revenue from several types of taxes due to the COVID-19 pandemic (Clemens & Veuger 2020; Chernick, Copeland & Reschovsky 2020; Rephann 2020). Clemens & Veuger (2020) explain that the income tax base decreases by 11.9% and personal income declines by 5.6%. This percentage amounts to approximately USD106 billion of sales tax and income tax revenue by 2021. The state sales tax shows much greater variations than the income tax base as changes in aggregate consumption become changes in the state sales tax base.

In Indonesia, the revenue from all sources is expected to be less than 10% of GDP in 2020, compared to nearly 12% in 2017–2018. A low revenue-to-GDP ratio may limit government spending on social protection and economic development. According to the latest update of the state budget, as of March 31, 2020, tax revenue decreased by 2.47% year-on-year, resulting in a cumulative decrease of IDR241.6 trillion. In addition, tax revenue will continue to shrink as the government issues a tax stimulus to combat COVID-19. Tax-exempt income from SOE profits seems insubstantial as

commodity prices continue to fall (LPEM FEB UI 2020). Overall, the Ministry of Finance estimates the government revenue gap to be around 10% in 2020 (Tempo.co 2020).

Local governments of Indonesia also face budget deficits as their local own-source revenue decreases due to lower economic activities. Local governments are in a more difficult situation than the central government due to limited opportunities for additional sources of income (Halimatussadiah et al. 2020). As a result, the crisis puts great pressure on their respective local budgets. Local governments have not reacted immediately to fiscal adjustments during the crisis, as local budgets are relatively safe under normal circumstances and relying heavily on central government transfers. Local budget control measures vary across districts/cities due to differences in the number of COVID-19 cases, budget capacity, and ability to achieve budget efficiency and develop alternative revenue streams in the face of revenue shortfalls.

Blanchard, Philippon & Pisani-Ferry (2020) argue that every sector of the economic activities of the community that is affected by the pandemic should be immediately 'rescued' to a certain degree, such as assisting the stakeholders affected by the economic downturn using financial instruments. One hundred and twenty countries are implementing fiscal incentives to overcome the negative impact of COVID-19, including Indonesia with its various tax relaxation policies (DDTCNews 2020).

The government of Indonesia has issued the Instruction of the Minister of Home Affairs No. 1/2020 on the acceleration of the COVID-19 outbreak at the regional level. The policy aims to overcome the economic impacts by refocusing and reallocating local government budgets, such as reducing and exempting local taxes. DDTCNews (2020) reveals that 70 districts/cities have implemented fiscal incentives, such as the elimination of fines and administrative sanctions, tax exemptions, and tax extension payments in several types of taxes, mostly in the hotel, restaurant, entertainment, parking, and property sectors (DDTCNews 2020).

Our contribution to the literature is twofold. First, we provide an overview of the correlation between COVID-19 and local revenue, demonstrated through the local tax revenue mobilization in Indonesia. Second, this study contributes to the emerging literature on policy impact assessments of local fiscal incentives during COVID-19 using sub-national data. In the context of developing countries, the findings of this study enrich the literature on determining appropriate policies for economic recovery. By applying the difference-in-difference random effect method, we discover that the COVID-19 leads to a decrease in total revenue in tertiary regions by -2.18% yet an increase in local own-source revenue in dominant tertiary regions by 4.62%. Furthermore, there is no evidence that the fiscal incentive policies have a positive effect on the local own-source revenue, albeit having a positive sign. It suggests that the tax base is more important than incentives for recovering the local own-source revenue in dominant tertiary regions.

The remainder of the paper is structured as follows. In the next section, we discuss the literature on the significance of local tax incentives to business actors in accelerating regional economic recovery. Section 3 describes our methodology. Section 4 presents our results and analysis, while the final section offers conclusions and recommendations.

2. Literature Review

Estimating local revenue during the pandemic is a difficult undertaking. We contend that more credible findings can be attained provided that revenue projections are deteriorated by particular revenue sources, connected to the best forecasts of economic circumstances, and historically estimated measures of how sensitive individual revenues are to economic changes. The need for social distancing to combat the COVID-19 spread has specifically impacted tax base, tax administration, and taxpayer compliance.

A growing number of studies at various levels of gov-

ernment have examined revenue projections during the COVID-19 pandemic. In addition to predicting the dire situation of revenue shortfalls for state-wide or specific states (Dadayan 2020; The Center for State Policy Analysis 2020; The Council of State Governments 2020; Zhao 2020; Clemens & Veuger 2020), studies on the need to examine different revenue sources separately to make reliable revenue projections are scant (IMF 2020; Dadayan 2020).

