

## The Role of Infrastructure Loan in the Regional Development Bank

(Peranan Pinjaman Infrastruktur di Bank Pembangunan Kawasan)

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### ABSTRACT

*This paper aims to examine the role of infrastructure loan in Indonesian regional development banks. This research further analyze the relationship between types of loan and NPL. The paper employs the approaches of simulation and panel data regression on a sample of 24 Indonesian regional development banks over 2009 to 2016. It examines the financial performance of bank that have not offering infrastructure loan. It further simulates the financial performance of the bank when infrastructure loan is offered, and compares it to the initial financial performance. The results found that the banks perform better when they provide infrastructure loan than without such loan. However, the better performance of the banks in profitability and cost management is a result of the trade-off with lower liquidity. Our finding based on panel data regression indicates that Working Capital Loan and Consumptive Loan are the main contributors to the NPL. However, there is an indication that the increased in long term loan that includes infrastructure loan able to reduce the NPL.*

*Keywords: Regional Development bank; infrastructure loan; financial indicators simulation*

### ABSTRAK

*Kertas ini bertujuan untuk menguji peranan pinjaman infrastruktur di bank-bank pembangunan kawasan Indonesia. Kajian ini selanjutnya menganalisis hubungan di antara jenis pinjaman dan NPL. Kajian ini menggunakan pendekatan regresi data panel dan simulasi ke atas sampel 24 bank pembangunan kawasan Indonesia dari tahun 2009 hingga 2016 dengan meneliti prestasi kewangan bagi bank yang tidak menawarkan pinjaman infrastruktur. Ia selanjutnya mensimulasikan prestasi kewangan bank apabila pinjaman infrastruktur ditawarkan, dan membandingkan dengan prestasi kewangan awal. Keputusan menunjukkan bahawa prestasi bank adalah lebih baik apabila terdapat pinjaman infrastruktur berbanding tanpa pinjaman tersebut. Walau bagaimanapun, prestasi bank yang baik dalam keuntungan dan pengurusan kos adalah hasil dari pertukaran dengan kecairan yang rendah. Penemuan berdasarkan regresi data panel menunjukkan bahawa Pinjaman Modal Pekerjaan dan Pinjaman Konsumtif adalah penyumbang utama kepada NPL. Walau bagaimanapun, terdapat petunjuk bahawa peningkatan pinjaman jangka panjang yang merangkumi pinjaman infrastruktur mampu untuk mengurangkan NPL.*

*Kata kunci: Bank pembangunan daerah; pinjaman infrastuktur; simulasi petunjuk kewangan*

### INTRODUCTION

Infrastructure development has been a focus of the Indonesian government to support the Government's Nine Priority Agendas or Nawacita. The government has the intention to do so as infrastructure development provides much of benefits for the nation. The benefits of infrastructure include its contribution to enhancing economic growth and welfare (Esfahani & Ramírez 2003); increase aggregate productivity (Calderón et al. 2015); reduce poverty (Fan et al. 2005; Gibson & Rozelle 2003); increase employment and hours of work (Dinkelman 2011); and contribute to dramatic reduction of price dispersion, elimination of waste, while also improving both consumer and producer welfare (Jensen

2007). Investment in infrastructure also exhibits a high social return (Canning & Bennathan 2002).

Based on Indonesian National Medium –Term Development Plan (BAPPENAS 2015), from 2015 through 2019, Indonesia will need US\$ 366.7 billion to finance infrastructure needs. The government provides a budget of US\$ 173.1 billion or 47% of the fund required, while Indonesian State-Owned Enterprises offer 20% of the fund. The remaining 30% are expected to come from the private sectors. The types of infrastructure may include electricity, energy, information communication and technology, public transport modes, special economic zones, toll road, water supply, airport, and seaport.

Infrastructure development presented an opportunity for the banking sector. Indonesia Banking

Survey 2017 stated that one of the potentially growing areas in 2017 was infrastructure financing. Additionally, the Indonesian President, Joko Widodo, ordered the Regional Development Banks (BPDs) to establish synergy in enhancing competitiveness in loan distribution. The reason was that BPDs had a role in developing local economies.<sup>1</sup> Infrastructure financing could boost loan growth of BPDs. In 2017 the growth was 9.49% according to the Indonesian Banking Statistic (SPI) December 2017 report. In response to the order of the President, Regional Development Bank Association (Asbanda), sought to increase the size of productive loan up to 60%, while 40% for the consumptive loan.<sup>2</sup>

Asbanda's response was in line with the regulation regarding the bank and its type of loan allocation. Based on the regulation of Financial Service Authority (OJK) No. 6 the year 2016, bank must allocate at least 55%, 60%, 65%, or 70% of its total loan for productive use for banks listed in Commercial Bank Business Activity 1 (BUKU 1), BUKU 2, BUKU 3, and BUKU 4 respectively. Most of the BPDs are listed in BUKU 1 and BUKU 2.

Unfortunately, current loan distribution indicated that BPDs had not complied with the regulation and the mission of Asbanda. At the end of 2017, BPDs only managed to distribute 29.76% of its total loan for productive use. The remaining 70.24% went to consumption purposes. Since 2014, the size of the loan made for productive use had been declining on average. The mean of the size of BPDs loan for productive use from 2012-2017 was 31.01% which was higher than the volume in 2017 and 2016 that accounted for 29.76% and 29.16% respectively.

According to the Indonesian Law No. 13 the year 1962, the purposes of BPD establishment were to accelerate the implementation of equitable development efforts and to mobilize capital and potential resource of the regions together with the private sectors to finance regional projects for the national development. As far, BPDs had played a relatively smaller role compared to other State-Owned Banks such as Bank Mandiri, BNI, and BRI in financing infrastructure. Bank Panin, a private bank, had even significantly contributed to the infrastructure financing which supposed to be a function of BPDs as agents of local development. Out of 26 BPDs in Indonesia, there were 14 BPDs had taken part in infrastructure loan provision either in forms of syndication or non-syndication.

However, banks need to be aware of the attributes of infrastructure loan such as a large amount of fund required; the probability of having undisbursed loan; lower interest rate compared to consumptive loan; and the possibility of having syndicated loan distribution.

Another challenge for the banks is the need to maintain and improve the financial performance after infrastructure loan provision. The Indonesian Law No. 10 the year 1998 asserts that bank must maintain its soundness complying with the requirement of capital adequacy, asset quality, liquidity, profitability, solvability, and other business aspects, and meet the prudential principles. As a derivation of the law, OJK Regulation No. 4 the year 2016 about Assessment of the Soundness of Commercial Banks regulates that banks must maintain Risk Profile, Good Corporate Governance, Earnings and Capital (RGEC). RGEC requires assessment in Non-Performing Loan (NPL), Return on Asset (ROA), Loan to Debt Ratio (LDR), Return on Equity (ROE), Net Interest Margin (NIM), Operating Expense to Operating Income (OEOI), and Capital Adequacy Ratio (CAR).

This study examines the financial performance of the BPDs that have not taken part in infrastructure loan provision. This study also simulates the financial performance of the BPDs when infrastructure loan becomes one of the BPDs' provisions, and compares it to the initial financial performance. This research also tries to explain the relationship between types of loan and NPL. To our knowledge, this is the first study to examine the role of infrastructure loan in Indonesian regional development banks and to present a simulation method in predicting the changes in financial performance.

The organization of the paper is as follows. The next section presents a literature review on infrastructure and the role of development banks. Then, the methodology section portrays the data and methods used in this study, followed by sections of simulation analysis and panel data regression analysis. The following section offers the result and the discussion of the findings. The final section concludes.

## LITERATURE REVIEW

Infrastructure has a substantial influence on the economy of a country in several ways. Esfahani and Ramírez

TABLE 1. BPD loan based on type of use

Type of Use	2012	2013	2014	2015	2016	2017	Mean
Productive*	32.32	32.93	31.74	30.12	29.16	29.76	31.01
Consumptive	67.68	67.07	68.26	69.88	70.84	70.24	68.99

\*Productive use includes working capital and investment loan

Source: Bank Indonesia, Indonesia Banking Statistic report, December 2017

(2003), investigates infrastructure contribution to economic growth and welfare. According to them, 'the contribution of infrastructure to GDP is substantial and, in general, exceeds the cost of provision of those services.' Infrastructure also contributes to multifactor productivity, capital deepening (Pereira & Andraz 2010) and increases aggregate productivity (Calderón et al. 2015). Additionally, infrastructure reduces poverty (Fan et al. 2005; Gibson & Rozelle 2003) increases employment and the hours of work (Dinkelman 2011), while also dramatically contributes to the reduction of price dispersion across regions, eliminates waste, and increases producer and consumer welfare (Jensen 2007).

Investment in infrastructure exhibits high social return (Canning & Bennathan 2002), especially for low and middle-income country; the return for infrastructure investment is excessively large. Investment in infrastructure also shows to have a lower systematic risk than comparable equities as investigated by Rothballer (2012).

Government has provided around 70 percent of the infrastructure needs in the developing and transition economies (Gaspar et al. 2015). There are seven options available to finance infrastructure. The options are budget reallocation from the government, privatization, raising taxes, public debt, tax-exempt bonds, revenue bonds, and private financing (Regan 2017). In private financing, the government may depend on the role of development banks as an agent of development in providing the necessary funds.

De Aghion (1999: 83), defines development banks as "government-sponsored financial institutions concerned primarily with the provision of long-term capital to the industry." Lazzarini et al. (2011) highlight two critical aspects of development banks, their status as state-owned banks, and their role in solving credit markets failure, especially for the case of long term projects. A study by Levy-Yeyati et al. (2004) shows that state-owned banks play a useful smoothing role as the banks' lending are much less responsive to microeconomics shocks than the lending of private banks. Dinç (2005) observes that government-owned banks are bound to political influences. The decisions of these banks are affected by the external parties of the banks, especially the government. Government owned-banks facilitate the financing of projects when privates are unable or unwilling to take, particularly project that can promote economic development.

However, infrastructure project financing creates a challenge for the banks as the financing may take a long time to reach maturity and have a lower interest rate. On the other hand, banks need to maintain their financial performance. In Indonesia, the Financial Service Authority regulates the measurement of bank financial soundness in regulation no. 1, the year 2016

about Measurement of Commercial Banks Soundness. The regulation employs RGEC method in determining the banks' performance.

Ponto and Tasik (2017), through simulation analysis, specifically investigate PT Bank SulutGo performance before and after simulation loan included as one of the bank's loan. They find that after distributing infrastructure loan Bank, SulutGo has an improvement in its ROA, LDR, and OEOI in capital taking scenario. Meanwhile, in credit switching scenario, the bank also has an improvement in ROA, NPL Net, NIM, and OEOI. However, the study only focuses on one particular regional development bank (i.e., PT Bank SulutGo). On the contrary, this study covers 24 of 26 regional development banks.

## METHODOLOGY

This study examines the financial statements covering 24 of 26 Indonesian regional development banks where the remaining two banks are not included due to data issue. We acquire this data from the banks' annual report published on their official website as well as bank financial statement released by OJK. This study focuses on the annual reports of the banks from 2009 to 2016 because most of the banks' reports of the years before 2009 are no longer available. The study relies on two approaches of analysis, simulation, and panel data regression. While panel data regression focuses on 24 of 26 Indonesian regional banks, the simulation analysis only covers 12 banks in the analysis as these banks are the only regional development banks that have not distributed infrastructure loan.