Various organizations also conduct surveys and forecasts at the local level, including districts and cities. According to the National Association of Counties (NACo) (2020), the COVID-19 pandemic resulted in a loss of more than $144 billion in local budgets in the 2021 fiscal year, with an additional $54 billion due to risky state lockdowns. The impact may affect property tax revenue. McDonald & Larson (2020) discover that the majority of local governments in North Carolina expect budget shortfalls, with more than 20% expecting deficits of 10% or more.

Chernick, Copeland & Reschovsky (2020) offer a comprehensive analysis and forecast of municipal revenue in 150 cities in the United States. The results reveal that the major revenue sources of cities such as property, sales and income taxes, fees and charges, and intergovernmental aid faced a shortfall relative to 5.5% in a less severe scenario and 9% in a more severe scenario in the 2021 fiscal year.

In Indonesia, the budgetary consequences of the COVID-19 crisis include decreased revenue, increased expenditure, and a larger government deficit. Sparrow, Dartanto & Hartwig (2020) show a dismal outlook for the Indonesian economy, with domestic revenue is anticipated to decline from roughly IDR1.955 trillion in 2019 to IDR1.699 trillion in 2020, and expenditure is anticipated to rise by 11% from approximately IDR2.309 trillion in 2019 to IDR2.739 trillion in 2020. Tax revenue is expected to fall to 9% of GDP, mainly due to lower personal and corporate taxes. Falling oil and gas prices as well as lower prices for other commodities reduce duty-free income by almost a third compared to the 2019 budget.

On the other hand, COVID-19 has a different impact at the local level. Qibthiyyah (2021) shows an average negative (nominal) income growth, which is 10.48% for provincial governments and 11.66% for local governments (district and city level). Provinces and districts/cities obtain lower revenues due to a decrease in central government transfers and regional revenue, particularly tax revenue.

The decline in national revenue has prompted the government to adopt an expansionary fiscal policy to overcome the impact of COVID-19 by providing a fiscal stimulus focusing on tax incentives, non-fiscal incentives, spending incentives, social assistance, and food availability security (Bank Indonesia 2020). The government issues tax relaxation policies as an effort to support an economic recovery. Tax revenue is one of the options that the post-crisis government needs to address to narrow the budget deficit and minimize the increase in public debt (Makin & Layton 2021). However, the effectiveness of providing fiscal incentives in times of crisis shows various impacts in several studies.

Fiscal incentives can be defined as measurable benefits given to specific companies or categories of companies by the government to encourage them to behave in certain manners. These fiscal incentives consist of tax exemptions and lower taxes for foreign investors, financial incentives such as grants, preferential loans to multinational companies, and government insurance at preferential rates, as well as other measures such as market preferences, stabilization clauses that guarantee the existing regulations, infrastructure, and subsidized services (Brewer & Young 1997; OECD 2003; United Nations Conference on Trade and Development [UNCTAD] 2004).

In the context of Indonesia, Budiman, Indaryani & Mulyani (2020) reveal that income tax incentives positively affect the sustainability of Troso SME in Jepara. Afonso & Furceri (2010) discover that government spending has an equal impact on economic growth with or without a financial crisis.

These results apply to all research samples using control variations, sub-samples, and specifications. As a result, larger spending programs that do not seem to be well-targeted indicate the ineffectiveness of the programs.

Meanwhile, in the global context, the experience of the Japanese government in providing a fiscal stimulus in the 2008 global financial crisis also yielded positive results. Applying a mixed vector autoregression/event study approach, Miyazaki (2016) research reveals that subsidy and tax relief programs designed to promote the use of environmentally friendly cars help stimulate car production. It is in line with the finding of Spilimbergo et al. (2008), indicating that the fiscal stimulus imposed in the 2008–2009 global financial crisis by developed countries, with targeted tax cuts and transfers, tends to have the highest multiplier effect.

However, studies on the impact of the COVID-19 crisis on the local government finance (revenue and expenditure) at district and city level are rather scarce. Drawing from the impact of local revenue changes as discussed in the aforementioned studies, particularly on total revenue and local own-source revenue, we aimed to conduct a further study on this matter as a component of our forecasts in the COVID-19 era. Local own-source revenue is the income obtained by regions and collected based on regional regulations. In other words, local own-source revenue aims to grant local governments the authority to fund the implementation of regional autonomy according to the regional potential as a manifestation of decentralization. Furthermore, we evaluated the significance of the implementation of fiscal incentives in increasing the local own-source revenue at the local level.