## SIMULATION ANALYSIS

The simulation analysis focuses on Bank Bengkulu, Bank Kalbar, Bank Kalsel, Bank Lampung, Bank NTB, Bank Papua, Bank Riau Kepri, Bank Sultra, Bank Sulteng, Bank SulutGo, Bank Sumatera Barat, and Bank Sumsel Babel. This study simulates the performance of the banks as the banks provide infrastructure loan. The banks included are those that have not distributed the loan yet. This study then compares the banks' performance before and after the presence of the loan.

The simulation includes two scenarios which are Cash-Loan Reallocation and Loan Switching. This simulation uses data from the year of 2016 that aims to observe how the performance of the BPDs in 2016 if the banks were providing infrastructure loan. The year 2016 is chosen as it is the latest year with available data. Then we use t-statistics to compare the bank performance before and after the presence of infrastructure loan. We observe the change that occurs, which mostly on profitability indicators.

Both scenarios of simulation require banks' balance sheets and income statements. The Cash-Loan Reallocation simulation takes the steps as follows:

1. We modify the balance sheets by taking Rp. 100 billion from Cash account and allocating it to Loan account as infrastructure loan.
2. The Loan account increases by Rp. 100 billion.
3. In the income statement, we calculate the new revenue after the infrastructure loan allocation. We assume that the loan allocation takes place at the beginning of the year and yields interest income for the year and that the infrastructure loan has the same interest rate as the corporate loan. The revenue resulting from the infrastructure loan is added up to the Interest Income account.
4. In this step, we use the cost per interest income before the presence of infrastructure loan as the benchmark to compare the old (before the presence of infrastructure loan) cost of loan provided to the new one (after the presence of it). The cost of loan provision is calculated as follows:

$$\text{new interest income} \times \frac{\text{operational cost}}{\text{old interest income}} \quad (1)$$

5. We calculate infrastructure loan net profit by subtracting the cost of loan provision from the interest income. We then add the profit calculated to the existing Net Profit(Loss) account in the income statement.
6. We calculate the income tax from the infrastructure loan net profit as follows:

$$\text{infrastructure loan net profit} \times \frac{\text{estimated current year tax}}{\text{existing net profit}} \quad (2)$$

We use the ratio in the second term of equation (2) to proxy the tax rate for infrastructure loan net profit that is not explicitly available. The ratio accounts for the estimated current-year tax as it is the tax estimated by the banks.

7. We calculate the after-tax net profit of the infrastructure loan by subtracting income tax in equation (2) from the infrastructure loan net profit. We then add the after-tax net profit of the infrastructure loan to Comprehensive Total Profit(Loss) account of the current year.
8. We add the after-tax net profit from step 7 to the asset side of balance sheets. We assume the interest is paid in cash, so we add it to Cash account.
9. On the liability and equity side of the balance sheets, we add the infrastructure loan net profit to the Profit/Loss and Total Equity account.

In the second scenario, which is Loan Switching, we consider the regulation of minimum 55% for the bank in BUKU 1 and 60% for the bank in BUKU 2 of the total

loan for productive use. Productive loan includes short term loan and long-term loan. The short-term loan has maturity no longer than 12 months such as working capital loan, while the long-term loan has maturity more than 12 months which includes investment loan and syndication loan. Infrastructure loan is a long-term loan. For the banks that have distributed infrastructure loan, it is commonly recorded in investment and syndication loan account. In this scenario, we allocate 10% of the productive loan for infrastructure loan. Therefore, infrastructure loan accounts 5.5% or 6% of the total loan. The rate depends on the BUKU of BPDs. For example, the rate of 5.5% comes from 10% of 55% as regulated in BUKU 1. That said, the procedure for Loan Switching scenario is as follows:

1. In balance sheets, we take 5.5% or 6% of Total Loan for infrastructure.
2. In the income statement, we calculate the change in interest income resulting from loan switching, that is,

$$(100\% - 5.5\% \text{ or } 6\%) \times \text{interest income} \quad (3)$$

3. We then calculate the interest income from infrastructure loan as follows:

$$5.5\% \text{ or } 6\% \text{ of total loan} \times \text{interest rate} \quad (4)$$

4. The rate used is the corporate interest rate.
5. We add the interest income from equation (4) to interest income from equation (3) to get the new interest income after infrastructure loan is present.
6. We subtract the old interest income from the new interest income to get the change in income. The old interest income is the interest income before the presence of infrastructure loan.
7. We add the change in income to calculate the Net Profit account.
8. We calculate the tax income of the current year as follows:

$$\text{net profit} \times \frac{\text{estimated current year tax}}{\text{existing net profit}} \quad (5)$$

9. We calculate the after-tax Net Profit and Comprehensive Total Profit of the current year.
10. We calculate the change in Comprehensive Total Profit before and after the presence of infrastructure loan.
11. On the equity side, we add the result from step 9 to Profit/Loss account.
12. We add the result of step 9 to Cash account in the balance sheets.
13. We assess the bank performance indicators using ratios such as ROA, Current Ratio, and OEOI.

For both scenarios, we use paired t-test to examine the difference before and after the presence of infrastructure loan, that is, whether the mean of



indicators before simulation equals to, is larger or is smaller than the mean after simulation. The equation of paired t-test (Lind et al. 2012: 392) is as follows:

$$t = \frac{\bar{d}}{s_d / \sqrt{n}} \tag{6}$$

where  $\bar{d}$  = mean of the difference between paired or related observations,  $s_d$  = standard deviation,  $n$  = number of paired observations, and degree of freedom =  $n - 1$ .

PANEL DATA REGRESSION ANALYSIS

Existing literature have suggested that macroeconomic factors such as economic growth, unemployment level and inflation (Mazreku et al. 2018; Messai & Jouini 2013) as well as bank specific variables (Louzis et al. 2011; Zouari-ghorbel 2014) have effects on NPL. Different types of loan can result in diverge level of NPL as each loan has its own characteristic and may have more inherent risk due to the influence of macroeconomic variables (Louzis et al. 2011). Nevertheless, to our knowledge there has not been any literature that investigate the impact of type of loan on NPL.

Analyses made in the simulation aim to show the change in financial indicators as the BPDs accounted for infrastructure loan. However, the simulation does not predict the contribution of loan to NPL. This prediction is important when banks intend to change the loan composition. Particularly, how reducing the consumptive loan to increase the productive loan can affect the NPL. For this reason, this study investigates the roles of Working Capital Loan (WCL), Investment and Syndication (IS) Loan, and Consumptive Loan

using Panel Data Regression. WCL and IS Loan are two kinds of productive loans.

Using panel data, let the following equation be the model predicting Non – Performing Loan (NPL) for bank  $i = 1, \dots, N$  which is observed at several years  $t = 1, \dots, T$ .

$$NPL_{it} = \beta_1 X_{1it} + \beta_2 X_{2it} + \dots + \beta_n X_{nit} + \alpha_i + \varepsilon_{it} \tag{7}$$

where  $NPL_{it}$  is the dependent variable,  $X_{nit}$  accounts the loan variables (i.e. WCL, IS and Consumptive Loan),  $\alpha_i$  is the intercept,  $\beta_n$  accounts the parameters, and  $\varepsilon_{it}$  is an idiosyncratic error term.

RESULTS AND DISCUSSION

Table 2 shows that the 12 BPDs included in the sample in average provide 19.77% of the total loan for productive purposes compared to 80.24% distributed for the consumptive loan.

Although OJK regulation has stated that banks in BUKU 1 must provide 55% and BUKU 2 60% of total the total credit for the productive type of loan, the current loan distributed to these 12 BPDs is still far from the requirement. Bank Papua provides 57%, the highest percentage of total loan for the productive purpose among others, although it is still 3% short of the requirement in BUKU 2.

After we make the simulation, it turns out that BPDs' ROA in scenario 1 is higher than that before the simulation, as shown in table 3. In average, there is 2.69% growth in ROA for the 12 banks after the simulation. It is interesting to observe that Bank Papua that has the highest corporate loan interest rate only grows at 2.98%. The reasons behind this low growth in

TABLE 2. Loan, interest and tax indicators, 2016

No	Bank	Productive Loan	Consumptive Loan	Operational Cost to Interest Income	Tax Ratio	Interest Revenue to Total Loan
1	Bank Bengkulu	5.46	94.54	27.51	20.88	25.59
2	Bank Kalbar	27.37	72.63	38.40	25.54	18.15
3	Bank Kalsel	37.08	62.92	28.55	25.00	22.31
4	Bank Lampung	2.26	97.74	34.66	25.00	19.07
5	Bank NTB	14.94	85.06	39.43	23.01	19.59
6	Bank Papua	57.00	43.00	51.09	40.94	14.70
7	Bank Riau Kepri	17.32	82.68	33.01	27.15	17.11
8	Bank Sultra	5.68	94.32	21.50	30.07	23.16
9	Bank Sulteng	4.16	95.84	39.74	25.00	18.80
10	Bank SulutGo	N.A.	N.A.	45.08	25.00	19.95
11	Bank Sumbar	N.A.	N.A.	37.59	25.00	16.30
12	Bank Sumsel Babel	26.37	73.63	51.50	25.00	15.27
	Average	19.77	80.23	37.34	26.47	19.17

Source: Authors' Calculation

ROA are the inefficiency in operational cost and high tax ratio. As seen from table 2, Bank Papua records 51.09% of Operational Cost to Interest Income ratio. For every rupiah of interest income earned, Bank Papua operational cost is 51 cents which are more than half of the revenue goes to the cost. The condition gets worse when Tax Ratio reaches 40.94%, the highest among other banks. Bank Bengkulu, on the other hand, has the highest growth in ROA at 4.9%, as shown in table 3. This high growth is due to the facts that the bank operates better than the other banks. The bank's Operational Cost to Interest Income ratio is only 27.51%, and the tax ratio is at the lowest rate, which is 20.88%. Bank Sumbar experiences the lowest growth of 1.36%.

In the first scenario, we consider three important variables in determining banks financial performance, namely, infrastructure loan interest rate, bank operational cost to interest income ratio, and tax ratio. Raising the interest rate of BPDs is difficult to take because BPDs need to compete with other banks in loan provision.

Additionally, the role of BPDs to become an agent of local development encourages them to provide infrastructure loan at the appropriate interest rate as an incentive to boost regional development. This condition leaves BPDs with only two choices, either operating more efficiently by reducing the cost or lowering the tax ratio.