3. Method

This study utilized a quantitative approach to evaluate the impact of the COVID-19 crisis on regional income in the dominant tertiary sectors through the difference-in-difference method. Difference-in-difference (DiD) is a statistical analysis technique used in econometric and quantitative research in the social sciences that attempts to imitate experimental research designs using observational research data by studying the differential effects of the 'treatment group'. This method aims to reduce the effects of extraneous factors and selection bias.

The DiD method calculates the difference in changes in the value of the dependent variable between the treatment group and control group at a certain time. It is evident in the impact of a treatment on a dependent variable evaluated. The DiD method is described in Equation (1) as follows:

$$\mathrm{DiD} = (\mathrm{YT2} - \mathrm{YT1}) - (\mathrm{YC2} - \mathrm{YC1}) \qquad (1)$$

where $(\mathrm{YT2} - \mathrm{YT1})$ is the change in the value of the dependent variable for the treatment group during the observation period and $(\mathrm{YC2} - \mathrm{YC1})$ is the change in the value of the dependent variable for the control group during the observation period (Gertler et al. 2011).

The DiD method was employed to examine whether there is a decline in total revenue and local own-source revenue during the COVID-19 crisis and whether the impact varies between tertiary and non-tertiary regions. Dominant tertiary regions are classified based on GRDP as per the data provided by BPS.

The tertiary sectors include (1) wholesale and retail trade, car, and motorcycle repairs; (2) transportation and warehousing; (3) provision of accommodation and food and drink; (4) information and communication; (5) financial and insurance services; (6) real estate; (7) company services; (8) mandatory government administration, defense, and social security; (9) education services; (10) health services and social activities; and (11) other services. Meanwhile, the non-tertiary sectors include (1) agriculture, forestry, and fisheries; (2) mining and quarrying; (3) processing industry; (4) electricity and gas procurement; (5) water supply, waste management, and recycling; and (6) construction.

The treatment variable is a dummy variable of the districts and cities with dominant tertiary sectors of more than 40% while the control variable is a dummy variable of the districts and cities with dominant tertiary sectors of less than 40%. Furthermore, the time variable is the period of 2018–2019 (pre-COVID-19 as a baseline year) and 2020 (post-COVID-19). This study employed a control variable to control the variation in the impact of COVID-19 on income in each region and the identification of the treatment effect. This study used several control variables ($\mathrm{COV}_{\mathrm{it}}$), namely foreign investment, domestic investment, population, social assistance expenditure, and goods and services expenditure. The econometric model of the DiD method in this study refers to the basic model of Lance et al. (2014):

$$
\begin{aligned}
\mathrm{Revenue}_{\mathrm{it}} \quad = \quad & \alpha_0 + \alpha_1.\mathrm{period}_{\mathrm{t}} + \alpha_2.\mathrm{group}_{\mathrm{i}} \\
& + \alpha_3.(\mathrm{period}_{\mathrm{t}}.\mathrm{group}_{\mathrm{i}}) + \sum_{\mathrm{k}=0}^{\mathrm{n}} \alpha \mathrm{COV}_{\mathrm{it}} \\
& + \varepsilon_{\mathrm{it}} \qquad\qquad\qquad (2)
\end{aligned}
$$

where $\mathrm{Revenue}_{\mathrm{it}}$ is an outcome variable of total revenue and local own-source revenue at group i in

period t; α_0 is the intercept; α_1 is the coefficient of the time dummy variable; $\mathrm{period}_{\mathrm{t}}$ is a time dummy variable (1 = after the COVID-19 crisis in 2020, 0 = before the COVID-19 crisis in 2018 and 2019); $\mathrm{group}_{\mathrm{i}}$ is a dummy variable group (1= treatment group, i.e. regions with dominant tertiary sectors > 40%, and 0 = control group, i.e., regions with no dominant tertiary sectors); α_2 is the coefficient of the dummy group variable; α_3 is the DiD coefficient indicating the impact of the COVID-19 crisis on the dependent variable; $\mathrm{period}_{\mathrm{t}}.\mathrm{group}_{\mathrm{i}}$ is the interaction between the time dummy variable and the group dummy variable. $\mathrm{COV}_{\mathrm{it}}$ is a control variable to control the variation of changes in local revenue in each district/city. The control variables are foreign investment, domestic investment, population, social assistance expenditure, and goods and services expenditure, and $\varepsilon_{\mathrm{it}}$ it is the standard error.