The average ratio of Operational Cost to Interest Income of the BPDs included in the sample is 37.34%,

TABLE 3. Returns on assets under two scenarios

No	Bank	2016	Mean 2009-2016	Scenario I	Scenario II	Growth I	Growth II
1	Bank Bengkulu	2.78	3.51	2.92	2.28	4.90	-18.09
2	Bank Kalbar	2.88	3.39	2.92	2.57	1.41	-10.86
3	Bank Kalsel	2.60	2.63	2.68	2.26	3.16	-13.25
4	Bank Lampung	2.85	3.25	2.96	2.67	3.95	-6.42
5	Bank NTB	3.95	5.00	4.02	3.53	1.89	-10.70
6	Bank Papua	1.28	2.44	1.32	1.44	2.98	12.32
7	Bank Riau Kepri	2.74	2.86	2.78	2.57	1.42	-6.28
8	Bank Sultra	3.87	5.04	4.03	3.48	4.15	-10.02
9	Bank Sulteng	2.91	3.47	3.02	2.63	3.64	-9.55
10	Bank SulutGo	2.00	2.39	2.04	1.60	2.06	-19.88
11	Bank Sumbar	2.19	2.57	2.22	1.95	1.36	-10.83
12	Bank Sumsel Babel	2.23	2.06	2.26	2.10	1.40	-5.89
	Average	2.69	3.22	2.76	2.42	2.69	-9.12

Source: Authors' Calculation

TABLE 4. Operating expenses to operating income

No	Bank	2016	Mean 2009-2016	Scenario I	Scenario II	Growth I	Growth II
1	Bank Bengkulu	83.63	78.00	83.01	86.23	-0.75	3.10
2	Bank Kalbar	75.05	74.06	74.85	77.12	-0.27	2.75
3	Bank Kalsel	84.44	78.19	84.16	86.37	-0.34	2.28
4	Bank Lampung	73.78	77.18	73.17	75.02	-0.82	1.69
5	Bank NTB	70.20	66.33	69.89	72.57	-0.45	3.38
6	Bank Papua	85.90	74.34	85.61	84.46	-0.34	-1.68
7	Bank Riau Kepri	75.53	74.88	75.32	76.67	-0.28	1.51
8	Bank Sultra	79.48	68.64	78.81	81.37	-0.83	2.38
9	Bank Sulteng	71.83	67.61	71.30	73.81	-0.75	2.76
10	Bank SulutGo	85.88	83.08	85.69	88.14	-0.23	2.62
11	Bank Sumbar	81.17	79.26	80.98	82.94	-0.23	2.19
12	Bank Sumsel Babel	80.97	80.88	80.80	81.95	-0.21	1.20
	Average	78.99	75.21	78.67	80.55	-0.46	2.01

Source: Authors' Calculation

as seen in table 2. This ratio does not account for the interest cost for deposits and the loan loss cost. The Operating Expense to Operating Income ratio covers all revenue and expenses made by the banks. As shown in table 4, the average OEOI of the 12 BPDs in 2016 is 78.99%. In the first scenario, the OEOI ratio has a negative growth of -0.41% on average. Although the cost is higher in this scenario, the increase in profit offsets the increase in operational cost. Improvement in profit is the reason for the negative growth of OEOI.

The improvement in profit accounted in ROA and reduction in OEOI ratio in scenario 1 are trade-offs of worsening in bank financial performance as seen in liquidity ratio. Current Ratio of all BPDs has negative growth of -4.38% on average. The highest growth in ROA of Bank Bengkulu is a result of having high negative growth in the current ratio of -8.71%. The growth of Bank Bengkulu is still below that of Bank NTB of -9.19%. In average, BPDs current ratio grows at -4.38%. The growth of this current ratio is greater in absolute value compared to the average growth in ROA of 2.69%. The banks must pay attention when lower liquidity disrupts the banks' performance and reduces its ability to handle business risks and uncertainties.

In the Credit Switching scenario, infrastructure loan takes 5.5% or 6% of the total loan. The average interest income to total loan ratio of the BPDs before infrastructure loan is 19.17%, where the highest goes to Bank Bengkulu of 25.59%. The highest BPDs' loan interest rate is for a non-housing consumptive loan at 12.95% in average, then followed by microloan at 12.84, corporate loan at 11.89%, housing loan at 11.69%, and retail credit at 11.52%. Bank Bengkulu and Bank Papua are the only BPDs with corporate loan interest rate higher than non-housing consumptive loan interest rate.

In this scenario, BPDs' ROA is lower than that before the simulation. In average, ROA has negative growth of -9.12%. The three banks with the highest negative growth are Bank SulutGo at -19.88%, Bank Bengkulu, 18.09% and Bank Kalsel, -13.25%. There are three determinants of the high negative growth in ROA for these BPDs. They are high-interest income to total loan ratio, low corporate loan interest rate, and the amount of total loan. For Bank Bengkulu, high-interest income to total loan ratio is the most significant determinant. In 2016, Bank Bengkulu had the highest interest income to total loan ratio among BPDs. To give infrastructure loan, Bank Bengkulu has to switch from 25.59% of interest income to 11.14% of infrastructure loan interest rate. The switching causes Bank Bengkulu's net profit to drop, which results in lowering the ROA. Bank Kalsel's case is similar to that of Bank Bengkulu. Bank Kalsel has interest income to total loan ratio of 22.31%, but the corporate loan interest rate is high, which is 13.5%. The high corporate loan interest rate can compensate for the BPDs' profit loss resulting from including the infrastructure loan. On the other hand, the three determinants show significant influence on the performance of Bank SulutGo. Bank SulutGo has the lowest corporate loan interest rate and interest income to total loan ratio of 19.95%. Bank SulutGo also distributes a large amount of credit in 2016 at Rp. 8.88 trillion. Taking 6% of its total credit and allocating it to infrastructure loan at the low-interest rate is costly for Bank SulutGo. The only BPD that shows improvement in profit is Bank Papua. Bank Papua has the highest corporate loan interest rate among others which is 19.26%, while its interest income to total loan ratio is 14.7%. Switching to infrastructure loan with high-interest rate results in high profit. However, a question worth discussing whether the parties who

TABLE 5. Current ratio

No	Bank	2016	Mean 2009-2016	Scenario I	Scenario II	Growth I	Growth II
1	Bank Bengkulu	26.80	34.7	24.47	26.23	-8.71	-2.15
2	Bank Kalbar	32.68	34.8	31.83	32.37	-2.60	-0.97
3	Bank Kalsel	49.98	48.1	48.69	49.64	-2.57	-0.68
4	Bank Lampung	44.87	69.9	42.12	44.55	-6.13	-0.70
5	Bank NTB	50.47	37.3	45.83	47.35	-9.19	-6.18
6	Bank Papua	40.71	56.8	40.14	40.83	-1.41	0.31
7	Bank Riau Kepri	55.04	55.4	54.19	54.74	-1.54	-0.54
8	Bank Sultra	47.61	59.6	45.15	47.18	-5.17	-0.91
9	Bank Sulteng	49.99	68.9	46.68	49.62	-6.63	-0.74
10	Bank SulutGo	26.23	37.4	25.02	25.64	-4.60	-2.22
11	Bank Sumbar	33.01	32.1	32.36	32.78	-1.96	-0.67
12	Bank Sumsel Babel	34.86	39.1	34.13	34.76	-2.10	-0.28
	Average	41.02	47.85	39.22	40.47	-4.38	-1.31

Source: Authors' Calculation

are constructing the infrastructure may accept the high-interest rate loan provided by Bank Papua.

Lower ROA in scenario two is in accordance with higher OEOI ratio. In average, this ratio grows by 2.01% with the highest goes to Bank NTB and Bank Bengkulu of 3.38% and 3.1% respectively. Loss in net profit or reduction in interest income are the causes of the increase in OEOI ratio.

The negative growth of the current ratio is lower in scenario two, as compared to scenario one. In average, the growth in scenario two is -1.31% lower in absolute value than -4.38% in scenario one. Profit loss from switching to infrastructure loan is the reason for the reduction in the current ratio in scenario two. In this scenario, the cash account is lower, resulting from the loss occurred. The cash account is one of the components for the current asset. That said, change in cash account results in a change in the current ratio.

BPDs' average ROA in the year of 2016 is 2.69%, while BPDs' average ROA after scenario one is 2.76%. There is 0.07 percentage point increase in average ROA after scenario one. In scenario two, ROA decreases by 0.27 percentage points to 2.42%. Paired t-test analysis shows that the t-value for the difference before and after scenarios one and two are -5.7 and 5.31, respectively. The p-values for scenario one and two are 0.0001 and 0.0002, respectively. We reject the hypothesis that there is no significant difference in mean before and after simulation for both scenarios. The result from a one-tailed test suggests that BPDs' ROA after scenario one is better than the initial ROA, while there is a reduction in ROA after scenario two.

Before the simulations, BPDs' OEOI ratio is 78.99% at the mean. In average, OEOI ratio decreases by 0.32 percentage points to 78.67% in scenario one and increases by 1.56 percentage points to 80.55% in scenario two. The t-values for scenarios one and two are 4.33 and -5.07, respectively. In scenario one, the p-value

for the one-tailed test is 0.0006, which suggests that OEOI in scenario one is lower than the initial OEOI. In scenario 2, however, OEOI is getting higher after the simulation at p-value equals to 0.0002.

Current Ratio of BPDs in 2016 is 41.02% at the mean. After the simulations, Current Ratio decreases to 39.22% in scenario one and 40.47% in scenario 2. The t-values are 4.83 in scenario 1 and 2.27 in scenario two, while the p-values are 0.0003 and 0.0223, respectively. The result suggests that BPDs' Current Ratio is significantly lower in both scenarios compared to the initial one.

Analyses made in both scenarios of simulation do not capture the contribution of loan to NPL. The analyses, however, aim to show the change in financial indicators as the BPDs accounted for infrastructure loan. To capture the contribution of loan types, this study investigates the roles of Working Capital Loan (WCL) and Investment and Syndication (IS) Loan as productive loan as well as consumptive loan.

Table 6 presents the descriptive statistics. WCL is a short – term loan usually for a year, while Investment and Syndication loan is a long – term loan. Infrastructure loan is included in the long – term loan. The mean of NPL is Rp. 271 billion with a standard deviation of Rp. 394 billion. If measured by its ratio to total loan, NPL ratio is 2.30% at the mean. In average, the BPDs in the sample for all the year included, allocate only 14.94% of its total loan for WCL and 11.43% for Investment and Syndication loans. In nominal rupiah, BPDs in average allocate Rp. 1.93 trillion for WCL, Rp. 1.23 trillion for Investment and Saving Loan, and Rp. 6.97 trillion for Consumptive Loan.

Table 7 shows the panel data regression model of NPL. The objective of this analysis is to investigate the impact of each type of loan on a non-performing loan. Shortly speaking, this analysis aims to convince the benefit of having investment and indication loan. This

TABLE 6. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
NPL_billion	156	271.08	394.76	2.75	2135.33
NPL_ratio	156	2.30	2.28	0.09	15.03
lnNPL	156	11.57	1.46	7.92	14.57
WCL_billion	151	1926.92	2357.72	12.26	10991.72
IS_Loan_billion	151	1230.78	1367.37	3.36	7534.05
Consumptive Loan_billion	151	6975.48	7355.86	461.14	48329.50
lnWCL	151	13.56	1.57	9.41	16.21
lnIS_Loan	151	13.10	1.74	8.12	15.83
lnConsumptive_Loan	151	15.39	0.84	13.04	17.69
WCL_ratio	151	14.94	9.89	0.93	52.20
IS_Loan_ratio	151	11.43	10.06	0.45	48.34