Next, this study also examined the relationship between fiscal incentive policies and local own-source revenue. The observation period deployed is 2020 considering that the implementation of fiscal incentive policies began in 2020. The mathematical illustration to answer the second research question is displayed in Equation (3) as follows:

$$
\mathrm{Local\ own-source\ revenue} = \beta_0 + \beta_1.\mathrm{policy} + \beta_2.\mathrm{group} + \beta_3.(\mathrm{policy}.\mathrm{group}) + \sum_{\mathrm{k}=0}^{\mathrm{n}} \beta \mathrm{COV} + \varepsilon_{\mathrm{it}} \qquad (3)
$$

The dependent variable is local own-source revenue. Local own-source revenue is a measure of regional financial independence illustrated by the ratio of local own-source revenue to the local budget (Hammond & Tosun 2009). β_0 is the intercept; β_1 is the coefficient of the policy dummy variable; policy is a dummy variable of incentive policies (0= regions that do not provide incentives; 1= regions that provide incentives); group is a dummy variable group (1= treatment group, which is regions with dominant tertiary sectors > 40%, and 0 = control group, which is regions with no dominant tertiary sectors); β_2 is the coefficient of the regional dummy variable; β_3 is the DiD coefficient which denotes the impact of providing fiscal incentives; policy.group is the interaction between the policy dummy variable

and the regional dummy variable; COV is the control variable for GRDP per capita, foreign investment, domestic investment, social assistance expenditure, and goods and services expenditure; and $\varepsilon_{\mathrm{it}}$ is the standard error.

4. Results and Analysis

4.1. The Impact of COVID-19 on Total Local Revenue

Our study employed the 2018-2020 data comprising 508 districts/cities and a balanced panel data of 1.524 observations. Among the 1.524 observations, 913 regions have dominant tertiary sectors of more

Table 1. Definition of Operational Variables

Variable	Definition	Source
Total local revenue	Log of the realization of total local revenue at the district/city level.	Ministry of Finance
Local own-source revenue	Log of the realization of local own-source revenue.	Ministry of Finance
Pandemic	Dummy variable 1 is 2020, while 0 is 2018 and 2019.	
Tertiary	Dummy variable 1 if regions have dominant tertiary sectors of more than 40%, and 0 if regions have no dominant tertiary sectors.	Statistics Indonesia
Foreign investment	Log realization of foreign investment at the district/city level.	Investment Coordinating Board
Domestic Investment	Log realization of domestic investment at the district/city level.	Investment Coordinating Board
Population	Log of population.	Statistics Indonesia
Social spending	Log of realization of social spending at the district/city level.	Ministry of Finance
Goods and services expenditure	Log of goods and services expenditure at the district level.	Ministry of Finance
GDRP per capita	Log GRDP per capita according to constant prices, i.e., total GRDP at constant prices divided by total population.	Statistics Indonesia
Fiscal incentives	Dummy variable 1 if regions implement fiscal incentive policies, and 0 if regions do not implement the policies.	DDTCNews

than 40% and 611 regions have no dominant tertiary sectors. Table 2 summarizes the statistics of all variables in the tertiary and non-tertiary regions.

Table 2 represents the mean and standard deviation according to the conditions before and after COVID-19 in each treatment and control group. Tertiary regions have an average total revenue of IDR1,677 billion in 2019 which declined by 10.9% to IDR1,493 billion after COVID-19. Meanwhile, total revenue decreases by 13.7% in non-tertiary regions from IDR1,631 to IDR1,407 billion in 2020.

Figure 1 reveals the average total revenue before and after the intervention. The intervention is the effect of COVID-19 on districts/cities in tertiary and non-tertiary regions in 2018–2020. Non-tertiary regions are designated as counterfactual. Tertiary and non-tertiary regions follow the same parallel trend related to total revenue before and after COVID-19. Before COVID-19, both groups experience a steady increase in the average regional income.