Source: Authors' Calculation



type of loan is the domain of the infrastructure loan. In the specification (1) of table 7, we use the value of NPL in billion rupiahs as the regressand, while WCL, IS loan and Consumptive Loan are the regressors. We find that Consumptive Loan as the only variable that has a significant impact on NPL. The coefficient of this variable is 0.0229 at 1% significant level. This model predicts that increasing Rp. 1 billion in Consumptive Loan will increase the BPDs' NPL by Rp. 22.9 million, assuming others remain constant. In other words, if BPDs increase their consumptive loan, 2.29% of the loan will become NPL. IS Loan and WCL have no significant influence on NPL. The r-squared coefficient of this model is 0.445, which means the regressors can explain 44.5% of the variation occurred in the regressand.

In the specification (2), we use a ratio of NPL to total loan as the regressand. WCL in billion rupiahs is the only significant variable in this specification. The coefficient of WCL billion is 0.0005 at 10% significant level, which means that the increasing of Rp. 1 trillion in WCL will increase BPDs' NPL ratio by 0.5%, *ceteris paribus*. The r-squared for this model is 11.9%.

In the specification (3), we take the natural logarithm function for NPL and the regressors. The result confirms the significant influence of the WCL and Consumptive Loan on NPL. Both  $\ln$ WCL and  $\ln$ Consumptive Loan are significant at 1%. From the model, we estimate

that an increase by 1% in WCL will increase the BPDs NPL by 0.53%, while an increase in Consumptive Loan by 1% will increase NPL by 0.57%, *ceteris paribus*. Investment and Syndication Loan is not significant. The r-squared coefficient for this model is 67.4%.

In the specification (4), we use the NPL ratio as the regressand. The result suggests that only consumptive loan does not significantly affect the NPL ratio. WCL has a positive correlation to NPL ratio, while Investment and Syndication Loan displace negative effect. The result also suggests that a 1% increase in WCL will increase the NPL ratio by 0.0127%, assuming others remain constant. In average, BPDs provide Rp. 1.93 trillion of WCL, if this value increases by 100%, the NPL ratio will increase by 1.27%, *ceteris paribus*. The marginal effect of Investment and Syndication Loan is -0.72 and significant at 1%. Investment and Syndication Loan is a more secure type of loan than a short-term loan. Furthermore, governments help secures the provision of syndication loan for infrastructure project because it has a low probability of increasing NPL.

The result suggests that investment and indication loan is not contributing to the expansion of NPL. In contrast, if any effect, the loan is negatively affecting the growth of NPL. That said, the importance of this study is limited to showing whether or not the investment and indication loan is potentially creating NPL, which, in

TABLE 7. Panel data regression model of NPL

VARIABLES	NPL (billion) (1)	NPL (ratio) (2)	Ln NPL (3)	NPL (ratio) (4)
WCL_billion	0.0559 (0.0391)	0.0005* (0.0003)		
IS_Loan_billion	0.0473 (0.043)	-0.00002 (0.0003)		
Consumptive Loan_billion	0.0229*** (0.008)	-0.00002 (0.00006)		
$\ln$ WCL			0.528*** (0.144)	1.268*** (0.433)
$\ln$ IS_Loan			0.0414 (0.101)	-0.722** (0.304)
$\ln$ ConsumptiveLoan			0.569*** (0.135)	0.139 (0.406)
Constant	-49.54 (48.83)	1.544*** (0.351)	-4.883*** (1.844)	-7.559 (5.554)
Observations	148	148	148	148
R2 within	0.324	0.068	0.42	0.077
R2 between	0.521	0.198	0.705	0.147
R2 overall	0.445	0.119	0.674	0.101
Number of id	24	24	24	24

Standard errors in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1  
 Source: Authors' Calculation

this case, is not. Therefore, the analysis on the efficiency of the errors of the magnitude of each loan type of is not the focus of this study. Further research is necessary to explore the standard errors of the regressors in the model when the efficiency of errors is important.

The findings in this study provide the first insight on infrastructure loan provision by the BPDs. Therefore, this study becomes the first guide to the BPDs which have not involved in the loan provision, particularly in managing the financial indicators and what to expect after the loan provision. As far as profitability is concerned, infrastructure loan provision is an excellent instrument to improve the banks' financial performance. In the first scenario proposed, i.e., cash-loan reallocation, BPDs are better-off as compared to the second scenario because profitability improves. The scenario suggests that it is better if the banks reallocate Rp. 100 billion from Cash account to Loan account as infrastructure loan.

### CONCLUSION

This study suggests that BPDs have better performance as measured by ROA and OEOI as they provide infrastructure loan through Cash-Loan Reallocation scenario than without infrastructure loan provision. However, the better performance of BPDs in profitability and cost management is a result of the trade-off with lower liquidity as seen through current ratio. In Loan Switching scenario, BPDs' OEOI ratio rises while ROA lowers, which results in low-interest revenue from infrastructure loan.

We find significant differences in bank performance before and after simulation scenarios one and two. In scenario one, BPDs have higher ROA, lower OEOI ratio, and lower current ratio than that before the simulation. In scenario two, BPDs have lower ROA and higher OEOI ratio than that before the simulation, except for Bank Papua.

Our finding based on panel data regression indicates that WCL and Consumptive Loan are the main contributors to BPDs' NPL. On the other hand, there is an indication that increasing the portion of long term loan (infrastructure loan included) can reduce BPDs' NPL. This study provides the first evidence in the literature to examine the role of infrastructure loan in Indonesian regional development banks as well as to present a simulation method in predicting the changes in financial performance. The findings suggest that BPDs need to improve their performance, especially in term of cost management. Some of the BPDs operate inefficiently and therefore make it difficult for the BPDs to switch their loan allocation to infrastructure loan with efficient interest rate. We recommend that the government gives incentives to banks to provide more infrastructure loan. This incentive can take in forms of lower income tax for infrastructure loan. With low-interest rate and income

tax rate, infrastructure loan can be a good option for expanding the productive loan.

### NOTES

- 1 This information is taken from Tempo media. <https://bisnis.tempo.co/read/news/2015/05/26/092669686/bank-pembangunan-daerah-harustangkap-peluang-infrastruktur>
- 2 This information is taken from site <http://infobanknews.com/dorong-infrastruktur-bpd-perbesar-porsi-kredit-produktif/>

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### REFERENCES

- Bappenas. 2015. Infrastructure Financing in Indonesia: Government Policy and The Opportunity. Jakarta. <https://doi.org/10.1017/CBO9781107415324.004>
- Calderón, C., Moral-Benito, E. & Servén, L. 2015. Is infrastructure capital productive? A dynamic heterogeneous approach. *Journal of Applied Econometrics* 30(2): 177–198.
- Canning, D. & Bennathan, E. 2002. The Social Rate of Return on Infrastructure Investments. *Policy Research Working Paper Series 2390*. Washington D. C.
- De Aghion, B.A. 1999. Development banking. *Journal of Development Economics* 58(1): 83–100.
- Diñç, I.S. 2005. Politicians and Banks: Political Influences On Government-Owned Banks In Emerging Markets. *Journal of Financial Economics*, 77(2), 453–479.
- Dinkelmann, T. 2011. The effects of rural electrification on employment: New evidence from South Africa. *American Economic Review* 101(December): 3078–3108.
- Esfahani, H.S. & Ramírez, M.T. 2003. Institutions, Infrastructure, and Economic Growth. *Journal of Development Economics* 70(2): 443–477.
- Fan, S., Nyange, D. & Rao, N. 2005. Public Investment and Poverty Reduction in Tanzania: Evidence from Household Survey Data. *DSGD Discussion Paper No. 18 of International Food Policy Research Institute*. Retrieved from <https://ageconsearch.umn.edu/record/58373/files/dsgdp18.pdf>
- Gaspar, V., Schwartz, G., Cangiano, M., Clements, B., Hughes, R., van Eden, H., ... Vu, H. 2015. Making Public Investment More Efficient. *International Monetary Fund Staff Report*. Retrieved from <http://www.imf.org/external/np/pp/eng/2015/061115.pdf>
- Gibson, J. & Rozelle, S. 2003. Poverty and access to roads in Papua New Guinea. *Economic Development and Cultural Change* 52(1): 159–185.
- Jensen, R. 2007. The digital provide: Information (Technology) market performance, and welfare in the South Indian

- fisheries sector. *Quarterly Journal of Economics*, CXXII(3): 879–924.
- Lazzarini, S.G., Musacchio, A., Bandeira-de-mello, R. & Marcon, R. 2011. What Do Development Banks Do? Evidence from Brazil. *Harvard Business School Working Paper No. 12-047*. Retrieved from [http://www.hbs.edu/faculty/Publication Files/12-047.pdf](http://www.hbs.edu/faculty/Publication%20Files/12-047.pdf)
- Levy-Yeyati, E., Micco, A. & Panizza, U. 2004. Should the Government be in the Banking Business? The Role of State-Owned and Development Banks. *Inter-American Development Bank* (November): 1–43. Retrieved from [https://www.econstor.eu/bitstream/10419/88042/1/idb-wp\\_517.pdf](https://www.econstor.eu/bitstream/10419/88042/1/idb-wp_517.pdf)
- Lind, D.A., Marchal, W.G. & Wathen, S.A. 2012. *Business & Economics*. 15th ed. New York: McGraw-Hill Irwin.
- Louzis, D.P., Vouldis, A.T. & Metaxas, V.L. 2011. Macroeconomic and bank-specific determinants of non-performing loans in Greece: A comparative study of mortgage, business and consumer loan portfolios. *Journal of Banking and Finance* 36(4): 1012–1027.
- Mazreku, I., Morina, F., Misiri, V. & Spiteri, J.V. 2018. Determinants of the Level of Non-Performing Loans in Commercial Banks of Transition Countries. *European Research Studies Journal* XXI(3): 3–13.
- Messai, A.S. & Jouini, F. 2013. Micro and Macro Determinants of Non-performing Loans. *International Journal of Economics and Financial Issues* 3(4): 852–860.
- Pereira, A.M. & Andraz, J.M. 2010. On the Economic Effects of Public Infrastructure Investment: A Survey of the International Evidence. *Journal of Economic Development* 38(108): 1–37.
- Ponto, E. & Tasik, H.H.D. 2017. PT. Bank SULUTGO as a regional development bank and the infrastructure loan: a Simulation analysis. *Jurnal EMBA* 5(2): 2927–2937.
- Regan, M. 2017. Capital Markets, Infrastructure Investment and Growth in the Asia Pacific Region. *International Journal of Financial Studies* 5(1): 5.
- Rothballer, C. 2012. Infrastructure investment characteristics: Risk, Regulation, and inflation hedging an empirical analysis of listed infrastructure firms. *Technische Universität München*. Retrieved from <https://mediatum.ub.tum.de/doc/1106559/1106559.pdf>
- Zouari-ghorbel, S. 2014. Macroeconomic and bank-specific determinants of household's non-performing loans in Tunisia: A dynamic panel data. *Procedia Economics and Finance* 13: 58–68.

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