The revenue of tertiary districts increases from 27.92 to 28.00 in 2019. Non-tertiary districts in 2019 also experience an increase in the average total revenue from 27.90 to 27.98 in 2019. During the COVID-19 crisis in 2020, the two groups experience a decrease in the average total revenue by 27.86 in tertiary regions and by 27.84 in non-tertiary regions. In the DiD approach, the average total revenue of

both regions before COVID-19 follows the same trend, which continues after COVID-19. Thus, the categorization of tertiary and non-tertiary regions does not affect total revenue.
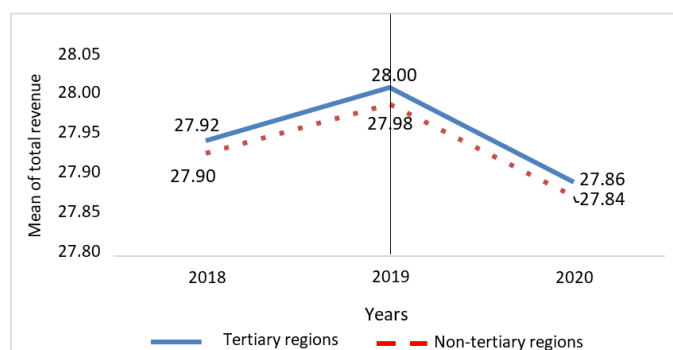

Figure 1. Total Revenue

Table 3 presents data on the average regional income before and after COVID-19 for each region. After COVID-19, total revenue decreases by -0.1016 in tertiary regions and by -0.1018 in non-tertiary regions. By subtracting the difference before and after, the estimated difference in DiD is 00002.

Table 4 indicates the effect of the tertiary variable, the time variable, and other control variables such as foreign investment, domestic investment, population, social assistance, and goods and services expenditure on the dependent variable of total revenue. The chosen model is model (5), which de-

Table 2. Descriptive Analysis

Variable	Tertiary regions pre-pandemic (2019)		Non-tertiary regions pre-pandemic (2019)		Tertiary regions post-post-pandemic (2020)		Non-tertiary regions post-pandemic (2020)	
	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev	Mean	Std. Dev
Total revenue (billion)	1.677	1.092	1.631	1.011	1.493	1.013	1.407	804
Local own-source revenue (billion)	285	565	185	279	248	446	169	221
Dummy COVID-19 (1=2020, 0=2018–2019)	0	0	0	0	1	0	1	0
Dummy tertiary (1=districts/cities have dominant tertiary sectors > 40%, 0=otherwise)	1	0	0	0	1	0	0	0
FDI	54271.991	193543.92	64741.959	190431.45	48985.574	165601.84	72493.762	211951.06
Domestic investment	700828.27	1787396.6	821782.95	1553456	847816.06	2104842.8	766103.2	1784815.3
Population	527743.62	630783.58	471666.16	622586.12	551901.46	698863.23	458996.61	499662.79
Social assistance expenditure (million)	14.540	26.650	9.788	15.170	15.460	38.840	12.620	40.110
Good and service expenditure (million)	457.000	402.600	416.900	275.700	374.500	368.300	338.500	231.100
GDRP capita	90.626	1023.999	47.022	65.657	178.603	1953.359	40.339	61.04
Dummy of fiscal incentives (1=implement incentive, 0=otherwise)	0	0	0	0	.162	.369	.095	.294

Table 3. Estimation of DiD in Total Revenue

	Pre-COVID-19	Post-COVID-19	The difference before/after
Tertiary regions	27.963	27.861	-0.1016
Non-tertiary regions	27.941	27.840	-0.1018
Difference of regions	0.0214	0.0216	0.0002

creases by 2.18% and is significant at the 1% level. The estimation results predicting a decrease in total local own-source revenue during the COVID-19 crisis are smaller than the results of other studies (Clemens & Veuger 2020; Chernick, Copeland & Reschovsky 2020), which is around 5.5%–11.9%.

These results signify that this study only measures revenue at the national level. In addition, observed from the estimation results, several variables have a positive and significant effect at the 1% level, such as population, social assistance, and goods and services expenditure. The positive correlation between population and total revenue aligns with the finding of Potia & Dahiya (2020), suggesting a shift in consumer preferences in the transformation of the Indonesian economy to local products across various categories. For example, 53% of respondents report a greater preference for local fruits. Meanwhile, more than 40% express an increased preference for local products including health care, personal care, paper goods, and packaged foods.

Social assistance obtains a coefficient of 0.00966 and is significant at the 1% level. This positive finding indicates that social assistance spending can ease financial conditions and increase the purchasing power of vulnerable people. A similar finding is evident from the goods and services expenditure that positively influence total revenue. Goods and services expenditure during the COVID-19 crisis, such as medical equipment and procurement of vaccines, increases total revenue effectively.

4.2. The Impact of COVID-19 on Local Own-Source Revenue

Observed from the dependent variable of local own-source revenue, tertiary and non-tertiary regions follow the same parallel trend before and after COVID-19 (see Figure 2). Before COVID-19, both regions experience an increase in local own-source revenue

Table 4. The Impact of COVID-19 on Total Revenue

|	Dependent variable: log of total revenue				
	(1)	(2)	(3)	(4)	(5)
Pandemic	-0.0910***	-0.0872***	-0.0954***	-0.00374	0.00255
	(0.0114)	(0.00859)	(0.00856)	(0.00354)	(0.00495)
dummy tertiary	0.0270***	-0.0172***	-0.0172***	-0.0308***	-0.0326***
(1: dominant tertiary region > 40%)	(0.00940)	(0.00583)	(0.00533)	(0.00453)	(0.00481)
pandemic*tertiary	-0.0201	-0.0155	-0.00498	-0.0246***	-0.0218***
	(0.0163)	(0.0103)	(0.00902)	(0.00615)	(0.00691)
log of population		0.423***	0.436***	0.235***	0.244***
		(0.00250)	(0.00265)	(0.00254)	(0.00377)
log of foreign investment			0.0132***	0.000825	0.000856
			(0.000711)	(0.000624)	(0.000674)
log of domestic investment			0.0129***	0.00119*	0.00122*
			(0.000586)	(0.000638)	(0.000717)
log of social spending				0.0116***	0.00966***
				(0.00127)	(0.00132)
log of goods and services expenditure				0.488***	0.478***
				(0.00477)	(0.00629)
2018.year					0
					(.)
2019.year					0.0174***
					(0.00446)
2020.year					0
					(.)
_cons	27.92***	22.62***	22.20***	11.77*** (0.0907)	11.96***
	(0.00671)	(0.0330)		(0.0305)	(0.121)
N	1523	1523	1086	957	957
chi2	163.5	29088.5	51453.3	406734.3	154313.2

Notes: Standard errors in parentheses
            * p<0.1, ** p<0.05, *** p<0.01

for tertiary regions from 25.44 to 25.58 in 2019. In the same year, non-tertiary regions also experience an increase in average local own-source revenue from 25.37 to 25.40. After COVID-19, both regions experience a decrease in average local own-source revenue by 25.40 in tertiary regions and by 25.26 in non-tertiary regions. Applying the DiD method, the average local own-source revenue in both regions before COVID-19 follows the same trend and continues after COVID-19. Thus, the categorization of tertiary and non-tertiary regions does not affect local own-source revenue.

Table 5 presents the average local own-source revenue before and after COVID-19 for each region. After COVID-19, local own-source revenue decreases by -0.11525 in tertiary regions and by -0.1195 in non-tertiary regions. By subtracting the difference before and after COVID-19, the estimated difference in DiD is 0.00425. S

Furthermore, changing the dependent variable to
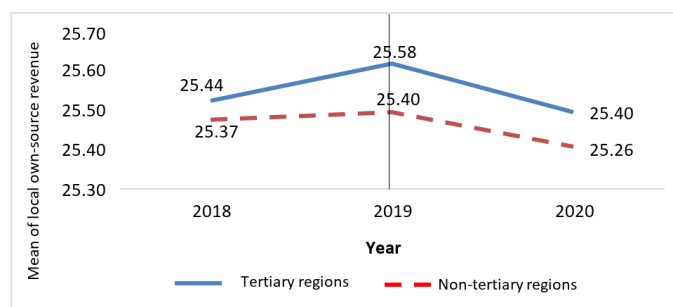
Figure 2. Local Own-Source Revenue

local own-source revenue affects the results as presented in Table 6, indicating that the interaction variable (pandemic-tertiary) has a positive relationship to local own-source revenue and an increase of 4.62% (column 5). The estimation results predicting an increase in the local own-source revenue of tertiary regions during the COVID-19 crisis support the report by World Bank (2020) that economic growth and global trade begin to improve in the third quarter. It is in line with the partial reopening of eco-

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Table 5. The estimation of DiD on Local Own-Source Revenue

	Pre-COVID-19	Post- COVID-19	Difference before/after
Tertiary regions	25.51	25.39	-0.115
Non tertiary regions	25.38	25.26	-0.119
Difference of regions	0.130	0.134	0.004

nomic activities in several countries, demonstrating a remarkable policy support. The local own-source revenue of tertiary regions has a significant role in combatting the pandemic-induced recession.

Several variables with a positive and significant effect at the 1% level include population, foreign investment, domestic investment, social assistance, and goods and services expenditure on. Foreign investment and domestic investment variables also have a positive effect on local own-source revenue. The investment rate during the COVID crisis is presumed to be less affected. It confirms the report compiled by the Investment Coordinating Board [BKPM] (2021) that foreign investment reached IDR111.1 trillion in the fourth quarter of 2020 or equivalent to a 5.36% increase compared to the same period in 2019. Social assistance and goods and services expenditure also have a positive influence on local own-source revenue. The social assistance coefficient of 0.0428 has a positive and significant effect at the 1% level and goods and services expenditure has a positive growth of 85.3%.

However, the pace of recovery has been uneven across the tertiary sectors. The most affected tertiary sectors such as government administration, defense, social security, health services, and social activities affect the local own-source revenue and are significant at the 1% level. Government administration, defense, and compulsory social security contract by 45.4%, health services and social activities by 18.3%, and education services by 3.72%. Meanwhile, economic performance in non-tertiary regions tends to be better. For instance, government administration, defense, and compulsory social security decreases by 31%, education services by 25%, and health services and social activities by 11.1%.

Meanwhile, the provision of accommodation and food and drink, financial and insurance services, and other services have a positive influence on local own-service revenue and are significant at the 1% level, namely 21.8%, 15%, and 17.6%, respectively. On the other hand, the non-tertiary sectors have a positive relationship with local own-source revenue, particularly transportation and warehousing (16.2%), information and communication (22.1%), financial and insurance services (17.9%), as well as others services (14.2%). The four tertiary sectors are statistically significant at the 1% level.

4.3. The Impact of Fiscal Incentives on Local Own-Source Revenue

The implementation of fiscal incentives at the local government level is minimal, namely 70 regions out of 508 districts/cities. At the level of tertiary regions, the application of fiscal incentives is higher than that of non-tertiary regions, consisting of 47 districts/cities.

Employing the cross-sectional method, this study indicates that the specification of the selected model is model 4 because the local own-source revenue variable remains having a positive value after including other control variables. It shows a positive relationship between fiscal incentives and implies that the local own-source revenue is not statistically significant. It is presumably due to the lack of regions implementing fiscal incentive policies to recover the regional economy. Meanwhile, other variables that show a positive and significant influence at the 1% level are tertiary dummy, domestic investment, and goods and services expenditure.

Even though fiscal incentives have no significant effect on local own-source revenue, the recovery of local own-source revenue is due to the potential tax base in regions with dominant tertiary sectors.

Table 6. The Impact of COVID-19 on Local Own-Source Revenue

	Dependent variable: log of local own-source revenue				
	(1)	(2)	(3)	(4)	(5)
Pandemic	-0.0985***	-0.101***	-0.126***	-0.000969	-0.00599
	(0.0214)	(0.0204)	(0.0193)	(0.00878)	(0.0120)
dummy tertiary	0.105***	-0.00297	0.120***	0.109***	0.102***
(1: dominant tertiary region > 40%)	(0.0181)	(0.0137)	(0.0146)	(0.00905)	(0.00995)
pandemic*tertiary	-0.00399	0.0109	0.0144	0.0452***	0.0462***
	(0.0314)	(0.0245)	(0.0249)	(0.0127)	(0.0145)
log of population		0.927***	0.787***	0.434***	0.431***
		(0.00614)	(0.00647)	(0.00684)	(0.00760)
log of foreign investment			0.0284***	0.0132***	0.0138***
			(0.00203)	(0.00154)	(0.00163)
log of domestic investment			0.0406***	0.0223***	0.0214***
			(0.00277)	(0.00223)	(0.00234)
log of social spending				0.0409***	0.0428***
				(0.00278)	(0.00322)
log of goods and services expenditure				0.848***	0.853***
				(0.0121)	(0.0131)
2018.year					.
					.
2019.year					-0.0239**
					(0.00993)
2020.year					.
					.
_cons	25.38***	13.77***	14.88***	-3.724***	-3.858***
	(0.0127)	(0.0790)	(0.0846)	(0.252)	(0.271)
N	1523	1523	1086	957	957
chi2	93.31	22833.4	24865.9	60982.8	58254.8

Notes: Standard errors in parentheses
     * p<0.1, ** p<0.05, *** p<0.01

Table 7. Regions Implementing a Fiscal Policy

	Regions that implement fiscal incentives	Regions that do not implement fiscal incentives
Tertiary regions	47	240
Non tertiary regions	23	198
Total	70	438

The tertiary dummy variable increases local own-source revenue by 37.1%. The estimation results reflect that the ability of regions to finance their expenditure depends on the production of goods and services by the regions. It means that the higher the production of goods and services by the regions, the greater the potential local own-source revenue that can be earned by the local government.

Fiscal incentive policies at the regional level have been previously regulated through Government Regulation Number 45/2008 on the Guidelines for Providing Incentives and Facilitation of Investment in Regions. However, in practice, not many local governments have implemented it. KPPOD (2017) mentions that despite having different fiscal incen-

tive policies, Padang and Pontianak are considered successful in implementing their fiscal incentives.

In this regard, the local government of Padang provides fiscal incentives to reduce all regional taxes and retribution as regulated in Law No. 28/2009 on Regional Taxes and Retribution. Meanwhile, Pontianak emphasizes fiscal incentives in the form of reducing and exempting building construction permit fees for SMEs. The impact of providing fiscal incentives in both regions can be seen in the medium and long terms. The incentives of various deductions for payments in Padang and Pontianak are realized to reduce regional revenue. However, the positive impact of effecting incentives is evident in the increase in local own-source revenue and investment. Provid-

Table 8. The Impact of Fiscal Incentives on Local Own-Source Revenue

	Dependent variable: log of local own-source revenue			
	(1)	(2)	(3)	(4)
incentives	0.840***	0.788***	0.313	0.257
	(0.261)	(0.254)	(0.211)	(0.161)
dummy tertiary	0.0667	0.212*	0.548***	0.371***
	(0.114)	(0.118)	(0.105)	(0.0772)
incentives*tertiary	0.290	0.105	0.110	-0.0879
	(0.322)	(0.317)	(0.261)	(0.195)
log of GDRP per capita		0.0478*	-0.0319	-0.00753
		(0.0282)	(0.0242)	(0.0172)
log of foreign investment			0.0911***	0.0190
			(0.0174)	(0.0131)
log of domestic investment			0.170***	0.0583***
			(0.0239)	(0.0187)
log of social spending				0.0370*
				(0.0209)
log of goods and services expenditure				1.271***
				(0.0723)
_cons	25.16***	25.01***	22.67***	-9.907***
	(0.0842)	(0.125)	(0.281)	-1.757
N	508	428	331	286

Notes: t statistics in parentheses
    * $p<0.1$, ** $p<0.05$, *** $p<0.01$

ing investment incentives is a good and innovative policy. However, innovative approaches need to be well planned to identify and appropriately anticipate the benefits and impacts of allotting incentives to support economic improvement through increased investment inflows.

5. Conclusion

This study applied the difference-in-difference random effect method to address two research questions, namely the evaluation of the impacts of the COVID-19 on total revenue and local own-source revenue and the examination of the fiscal policies in increasing local own-source revenue. The unit of analysis in this study covered 508 districts/cities classified using a 40% threshold for regions with dominant tertiary sectors according to the contribution of the tertiary sectors to the 2019 national GDP.

Districts/cities with dominant tertiary sectors of more than 40% serve as the treatment variable, while the control variable is districts/cities with dominant tertiary sectors of less than 40%. The time variable is before COVID-19 (2018–2019) and af-

ter COVID-19 (2020). The estimation results reveal a decrease in total revenue in tertiary regions by -2.18% and an increase in local own-source revenue by 4.62%. Meanwhile, the fiscal incentive policies positively affect the local own-source revenue by 25.7%, albeit statistically insignificant. It indicates that the role of the tax base in dominant tertiary regions is stronger in shaping the recovery process of the local own-source revenue compared to incentives. It may also be the consequence of insufficient incentives.

The government deems the COVID-19 pandemic as one of the foremost challenges in adjusting their activities and policies. The government should review the effectiveness of the temporary fiscal incentive policies to decide whether tax incentives remain crucial. During the economic recovery, it is mandatory to evaluate declining sectors which can be bolstered by tax revenue to determine appropriate tax policies. Our finding also suggests that fiscal incentives have no positive impacts on increasing local own-source revenue.

Since the COVID-19 pandemic has not yet been over at the time this study was conducted, we provide insights into the impact of COVID-19 on lo-

cal government finances (income and spending) in districts and cities, which are rarely discussed in previous studies, particularly those with dominant tertiary sectors. We encountered several data limitations and anomalies while analyzing the first phase of the pandemic. Therefore, future studies are needed to analyze the impact of the pandemic on local revenue, the impact of a prolonged fiscal stimulus, particularly in 2020–2022, and to draw important lessons from different countries.

However, future studies are needed to provide a more rigorous empirical and technical method. Considering that the fiscal incentive policies have merely been applied since 2020, only several regions implement the policies at the present, rendering the impact of the incentives on the recovery of local economy, including increasing local revenue, remains to be seen further.

Acknowledgement

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